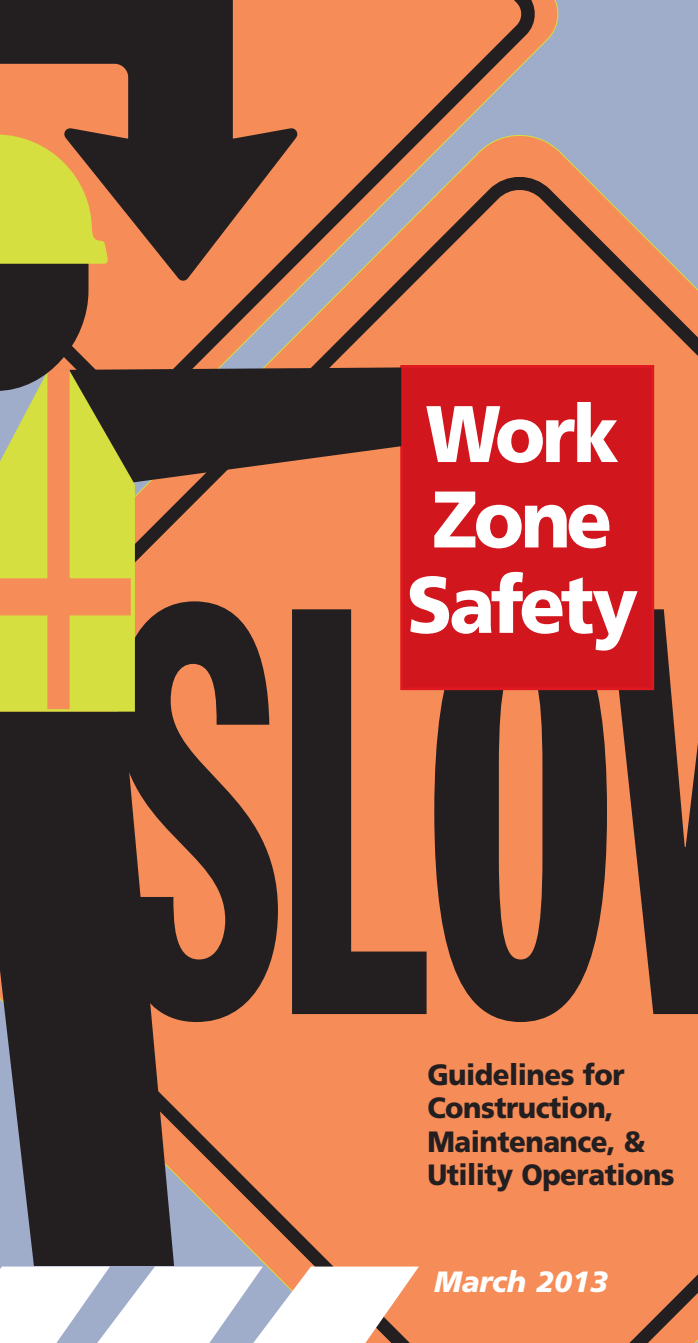


Work Zone Safety

Guidelines for Construction, Maintenance, & Utility Operations

March 2013

Table of Contents

Introduction and Fundamental Principles **2**
Traffic Control Devices **3**
Signs 3
Channelizing Devices 6
Warning Lights 9
Pavement Markings 9
Arrow Boards 10
Components of a Traffic Control Zone **11**
Taper Length Criteria for Work Zones **12**
Buffer Lengths **13**
Planning the Layout **13**
Typical Application Diagrams **15**
Work Beyond the Shoulder 16
Work on Shoulder or Parking Lane 17
Shoulder or Parking Lane Closed on Divided Roadway 18
Work in Center of Road *(Two-Way Traffic, 35 mph or Less)* 19
Work in Travel Lane *(Two-Way Traffic, 35 mph or Less)* 20
Lane Closure on a Road with Low Volume *(Self-Regulating)* 21
Lane Closure on a Road with Low Volume *(Yield Sign)* 22
Lane Closure on a Two-Lane Road with Stop Signs 23
Lane Closure on a Two-Lane Road with Low-Volume *(1 Flagger)* 24
Lane Closure on a Two-Lane Road *(2 Flagger Operation)* 25
Work Near Highway-Rail Grade-Crossing 26
Temporary Road Closure 27
Surveying Along Centerline of Road with Low-Volume 28
Center Turn Lane Closed on a 3-Lane, 2-Way Road 29
Lane Shift on a 3-Lane, 2-Way Road 30
Lane Closure on a 4-Lane Undivided Road 31
Lane Closure on Divided Roadway 32
Double Lane Closure on Divided Roadway 33
Center Lane Closure on Divided Multi-lane Roadway 34
Half Road Closure on Multi-lane Roadway 35
Lane Closure in Advance of an Intersection *(On Through Road)* 37
Lane Closure in Advance of an Intersection *(On Side Road)* 38
Lane Closure Beyond an Intersection *(On Through Road)* 39
Lane Closure Beyond an Intersection *(On Side Road)* 40
Lane Closure on Far Side of Intersection 41
Closure in the Center of an Intersection 42
Street Closure with Detour 43
Mobile Operations **44**
On the Shoulder 45
On a Two-Lane Road 47
On a Two-Lane Road Using Flaggers 49
On a Multi-Lane Road 51
Pedestrian and Bicyclist Safety **53**
Sidewalk Closure—Pedestrian Detour 54
Sidewalk Closure—Pedestrian Walkway Provided 55
Flagging Procedures **56**
Worker Safety **57**
Supervisor's Checklist **57**
Liability **58**
Acknowledgments **58**

Introduction

This handbook presents information and guidelines for temporary traffic control, including examples of typical traffic control applications. It applies to construction, maintenance, and utility work zones.

This information is intended to illustrate the principles of proper temporary traffic control, but it does not establish standards or warrants. Part 6 of the MUTCD and the Wisconsin MUTCD Supplement contain the standards for temporary traffic control. These standards are highlighted in yellow in the text of this handbook.

Fundamental Principles

Experience has shown that the following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

1. Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
2. Inhibit traffic movement as little as possible.
3. Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
4. Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
5. Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
6. Train all persons that select, place, and maintain temporary traffic control devices.
7. Establish proper legislative authority to implement and enforce needed traffic regulations, speed zones, parking controls, and incident management.
8. Keep the public well informed.
9. Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

Traffic Control Devices

The following traffic control devices are used in work zones:

- Signs
- Channelizing Devices
- Warning Lights
- Pavement Markings
- Arrow Boards

Device sizes and quantities shown in this handbook and the MUTCD generally represent minimums. Contract plans or other agency requirements can exceed these minimums and must be followed.

Signs

Signs used in work zone traffic control are classified as regulatory, guide, or warning. Regulatory signs impose legal restrictions and shall only be used with permission from the authority with jurisdiction over the roadway. Guide signs commonly show destinations, directions, and distances. Warning signs give notice of conditions along the roadway.

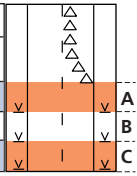
Temporary Warning Signs – With few exceptions, temporary warning signs for construction, maintenance, and utility work zones shall be diamond shaped, having a black symbol or message on an orange background. As a general rule, these signs should be located on the right-hand side of the roadway. Normally, the first advance warning sign used is ROAD WORK AHEAD or UTILITY WORK AHEAD. The END ROAD WORK or END UTILITY WORK signs should be used on long-term stationary work lasting more than 7 days.

Size – On expressways and freeways advance warning signs shall be 48 inches by 48 inches. On other roadways where speed limits are 45 mph or greater, they should be 48 inches by 48 inches. Where speed limits are 40 mph or less, 36 inch by 36 inch signs may be used.

Mounting – Temporary post-mounted signs shall be mounted at a height of at least 7 feet in urban areas and 5 feet in rural areas, measured from the bottom of the sign. Signs mounted on Type III barricades used to close any part of a road or lane should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails. For signs mounted on other portable supports or on barricades used solely as a sign support, the bottom of the sign shall be not less than one foot above the traveled way. Sign supports shall be crashworthy.

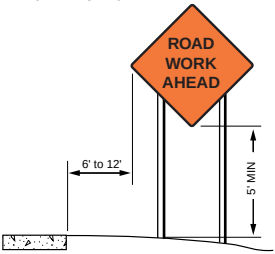
Spacing of Advance Warning Signs

Sign Spacing (feet)				
	25-30 mph	35-40 mph	45-55 mph	Expressway/ Freeway
A	200*	350	500	1,000
B	200*	350	500	1,500
C	200*	350	500	2,640

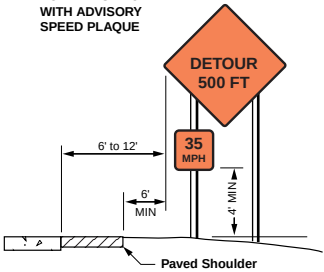


Distances shown are approximate. Adjust sign spacing for curves, hills, intersections, driveways, and other obstructions to improve sign visibility.
** Where field conditions warrant, spacing may be as short as 100 feet.*

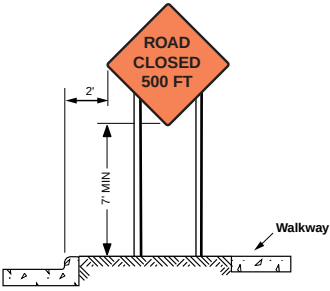
RURAL DISTRICT

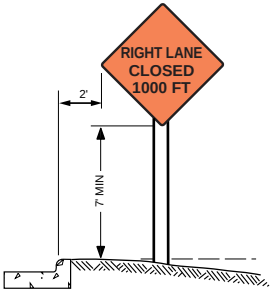


RURAL DISTRICT WITH ADVISORY SPEED PLAQUE

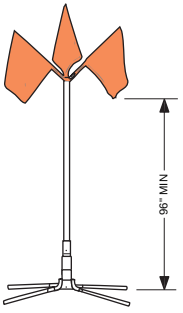


FOR BUSINESS, COMMERCIAL AND RESIDENTIAL

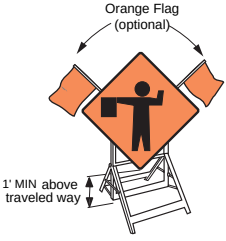




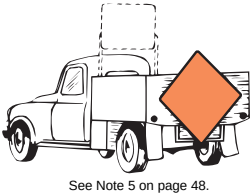
PORTABLE AND TEMPORARY MOUNTINGS

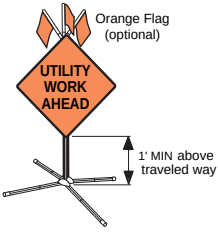


High Level Warning Device (Flag Tree)

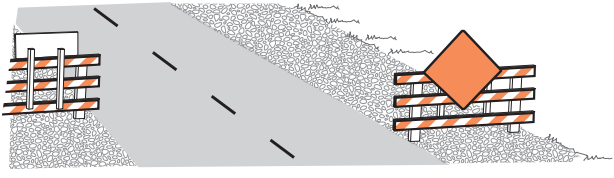


Portable sign supports should not be used for more than seven continuous days.





See Note 5 on page 48.



Illumination and Retroreflectorization – All signs used during hours of darkness shall be made of retroreflective material or illuminated. Street or highway lighting is not regarded as meeting requirements for sign illumination.

Removal – When work is suspended for short periods, all signs that are no longer appropriate shall be removed, covered, or laid flat so they are not visible to traffic.

Portable Changeable Message Signs (PCMS) – These can display a variety of messages, but are typically used to display "real-time" or changing information about closures, delays or other temporary traffic conditions. They should only be used to supplement other signs, and not to substitute for any required signs. If used during lane or ramp closures, place PCMS in advance of locations where stopped traffic is expected and/or prior to exits to alternate routes. PCMS should not display more than two screens or displays, which should be readable twice at the usual roadway speed limit. More than one PCMS should be used if the message exceeds two screens. Avoid using messages that would cause abrupt or inappropriate actions by drivers. PCMS should be delineated with retroreflective channelizing devices.

Channelizing Devices

Channelizing devices are used to warn and alert drivers, bicyclists and pedestrians of conditions in work zones, to separate traffic from the work area, and to guide and direct traffic. Channelizing devices include cones, tubular markers, vertical panels, drums, and barricades.

Cones are used most commonly for short-duration maintenance and utility work. Cones used at night shall be retro-reflectorized as shown on page 8. Drums are used most commonly where they will remain in place for a prolonged period. Channelizing devices shall be crashworthy. Ballast shall not be placed on top of channelizing devices.

Spacing – Space channelizing devices so it is apparent that the roadway or work area is closed to traffic. There are several rules of thumb that can be used to guide you in the proper spacing of channelizing devices.

1. The maximum spacing between devices in a taper should be a distance, in feet, which is approximately equal to the speed limit in mph. For example, if the taper is on a street with a 35 mph speed limit, the devices should be spaced about 35 feet apart.
2. Two-way traffic tapers should be made up of at least five (5) channelizing devices.
3. The maximum spacing between devices in a buffer or work area should be a distance, in feet, of 2 times the speed limit in mph. For example, if the speed limit is 35 mph, the devices in the buffer and work area should not be more than 70 feet apart.

