



SD
DEPARTMENT OF
TRANSPORTATION

Basic Sign Management

October 23rd, 2024 / Sioux Falls, South Dakota
Doug Kinniburgh – Local Government Engineer
<https://dot.sd.gov/>

Better Lives Through Better Transportation

1

Agenda

- Management
- Sign Maintenance
- Post Maintenance



2



Sign Management

- Sign Inventory
- Analysis
- Plan

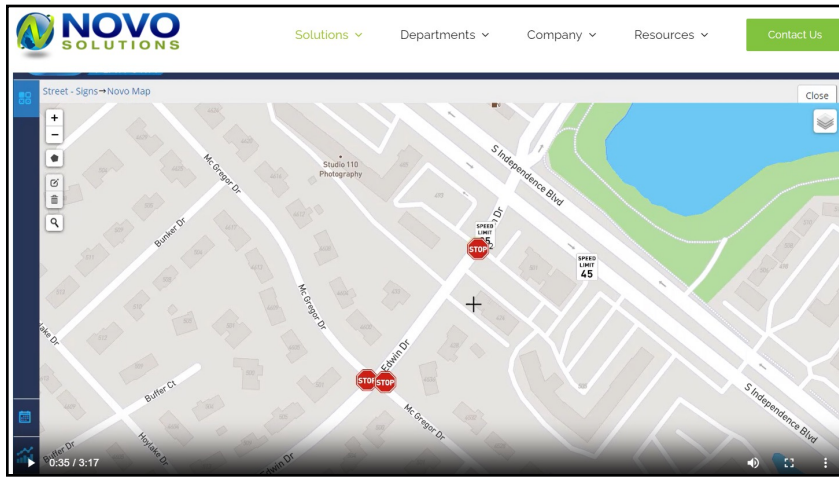
3

Sign Inventory

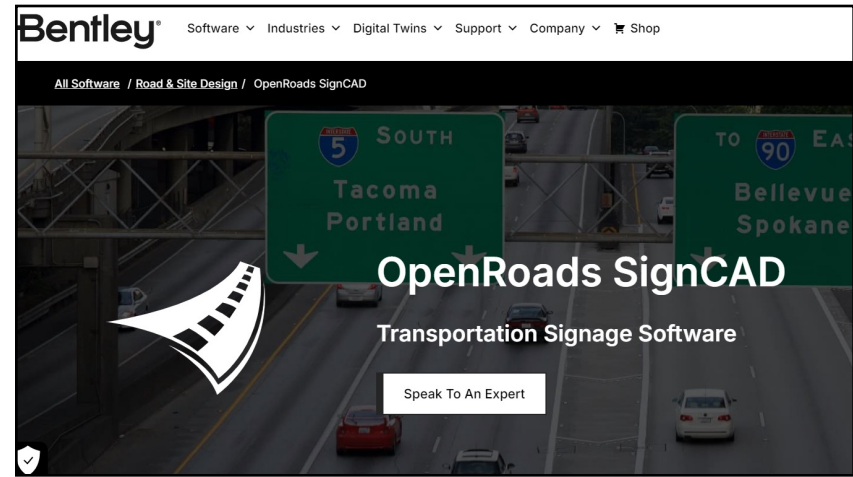
- Software Package
- Spreadsheet
- Map



4



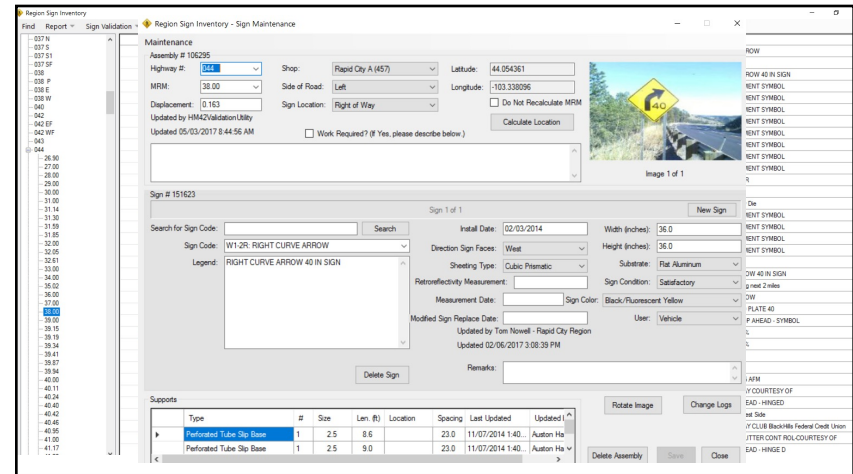
5



6



7



8


Sign Assessment Methods

1. Visual nighttime inspection method
 - a. Develop agency guidelines and procedures and use one or more of the following procedures:
 - i. Calibration signs procedure
 - a) Calibration signs are needed for each color of sign in Table 2A-3 of the 2009 MUTCD.
 - b) Calibration signs are viewed at typical viewing distances using the inspection vehicle.
 - c) Calibration signs need to be properly stored between inspections so that their retroreflectivity does not deteriorate over time.
 - ii. Comparison panels procedure
 - iii. Consistent parameters procedure
 - a) Using an inspector who is at least 60 years old
 - b) Using a sport utility vehicle or pick-up from which to make the observations
 - c) Using a model year 2000 or newer vehicle
