

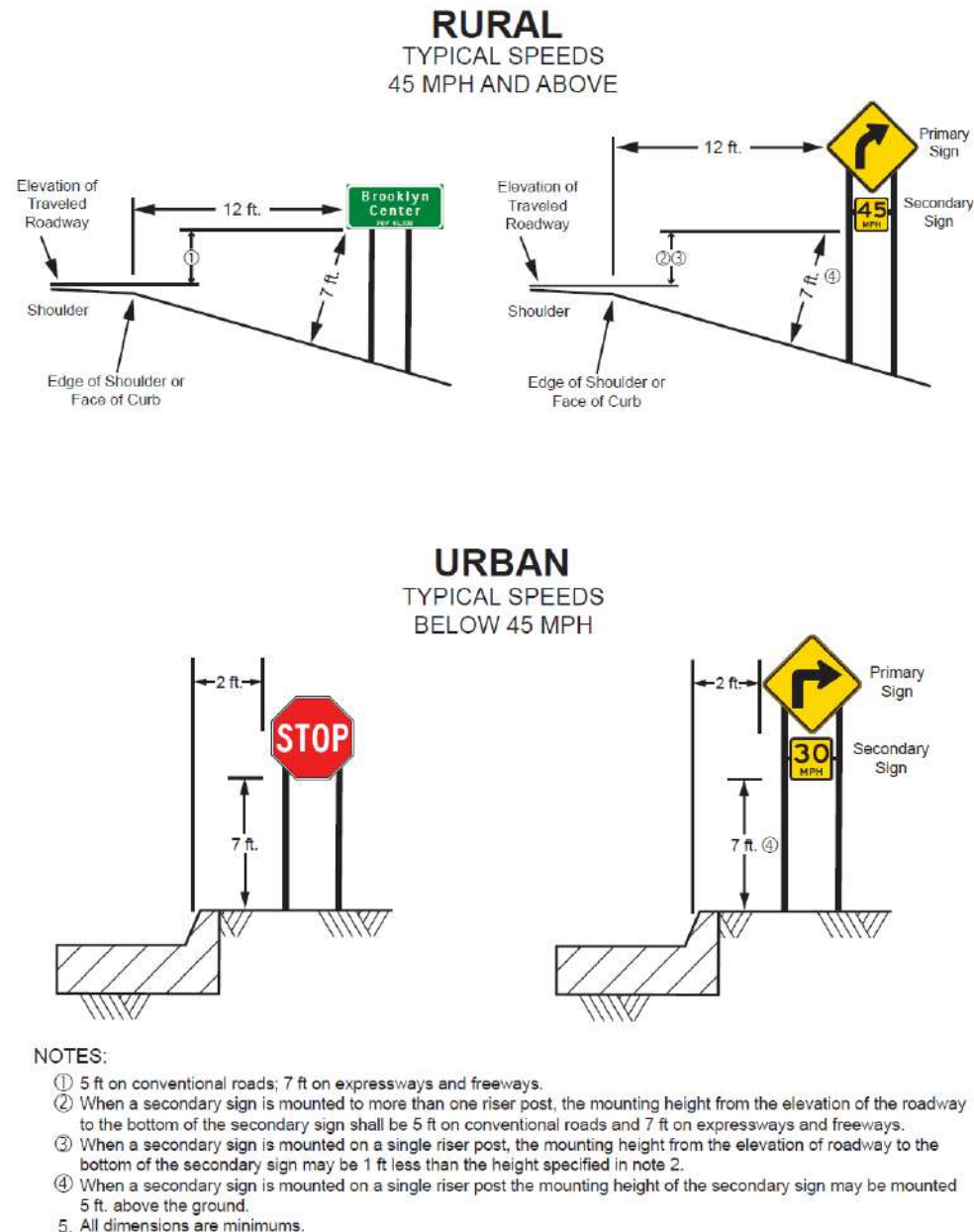
Chapter 4

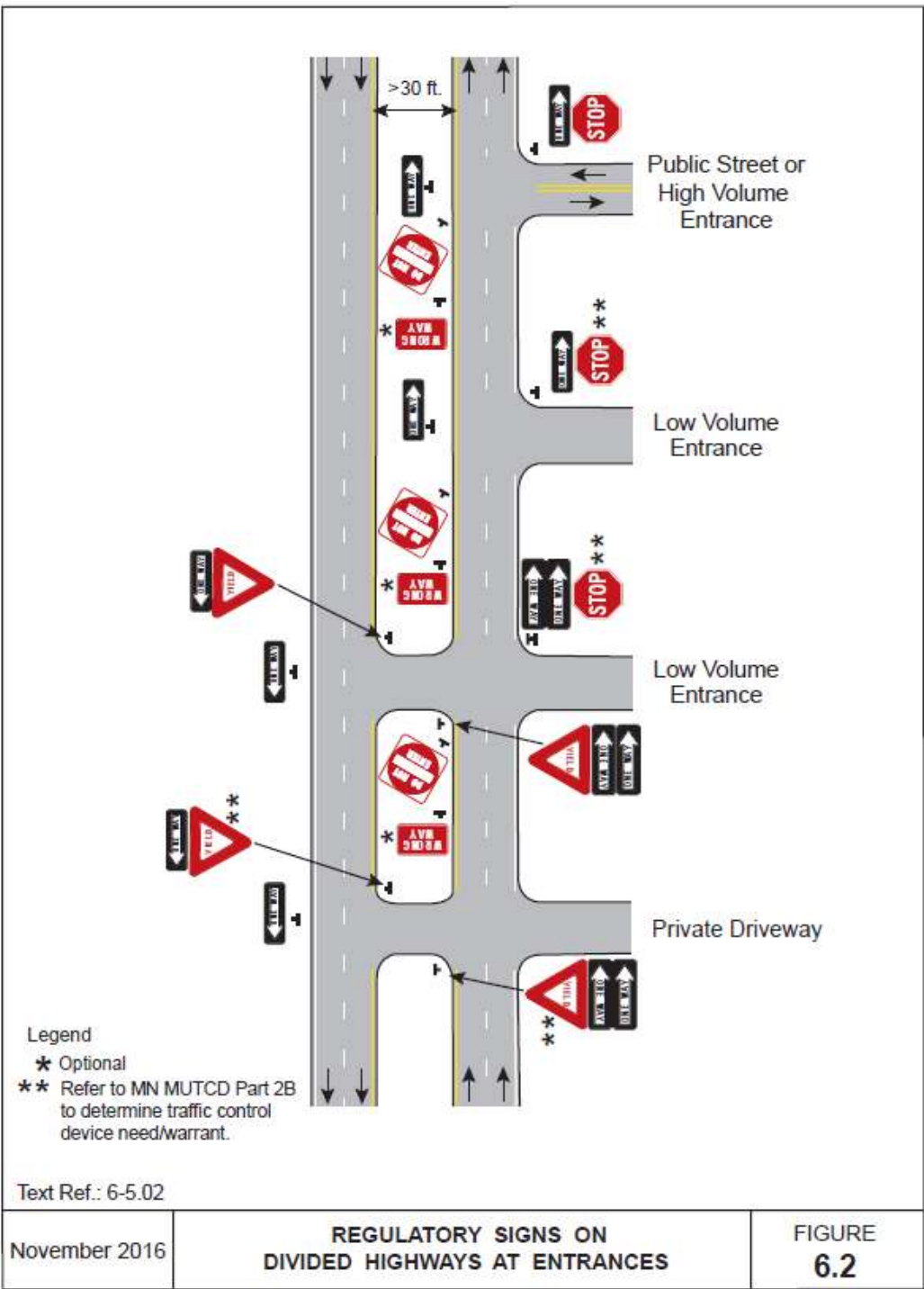
Select Figures from TEM

Sign Plan Design for At-Grade Intersections June 2017



TEM





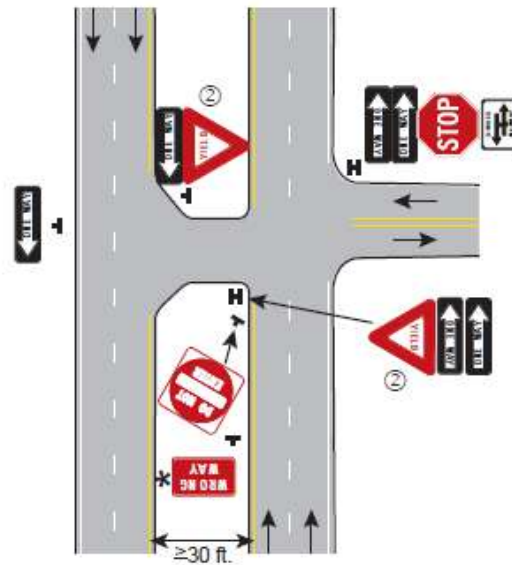
Text Ref.: 6-5.02

November 2016

REGULATORY SIGNS ON
DIVIDED HIGHWAYS AT ENTRANCES

FIGURE
6.2

TEMP

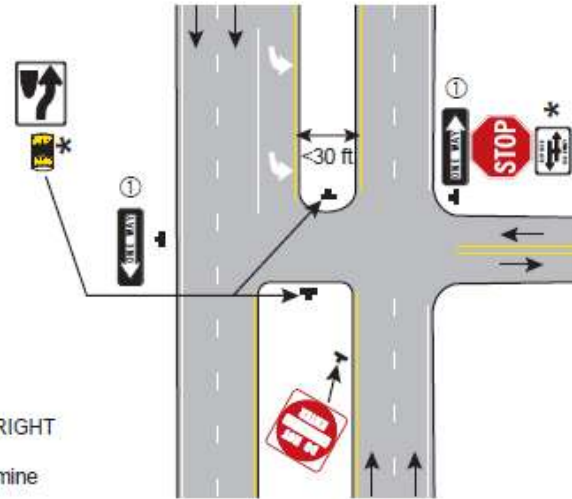


MEDIAN 30 FT. OR GREATER

NOTES:
1. If "ONE WAY" signs are to be used, both shall be installed.

Legend

- Cylinder Style Delineator (X4-13)
- * Optional
- ① ONE WAY signs are optional if KEEP RIGHT signs are installed.
- ② Refer to MN MUTCD Part 2B to determine traffic control device need/warrant.



MEDIAN LESS THAN 30 FT.