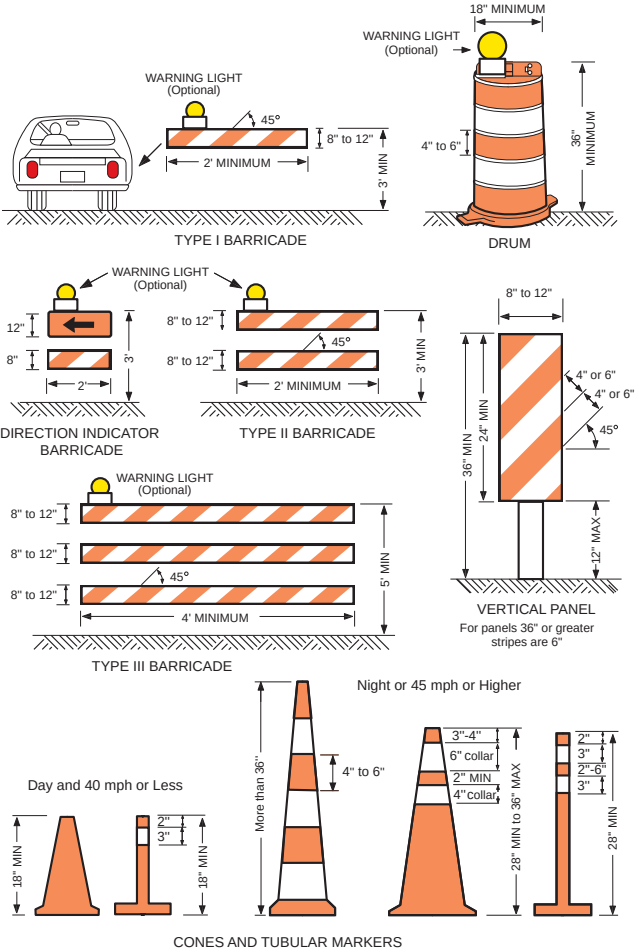
4. Shorter spacing between devices in the buffer and work area is appropriate under some conditions to enhance the separation between the work area and the open traffic lane(s). Examples are in urban areas, on congested roadways, during work at night, along drop offs or where vehicles are frequently knocking over the devices.

5. Additional devices are appropriate to outline the path for turning vehicles near intersections or where existing pavement markings conflict with the temporary travel path.

Number of Channelizing Devices Needed

Length (ft)	35 MPH		45 MPH		55 MPH		65 MPH	
	Taper	Buffer/ Work	Taper	Buffer/ Work	Taper	Buffer/ Work	Taper	Buffer/ Work
100	5	2 – 3	5	2 – 3	5	2 – 3	5	2 – 3
150	6	3 – 5	5	2 – 4	5	2 – 3	5	2 – 3
200	7	3 – 6	6	3 – 5	5	2 – 4	5	2 – 4
250	9	4 – 8	7	3 – 6	6	3 – 5	5	2 – 4
300	10	5 – 9	8	4 – 7	7	3 – 6	6	3 – 5
350	11	5 – 10	9	4 – 8	8	4 – 7	7	3 – 6
400		6 – 12	10	5 – 9	9	4 – 8	8	4 – 7
450		7 – 13	11	5 – 10	10	5 – 9	8	4 – 7
500		8 – 15	13	6 – 12	11	5 – 10	9	4 – 8
550		8 – 16	14	7 – 13	11	5 – 10	10	5 – 9
600		9 – 18	15	7 – 14	12	6 – 11	11	5 – 10
650		10 – 19	16	8 – 15	13	6 – 12	11	5 – 10
700		10 – 20	17	8 – 16	14	7 – 13	12	6 – 11
800		12 – 23	19	9 – 18	16	8 – 15	14	7 – 13
900		13 – 26		10 – 20	18	9 – 17	15	7 – 14
1000		15 – 29		12 – 23	20	10 –19	17	8 – 16

The number of devices in the buffer/work area: lower number is for spacing of 2 times the speed; higher number is for spacing equal to speed.



Notes

1. Stripes on barricade rails shall slope downward at an angle of 45 degrees toward the direction traffic is to pass.
2. Barricade rail stripe widths shall be 6 inches except where rail lengths are less than 36 inches, then 4 inch wide stripes may be used.
3. The sides of barricades and vertical panels facing traffic shall have retro-reflective rail faces. Drums, cones, and tubular markers shall have retro-reflective bands as shown above.

Warning Lights

Warning lights may supplement retroreflectorization on warning signs and channelizing devices. They are especially useful in areas prone to fog or inclement weather. Warning lights shall be securely mounted at a minimum mounting height of 30 inches. The principal types and uses of warning lights are:

1. **Low Intensity Flashing Lights (Type A)**
   May be mounted on barricades or drums to warn of an isolated hazard at night. They may also be mounted on signs. They shall not be used on a series of devices used for delineation.

2. **High Intensity Flashing Lights (Type B)**
   May be mounted on advance warning signs, or on independent supports to draw attention to extreme hazards both day and night.

3. **Low Intensity Steady-Burn Lights (Type C)**
   May be used in a series to delineate the edge of the travelway and channelize traffic at night.

4. **Low Intensity 360° Steady-Burn Lights (Type D)**
   May be used in a series to delineate the edge of the travelway and channelize traffic at night.

Pavement Markings

For long-term stationary projects, follow the guidelines of Part 6 of the MUTCD in placing and removing pavement markings. The colors of temporary pavement markings and delineators shall follow the same standard as permanent markings. When used to enhance the visibility of the roadway edge, white is required along both sides of two-way roadways and the right side of one-way roadways. Yellow is required on the left side of one-way roadways. Centerlines are yellow when separating opposing directions of traffic. Lane lines are white when separating lanes going the same direction.

For projects that are not long-term and where existing pavement marking conflicts with the temporary travel path, additional signing and channelizing devices are appropriate.

Arrow Board

An arrow board in the arrow or chevron mode shall only be used for lane closures on multilane roadways. An arrow board shall not be used on a multilane roadway to shift all lanes of traffic at one location. An arrow board shall only be used in the caution mode for shoulder work, blocking the shoulder, roadside work near the shoulder, or when one lane on a two lane, two-way roadway is closed. Arrow boards should not be used without signs or other devices and should be delineated with retroreflective channelizing devices.

Board Type	Roadway Speed	Min. Size	Min. # Lamps	Min. Legibility Distance
A	25-30 mph	24" x 48"	12	1/2 mile
B	35-40 mph	30" x 60"	13	3/4 mile
C	≥ 45 mph	48" x 96"	15	1 mile
D	*	*	12	1/2 mile

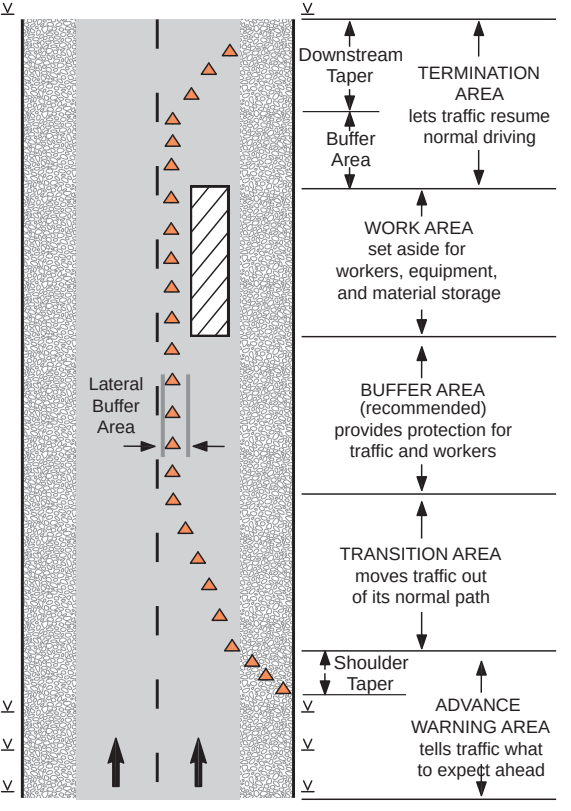
Mobile operations on high-speed roads may use 30" x 60" Arrow Boards.

***** *Type D arrow shaped boards are intended for use on authorized vehicles. Type D arrow length is 48" and arrowhead width is 24".*

OPERATING MODE	BOARD DISPLAY Element layout for Type C Board: right shown, left similar
At least one of the next 3 modes shall be provided:	
Flashing Arrow	 Merge Right
Sequential Arrow Not for use on WisDOT highways	 Merge Right
Sequential Chevron Not for use on WisDOT highways	 Merge Right
The following mode shall be provided: **Flashing Double Arrow**	 Merge Right or Left
At least one of these 2 modes shall be provided:	
Flashing Caution or **Alternating Diamond Caution**	 or (preferred)

Components of a Traffic Control Zone

The traffic control zone is the distance between the first advance warning sign and the point beyond the work area where traffic is no longer affected. Below is a diagram showing the components of a traffic control zone.



Taper Length Criteria for Work Zones

The table below lists the five types of tapers and their lengths used in temporary traffic control. The length of each type of taper is based on formulas using the speed of the traffic and the width of the offset (or lane width).

Type of Taper	Taper Length
Merging Taper – The number of lanes is reduced on a multilane road	L minimum
Shifting Taper – A lateral shift, but no reduction in the number of travel lanes	1/2 L minimum
Shoulder Taper – The shoulder is closed	1/3 L minimum
Two-way Traffic Taper – Opposing directions of traffic share one open lane	50 feet minimum 100 feet maximum
Downstream Taper – The work area ends and traffic resumes normal driving (use is optional)	50 feet minimum 100 feet maximum

Formulas for L

Speed Limit	*Formula*
40 MPH or less	$L = WS^2 / 60$
45 MPH or greater	$L = W \times S$

L = Taper Length in feet
W = Width of offset (lane width or lane shift) in feet
S = Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph

L (feet)

Speed (mph)	**Width of offset** (ft)			
	10	**11**	**12**	**15**
25	105	115	125	160
30	150	165	180	225
35	205	225	245	310
40	270	295	320	400
45	450	495	540	675
50	500	550	600	750
55	550	605	660	825
65	650	715	780	975

Buffer Lengths

A buffer area is recommended to separate traffic from the work area or oncoming vehicles and provide recovery space for an errant vehicle. The buffer area should not include any work activity nor storage of equipment, vehicles or material.

Suggested Buffer Lengths

Speed (mph)	**Length** (ft)	**Speed** (mph)	**Length** (ft)
20	115	45	360
25	155	50	425
30	200	55	495
35	250	60	570
40	305	65	645

A lateral buffer area may also be used. Its width should be based on conditions at the work site.

Planning the Layout

Exercise judgement when planning temporary traffic control. Consider duration of work, location and road characteristics.

Duration of Work

As a general rule, the longer the operation will last, the more traffic control devices are needed.

Long-term stationary Work at a location more than 3 days.

Intermediate-term stationary Work at a location more than one daylight period up to 3 days or night time work lasting more than 1 hour.

Short-term stationary Daytime work at a location for more than 1 hour in a single daylight period.

Short duration Work at a location up to 1 hour.

Mobile Work that moves intermittently or continuously.

Location of Work

Generally, the closer the work is to traffic, the more control devices are needed. For example, when a lane is closed on a multi-lane road for a stationary operation, a merging taper using channelizing devices and advance warning signs shall be provided. When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign and channelizing devices shall be used to close the shoulder.

Roadway Characteristics

The traffic control layout must take into account traffic volumes, speed, roadway alignment, highway-rail grade crossings, intersections, pedestrians, and bicycles. Generally, more traffic control is required where volumes and/or speeds are high, visibility is poor, and conflicts exist due to rail crossings, intersections, pedestrians, and bicycles. If traffic backups are expected during lane closures, place additional signs further in advance to warn drivers of the closures before they encounter stopped traffic.

Low Volume – Several typical diagrams in these guidelines are appropriate only for roads with low volumes. As a general rule, roads with low volumes have an average daily traffic volume (ADT) less than 400 vehicles per day. If the traffic volumes are not known, the following rule of thumb can be used to determine if the road can be treated as low volume.

> *Rule of Thumb* – Count the number of vehicles that pass a single reference point over a five (5) minute period. If not more than three vehicles pass the reference point in that period, then the road can be considered low volume.

In addition, give consideration to local nearby facilities, such as schools, manufacturing plants, and other uses that generate special traffic. Also consider whether the work zone is subject to peak hour traffic increases. Peak hours are usually 6-9 a.m. and 3-6 p.m., but will vary in different areas.

Rail Crossings – If there is a rail crossing near the work area, coordination with the railroad company should occur before work starts. Lane restrictions, flagging or other operations shall not create conditions where vehicles can be stopped on the railroad tracks. If traffic backups are likely to extend through the crossing, see page 26 and page 36, Note 8.

Reduced Speeds – Speed limits should be reduced only in the portion of the temporary traffic control zone where there are geometric or physical restrictions, such as closed or narrowed lanes. Reductions are typically no more than 10 mph. Orange advisory speed plaques shall only be used on the same support as a warning sign and shall not be used unless the authority with jurisdiction over the roadway has determined the recommended advisory speed.

Typical Application Diagrams

The following diagrams are examples of the application of standards, guidance, and options in the MUTCD, the Wisconsin Supplement and accepted practices.

These typical layouts are not a substitute for engineering judgment and need to be adapted to fit the conditions of a particular site.

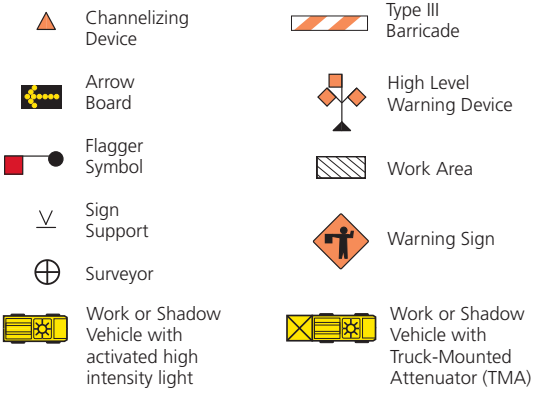
Contract plans or other agency documents often contain applicable layouts required by the contract.

The diagrams are not to scale, and the number of channelizing devices shown might not be the number needed at the work site. Use the tables on the typical diagrams to determine taper and buffer lengths, and use pages 6–7 for guidance on the spacing and number of devices.

The notes and tables on the diagrams provide important information. ***Read them carefully*** before using the diagrams.