 - b. Conduct inspections at normal speed from the travel lane
 - c. Use low-beam headlights with minimizing interior vehicle lighting
 - d. Evaluate signs at typical viewing distance so that adequate time is available for an appropriate driving response.
2. Measured sign retroreflectivity method
 - a. Use Table 2A-5

9

MUTCD 11th Edition
Page 63

MUCTD



Sign Color	Beaded Sheeting Type (ASTM D4956)			Prismatic Sheeting	Additional Criteria
	I	II	III		
White on Green	W: G ≥ 7	W: G ≥ 15	W: G ≥ 25	W ≥ 250; G ≥ 25	Overhead
White on Blue	W: B ≥ 3	W: B ≥ 5	W: B ≥ 12	W ≥ 250; B ≥ 12	Post-mounted
White on Brown	W: Br ≥ 1	W: Br ≥ 5	W: Br ≥ 10	W ≥ 350; Br ≥ 10	Overhead
Black on Yellow or Black on Orange	Y: O*	Y: O*	Y: O*	Y ≥ 50; O ≥ 50	+
White on Red	W: R ≥ 1	W: R ≥ 1	W: R ≥ 1	W ≥ 35; R ≥ 7	+
Black on White	W: W ≥ 1	W: W ≥ 1	W: W ≥ 1	W ≥ 50	-

¹ The minimum maintained retroreflectivity levels shown in this table are in units of cd/m² measured at an observation angle of 0.2° and an entrance angle of 4.0°. For all sizes of both symbol signs and for word legend and line symbol signs measuring less than 48 inches. Minimum sign contrast ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity). * This sheeting type shall not be used for this color for this application.