Text Ref.: 6-5.02


November 2016

REGULATORY SIGNS FOR DIVIDED
HIGHWAY - T INTERSECTIONS

FIGURE
6.3

TEMP

Legend

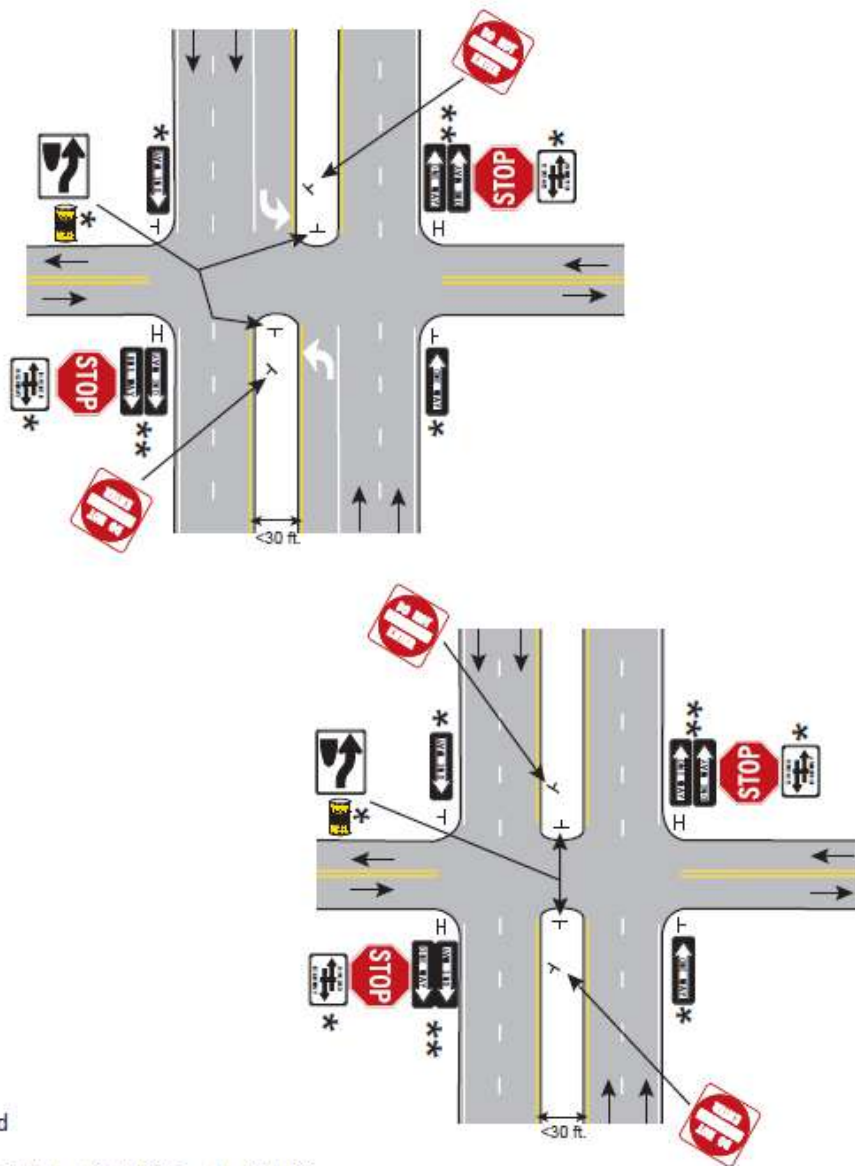
-  Cylinder Style Delineator (X4-13)
- * Optional
- ** ONE WAY signs are optional if KEEP RIGHT signs are installed.

Text Ref.: 6-5.02

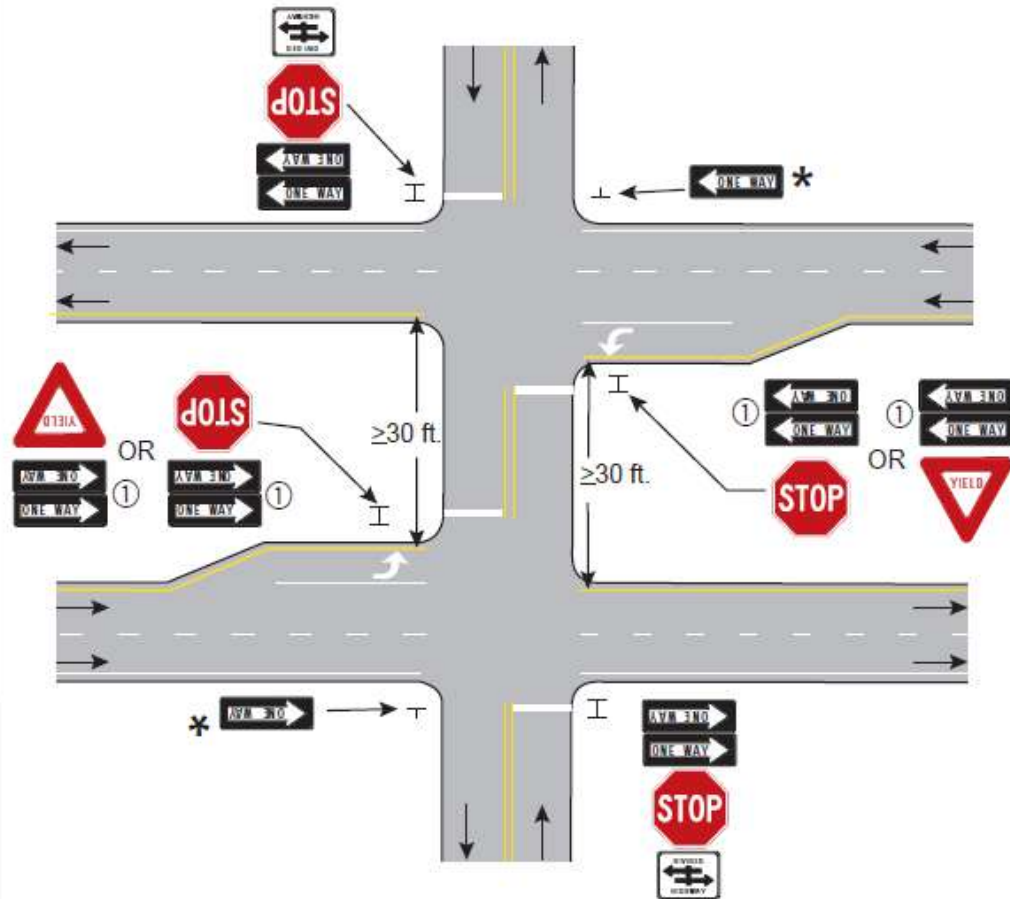
November 2016

REGULATORY SIGNS FOR DIVIDED HIGHWAY INTERSECTIONS - MEDIANS LESS THAN 30 FT. WIDE

FIGURE
6.4



TEM



NOTES:

- ① If placement of the ONE WAY signs in the median creates confusion see Figure 6.7B.
2. See Figure 6.8 for DO NOT ENTER and WRONG WAY signs.

* Optional

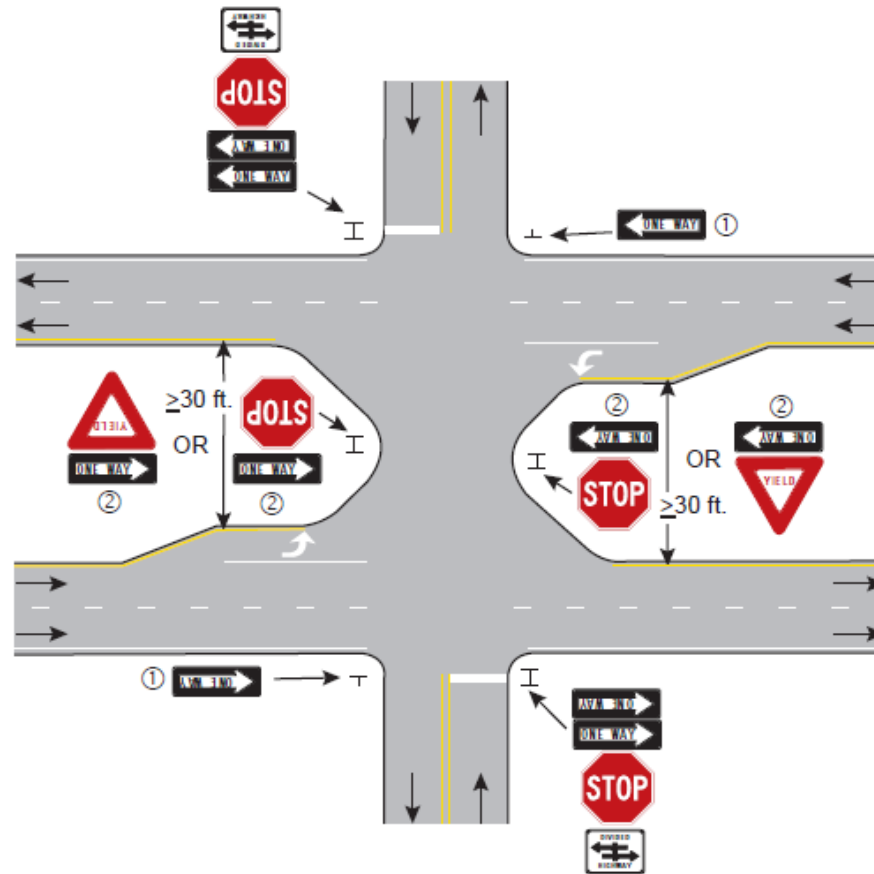
Text Ref.: 6-5.02

November 2016

REGULATORY SIGNS FOR DIVIDED HIGHWAY
INTERSECTION - MEDIAN WIDTH 30 FT.
OR GREATER

FIGURE
6.5A

TEM



NOTES:

- ① Exercise engineering judgment in determining placement of ONE WAY signs. Field experience has shown that when placed in the median, the ONE WAY signs above the STOP/YIELD signs point towards each other causing confusion to motorists from the approaching cross streets. The MN MUTCD states to install ONE WAY signs in the near right and far left corners of each intersection. Instead of placing a ONE WAY sign in the near right corner (typically mounted above the STOP/YIELD sign in the median), consideration could be given to installing that sign in the far right corner of the intersection as shown in the figure above.
- ② Mount the ONE WAY sign back-to-back above the STOP or YIELD sign.
3. See Figure 6.8 for DO NOT ENTER and WRONG WAY signs.

