

Traffic Engineering 101 - The Basics

Understanding the basic principles and how these drive the decisions regarding traffic management in Louisiana





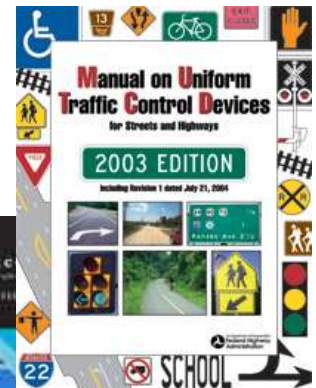
Traffic Engineering 101

- Purpose:
 - To provide an overview of engineering principles; guidelines & laws which govern traffic management in Louisiana
 - Discuss how DOTD's decisions impact local communities
 - Facilitate feedback & questions from local agencies on state and local traffic engineering issues



Manual on Uniform Traffic Control Devices

- Federal policy
- All states must adopt
- Set minimums for traffic control devices such as
 - Signs
 - Pavement marking
 - And signals





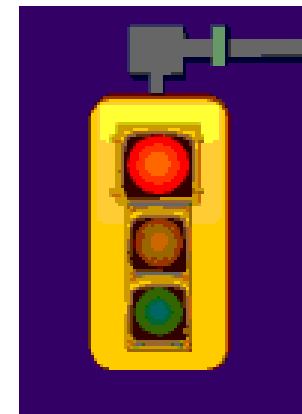
Engineering Design Standard Manual

- DOTD policy
- Signed by Chief Engineer
- Provides additional requirements



Basic Principle of Traffic Engineering

“Everything is designed to meet Driver Expectancy”





Driver Expectancy





Driver Expectancy





TR Engineering 101

- Module:

1. Introduction & Overview (3/22/10)
2. Speed Management Overview (4/26/10)
3. School Zones (4/26/10)
4. Intersection Traffic Control (5/24/10)
5. Traffic Signal (5/24/10)
6. Roundabouts (5/24/10)
7. **Sign Selection & Installation (6/28/10)**
8. **Work Zones (6/28/10)**
9. Access Management (7/26/10)
10. Roundabouts (8/23/10)



Work Zone Signing and Devices

- MUTCD & DOTD Policy
- DOTD current details





Standard Signs, Special Signs and Installation

- MUTCD & DOTD Policy
- Installation of signs



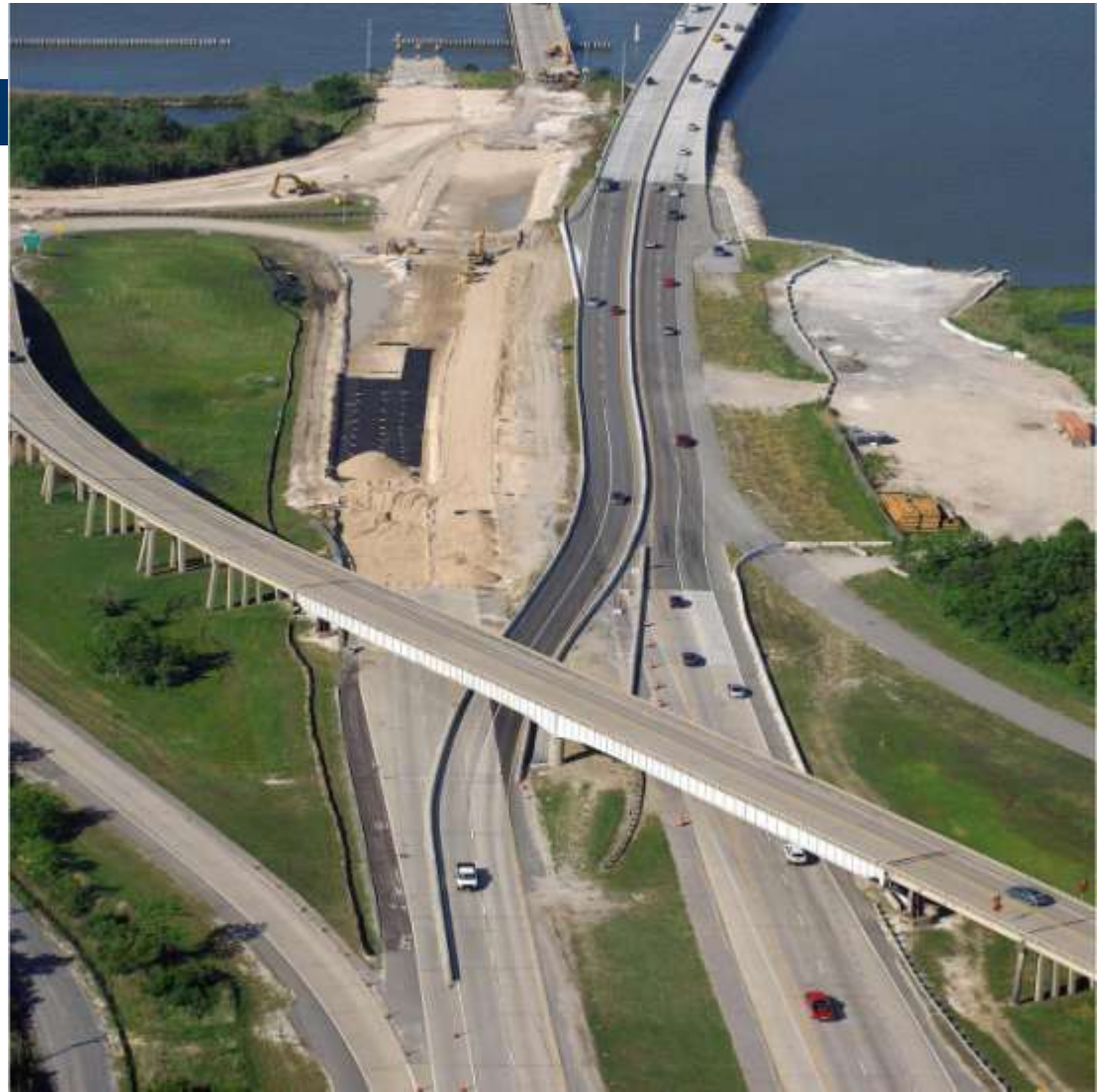


More Suggestions?

- Other traffic issues or questions?
- Contact Jody Colvin at Jody.Colvin@la.gov
- or Marie B. Walsh at mbwalsh@ltrc.lsu.edu

Work Zones -Temporary Traffic Control

Traffic
Engineering 101
Webinar
June 28, 2010



Work Zones -Temporary Traffic Control

**WHY SHOULD
WE BE
CONCERNED?**



Work Zones -Temporary Traffic Control

- Work zones account for 800 to 1000 fatalities per year on our roads
- About 40,000 injuries occur in work zones every year, and most are occupants of vehicles
- Work zones account for about 10 percent of delays due to traffic congestion nationwide, or 24 percent of non-recurring delays

Work Zones - Temporary Traffic Control

Special concerns:

- Work zones present road users with changing and unexpected circumstances
- Work zones affect the public's perception of government, in both good and bad ways
- As our road system ages, more and more projects must be done under active traffic conditions (80% and rising), meaning more exposure to workers and motorists

Work Zones - Temporary Traffic Control



- There are over 3000 active work zones at any time on our busiest highways
- Motorists can expect to encounter one work zone for every 100 miles traveled

Work Zones - Temporary Traffic Control



- The key to safe and efficient work zones, as in all traffic control, is good communication with the road user
- Most communication with road users is done visually through signs, markings, and channelizing devices

Work Zones - Temporary Traffic Control

A

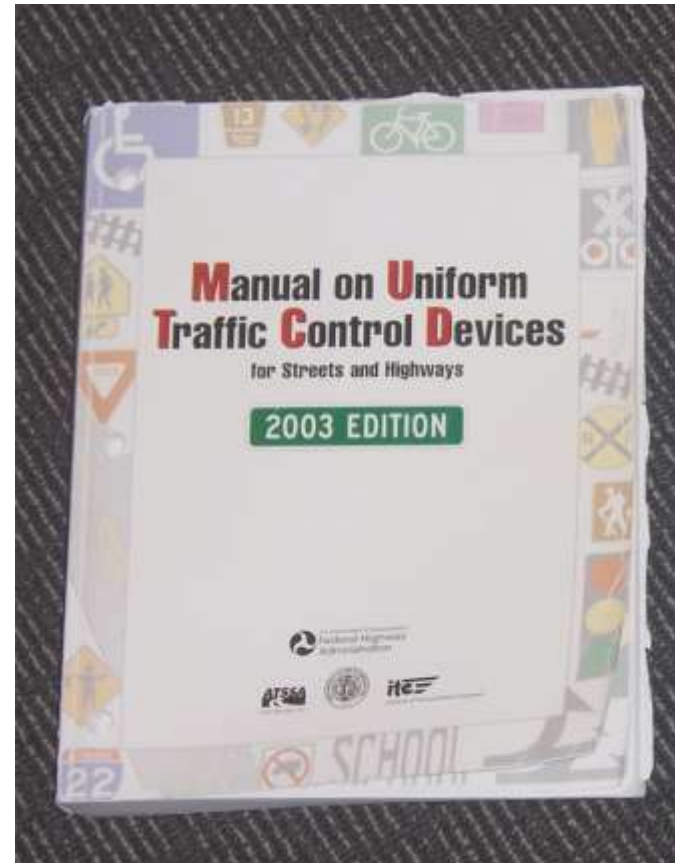


B



Work Zones - Temporary Traffic Control

- Design and usage of Traffic Control Devices in Work Zones is governed by the Manual on Uniform Traffic Control Devices (MUTCD)
- Part 6 of the MUTCD addresses the special requirements for Temporary Traffic Control in Work Zones



Work Zone Traffic Management



- The most common type of sign in work zones is the warning sign, but instead of being yellow, warning signs in work zones are orange
- Most other signs used in work zones keep the same colors as their counterparts outside of the work zone

Work Zones - Temporary Traffic Control

- Channelizing devices
 - Drums
 - Cones
 - Delineators
- Always used in a series to provide guidance to road users



Work Zones - Temporary Traffic Control

On which side of this barricade should traffic pass ?