Bold Symbol Signs

- W1-1.2 – Turn and Curve
- W1-3.4 – Reverse Turn and Curve
- W1-5 – Yield Ahead
- W1-6.1 – Pedestrian Crossing
- W1-6.2 – Farm Equipment
- W1-6.3 – Large Animal
- W1-6.4 – Snowmobile Crossing
- W1-7 – Speed Reduction
- W1-8 – Fire Station
- W1-9 – School Crossing
- W1-10 – Truck Crossing
- W1-11 – Intersection in Curve
- W1-12 – Double Arrow
- W1-13 – T-intersection
- W1-14 – T-intersection with Advance Warning
- W1-15 – 270 Degree Loop
- W1-16 – T-intersection with Advance Warning
- W1-17 – T-intersection with Advance Warning
- W1-18 – T-intersection with Advance Warning
- W1-19 – T-intersection with Advance Warning
- W1-20 – T-intersection with Advance Warning
- W1-21 – T-intersection with Advance Warning
- W1-22 – T-intersection with Advance Warning
- W1-23 – T-intersection with Advance Warning
- W1-24 – T-intersection with Advance Warning
- W1-25 – T-intersection with Advance Warning
- W1-26 – T-intersection with Advance Warning
- W1-27 – T-intersection with Advance Warning
- W1-28 – T-intersection with Advance Warning
- W1-29 – T-intersection with Advance Warning
- W1-30 – T-intersection with Advance Warning
- W1-31 – T-intersection with Advance Warning
- W1-32 – T-intersection with Advance Warning
- W1-33 – T-intersection with Advance Warning
- W1-34 – T-intersection with Advance Warning
- W1-35 – T-intersection with Advance Warning
- W1-36 – T-intersection with Advance Warning
- W1-37 – T-intersection with Advance Warning
- W1-38 – T-intersection with Advance Warning
- W1-39 – T-intersection with Advance Warning
- W1-40 – T-intersection with Advance Warning
- W1-41 – T-intersection with Advance Warning
- W1-42 – T-intersection with Advance Warning
- W1-43 – T-intersection with Advance Warning
- W1-44 – T-intersection with Advance Warning
- W1-45 – T-intersection with Advance Warning
- W1-46 – T-intersection with Advance Warning
- W1-47 – T-intersection with Advance Warning
- W1-48 – T-intersection with Advance Warning
- W1-49 – T-intersection with Advance Warning
- W1-50 – T-intersection with Advance Warning
- W1-51 – T-intersection with Advance Warning
- W1-52 – T-intersection with Advance Warning
- W1-53 – T-intersection with Advance Warning
- W1-54 – T-intersection with Advance Warning
- W1-55 – T-intersection with Advance Warning
- W1-56 – T-intersection with Advance Warning
- W1-57 – T-intersection with Advance Warning
- W1-58 – T-intersection with Advance Warning
- W1-59 – T-intersection with Advance Warning
- W1-60 – T-intersection with Advance Warning
- W1-61 – T-intersection with Advance Warning
- W1-62 – T-intersection with Advance Warning
- W1-63 – T-intersection with Advance Warning
- W1-64 – T-intersection with Advance Warning
- W1-65 – T-intersection with Advance Warning
- W1-66 – T-intersection with Advance Warning
- W1-67 – T-intersection with Advance Warning
- W1-68 – T-intersection with Advance Warning
- W1-69 – T-intersection with Advance Warning
- W1-70 – T-intersection with Advance Warning
- W1-71 – T-intersection with Advance Warning
- W1-72 – T-intersection with Advance Warning
- W1-73 – T-intersection with Advance Warning
- W1-74 – T-intersection with Advance Warning
- W1-75 – T-intersection with Advance Warning
- W1-76 – T-intersection with Advance Warning
- W1-77 – T-intersection with Advance Warning
- W1-78 – T-intersection with Advance Warning
- W1-79 – T-intersection with Advance Warning
- W1-80 – T-intersection with Advance Warning
- W1-81 – T-intersection with Advance Warning
- W1-82 – T-intersection with Advance Warning
- W1-83 – T-intersection with Advance Warning
- W1-84 – T-intersection with Advance Warning
- W1-85 – T-intersection with Advance Warning
- W1-86 – T-intersection with Advance Warning
- W1-87 – T-intersection with Advance Warning
- W1-88 – T-intersection with Advance Warning
- W1-89 – T-intersection with Advance Warning
- W1-90 – T-intersection with Advance Warning
- W1-91 – T-intersection with Advance Warning
- W1-92 – T-intersection with Advance Warning
- W1-93 – T-intersection with Advance Warning
- W1-94 – T-intersection with Advance Warning
- W1-95 – T-intersection with Advance Warning
- W1-96 – T-intersection with Advance Warning
- W1-97 – T-intersection with Advance Warning
- W1-98 – T-intersection with Advance Warning
- W1-99 – T-intersection with Advance Warning
- W1-100 – T-intersection with Advance Warning


Fine Symbol Signs (symbol signs not listed as bold symbol signs)

Special Cases

- W3-1 – Stop Ahead: Red retroreflectivity ≥ 3
- W3-2 – Yield Ahead: Red retroreflectivity ≥ 7, White retroreflectivity ≥ 35
- W3-3 – Signal Ahead: Red retroreflectivity ≥ 7, Green retroreflectivity ≥ 7
- W3-4 – Speed Reduction: White retroreflectivity ≥ 50
- For non-diamond shaped signs, such as W1-3 (the Passing Zone), W4-4P (Cross Traffic Does Not Stop), or W13-1P2.3.6.7 (Speed Advisory Signs), use the largest sign dimension to determine the proper minimum retroreflectivity level.

