# TRAFFIC CONTROL FIELD MANUAL

## FOR IDOT EMPLOYEES

MARCH 2023, ISSUE 2


**BUREAU OF SAFETY PROGRAMS & ENGINEERING**

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Illinois Department of Transportation

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# General

## Introduction

This Manual is issued for the purpose of the proper application of temporary traffic control devices for all employees of the Illinois Department of Transportation (IDOT) working on or near open traffic lanes. Work Zone Cases have been developed to establish the minimum requirements for work site protection, when traffic control is provided by the Department. IDOT employees providing inspection for contract work, permit work, or utility work shall work within the traffic control provided by the Contractor, Permit Holder, or Utility Company. Traffic control and work site protection measures for contracted work, permit work, or utility work shall be in accordance with the contract documents, permit documents, or the applicable IDOT Highway Standards for Traffic Control. Since Work Zone Cases call for the minimum requirements, additional devices should be added when necessary to enhance safety. These Work Zone Cases shall not replace traffic control highway standards placed within a contract or Traffic Control Plan (TCP).

This Manual does not apply to Emergency Traffic Patrol (ETP) and Emergency Patrol Vehicles (EPV) personnel. Snow and ice control operations, EPV operations, and ETP operations requirements are covered by IDOT's Safety Code. Workers other than IDOT personnel using this Manual for reference shall be aware that this Manual is not a substitute for training of personnel whose actions affect traffic control and the safety of the public.

For two-lane, two-way roadways, contractors or their authorized agents shall either use a case that requires two (2) flaggers or modify a case that allows the use of one (1) flagger to two (2) flaggers. Only employees or officials of the State or public agencies engaged in construction or maintenance may use one (1) flagger to control traffic on a two-lane roadway where allowed.

The proper use and most effective placement of traffic control devices are required to prevent injury to employees and the public. Planning should be a high priority so that work can proceed in a safe, efficient, and orderly manner with minimal interference to motorists. Each Work Zone Case herein has been developed to meet the requirements of the "Manual on Uniform Traffic Control Devices for Streets and Highways, Part 6."

These cases and the traffic control included in the Contract or permit documents establish minimum requirements which will provide a reasonable level of safety. Application of these requirements cannot, however, guarantee the safety of every worksite. Each worker and supervisor should, therefore, be alert for any circumstance which could require change, including the application of additional devices. When specific operations are not covered, a TCP should be developed for the special application. Each employee is responsible and should review the traffic control to ensure the safety of the employees and the motorists. Deficiencies shall be corrected. For work operations expected to be in place for more than three (3) days, a TCP shall be developed and approved by the District.

Quality Standard for Work Zone Traffic Control Devices included in this manual establishes criteria for determining the condition of temporary traffic control devices as stated in Article 701.04 of the IDOT Standard Specifications for Road and Bridge Construction and applies to all temporary traffic control devices on roadways under the jurisdiction of the Department.

## Definitions

**Advance Warning Area** - that part of a Temporary Traffic Control (TTC) zone used to inform the motorist what to expect ahead. This area may contain anywhere from a single sign or a rotating/strobe light on a vehicle to a series of signs and the use of a portable changeable message sign (PCMS)/Message Boards.

**Advance Warning Sign Spacing** - the distance between signs or between a sign and some other location or device within the TTC zone. It is determined by the posted speed limit. This will ensure that the motorist has sufficient time to read the signs and react accordingly. Typical Advance Warning Sign Spacings are included in the TTC Distance Charts.

**Advisory Speed** - the recommended speed for all vehicles operating on a section of highway and based on the highway design, operating characteristics, and conditions. Advisory speeds are not enforceable.

**Approach Sight Distance** - the distance which a motorist can visually identify the flagger station, a lane closure, a slow moving or stopped

vehicle, or any other situation which requires adjustments by the motorist.

**Average Daily Traffic (ADT)** - average daily traffic volumes. Use most recent ADTs posted on IDOT's website.

**Bi-directional Left Turn Lane** - that part of the roadway that has a continuous bi-directional left turn lane located between the opposing lanes of traffic. This design variation may be found on either two-lane, two-way roads or multilane roads.

**Buffer Space** - an area between the lane closure taper and the work area that provides a recovery space for an errant vehicle and is free of equipment, workers, material and vehicles.

**Crashworthy** - is a characteristic of roadside devices that have been successfully crash tested in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" or Manual for Assessing Safety Hardware (MASH).

**Decision Sight Distance** - the total distance traveled during the length of time required for a driver to:

- detect an unexpected or otherwise difficult-to-perceive information source or hazard in a roadway environment that may be visually cluttered,
- recognize the hazard or its potential threat,
- select an appropriate speed and path, and
- initiate and complete the required maneuver safely and efficiently.

The decision sight distance is used to determine the minimum advance warning distance to the furthest and/or single sign. When determining minimum sight distance to flaggers and mobile operations, these distances also apply.

**Divided Road** - a highway or two roadways where opposing traffic is separated by a median (ditch, barrier, curbing, etc.). Temporary traffic control for divided multilane roads may be also used for one-way roadways.

**Downstream Taper** - the taper at the end of the activity area which guides traffic back into its original lane. When used, this taper should be 50 ft to 100 ft with a 20 ft spacing between channelizing devices.

**Duration** - the length of time traffic is disrupted. The following are defined in overlapping intervals since TTC layouts for longer durations may always be used for shorter durations, especially when roadway attributes such as traffic volume and speed, and the work area location may warrant higher levels of traffic control.

- **Brief Encroachment** - for non-emergency daylight operations where workers and/or equipment are in or within two (2) feet of the traveled lane for less than 15 minutes. When a non-emergency operation stays in one location during daylight conditions for less than 15 minutes.
- **Moving Operation** - operations that stop briefly then move on and operations that are continuously moving; when an operation is continuously moving or stopped in one location for periods of 15 minutes or less. The traffic control devices are typically vehicle-mounted. The work area should change by at least the decision sight distance for it to be considered a change in location.
- **Short Term** - when an operation stays in one location during non-emergency daylight conditions from 15 to 60 minutes, such that minimal TTC devices are deployed.
- **Intermediate Term** - when an operation stays in one location from greater than one (1) hour to no more than three (3) days. Advance signing and larger channelizing devices are required.
- **Long Term** - when an operation stays in one location for more than three (3) days. A project specific Traffic Control Plan is required. Contact with the District is required.

**Engineering Judgment** - the evaluation of available pertinent information, and the application of appropriate principles, standards, guidance, and practices as contained in this Manual and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device.

**Expressway** - any multilane, divided highway for through traffic with partial control of access and generally with at-grade intersections.

**Freeway** - any divided highway with full control of access (i.e. has interchanges, ramps, and no at-grade intersections).

**High Speed Road** - a roadway where the posted speed limit is 45 mph or greater.

**Highway** - a general term for denoting a public way for the purposes of vehicular travel, including the entire area within the right-of-way.

**Lane Closure** - a closure of one or more lanes of the roadway to traffic. Generally, a minimum lane width of 10 ft is required for a traffic operation. Work operations that restrict adjacent lane width should consider various lane closure alternatives depending upon volume and speeds on the roadway.

**Lateral Buffer Space** - the space that separates the traffic space from the work area. It is typically the extra space provided between traffic and workers, excavations, pavement edge drop-offs, or an opposing lane of traffic. Traffic lanes may be closed to provide for lateral buffer space. See the Drop-off Guidelines of this Manual for more information.

**Low Speed Road** - a roadway where the posted speed limit is 40 mph or less.

**May** - this word, or the adjective "OPTIONAL", means that an item is truly discretionary.

**Merging Taper** - the taper used on a multi lane road to close a lane and combine its traffic from that of the adjacent lane. Its length is dependent on the posted speed of the roadway. Higher speeds require a longer distance for traffic to merge lanes. Typical merging tapers are included in the TTC Distance Charts.

**Message Boards** - refer to Portable Changeable Message Signs (PCMS) definition.

**Motorist** - an operator of a motorized vehicle intended to be used on a roadway.

**Multilane Road** - a roadway where two (2) or more lanes of traffic travel in the same direction. A multilane road may be classified as either undivided or divided.

**Off Shoulder** - a work area located primarily off the shoulder, or which causes little or no restrictions on the use of the shoulder. This work area should have little or no interference with traffic such that traffic speeds generally are not reduced.

**Portable Changeable Message Sign (PCMS)** - a sign either trailer-mounted or vehicle-mounted that is capable of displaying more than one message, changeable by remote or automatic control.

**Posted Speed Limit** - the speed limit determined by law and shown on Speed Limit signs. It is used in this Manual's charts to determine the spacing of TTC devices and the lengths of various tapers on the TTC layouts.

**Road, Roadway** - that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles.

**Roll-Ahead Distance** - the recommended minimum distance between a shadow vehicle with truck mounted attenuator and the work area. A shadow vehicle may be used in a moving operation to provide extra safety for the workers. Appropriate roll-ahead distances are shown in Work Zone Cases and on page 23.

**Rural Highway** - a highway where traffic is normally characterized by lower volume, higher speed, fewer turning conflicts and fewer conflicts with pedestrians.

**Shadow Vehicle** – the vehicle placed in advance of the work area to provide advance warning to motorists or close a lane/shoulder to protect the work area. The shadow vehicle shall be equipped with a TMA if it encroaches in the open lane. Shadow vehicles shown in the work zone case may not be omitted.

**Shall** - this word, or the term "REQUIRED", means that the definition is an absolute requirement.

**Shifting Taper** - the taper used to move traffic from the traffic lane onto a bypass or shoulder. This traffic maneuver generally requires half the distance of a merging taper. See the TTC Distance Charts for the length of a shifting taper called L/2.

**Should** - this word, a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate.

**Shoulder Closure** - a closure of the roadway shoulder for work operations. The shoulder then becomes unusable by traffic for vehicle maneuvers or break-downs. TTC layouts for work operations using or on a shoulder are dependent on the type of shoulder usage and duration.

**Shoulder Taper** - the taper used to close the shoulder off to traffic so that shoulder work can be done or equipment can be placed on the shoulder. Since this taper is used to guide errant traffic back to its normal lane path, it does not require a full merge distance. The taper length is reduced to one third (1/3) of a merging taper length. See the TTC Distance Charts for the length of a shoulder closure taper called L/3.

**Spotter** - a trained worker whose sole duty is to monitor traffic and warn co-workers of errant drivers or other hazards.

**Temporary Traffic Control (TTC) Plan** - a plan describing the traffic controls to be used for facilitating vehicle and pedestrian movements through a temporary traffic control zone.

**Temporary Traffic Control (TTC) Zone** - an area of a highway where road user conditions are changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel. See Areas in Work Zone.

**Termination Area** - that part of a TTC zone located beyond the work area which guides traffic back into its normal traffic path. A longitudinal buffer space may be used between the end of the work area and the beginning of the downstream taper.

**Traffic Control Device** - a sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or shared-use path by authority of a public agency having jurisdiction.

**Traffic Space** - that part of the roadway open to traffic that is next to the activity area. Traffic routing is provided with channelizing devices. For a description of the various types of channelizing devices and their general uses, see the Temporary Traffic Control Devices Section of this Manual.

**Transition Area** - that part of the TTC zone that moves the traffic from its normal path or lane into the traffic space. This movement of traffic is done through the use of channelizing devices and directional signing placed in various types of tapers.

**Traveled Lane** - the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms and sidewalks.

**Turn Lane Closure** - the closure of a right or left turn lane for work operations. Signing in the TTC zone shall provide adequate warning to the motorists and provide an alternative turning maneuver. Layouts from the various roadway types should be reviewed for the best alternate depending upon roadway intersection design, traffic control (stop, yield, signals, etc.), speed limit, and volume.

**Two-Lane, Two-Way Road** - a roadway consisting of two (2) opposing lanes of undivided traffic.

**Two-Way Taper** - the taper used on two-lane, two-way road to change the road into a single lane of two-way traffic. It is primarily used for flagging operations and other traffic control situations. It is typically 100 ft in length and contains six (6) equally spaced channelizing devices.

**Undivided Road** - a roadway where opposing traffic lanes have no physical separation barriers except pavement markings (where required).

**Urban Street** - a type of street normally characterized by relatively low speed, wide ranges of traffic volumes, narrower lanes, frequent intersections and driveways, significant pedestrian traffic, and more businesses and houses.

**Volume** - the number of vehicles passing a given point on the roadway or, the Average Daily Traffic (ADT).

**Work Area** - that portion of the roadway or shoulder that is closed to the traffic and set aside for workers, equipment, work vehicles, and materials. It may be stationary or moving. The space requirements for a specific TTC Zone will determine the type of TTC layout that is appropriate for the project. The layout will specify the appropriate sign locations, flagger stations and tapers depending on the type of work space.

**Work Vehicle** – the vehicle typically actively engaged in the work operation. Work vehicles shall be either completely on the shoulder or behind a lane/shoulder closed with channelizing devices or a shadow vehicle with a TMA.

**Work Zone Speed Limits** - a regulatory speed limit in a temporary traffic control zone.

# Temporary Traffic Control Devices

## General Guidelines

For approved temporary traffic control (TTC) devices, refer to the IDOT website, contract documents, Work Zone Cases or Permit documents. All TTC devices should be placed in the order that drivers will see them, starting with the sign or device that is farthest from the work area, placing the others as the work area is approached. Removal of TTC devices should be done in the reverse order or under Work Zone Cases WZ 21 or WZ 40 for moving operations. A common exception to this practice is the placement and removal of detour signing and TTC devices. Detour signing and TTC devices should be erected from the end of the detour and continue to the beginning of the detour. Detour signing removal should be in the reverse order, removing signs in the direction of traffic flow.

All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement, with the following exceptions:

- When authorized by their supervisor or the applicable Work Zone Case.
- For brief encroachments, where site conditions do not allow vehicles to be parked completely out of the traveled way.

At locations where all vehicles, equipment, workers or their activities are more than 15 ft from the edge of pavement, no traffic control devices are required.

All equipment, trucks, and materials should be parked on the shoulder and downstream from the shadow vehicle. If at all possible, lane closure tapers and the buffer area should be kept free of any materials, equipment, or workers, except as shown herein on applicable Work Zone Cases.

Workers should not be farther than 200 ft downstream of the shadow vehicle or work vehicle.

Signs that do not apply to current conditions such as WORKERS and/or FLAGGER shall be removed, covered, or turned from the view of motorists.

The following pages describe some of the most frequently used traffic control devices. For these devices to perform successfully they shall be of good quality, their placement shall be proper and their position shall be maintained. All devices should be periodically evaluated using the Quality Standard for Work Zone Traffic Control Devices in this Manual.

Distances stated in this Manual are guides. Field conditions may force adjustments to maximize visibility of flaggers and signs in some work zones. In general, small increases in distance are acceptable. Decreases in distance should only be used for unique situations where an increase in distance will not work.

The flagger station shall be lit during non-daylight hours. In addition, consideration should be given to illuminating the work site. Special attention should be given to assuring that auxiliary lights/floodlights do not create a disabling glare for the motorists.

## Channelizing Devices

The function of channelizing devices is to delineate a desired vehicle path, mark specific hazards on or near the roadway, separate opposing traffic flows, and partially or totally close the roadway.

Channelizing devices include cones, drums, barricades and various kinds of markers.

At night, reflectorized cones, drums, or barricades shall be utilized. If cones are used at nighttime, retroreflective collars are required and workers shall be present to maintain the devices.

Sandbags may only be used on the lower barricade rails. Striped panels facing traffic shall not be covered. Weights of concrete, stone or other materials shall not be used. Sandbags shall not be added to self-ballasting barricades.

Barricades are to be placed so that the stripes slant downward toward the side on which traffic is to pass.

## Warning Lights

Special attention should be given to assure maximum sign retroreflectivity and that lighting devices are operational. Steady burn lights shall be used on barricades and drums when these devices are used for delineation of the traveled way. Flashing lights shall be used to mark obstructions and hazards.

Warning lights on devices shall be placed on the side which traffic is to pass.

## Vehicle Strobe/Warning Lights

Strobe/warning lights on work vehicles utilized by the Contractor, Permit Holder or Utility Company are addressed in the contract documents, permit documents, and/or the IDOT Highway Standards for Traffic Control. Vehicle strobe/warning lights shall be a system which supplements vehicle hazard lights. These strobe/warning light systems should have visibility from all directions. Vehicle hazard lights are not considered vehicle strobe/warning lights. The remainder of this section addresses vehicles owned or leased by the Department and utilized by its employees.

When vehicles are located on or within 15 ft of the pavement edge, vehicular mounted strobe/warning lights will be utilized. This requirement includes all vehicles parked on the shoulder. Revolving lights are adequate for tractors, while non-truck mounted equipment is exempt, i.e. air compressors, asphalt kettles, etc.

Revolving lights on existing vehicles may be utilized until the vehicle is replaced.

Illinois law allows the use of amber/white lights only when engaged in work operations.

Exception: Unoccupied vehicles, such as vans or pickups with equipment needed for the current work activity, parked in a closed lane as support vehicles. The lane shall be closed in accordance with the applicable Work Zone Case. This would apply to those work activities which exceed 60 minutes. The shadow vehicles and actual work vehicles, such as a lift, asphalt truck, drill rig, etc. shall have their strobe/warning lights operating.

## High Visibility Clothing (Personal Protective Equipment)

High visibility clothing requirements for the Contractor, Permit Holder or Utility Company are addressed in the contract documents, permit documents, or the Standard Specifications for Road and Bridge Construction. The remainder of this section addresses high visibility clothing requirements for IDOT employees.

All employees on foot, excluding flaggers, within the highway right-of-way shall wear Department approved high-visibility safety apparel in accordance with the Department Employee Safety Code. IDOT flaggers shall be equipped with Department approved high-visibility safety apparel in accordance with the Flaggers' Guide in this Manual.

Visibility during non-daylight hours is sharply reduced. As a minimum, all employees assigned to work at night shall wear Department approved high-visibility safety apparel in accordance with Department Employee Safety Code.

See "Flaggers' Guide" in this Manual for flagging requirements.

## Work Zone Signing

All advance warning signs shall be removed, covered, or turned to face away from traffic when they are no longer required or appropriate.

When work operations exceed four (4) days, signs shall be post mounted unless the signs are located on the pavement or define a moving operation. When approved by the District, temporary sign supports may be used where posts are impractical. When post mounting is not required, either temporary sign supports or sign trailers may be used.

Post mounted signs shall be a breakaway design. The sign shall be within five (5) degrees of vertical. Two (2) posts shall be used for signs greater than 16 sq. ft. in area or where the height between the sign and the ground exceeds 7 ft.

Signs on temporary supports shall be crashworthy. Documentation of meeting the requirements shall be the FHWA letter stating acceptance of the sign support system for the required test level. The signs shall be supported within 20 degrees of vertical.