Work Zones - Temporary Traffic Control



- Portable Changeable Message Signs (PCMS)
- Programmable Messages
- Can give updates on road, lane and ramp closures

Work Zones - Temporary Traffic Control

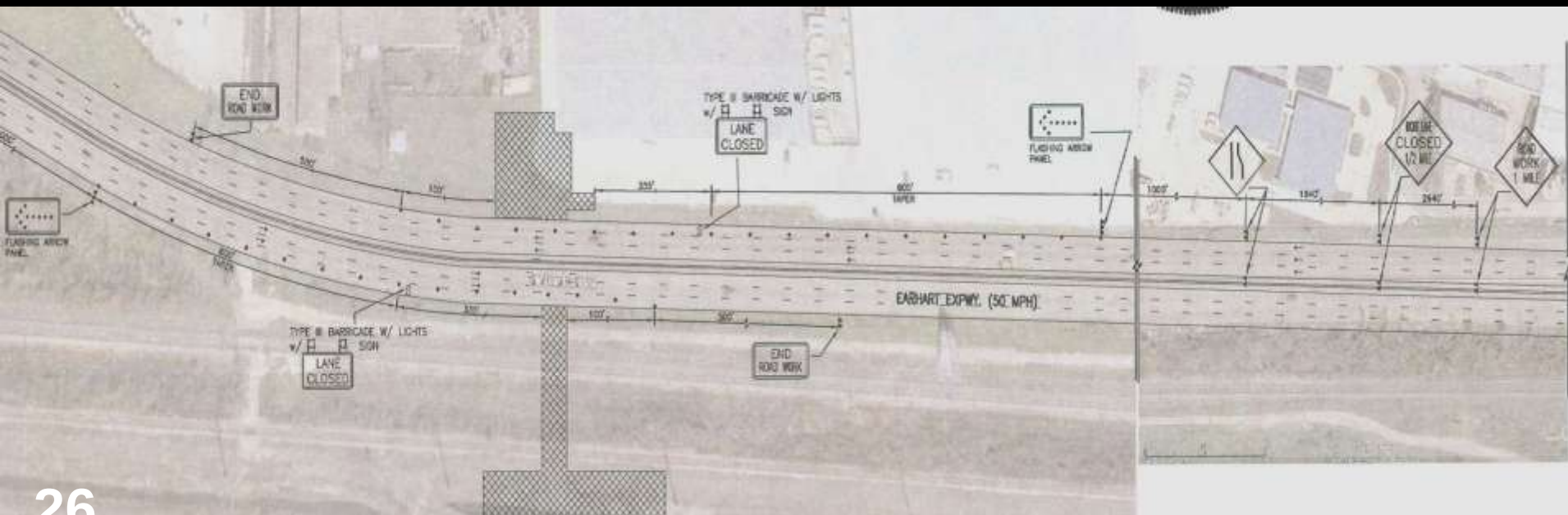
- PCMS Messages must relate to traffic conditions
- No advertising allowed
- Guidance and approved abbreviations in the MUTCD



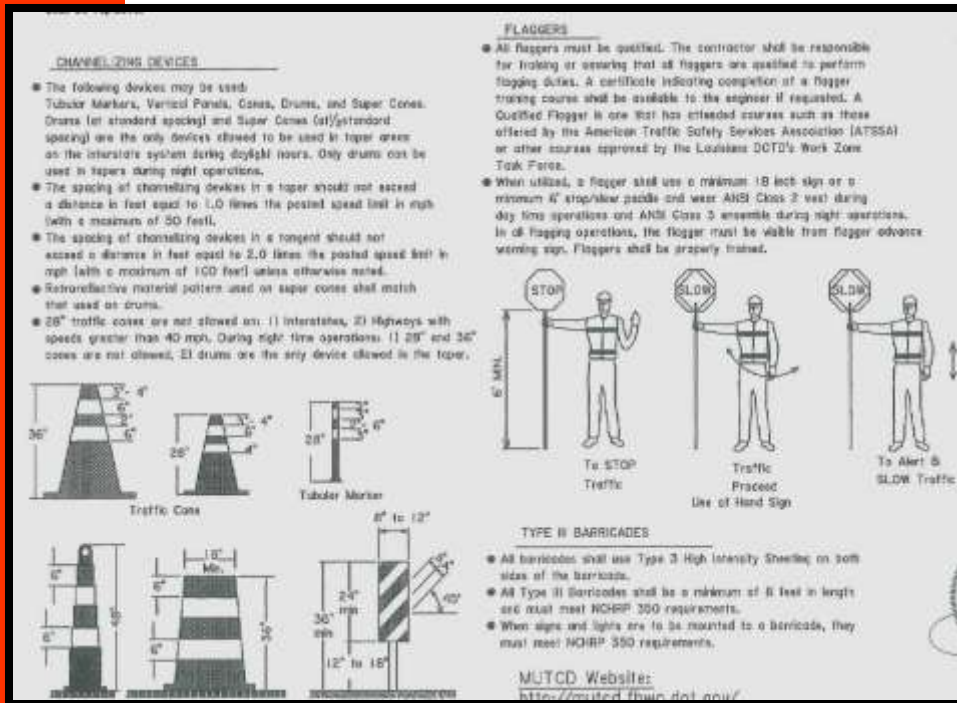


Work Zones - Temporary Traffic Control

Temporary Traffic Control Plans must be prepared by qualified engineering personnel!



Work Zones - Temporary Traffic Control



- Site specific plans will still be needed in many cases
- TC Details developed by DOTD can help standardize Traffic Control in Work Zones

Work Zones - Temporary Traffic Control

Additional resources:

- ATSSA.org
- FHWA.dot.gov
- LTAP center
 - www.louisianaltap.org
- DOTD District Traffic Operations Engineers



Work Zones - Temporary Traffic Control

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Traffic Control Details

Joy Johnson
LA DOTD Section 77
Traffic Engineering Management



What are the LA DOTD Traffic Control Details?

- ◆ A resource for state and local agencies
- ◆ Also known as TC Details
- ◆ General and specific information
 - Design of temporary traffic control plans
 - Placement of traffic control devices



The LA DOTD TC Details also provide:

- ◆ Examples of typical traffic control layouts
- ◆ References to publications related to work zone safety:
 - *NCHRP Reports*
 - *ATSSA Guidelines*
 - *LA DOTD QPL List*
 - *LA Standard Specifications for Roads and Bridges*
 - *FHWA Handbooks*
 - *AASHTO Roadside Design Guide*



DOTD uses the Traffic Control Details for:

- ◆ Permits
- ◆ Road and bridge construction
- ◆ Roadside mowing and clearing
- ◆ Traffic signal maintenance
- ◆ Sign installation and replacement
- ◆ Roadway striping



Local Agencies can use the TC Details for:

- ◆ Implementing state standards into traffic control design
- ◆ Answering questions related to traffic control
- ◆ Maintaining uniformity in the use of traffic control devices
- ◆ Guidance for common traffic control situations



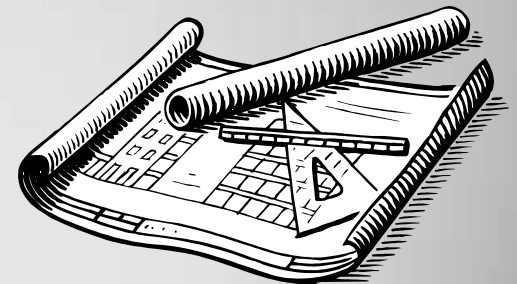
Who else uses the Traffic Control Details?

- ◆ Consultants
- ◆ Contractors
- ◆ Traffic Control Technicians and Supervisors
- ◆ Utility Workers
- ◆ Maintenance Personnel



2010 Traffic Control Details

- ◆ Revised March 2010
- ◆ Collaboration of the Louisiana Work Zone Task Force
- ◆ Required for Plan Delivery Dates of August 2010 or later
- ◆ 20 Sheets



TC-00(A)

Second General Notes Sheet

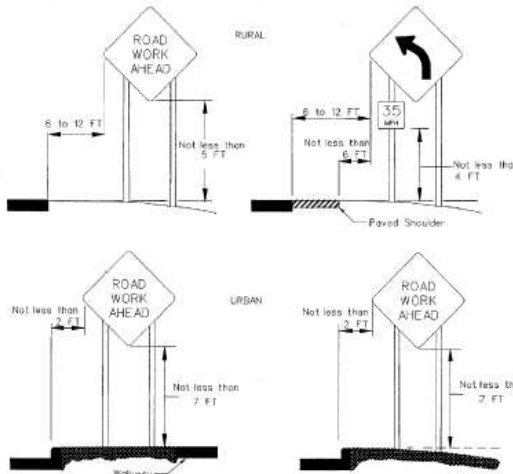
TC-00(B)

SIGNS

- All signs used for temporary traffic control shall follow the plans, the LADOTD TC Details, and the MUTCD.
- Signs shown in the TC illustrations are typical and may vary with each specific condition.
- When projects are separated by less than one mile, they shall be signed as one project.
- One Type B High Intensity light shall be used to supplement the first sign (or pair of signs) that gives warning about a lane closure during night time operations (see GPL).
- Mesh rollup signs shall not be allowed on any project.
- Contractor shall use caution not to damage existing signs which remain in place. Any LADOTD signs damaged by work operations shall be replaced by the contractor under item 713-01-DQ100.
- All signs (permanent and temporary) shall be removed or completely covered with a strong, lightweight, opaque material when no longer applicable. (Burlap is not an acceptable material to cover signs).
- At no time shall signs warning against a particular operation be left in place once the operation has been completed or where the condition has been removed.
- Signs shall have a minimum of two bolts per post.
- Warning signs used for temporary traffic controls shall meet the following guidelines unless otherwise noted in the plans:
 - size shall be 48 inches by 48 inches.
 - see the Louisiana Standard Specifications for Roads and Bridges and the QPL for sheeting information.
 - Lateral distance of signs shall be a minimum of 6 feet from the edge of shoulder or edge of pavement if no shoulder exists, and 2 feet from the back of curb in urban areas (see diagram).
- When portable sign frames are not in use they shall be removed from the pavement and shoulder area; if they remain, they shall be standing (do not lay the stand down), facing away from traffic. If the sign stand is used on a bridge it shall be attached to a bridge rail.
- Left side mounted signs will not be required for roadways with a center left turn lane and for undivided roadways.

SIGN SUPPORT AND HEIGHT

- Signs over 10 square feet shall be mounted on two posts and signs over 20 square feet shall be mounted on at least three posts. The following sign height and support shall be required:
 - a 2 pound U-Channel post shall be used and driven to a minimum depth of 3 feet. (if splicing is required see Allowable Lap Splice for U-Channel Post.)
 - for Rural areas the sign height shall be a minimum of 5 feet above the roadway (see diagram).
 - for Urban areas the sign height shall be a minimum of 7 feet above the roadway (see diagram).
- For warning signs used for lane closures and lane shifts where the road will return to full public use within 12 hours and the roadway has no more than 2 lanes in each direction then:
 - a vinyl rollup sign will be allowed provided that they meet all size, color, retroreflectivity requirements, and NCHRP Report 350.
 - NCHRP Report 350 approved portable sign frames may be used, provided they are visible to the driver (i.e. no obstructions such as on street parking or other traffic control devices shall block the sign).



LANE CLOSURES

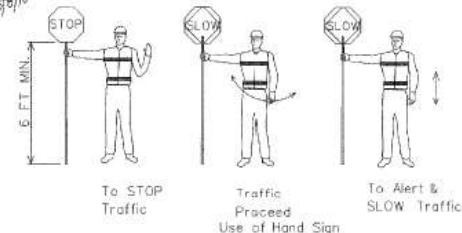
- All proposed lane, road, or shoulder closures shall be reviewed by the DTOE and approved by the Project Engineer.
- Two lane, two-way highways shall have a maximum work area of two miles; all other roadways shall have a four mile maximum work area.
- A queue analysis shall be performed by the engineer prior to approval of lane closures on all interstates according to EDMS V.1.1.4.
- Closure plans and times shall be turned in to the Project Engineer for review according to the following:
 - 5 working days minimum if traffic control plan has been approved or is contained in the plans.
 - 10 working days minimum and a traffic control plan must be submitted for lane closures not addressed in the plans.
- Weekly updates to the DTOE, Project Engineer, the LADOTD TMC operator, and the regional TMC operator (if applicable) will be required for all ongoing lane closures to update the closure status.
- Daily updates to the DTOE, Project Engineer, and TMC operator (if applicable) will be required for all projects where active closures are in place.

FLAGGERS

- All flaggers shall be qualified.
- The contractor shall be responsible for training or assuring that all flaggers are qualified to perform flagging duties.
- A Qualified Flagger is one that has completed courses such as those offered by ATSSA, AGC, or other courses approved by the LADOTD Work Zone Task Force. The contractor shall be responsible for getting the flagger course approved.
- When utilized, a flagger shall use a minimum 18 inch octagonal shape sign on a minimum 6 foot stop/slow paddle and wear ANSI Class 2 Lime Green vest during day time operations and ANSI Class 3 Lime Green ensemble during night operations.
- In all flagging operations, the flagger must be visible from the flagger advance warning sign.