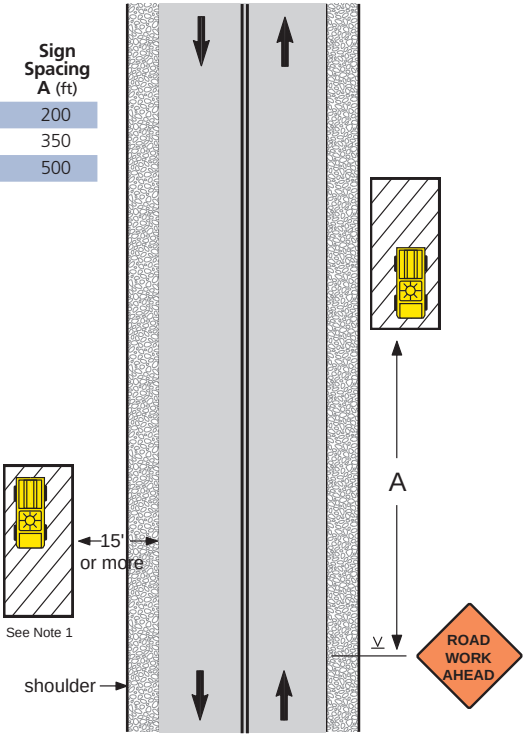
The diagrams and tables generally indicate minimums. For more information, refer to Part 6 of the MUTCD and the Wisconsin MUTCD supplement. These contain the standards for work zone traffic control.

Legend



Work Beyond the Shoulder

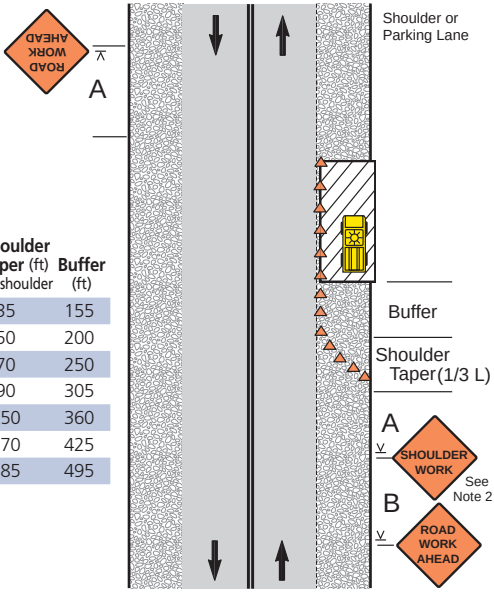
Speed Limit (mph)	Sign Spacing A (ft)
25-30	200
35-40	350
45-55	500



Notes

1. The warning sign may be omitted where the work area is behind a guard rail, more than 2′ behind a curb, 30′ or more from the edge of a freeway/expressway, or 15′ or more from the edge of any other roadway.
2. For short-term, short-duration, or mobile operations, the warning sign may be omitted if a vehicle with activated high intensity light is used. On state trunk highways, the warning sign can be omitted if the duration of work is less than 60 minutes and activated high intensity lights are used.
3. The ROAD WORK AHEAD sign may be replaced with other appropriate signs such as SHOULDER WORK, UTILITY WORK AHEAD, SURVEY CREW or Workers.

Work on Shoulder or Parking Lane

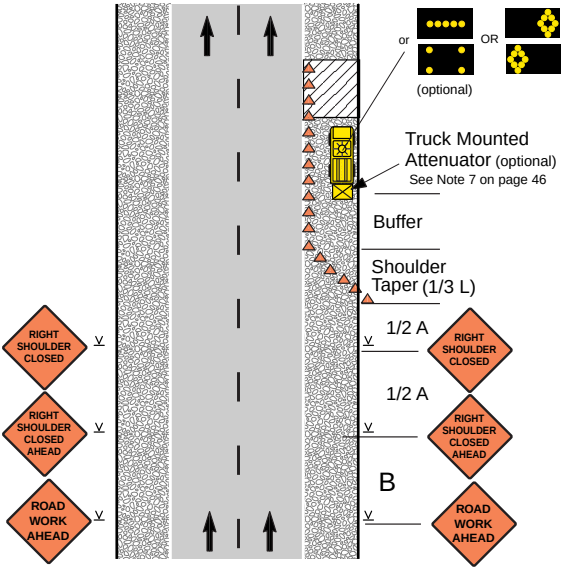


Speed Limit (mph)	Sign Spacing A, B (ft)	Shoulder Taper (ft) 10' shoulder	Buffer (ft)
25	200	35	155
30	200	50	200
35	350	70	250
40	350	90	305
45	500	150	360
50	500	170	425
55	500	185	495

Notes

1. Encroachment into the traffic lane is allowable, but a 10-foot minimum travel lane width should be maintained. A lane closure should be considered if there is encroachment on roads with speeds greater than 35 mph, or for other conditions where workers, equipment, or the work activity would benefit from the lateral buffer (see pages 22 and 23).
2. If there is encroachment into the traffic lane, a ROAD NARROWS sign may be used instead of SHOULDER WORK. For roads with low volume, the SHOULDER WORK or ROAD NARROWS sign can be omitted.
3. For short duration work (60 minutes or less), the channelizing devices may be omitted if a vehicle with activated high intensity lights is used. For short duration work with no lane encroachment, the signs may also be omitted.
4. Workers, UTILITY WORK AHEAD, SHOULDER WORK AHEAD, or SURVEY CREW signs may be used instead of SHOULDER WORK or ROAD WORK AHEAD.
5. When work area is at least 2' from traffic lane on roads with low volume and speeds of 35 mph or less, the sign on opposite side can be omitted.

Shoulder or Parking Lane Closed on Divided Roadway



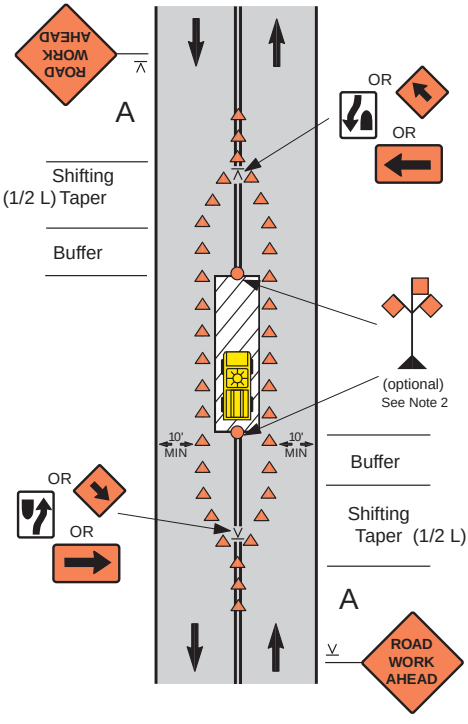
Notes

1. SHOULDER CLOSED signs should be used on limited-access highways where there is no opportunity for disabled vehicles to pull off the traveled way.
2. For short-term stationary work, one SHOULDER CLOSED warning sign can be omitted.
3. For short duration work (60 minutes or less), the channelizing devices can be omitted if a vehicle with activated high intensity lights is used. For short duration work with no lane encroachment, the signs can also be omitted.
4. UTILITY WORK AHEAD or Workers signs can be used instead of the warning signs shown.
5. If the parking lane is used as a traffic lane follow the lane closure layout. See page 32.

Speed Limit (mph)	Sign Spacing (ft) A	Sign Spacing (ft) B	Shoulder Taper (ft) 10′ shoulder	Buffer (ft)
35	350	350	70	250
40	350	350	90	305
45	500	500	150	360
50	1000	1500	170	425
55	1000	1500	185	495
60	1000	1500	200	570
65	1000	1500	220	645

Work in Center of Road

(Maintaining Two-Way Traffic, 35 MPH or Less)



Notes

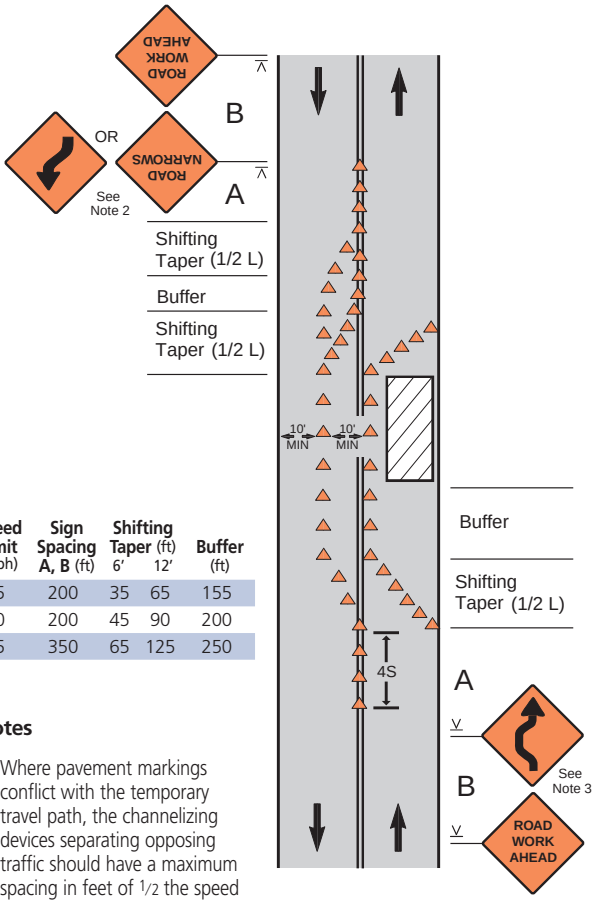
1. Additional advance warning signs can be used such as ROAD NARROWS or Reverse Curve/Turn signs. The Reverse Curve/Turn sign is appropriate for larger deviations in the travel path.

Speed Limit (mph)	Sign Spacing A, B (ft)	Shifting Taper (ft) 5′	Shifting Taper (ft) 10′	Buffer (ft)
25	200	30	55	155
30	200	40	75	200
35	350	55	105	250

2. Channelizing devices and high level warning devices may be eliminated on roads with low volumes if a work vehicle with activated high intensity lights is used.
3. The Large Arrow sign can be used instead of the Keep Right or Down Arrow sign where space permits.

Work in Travel Lane

(Maintaining Two-Way Traffic, 35 MPH or Less)



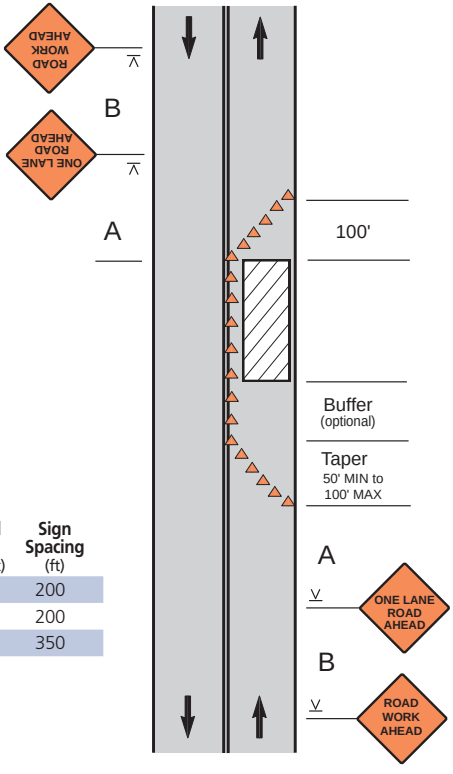
Speed Limit (mph)	Sign Spacing A, B (ft)	Shifting Taper (ft) 6′	Shifting Taper (ft) 12′	Buffer (ft)
25	200	35	65	155
30	200	45	90	200
35	350	65	125	250

Notes

1. Where pavement markings conflict with the temporary travel path, the channelizing devices separating opposing traffic should have a maximum spacing in feet of 1/2 the speed limit in mph.
2. The ROAD NARROWS or Reverse Curve/Turn sign is optional on roads with low volume or where the lane shift requires only a minor deviation in the travel path. The Reverse Curve/Turn sign is appropriate for larger deviations in the travel path.
3. If the tangent is more than 600 feet, the Reverse Curve/Turn sign should be used instead of the Double Reverse Curve sign.
4. If speeds are 30 mph or less, Reverse Turn signs shall be used instead of Reverse Curve.

Lane Closure on a Road with Low Volume

(No Flagger, Traffic Self-Regulating, 35 MPH or Less)



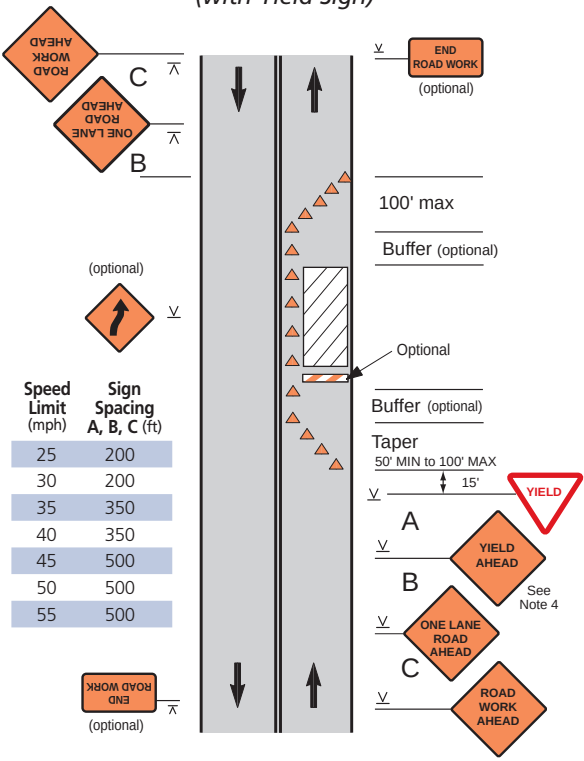
Speed Limit A, B (ft)	Sign Spacing (ft)
25	200
30	200
35	350

Notes

1. This layout may be used where work areas are short, sight distance is good, and traffic can readily see the roadway beyond.
2. Set the buffer area lengths based on space at the site. The total length of the temporary traffic control zone must be short enough that drivers can see approaching traffic beyond the work area.
3. Where traffic does not self-regulate effectively, one or two flaggers, a YIELD sign, or STOP signs for each direction near the beginning of the tapers shall be used with appropriate, advanced warning signs. See pages 22 through 26.