10

MUCTD



Guidance:

⁰⁴ Except for those signs specifically identified in Paragraph 5 of this Section, one or more of the methods described in "Maintaining Traffic Sign Retroreflectivity," (FHWA-SA-07-020, Revised 2013), FHWA, or a method developed based on an engineering study, should be used to maintain sign retroreflectivity at or above the minimum levels in Table 2A-5. Signs that are identified through the agency's method as being below the minimum levels should be replaced.

Option:

⁰⁵ Highway agencies may exclude the following signs from the retroreflectivity maintenance guidelines described in this Section:

- A. Parking, Standing, and Stopping (R7 and R8 series) signs;
- B. Walking/Hitchhiking/Crossing (R9 series, R10-1 through R10-4b) signs;
- C. Acknowledgment signs; and
- D. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians.

11

Sign Management Methods

1. Expected sign life method
 - a. Monitor age of individual signs and replace before they degrade below the minimum levels in Table 2A-5
 - b. Dependent on maintaining an individual sign inventory and knowing sign age
2. Blanket replacement method
 - a. Grouped by geographic area, roadway corridor, or sign category (e.g., warning signs)
 - b. Based on expected sign life
3. Control signs method
 - a. Agency monitor performance of a control sample of signs
 - b. Should use an assessment method to monitor the control signs.
 - c. Develop a sampling plan to determine the appropriate number and type of control signs needed to represent.

12



13



14



15

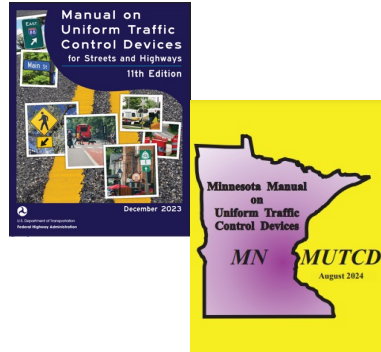


16

MUCTD

• Federal MUTCD final rule published on December 19, 2023 and became effective January 18, 2024

- SD, MT, WY, & KS use the Federal Edition
- ND, CO, NE, IA use the Federal with a State Supplement
- MN published in August 2024
- MO also uses their own manual



17

MUCTD Guidance on Sign Maintenance

Section 2A.19 Maintenance

Guidance:

- 01 Maintenance activities should consider proper position, cleanliness, legibility, and daytime and nighttime visibility (see Sections 2A.21 and 2A.22). Damaged or deteriorated signs, gates, or object markers should be replaced.
- 02 To assure adequate maintenance, a schedule for inspecting (both day and night), cleaning, and replacing signs, gates, and object markers should be established. Employees of highway, law enforcement, and other public agencies whose duties require that they travel on the roadways should be encouraged to report any damaged, deteriorated, or obscured signs, gates, or object markers at the first opportunity.
- 03 Steps should be taken to see that weeds, trees, shrubbery, and construction, maintenance, and utility materials and equipment do not obscure the face of any sign or object marker.
- 04 A regular schedule of replacement of lighting elements for illuminated signs should be maintained.

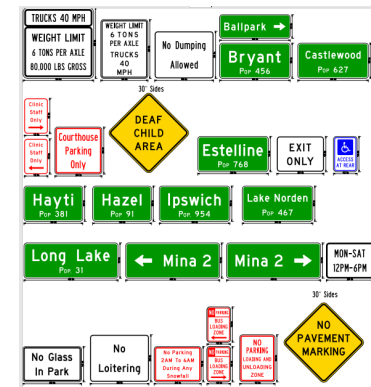
18

Sign Fabrication



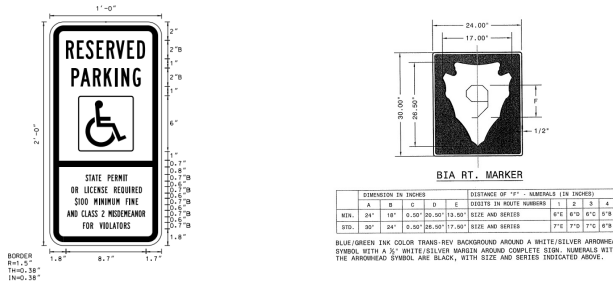
19

Obtain Shop Drawings or Plan Layouts



20

Sign Design Requirements



21

Improvising to Provide a Message?