REFERENCES

- The contractor shall be responsible for understanding all rules and requirements in the current edition of the following documents:
 - Louisiana Standard Specifications for Roads and Bridges. <http://www.dotd.louisiana.gov/doclist.asp?ID=50>
 - Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD). <http://mutcd.fhwa.dot.gov>
 - LADOTD Qualified Products List (QPL) Manual. <http://www.dotd.louisiana.gov/highways/construction/lab/qpl/tableofcontents.shtml>
 - LADOTD Engineering Directives and Standards Manual (EDSM) V.1.1.4 - Interstate Lane Closures. <http://webmail.dotd.la.gov/ppmemos.nsf>
 - National Cooperative Highway Research Program (NCHRP) Report 350: "Guidelines for Work Zones Traffic Control Devices". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_350-a.pdf
 - NCHRP Report 475: "A Procedure for Assessing and Planning Nighttime Highway Construction and Maintenance". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_475.pdf
 - NCHRP Report 476: "Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_476.pdf
 - NCHRP Report 498: "Illumination Guidelines for Nighttime Highway Work". http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_498.pdf
 - American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide
 - American Traffic Safety Services Association (ATSSA) Quality Guidelines for Work Zone Traffic Control Devices and Features
 - U.S. Department of Transportation Federal Highway Administration Traffic Control Handbook for Mobile Operations at Night. <http://www.dot.state.il.us/plr/1023.pdf>

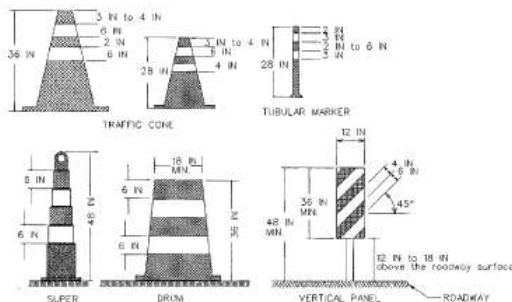


Third General Notes Sheet

TC-00(C)

CHANNELIZING DEVICES

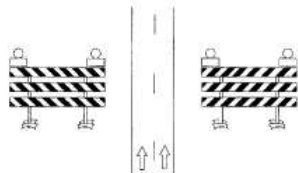
- The following devices may be used as channelizing devices: Tubular Markers, Vertical Panels, Cones, Drums, and Super Cones.
- 28 inch traffic cones are not allowed on:
 - Interstates.
 - Highways with speeds greater than 40 mph.
- During night time operations 28 inch and 36 inch cones are not allowed.
- Retroreflective material pattern used on super cones shall match that used on drums.
- Tangent Areas:**
 - Standard Spacing:** See Standard Device Spacing and Buffer Space table.
 - Daylight Operations:** Drums are spaced at standard spacing. All other devices are at 1/2 standard spacing.
 - Nighttime Operations:** Drums (at standard spacing) and supercones (at 1/2 standard spacing) are the only devices allowed.
- Taper Areas:**
 - Standard Spacing:** See Standard Device Spacing and Buffer Space table.
 - Daylight Operations:** Drums are spaced at standard spacing. All other devices are 1/2 standard spacing.
 - Nighttime Operations:** Drums (at standard spacing) are the only devices allowed.
- Type C steady burn lights shall be used on all channelizing devices in the taper as well as the first two devices in the tangent at night, (see the QPL).
- Typical channelizing device lateral placement (do not include when it is used as a divider for opposing directions of traffic) shall be 2 feet off the lane line in the closed lane or shoulder.
- Devices may be adjusted laterally to accommodate ongoing work in the immediate vicinity but must be returned to the closed lane after the work activity has moved.
- A 10 foot minimum travel lane should be maintained where practical.
- Channelizing devices on the lane line shall be of the same type.
- Channelizing devices in each taper shall be of the same type.



30
ALL DETAILS SHOW MINIMUM CONSTRUCTION SIGNING.
ALL SITUATIONS SHALL BE REVIEWED AND/OR DESIGNED BY THE ENGINEER.
CONTRACTORS ARE RESPONSIBLE FOR COMPLYING WITH ALL TC DETAILS.

TYPE II BARRICADES

- All barricades shall use Type 3 High Intensity Sheeting on both sides of the barricade.
- All Type II Barricades shall be a minimum of 8 feet in length and must meet NCHRP Report 350 requirements.
- When used for overnight closures, two Type B High Intensity lights shall supplement all barricades that are placed in a closed lane or that extend across a highway. Two Type A Low Intensity lights may be used in urban areas if approved by the Project Engineer (see QPL).
- When signs and lights are to be mounted to a barricade, they must meet NCHRP Report 350 requirements.
- Type II barricades shall be placed:
 - at the beginning of a closed lane or shoulder and at 1,000 foot intervals where no active work is ongoing and the lane must remain closed. A minimum of 2 barricades shall be placed if the lane or shoulder closure is less than 2,000 feet. (One Barricade shall be placed at the beginning of the lane closure and one shall be placed in the middle of the lane closure.)
 - before each or group of unfilled holes or holes filled with temporary material.
 - before uncured concrete.
 - in the closed lane on each side of every intersection and crossover.
 - in front of piles of material (dirt, aggregate, broken concrete), culverts, and equipment which is near the work zone.



DROP-OFFS

- When a shoulder drop-off greater than 2 inches but less than 6 inches exists, a "SHOULDER DROP-OFF" sign will follow the "SHOULDER WORK" sign. When the drop-off exceeds 6 inches, the "SHOULDER DROP-OFF" sign shall be replaced by a "NO SHOULDER" sign.
- A temporary edgeline or channelizing device shall be placed at the pavement edge adjacent to the drop-off during nonworking hours when the dropoff is greater than 2 feet.
- For drop-offs on non-interstate routes vertical panels and a temporary edgeline shall be used.
 - For pre-construction speeds of 40 mph or less space at 20 feet.
 - For pre-construction speeds of 45 mph or more space at 40 feet.
- A concrete barrier shall be used:
 - on all interstate work where a drop-off is 6 inches or greater and within 2 feet of the traveled way.
 - for non-interstate roadways with speeds greater than 45 mph where a drop-off is 10 inches or greater and within 2 feet of the traveled way.
- If a portable concrete barrier will be required then the deflection shall be considered in the design.

STANDARD DEVICE SPACING AND BUFFER SPACE

SPEED LIMIT (prior to construction)	MERGING TAPER LENGTH (L)				STANDARD DEVICE SPACING IN FEET		BUFFER SPACE
	Lane Width (FT)				Along Taper	Along Tangent	
MPH	9	10	11	12			FT
25	95	105	115	125	20	40	155
45	405	450	495	540	40	80	360
55	495	550	605	660	40	80	495
60	540	600	660	720	40	80	570
65	585	650	715	780	40	80	645
70	630	700	770	840	40	80	730

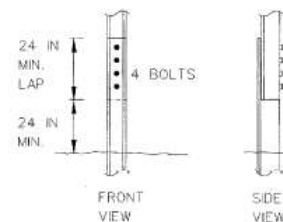
SPEED LIMIT (prior to construction)	SHIFTING TAPER LENGTH				STANDARD DEVICE SPACING IN FEET		BUFFER SPACE
	Lateral Movement				Along Taper	Along Tangent	
MPH	9	10	11	12			FT
25	48	53	57	63	20	40	155
45	203	225	248	270	40	80	360
55	248	275	303	330	40	80	495
60	270	300	330	360	40	80	570
65	293	325	358	390	40	80	645
70	315	350	385	420	40	80	730

SPEED LIMIT (prior to construction)	SHOULDER TAPER LENGTH				STANDARD DEVICE SPACING IN FEET		BUFFER SPACE
	Shoulder Width (FT)				Along Taper	Along Tangent	
MPH	4	6	3	10			FT
25	14	21	28	35	20	40	155
45	60	90	120	150	40	80	360
55	73	110	147	183	40	80	495
60	80	120	160	200	40	80	570
65	87	130	173	217	40	80	645
70	93	140	187	233	40	80	730

- All termination and flagger tapers are 100 feet minimum per lane. (MIN. 6 Channelizing Devices per lane spaced 20 feet apart.)
- See TC Details for Flagger taper.
- See MUTCD for taper formulas.

ALLOWABLE LAP SPICE FOR U-CHANNEL POST

- U-Channel posts may be spliced where long lengths are required. The upper section shall overlap the lower section by at least 24 inches. The bottom edge of the upper section of the splice shall be a minimum of 24 inches above the ground. The spliced sections shall be secured with at least four 5/8 inch diameter hex bolts spaced equally along the splice.



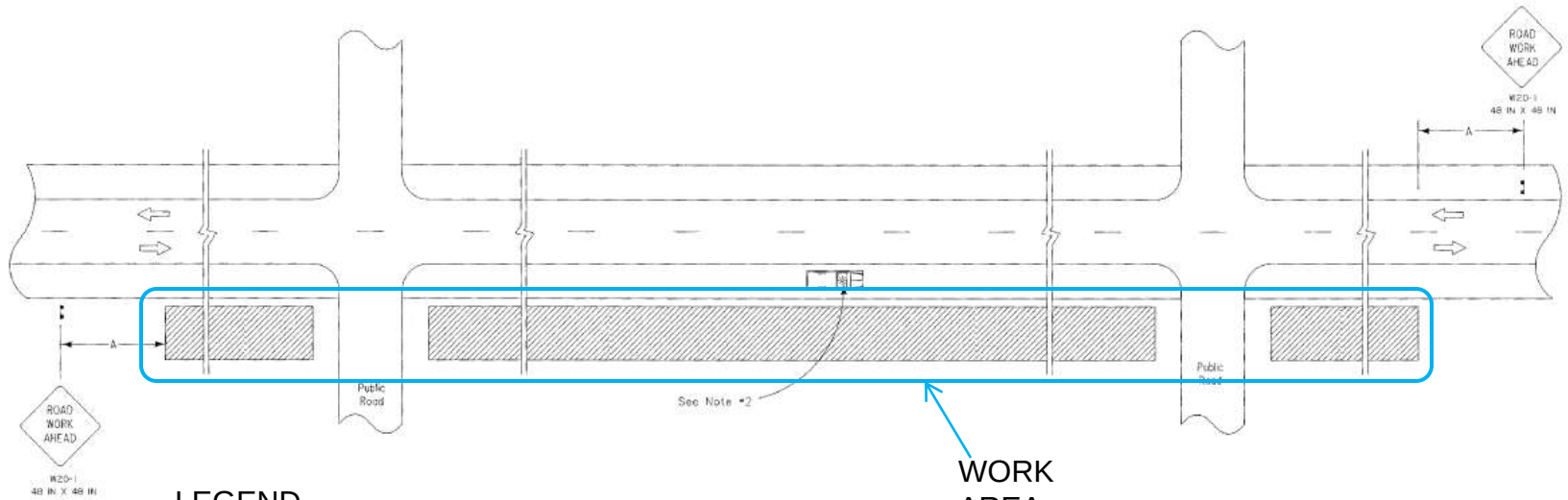
TC-00(D)

TEMPORARY TRAFFIC CONTROL LAYOUT FOR PLACEMENT OF ROAD WORK NEXT XX MILES AND END ROAD WORK SIGNS		 FLORIDA DEPARTMENT OF TRANSPORTATION	SHEET NUMBER
DRAWN BY: J. COLVIN CHECKED BY: P. ALLEN DESIGNED BY: J. JOHNSON APPROVED BY: J. COLVIN DATE: 03/08/2010			

Example of a Typical Layout

TC-01

SEE TC-00(A), TC-00(B), TC-00(C) AND TC-00(D)



LEGEND

LEGEND

- Traffic Sign
- Work Area
- Direction of Travel
- Truck with Amber Light

SPEED LIMIT (prior to construction)	SPACING 'A'
35 mph	500 FT
45 mph	1000 FT
55 mph	1500 FT

41

SIGN SPACING
CHART

WORK
AREA

NOTES

NOTES

This sheet shall be used with the Temporary Traffic Control General Notes Sheets TC-00(A), TC-00(B), TC-00(C), and TC-00(D).