Weights used to stabilize signs shall be attached to the sign support as per the manufacturer's specifications. Sign trailers, when erected, shall have their tires resting on the ground or elevated a maximum of 6 in. above the ground. Weights used to stabilize the trailer shall be sandbags mounted a maximum of 12 in. above the ground. To prevent wind induced rolling of the trailer, the wheels shall be chocked with sandbags or the trailer tongue may be pinned. The pinning method shall be designed to give way in the event of a vehicular impact and shall meet the approval of the District.

All warning signs shall be a minimum of 48 in. by 48 in., although signs on local roads may be a minimum of 36 in. by 36 in. (see contract documents). For signs mounted on trucks above truck-mounted attenuators and below arrow boards, 36 in. by 36 in. warning signs may be allowed in order to avoid obscuring the arrow board. For this application the sign shall be mounted in such a way that the bottom corner of the sign is completely visible above the truck-mounted attenuator and its top corner is at least 2 in. from any of the arrow board lamps or LEDs. Signs shall not be cut or have their diamond shape modified. Signs mounted on portable stands shall be no less than 12 in. above the traveled way. When warning signs are used on a paved surface, sandbags should be used to minimize movements. Signs shall be a minimum of 2 ft and a maximum of 10 ft from the edge of the pavement or face of curb. Placement should be adjusted to field conditions so they are readily seen by motorists. Longitudinal dimensions for the placement of signs may be increased up to 100 ft to avoid obstacles, hazards, or to improve sight distance. Spacing of signs should only be decreased when warranted by unique site conditions. The last sign in a series should be repeated 500 ft past major intersections and interchanges outside of urban areas.

## "ROAD WORK AHEAD" and "ROAD CONSTRUCTION AHEAD" Signs

Work Zone Cases require "ROAD WORK AHEAD" signs. "ROAD CONSTRUCTION AHEAD" signs are required for Contractors, Permit Holders, and Utility Companies in accordance with contract documents, permit documents, and the applicable IDOT Highway Standards for Traffic Control. "ROAD WORK AHEAD" / "ROAD CONSTRUCTION AHEAD" signs shall be erected on all side roads located within the limits of the mainline "ROAD WORK AHEAD" / "ROAD CONSTRUCTION AHEAD" signs.

## "SURVEY CREW" Signs

For appropriate applications "SURVEY CREW' signs may be used in lieu of Workers (W21-1) signs.

## Work Zone Speed Limit Signs

Work zone speed limit sign assemblies shall be provided and located as shown on the Work Zone Case, in the contract documents, permit

documents, or traffic control plan. All permanent speed limit signs located within the work zone shall be removed or covered.

Two (2) additional assemblies shall be placed 500 ft beyond the last entrance ramp for each interchange or sideroad. Work zone speed limit signs shall not be installed on a vehicle.

Modifications of work zone speed limits shall be based on engineering judgment, and approved by the District in accordance with the Policy on Establishing and Posting Speed Limits on the State Highway System (speed limit policy). This may include replacing the existing regulatory speed limit with a work zone speed limit at the same speed, or reduction of 10 mph for existing speed limits of 65 mph or less and 15 mph for existing 70 mph speed limits. Justifications for reductions of work zone speed limits include:

- Workers are present in the closed lane adjacent to traffic; or
- Drop-offs next to open traffic lanes; or
- Weaves and/or temporary alignments

Optional work zone speed limit signs which match the existing regulatory speed may be used, except for the following Work Zone Cases (Each Work Zone Case will display optional work zone speed limit signs if allowed.):

- Moving Operations
- Work on Ramps
- Two-Lane Roadway with Lane Closure

Each Work Zone Case will display optional work zone speed limit signs if allowed.

When determining whether to install optional work zone speed limit signs where the work zone speed limit matches the existing regulatory speed limit, the Districts shall reference Section D in the Policy on Establishing and Posting Speed Limits on the State Highway System (speed limit policy).

This work shall be coordinated with the lane closure(s) by promptly establishing a reduced posted speed zone when the lane closure(s) are put into effect and promptly reinstating the posted speed zone when the lane closure(s) are removed.

The work zone speed limit signs and End Work Zone Speed Limit sign shown in advance of and at the end of the lane closure(s) respectively shall be used for the entire duration of the closure(s). On multilane roadways having an existing, posted speed limit of greater than or equal to 45 mph, a 45 mph Work Zone Speed Limit shall be established through placement of work zone speed limit signs when workers are present in the closed lane adjacent to traffic and are not protected by temporary concrete barrier. The sign assemblies shown within the lane closure(s) will not be required when the worker(s) are located behind a temporary concrete barrier wall. This sign should only be used within a series of warning signs.

Contact the Bureau of Safety Programs and Engineering for the current fine amount.

## Work Zone Speed Limit Assembly


W21-I115(0)-3618

R2-1-3648

R10-I108p-3618

R2-I106p-3618


G20-I103-6036

# Guidelines for the Use of Portable Changeable Message Signs (PCMS)

The primary purpose of Portable Changeable Message Signs (PCMS) is to advise motorists of unexpected traffic and routing situations.

**Portable Changeable Message Signs SHALL:**

1. Be aimed at approaching traffic.
2. Be dimmed at night.
3. Be placed in advance of any hill crests or sharp corners that would limit visibility to approaching traffic.
4. Be disconnected from tow vehicles when in a single location for longer than two (2) hours. (Tow vehicle shall be moved away so as not to be a hazard.)
5. Provide real time information to motorists on traffic conditions ahead. Be placed such that the bottom of the message sign is a minimum of 7 ft above the roadway in urban areas and a minimum of 5 ft above the roadway in rural areas.
6. Be placed according to manufacturers' recommendations, if applicable.

**Messages**

- Each message should consist of no more than two (2) phases and shall consist of no more than three (3) phases.
- A phase shall consist of no more than three (3) lines of text.
- Each phase should be understood by itself regardless of the sequence in which it is read.
- An accurate description of the work location or the incident location is critical.
- The use of abbreviations is discouraged. The entire word should be spelled out whenever space permits.
- If abbreviations are used, they should be easily understood (see the following list of acceptable abbreviations and unacceptable abbreviations).
- Text shall be in caps and not utilize symbols
- Message shall be center justified
- Mileage shall be in fractions, not decimal

## Abbreviations That SHALL be Used Only on PCMS

| Word Message | Standard Abbreviation | Prompt Word That Should Precede the Abbreviation | Prompt Word That Should Follow the Abbreviation |
|---|---|---|---|
| Access | ACCS | --- | Road |
| Ahead | AHD | FOG | --- |
| Blocked | BLKD | LANE | --- |
| Bridge | BR | [NAME] | --- |
| Cannot | CANT | --- | --- |
| Center | CNTR | --- | Lane |
| Chemical | CHEM | --- | Spill |
| Condition | COND | Traffic | --- |
| Congested | CONG | Traffic | --- |
| Construction | CONST | --- | Ahead |
| Crossing | XING | --- | --- |
| Do Not | DONT | --- | --- |
| Downtown | DWNTN | --- | Traffic |
| Eastbound | E-BND | --- | --- |
| Emergency | EMER | --- | --- |
| Entrance, Enter | ENT | --- | --- |
| Exit | EX | Next | --- |
| Express | EXP | --- | Lane |
| Frontage | FRNTG | --- | Road |
| Hazardous | HAZ | --- | Driving |
| Highway-Rail Grade Crossing | RR XING | --- | --- |
| Interstate | I- | --- | [Number] |
| It is | ITS | --- | --- |
| Lane | LN | [Roadway] | --- |
| Left | LFT | --- | --- |
| Local | LOC | --- | Traffic |
| Lower | LWR | --- | Level |
| Maintenance | MAINT | --- | --- |
| Major | MAJ | --- | Accident |
| Minor | MNR | --- | Accident |
| Normal | NORM | --- | --- |
| Northbound | N-BND | --- | --- |
| Oversized | OVRSZ | --- | Load |
| Parking | PKING | --- | --- |
| Pavement | PVMT | Wet | --- |
| Prepare | PREP | --- | To Stop |
| Quality | QLTY | Air | --- |
| Right | RT | Keep, Next | --- |

| Right | RT | --- | Lane |
|---|---|---|---|
| Roadwork | RDWK | --- | Ahead, [Distance] |
| Route | RT, RTE | Best | --- |
| Service | SERV | --- | --- |
| Shoulder | SHLDR | --- | --- |
| Slippery | SLIP | --- | --- |
| Southbound | S-BND | --- | --- |
| Speed | SPD | --- | --- |
| State, county, or other non-US or non-Interstate numbered route | [Route Abbreviation determined by highway agency] * | --- | [Number] |
| Tires with Lugs | LUGS | --- | --- |
| Traffic | TRAF | --- | --- |
| Travelers | TRVLRS | --- | --- |
| Two-Wheeled Vehicles | CYCLES | --- | --- |
| Upper | UPR | --- | Level |
| Vehicle(s) | VEH, VEHS | --- | --- |
| Warning | WARN | --- | --- |
| Westbound | W-BND | --- | --- |
| Will Not | WONT | --- | --- |

*A space and no dash shall be placed between the abbreviation and number of a route.

## Unacceptable Abbreviations on PCMS

| Abbreviation | Intended Word | Common Misinterpretation |
|---|---|---|
| ACC | Accident | Access (Road) |
| CLRS | Clears | Colors |
| DLY | Delay | Daily |
| FDR | Feeder | Federal |
| L | Left | Lane (Merge) |
| LT | Light (Traffic) | Left |
| PARK | Parking | Park |
| POLL | Pollution (Index) | Poll |
| RED | Reduce | Red |
| STAD | Stadium | Standard |
| WRNG | Warning | Wrong |

# Guidelines for the Use of Flashing Arrow Boards (AB)

## Flashing Arrow Boards (AB) SHALL:

1) Be "aimed" at approaching traffic.
2) Be dimmed when used at night.
3) Be used in the caution mode only for:
   a) Work on roadway of two-lane, two-way roads;
   b) When closing turn lane;
   c) When closing a shoulder or work on shoulder;
   d) Roadside work close to the shoulder;
   e) When parked in a closed lane beyond the taper.
4) Be placed in advance of any hill crests or sharp corners that would limit visibility to approaching traffic.
5) Be placed at or close to the start of the lane taper.
6) Be disconnected from tow vehicle when in a single location for longer than two (2) hours.(Tow vehicle shall be moved so as not to be a hazard.)
7) Be placed according to manufacturers' recommendations, if applicable.

Only flashing arrow, flashing double arrow, and/or flashing caution displays shall be used. Sequential arrow, sequential chevron or alternating diamond caution displays shall not be used.

Flashing arrow mode shall only be used in merging taper.

Note: When a truck mounted Arrow Board is utilized, it replaces an Arrow Board shown on the case drawing.

Arrow Boards shall comply with the requirements shown in the table below.

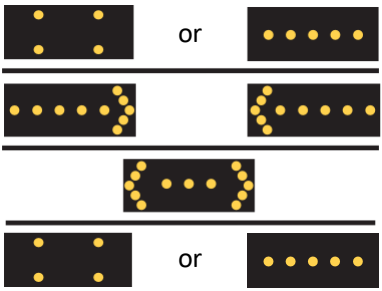
Any device not meeting these criteria may only be used as a supplemental device. An Arrow Board shall be rectangular in shape, be of solid construction, and be finished in non-reflective black.

| Arrow Board Type | | Minimum Size | Minimum Legibility Distance | Minimum Mounting Height (Above Pavement to Bottom of Board) |
|---|---|---|---|---|
| A | Truck Mounted | 48 in. x 24 in. | ½ mile | 6 ft for speeds ≤ 45 mph |
| B | Truck or Trailer Mounted | 60 in. x 30 in. | ¾ mile | 6 ft for all speeds but less than 24 hour duration |
| C | Truck or Trailer Mounted | 96 in. x 48 in. | 1 mile | 7 ft for all speeds all lengths of time |

**Proper Procedure**

1) Two-Lane Two-Way Highway
2) Multilane Roadway
3) Merge Right or Left (Center Land Closure)
4) Caution

**Panel Display**

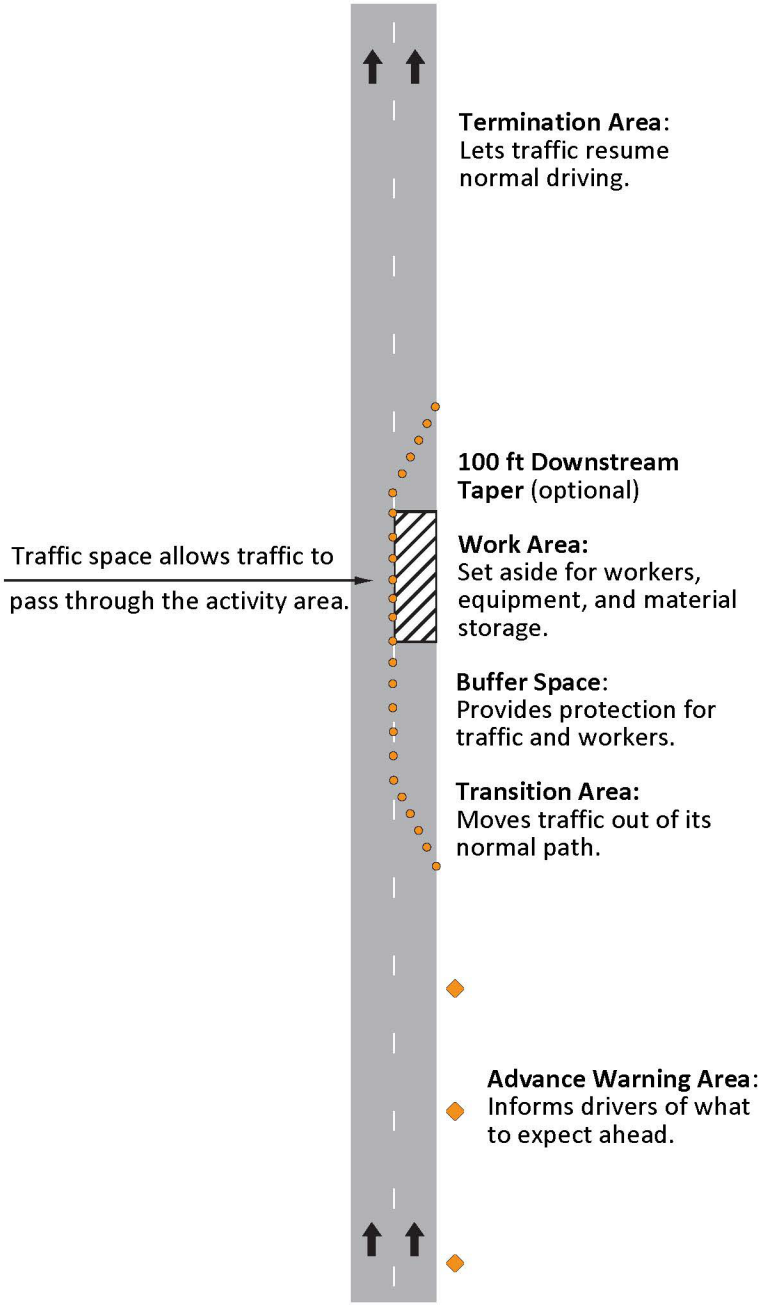



## Temporary Concrete Barrier

Temporary concrete barrier shall be identified as Illinois F Shape by stamp or paint. Temporary concrete barrier shall meet FHWA crashworthy standards for Category 3, Test Level 3 requirements. The barriers shall be seated on bare, clean pavement or paved shoulder and pinned together in a smooth, continuous line.

The barrier unit at each end of the installation shall be secured to the pavement or paved shoulder using six (6) anchoring pins and protected with an accepted crashworthy device of the specified Test Level as shown on the Plans. Each approach end of the barrier shall be shielded with an approved crashworthy end treatment, regardless of placement within or outside the clear zone. If TCB is required contact the Traffic Control Supervisor for design specific installations and construction requirements.

# Components of Work Zone Temporary Traffic Control



## Shadow Vehicle with Truck Mounted Attenuators (TMA)

The purpose of a shadow vehicle is to protect both the workers and the motorists. TMAs shall be utilized at locations shown into the work zone cases and when the shadow vehicle may encroach the lane open to traffic. A truck mounted attenuator and an arrow board may not be required when the shadow vehicle is entirely on the shoulder.

Where the TMAs are labeled as optional, extra consideration should be given to the following:

- Heavy truck volumes
- Traffic volumes and speeds
- Limited sight distance

When a TMA is not available and one is required, the activity shall be postponed until one is available. An Arrow Board is not an acceptable substitute for a TMA.

When required on a case drawing, a TMA shall be dispatched with the crew.

The driver should exit the truck when the truck is to be stopped for more than 15 minutes.

Workers shall not be greater than 200 ft downstream of any shadow or work vehicle. When utilized in a stationary work operation, the truck should be in neutral and the parking brake engaged.

The truck should have an actual weight of no less than 11,000 lb and no greater than 26,000 lb. Higher weights may be used when approved by the TMA manufacturer.

The truck should be positioned to allow a roll-ahead distance as indicated on the appropriate Work Zone Case or the table below (or other as recommended by the manufacturer).

| TMA PLACEMENT TABLE | | |
|---|---|---|
| **Speed (mph)** | **Distance (ft)** | |
| | **Stationary Operations** | **Moving Operations** |
| 60 - 70 | 120 | 180 |
| 50 - 55 | 100 | 180 |
| ≤ 45 | 80 | 120 |

## Drop-off Guidelines

A drop-off is defined as an elevation difference between lanes or the traveled lane and shoulder as traversed by the wheel of a motor vehicle. Changes in elevation along highways present exposure to risk for highway users, especially vulnerable users (e.g. motorcyclists). Exposure can be limited by reducing speed, increasing lateral distance to the drop-off, providing a transition, or installing a barrier.

Protection of drop-off conditions should be considered when one of the following exists:

- A differential pavement elevation between open lanes; or
- A differential elevation between an open lane and an adjoining shoulder; or
- A hole, trench, or excavation off the pavement, but within the clear zone.

Additional information on drop-off conditions and countermeasures is available in the Bureau of Design and Environment Manual and Safety Policy 4-21.

## Temporary Traffic Control Distance Charts

All devices shown on cases should be properly placed and their position maintained. All of the dimensions shown on the cases for the placement of devices are shown below. Distances on most roadways can easily be located by counting permanent skip-dash stripes. Since the dimensions are minimums and the stripes are spaced at 40 ft centers, adding 1/2 stripe cycle (20 ft), when needed, will keep it simple.