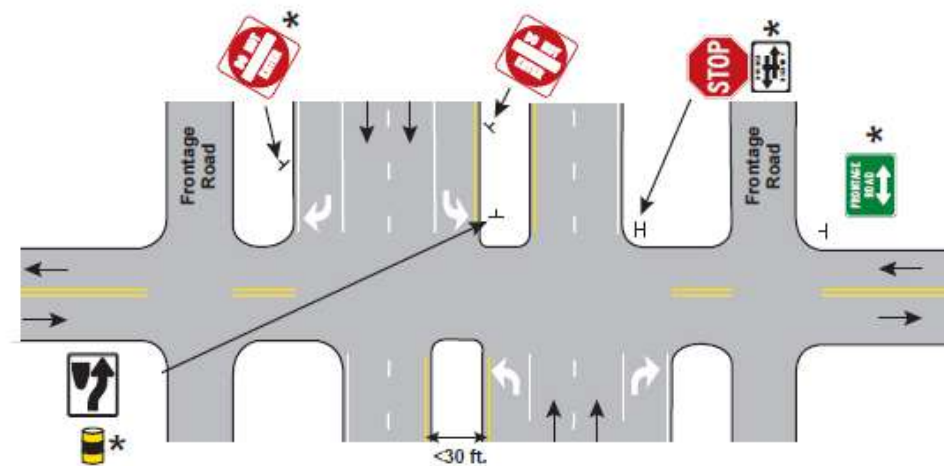
Text Ref.: 6-5.02

November 2016

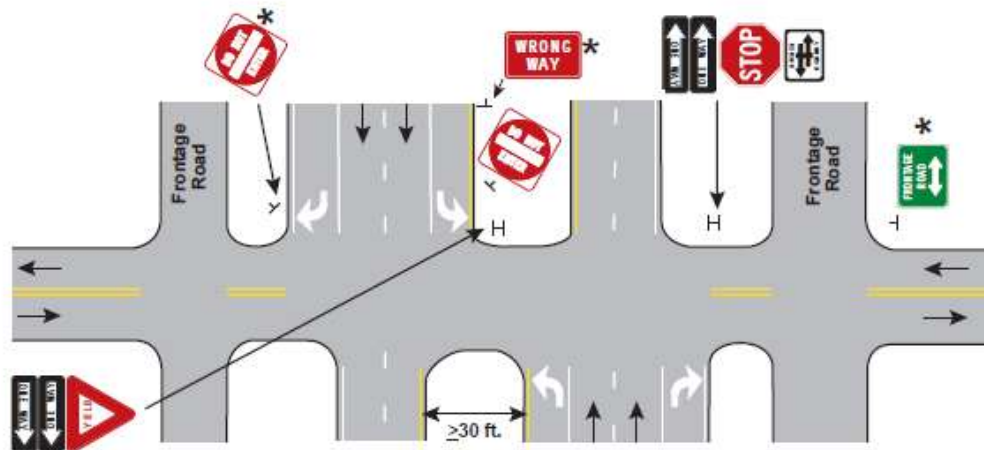
REGULATORY SIGNS FOR DIVIDED HIGHWAY
INTERSECTION - MEDIAN WIDTH 30 FT. OR GREATER

FIGURE
6.5B

TEMP



MEDIAN LESS THAN 30 FT.



MEDIAN 30 FT. OR GREATER

Legend

- Cylinder Style Delineator (X4-13)
- * Optional

NOTES:

1. The signing is the same for both approaches to the intersection.

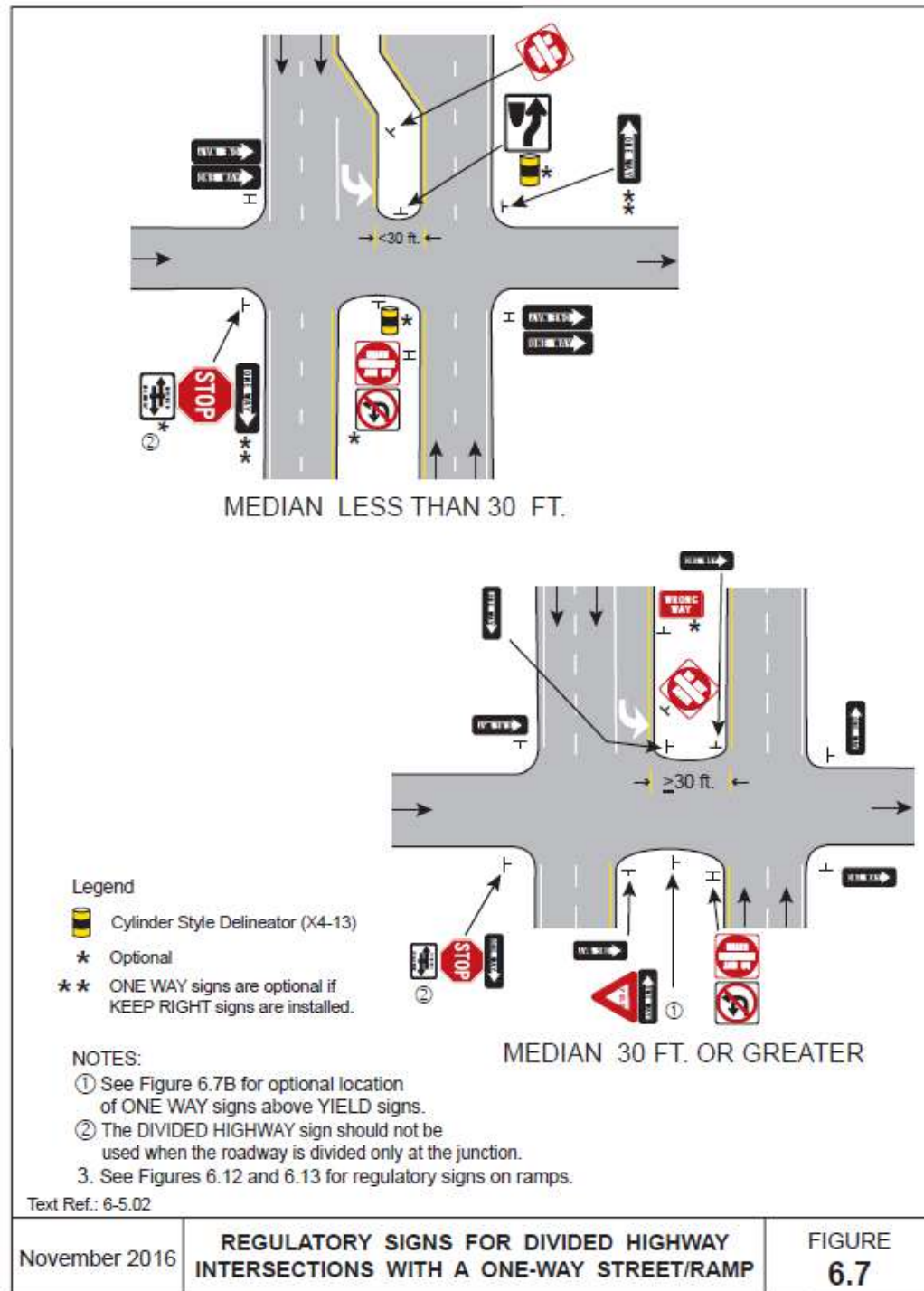
Text Ref.: 6-5.02

November 2016

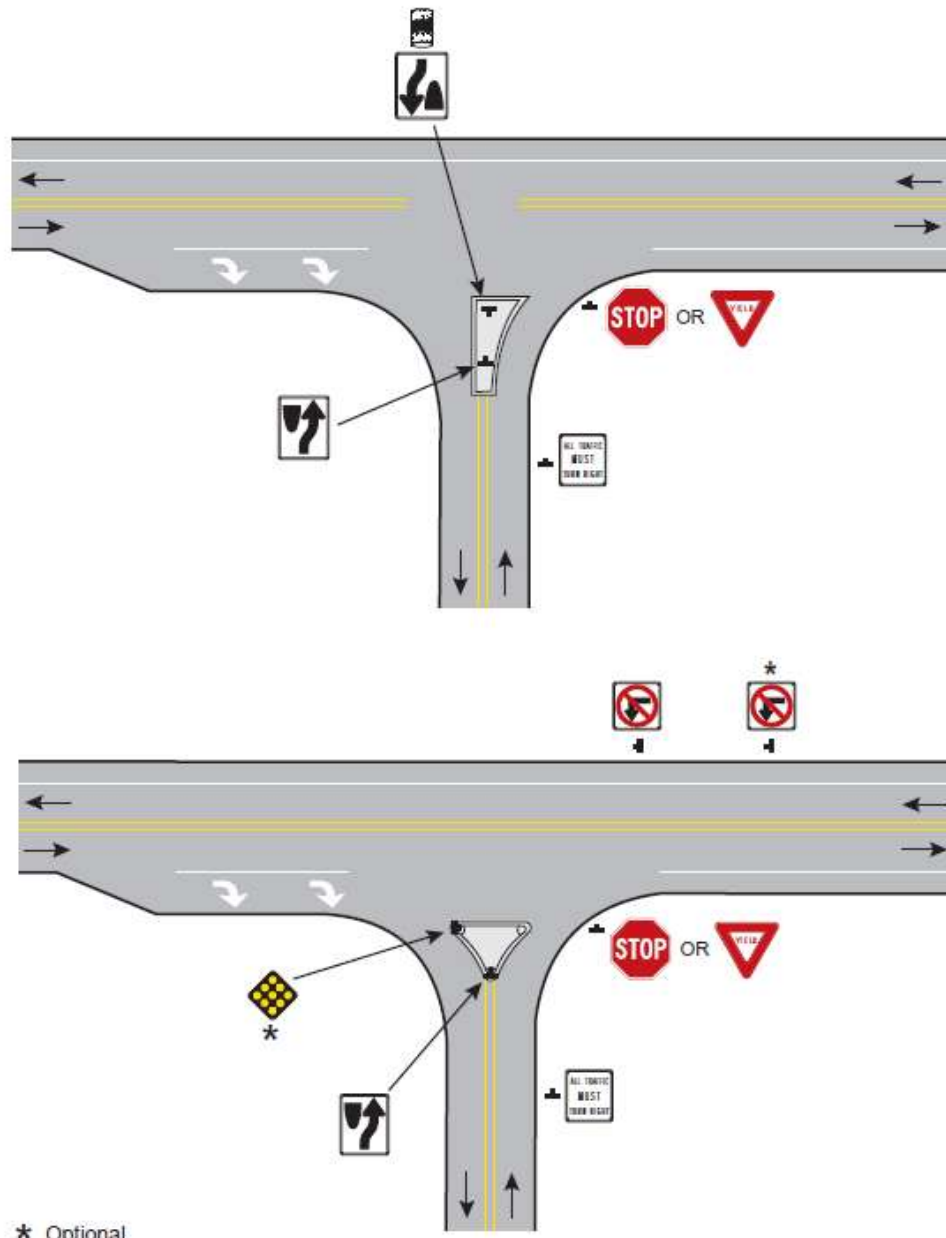
REGULATORY SIGNS FOR DIVIDED
HIGHWAY INTERSECTIONS WITH FRONTAGE ROADS

FIGURE
6.6

TEMP



TEM

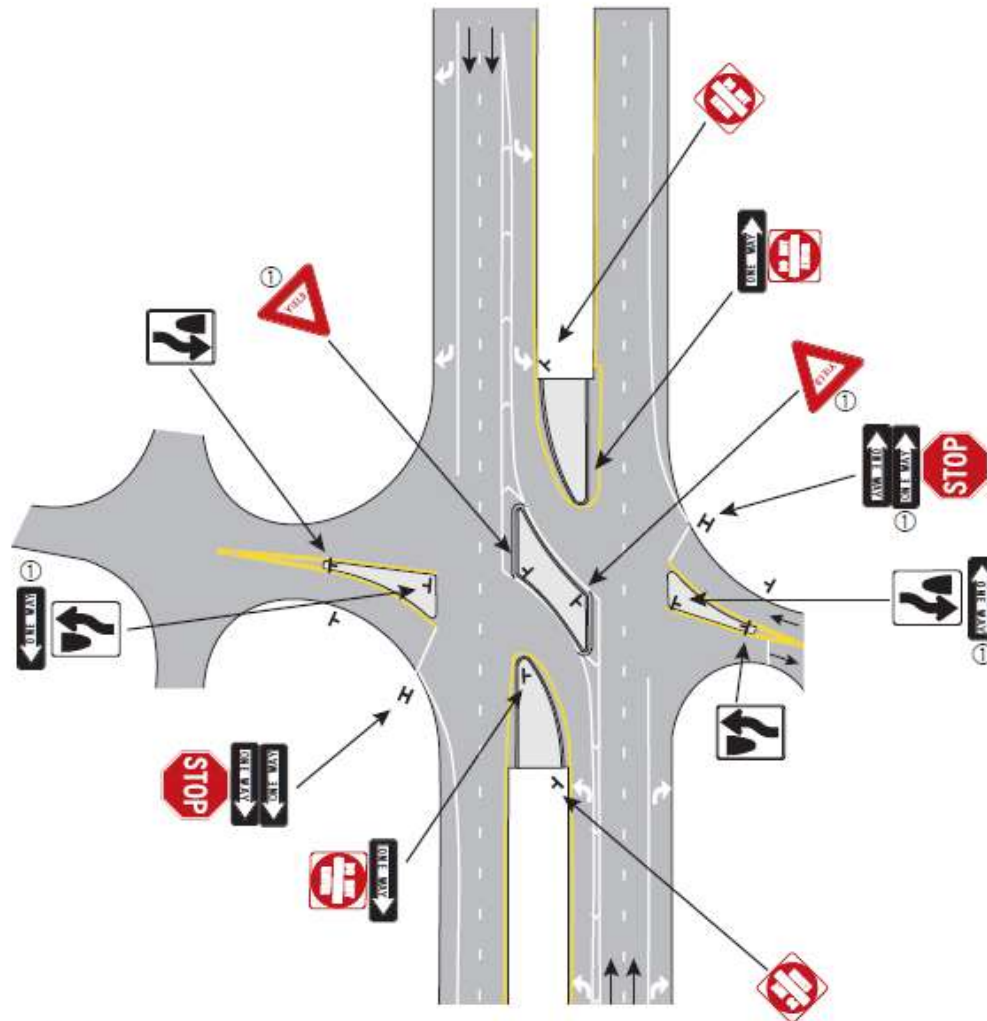


Text Ref.: 6-5.02

May 2015

REGULATORY SIGNS
RIGHT IN - RIGHT OUT INTERSECTIONS

FIGURE
6.10



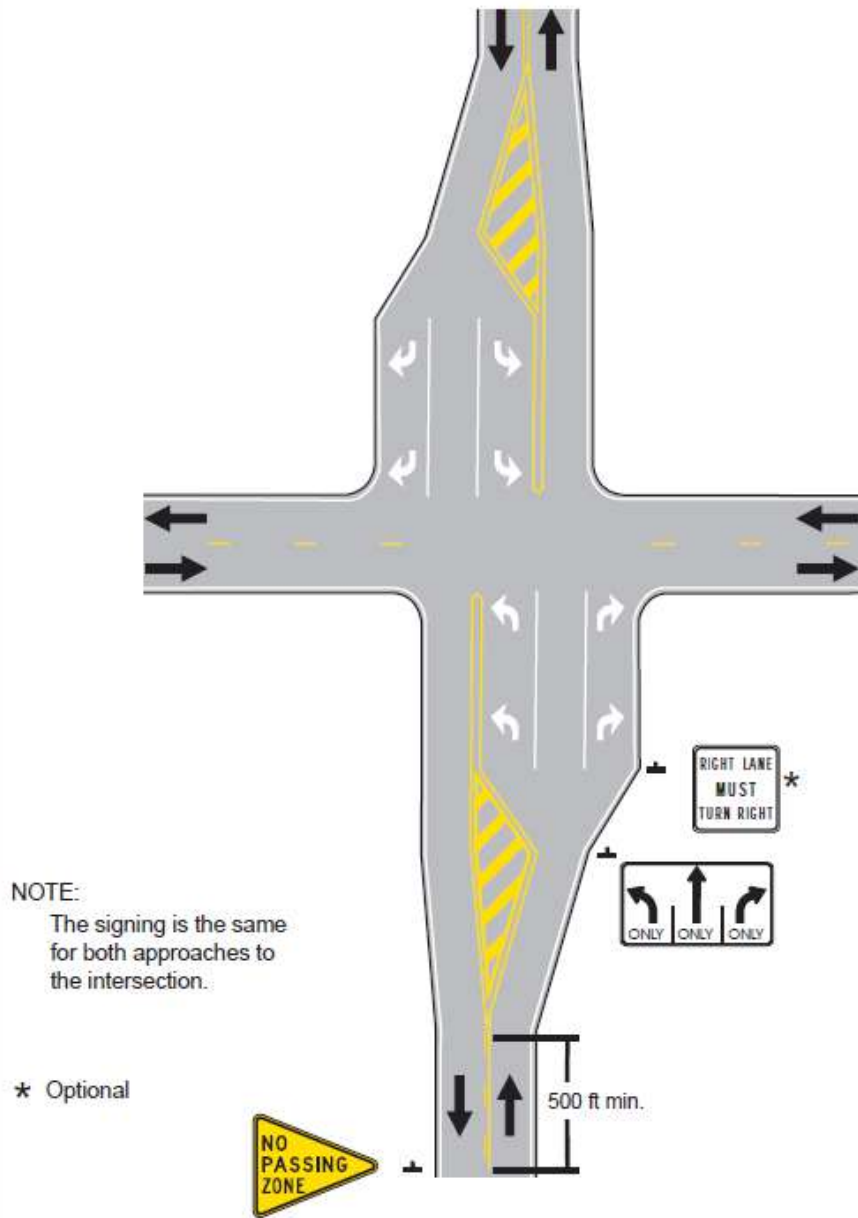
Text Ref.: 6-5.02

May 2015

3/4 ACCESS INTERSECTION SIGNING

FIGURE
6.11

TEM



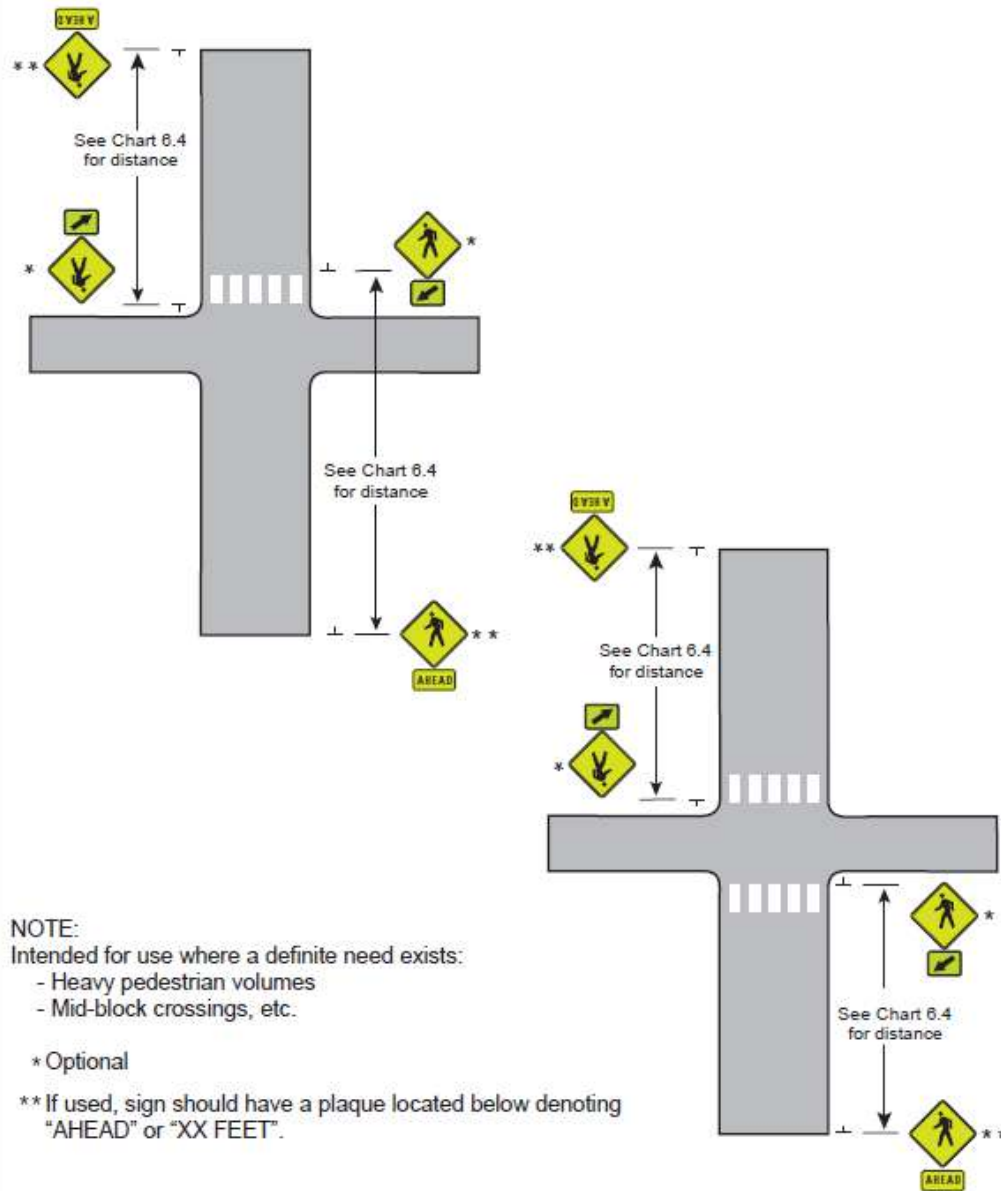
Text Ref.: 6-6.07

May 2015

CHANNELIZED INTERSECTION SIGNING
PAINTED MEDIAN

FIGURE
6.19B

TEMP



Text Ref.: 6-6.09.01

May 2015

PEDESTRIAN CROSSING SIGNING
AT UNCONTROLLED LOCATIONS

FIGURE
6.20

TE