1. This layout represents the minimum traffic controls required for workers and equipment operating more than 15 feet from the travel way.
2. If the operation results in equipment or other vehicles being parked closer than 15 feet to the travelway, but not within the roadway, each vehicle shall have an amber light.
3. When a work area has been established on one side of the roadway only, there shall be no parking on the opposite shoulder within 500 feet of the work area.

ALL TC DETAILS SHOW MINIMUM CONSTRUCTION SIGNING.
ALL SITUATIONS SHALL BE REVIEWED AND/OR DESIGNED BY THE ENGINEER.
CONTRACTORS ARE RESPONSIBLE FOR COMPLYING WITH ALL TC DETAILS.



TRAFFIC CONTROL LAYOUT FOR CONSTRUCTION

TC-01

TRAFFIC ENGINEERING

TC Details address the following situations:

- ◆ Shoulder work
- ◆ Flagging operations
- ◆ Diversions
- ◆ Lane closures
- ◆ Detours
- ◆ Moving operations



Highlights of the Traffic Control Details

- ◆ Encourage uniformity
- ◆ Provide guidance above MUTCD minimum
- ◆ Consult TC Details:
 - Before performing work that affects traffic
 - Before designing temporary traffic control plans
- ◆ Contractors are responsible for complying



Resources

- ◆ Contact LTAP for on-site work zone training
 - Low-volume roads
 - www.LouisianaLTAP.org
 - Louisiana Roads Scholar Program
- ◆ Contact a local LA DOTD District traffic office



LA DOTD Traffic Control Details are located at **www.dotd.la.gov**.

For more information or to request a copy of the DOTD Traffic Control Details contact Joy Johnson:

(225) 242-4636
joy.johnson@la.gov





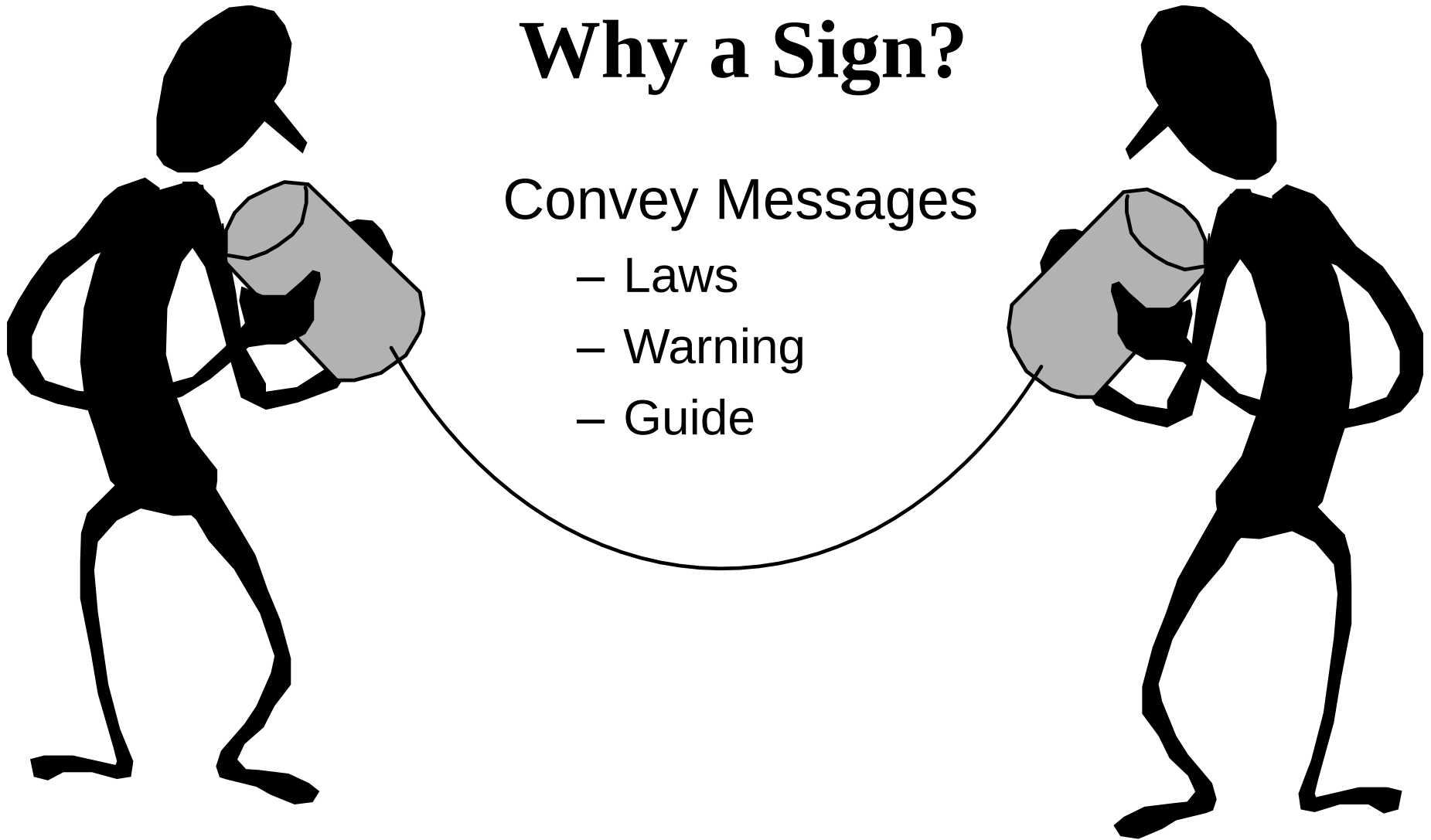
Signs



Why a Sign?

Convey Messages

- Laws
- Warning
- Guide



Communicate!

Too Many Signs?





Excessive Use of Signs

- All signs should be used conservatively
- If over used tend to lose their effectiveness.
- Signs should be used only where justified by engineering judgment or studies



Which way do you go?





Which route?





Standard Signs

- Covered in the MUTCD
- Different categories
 - Regulatory
 - Warning
 - Guide
- Standardized
 - Shapes
 - Colors
 - Sizes
 - Layouts
 - Fonts
 - Symbols



Standard Signs

- A. Regulatory signs give notice of traffic laws or regulations.





Standard Signs

- B. Warning signs give notice of a situation that might not be readily apparent.



Standard Signs

- C. Guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.



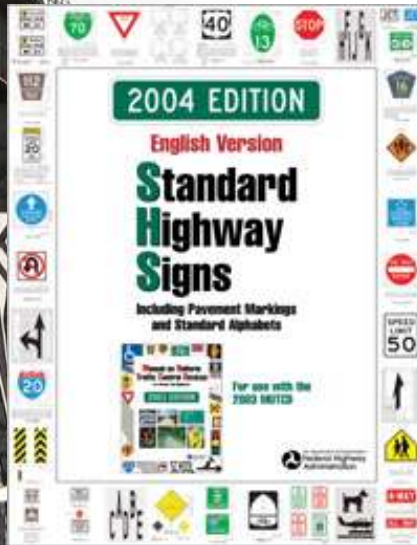


Standard Highway Signs

This manual shows typical signs approved for use on streets and highways.

What's included:

- Design layout for standard signs
- Design guidelines for non standard signs
- Approved alphabet
- Pavement marking standards





Standard Sign Layout



W1-1L

W1-1R
TURN

See page 62 for symbol design.

A	B	C	D	E	F	G	H	J	K	L	M	N
18	.375	.625	.725	2.25	2.625	5.875	3.75	1.875	1	.625	2.5	1.5
24	.375	.625	0.625	3	3.5	7.75	5	2.5	1.5	.813	3.25	1.5
30	5	.75	12	3.75	4.375	9.688	6.25	3	1.875	1	4.063	1.875
36	.625	.875	14.375	4.5	5.25	11.625	7.5	3.625	2.25	1.25	4.875	2.25
48	.75	1.25	19.188	6	7	15.5	10	4.875	3	1.625	6.5	3

WARNING SIGN COLORS:
LEGEND — BLACK
BACKGROUND— YELLOW (RETROREFLECTIVE)

TTC SIGN COLORS:
LEGEND — BLACK
BACKGROUND— ORANGE (RETROREFLECTIVE)



Alphabet Example

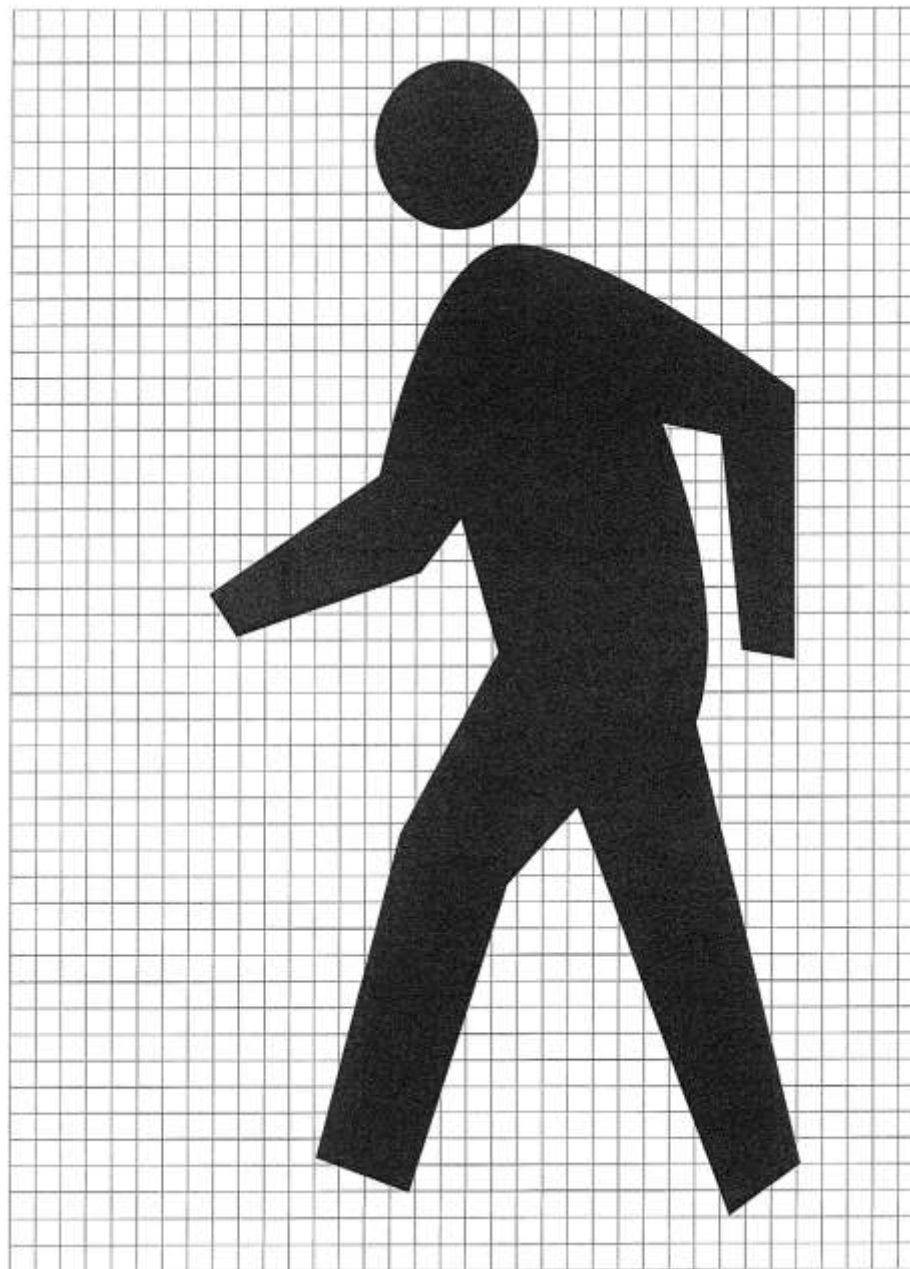
SERIES EM 2000

ABC
DEF
GHI



Symbols

- All symbols shall be unmistakably similar to, or mirror images of, the adopted symbol signs
- Symbols and colors shall not be modified unless otherwise provided in the MUTCD
- In the “Standard Highway Signs and Markings” book





Word Messages

- Where a standard word message is applicable, the wording shall be as provided in this Manual.
- Non standard word message signs may be used on the same shape and color as described in the MUTCD





Signs at Night

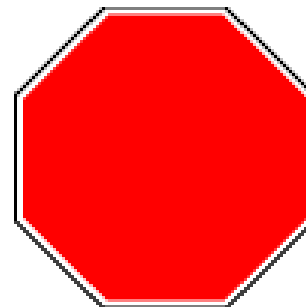
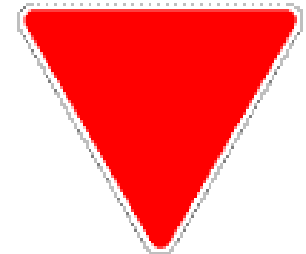
- Signs shall be retroreflective or illuminated
- Must look the same at night as during the day
 - Same shape
 - Similar color
- The requirements for sign illumination shall not be considered to be satisfied by street or highway lighting.