22

Unnecessary Signs?



23

Are these Signs Providing Driver Info?



24

Unnecessary Signs?



25

Better Alternatives



26

Well, that bridge is CLOSED!



27

General Sign Maintenance

- Clean Your Signs
 - For maximum service life, keep signs clean and free from dirt, oil, tar, and bituminous material.
 - Avoid pressure washers and scrubbing with stiff bristle brushes
 - Treat like a car finish
- Tar, Oil, and Bituminous Material Removal
 - Use a citrus cleaner recommend by the sign sheeting manufacturer
 - Apply cleaner per manufacture as most do not recommend direct application
 - Rinse with clean water
- Graffiti Removal – try the following in the order shown
 - Soap and Water
 - Isopropyl alcohol
 - Citrus cleaner
 - Mineral spirits
 - Commercial graffiti removers



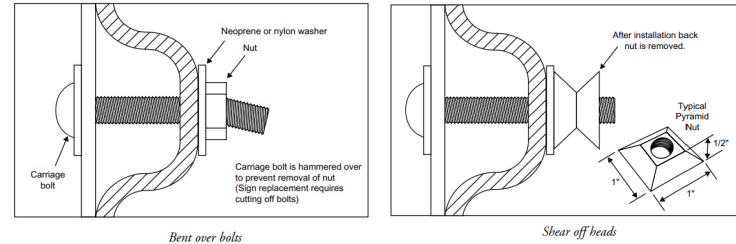
28

Sign Repair



29

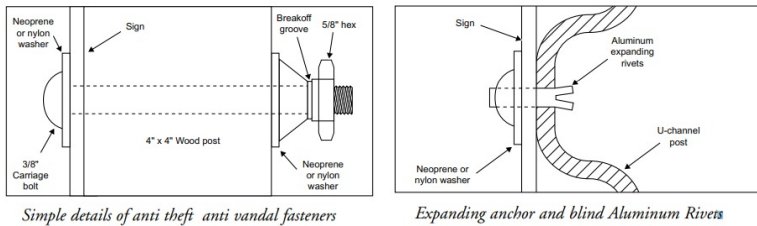
How to Guard Against Theft



30

How to Guard Against Theft

**Mn/DOT
2002**
\$700 fine and/or imprisonment
for theft or vandalism of this sign



31

Post Installation Issues



32

SDDOT Guidance on NPZ Pennants

33

Able to mow?

34

Use Caution with the # of Supports

35

MUCTD Guidance on Mounting Height

A – Roadside sign in rural area


C – Roadside sign in business, commercial, or residential area

*Where parking or pedestrian movements are likely to occur

36

Guidance on Mounting Height

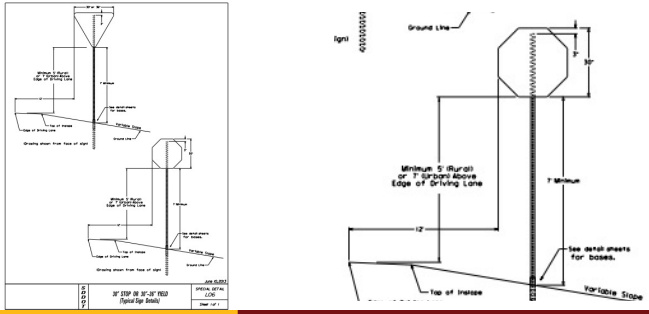
Section 2A.15 Mounting Height
Standard:
 01 The provisions of this Section shall apply unless specifically stated otherwise for a particular sign or object marker elsewhere in this Manual.
Support:
 02 It might be necessary to use larger minimum mounting heights than those prescribed in this Manual to ensure appropriate crash performance of sign installations that are required to be crashworthy (see Section 1D.11).
 03 In addition to the provisions of this Section, information affecting the minimum mounting height of signs as a function of crash performance can be found in the "Roadside Design Guide," 4th Edition, 2011, AASHTO.
Standard:
 04 In rural areas, the minimum height, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement, of signs installed at the side of the road shall be 5 feet (see Figure 2A-2).
 05 In business, commercial, or residential areas where parking, bicyclist, or pedestrian movements are likely to occur, or where the view of the sign might be obstructed, the minimum height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of signs installed at the side of the road shall be 7 feet (see Figure 2A-2).
Option:
 06 The height to the bottom of a secondary sign mounted below another sign may be 1 foot less than the height specified in Paragraphs 4 and 5 of this Section.
Standard:
 07 The minimum height of signs, measured vertically from the bottom of the sign to the sidewalk shall be 7 feet.