Lane Closure on a Two-Lane Road with Low Volume

(with Yield Sign)

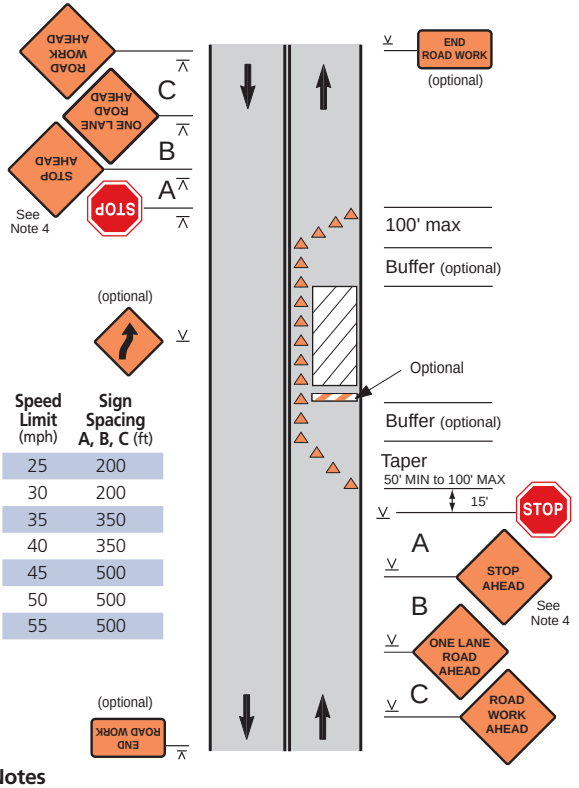


Speed Limit (mph)	Sign Spacing A, B, C (ft)
25	200
30	200
35	350
40	350
45	500
50	500
55	500

Notes

1. This layout may be used when volume is low, work area short, sight distance good, and traffic can see beyond the work area. It shall not be used on a state-trunk highway or any other roadway officially designated as a "through" highway.
2. The YIELD sign shall only be used with permission from the authority having jurisdiction over the roadway.
3. Set the buffer area lengths based on space at the site. The total length of the temporary traffic control zone must be short enough that drivers can see approaching traffic beyond the work area.
4. Yield Ahead symbol sign may be used.

Lane Closure on a Two-Lane Road with Stop Signs *(ADT Less Than 1000)*



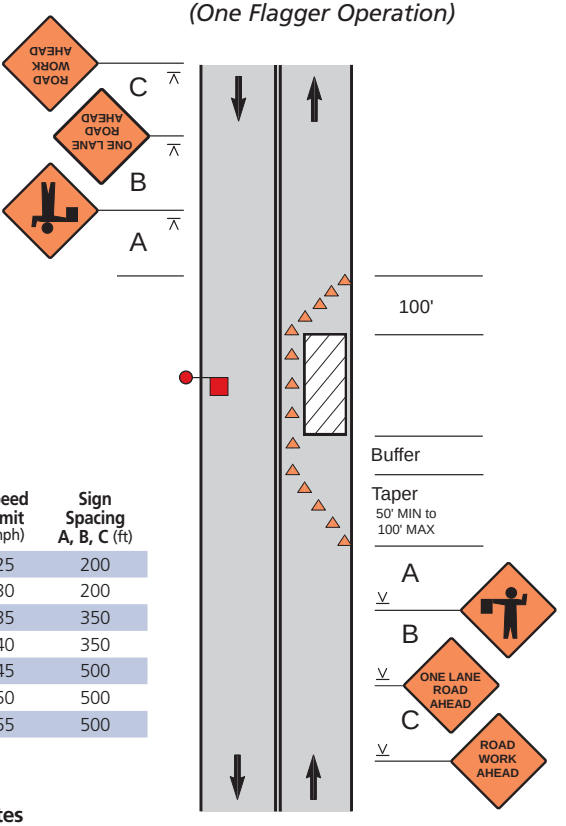
Speed Limit (mph)	Sign Spacing A, B, C (ft)
25	200
30	200
35	350
40	350
45	500
50	500
55	500

Notes

1. Consider using this layout when ADT is less than 1000, work area is short, sight distance good, and traffic can see beyond the work area. It could be appropriate for ADT above 1000 if limited to off-peak hours.
2. STOP signs shall only be used with permission from the authority having jurisdiction over the roadway.
3. Determine buffer area length based on space at the site. Total length of the temporary traffic control zone must be short enough that drivers from both directions can see approaching traffic beyond the work area.
4. Stop Ahead symbol sign may be used.

Lane Closure on a Two-Lane Road with Low-Volume

(One Flagger Operation)



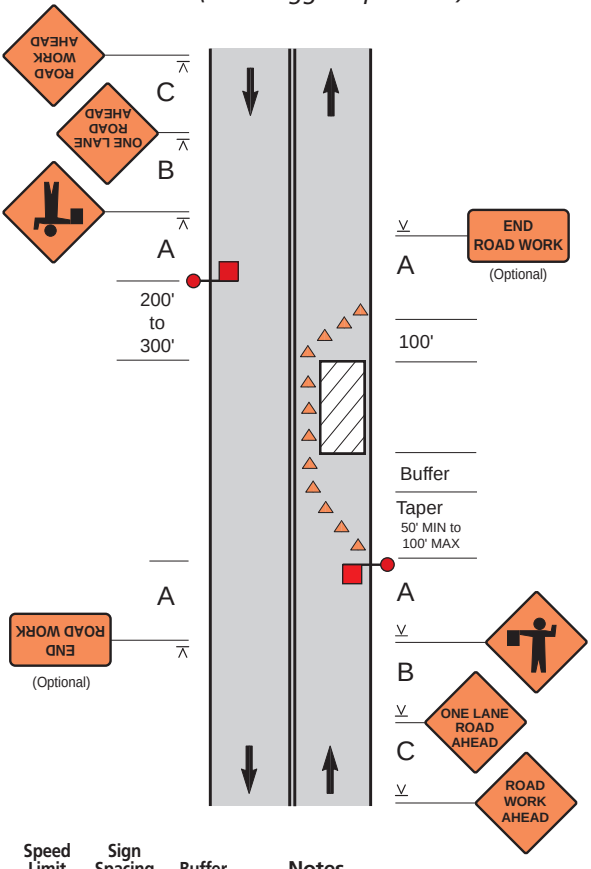
Speed Limit (mph)	Sign Spacing A, B, C (ft)
25	200
30	200
35	350
40	350
45	500
50	500
55	500

Notes

1. A single flagger may be adequate for roads with low volumes that have short, straight work areas. Where one flagger is used, the flagger should be visible to approaching traffic from both directions.
2. Set the buffer area lengths based on space at the site. The total length of the temporary traffic control zone must be short enough that drivers can see approaching traffic beyond the work area.
3. The flagger shall use approved flagging procedures according to the MUTCD and as shown on page 56.
4. For short duration work (60 minutes or less), the ROAD WORK AHEAD sign may be omitted.

Lane Closure on a Two-Lane Road

(Two Flagger Operation)

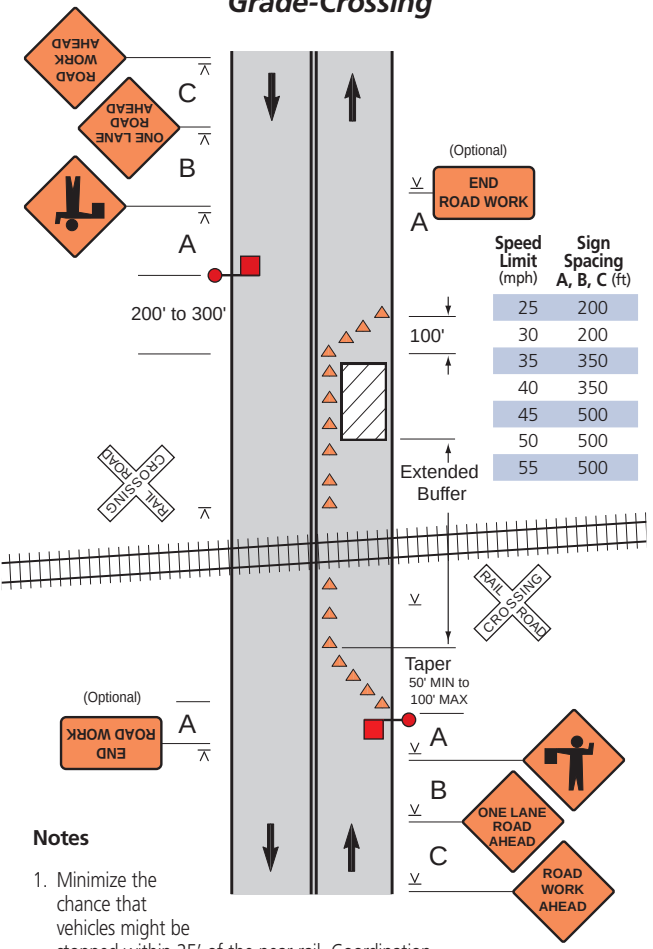


Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495

Notes

1. The flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.
2. For short duration work (60 minutes or less), the ROAD WORK AHEAD sign may be omitted.

Work Near Highway-Rail Grade-Crossing



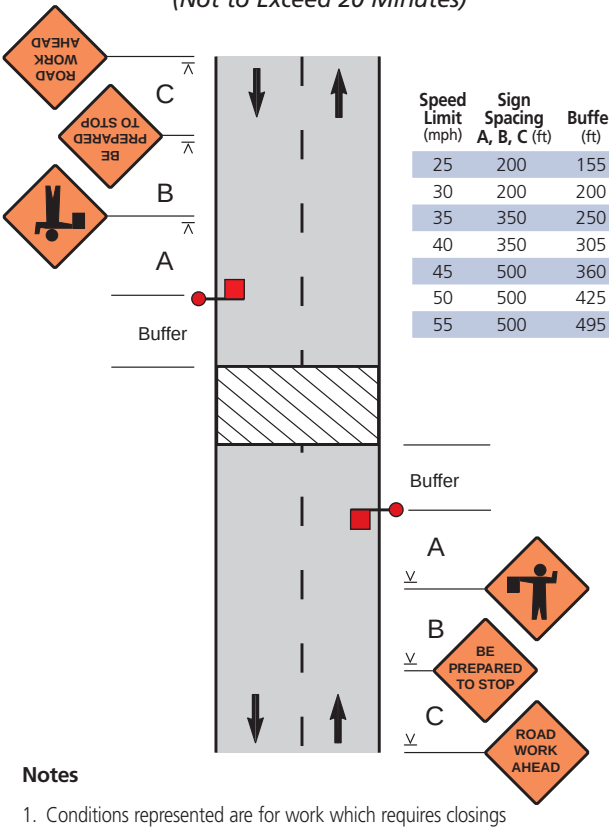
Speed Limit (mph)	Sign Spacing A, B, C (ft)
25	200
30	200
35	350
40	350
45	500
50	500
55	500

Notes

1. Minimize the chance that vehicles might be stopped within 25' of the near rail. Coordination with the railroad company should occur before work starts.
2. If queuing of vehicles across active rail tracks cannot be avoided, a flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the crossing.
3. The flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.
4. For short duration work (60 minutes or less), the ROAD WORK AHEAD sign may be omitted.

Temporary Road Closure

(Not to Exceed 20 Minutes)

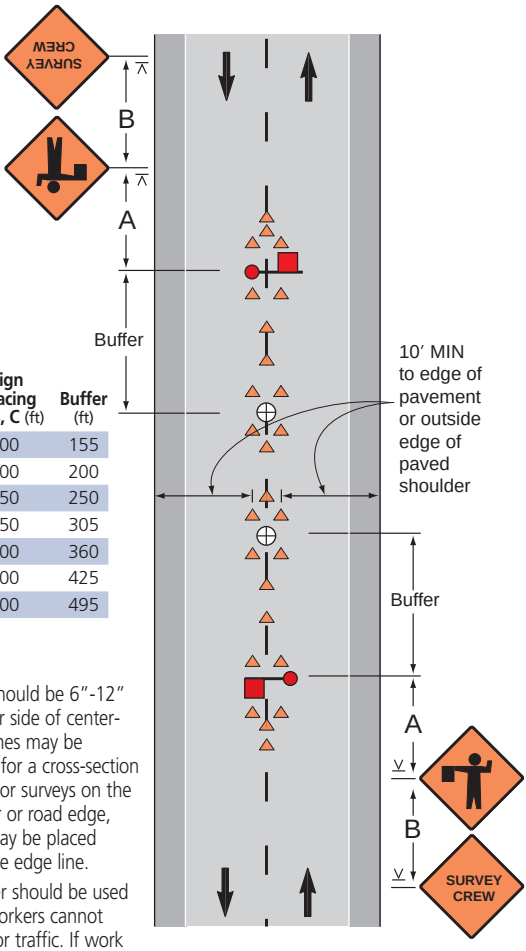


Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495

Notes

1. Conditions represented are for work which requires closings during daytime hours only.
2. This application is intended for a planned temporary closing not to exceed 20 minutes.
3. A flagger or uniformed officer shall be used for this application.
4. The flagger should stop the first vehicle from the shoulder as shown. After stopping the first vehicle if the view of the flagger is obstructed, then he/she should move toward the centerline to stop additional traffic.
5. Flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.