Shapes

Particular shapes shall be used exclusively for specific signs or series of signs.





Shapes

Particular shapes shall be used exclusively for specific signs or series of signs.

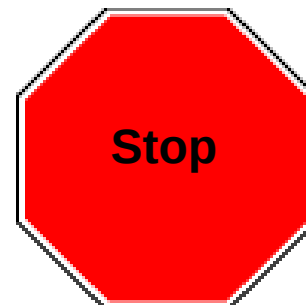
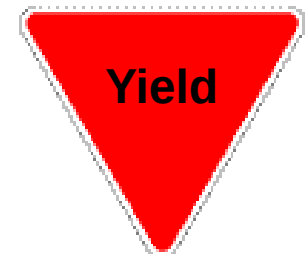
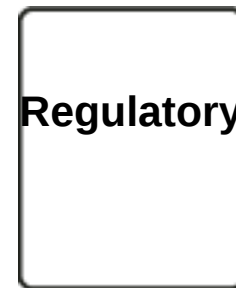


Table 2A-4. Use of Sign Shapes

Shape	Signs
Octagon	Stop*
Equilateral Triangle (1 point down)	Yield*
Circle	Grade Crossing Advance Warning*
Pennant Shape/Isosceles Triangle (longer axis horizontal)	No Passing*
Pentagon (pointed up)	School Advance Warning Sign (squared bottom corners)* County Route Sign (tapered bottom corners)*
Crossbuck (two rectangles in an "X" configuration)	Grade Crossing*
Diamond	Warning Series
Rectangle (including square)	Regulatory Series Guide Series** Warning Series
Trapezoid	Recreational and Cultural Interest Area Series National Forest Route Sign

* This sign shall be exclusively the shape shown.

** Guide series includes general service, specific service, tourist-oriented directional, general information, recreational and cultural interest area, and emergency management signs.



Colors

The colors to be used on standard signs and their specific use on these signs shall be as provided in the applicable Sections of the MUTCD.



Colors

The colors to be used on standard signs and their specific use on these signs shall be as provided in the applicable Sections of the MUTCD.

Regulatory



Warning



Construction

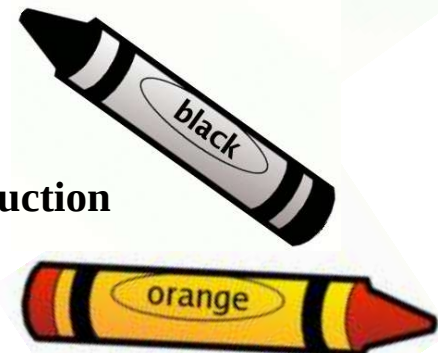


Table 2A-5. Common Uses of Sign Colors

Type of Sign	Legend								Background											
	Black	Green	Red	White	Yellow	Orange	Fluorescent Yellow-Green	Fluorescent Pink	Black	Blue	Brown	Green	Orange*	Red*	White	Yellow*	Purple	Fluorescent Yellow-Green	Fluorescent Pink	
Regulatory	X		X	X					X					X	X					
Prohibitive			X	X										X	X					
Permissive		X													X					
Warning	X															X				
Pedestrian	X															X		X		
Bicycle	X															X		X		
Guide				X								X								
Interstate Route				X						X				X						
State Route	X														X					
U.S. Route	X														X					
County Route					X					X										
Forest Route				X							X									
Street Name				X								X								
Destination				X								X								
Reference Location				X								X								
Information				X						X		X								
Evacuation Route				X						X										
Road User Service				X						X										
Recreational				X							X	X								
Temporary Traffic Control	X												X							
Incident Management	X												X						X	
School	X																	X		
ETC-Account Only	X																X****			
Changeable Message Signs																				
Regulatory			X***	X					X											
Warning					X				X											
Temporary Traffic Control					X	X			X											
Guide				X					X			X**								
Motorist Services				X					X	X**										
Incident Management					X			X	X											
School, Pedestrian, Bicycle					X		X		X											

* Fluorescent versions of these background colors may also be used.

** These alternative background colors would be provided by blue or green lighted pixels such that the entire CMS would be lighted, not just the legend.

*** Red is used only for the circle and slash or other red elements of a similar static regulatory sign.

**** The use of the color purple on signs is restricted per the provisions of Paragraph 1 of Section 2F.03.

Example of Sign Colors

Table 2A-5. Common Uses of Sign Colors

Type of Sign	Legend								Background										
	Black	Green	Red	White	Yellow	Orange	Fluorescent Yellow-Green	Fluorescent Pink	Black	Blue	Brown	Green	Orange*	Red*	White	Yellow*	Purple	Fluorescent Yellow-Green	Fluorescent Pink
Incident Management					X			X	X										
School, Pedestrian, Bicycle					X		X		X										

* Fluorescent versions of these background colors may also be used.

** These alternative background colors would be provided by blue or green lighted pixels such that the entire CMS would be lighted, not just the legend.

*** Red is used only for the circle and slash or other red elements of a similar static regulatory sign.

**** The use of the color purple on signs is restricted per the provisions of Paragraph 1 of Section 2F.03.

Figure 7B-1. School Area Signs



Regulatory

- Used to inform road users of selected traffic laws or regulations
- Rectangular unless specifically designated otherwise in the MUTCD
- Black letters on white background or red letters on white background
- Exceptions
 - Stop Sign
 - Yield sign





Regulatory Signs for City Ordinances



- Non standard Sign
- Complete a Traffic Control Device Permit Form
- Attach
 - Ordinance
 - Shop drawing of sign
 - Map showing proposed location of sign



Warning

- Used to alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.
- The use of warning signs shall be based on an engineering study or on engineering judgment.
- The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs.





Warning

- Diamond shaped unless specifically designated otherwise in the MUTCD
- Black letters on yellow background
- Exception:
 - Construction Warning signs
 - Orange background and black lettering





Warning

- Placed to provide an adequate Perception Reaction Time.
- MUTCD Table 2C-4 show the guidelines for advance warning signs
- Do not place too far in advance of the condition because drivers might forget the warning because of other driving distractions.

Table 2C-4. Guidelines for Advance Placement of Warning Signs

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

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 appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four 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 must 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 (2005 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 2005 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.

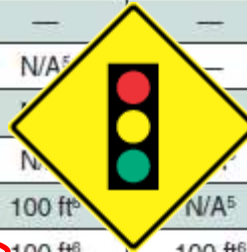
⁴ Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PRT, a vehicle deceleration rate of 10 feet/second², minus the sign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

⁵ No suggested distances are provided for these speeds, as the 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 signs.

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

Table 2C-4. Guidelines for Advance Placement of Warning Signs

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20 mph	225 ft	100 ft ⁶	N/A ⁵	—	—	—	—	—	—
25 mph	325 ft	100 ft ⁶	N/A ⁵	N/A ⁵	—	—	—	—	—
30 mph	460 ft	100 ft ⁶	N/A ⁵	—	—	—	—	—	—
35 mph	565 ft	100 ft ⁶	N/A ⁵	N/A ⁵	—	—	—	—	—
40 mph	670 ft	125 ft	100 ft ⁶	100 ft ⁶	N/A ⁵	—	—	—	—
45 mph	775 ft	175 ft	125 ft	100 ft ⁶	100 ft ⁶	N/A ⁵	—	—	—
50 mph	885 ft	250 ft	200 ft	175 ft	125 ft	100 ft ⁶	—	—	—
55 mph	990 ft	325 ft	275 ft	225 ft	200 ft	125 ft	N/A ⁵	—	—
60 mph	1,100 ft	400 ft	350 ft	325 ft	275 ft	200 ft	100 ft ⁶	—	—
65 mph	1,200 ft	475 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft ⁶	—
70 mph	1,250 ft	550 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	—
75 mph	1,350 ft	650 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft ⁶



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 appropriate for an alignment warning symbol sign. For Conditions A and B, warning signs with less than 6-inch legend or more than four words, a minimum of 100 feet should be added to the advance placement distance to provide adequate legibility of the warning sign.

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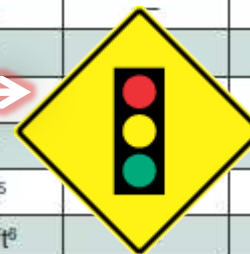
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25 mph	325 ft	100 ft ⁶	N/A ⁵	N/A ⁵	—	—	—	—	—
30 mph	460 ft	100 ft ⁶	N/A ⁵	N/A ⁵	—	—	—	—	—
35 mph	565 ft	100 ft ⁶	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—
40 mph	670 ft	125 ft	100 ft ⁶	100 ft ⁶	N/A ⁵	—	—	—	—
45 mph	775 ft	175 ft	125 ft	100 ft ⁶	100 ft ⁶	N/A ⁵	—	—	—
50 mph	885 ft	250 ft	200 ft	175 ft	125 ft	100 ft ⁶	—	—	—
55 mph	990 ft	325 ft	275 ft	225 ft	200 ft	125 ft	N/A ⁵	—	—
60 mph	1,100 ft	400 ft	350 ft	325 ft	275 ft	200 ft	100 ft ⁶	—	—
65 mph	1,200 ft	475 ft	450 ft	400 ft	350 ft	275 ft	200 ft	100 ft ⁶	—
70 mph	1,250 ft	550 ft	525 ft	500 ft	450 ft	375 ft	275 ft	150 ft	—
75 mph	1,350 ft	650 ft	625 ft	600 ft	550 ft	475 ft	375 ft	250 ft	100 ft ⁶