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. On high-speed roadways (45 mph and greater), the spacing should be 400-500 feet. On low speed roadways (less than 45 mph), the spacing should be 200-400 feet.
4. Do not use Divided Highway Begins and Divided Highway Ends signs when the highway is divided only at intersections or junctions.

* Optional

Text Ref.: 6-6.20

TRANSITION SIGNING
DIVIDED AND UNDIVIDED ROADWAYS

FIGURE
6.22

May 2015

2015

SIGNAL MAST ARM INTERSECTION SIGNING

FIGURE
6.2

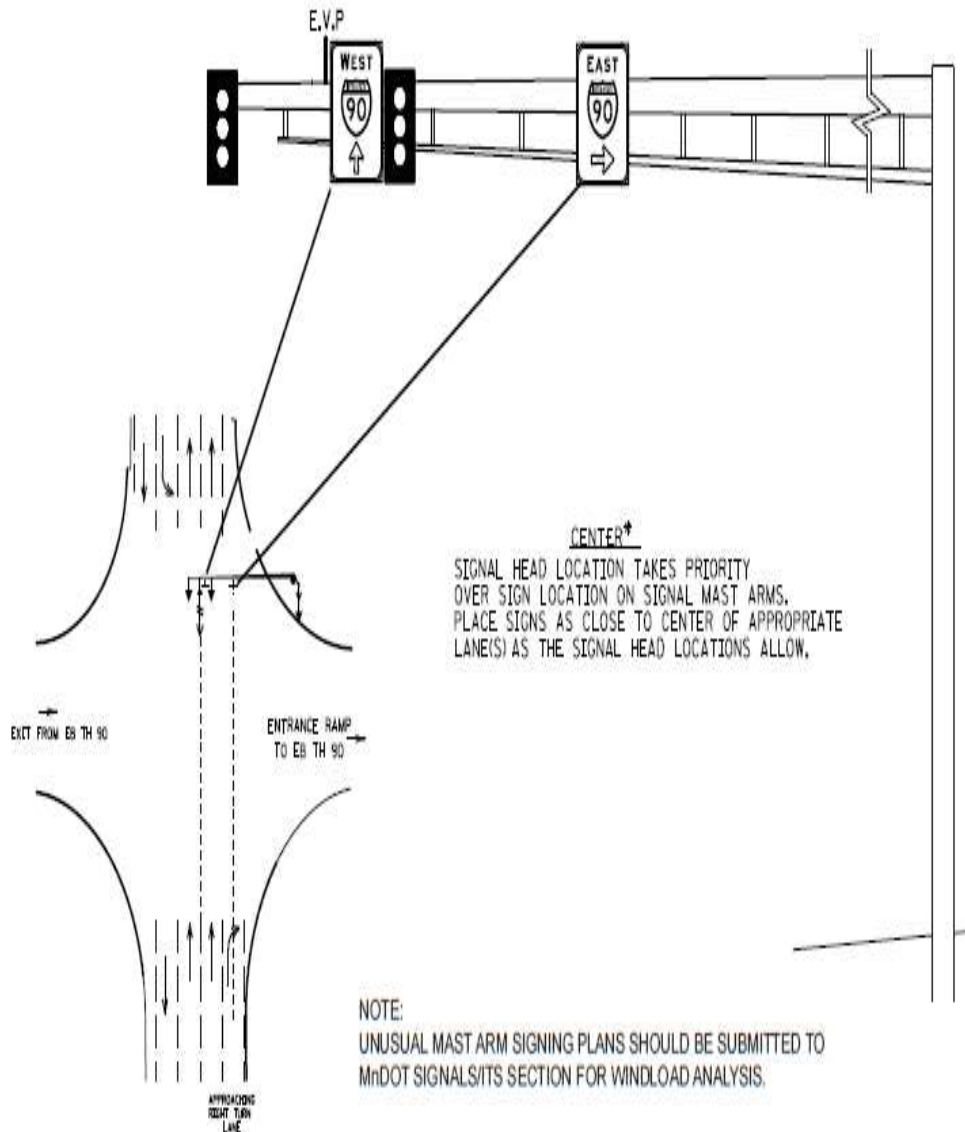
PLANNING/DESIGN/CONSTRUCTION

DESIGN/CONSTRUCTION/OPERATION AND MAINTENANCE

E.V.P.
EMERGENCY VEHICLE PRE EMPTION SENSOR
MUST BE VISIBLE TO ONCOMING TRAFFIC.
CURRENT STANDARD PLATE 8123 PUTS
THE E.V.P. AT 6' FROM END OF MASTARM.

DIRECTIONAL SIGN
(WITH UP ARROW):
CENTER* THE SIGN
OVER THE THRU LANES

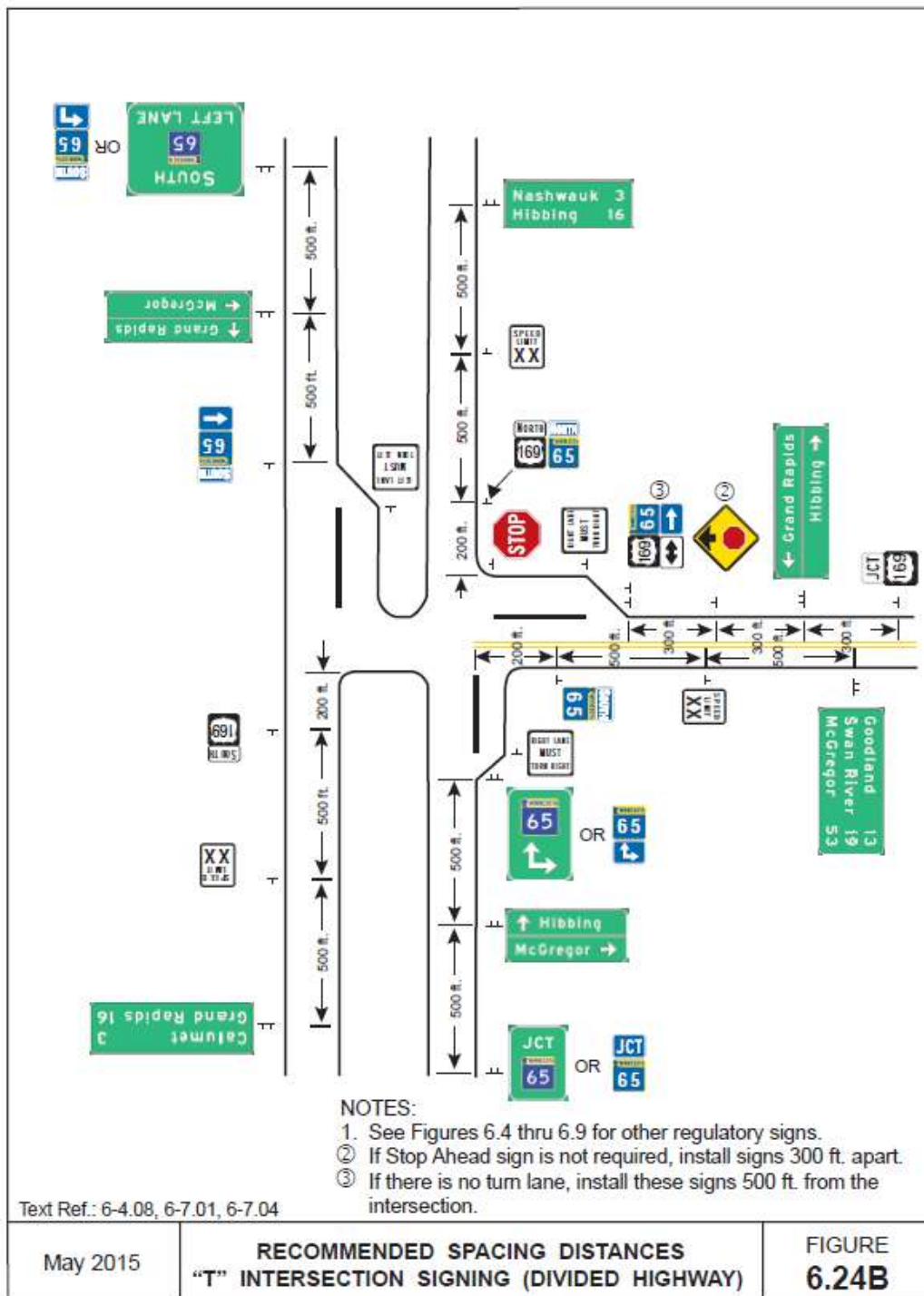
DIRECTIONAL SIGN
(WITH RIGHT ARROW):
SIGN IS CENTERED OVER
APPROACHING
RIGHT TURN LANE