Surveying Along Centerline of Road with Low Volume

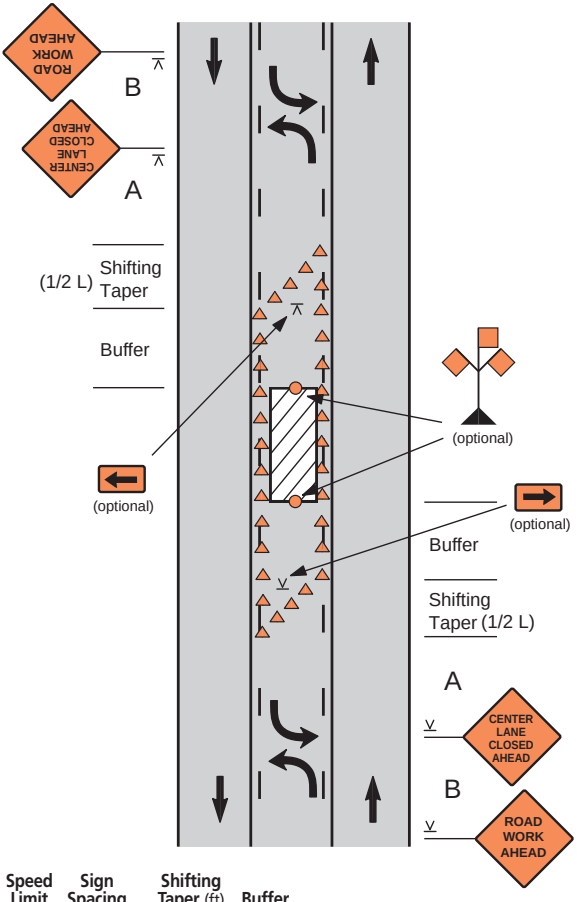


Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495

Notes

1. Cones should be 6″-12″ on either side of center-line. Cones may be omitted for a cross-section survey. For surveys on the shoulder or road edge, cones may be placed along the edge line.
2. A flagger should be used when workers cannot watch for traffic. If work is along the shoulder, the flagger may be omitted.
3. For surveying on the centerline of a road with high-volume, one lane shall be closed using layouts shown on page 25.
4. A high-level warning device may be used to protect a surveying device, such as a target on a tripod.
5. ROAD WORK AHEAD signs may be used in place of SURVEY CREW signs.

Center Turn Lane Closed on a Three-Lane, Two-Way Road

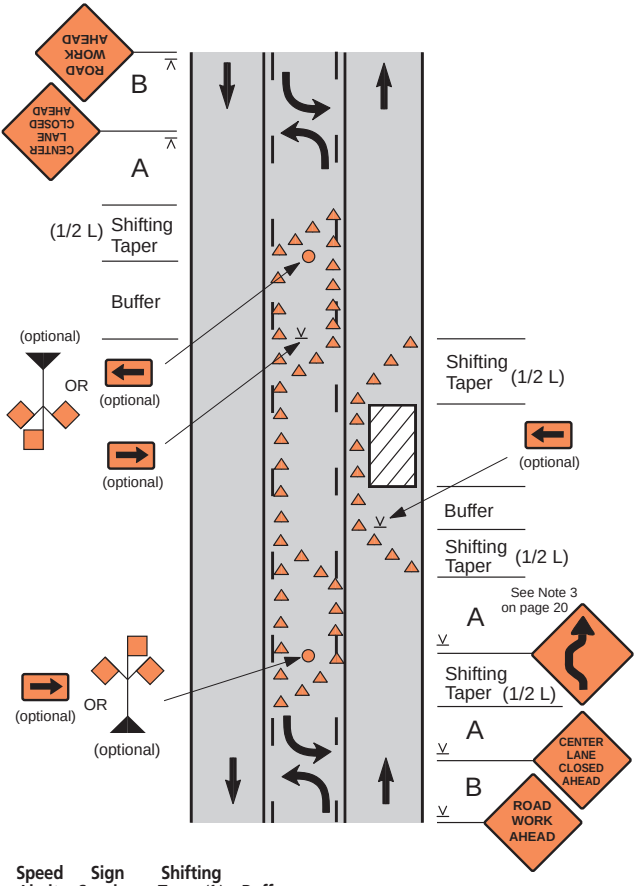


Speed Limit (mph)	Sign Spacing A, B (ft)	Shifting Taper (ft) for 12′ lane	Buffer (ft)
25	200	65	155
30	200	90	200
35	350	125	250
40	350	160	305
45	500	270	360
50	500	300	425
55	500	330	495

Note

1. Use turn restrictions or close driveways located in the workzone as appropriate.

Lane Shift on a Three-Lane, Two-Way Road

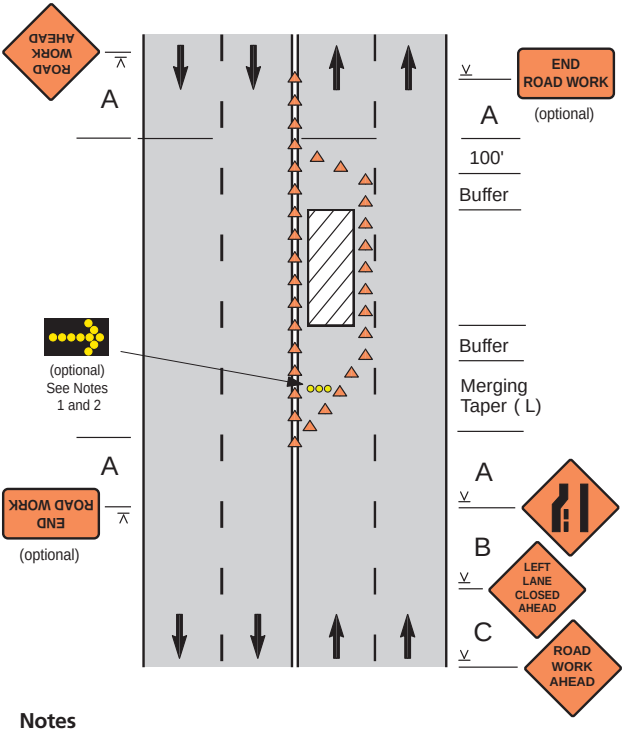


Speed Limit (mph)	Sign Spacing A, B (ft)	Shifting Taper (ft) for 12′ lane	Buffer (ft)
25	200	65	155
30	200	90	200
35	350	125	250
40	350	160	305
45	500	270	360
50	500	300	425
55	500	330	495

Notes

1. Use turn restrictions or close driveways located in the work-zone as appropriate.
2. If speeds are 30 mph or less, Reverse Turn signs shall be used instead of Reverse Curve.

Lane Closure on a Four-Lane Undivided Road

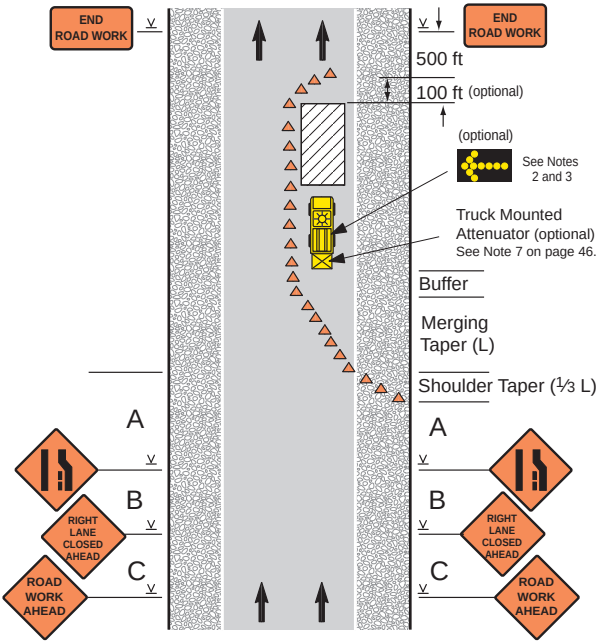


Notes

1. An arrow board is optional based on traffic volume, speed, and visibility. Generally, it is a good practice on roads with speeds of 35 mph or greater. When used, it should be placed near the beginning of the taper or on a vehicle in the work area.
2. If an arrow board is not used, a Large Arrow sign or directional indicator barricades in the taper can be used for added guidance.

Speed Limit (mph)	**Sign Spacing A, B, C** (ft)	**Merging Taper** (ft) for 12' lane	**Buffer** (ft)
25	200	125	155
30	200	180	200
35	350	245	250
40	350	320	305
45	500	540	360
50	500	600	425
55	500	660	495

Lane Closure on Divided Roadway

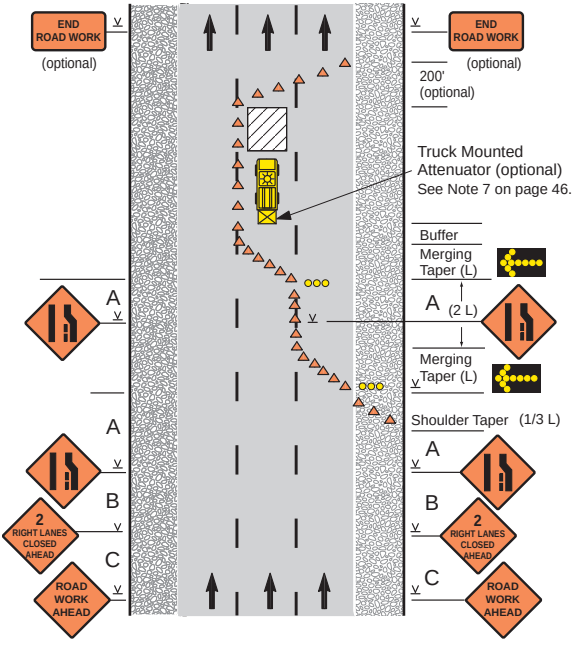


Notes

1. When a side road intersects the roadway within the work zone, additional devices shall be erected to channelize traffic to/from the side road, and a ROAD WORK AHEAD sign shall be placed on each side road approach.
2. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each lane closed.
3. Except for freeways, an arrow board is optional based on traffic volume, speed, and visibility. Generally, it is a good practice where speeds are 35 mph or greater. When used, it should be placed near the beginning of the taper or on a vehicle in the work area.
4. If an arrow board is not used, a Large Arrow sign or directional indicator barricades in the taper can be used to provide added guidance.

Speed Limit (mph)	Sign Spacing (ft) A	B	C	Merging Taper (ft) for 12′ lane	Buffer (ft)
30	200	200	200	180	200
35	350	350	350	245	250
40	350	350	350	320	305
45	500	500	500	540	360
50	1000	1500	2640	600	425
55	1000	1500	2640	660	495
60	1000	1500	2640	720	570
65	1000	1500	2640	780	645

Double Lane Closure on Divided Roadway



Notes

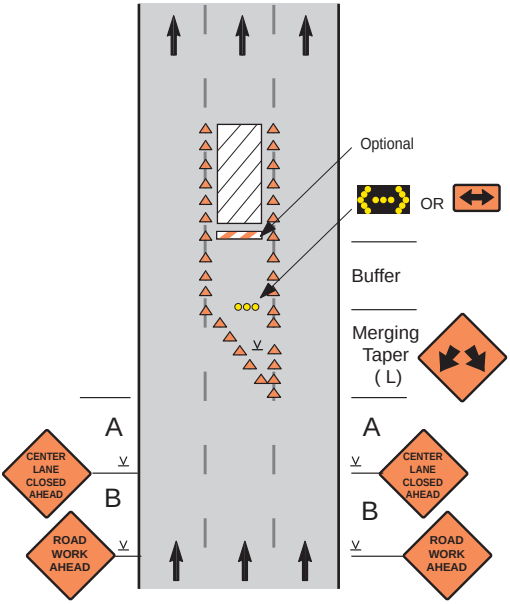
1. When a side road intersects the roadway within the work zone, additional devices shall be erected to channelize traffic to/from the side road, and a ROAD WORK AHEAD sign shall be placed on each side road approach.

Speed Limit (mph)	Sign Spacing (ft) A	B	C	Merging Taper (ft) for 12' lane	Buffer (ft)
35	350	350	350	245	250
40	350	350	350	320	305
45	500	500	500	540	360
50	1000	1500	2640	600	425
55	1000	1500	2640	660	495
60	1000	1500	2640	720	570
65	1000	1500	2640	780	645

2. An arrow board shall be used for each freeway lane closed. The second arrow board should be placed near the beginning of the second merging taper or on a vehicle in the work area.

Center Lane Closure on Divided Multi-Lane Roadway

(Speeds of 35 mph or Less)

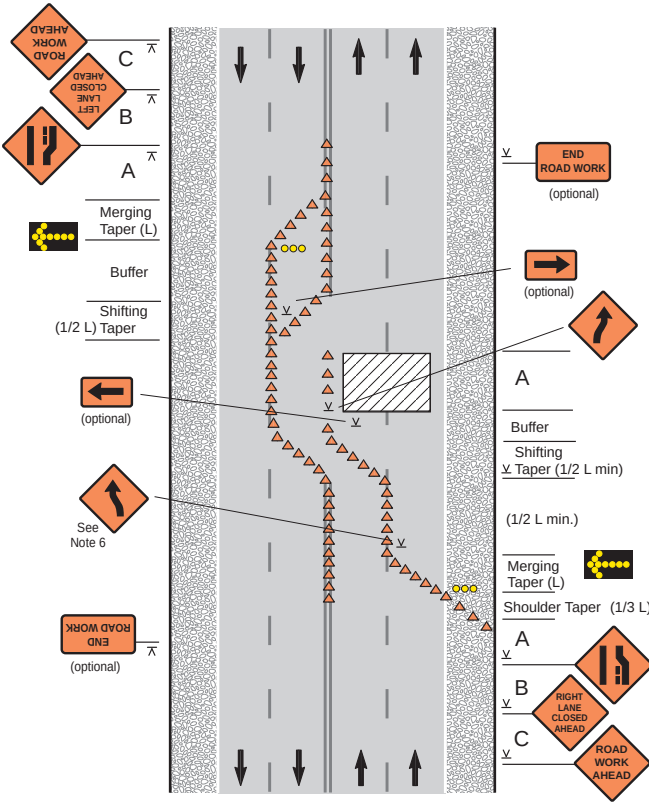


Notes

Speed Limit (mph)	Sign Spacing (ft) A	Sign Spacing (ft) B	Merging Taper (ft) for 12' lane	Buffer (ft)
25	200	200	125	155
30	200	200	180	200
35	350	350	245	250

1. The merging taper shall direct traffic into either the right or left lane but not both.
   Consider turning volumes and bus stop locations to determine the direction for the merging taper.
2. An arrow board shall be used when a freeway lane is closed.
3. When an arrow board is used, it should be placed in the closed lane near the end of the merging taper or on a vehicle in the work area.
4. If an arrow board is not used, a Large Double Arrow sign may be used to provide added guidance.