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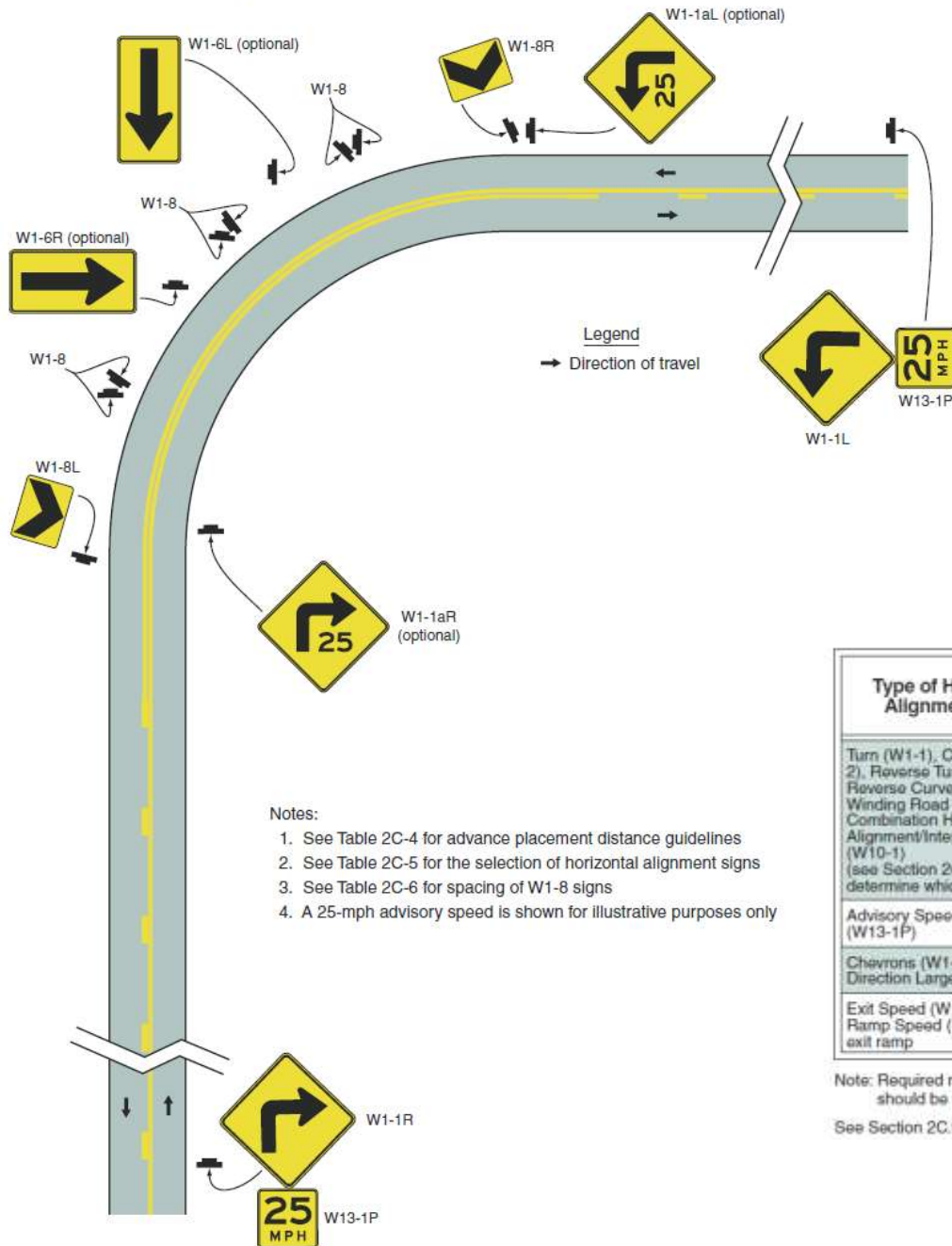


Curve Warning Signs

- Shall be used in advance of horizontal curves:
 - on freeways,
 - on expressways, and
 - on roadways with more than 1,000 AADT



Figure 2C-2. Example of Warning Signs for a Turn



Notes:

1. See Table 2C-4 for advance placement distance guidelines
2. See Table 2C-5 for the selection of horizontal alignment signs
3. See Table 2C-6 for spacing of W1-8 signs
4. A 25-mph advisory speed is shown for illustrative purposes only

Table 2C-5. Horizontal Alignment Sign Selection

Type of Horizontal Alignment Sign	Difference Between Speed Limit and Advisory Speed				
	5 mph	10 mph	15 mph	20 mph	25 mph or more
Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use)	Recommended	Required	Required	Required	Required
Advisory Speed Plaque (W13-1P)	Recommended	Required	Required	Required	Required
Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)	Optional	Recommended	Required	Required	Required
Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp	Optional	Optional	Recommended	Required	Required

Note: Required means that the sign and/or plaque shall be used, recommended means that the sign and/or plaque should be used, and optional means that the sign and/or plaque may be used.

See Section 2C.06 for roadways with less than 1,000 ADT.

Guide Signs

- Rectangular unless specifically designated otherwise in the MUTCD
- White message and border on a green background.
- Letters and numerals shall be at least 6 inches in height for all upper-case letters, or a combination of 6 inches in height for upper-case letters and 4.5 inches in height for lower-case letters.





Guide Signs

- Limited to no more than three lines of destinations, which include place names, route numbers, street names, and cardinal directions.
- Where two or more signs are included in the same overhead display, the amount of legend should be further minimized.



Too Much Information?





Street Name Signs

- Shall be retroreflective or illuminated
- Background colors shall be green, blue, brown, or white
- Legend and border shall be white unless a white background then the legend and border shall be black.



Table 2D-2. Recommended Minimum Letter Heights on Street Name Signs

Type of Mounting	Type of Street or Highway	Speed Limit	Recommended Minimum Letter Height	
			Initial Upper-Case	Lower-Case
Overhead	All types	All speed limits	12 inches	9 inches
Post-mounted	Multi-lane	More than 40 mph	8 inches	6 inches
Post-mounted	Multi-lane	40 mph or less	6 inches	4.5 inches
Post-mounted	2-lane	All speed limits	6 inches*	4.5 inches*

* On local two-lane streets with speed limits of 25 mph or less, 4-inch initial upper-case letters with 3-inch lower-case letters may be used.

Table 2D-2. Recommended Minimum Letter Heights on Street Name Signs

Type of Mounting	Type of Street or Highway	Speed Limit	Recommended Minimum Letter Height	
			Initial Upper-Case	Lower-Case
Overhead	All types	All speed limits	12 inches	9 inches
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Post-mounted	Multi-lane	40 mph or less	6 inches	4.5 inches
Post-mounted	2-lane	All speed limits	6 inches*	4.5 inches*

* On local two-lane streets with speed limits of 25 mph or less, 4-inch initial upper-case letters with 3-inch lower-case letters may be used.



Supplemental Guide Signs MUTCD

- No more than one on each interchange approach.
- Should not list more than two destinations.
- Should be installed as an independent guide sign assembly
- States and other agencies should adopt an appropriate policy for installing supplemental signs
 - Such items as population, amount of traffic generated, distance from the route, and the significance of the destination should be taken into account.



DOTD Policy

- EDSM VI.2.1.3 Supplemental Guide Signs on Interstate Highways
- EDSM VI.2.1.4 Supplemental Guide Signs on Non Interstate State Maintained Highways



Supplemental Guide Signs on the Interstate

- No more than 2 destinations
- Charts that give examples of what qualifies and what doesn't qualify



GUIDELINE CRITERIA FOR SIGNING TRAFFIC GENERATORS ACCESSIBLE FROM INTERSTATES IN LOUISIANA

TYPE OF GENERATOR	SPECIFIC CRITERIA	ABOVE 400,000	50,000 – 400,000	BELOW 50,000
		MAJOR METROPOLITAN AREA	URBAN AREAS	RURAL AREAS
AIRPORTS	NUMBER OF REGULARLY SCHEDULED MOVEMENTS (ONE-WAY) PER DAY (COMMERCIAL)	35	25	15
	MILEAGE FROM INTERCHANGE	5	5	5
COLLEGES* UNIVERSITIES*	TOTAL ENROLLMENT FULL-TIME & PART TIME	2,000	1,000	1,000
	MILEAGE FROM INTERCHANGE	5	5	5
MILITARY BASES*	EMPLOYEES OR PERMANENTLY ASSIGNED PERSONNEL	5,000	5,000	5,000
	MILEAGE FROM INTERCHANGE	5	5	5
ARENAS AUDITORIUMS CONVENTION HALLS DAMS FAIRGROUNDS RACE TRACKS LAKES NATIONAL HISTORICAL SITES-MONUMENTS NATIONAL PARKS RECREATION AREAS STADIUMS STATE PARKS	SEATING CAPACITY	6,000	5,000	4,000
	ANNUAL ATTENDANCE	300,000	250,000	200,000
	**MILEAGE FROM INTERCHANGE	5	5	5
REGIONAL MEDICAL CENTERS	TOTAL NO. OF BEDS	600	500	400
	MILEAGE FROM INTERCHANGE	1	1	1
	TYPE OF CARE	HOSPITAL HAS 24 HOUR EMERGENCY PHYSICIAN COVERAGE AND REGULARLY OFFERING CARDIOLOGY AND TRAUMA-RELATED SURGICAL SPECIALTIES (i.e. GENERAL SURGERY, NEUROSURGERY, AND ORTHOPEDICS).		
STATE POLICE STATIONS (TROOP HQTS)	MILEAGE FROM INTERCHANGE	1	1	2
TOLL HIGHWAYS AND BRIDGES	DIRECT ACCESS FROM EXIT AND PART OF THE STATE HIGHWAY SYSTEM.			
BUSINESS DISTRICT	DIRECT ACCESS AND NOT MORE THAN 5 MILES FROM THE INTERCHANGE.			
SHOPPING CENTERS	SEE RS 48:244.3 and LAC 70:401			
AUDUBON TRAIL GOLF COURSES	SEE Act 951 of the 2001 Regular Session of the Louisiana Legislature			

* DISTANCE MAY BE INCREASED ONE MILE FOR EACH 10% OVER THE MINIMUM STUDENTS OR EMPLOYEES LISTED UP TO A MAXIMUM OF 25 MILES.

** DISTANCE MAY BE INCREASED ONE MILE FOR EACH 20,000 PEOPLE OVER THE MINIMUM ATTENDANCE SHOWN UP TO A MAXIMUM OF 25 MILES.



GUIDELINE CRITERIA FOR SIGNING TRAFFIC GENERATORS ACCESSIBLE FROM INTERSTATES IN LOUISIANA

TYPE OF GENERATOR	SPECIFIC CRITERIA	ABOVE 400,000	50,000 – 400,000	BELOW 50,000
		MAJOR METROPOLITAN AREA	URBAN AREAS	RURAL AREAS
AIRPORTS	NUMBER OF REGULARLY SCHEDULED MOVEMENTS (ONE-WAY) PER DAY (COMMERCIAL)	35	25	15
	MILEAGE FROM INTERCHANGE	5	5	5
COLLEGES* UNIVERSITIES*	TOTAL ENROLLMENT FULL-TIME & PART TIME	2,000	1,000	1,000
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ARENAS AUDITORIUMS CONVENTION HALLS DAMS FAIRGROUNDS RACE TRACKS LAKES NATIONAL HISTORICAL SITES-MONUMENTS NATIONAL PARKS RECREATION AREAS STADIUMS STATE PARKS	SEATING CAPACITY	6,000	5,000	4,000
	ANNUAL ATTENDANCE	300,000	250,000	200,000
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STATE POLICE STATIONS (TROOP HQS)	MILEAGE FROM INTERCHANGE	1	1	2
TOLL HIGHWAYS AND BRIDGES	DIRECT ACCESS FROM EXIT AND PART OF THE STATE HIGHWAY SYSTEM.			
BUSINESS DISTRICT	DIRECT ACCESS AND NOT MORE THAN 5 MILES FROM THE INTERCHANGE.			
SHOPPING CENTERS	SEE RS 48:244.3 and LAC 70:401			
AUDUBON TRAIL GOLF COURSES	SEE Act 951 of the 2001 Regular Session of the Louisiana Legislature			

* DISTANCE MAY BE INCREASED ONE MILE FOR EACH 10% OVER THE MINIMUM STUDENTS OR EMPLOYEES LISTED UP TO A MAXIMUM OF 25 MILES.