***Distance Charts on Pages 25 - 26***

| Distance in ft (mile) | Number of Stripes* |
|---|---|
| 100 | 2 ½ |
| 120 | 3 |
| 180 | 4 ½ |
| 200 | 5 |
| 220 | 5 ½ |
| 240 | 6 |
| 260 | 6 ½ |
| 300 | 7 ½ |
| 320 | 8 |
| 400 | 10 |
| 500 | 12 ½ |
| 540 (1/10) | 13 ½ |
| 600 | 15 |
| 660 | 16 ½ |
| 720 | 18 |
| 780 | 19 ½ |
| 800 | 20 |
| 1000 (2/10) | 25 |
| 1100 | 27 ½ |
| 1200 | 30 |
| 1320 | 33 |
| 1500 | 37 ½ |
| 1600 (3/10) | 40 |
| 2000 | 50 |
| 2600 (1/2) | 65 |

*Cycles

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| Speed (mph) | Shoulder Taper Lengths (ft) | | | | | | | Buffer Space ** |
|---|---|---|---|---|---|---|---|---|
| | Shoulder Width (ft) | | | | | | | |
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | |
| 30 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 200 |
| 35 | 15 | 30 | 40 | 55 | 70 | 85 | 95 | 250 |
| 40 | 20 | 35 | 55 | 70 | 90 | 110 | 125 | 305 |
| 45 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 360 |
| 50 | 35 | 70 | 100 | 135 | 170 | 200 | 235 | 425 |
| 55 | 40 | 75 | 110 | 150 | 185 | 220 | 260 | 495 |
| 60 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 570 |
| 65 | 45 | 90 | 130 | 175 | 220 | 260 | 305 | 645 |
| 70 | 50 | 95 | 140 | 190 | 235 | 280 | 330 | 730 |

| Speed (mph) | Lane Taper Length (ft) | | Buffer Space** |
|---|---|---|---|
| | Merging | Shifting | |
| 30 | 180 | 90 | 200 |
| 35 | 245 | 125 | 250 |
| 40 | 320 | 160 | 305 |
| 45 | 540 | 270 | 360 |
| 50 | 600 | 300 | 425 |
| 55 | 660/1000 | 330 | 495 |
| 60 | 1000 | 360 | 570 |
| 65 | 1000 | 390 | 645 |
| 70 | 1000 | 420 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# Layout Indices and Work Zone Cases

## Guidelines for Selection and Index Guide

The following pages contain listings for most of the work activities for day-to-day maintenance and traffic work that are conducted on or adjacent to roads and streets open to traffic. In most situations, this reference should help IDOT field crews to select the proper traffic control for the type of work and its location.

**General Notes:**

1) Whenever possible, work should be conducted without any intrusion into a traveled lane. For work on shoulders that must intrude within 2 ft of a traveled lane, signs, shadow vehicles and/or flaggers may be required as called for in:
   a) Work Zone Cases listed
   b) Short Term and Brief Encroachments (This provision does not apply to pavement pothole or bridge patching.)
2) In many of the Index Guides there are several cases from which to choose. The selection of the proper case is dependent on three (3) variables: speed of traffic, volume of traffic, and the amount of time workers are in the work area.
3) Roadside and some bridge work can usually be conducted a sufficient distance from lanes open to traffic, such that the use of vehicle strobe/warning lights as defined on page 12 will be all that is needed. Refer to appropriate Work Zone Case for guidance.
4) The index guides for Work Zone Case number selection show most typical applications for each work activity, but may not be all inclusive.
5) Other appropriate Work Zone Cases, IDOT Highway Standards as determined by the Contract, or Contract Traffic Control Plans may be utilized if the work site situations are applicable.

6) When an activity does not have a case number:
   a) Either the work is more than 15 ft off of the roadway or more than 2 ft beyond the curb;
   b) A case must be selected which most closely applies; or
   c) A special detail shall be developed.
7) Work Zone Cases are not drawn to scale and the number of devices shown do not necessarily reflect the number of devices required to setup the Work Zone Case.
8) Special work requires special attention. Work activities that are not conducted under normal conditions and work activities at locations that require special considerations should be planned in advance of the time workers are scheduled to perform the task(s). Each worker and supervisor should be alert for any circumstance which would require change. Deviations from the Case Number selection index shall be with the approval of the supervisor/Engineer.
9) Department employees used to perform flagging or to stop traffic shall be trained flaggers.

## Index Guide for Work Zone Case Number Selection

**Highway Safety Information on Contract Projects:**

When State work forces are exposed to the hazards of traffic, **the Engineer shall ensure their safety by providing appropriate traffic control and protection.** On projects with contracts let and the Contractor is on the project, most traffic control should be provided by the Contractor with Highway Standards included in the Contract. On active projects the Contractor may be required to provide TTC for the Engineer and inspection staff. Infrequently, IDOT personnel working on a project may do a layout or inspection outside the limits of the Contractor's traffic control and protection. **If this cannot be done safely by utilizing the "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47), the Contractor should be required to provide the proper traffic control and furnish signs, channelizing devices, flaggers, and other necessary traffic control items as directed by the Engineer.** This work should be paid at the contract unit price for that standard or by force account in accordance with the Standard Specifications for Road and Bridge Construction. For patching contractors on multilane roadways, the Contractor may be required to

provide traffic control 2 days early in advance of work, so that IDOT personnel may mark patches.

When personnel, surveyors, or inspectors are on the roadway, advance warning signs shall be used, except when the "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47), is being utilized. SURVEY CREW warning signs may be substituted for ROAD WORK AHEAD signs, as appropriate, to better advise motorists of the hazard they approach. Otherwise, signs and signing requirements should be as required under the appropriate Standards or Work Zone Case.

The taking of measurements in a traffic lane should be performed as quickly as possible. Standing in or adjacent to an open traffic lane should be avoided while discussing the work or while transmitting or recording readings.

Exposures of personnel to peak traffic volumes should be avoided by scheduling the working hours of personnel to be near the roadway during periods of off-peak traffic conditions, when possible.

Vehicles of employees are to be legally parked 15 ft or more from the edge of the traveled way and in the same direction of traffic. Vehicles parked within 15 ft of the pavement edge must be in the same direction of traffic and have their strobe/warning lights operating. All vehicles shall be parked in the direction of the traffic on the same side of the pavement.

Only trained/certified flaggers shall be used to perform flagging or stop traffic.

Have a minimum of two employees present when working.

Contract Projects Index Guide:

Index Guide for when the Contractor is not able to supply the Traffic Control.

**Marking Patches and Other on Pavement Investigations:**

| | | Work Zone (WZ) Case No. | |
|---|---|---|---|
| Multilane | High Traffic Volumes > 20,000 ADT | 40, 41, 42, 44, 46, 47 | --- |
| | Low Traffic Volumes ≤ 20,000 ADT | | *, S4 |
| Two-Lane | Traffic Volumes > 5,000 ADT | 21, 24, S2 | --- |
| | Traffic Volumes ≤ 5,000 ADT | | *, 30 |

* The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) may be used where it is safe/applicable.

**Layout and Staking with Instrument on Pavement and Chaining Along Centerline:**

| | | Work Zone (WZ) Case No. | |
|---|---|---|---|
| Multilane | | 40, 41, 42, 44, 46, 47, 48, 49, 60, 62, 92 | |
| Two-Lane | High Traffic Volumes > 5,000 ADT | 21, 22, 24, S2 | --- |
| | Low Traffic Volumes ≤ 5,000 ADT | | 30, S5 |

**Profilographing:**

| | Work Zone (WZ) Case No. |
|---|---|
| Two-Lane | 22, 24 |

**Cross Sectioning (No Instrument on Pavement):**

| | Work Zone (WZ) Case No. | |
|---|---|---|
| Multilane | *, 04,06 | 40, 46, 47, 48, 49, 60, 62, S4 |
| Two-Lane | | 21, 22, 24, 30, S2 |
| Intersections | 91, 94 | |

**Walk On / Walk Off Miscellaneous Inspections:**

| | Work Zone (WZ) Case No. |
|---|---|
| Multilane | *, 40, 46, 47, 48, 49, S4 |
| Two-Lane | *, 21, 24, 30, S2 |

* The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) may be used where it is safe/applicable.

**Day Labor Type Operations and Other Similar Operations:**

| | | Work Zone (WZ) Case No. |
|---|---|---|
| Unloading Equipment and Supplies | | 03, 04, 21, 40 |
| Shoulder Rock Projects | | 22, 46, 48 |
| Beam Changes / Straightening and Bridge Joint Work - Daytime Operations | Multilane | 41, 44 |
| | Two-Lane | 21 |
| Bump Milling Operations | Multilane | 03, 04, 21, 40 |
| | Two-Lane | 21, 22, 24 |

**Joint Cutting:**

This work may be done utilizing the following Work Zone Cases by making a few minor adjustments. On multilane roadways when the saw encroaches into an open lane, the channelizing devices shall be moved about 4 ft into the open lane to allow for the encroachment. The taper shall be at the same rate as the taper that closed the lane. The flagger, when required, shall stay behind the channelizing devices. The channelizing devices shall be moved back to their original position as soon as possible. One side of the highway will be done at a time.

**Joint Cutting:**

| | Work Zone (WZ) Case No. |
|---|---|
| Multilane | 41, 42, 44, 47, 48, 49 |
| Two-Lane | 21, 22, 24 |

## General Survey Safety Information:

1) **It is each employee's responsibility to work in a safe manner.** Safety is not to be compromised.
2) Peak traffic volumes should be avoided by scheduling working hours to be near the roadway during periods of off-peak traffic conditions, when possible.
3) Vehicles should be legally parked facing the same direction as traffic flow and more than 15 ft from the edge of the traveled way in rural areas. In urban areas, vehicles should be parked in parking lanes. Vehicles parked within 15 ft of the pavement edge must have their strobe/warning lights operating, unless in a marked parking lane. All vehicles shall be parked on the same side of the pavement in the same direction as the traffic flow.
4) **Workers:**
   a) Shall utilize the "Brief Encroachments" (page 46) or "Short Term Encroachments" (page 47), where applicable. Minimize the number of workers in or within two (2) feet of the traveled lane.
   b) Shall plan an escape route.
   c) Shall always look in both directions before walking into or within two (2) feet of traveled lane.
   d) Shall discuss work and transmit and record data away from open traveled lanes and the area adjacent to an open traveled lane, as much as possible.
   e) Should avoid turning their back to traffic.
   f) Shall use only trained/certified flaggers to perform flagging or stop traffic.
5) **Two-Lane Roadways:**
   a) Use strobe/warning lights on vehicle when driving slower than normal speed, and when stopped.
   b) Minimize stopping vehicle on shoulder. When possible, park at entrances.
   c) When possible, avoid parking on narrow shoulders or in "no-passing zones".
   d) The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) and WZ 30 may be utilized where applicable.
6) **Multilane Roadways:**

a) Drive on shoulder with strobe/warning lights on when traveling significantly slower than normal speeds and when parked.
b) Park on the outside or median shoulder, whichever is closer to the work.
c) Make sure vehicle is parked on the shoulder of the lanes in which you are working. Do not cross the median and work in the opposite direction lanes without moving the vehicle.
d) Stop/park vehicle as far as possible off the edge of the pavement.
e) Minimize walking/running across traffic lanes.

Workers should enter onto the pavement only during appropriate gaps in traffic in accordance with the "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47). If the operation requires workers to remain in a traffic lane, the lane must be closed with proper traffic control signs and devices.

**Field Checks, Inspections, Meetings and Notes, Final Inspections, Hydraulic Checks, Miscellaneous Inspections, Patching, Pickup and Road Condition Surveys:**

| | **Work Zone (WZ) Case No.** | |
|---|---|---|
| Multilane Roadways | *, 04, 05, 06 | 40, 46, 47, 49, 60, 62, S4 |
| Two-Lane Roadways > 5,000 ADT | | 21, 24, S2 |
| Two-Lane Roadways ≤ 5,000 ADT | | 21, 24, 30, S2 |

**Short intermittent periods of time on the pavement, i.e. Traffic Counter Tubes:**

| | **Work Zone (WZ) Case No.** | |
|---|---|---|
| Multilane Roadways | * | 40, 46, 47, 60 |
| Two-Lane Roadways | | 24, 30 |
| Intersections | | 91, 94 |

* The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) may be used where it is safe/applicable.

**Data Collection / Maintenance of Permanent Counter Stations and Installation of Counter Stations on Pavement:**

| | Work Zone (WZ) Case No. | |
|---|---|---|
| Multilane Roadways | * | 40, 41, 42, 46, 47, 48, 51 |
| Two-Lane Roadways | | 21, 30 |

* The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) may be used where it is safe/applicable.

**Bridge Deck Soundings:**

| | Work Zone (WZ) Case No. |
|---|---|
| Multilane Roadways | 40, 41, 46, 47, 48, 49 |
| Two-Lane Roadways | 21, 24, 30 |

**Surveys in vehicle, driving slower than prevailing speed:**

| |
|---|
| Flashing strobe/warning lights on vehicle |

Surveying Crew Safety Information:

1) **The employee placed in charge of the survey crew shall have the primary responsibility for ensuring that traffic control is established.**
2) It shall be each employee's responsibility to work in a safe manner and to provide a safe environment for the crew and the traveling public. Safety is not to be compromised.
3) Crew chief shall discuss with their supervisor the use of additional devices when increased traffic volume necessitates, including, but not limited to: additional flaggers, lane closures, use of spotters to watch for hazardous conditions and to warn the crew.
4) Offset surveying procedures should be used whenever possible. Actual time on the roadway should be kept to a minimum.
5) Peak traffic volumes should be avoided by scheduling the working hours of personnel to be near the roadway during off-peak traffic periods.
6) Operations other than centerline chaining require frequent short duration movements on/off the roadway and the use of flaggers shall be required by the appropriate case.

7) SURVEY CREW warning signs may be substituted for ROAD WORK AHEAD signs so that motorists are more aware of the hazard they approach. SURVEY CREW warning signs may also be substituted for ROAD WORK AHEAD signs for any non-survey work zone cases used.
8) Vehicles of employees should be legally parked 15 ft from the edge of the traveled way in the direction of traffic flow. Vehicles parked within 15 ft of the pavement edge shall have their strobe/ warning lights operating. All vehicles shall be parked on the same side of the pavement and in the direction of traffic flow.
9) Workers:
    a) Shall utilize the "Brief Encroachments" (page 46) or "Short Term Encroachments" (page 47), where applicable. Minimize the number of workers in or within two (2) feet of the traveled lane.
    b) Shall plan an escape route.
    c) Shall always look both directions before walking onto or within two (2) feet of the traveled lane.
    d) Shall discuss work and transmit and record data away from open traveled lanes and the area adjacent to an open traveled lane, as much as possible.
    e) Should avoid turning their back to traffic.
    f) Shall use only trained/certified flaggers to perform flagging or stop traffic.
10) Workers shall not stand directly behind or in front of a vehicle.
11) Two-Lane Roadways:
    a) Strobe/warning lights shall be used on vehicles when driving slower than normal speed, and when stopped.
    b) Workers shall minimize stopping vehicle on shoulder. When possible, park at entrances.
    c) When possible, parking on narrow shoulders or in "no-passing zones" should be avoided.
    d) The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) and WZ 30 may be utilized where applicable.
12) Multilane Roadways:
    a) Workers shall drive on shoulder with strobe/warning lights on when traveling significantly slower than normal speeds.

b) Workers shall park in the same direction as adjacent traffic flow on the outside or median shoulder, whichever is closer to the work.

c) Workers should park vehicle, with strobe/warning lights on, on the shoulder of the lane in which they are working. The vehicle should be used before crossing the median and working in the opposite direction lanes.

d) Stop/park vehicle as far as possible off the edge of the pavement.

e) Workers shall minimize walking/running across traffic lanes.

f) Workers should enter onto the pavement only during appropriate gaps in traffic in accordance with "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47). If operation requires workers to remain in a traffic lane, the lane shall be closed with proper traffic control signs and devices.

**Layout and Staking with Instrument on Pavement and Chaining Along Centerline:**

| | **Work Zone (WZ) Case No.** |
|---|---|
| Multilane Roadways | 40, 41, 42, 44, 44a, 45a, 46, 47, 48, 49, 60, 62, 92 |
| Two-Lane Roadways | 21, 22, 24, 30, S2, S5 |

**Field Surveys Without Instrument on Pavement:**

| | **Work Zone (WZ) Case No.** | |
|---|---|---|
| Multilane Roadways | * | 04, 06, 07b, 40, 46, 47, 48, 49, 60, 62, S4 |
| Two-Lane Roadways | | 04, 06, 07a, 21, 22, 24, 30, S2 |
| Intersections | | 91, 94 |

* The "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) may be used where it is safe/applicable.

## Bridge Inspector Safety Guidelines:

1. **The supervisor assigned for the inspection crew is responsible for ensuring that traffic control is properly established and maintained.** The guidelines in this section are minimums and should be supplemented as needed to minimize hazardous conditions, such as poor sight distance, poor weather conditions, higher traffic speeds, higher traffic volumes, sharp curves, tight clearances, etc. **Extra care is required while working on bridges, because of the lack of multiple escape routes. When in doubt, add additional traffic control.** In no case can any of the requirements be reduced or eliminated.
2. Peak traffic volumes should be avoided by scheduling working hours in or near the traveled lane during periods of off-peak traffic conditions.
3. Workers:
   a) Shall utilize the "Brief Encroachments" (page 46) or "Short Term Encroachments" (page 47), where applicable. Minimize the number of workers in or within two (2) feet of the traveled lane.
   b) Shall plan an escape route.
   c) Shall always look both directions before walking onto or within two (2) feet of the traveled lane.
   d) Shall discuss work and transmit and record data away from open traveled lanes and the area adjacent to an open traveled lane, as much as possible.
   e) Should avoid turning their back to traffic.
   f) Shall use only trained/certified flaggers to perform flagging or stop traffic.
   g) Shall stop/park vehicle as far as practical off the edge of the traveled lane and shoulder.

### Bridge Inspector Index Guide:

**As a minimum, the following cases should be utilized for daylight inspections that will last 60 minutes or less:**

**Case I: Two-Lane ADT < 5,000 or Multilane ADT < 10,000:** Utilize "Brief Encroachments" (page 46) and "Short Term Encroachments" (page 47) / WZ 30.

**Case II: Two-Lane ADT ≥ 5,000 < 10,000 or Multilane ADT ≥ 10,000 < 20,000:**

a) Vehicle parked in a visible location with strobe/warning lights operating, and
b) Two signs in each direction for 3 lane roadways or less and undivided multilane roadways. (See WZ B1 and WZ B3), or
c) Four signs in each direction for more than 3 lanes; divided. (See WZ B2)

**Case III: Two-Lane ADT ≥ 10,000 or Multilane ADT > 20,000:** Utilize cases required for work lasting more than 60 minutes, listed below.