Half Road Closure on Multi-Lane Roadway



Speed Limit (mph)	Sign Spacing A, B, C (ft)	Merging Taper (ft) for 12′ lane	Shifting Taper (ft) for 12′ lane	Buffer (ft)
25	200	125	65	155
30	200	180	90	200
35	350	245	125	250
40	350	320	160	305
45	500	540	270	360
50	500	600	300	425
55	500	660	330	495

Half Road Closure on Multi-Lane Roadway (continued)

Notes

1. Pavement markings no longer applicable shall be removed or obliterated as soon as practicable. Temporary markings shall be used as necessary. For intermediate term situations when it is not feasible to remove and restore pavement markings, channelizing devices shall be more closely spaced when the pavement markings conflict with the temporary travel path. In such locations a maximum channelizing device spacing in feet of 1/2 the speed limit in mph should be used.

2. When a side road intersects the roadway within the work zone, additional devices shall be erected to channelize traffic to/from the side road and a ROAD WORK AHEAD sign shall be placed on each side road approach.

3. An arrow board shall be used when a freeway is closed. On other roads an arrow board is optional based on traffic volume, speed, and visibility. Generally, it is a good practice on roads with speeds of 35 mph or greater.

4. If an arrow board is not used, a Large Arrow sign or directional indicator barricades in the taper can be used to provide additional guidance.

5. Large Arrow signs can be used at the shifts for added visibility.

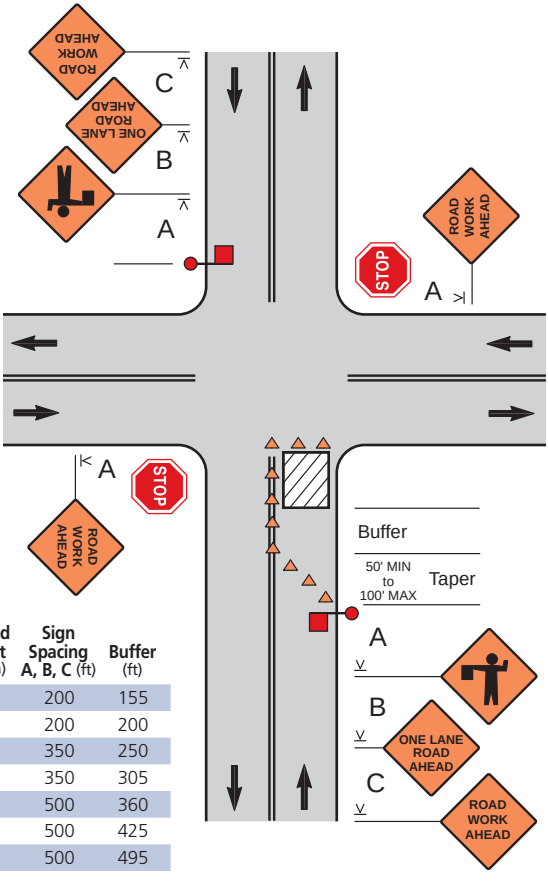
6. If the tangent distance along the buffer and work areas is less than 600 feet then the Double Reverse Curve Sign may be used instead of two Reverse Curve/Turn signs.

7. If speeds are 30 mph or less, Reverse Turn signs shall be used instead of Reverse Curve in advance of the shifting tapers.

8. If there is a highway-rail grade crossing near the work area and backups from the lane closure are anticipated to extend through the crossing, the temporary traffic control zone should be extended so the taper precedes the crossing. A flagger may be used at the crossing to minimize the chance of vehicles being stopped on the tracks. (See page 26).

Lane Closure in Advance of an Intersection

(Work Area on the Through Road)



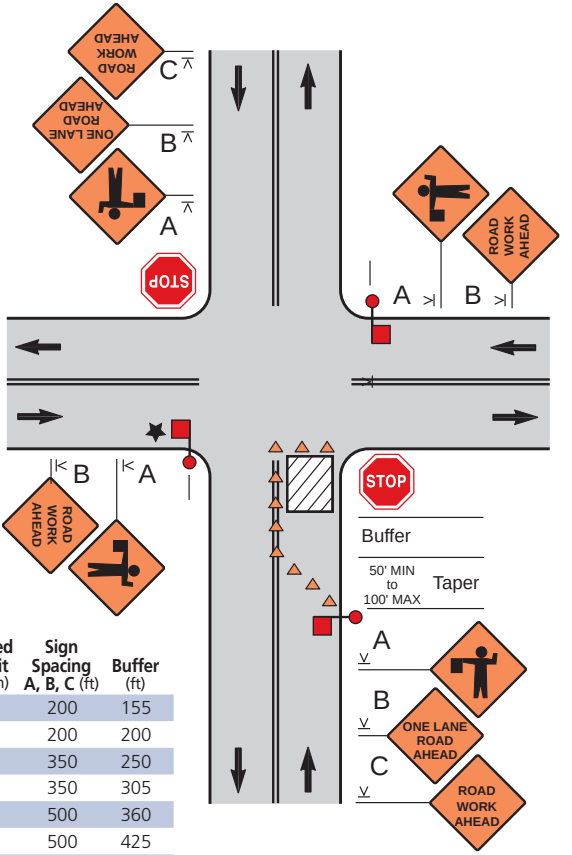
Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495

Notes

1. Depending on traffic conditions, consider additional traffic control on the side road approaches, such as flaggers and appropriate signs.
2. The flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.

Lane Closure in Advance of an Intersection

(Work Area on the Side Road)



Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495

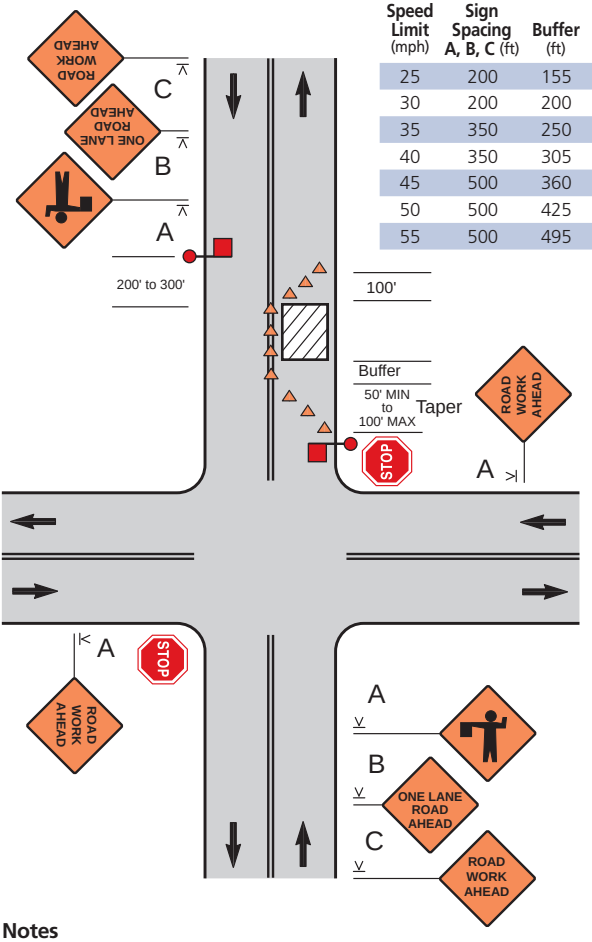
Notes

1. Depending on traffic conditions, consider additional traffic control, such as flaggers and appropriate signs.
2. ✸ The middle flagger has the best view of traffic from all directions and would normally be ***lead flagger*** and coordinate the other flaggers.
3. The flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.

Lane Closure Beyond an Intersection

(Work Area on the Through Road)

Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495



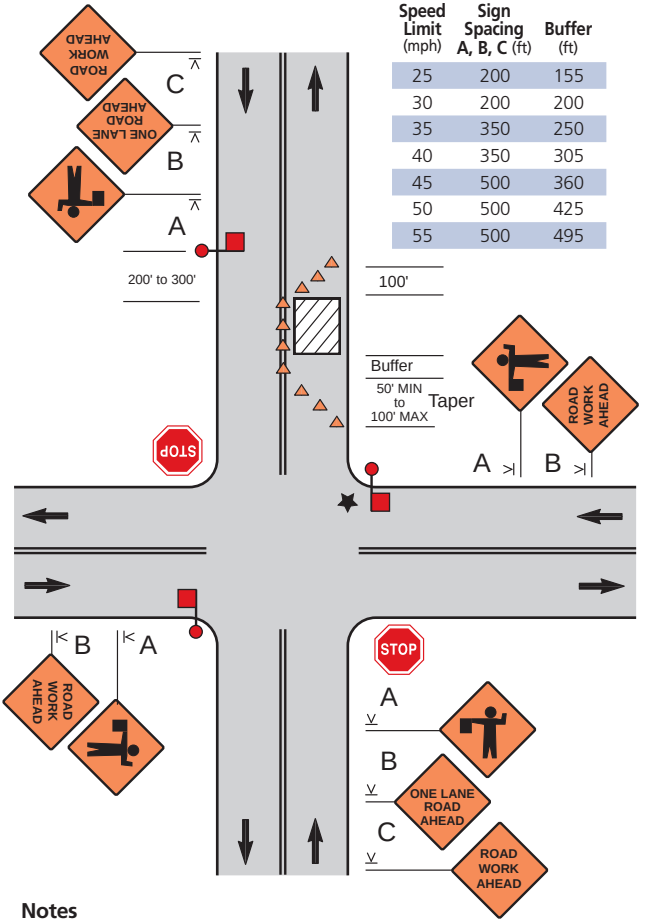
Notes

1. Depending on traffic conditions, consider additional traffic control, such as flaggers and appropriate signs.
2. The flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.

Lane Closure Beyond an Intersection

(Work Area on the Side Road)

Speed Limit (mph)	Sign Spacing A, B, C (ft)	Buffer (ft)
25	200	155
30	200	200
35	350	250
40	350	305
45	500	360
50	500	425
55	500	495

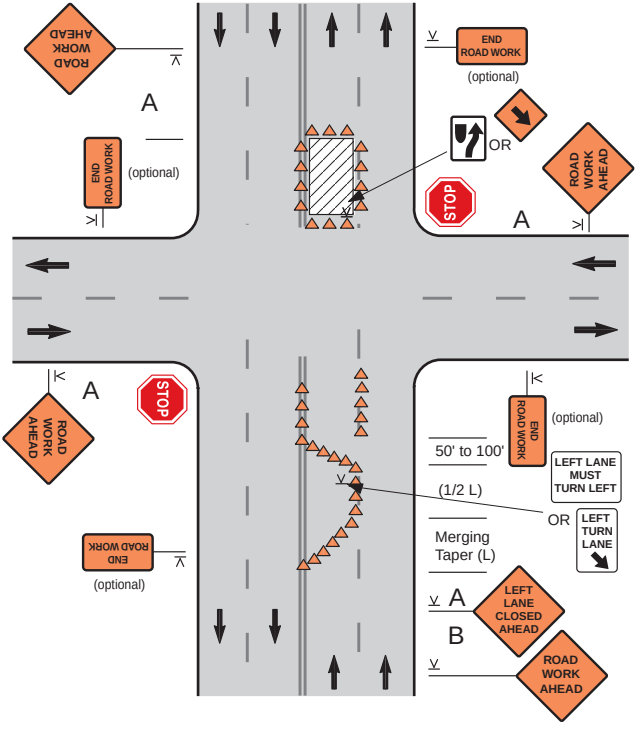


Notes

1. Depending on traffic conditions, consider additional traffic control, such as flaggers and appropriate signs.
2. The middle flagger would normally be ***lead flagger*** and would coordinate the other flaggers.
3. The flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.

Lane Closure on Far Side of Intersection

(Speeds of 35 mph or Less)

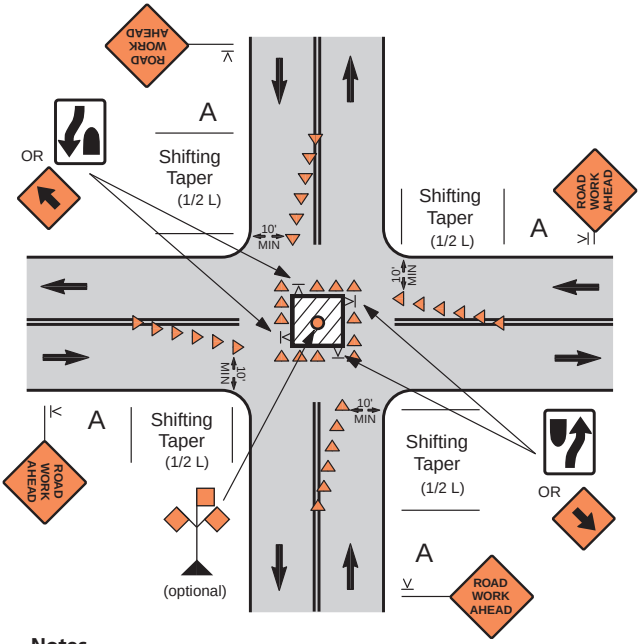


Notes

1. This layout is only appropriate for roads with speeds of 35 mph or less. For higher speeds, see page 31 for advance signing and taper layout.
2. Normal procedure is to close any lane that is not carried through the intersection on the near side of the intersection. However, if this results in the closure of a lane having significant turning movements, then that lane may be converted to a turn bay, and/or the lane may be restricted to turns only, as shown.
3. A Large Arrow sign or Arrow Board could be used instead of the Keep Right or Down Arrow sign where space permits.