** DISTANCE MAY BE INCREASED ONE MILE FOR EACH 20,000 PEOPLE OVER THE MINIMUM ATTENDANCE SHOWN UP TO A MAXIMUM OF 25 MILES.



Non Interstate Supplemental Guide Signs

- No more than 3 traffic generators per intersection
- Not signed for if there is a need for trail blazers
- Charts that give examples of what qualifies and what doesn't qualify

TABLE I
NON-INTERSTATE HIGHWAY TRAFFIC GENERATOR CRITERIA

CLASSIFICATION	CRITERIA	EXAMPLES
Transportation Facilities	Commercial Aviation Airports must provide at least two scheduled movements (one-way) per day. General Aviation Airports: Facility must accommodate freight, charter and private aircraft, have a minimum of five year-round based aircraft and have a fixed based operator. Railroad Stations: Must provide regular scheduled passenger service. Bus Station: Must provide regular scheduled passenger service.	
Educational Institutions	1. Post high-school institutions having a minimum of 1,000 full-time or part-time students.	Colleges: 4 year Junior Community Universities Seminaries Trade Schools
	2. State schools for special education.	School for Deaf School for Blind
	3. Middle and High Schools with athletic facilities.	Private Middle Senior High
Correctional Institutions	Federal or State operated.	Correctional Centers, Youth Camps, Prisons
Health Care Facilities	Any hospital or mental health care facility licensed by the State.	Mental Health Facilities: Mental Health Centers Development Centers State Hospitals State Schools Hospitals: General Veterans
Historical, Recreational, or Cultural Facilities	1. The facilities must be open to the general public have a minimum annual attendance of 50,000 with no charge when privately owned.	Historical Sites/ Areas: Home/ Buildings Indian Sites Monuments
	2. Outdoor recreational facilities provided by youth organizations.	Camps Boy/Girl Scout Church 4-H YMCA/YWCA

TABLE 1 (CONTINUED)

CLASSIFICATION	CRITERIA	EXAMPLES
Historical, Recreational, or Cultural Facilities	3. Special local historical attractions open continuously, with no charge to the public, or any State historical site listed on the official State map.	National Cemeteries State Historical Site National Historical Sites
	4. The facilities must be open to the public and have a minimum annual attendance of 50,000.	Cultural Attractions: Aquariums, Museums, Zoos, Planetariums and Arboretums
	5. Indoor facilities with a seating capacity of 5,000.	Arenas, Auditoriums, Convention Halls, Civic Centers
	6. Other outdoor recreational facilities.	Beaches, Lakes, National Parks, Recreational Areas, State Parks & Dams.
	7. The facilities must have an annual attendance of 200,000.	Fairgrounds, Racetracks and Stadiums.
Miscellaneous Governmental Facilities	Any building complex owned & operated or specifically for a local State or Federal governmental agency that has 10 employees or assigned personnel.	Ammunition Plants, Military Bases, Research Facilities: State-Federal, Highway Department Facilities, Court Houses, State Police Offices, City Police Station, Sheriff's Offices.
Business Districts	The marked route within city limits and not closer than three blocks to the C.B.D. of a community with less 10,000 population.	
Parking Facilities	The facilities must be open to the public, be 4 blocks of the marked route and have a minimum of 400 parking spaces.	Public off-street parking facilities Private off-street parking facilities open to the public & not operated to serve any specific business.



Gateway Signs

- Community Welcome Sign
- Standard and Non Standard
- Policy in LADOTD Traffic Engineering Manual



Non Standard



Standard



Standard Gateway Sign

- Installed and maintained by DOTD forces
- Make sign request to DTOE
- Placed at :
 - State Line
 - Parish Line
 - Corporate Limits of an incorporated community





Non Standard Gateway Sign

- Installed and maintained by local government
- Complete a Traffic Control Device Permit signed by a government official and attach
 - Proposed location
 - Shop Drawing
- Shall be retroreflective or illuminated
- No commercial advertising or sponsorship



Non Standard

- Should be placed beyond the clearzone
- If in the clearzone then shall be breakaway
- Minimum letter heights
 - Interstate 13 inches
 - Multi lane 10 inches
 - Other 6 inches



Gateway Signs





Summary



**No Conflicting
Messages**

**No Confusing
Information**



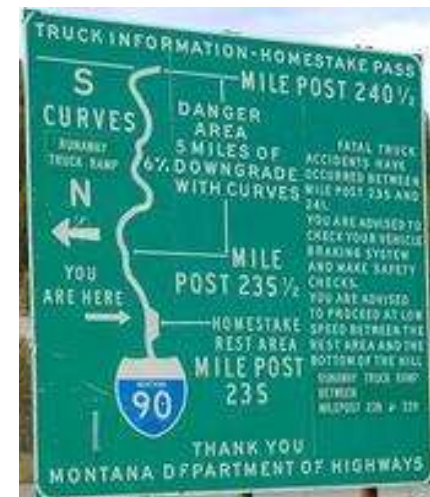


Summary

Only use standard symbols



**Limit the
information
Use standard font &
font sizes**



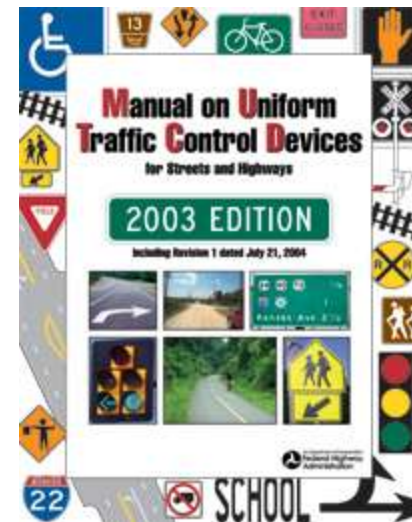


Summary

Message needs to
make sense



Follow Policy





Questions?

Contact

Jody Colvin
225-242-4635



Installation & Maintenance of Signs



Jared Chaumont, P.E.

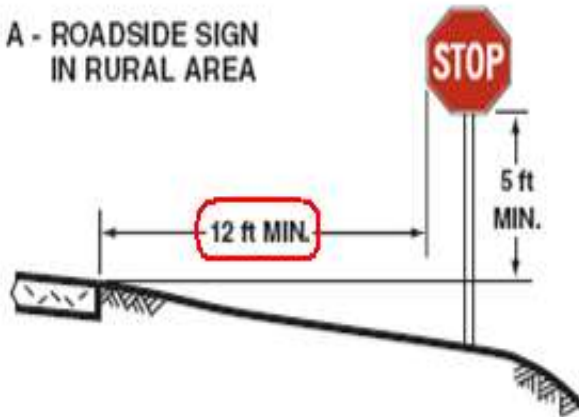
District 05 Assistant Traffic Operations Engineer

Uniform Vehicle Code Section 15-116

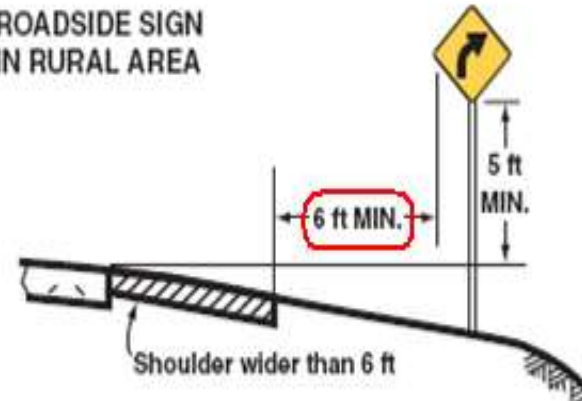
“No person shall install or maintain in any area of private property used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic ...”

Figure 2A-2. Examples of Heights and Lateral Locations of Sign Installations

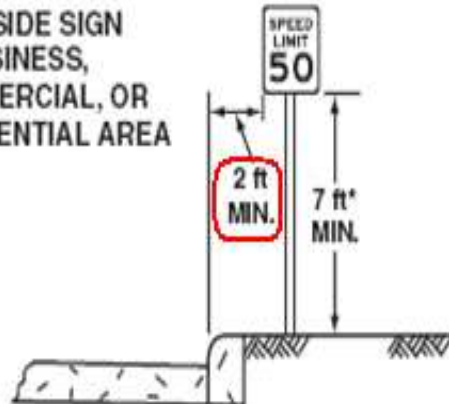
A - ROADSIDE SIGN
IN RURAL AREA



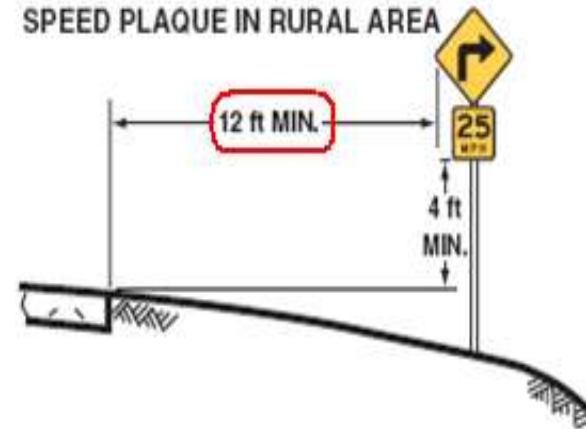
B - ROADSIDE SIGN
IN RURAL AREA



C - ROADSIDE SIGN
IN BUSINESS,
COMMERCIAL, OR
RESIDENTIAL AREA

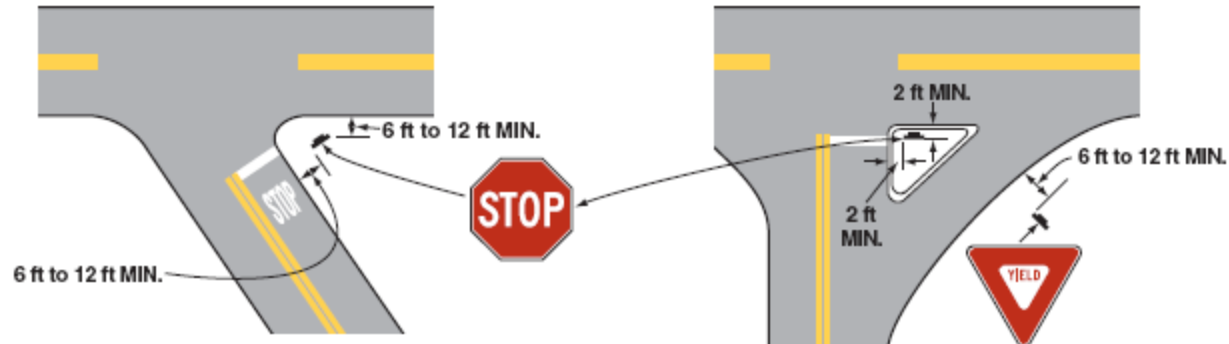


D - WARNING SIGN WITH ADVISORY
SPEED PLAQUE IN RURAL AREA



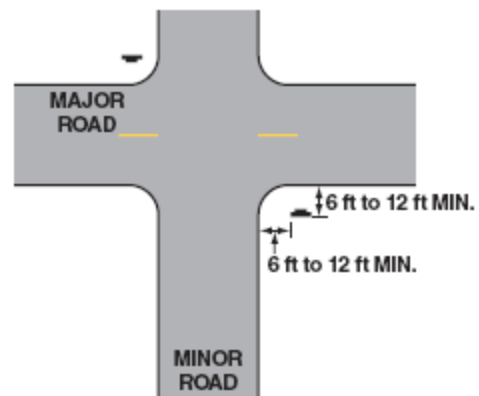
*Where parking or pedestrian movements are likely to occur