**The following cases shall be utilized for daylight inspections that will last more <u>than 60 minutes:</u>**

| | Work Zone (WZ) Case No. | |
|---|---|---|
| Multilane Roadways | 04, 05, 06 | 40, 41, 42, 44, 44a, 46, 47, 49, 50, 51 |
| Two-Lane Roadways | | 21, 24, 30 |

Drill Crew Safety Guidelines:

1. **The drill site and crew shall be protected at all times with the proper temporary traffic control in accordance with this Manual.** A copy of this Manual should be in each vehicle. **All personnel should be aware of which Work Zone Case is being used, what is involved with the setup, and who is in charge of the traffic control.** Any vehicle within the limits of the traffic control "work area" and within 15 ft of the pavement edge shall have strobe/ warning lights operating at all times.
2. Safety is the responsibility of all members of the drill crew. Working together in close communication with each other is imperative. Any unsafe or questionable condition shall be called to the attention of the crew chief and discussed with other crew members and corrected.
3. Only trained/certified flaggers shall be used to perform flagging or stop traffic.

| | | Work Zone (WZ) Case No.* |
|---|---|---|
| **Pavement Core < 60 Minutes** | Multilane Roadways | 04, 05, 40, 41, 46, 47, 48, 49, 50, 51 |
| | Two-Lane Roadways | 03, 04, 21, 22 |
| | Intersections | 91, 92, 93, 94, 95, 95a |
| | Ramps | 60, 62 |

* Applicable IDOT Highway Standards may also be utilized.

| | | Work Zone (WZ) Case No.* |
|---|---|---|
| **Soil Boring < 60 Minutes** | Multilane Roadways | 04, 05, 40, 41, 46, 47, 48, 49, 50, 51 |
| | Two-Lane Roadways | 03, 04, 21, 22 |
| | Intersections | 92, 93 |
| | Ramps | 60, 62 |
| **Soil Boring > 60 Minutes** | Multilane Roadways | 41, 42, 46, 47, 48, 50, 51 |
| | Two-Lane Roadways | 06, 21 |
| | Intersections | 92, 93 |
| | Ramps | 61, 62 |

* Applicable IDOT Highway Standards may also be utilized.

| | | Work Zone (WZ) Case No.* |
|---|---|---|
| **Structure Boring** | Multilane Roadways | 41, 42 |
| | Two-Lane Roadways | 06, 21 |

* Applicable IDOT Highway Standards may also be utilized.

## Portable Scale Crew Safety Guidelines:

1. Safety is the responsibility of all members of the portable weight scale crew. Working together in close communication with each other is imperative. Any unsafe or questionable condition shall be called to the attention of the supervisor and discussed with other crew members and corrected. Safety is not to be compromised.
2. The guidelines in this section are minimums and should be supplemented as needed to minimize hazardous conditions.
3. Workers:
   a) Shall spend the least time possible in the area between/ around the trucks.
   b) Shall spend the least time possible crossing between where trucks are moving/parking.
   c) Shall look in both directions when moving in the area of the trucks.
   d) Should avoid turning their backs to traffic.

e) Shall avoid standing directly in front of or in back of vehicles.
f) Shall discuss work, transmit and record data in a safe location.
g) Shall plan an escape route.

4. Oncoming traffic should have a clear, unobstructed view for at least 1500 ft prior to the truck weighing zone. This may be reduced in areas of lower posted speed limits.
5. Selecting sites for scale operation:
   a) Interstate Rest Areas should not be used during tourist season, between May 16 through September 15. When rest areas are utilized, caution must be used to prevent blockage of entry ramps so that access is always provided to the motorists.
   b) It is highly desirable to vary the hours of operation of the scales. During periods of darkness, only well lit locations should be utilized. It may be necessary to supplement the lights with portable or fixed lighting.
   c) New locations for portable scales are considered on a case by case basis. Contact supervisor for the correct method of requesting such a location.
6. Weighing operations should not be conducted when conditions are such that safety would be compromised. The surface of scales should be dry to prevent slippage of truck tires. Weighing of trucks should not be done under the following conditions:
   a) **Wet conditions. (At the discretion of the Illinois State Police)**
   b) **Ground fog, this severely restricts visibility and makes the scales unstable.**
   c) **Blowing snow.**
   d) **Ice.**
7. The scale crew has the following signs and equipment:
   a) TRUCK SCALES AHEAD sign - (48" diamond, black letters on yellow)
   b) ALL TRUCKS MUST WEIGH - (48" square, black letters on white)
   c) TRUCKS USE RIGHT LANE SCALES AHEAD (48" square black letters on white)
   d) CARS USE LEFT LANE - (48" square, black letters on white) TRUCKS USE RIGHT LANE - "LEFT" AND "RIGHT" words are interchangeable
   e) TRUCK SCALES - (48" square, black letters on white, arrow is reversible) > (arrow)
   f) Sign stands.

g) 28" narrow profile high visibility cones.
h) Reflective cone collars.
i) Fire extinguisher - 10 pound dry chemical, A-8-C Fires.
j) Red flags.
k) Operable flashlight.

**Portable Scale Cases:**

| | Work Zone (WZ) Case No. |
|---|---|
| Multilane Roadways | W1, W2, W3 |
| Two-Lane Roadways | W4, W5, W6 |

***Index Guide for Work Zone Case No. Selection on Pages 42 - 46***

# Index Guide for Work Zone Case No. Selection

| Code | Work Activity Pavement | 2-Lane 2-Way WZ | Multilane WZ | Intersection WZ |
|---|---|---|---|---|
| **410** | Pothole Patching | 21, 22 | 7b, 40, 41, 42, 46, 48, 63, 64, 65, 66 | 92, 93, 95, 95a |
| **411** | Partial Depth Patching | 21, 22 | 40, 41, 42, 44, 44a, 50, 51, 64, 65, 66 | 92, 93, 95a |
| **412** | Full Depth Patching | 21 | | |
| **413** | Bituminous Overlay | 21, 22 | 41, 42, 44, 44a, 50, 51, 64, 65, 66 | |
| **414** | C.R.C. Pavement Patching | 21 | | |
| **415** | Bump Burning or Planing | 21, 22 | 40, 46, 47, 48, 49, 63, 64, 65, 66 | 92, 93, 95, 95a |
| **416** | Crack & Joint Sealing - Hand Poured | | | |
| **417** | Sealing or Skin Patching | | | |
| **510** | Pothole Patching - Liquid Asphalt & Chips | | 40, 46, 48, 49, 50, 63, 64, 65, 66 | |
| **515** | Pavement Milling | | 41, 42, 44, 44a, 50, 51, 64, 65, 66 | 92, 93, 95a |
| **516** | Crack & Joint Routing | | 40, 46, 48, 49, 50, 63, 64, 65, 66 | 92, 93, 95, 95a |
| **517** | Crack & Joint Clean and Seal with Rubberized Asphalt | | | |
| **518** | Transverse Joint Remove and Repair | | | |

| Code | Work Activity Shoulders & Side Approaches | 2-Lane 2-Way WZ | Multilane WZ |
|---|---|---|---|
| **420** | Patch & Repair Paved Shoulders | 04, 05, 06, 07a, 22 | 04, 05, 06, 07b, 40, 41, 63 |
| **421** | Add & Spread Aggregate - Hand | 04, 05, 06, 07a, 24 | 04, 05, 06, 07b, 63 |
| **422** | Add & Spread Aggregate - Machine | 05, 07a, 22, 24 | 05, 07b, 63 |
| **423** | Sealcoat Application | | |
| **424** | Cutting High Shoulders | | |
| **425** | Blading and Dragging | | |
| **426** | Shoulder Wedging | | |
| **427** | Concrete Shoulder Patch | 04, 05, 06, 07a, 22 | 04, 05, 06, 07b, 40, 41, 63 |

## Index Guide for Work Zone Case No. Selection Continued

| Code | Work Activity Other | 2-Lane 2-Way WZ | Multilane WZ |
|---|---|---|---|
| **752** | Slope Wall Repair | 03, 04, 06, 21 | 03, 04, 06, 40, 41, 42, 50, 64, 65, 66 |
| **753** | Collection Gutter Cleaning | | |
| **754** | Collection Gutter Repair | | |
| **755** | Rip Rap Placement | | |
| **756** | Channel Maintenance | | |
| | Accidents / Emergencies | 01 | 02 |

| Code | Work Activity Drainage | 2-Lane 2-Way WZ | Multilane WZ | Intersection WZ |
|---|---|---|---|---|
| **430** | Repairing Earth Slopes | 03, 04, 06, 07a, 21 | 03, 04, 06, 07b, 40, 41, 42, 64, 65, 66 | N/A |
| **431** | Ditches - Hand | | | |
| **432** | Ditches - Machine | 03, 04, 06, 07a, 21, 22 | | |
| **433** | Inlet, Manhole & Catch Basin Cleaning | 04, 06, 07a | 04, 06, 07b, 63, 64, 65, 66 | |
| **434** | Inlet, Manhole & Catch Basin Repair | 03, 04, 06, 21 | 03, 04, 06, 07b, 40, 41, 42, 64, 65, 66 | |
| **435** | Sewer Line, Pipe & Culvert Cleaning | 03, 04, 06, 07a, 21, 22 | 03, 04, 06, 07b, 40, 41, 42, 63, 64, 65, 66 | |
| **436** | Sewer Line, Pipe & Culvert Repair | 03, 04, 06, 21 | 03, 04, 06, 40, 41, 42, 64, 65, 66 | 92, 93, 95a |
| **438** | Underdrain Maintenance | | 03, 04, 06, 07b, 40, 41, 42, 64, 65, 66 | N/A |

## Index Guide for Work Zone Case No. Selection Continued

| Code | Work Activity Bridge | 2-Lane 2-Way WZ | Multilane WZ | Intersection WZ |
|---|---|---|---|---|
| **454** | Bridge Inspection (Lane Closure) | 03, 21, 30 | 03, 40, 41, 42, 44, 44a, 45, 45a, 60, 61, 63, 64, 65, 66 | 92 |
| **455** | Bridge Sealing | 21, 24 | 03, 40, 41, 42, 44, 44a, 64, 65, 66 | N/A |
| **550** | Bridge Cleaning ( > 1 hour duration) | 05, 21, 22 | 05, 40, 41, 42, 44, 44a, 45, 45a, 60, 61, 64, 65, 66 | 92 |
| | Bridge Cleaning ( < 1 hour duration) | 03, 21 | 03, 40 | N/A |
| **551** | Partial Depth Bridge Deck Patching | 21 | 03, 41, 42, 44, 44a, 45, 45a, 60, 61, 64, 65, 66 | 92 |
| **552** | Full Depth Bridge Deck Patching | | | |
| **553** | Deck Drain Cleaning | 03, 05, 21 | 03, 05, 40, 41, 42, 44, 44a, 60, 61, 64, 65, 66 | |
| **554** | Deck Drain Repair | 03, 21 | 03, 40, 41, 42, 44, 44a, 60, 61, 64, 65, 66 | |
| **555** | Joint Protection Shielding | 21 | 03, 40, 41, 42, 44, 44a, 45, 45a, 60, 61, 64, 65, 66 | |
| **556** | Joint Deck Slab Shoring | | | |
| **557** | Expansion Joint Repair | 03, 21 | 03, 40, 41, 42, 44, 44a, 45, 45a, 60, 61, 64, 65, 66 | N/A |
| **558** | Roadway Joint Maintenance | | 03, 41, 42, 44, 44a, 45, 45a, 63, 64, 65, 66 | |
| **559** | Handrail Repair / Maintenance | | 03, 40, 41, 42, 64, 65, 66 | |
| **650** | Bridge Guardrail Terminal Repair | | 03, 40, 41, 42, 63, 64, 65, 66 | |
| **652** | Bridge Bearing Maintenance (Excluding Activities 653 and 654) | | 03, 40, 41, 42, 64, 65, 66 | |
| **653** | Bridge Bearing Cleaning | 21 | 40, 41, 42, 64, 65, 66 | |
| **654** | Bridge Bearing Painting | | | |
| **655** | Structural Steel Repair | 03, 21 | 03, 40, 41, 42, 44, 44a, 45, 45a, 64, 65, 66 | |
| **656** | Jacking and Cribbing | | 40, 41, 64, 65, 66 | |
| **657** | Pin and Link Inspection and Maintenance | 21 | 40, 41, 42, 64, 65, 66 | |
| **750** | Bridge Concrete Repair | 03, 21 | 03, 40, 41, 42, 44, 44a, 45, 45a, 64, 65, 66 | |
| **751** | Bridge Epoxy Injection | 21 | N/A | |

## Index Guide for Work Zone Case No. Selection Continued

| Code | Work Activity Roadside | 2-Lane 2-Way WZ | Multilane WZ |
|---|---|---|---|
| **440** | Tree, Brush, and Shrub Removal | 04, 07a, 21, 22 | 04, 07b, 40, 41, 42, 64, 65, 66 |
| **441** | Landscape, Tree, Shrub, and Plant Maintenance | 04, 07a, 21 | |
| **442** | Mowing - Hand | 04, 07a | 04, 07b |
| **443** | Mowing - Machine | 04, 05, 07a | |
| **444** | Right-Of-Way Vegetation Spraying | | |
| **445** | Strip Vegetation Spraying | 05, 07a | 05, 07b |
| **446** | Mechanical Sweeping | N/A | 05, 52 |
| **447** | Litter Pickup | 07a | 07b |
| **448** | Road Patrol and Debris Cleanup | 04, 05, 07a | 04, 05, 07b |
| **449** | Manual Chemical Spray | | |
| **741** | Tree and Shrub Plant | 04, 06, 07a, 21, 22 | 04, 06, 07b, 40, 41, 42, 64, 65, 66 |
| **742** | Tree Spraying | 04, 07a | 04, 07b |
| **743** | Mulching | | |
| **744** | Fertilizer Application | | |
| **745** | Seeding | | |
| **746** | Sodding | | |

| Code | Work Activity Traffic Duties | 2-Lane 2-Way WZ | Multilane WZ | Intersection WZ |
|---|---|---|---|---|
| **200** | Sign Maintenance | 03, 04, 21, 22 | 03, 04, 40, 41, 44, 44a, 50, 60, 64, 65, 66 | 91, 92, 93, 94, 95, 95a |
| **220** | Center / Lane Striping | 23 | 52 | |
| **222** | Edge Line Striping | | | |
| **223** | Simultaneous Striping | | | |
| **224** | Specified Pavement Marking | 21 | 40, 50 | 92, 93, 95, 95a |
| **225** | Curb Marking | | 40, 41, 42 | |
| **226** | Marking removal | | 40, 50 | |
| **227** | Road / Curb Marker Maintenance | 04, 06 | 04, 06, 08 | |
| **240** | Traffic Signal Maintenance | 04, 21 | 40, 41, 42 | 91, 92, 93, 94 |
| **241** | Highway Lighting Maintenance | 03, 04, 21 | 03, 04, 40, 41 | 92 |
| **242** | Flash Beacon Maintenance | | N/A | |

**Index Guide for Work Zone Case No. Selection Continued**

| Code | Work Activity<br>Traffic Services & Facilities | 2-Lane 2-Way WZ | Multilane WZ |
|---|---|---|---|
| **460** | Guardrail Maintenance | 03, 04, 06, 07a, 21 | 03, 04, 06, 07b, 41, 42, 63, 64, 65, 66 |
| **461** | Fence Maintenance | 03, 04, 06 | |
| **462** | Barrier Wall Maintenance and Repair | | |
| **463** | Attenuator Sign Removal | | |
| **466** | Advertising Sign Removal | | |
| **467** | Delineator Maintenance | 04, 06 | 04, 06, 63 |

## Brief Encroachments (< 15 Minutes)

1. For non-emergency daylight operations where workers and/or equipment are in or within two (2) feet of the traveled lane in one location for less than 15 minutes.

   For emergency operations refer to Emergency Call Outs (WZ 00, WZ 01, WZ 02)
2. If the worker is unable to visually monitor traffic when performing the activity during the brief encroachment, then at least two (2) workers should be present, one (1) of whom shall perform tasks as a spotter.
3. Workers and/or equipment shall enter into or within two (2) feet of the traveled lane only during appropriate gaps in traffic.
4. No attempts shall be made to stop, slow, or direct traffic into another lane. If the operation cannot be performed within appropriate gaps, refer to appropriate Work Zone Case for guidance.
5. The amount of time the workers and/or equipment are in or within two (2) feet of the traveled lane shall be minimized.
6. Vehicle shall be as far as practical off the edge of the traveled lane and shoulder. On multilane roadways, vehicles may be driven at slow speeds on shoulder with strobe/warning lights operating. Vehicle shall not encroach into traveled lane.
7. The work vehicle should be on the same side of the road as the work.
8. Employee shall wear approved high-visibility apparel. Vehicle shall have its strobe/warning lights on.

## Short Term Encroachments (15-60 Minutes)

1. For non-emergency daylight operations where workers and/or equipment are in or within two (2) feet of the traveled lane in one location for 15 to 60 minutes.

   For emergency operations refer to Emergency Call Outs (WZ 00, WZ 01, WZ 02)
2. When required, TTC devices shall be deployed according to applicable Short Term Work Zone Cases (e.g. WZ 01, WZ 02, WZ 03, WZ 04, WZ 40, WZ 50, WZ 51, WZ 60, WZ S2, and WZ S4).
3. May be performed without a flagger, provided all vehicles and/ or equipment are completely off the traveled lane.
4. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly equipped, trained/certified flagger with proper warning signs in place.
5. Vehicle shall be as far as practical off the edge of the traveled lane and shoulder. On multilane roadways, vehicles may be driven at slow speeds on shoulder with strobe/warning lights operating.
6. The work vehicle should be on the same side of the road as the work.
7. Employee shall wear approved high-visibility apparel. Vehicle shall have its strobe/warning lights on.
8. Full lane closure, using pertinent Work Zone Case, should be considered when work at one location may exceed 60 minutes.

## Flagging by Contractors' Personnel

Contractors' personnel used to perform flagging or to stop traffic shall be certified flaggers in accordance with section 701.13 from Standard Specifications for Road and Bridge Construction.

# Work Zone Cases:

| | | Work Zone (WZ) Case No. |
|---|---|---|
| **Emergency Call Outs** | pg. 50 | 00, 01, 02 |
| **Two-Lane, Two-Way Roads** | Two-Lane, Two-Way Roads pg. 58 | 21, 22, 23, 24, 30 |
| | Intersections pg. 68 | 91 |
| **Multilane Undivided Roads** | Undivided Roads pg. 71 | 40, 50, 51, 52 |
| | Intersections pg. 80 | 92, 94, 95, 95a |
| **Multilane Divided Roads** | Divided Roads pg. 90 | 41, 42, 44, 44a, 45, 45a, 46, 47, 48, 49, 63, 64, 65, 66 |
| | Ramps pg. 118 | 60, 61, 62 |
| | Intersections pg. 124 | 93 |
| **Special Cases** | Shoulder Work pg. 128 | 03, 04, 05, 06, 07a, 07b |
| | Bridge Inspection pg. 140 | B1, B2, B3 |
| | Survey pg. 146 | S2, S4, S5, 7a, 7b |
| | Weigh Scales pg. 152 | W1, W2, W3, W4, W5, W6 |

# Emergency Call Outs


Work Zone (WZ) Case No.: 00, 01, and 02

# WZ 00: EMERGENCY OPERATIONS ONLY, USE OF 1 FLAGGER 2-LANE 2-WAY ROADWAY

**Use of One Flagger**

When one lane is closed on a two-lane highway. One flagger may be used when:

1. The flagger has an unrestricted sight distance beyond the work area as indicated in the diagram.
2. The work area does not more exceed than 200 ft.
3. The traffic is not delayed more than 3 minutes.
4. When lane closure is expected to be in place for more than 2 hours, a full lane closure should be installed. Inform District dispatcher or Station One of situation.