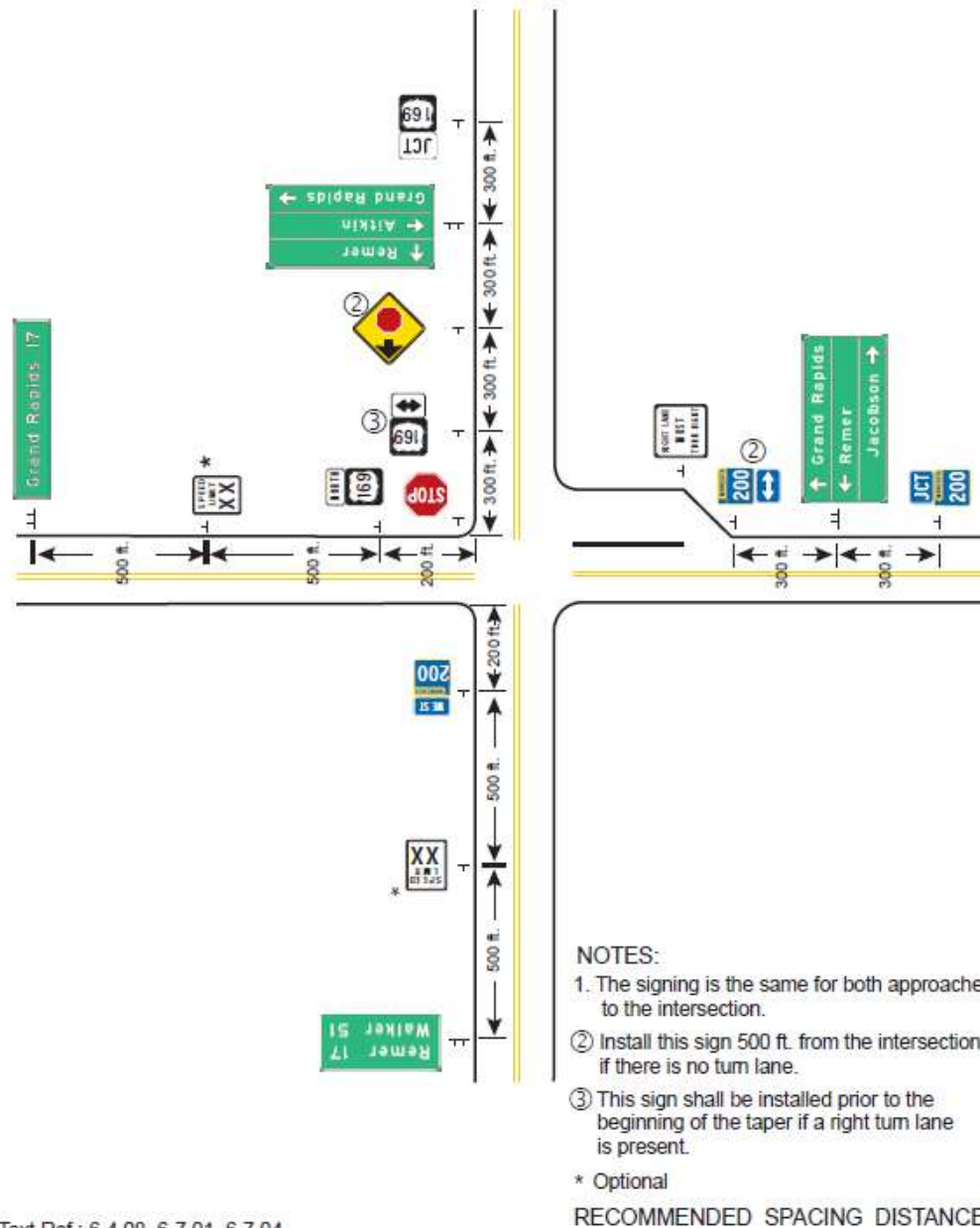


NOTE:
UNUSUAL MAST ARM SIGNING PLANS SHOULD BE SUBMITTED TO
MDOT SIGNALS/ITS SECTION FOR WINDLOAD ANALYSIS.

6.25E

| DESIGN BY | APPROVED BY | CHECKED BY | DATE | STATE PROJ. NO. | SHEET NO. | OF | SUCCES |
|-----------|-------------|------------|------|-----------------|-----------|----|--------|
| | | | | | | | |





Text Ref.: 6-4.08, 6-7.01, 6-7.04

NOTES:

1. The signing is the same for both approaches to the intersection.
- ② Install this sign 500 ft. from the intersection if there is no turn lane.
- ③ This sign shall be installed prior to the beginning of the taper if a right turn lane is present.

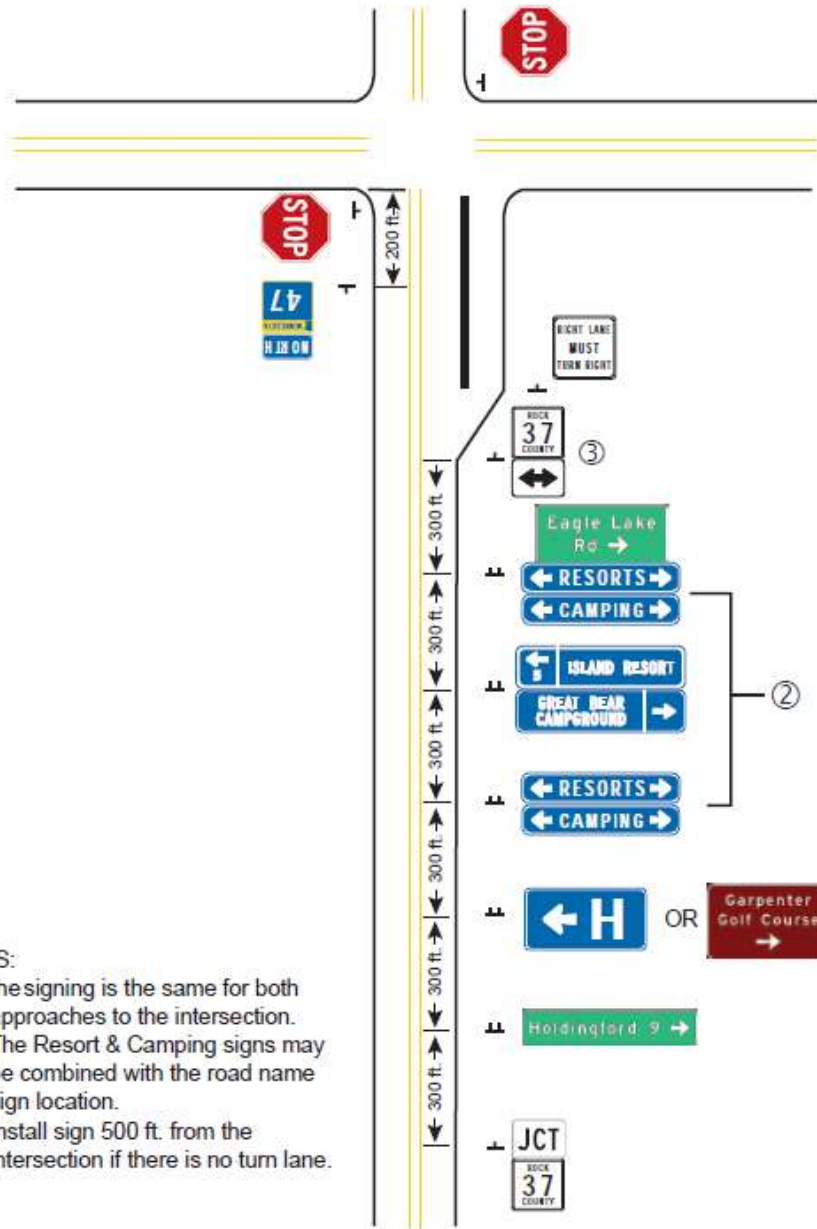
* Optional

RECOMMENDED SPACING DISTANCES

TEM

NOTES:

1. The signing is the same for both approaches to the intersection.
- ② The Resort & Camping signs may be combined with the road name sign location.
- ③ Install sign 500 ft. from the intersection if there is no turn lane.



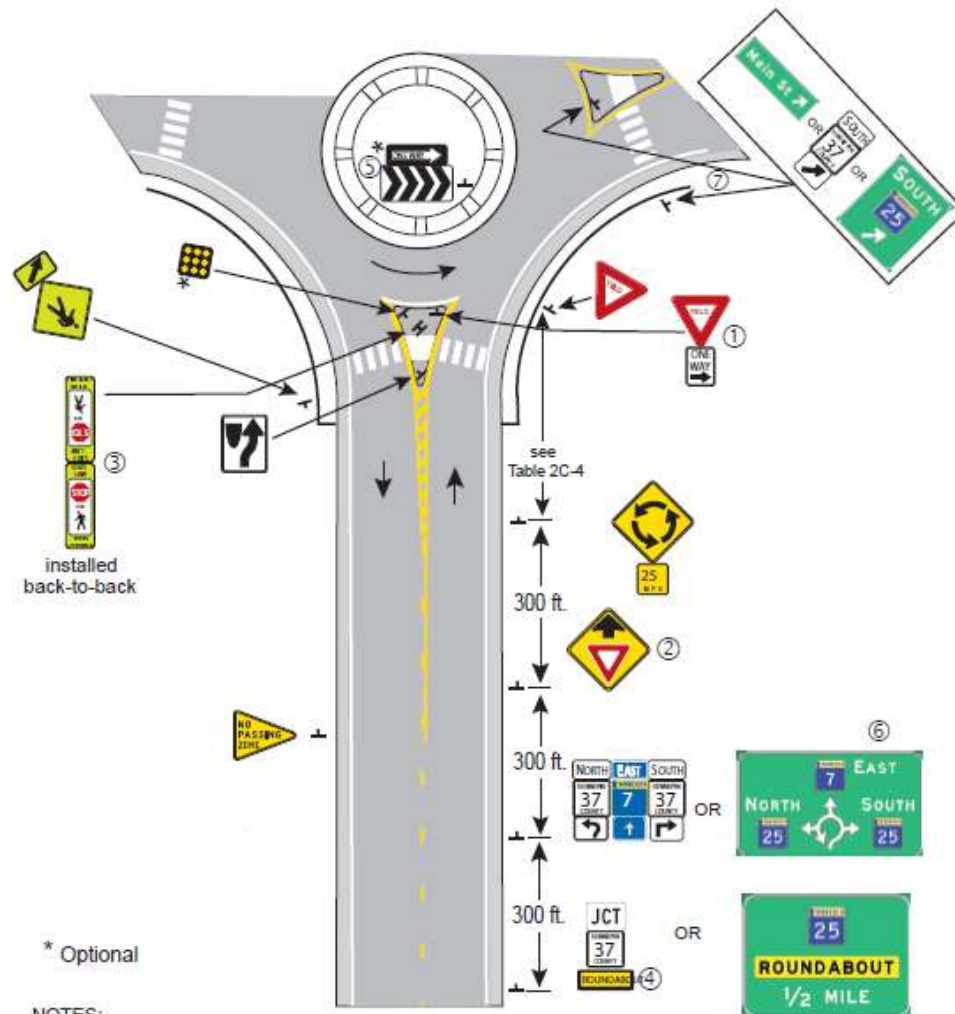
Text Ref.: 6-4.08, 6-7.01, 6-7.04, 6-7.06.03, 6-7.09.02, Appendix A - Resorts