Figure 2A-3. Examples of Locations for Some Typical Signs at Intersections

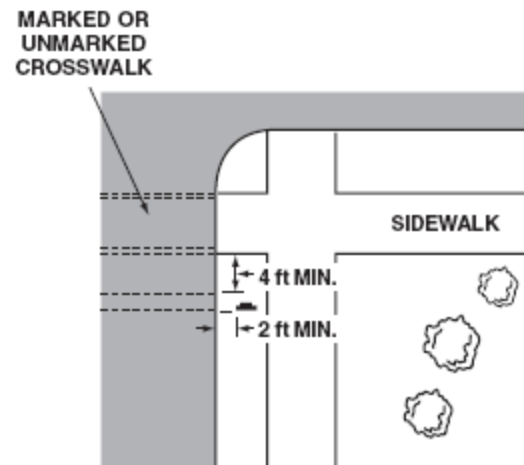


A - ACUTE ANGLE INTERSECTION

B - CHANNELIZED INTERSECTION

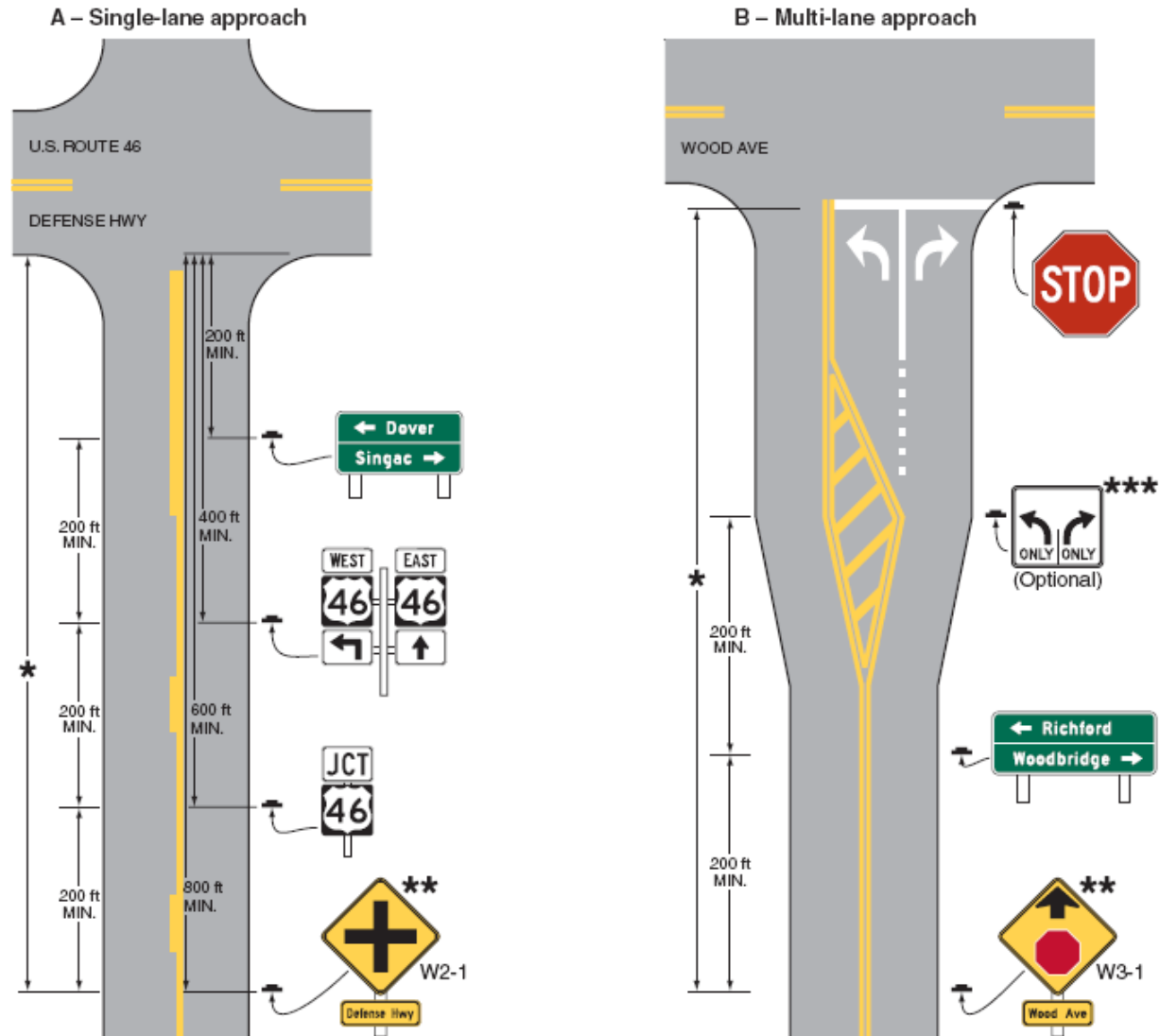


C - MINOR CROSSROAD



D - URBAN INTERSECTION

Figure 2A-4. Relative Locations of Regulatory, Warning, and Guide Signs on an Intersection Approach



Note: See Chapter 2D for information on guide signs and Part 3 for information on pavement markings

- * See Table 2C-4 for the recommended minimum distance
- ** See Section 2C.46 for the application of the W2-1 sign and Section 2C.36 for the application of the W3-1 sign
- *** See Section 2B.22 for the application of Intersection Lane Control signs

TABLE 2C-4. Guidelines for Advance Placement of Warning Signs

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

Standard:

Regulatory, warning, and guide signs and object markers shall be retroreflective ... to show the same shape and similar color by both day and night...

Table 2A-3. Minimum Maintained Retroreflectivity Levels¹

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Post-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			2
	Y*; O*	Y ≥ 75; O ≥ 75			3
White on Red	W ≥ 35; R ≥ 7				4
Black on White	W ≥ 50				—

¹ The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m² measured at an observation angle of 0.2° and an entrance angle of -4.0°.

² For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs

³ For text and fine symbol signs measuring less than 48 inches

⁴ Minimum sign contrast ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)

* This sheeting type shall not be used for this color for this application.

To Identify Sheeting Types see, <http://www.trafficsign.us/signsheet.html>

Standard:

Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.

Except for those signs specifically identified in Paragraph 6, one or more of the following assessment or management methods should be used to maintain sign retroreflectivity:

Paragraph 06

- A. Parking, Standing, or Stopping Signs (R7 and R8 series)
- B. Walking/Hitchhiking/Crossing signs (R9 and R10-1 through R10-4b series)
- C. Acknowledgement signs
- D. All signs with blue or brown backgrounds
- E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians

Figure 2B-24. Parking and Standing Signs and Plaques (R7 Series) (Sheet 1 of 2)

 NO PARKING ANY TIME ←	 NO PARKING 8:30 AM TO 5:30 PM ↔	 NO PARKING 8:30 AM TO 5:30 PM →	 NO PARKING LOADING ZONE ↔	 RESERVED PARKING ↔
ONE HOUR PARKING 9AM-7PM ↔ R7-1	NO PARKING LOADING ZONE ↔ R7-2	NO PARKING BUS STOP ↔ R7-3a	VAN ACCESSIBLE ↔ R7-4	
 ↓ 1 HOUR	 P 1 HOUR PAY PARKING ↔	 P PAY PARKING 15 MIN ↔	 P PAY PARKING →	
8:30 AM TO 5:30 PM ↔ R7-5	1 HOUR 7AM-6PM ↔ R7-6a	NO PARKING BUS STOP ↔ R7-7	 BUS STOP	2 HR PARKING 8:30 AM TO 5:30 PM ↔ R7-8

Figure 2B-25. Parking and Stopping Signs and Plaques (R18 Series)

R18-1	R18-2	R18-3	R18-4a	R18-5a
R18-6a	R18-7a	R18-8a	R18-9a	R18-10a
R18-11a	R18-12	R18-13	R18-14	R18-15

Figure 2H-5. Examples of Acknowledgment Sign Designs

The figure displays three examples of acknowledgment sign designs, each within a rectangular border. Design D14-1 is a white sign with blue text. It features the text 'PARKWAY SPONSORED BY' at the top, followed by a rectangular inset containing 'NAPERVILLE' and 'EVENING KIWANIS' on two lines. Below the inset is 'NEXT 3 MILES'. Design D14-2 is a white sign with blue text. It features 'ADOPT A STREET' at the top, followed by 'NEXT 2 MILES', then 'PARKWAY MAINTAINED BY', and a rectangular inset containing 'LINDAS' and 'GARDEN CLUB' on two lines. Design D14-3 is a blue sign with white text. It features 'ADOPT A HIGHWAY' on the left and 'SPONSORED BY' on the right. Below 'SPONSORED BY' is a rectangular inset containing 'FRED'S' and 'SIGN SHOP' on two lines.

D14-1

PARKWAY SPONSORED BY

NAPERVILLE
EVENING KIWANIS

NEXT 3 MILES

D14-2

ADOPT A STREET

NEXT 2 MILES

PARKWAY MAINTAINED BY

LINDAS
GARDEN CLUB

D14-3

ADOPT A HIGHWAY

SPONSORED BY

FRED'S
SIGN SHOP

Figure 2B-26. Pedestrian Signs and Plaques (Sheet 1 of 2)

The figure displays 18 different pedestrian-related traffic signs and plaques arranged in three rows:

- Top Row:** Four rectangular signs. From left to right: "WALK ON LEFT FACING TRAFFIC" (white background, black text); "CROSS ONLY AT CROSS WALKS" (white background, black text); a circular prohibition sign showing a walking person with a red diagonal slash; and "NO PEDESTRIAN CROSSING" (white background, black text).
- Middle Row:** Four rectangular signs. From left to right: "USE CROSSWALK" with a right-pointing arrow (white background, black text); a circular prohibition sign showing a hand holding a hitchhiking thumb with a red diagonal slash; "NO HITCHHIKING" (white background, black text); and "CROSS ONLY ON GREEN" (white background, black text).
- Bottom Row:** Twelve smaller rectangular signs and plaques. From left to right: "CROSS ONLY ON SIGNAL" with a signal icon; "ONE-WAY STREET" with an arrow pointing up; "AHEAD ONE-WAY STREET AHEAD" with an arrow pointing down; and various "PEDESTRIAN CROSSING" advance warning and plaque signs with different symbols like a walking person or a crosswalk.

Reflectivity Assessment or Management Methods

- A. Visual Nighttime Inspection
- B. Measured Sign Reflectivity
- C. Expected Sign Life
- D. Blanket Replacement
- E. Control Signs
- F. Other Methods

Visual Nighttime Inspection

- The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions.
- Signs identified below minimum retroreflectivity levels should be replaced.

Measured Sign Retroreflectivity

- Sign retroreflectivity is measured using a retroreflectometer.
- Signs with retroreflectivity below the minimum levels should be replaced.

Expected Sign Life

- When signs are installed, the installation date is labeled or recorded so that the age of the sign is known.
- The age of the sign is compared to the expected sign life.
- The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels.



Blanket Replacement

- All signs in an area/corridor, or of a given type, should be replaced at specified intervals.
- This eliminates the need to assess retroreflectivity or track the life of individual signs.
- The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on affected signs.

Control Signs

- Replacement of signs in the field is based on the performance of a sample of control signs.
- The control signs are monitored to determine the end of retroreflectivity life for the associated signs.
- All field signs should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.

Other Methods

Other methods developed based on engineering studies can be used.

Contact LTAP for more information on technical assistance to help your agency prepare to comply with the new regulations, portions of which begin to take effect in 2012.



Traffic Engineering 101

Thank You!

See you on July 26th at 2:00PM for
Access Management