Unless all of the above conditions are met, two flaggers shall be used.

Notes:

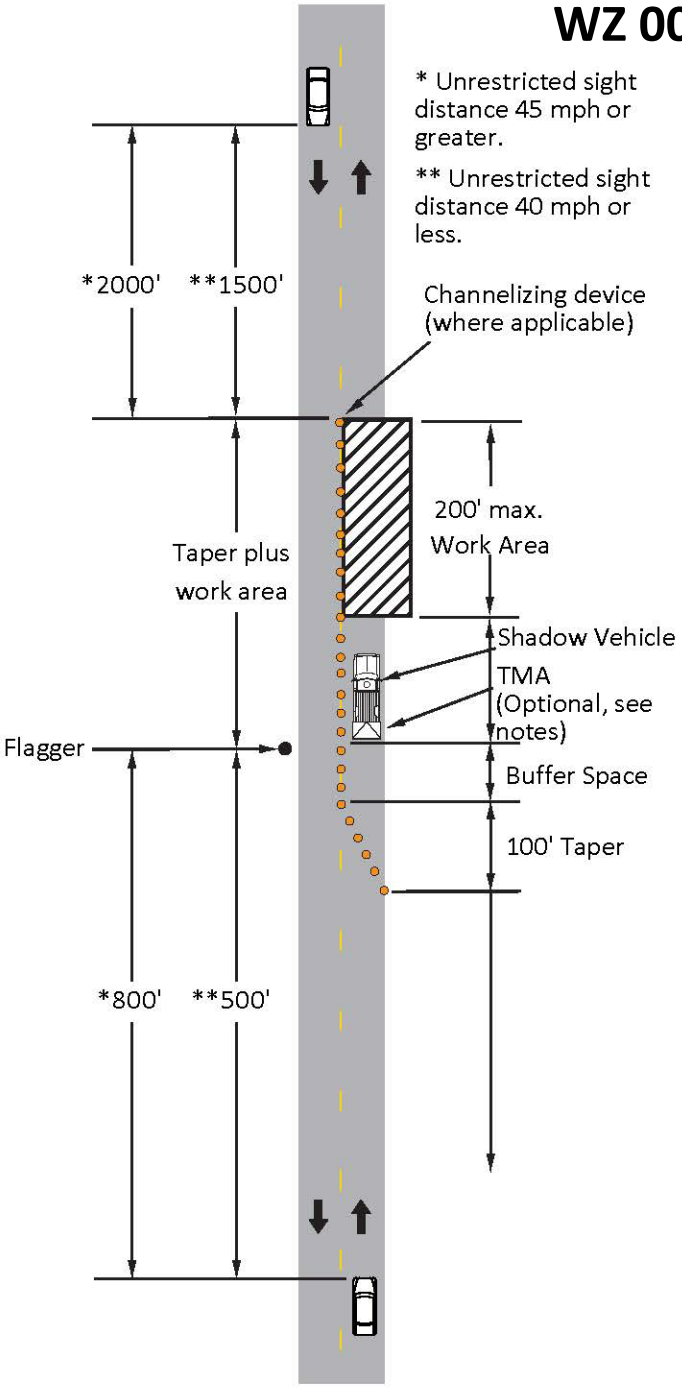
1. The flagger controls traffic in the closed lane only. The other lane operates free flow.
2. The flagger should be stationed on the shoulder opposite the lane closure or in a position where good visibility and traffic control can be maintained at all times.
3. Cones at 20 ft centers on taper and 50 ft centers along the travel way.

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) Stationary Operations |
| 60 - 70 | 120 |
| 50 - 55 | 100 |
| ≤ 45 | 80 |

| Speed (mph) | Buffer Space ** |
|---|---|
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 00


* Unrestricted sight distance 45 mph or greater.
** Unrestricted sight distance 40 mph or less.
*2000'
**1500'
Channelizing device (where applicable)
200' max. Work Area
Taper plus work area
Shadow Vehicle
TMA (Optional, see notes)
Flagger
Buffer Space
100' Taper
*800'
**500'

# WZ 01: EMERGENCY CALL OUTS AND NIGHTTIME OPERATIONS LESS THAN 60 MINUTES FOR 2-LANE 2-WAY ROADS

**First worker to respond:**

1. Handle situation per requirements for brief encroachments on page 46, if possible.
2. **If not:**
   - Call for additional devices/help.
   - Set up fusees and/or reflectorized cones.
   - Flags as a single flagger in accordance with WZ 00

**Second worker to arrive, sets up an approved case.**

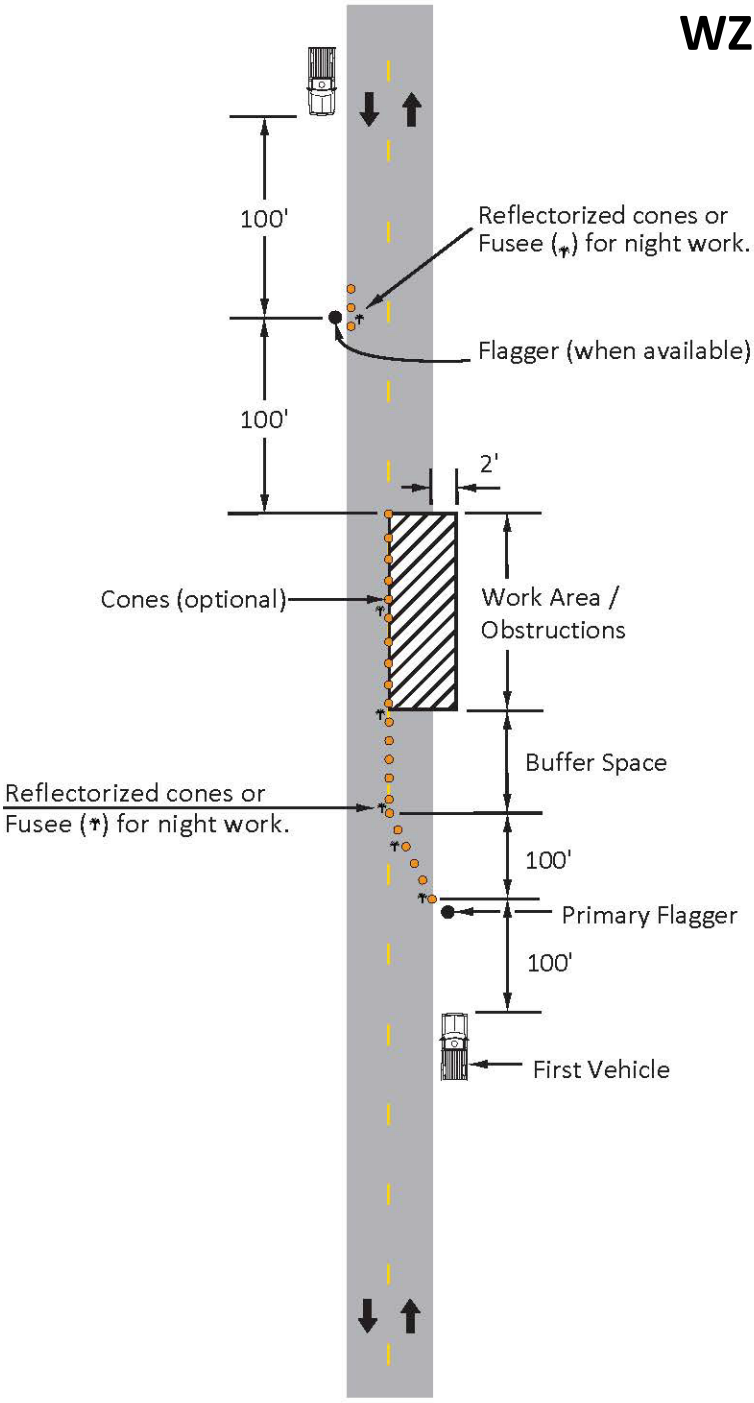
Notes:

1. All vehicles operating strobe/warning lights.
2. Arrow Board in CAUTION mode optional.
3. Reflectorized cones or fusees are required for night work longer than 15 minutes.
4. For emergency call outs when lane closure is expected to be in place for more than 2 hours, a full lane closure should be installed. Inform District dispatcher or Station One of situation.
5. Flagger station illuminated by balloon lighting, headlights, or equivalent means for night work.
6. Increase advance warning for restricted sight distance such as curves and hills.
7. Cones at 20 ft centers on taper and at 50 ft centers along travel way.

| Speed (mph) | Buffer Space ** |
|---|---|
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 01


100'
Reflectorized cones or
Fusee (↑) for night work.
Flagger (when available)
100'
2'
Cones (optional)
Work Area /
Obstructions
Buffer Space
Reflectorized cones or
Fusee (↑) for night work.
100'
Primary Flagger
100'
First Vehicle

# WZ 02: EMERGENCY CALL OUTS AND NIGHTTIME OPERATIONS LESS THAN 60 MINUTES FOR MULTILANE ROADS

**First Worker to Respond:**

1. Handle situation per requirements for short term encroachments on page 47, if possible.
2. **If not:**

- Call for additional devices/help.
- Set up fusees and/or reflectorized cones.
- Position vehicle to warn traffic.
- Aid situation as possible, as a flagger protect hazard.

**Second worker to arrive, sets up an approved case.**

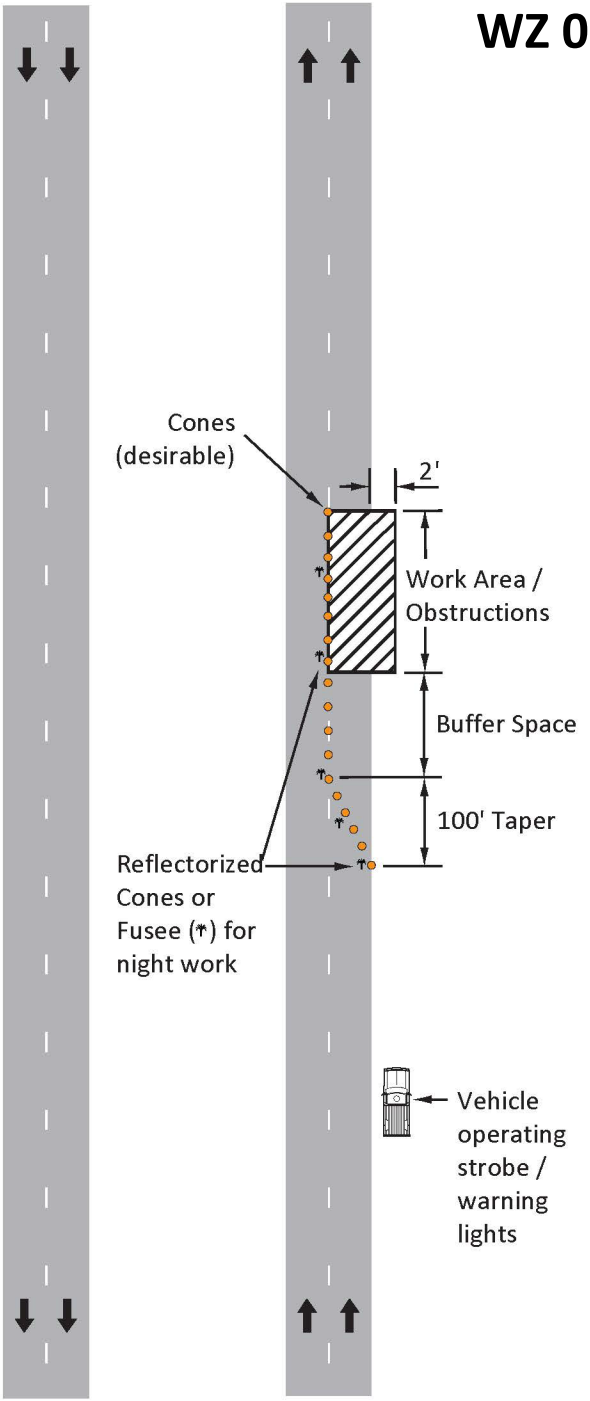
Notes:

1. All vehicles operating strobe/warning lights.
2. If >2 ft off shoulder, vehicle to set on shoulder with strobe/ warning lights operating.
3. Reflectorized cones or fusees are required after 15 minutes.
4. For emergency call outs, when lane closure is expected to be in place for more than 2 hours, a full lane closure should be installed. Inform District Dispatcher or Station One of situation.
5. Cones at 20 ft centers on taper and at 50 ft centers along travel way.

| Speed (mph) | Buffer Space ** |
|---|---|
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 02


Cones
(desirable)
2'
Work Area /
Obstructions
Buffer Space
100' Taper
Reflectorized
Cones or
Fusee (*) for
night work
Vehicle
operating
strobe /
warning
lights

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# Two-Lane Two-Way Roads

Work Zone (WZ) Case No.: 21, 22, 23, 24, and 30

Intersections WZ Case No.: 91

## WZ 21: 2L2W STATIONARY OPERATIONS

Notes:

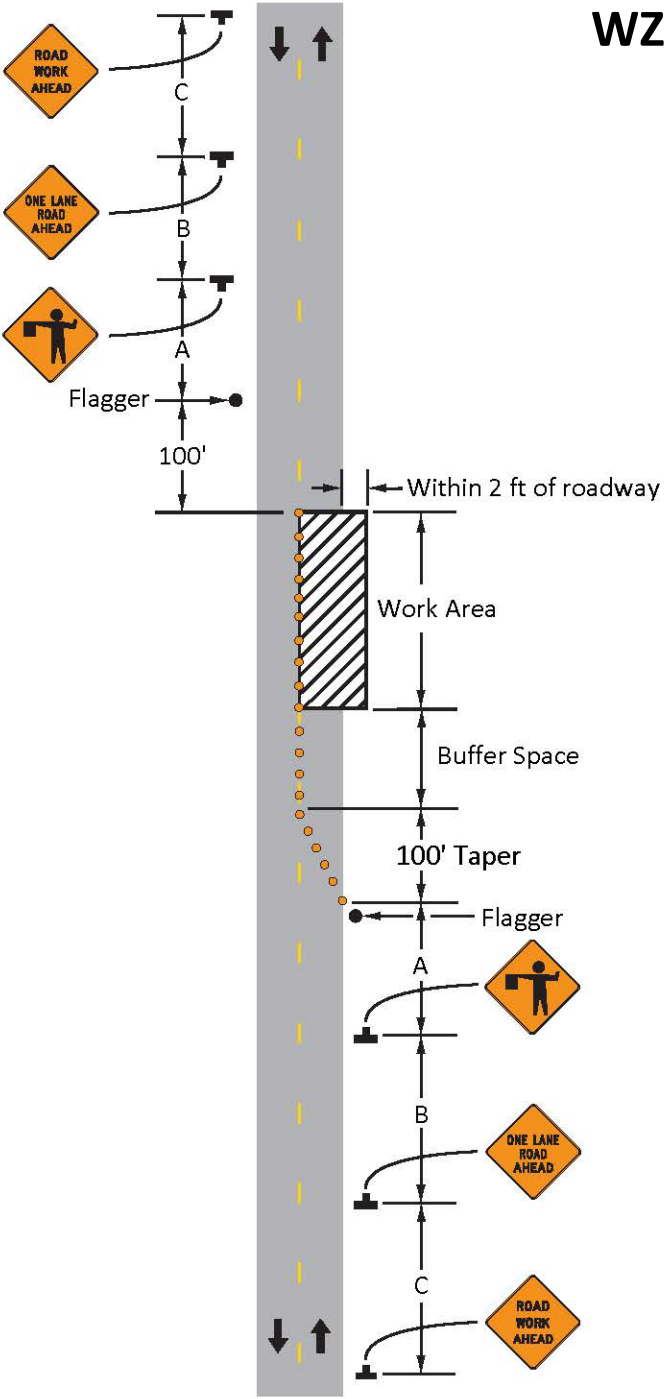
1. Cones at 20 ft centers on taper.
2. Cones on centerline (minimum of 3 cones)
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| Speed (mph) | Buffer Space ** |
|---|---|
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 21


ROAD WORK AHEAD
C
ONE LANE ROAD AHEAD
B
A
Flagger
100'
Within 2 ft of roadway
Work Area
Buffer Space
100' Taper
Flagger
A
B
ONE LANE ROAD AHEAD
C
ROAD WORK AHEAD

# WZ 22: 2L2W MOVING OPERATIONS

**Use of Flaggers or TMA**

Flaggers used for moving operations are dependent on the travel speed. If the work operation moves too fast for flaggers, the flaggers may be omitted, and the FLAGGER signs shall be replaced with WORKER signs. In lieu of flaggers, a shadow vehicle with a TMA and an arrow board in CAUTION mode shall be used in advance of the work area. The TMA shall be placed in advance of the work area in accordance with the TMA PLACEMENT TABLE.