May 2015

LOCAL ROAD/STREET INTERSECTION SIGNING

FIGURE
6.26

TEM



* Optional

NOTES:

- ① Consider these factors for placement: visibility, skew, and geometrics.
- ② Optional where posted speed limit is ≤ 40 mph. See Chart 8.5 for sign placement distance.
- ③ If used, mounting height to be 1 foot.
- ④ If there is no junction route marker assembly, then install the roundabout plaque above the roundabout warning sign.
- ⑤ Use the R6-4B sign for speed zones ≥ 45 mph and/or multi-lane approaches.
Use the R6-4A sign for speed zones < 45 mph and single lane approaches.
- ⑥ Diagrammatic sign shall be installed for speed zones ≥ 55 mph. Signs may be installed at District Traffic Engineer's discretion for speed zones 40-50 mph.
- ⑦ Guide signs may be installed in either location.

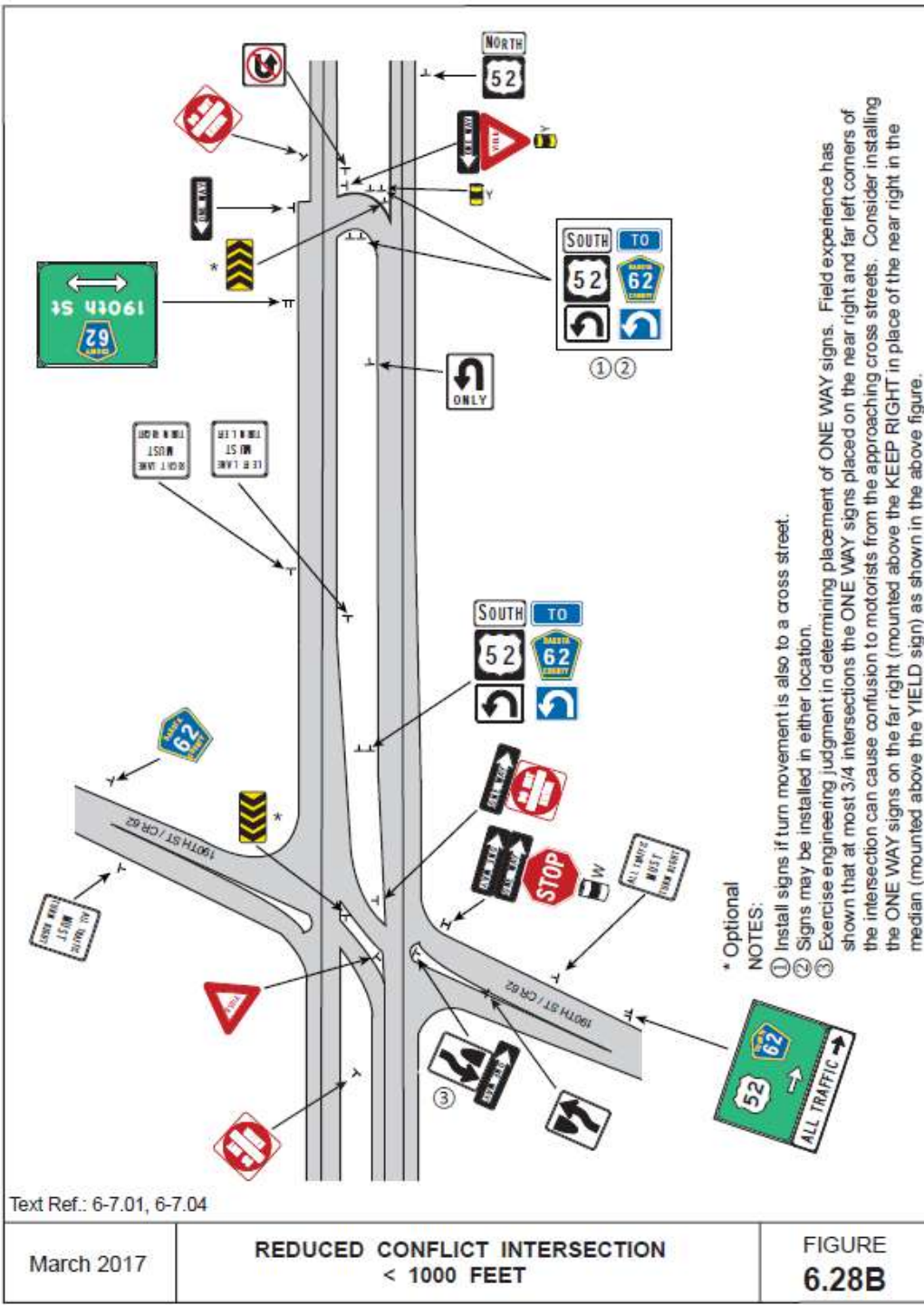
Text Ref.: 6-7.01, 6-7.04

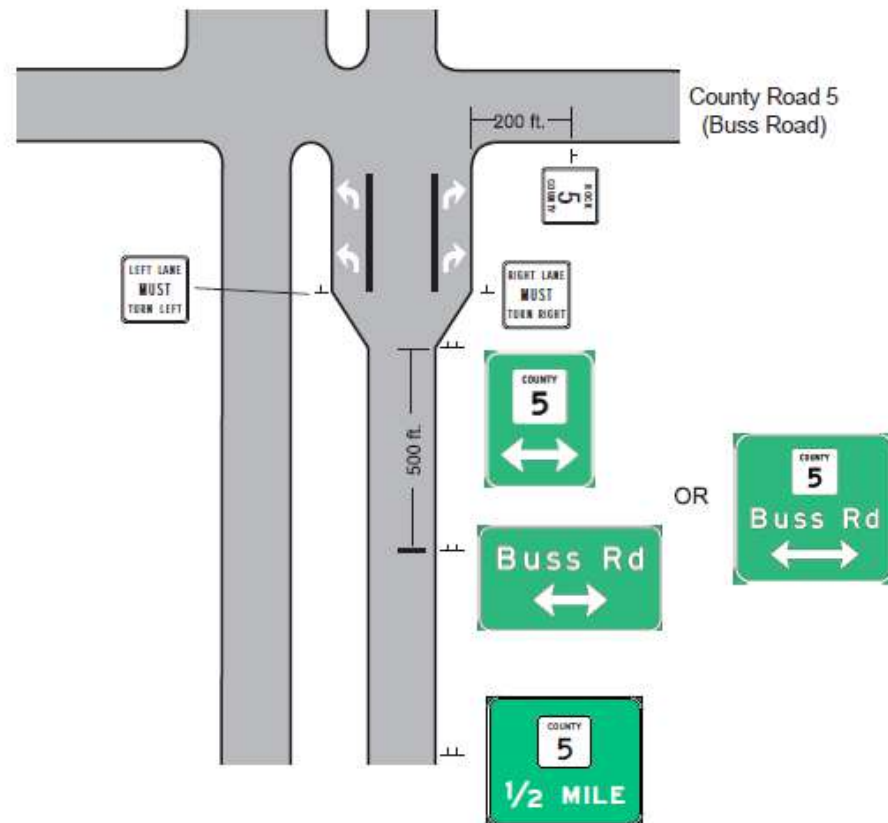
May 2015

SINGLE LANE ROUNDABOUT

FIGURE
6.27

TECH





NOTE:
The signing is the same for both approaches to the intersection.