02 It might be necessary to use larger minimum mounting heights than those prescribed in this Manual to ensure appropriate crash performance of sign installations that are required to be crashworthy (see Section 1D.11).

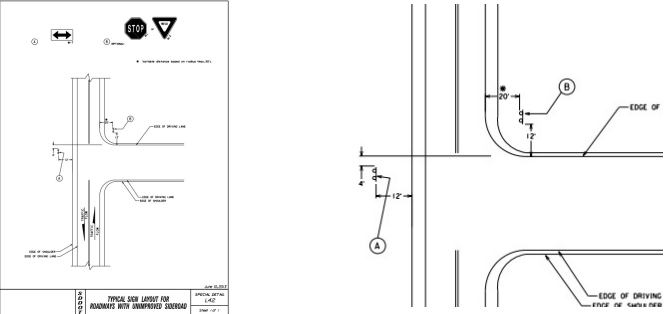
37

SDDOT Guidance on Mounting Height



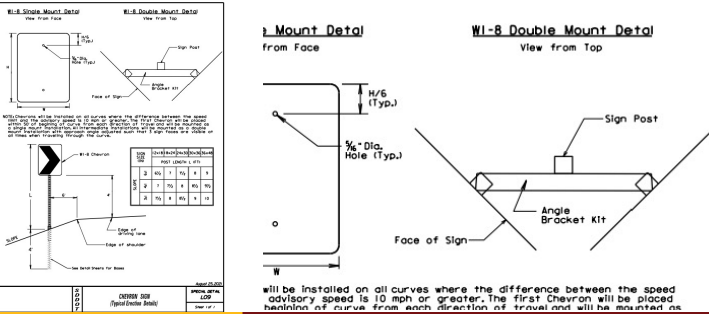
38

SDDOT Guidance on Sign Offset



39

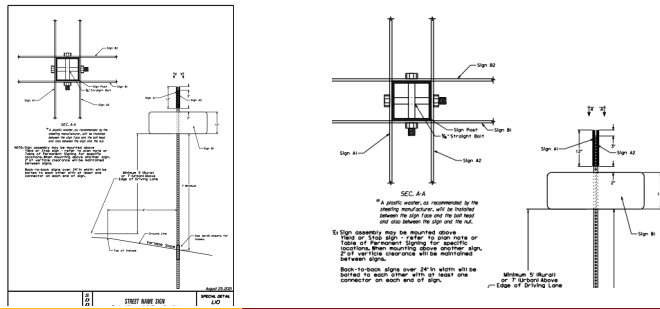
SDDOT Guidance on Sign Hardware



will be installed on all curves where the difference between the speed advisory speed is 10 mph or greater. The first Chevron will be placed backside of curve from each direction of travel and will be mounted as

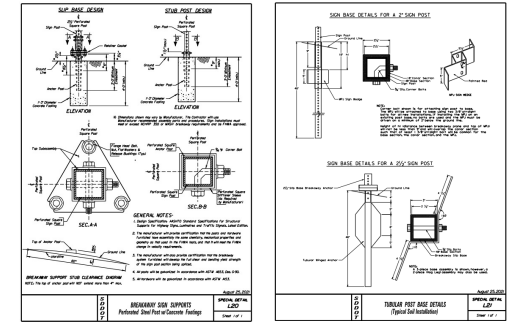
40

SDDOT Guidance on Sign Hardware



41

SDDOT Guidance on Sign Hardware



42

Questions ?

Doug Kinniburgh
 LGA Engineering Supervisor
Doug.Kinniburgh@state.sd.us
 (605)773-4284
 700 East Broadway Ave.
 Pierre, SD 57501



Better Lives Through Better Transportation

43