Speed Limit (mph)	Sign Spacing (ft) A	Sign Spacing (ft) B	Merging Taper (ft) for 12′ lane
25	200	200	125
30	200	200	180
35	350	350	245

Closure in the Center of an Intersection

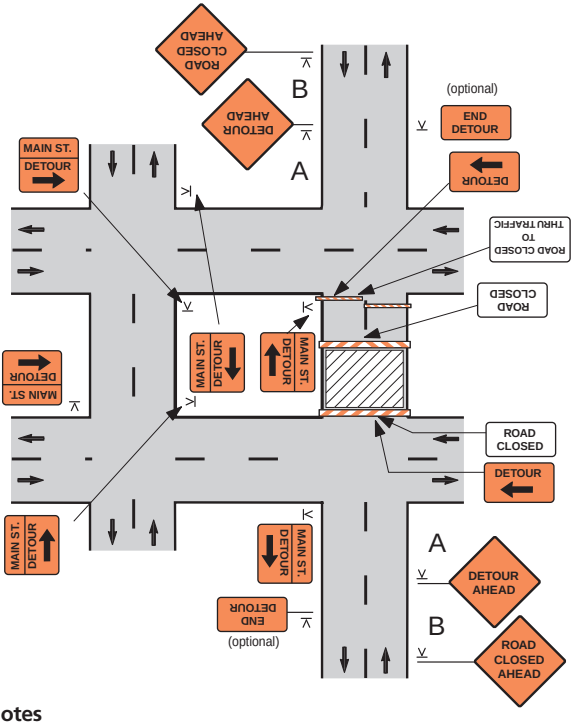


Notes

1. Consider additional advance warning signs such as ROAD NARROWS or Reverse Curve/ Turn. The Reverse Curve/ Turn sign is appropriate for larger deviations in the travel path.
2. Left turns may be prohibited as required by traffic conditions. Unless the streets are wide, it may be physically impossible to turn left, especially for large vehicles.
3. For short duration work (60 minutes or less), the channelizing devices may be eliminated if a vehicle with activated high intensity lights is positioned in the work space.

Speed Limit (mph)	**Sign Spacing A, B** (ft)	**Shift Taper** (ft) 5′ shift	10′ shift
25	200	30	55
30	200	40	75
35	350	55	105
40	350	70	135
45	500	115	225
50	500	125	250
55	500	140	275

Street Closure with Detour



Notes

Speed Limit (mph)	Sign Spacing A, B (ft)
25-30	200
35-40	350
45-50	500

1. This layout should be used for streets and roads without posted route numbers. See figure 6H-8 and 6H-9 of the MUTCD Part 6 for closing and detouring a numbered highway.
2. When a side road intersects the roadway within the work zone, place Type III barricades and ROAD CLOSED signs at the intersections, and provide advance signing of the closure on the side road approaches.
3. A street name sign may be mounted with the DETOUR sign and should be used if a local road is detoured onto a state highway. If used, the street nameplate goes above the DETOUR sign.
4. A DETOUR sign with an advance turn arrow may be used in advance of a turn and should be used on multilane streets.
5. DETOUR signs may be located on the far side of intersections.

Mobile Operations

Mobile operations are work activities that move along the road either intermittently or continuously. Safety for mobile operations should not be compromised by using fewer devices simply because the operation will frequently change its location.

Mobile devices can be used. For example, appropriately colored or marked vehicles with activated high intensity lights, perhaps augmented with signs or arrow boards, may be used in place of stationary signs and channelizing devices.

For mobile operations to be successful, the advance warning area should move with the work area or be repositioned periodically to be near the mobile work area.

Flaggers may be used. They shall use approved flagging procedures according to the MUTCD and as shown on page 56.

When volumes and/or speeds are high, a shadow vehicle, equipped with an arrow board or sign, should follow the work vehicle. In addition, vehicles may be equipped with truck-mounted attenuators and/or portable, changeable message signs. If traffic volumes are high, consideration should be given to doing the work during off-peak hours.

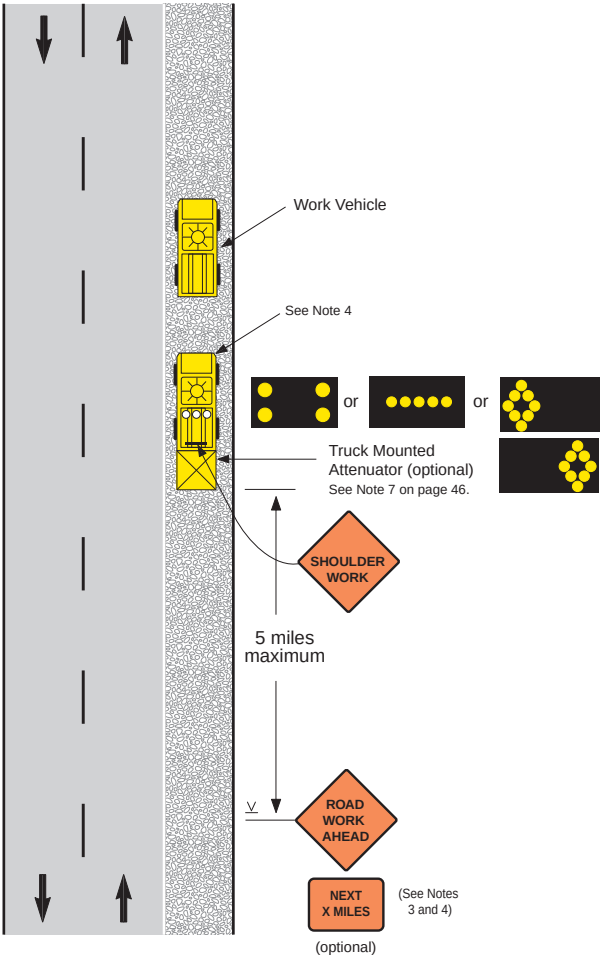
Intermittent Mobile Operations – These mobile operations often involve frequent short stops for activities such as litter cleanup, pothole patching, or utility operations and are similar to short-duration operations. Warning signs, activated high intensity lights, and/or channelizing devices should be used and moved periodically.

Continuously Moving Mobile Operations – These mobile operations include work activities in which workers and equipment move along the road without stopping, (e.g. pavement striping, mowing, street sweeping, or herbicide spraying), usually at slow speeds.

With operations that move slowly (less than 3 mph), mobile or stationary signs that are periodically repositioned in the advance warning area may be used. For mobile operations that move at speeds greater than 20 mph, vehicles shall have appropriate activated high intensity lights, signs, and/or special lighting.

For some continuously moving operations where volumes are low and visibility is good, a single work vehicle with appropriate warning devices on the vehicle may suffice.

Mobile Operation on the Shoulder



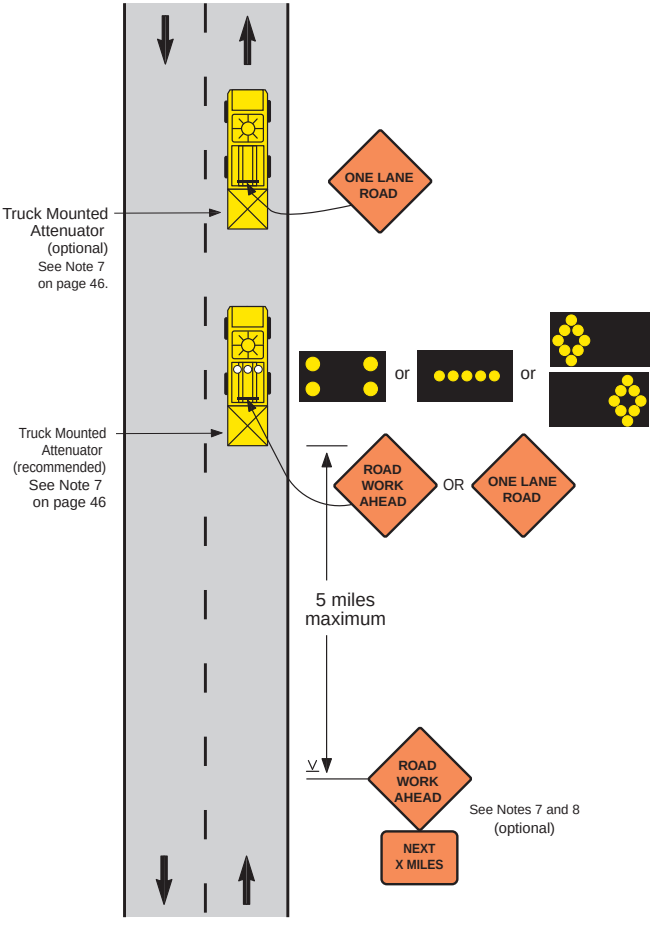
Notes

1. If the operation requires encroachment on the travelway, use a mobile or stationary lane closure, unless a 10-foot minimum lane width is maintained and the volume is less than 1500 ADT.
2. For operations that move less than 3 mph or where multiple work locations in a limited distance make it practical to place stationary signs, the distance from the advance warning sign to the work area should not exceed 5 miles.
3. The ROADWORK NEXT X MILES sign or a supplemental plaque (NEXT X MILES) may be used for work zones more than 2 miles long.
4. A shadow vehicle equipped with a SHOULDER WORK sign, optional Truck Mounted Attenuator and Arrow Board (in Caution mode) may be used, depending on availability and type of operation. Its use is recommended on high-volume roads, or roads with poor sight distance. If used, it is located behind the work vehicle to provide advance warning. If the shadow vehicle with sign is used, the stationary sign can be omitted.
5. Warning signs may be omitted if the work vehicle displays activated high intensity lights.
6. Other acceptable advance warning signs include UTILITY WORK AHEAD, SHOULDER WORK, MOWING, Workers, and ROAD MACHINERY AHEAD.
7. The table below gives recommended roll-ahead distances between a vehicle with a truck-mounted attenuator (TMA) and the work area for both stationary and mobile operations. The roll-ahead distance for the vehicle could vary depending upon the recommendations of the TMA manufacturer.

Roll-ahead Distances for TMAs

Speed	Stationary	Mobile
≤45 mph	100 ft	150 ft
50-55 mph	150 ft	200 ft
60-65 mph	200 ft	275 ft

Mobile Operation on a Two-Lane Road



Notes

1. The work and shadow vehicles should pull over periodically to allow traffic to pass. If this cannot be done frequently, a do not pass sign may be placed on the rear of the vehicle blocking the lane.

2. Shadow vehicles are used to warn traffic of the operation ahead. The distance between the work and shadow vehicles may vary according to terrain, paint drying time, and other factors. Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minimum distance and proceed at the same speed as the work vehicle. The shadow vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.

3. Additional shadow vehicles to warn and reduce the speed of on-coming or opposing traffic may be used. Police patrol cars may be used for this purpose.

4. Shadow and work vehicles shall display activated high intensity lights. Shadow vehicles should also display two high-intensity flashing lights mounted on the rear, adjacent to the sign.

5. Vehicle-mounted signs shall be mounted so as to not be obstructed by equipment or supplies and to provide an unobstructed view of vehicle lights or arrow board. Sign legends shall be covered or turned from view when work is not in progress.

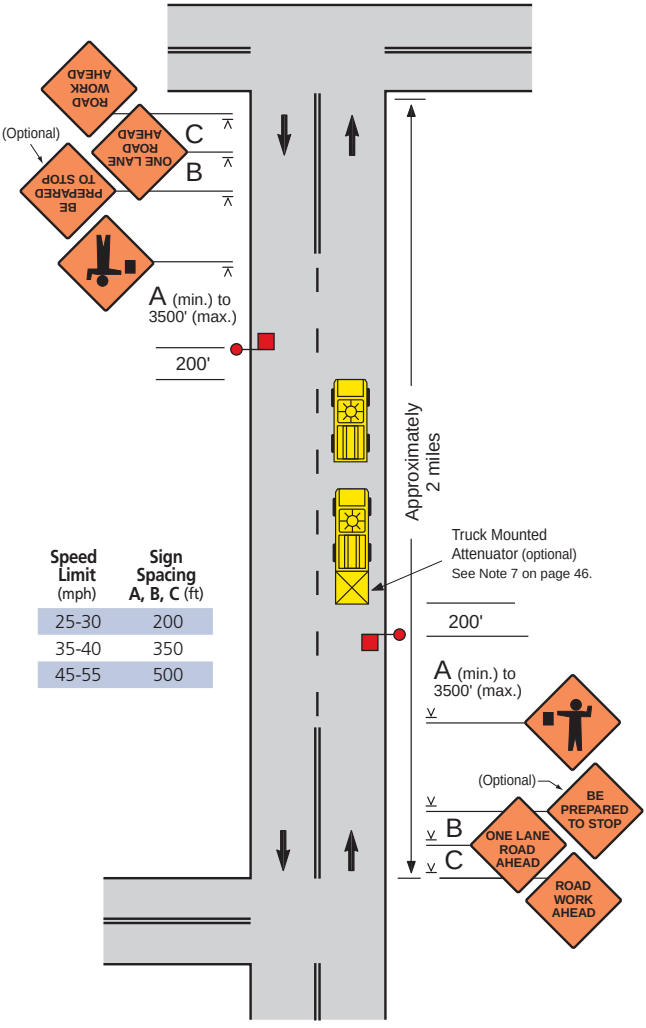
6. The shadow vehicle may not be needed for roadways with volume less than 1500 ADT, especially if sight distance is good. For higher volume conditions the shadow vehicle should be used.

7. Stationary advance warning signs similar to that on the shadow vehicle can be used to provide additional advance warning. These signs might include: SLOW MOVING TRAFFIC, ROAD WORK AHEAD, PAINT CREW AHEAD, SURVEY CREW AHEAD etc. Consider using these signs where speed and/or volumes are high, where sight distance is limited, or if a shadow vehicle is not used. If stationary signs are not used, use a ROAD WORK AHEAD sign on the shadow vehicle.

8. If stationary signs are used and the work zone is more than 2 miles long, the ROAD WORK NEXT X MILES sign or a supplemental plaque should be used.