Text Ref.: 6-7.01, 6-7.04, 6-7.06.03

May 2015

NAMED COUNTY ROAD SIGNING
ON AN EXPRESSWAY

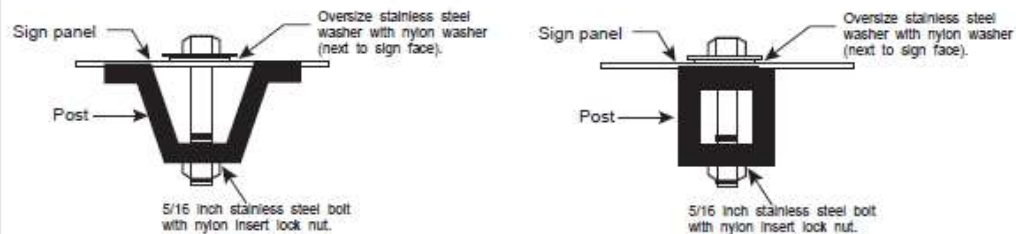
FIGURE
6.29

TE

TYPICAL MOUNTING



SIGN PANEL ATTACHMENT DETAIL



U-POST MOUNTING

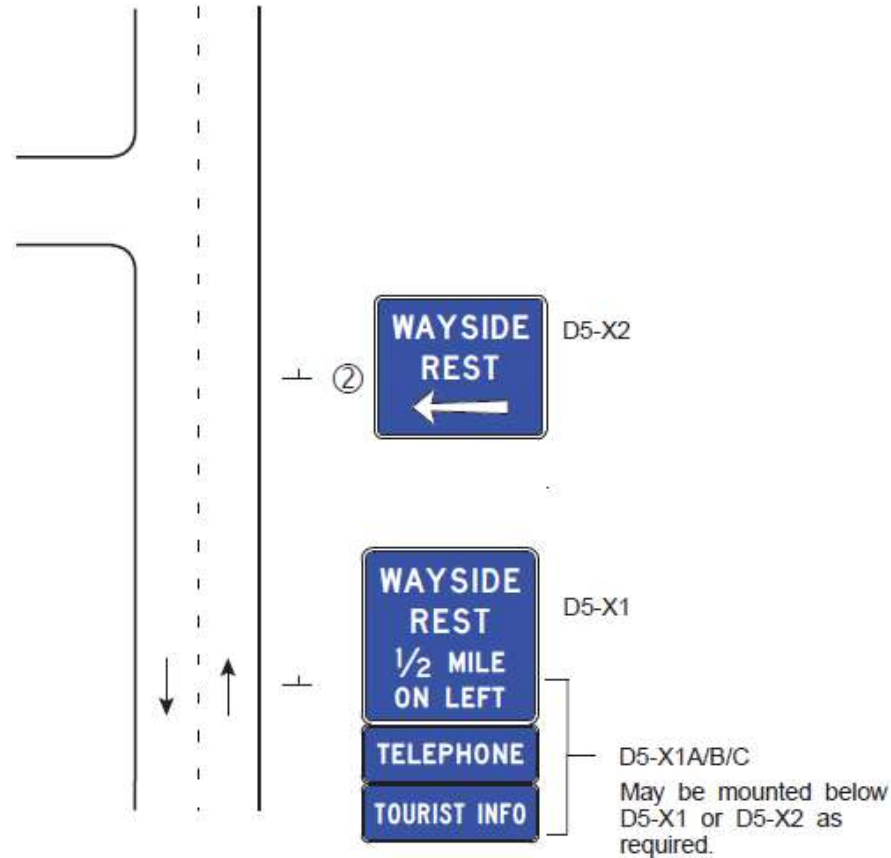
SQUARE TUBE MOUNTING

Text Ref.: 6-7.07.02

May 2015

COMMUNITY RECOGNITION SIGNING

FIGURE
6.35



NOTES:

1. The signing is the same for both approaches to the intersection.
- ② Install prior to the point of turn.

Text Ref.: 6-8.06.03

May 2015

WAYSIDE REST SIGNING

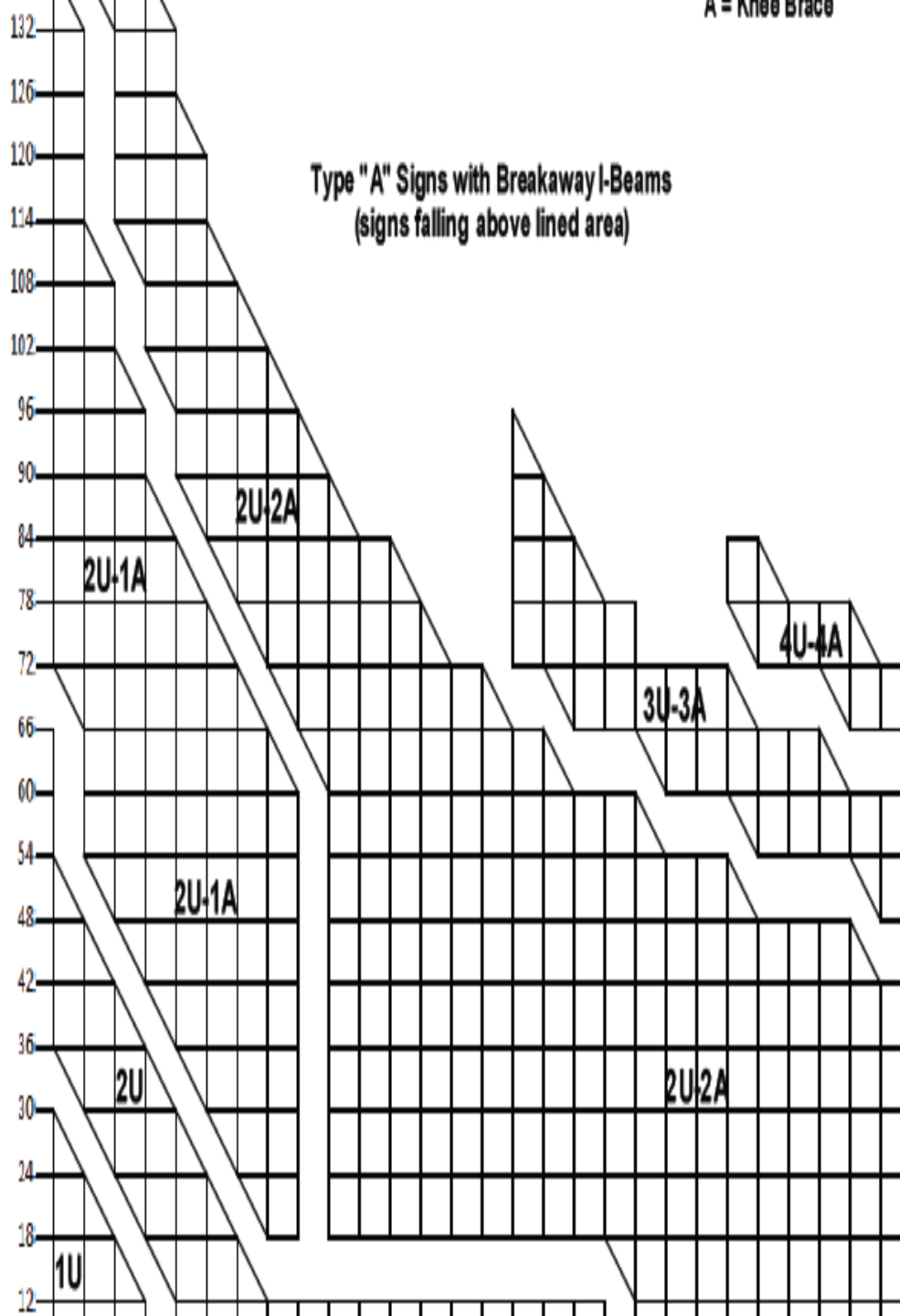
FIGURE
6.37

U-POST STRUCTURE CHART FOR
GROUND MOUNTED SIGNS

4.08.01
15

P
A
N
E
L

H
E
I
G
H
T



| PANEL WIDTH (inches) | POST SPACING | | |
|----------------------------|------------------------|------------------------|------------------------|
| | 2 POSTS (inches) | 3 POSTS (inches) | 4 POSTS (inches) |
| 36 | 24 | --- | --- |
| 42 | 30 | --- | --- |
| 48 | 30 | --- | --- |
| 54 | 30 | --- | --- |
| 60 | 36 | --- | --- |
| 66 | 42 | --- | --- |
| 72 | 42 | --- | --- |
| 78 | 54 | --- | --- |
| 84 | 54 | --- | --- |
| 90 | 54 | --- | --- |
| 96 | 54 | --- | --- |
| 102 | 60 | 45 | --- |
| 108 | 66 | 45 | --- |
| 114 | 66 | 45 | --- |
| 120 | 72 | 45 | --- |
| 126 | 78 | 45 | --- |
| 132 | 78 | 45 | --- |
| 138 | 78 | 48 | --- |
| 144 | 90 | 51 | 45 |
| 150 | 90 | 54 | 45 |
| 156 | 90 | 54 | 45 |
| 162 | 96 | 57 | 48 |
| 168 | 96 | 60 | 48 |
| 174 | 102 | 63 | 54 |
| 180 | 108 | 63 | 54 |

Use this chart if punch codes cannot be found in the
Standard Signs and Markings Manual.

Text Ref.: 6-4.08.01

May 2015

TYPE D SIGN POST SPACING CHART

CHART
6.3

TEN

| Posted or 85th Percentile Speed (mph) | Advance Placement Distance ¹ | | | | | | | | |
|--|--|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | Condition A: Speed reduction and lane changing in heavy traffic ² feet | Condition B: Deceleration to the listed advisory speed (mph) for the condition | | | | | | | |
| | | 0 ³ feet | 10 ⁴ feet | 20 ⁴ feet | 30 ⁴ feet | 40 ⁴ feet | 50 ⁴ feet | 60 ⁴ feet | 70 ⁴ feet |
| 20 | 225 | 100 ⁶ | see Note ⁵ | — | — | — | — | — | — |
| 25 | 325 | 100 ⁶ | see Note ⁵ | see Note ⁵ | — | — | — | — | — |
| 30 | 460 | 100 ⁶ | see Note ⁵ | see Note ⁵ | — | — | — | — | — |
| 35 | 565 | 100 ⁶ | see Note ⁵ | see Note ⁵ | see Note ⁵ | — | — | — | — |
| 40 | 670 | 125 | 100 ⁶ | 100 ⁶ | see Note ⁵ | — | — | — | — |
| 45 | 775 | 175 | 125 | 100 ⁶ | 100 ⁶ | see Note ⁵ | — | — | — |
| 50 | 885 | 250 | 200 | 175 | 125 | 100 ⁶ | — | — | — |
| 55 | 990 | 325 | 275 | 225 | 200 | 125 | see Note ⁵ | — | — |
| 60 | 1100 | 400 | 350 | 325 | 275 | 200 | 100 ⁶ | — | — |
| 65 | 1200 | 475 | 450 | 400 | 350 | 275 | 200 | 100 ⁶ | — |
| 70 | 1250 | 550 | 525 | 500 | 450 | 375 | 275 | 150 | — |
| 75 | 1350 | 650 | 625 | 600 | 550 | 475 | 375 | 250 | 100 ⁶ |

NOTES:

¹ The distances are adjusted for a sign legibility distance of 180 feet for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 feet, which is the appropriate distance for an alignment warning symbol sign. For Condition A and B, warning signs with less than a 6-inch legend or more than 4 words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

² Typical conditions are locations where the road user might use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PRT of 14.0 to 14.5 seconds for vehicle maneuvers (2004 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 180 feet for the appropriate sign.

³ Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2004 AASHTO Policy, Exhibit 3-1, Stopping Sight Distance, providing a PRT of 2.5 seconds, a deceleration rate of 11.2 feet/second², minus the sign legibility distance of 180 feet.

⁴ Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second², minus the sign legibility distance of 250 ft.

⁵ No suggested distances are provided for these speeds, as placement location is dependent on site conditions and other signing. An alignment warning sign may be placed anywhere from the point of curvature up to 100 feet in advance of the curve. However, the alignment warning sign should be installed in advance of the curve and at least 100 feet from any other sign.

⁶ The minimum advance placement distance is listed as 100 feet to provide adequate spacing between signs.