Mobile Operation on a Two-Lane Road Using Flaggers

(Traveling at less than 3 mph)



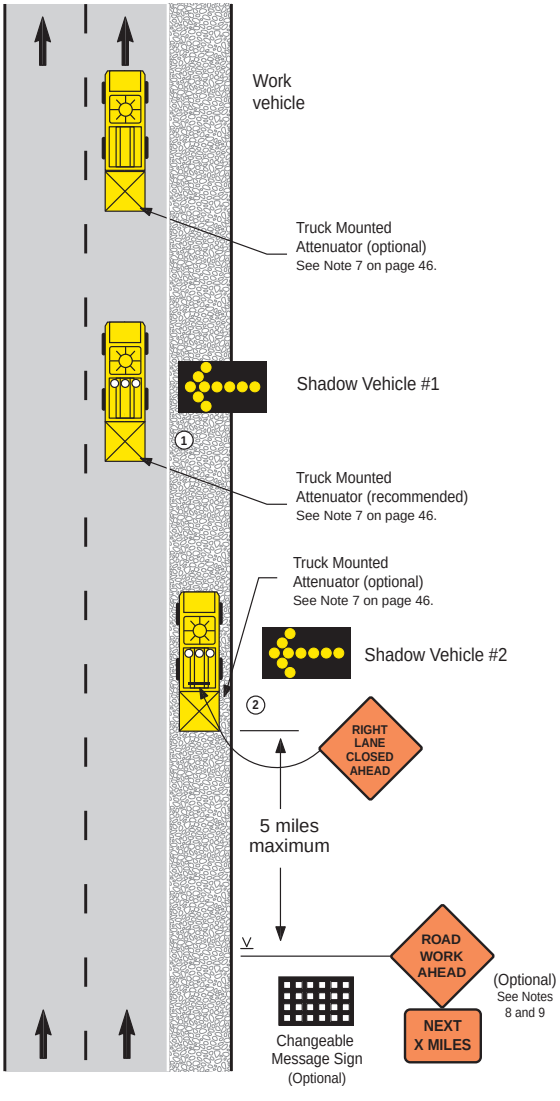
Speed Limit (mph)	Sign Spacing A, B, C (ft)
25-30	200
35-40	350
45-55	500

Mobile Operation on a
Two-Lane Road Using Flaggers
(Traveling at less than 3 mph)
(continued)

Notes

1. Do not exceed 2 miles for the total length of the temporary traffic control zone.
2. Where feasible, use well defined end points (e.g. major driveways, intersections, city limits, etc.) to establish the limits of the work zone.
3. Flagger warning signs should be repositioned periodically as the operation moves.
4. Suggested shadow vehicle configuration includes activated high intensity lights and a truck mounted attenuator.
5. If there is a sideroad intersection within the work area, provide ROAD WORK AHEAD signs and consider additional traffic control, such as flaggers and other appropriate signs on the sideroad approaches.
6. Flaggers shall use approved flagging procedures according to the MUTCD and as shown on page 56.

Mobile Operation on a Multi-Lane Road



Notes

1. Vehicles used for these operations should be made highly visible with appropriate equipment, such as activated high intensity lights, flags, signs, or arrow boards.
2. Shadow vehicle #1 should be equipped with an arrow board and truck mounted attenuator.
3. Shadow vehicle #2 should be equipped with an arrow board and may be equipped with a truck mounted attenuator. An appropriate lane closure sign should be placed on shadow vehicle #2 so as not to obscure the arrow board.
4. On high-speed roadways, a third shadow vehicle (not shown) may be used with shadow vehicle #1 in the closed lane, shadow vehicle #2 straddling the edge line, and shadow vehicle #3 on the shoulder.
5. When adequate shoulder width is not available, the rear shadow vehicle may drive partially in the lane.
6. Shadow vehicles should travel at a varying distance from the work operation so as to provide adequate sight distance for traffic approaching from the rear.
7. Spacing between vehicles should be minimized to deter traffic from driving in between the convoy of vehicles.
8. Stationary advance warning signs can be used to provide additional advance warning. These signs might include: SLOW MOVING TRAFFIC AHEAD, ROAD WORK AHEAD, PAINT CREW AHEAD, etc. Consider using these signs and/or a changeable message sign where speeds and volumes are high, where sight distance is limited, or if shadow vehicle #2 is not used.
9. If stationary signs are used and the work zone is more than 2 miles long, a ROAD WORK NEXT X MILES sign or supplemental plaque should be used.
10. Work should normally be done during off-peak hours.

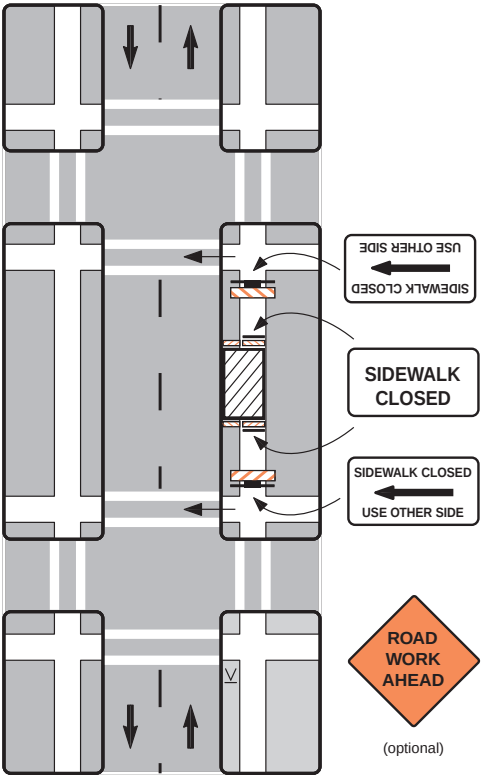
Pedestrian and Bicyclist Safety

It is important to provide continuous access for pedestrians, bicyclists, and to bus stops. If pedestrian or bicycle travel paths are closed or disrupted by construction, maintenance, or utility operations, traffic control is needed. This includes using signs, channelizing devices, etc. to direct pedestrians and bicyclists through or around the work site, or to alternate routes. Major considerations in planning for pedestrian and bicyclist safety are:

- Do not lead pedestrians or bicyclists into conflicts with work site vehicles, equipment, or operations, nor traffic moving through or around the work site. Obstructions should be clearly marked, especially at night.
- Do not block or relocate pedestrian or bicycle routes for non-construction activities such as parking for vehicles and equipment.
- Provide pedestrians with a safe, convenient and clearly delineated travel path that replicates as nearly as practical the most desirable characteristics of existing sidewalks or footpaths. Signals and devices mounted lower than 7 feet should not project more than 4 inches into pedestrian facilities.
- Where sidewalks are closed or relocated, provisions shall be made for disabled pedestrians. When it is determined a facility should be accessible to pedestrians with visual disabilities, continuously detectable edging should be provided for pedestrians using long canes for guidance. Examples include interconnected barrier, curb, lumber, or fencing with a continuous bottom rail. If channelizing devices are used there cannot be gaps between the bases. Audible devices should be considered to provide communication of closings and crosswalk changes to pedestrians with visual disabilities. Audible devices might not be needed if detectable channelization makes an alternate route of travel evident to persons with visual disabilities.
- Advance notification of sidewalk closures shall be provided to the maintaining agency.

Sidewalk Closure

(Pedestrian Detour)

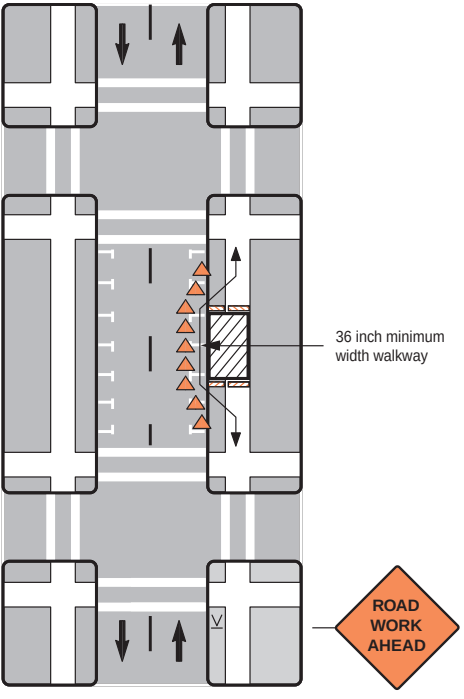


Notes

1. Additional advance warning may be necessary.
2. Only the traffic control devices related to pedestrians are shown. Other devices may be needed to control traffic on the streets such as lane closure signs, ROAD NARROWS or LANE NARROWS signs.
3. For nighttime closures, Type A flashing warning lights may be used on barricades supporting signs and closing walkways.
4. Audible devices should be considered to alert pedestrians with visual disabilities of closings and crosswalk changes.

Sidewalk Closure

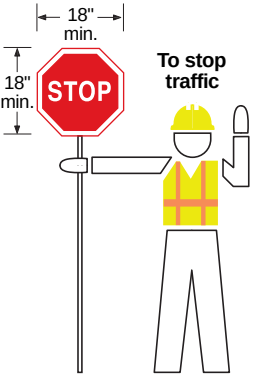
(Pedestrian Walkway Provided)



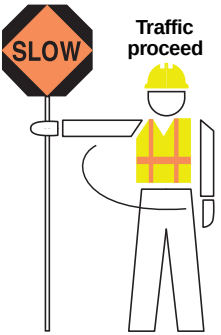
Notes

1. Additional advance warning may be necessary.
2. Only the traffic control devices related to pedestrians are shown. Other devices such as lane closure signs, ROAD NARROWS or LANE NARROWS signs may be needed to control traffic on the streets.
3. For nighttime closures, Type A flashing warning lights may be used on barricades supporting signs and closing walkways. Type C or Type D steady-burn lights may be used on channelizing devices separating the temporary walkway from vehicular traffic.
4. Where high speeds are likely, a barrier should separate the temporary walkway from vehicular traffic. Refer to Section 6D.01of Part 6 of the MUTCD for information on barriers.
5. Signs may be placed along a temporary walkway to guide pedestrians; for example, Keep Right or Keep Left signs.

Flagging Procedures



To stop traffic



Traffic proceed

To alert and slow traffic

Properly trained flaggers

- give clear messages to drivers as shown
- allow time and distance for drivers to react
- never stand in moving traffic lane
- coordinate with other flaggers

Properly equipped flaggers use

- approved sign paddles
- approved safety vest, shirt or coat
- brightly colored hat for better visibility
- retroreflective night equipment

Proper flagging stations have

- good approach sight distance
- high visibility to traffic
- illumination at night

Proper advance warning

- always use warning signs
- allow reaction distance from signs
- remove signs when not flagging

Flags should only be used in emergency situations. Flags used for signaling shall be a minimum of 24" x 24", red in color and mounted on a staff about 3' long.

Worker Safety

The safety of workers in a work site is just as important as the safety of the public traveling through the work zone. The best protection for both is good work zone traffic control.

All workers should be trained in how to work next to traffic in a way that minimizes their vulnerability. In addition, workers with specific traffic control responsibilities should be trained in traffic control techniques, device usage, and placement.

Workers close to traffic or construction equipment should wear bright, highly visible apparel meeting the requirements of ANSI 107-2004 standard for reflectivity and background material. Flaggers shall wear safety apparel meeting the requirements of ANSI 107-2004 Class 2 or 3. For nighttime work, apparel meeting ANSI 107-2004 Class 3 (including high-visibility pants) should be considered for flaggers.

These garments shall be either fluorescent orange-red or fluorescent yellow-green. The retroreflective material shall be orange, yellow, white, silver, or yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1000 feet. The safety apparel shall be designed to clearly identify the wearer as a person (i.e. retroflective material on the front, back, and both sides of the garment). Other specific agency requirements for garments can also apply, such as OSHA requirements for private sector employees and WisDOT Safety Directives for WisDOT employees.

A competent person designated by the employer should assess hazards at the work site and determine whether protective measures should be implemented. Planning the internal work activity area to minimize backing maneuvers of work vehicles should be considered to minimize the risk to workers on foot.

Supervisor's Checklist

1. Follow Part 6 and the *Wisconsin Supplement* of the *Manual on Uniform Traffic Control Devices*.
2. Have a traffic control plan before going to the work site.
3. Ask yourself, "What is the driver's view of the work site—at night, during peak hours, etc."
4. Investigate crashes/incidents to identify if changes are needed in the traffic control plan.

Liability

Steps to Minimize Liability

- have a current traffic control plan
- apply the concepts of the *MUTCD (Manual on Uniform Traffic Control Devices)*
- minimize traffic disruptions
- promptly remove or add devices as necessary
- train all personnel
- inspect work zone sites regularly for conformance and changing conditions
- maintain good documentation

Elements of a Good Inspection Program

- routinely conduct inspections at different times of day/evening
- identify hazards and take corrective action
- record observations and actions taken
- verify corrective actions
- update documentation

Minimum Documentation

- who was on the site and when
- where was the work taking place
- when were traffic control devices inspected, by whom
- record any irregularities, action taken and follow up inspection
- gather additional information in the event of a crash

Acknowledgments

Previous pocket-guide editions were adapted for use in Wisconsin by the Wisconsin Department of Transportation (WisDOT) and the Wisconsin Transportation Information Center (TIC) from the one produced by the Institute for Transportation Research and Education (ITRE) at North Carolina State University. This new edition includes changes contained in the 2009 *MUTCD* and the *2011 Wisconsin Supplement*.

The Wisconsin team that produced this edition included representatives of the construction, maintenance, and traffic sections of WisDOT; the Federal Highway Administration, Wisconsin Division; TIC workzone training instructors; and the University of Wisconsin-Madison Transportation Information Center.

NAME _____

Information and Training

For information, copies of this pocket guide, and training opportunities in work zone traffic control, flagging, or other street and highway design, operation and maintenance topics, contact the Wisconsin Transportation Information Center, a project of the University of Wisconsin-Madison Department of Engineering Professional Development, funded as a Local Transportation Assistance Program by the Federal Highway Administration, Wisconsin Department of Transportation, and UW-Extension.

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