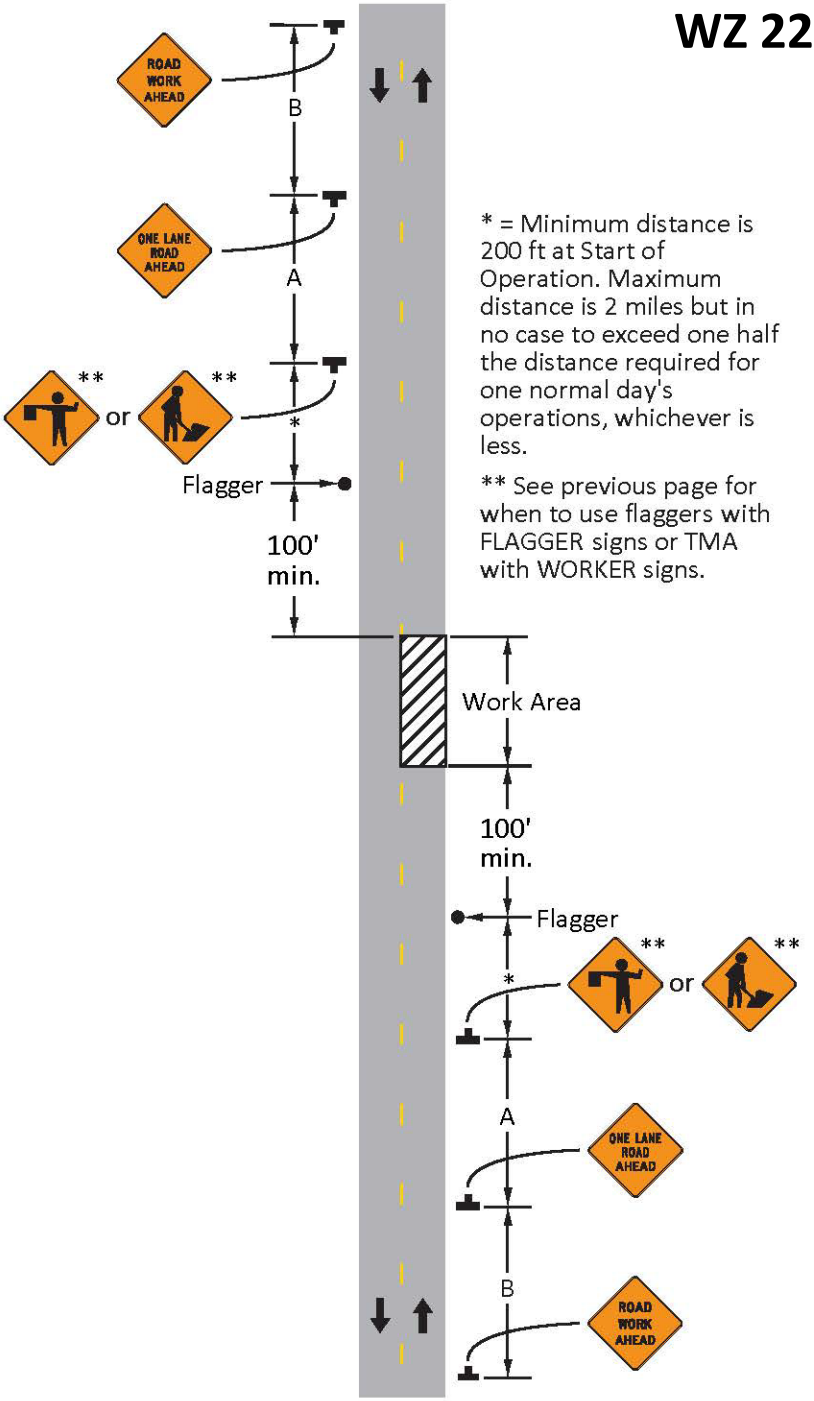
Notes:

1. If work operation exceeds 2 miles per half day, Work Zone Case 24 (WZ 24) must be utilized.
2. All Vehicles operating strobe/warning lights.
3. See Flaggers' Guide for flagger instructions and requirements.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Moving Operations |
| 60 - 70 | 180 |
| 50 - 55 | 180 |
| ≤ 45 | 120 |

# WZ 22




* = Minimum distance is 200 ft at Start of Operation. Maximum distance is 2 miles but in no case to exceed one half the distance required for one normal day's operations, whichever is less.

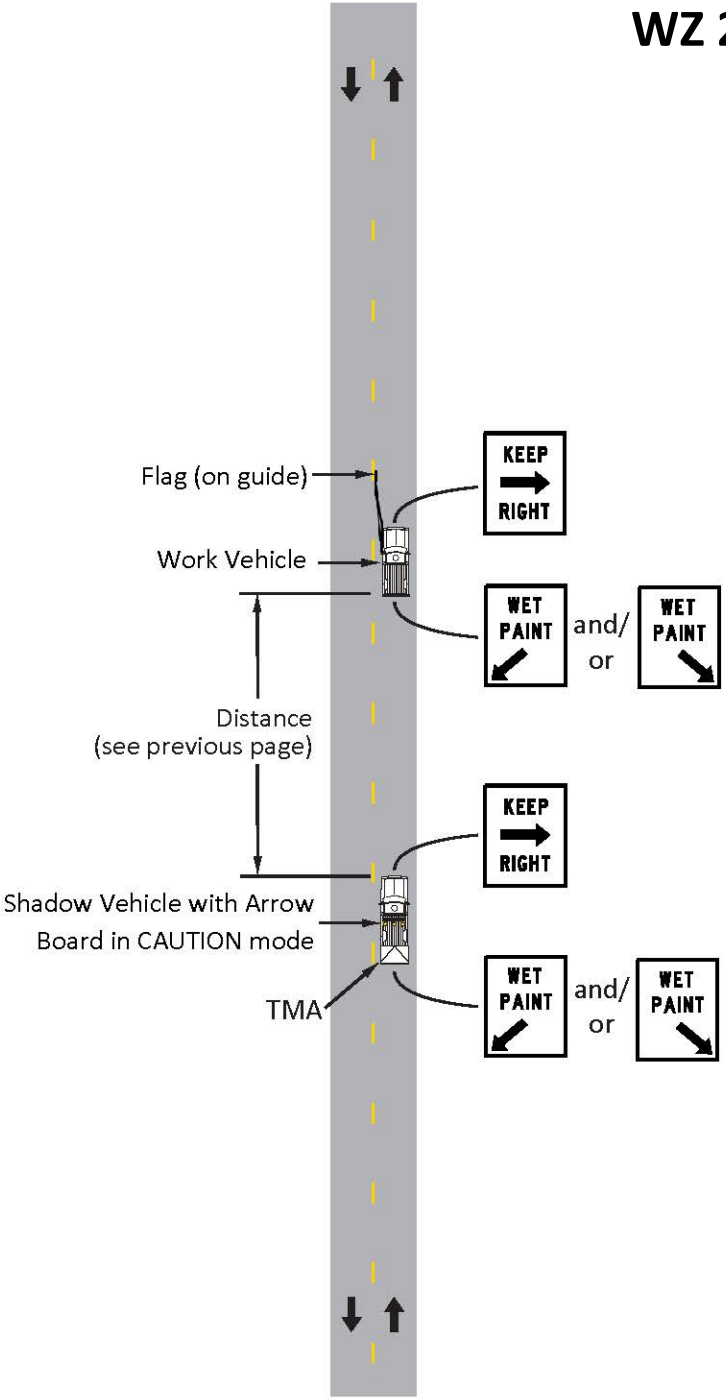
** See previous page for when to use flaggers with FLAGGER signs or TMA with WORKER signs.

## WZ 23: 2L2W STRIPING OPERATIONS

Notes:

1. Striping machine and all vehicles in convoy (except law enforcement vehicles) are to have headlights operating and are to display amber colored oscillating, rotating, flashing, or strobe/warning lights. At least one amber light is to be visible from any direction.
2. The distance shadow vehicles follow the striping machine will vary depending on the terrain and susceptibility of the painted line to wheel tracking. Whenever adequate stopping sight distance exists to rear, the shadow vehicle shall maintain minimal distance. The shadow vehicle should slow down in advance of vertical and horizontal curves that restrict sight distance.
3. Striping operation may be supported by additional traffic control devices.

# WZ 23


Flag (on guide)
Work Vehicle
KEEP
RIGHT
WET
PAINT
and/
or
WET
PAINT
Distance
(see previous page)
KEEP
RIGHT
Shadow Vehicle with Arrow
Board in CAUTION mode
TMA
WET
PAINT
and/
or
WET
PAINT

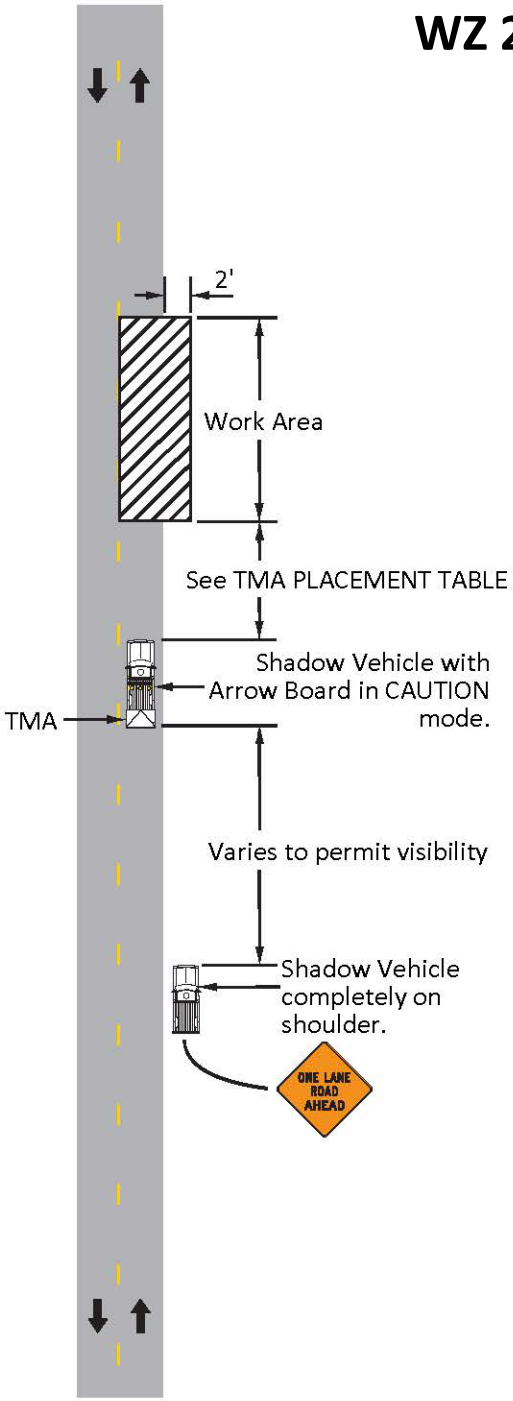
# WZ 24: 2L2W FAST-MOVING OPERATIONS (MORE THAN 4 MILES PER DAY)

Notes:

1. A shadow vehicle with a TMA and an arrow board in CAUTION mode shall be used in advance of the work area. The TMA shall be placed in advance of the work area in accordance with the TMA placement table.
2. All vehicles operating strobe/warning lights.
3. Work area between centerline and 2 ft outside of pavement edge.

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Moving Operations |
| 60 - 70 | 180 |
| 50 - 55 | 180 |
| ≤ 45 | 120 |

# WZ 24

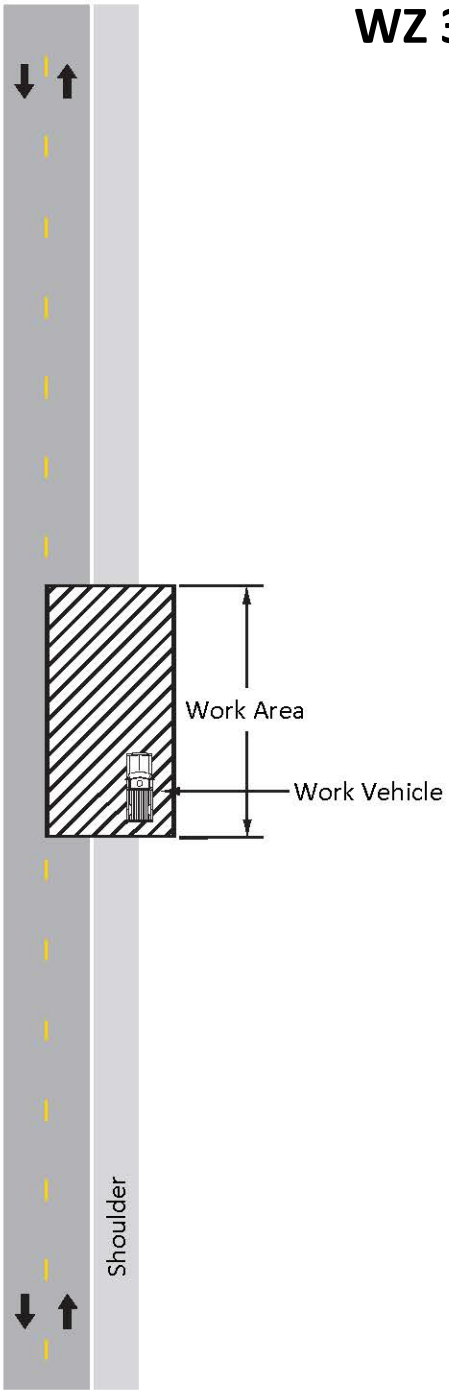

2'
Work Area
See TMA PLACEMENT TABLE
Shadow Vehicle with
Arrow Board in CAUTION
mode.
TMA
Varies to permit visibility
Shadow Vehicle
completely on
shoulder.
ONE LANE
ROAD
AHEAD

## WZ 30: 2L2W BRIEF ENCROACHMENT OPERATIONS

Notes:

1. Follow all the requirements of brief encroachments on page 46.
2. May be performed without a flagger, provided all vehicles are completely off traveled lanes.
   a. Each task must be performed with extreme care.
   b. The amount of time the workers are on the pavement shall be minimized.
   c. Workers shall enter onto the pavement only during appropriate gaps in traffic.
   d. Adequate sight distance must be available to utilize this case.
   e. If workers must remain in traffic lane and appropriate gaps do not exist, the lane must be closed with proper traffic control signs and devices.
   f. Vehicle may not encroach onto the pavement.
   g. When possible, work on the same side of road as the vehicle.
   h. Employee shall wear approved high-visibility apparel.
   i. Vehicle shall have its strobe/warning lights on.
3. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly trained and equipped flagger with proper warning signs in place.
4. When it is necessary for the vehicle to stop on the roadway, traffic control shall be in accordance with the proper case.
5. This case is only allowed during non-peak traffic.

# WZ 30



## WZ 91: 2L2W SIDEROAD OPERATIONS 15 MINUTES OR LESS

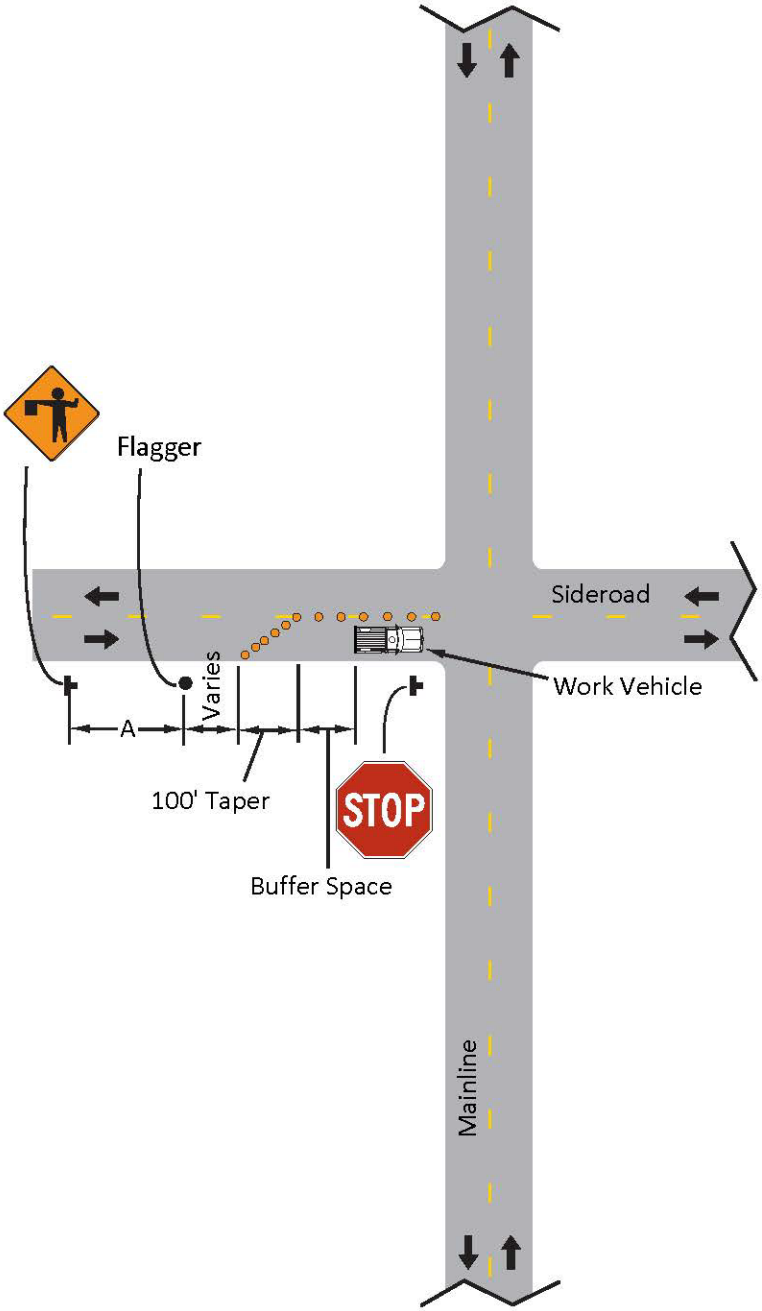
Notes:

1. Flagger to hold traffic until work completed, only if one flagger is used. Provide additional flaggers and flagger signs on other legs of intersection if required to control traffic.
2. All cones are required if additional flaggers are used.
3. All vehicles operating strobe/warning lights.
4. Cones at 20 ft centers on taper (minimum 6 cones).
5. Cones at 20 ft centers along drive lane.

| Speed (mph) | Buffer Space ** |
|---|---|
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 91


Flagger
Sideroad
Work Vehicle
Varies
A
100' Taper
STOP
Buffer Space
Mainline

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# Multilane Undivided Roads

Work Zone (WZ) Case No.: 40, 50, 51, and 52

Intersections WZ Case No.: 92, 94, 95, and 95a

## WZ 40: MULTILANE OPERATIONS 60 MINUTES OR LESS

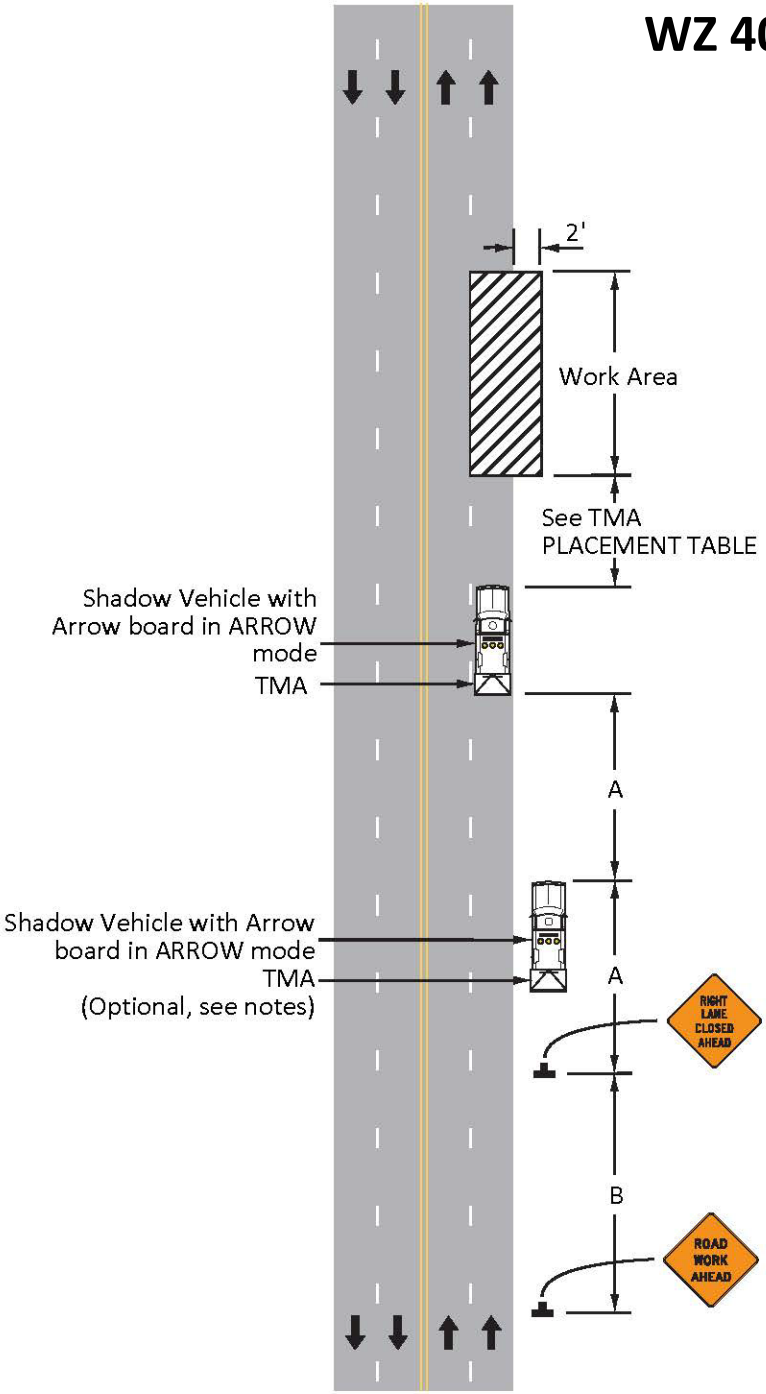
Notes:

1. Less than 15 minutes, both shoulder truck and signs optional. 15 to 60 minutes, either shoulder truck or signs shall be utilized.
2. For left lane closure use corresponding left lane information.
3. Signs not required in median when median is less than 10 ft wide.
4. All vehicles operating strobe/warning lights and arrow board.
5. TMA is required when truck encroaches onto the roadway.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Stationary Operations |
| 60 - 70 | 120 |
| 50 - 55 | 100 |
| ≤ 45 | 80 |

# WZ 40


2'
Work Area
See TMA
PLACEMENT TABLE
Shadow Vehicle with
Arrow board in ARROW
mode
TMA
A
Shadow Vehicle with Arrow
board in ARROW mode
TMA
(Optional, see notes)
A
RIGHT
LANE
CLOSED
AHEAD
B
ROAD
WORK
AHEAD

## WZ 50: MULTILANE OPERATIONS USING BI-DIRECTIONAL TURN LANE FOR THRU TRAFFIC FOR 45 MPH OR LESS

Notes:

1. No signs required up to 60 minutes, for more than 60 minutes signs are required.
2. An arrow board in CAUTION mode shall be placed at the start of the taper if shadow vehicle is removed if workers are no longer present.
3. All vehicles operating strobe/warning lights.
4. A work zone speed limit assembly may be installed. The work zone speed limit must equal the existing regulatory speed limit.
5. "End Work Zone Speed Limit" sign is required if work zone speed limit signs are installed.
6. "Road Work Ahead" sign shall be moved closer to the work area using appropriate sign spacings if work zone speed limit signs are not used.
7. Cones at 20 ft centers on taper and lane lines.

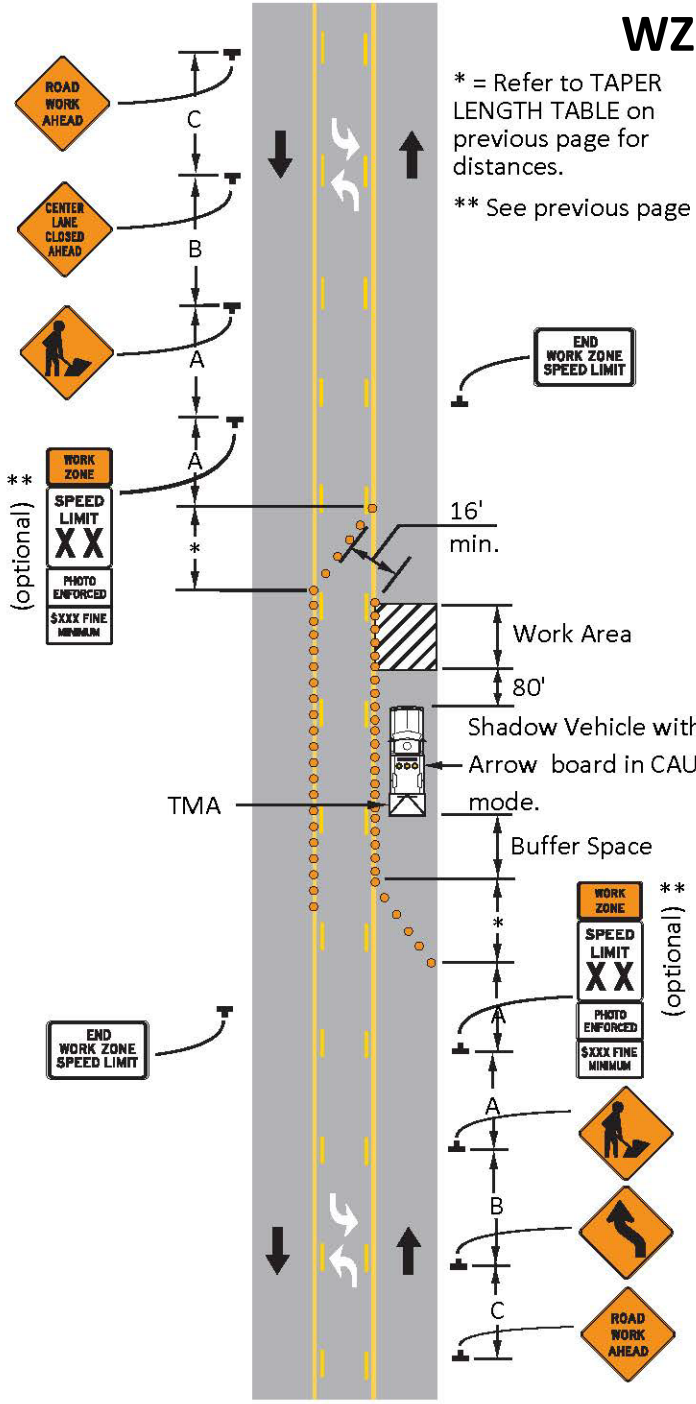
| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Stationary Operations |
| ≤ 45 | 80 |

| Speed (mph) | Lane Taper Length (ft) | Buffer Space** |
|---|---|---|
| | Shifting | |
| 30 | 90 | 200 |
| 35 | 125 | 250 |
| 40 | 160 | 305 |
| 45 | 270 | 360 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 50


* = Refer to TAPER LENGTH TABLE on previous page for distances.
** See previous page
ROAD WORK AHEAD
CENTER LANE CLOSED AHEAD
C
B
A
A
END WORK ZONE SPEED LIMIT
** (optional)
WORK ZONE
SPEED LIMIT XX
PHOTO ENFORCED
$XXX FINE MINIMUM
*
16' min.
Work Area
80'
Shadow Vehicle with Arrow board in CAUTION mode.
TMA
Buffer Space
END WORK ZONE SPEED LIMIT
** (optional)
WORK ZONE
SPEED LIMIT XX
PHOTO ENFORCED
$XXX FINE MINIMUM
A
A
B
C
ROAD WORK AHEAD

# WZ 51: MULTILANE OPERATIONS BI-DIRECTIONAL TURN LANE CLOSURE FOR 45 MPH OR LESS

Notes:

1. No signs required up to 60 minutes, for more than 60 minutes signs are required.
2. A work zone speed limit assembly may be installed. The work zone speed limit must equal the existing regulatory speed limit.
3. If operational problems are evident and caused by left-turning vehicles, the R3-9b signs in the immediate area of the work zone should be temporarily covered and/or adjustments made in the lengths of the work area, buffer areas and tapers. All dimensions shown may be increased.
4. "End Work Zone Speed Limit" sign are required if work zone speed limit signs are installed.
5. "Road Work Ahead" sign shall be moved closer to the work area using appropriate sign spacings if work zone speed limit signs are not used.
6. Cones at 20 ft centers on taper and lane lines.

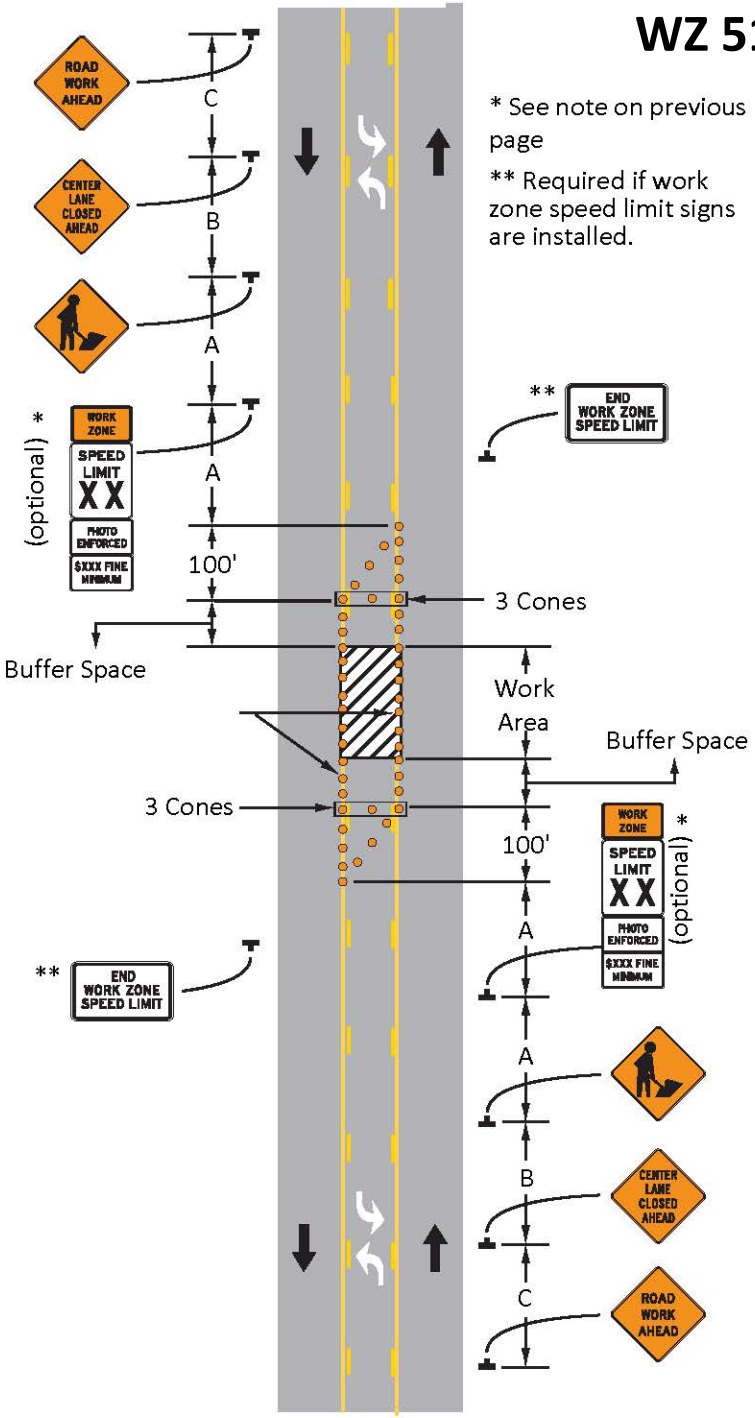

R3-9b

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |

| Speed (mph) | Buffer Space ** |
|---|---|
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 51




* See note on previous page

** Required if work zone speed limit signs are installed.

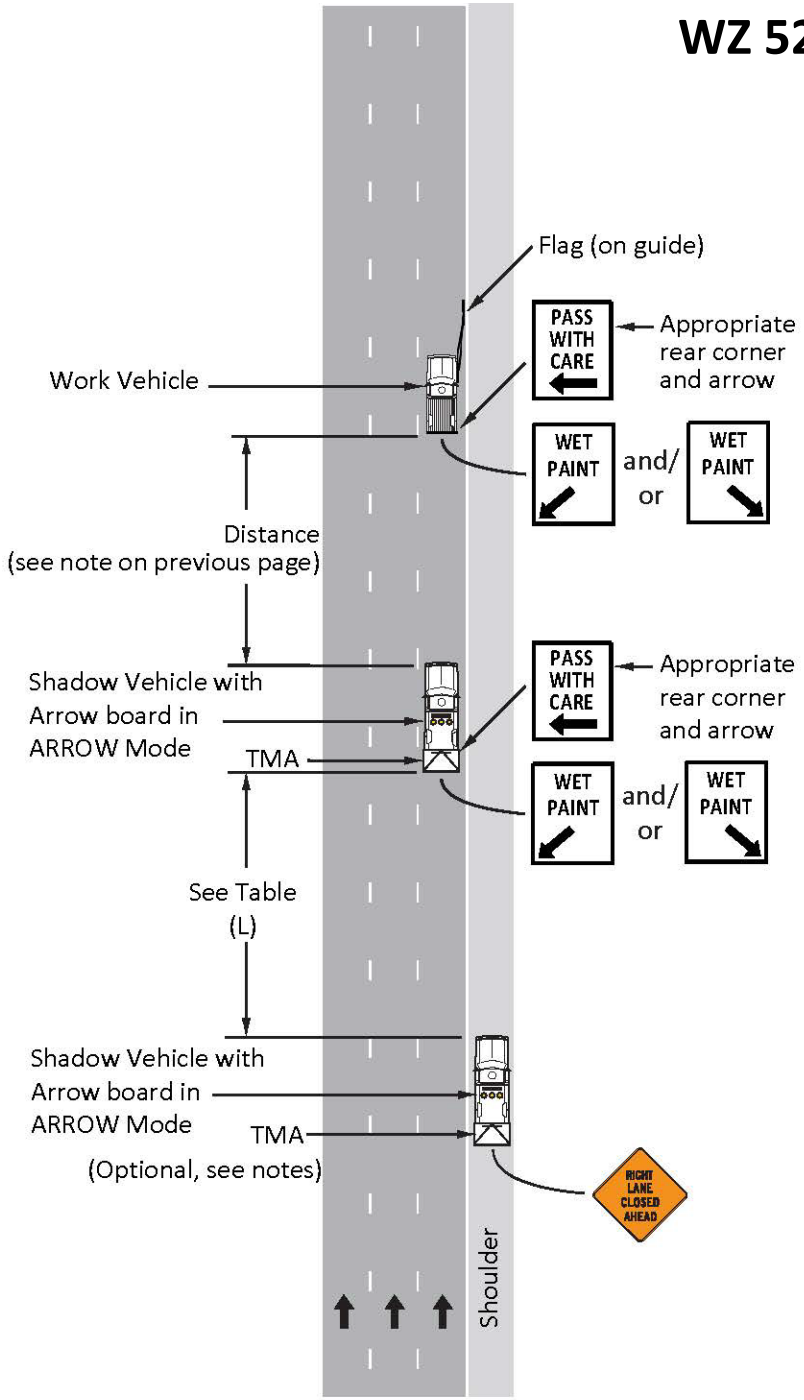
## WZ 52: MULTILANE STRIPING OPERATIONS

Notes:

1. Striping machine and all vehicles in convoy (except law enforcement vehicles) are to have headlights and strobe/warning lights operating. Strobe/warning lights are to be visible from any direction.
2. Distance shadow vehicle(s) follows striping machine will vary depending on terrain and susceptibility of painted line to wheel tracking, whenever adequate stopping sight distance exists to rear, the shadow vehicle shall maintain minimal distance. The shadow vehicle should slow down in advance of vertical and horizontal curves that restrict sight distance.
3. Striping operation may be supported by additional traffic control devices.
4. This WZ case is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, KEEP RIGHT signs shall be substituted for KEEP LEFT signs and arrow board indications shall be directed to the right.
5. TMA is required when truck encroaches onto the roadway

| Posted Speed (mph) | Length (ft) L+/- |
|---|---|
| 65 – 70 | 1000 |
| 55 -60 | 500 |
| 45-50 | 350 |
| ≤ 40 | 100 |

# WZ 52


Flag (on guide)
PASS WITH CARE
Appropriate rear corner and arrow
Work Vehicle
WET PAINT
and/ or
WET PAINT
Distance
(see note on previous page)
Shadow Vehicle with Arrow board in ARROW Mode
TMA
PASS WITH CARE
Appropriate rear corner and arrow
WET PAINT
and/ or
WET PAINT
See Table (L)
Shadow Vehicle with Arrow board in ARROW Mode
TMA
(Optional, see notes)
RIGHT LANE CLOSED AHEAD
Shoulder

# WZ 92: MULTILANE INTERSECTION OPERATIONS FOR 55 MPH OR LESS

Notes:

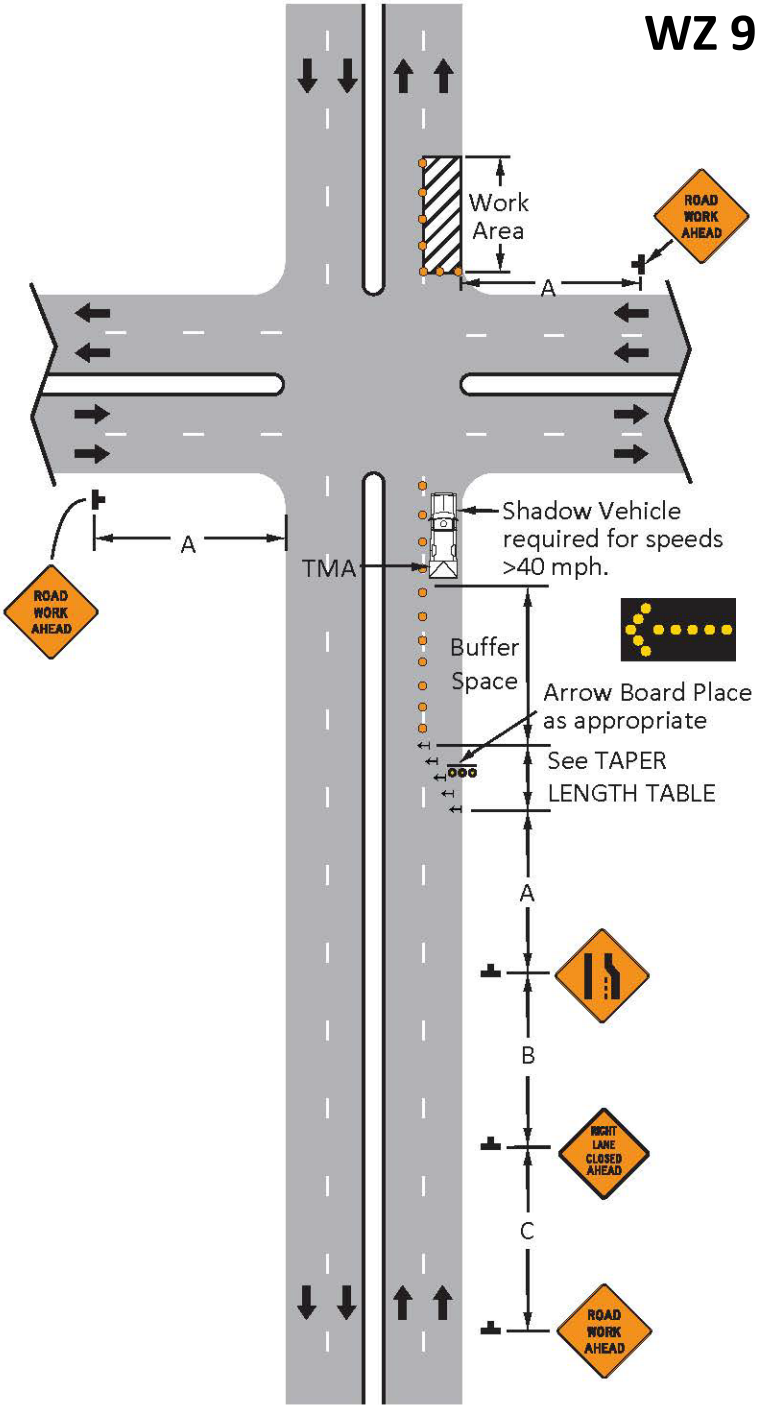
1. When 150 ft space is available, place shadow vehicle in advance of work area.
2. Shadow vehicle with TMA required for speeds > 40 mph.
3. For left lane closure use corresponding left lane information.
4. If work encroaches into side road, flagger and flagger signs are required.
5. Cones on lane line
   a. ≤ 35 mph – 40 ft centers
   b. ≥ 40 mph – 80 ft centers
6. Direction indicator barricades on taper.
   a. ≤ 35 mph – 20 ft centers
   b. ≥ 40 mph – 40 ft centers
   c. Cones may be substituted for direction indicator barricades for speeds less than 45 mph.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |

| Speed (mph) | Lane Taper Length (ft) | Buffer Space** |
|---|---|---|
| | Merging | |
| 30 | 180 | 200 |
| 35 | 245 | 250 |
| 40 | 320 | 305 |
| 45 | 540 | 360 |
| 50 | 600 | 425 |
| 55 | 660/1000 | 495 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 92





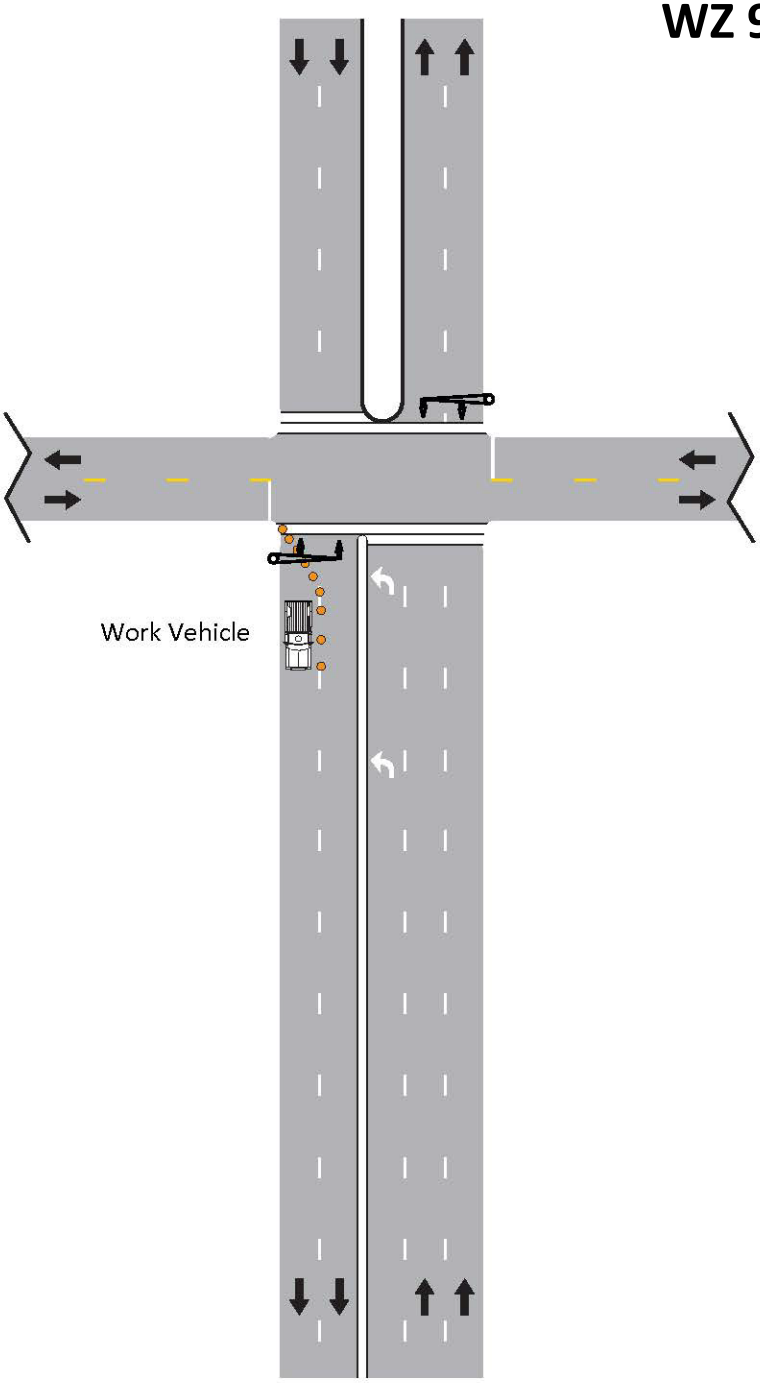

Drawing Not to Scale

# WZ 94: TRAFFIC SIGNAL MAINTENANCE OPERATIONS 15 MINUTES OR LESS

Method of Operation

1. Truck placed on pavement with strobe/warning lights operating
2. Use 6 channelizing devices for taper and 3 alongside of truck.
3. 
    a. Multilane: Place signals in flashing red or use shadow vehicle as per WZ 40.
    b. 2-Lane: Place signals in flashing red or control traffic as per WZ 21

# WZ 94



# WZ 95: MULTILANE TURN LANE CLOSURE FOR 15 MINUTES OR LESS

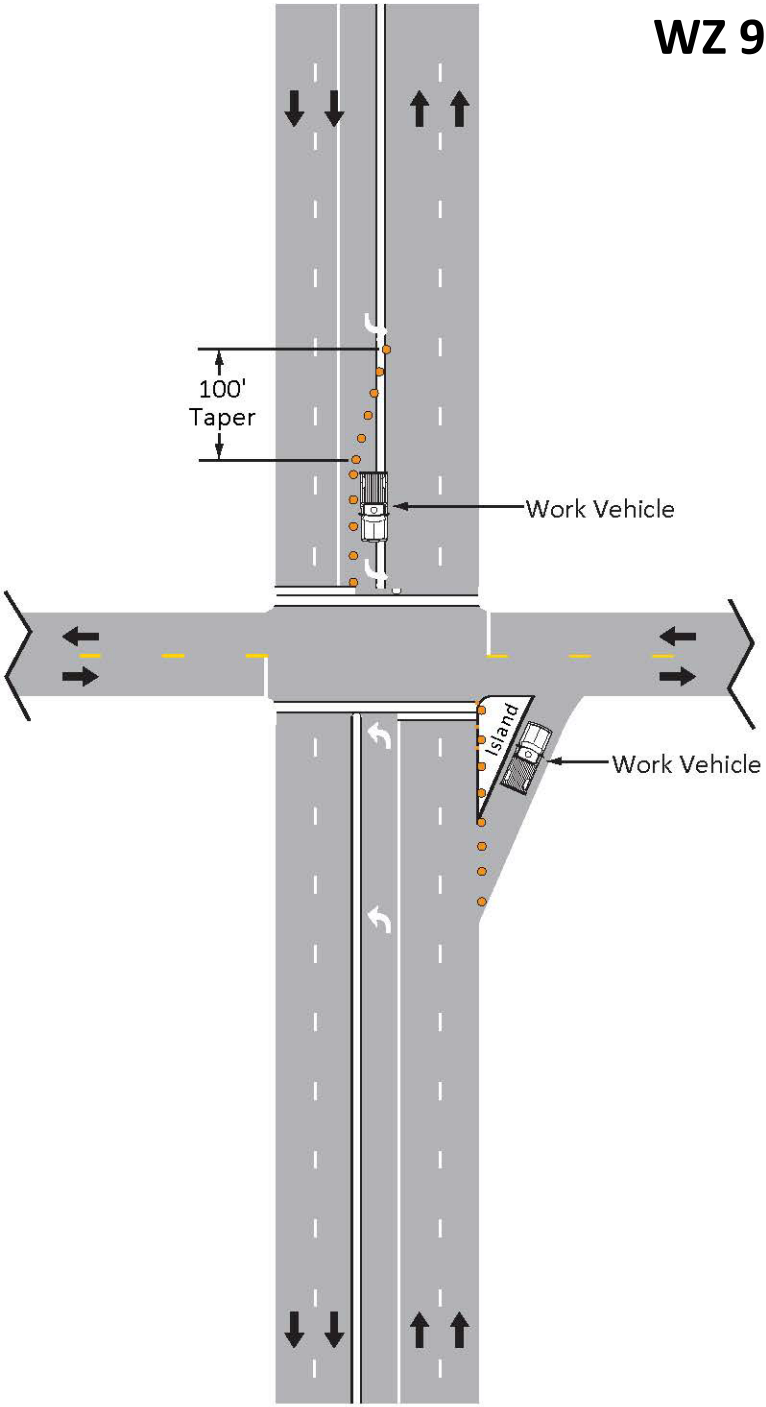
Method of Operation:

1. Truck placed on pavement with strobe/warning lights operating

Notes:

1. Cones at 20 ft centers on taper
2. Cones at 20 ft centers on lane line

# WZ 95



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# WZ 95a: MULTILANE TURN LANE CLOSURE GREATER THAN 15 MINUTES

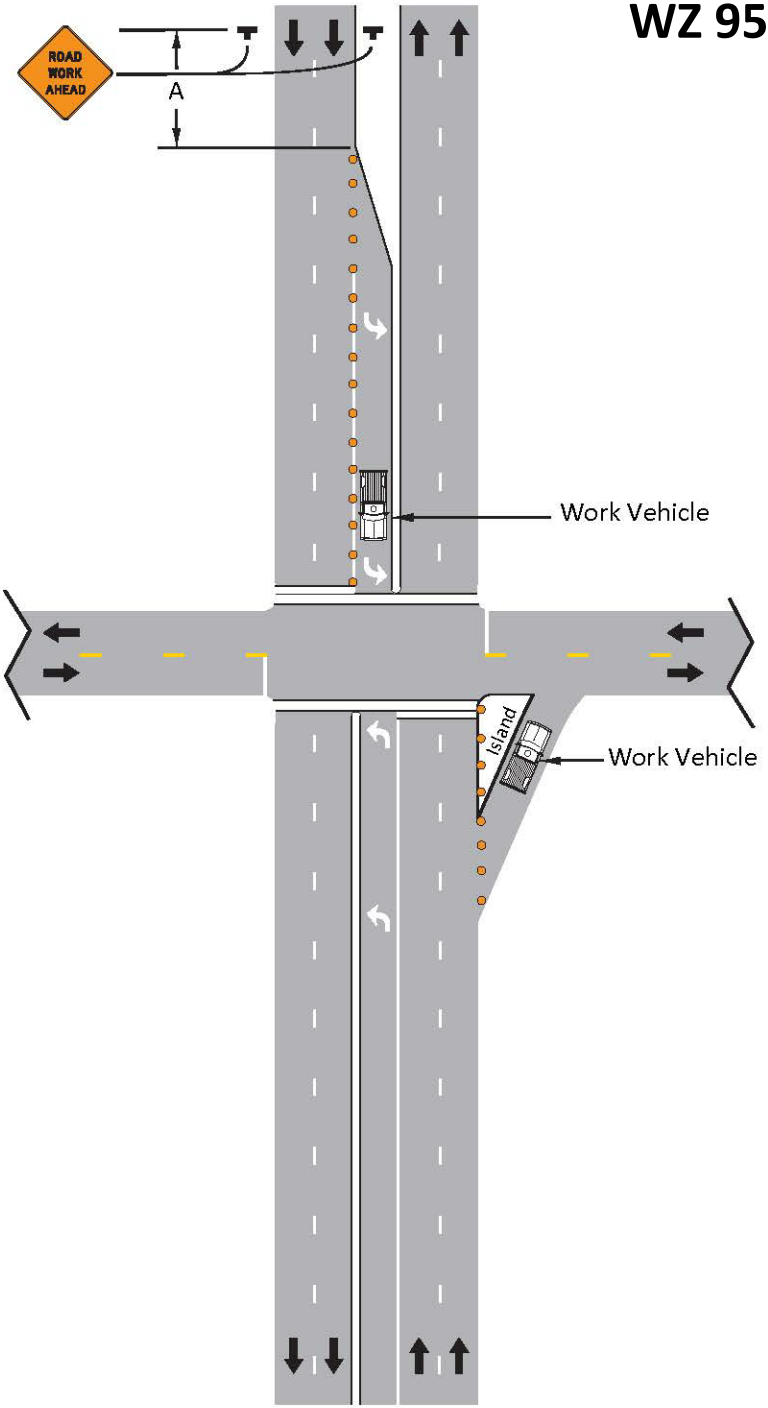
Method of Operation:

1. Truck placed on pavement with strobe/warning lights operating.
2. Signs not required in median when median is less than 10 ft wide.

Notes:

1. Cones at 20 ft centers.

# WZ 95a



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# Multilane Divided Roads

Work Zone (WZ) Case No.: 41, 42, 44, 44a, 45, 45a, 46, 47, 48, 49, 63, 64, 65, and 66
Intersections WZ Case No.: 60, 61, and 62
Intersections WZ Case No.: 93

## WZ 41: MULTILANE DIVIDED OPERATIONS ONE LANE CLOSURE FOR 55 MPH OR LESS

Notes:

1. Signs not required in median when median is less than 10 ft wide.
2. Cones may be substituted for direction indicator barricades for speeds less than 45 mph.
3. Drums or barricades may be substituted for cones. When drums or barricades are used, the spacing may be doubled.
4. All vehicles operating strobe/warning lights.
5. The opposing inside lane should be closed when work is within 2 ft of the centerline.
6. When work is being performed in the left lane, corresponding left lane information shall be used.
7. When shadow vehicle is moved forward to protect workers or is removed when workers are no longer present, an arrow board shall be placed within 300 ft of the start of the taper.
8. Use existing posted speed limit for 45 mph or less. Existing posted speed limits of 50 mph or 55 mph should be reduced to 45 mph. The existing posted speed limit may be reduced up to 10 mph with approval of District Operation Engineer.

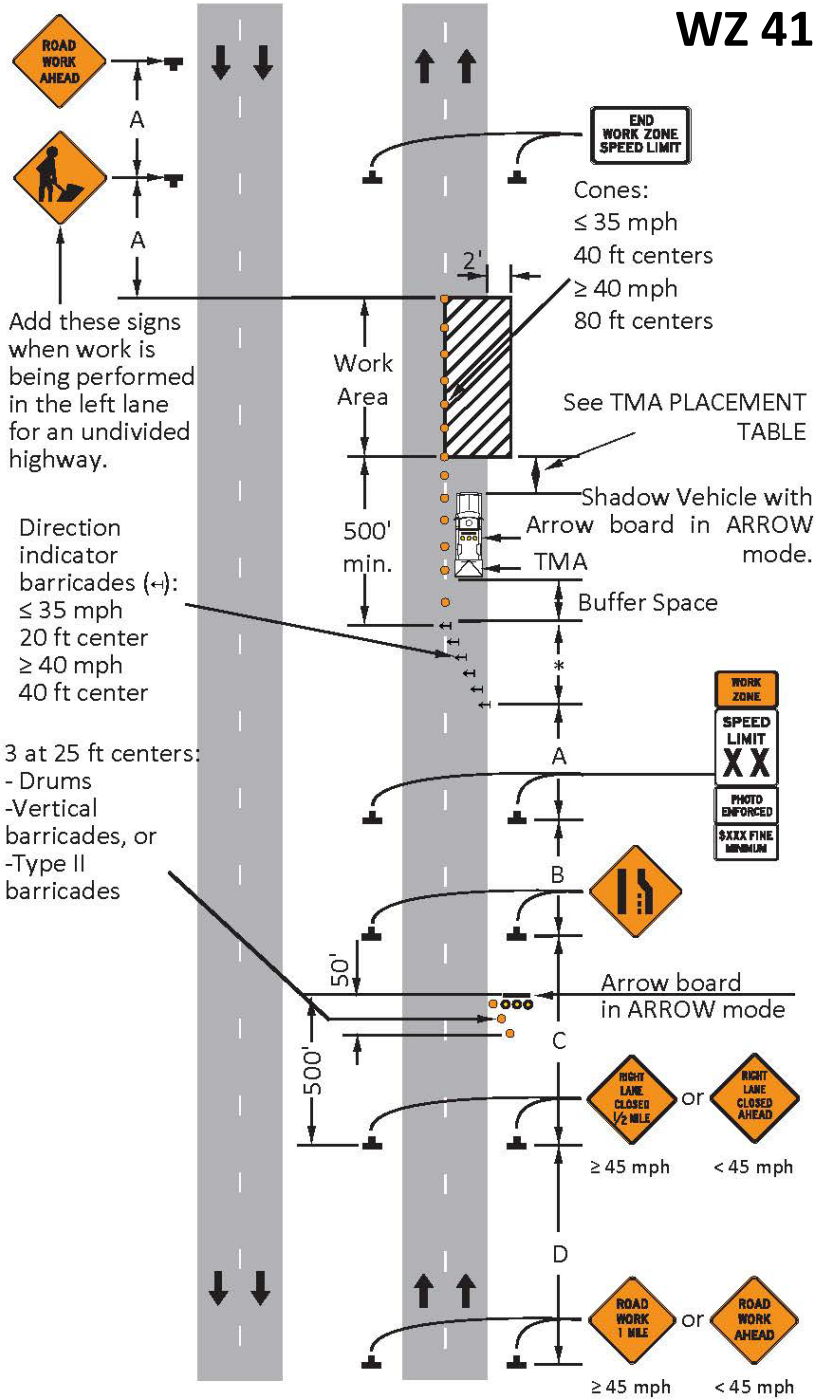
| Speed (mph) | Advance Sign Spacing (ft) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| ≤40 | 100 | 100 | 100 | 100 |
| 45 - 55 | 500 | 1000 | 1100 | 2600 |

| Speed (mph) | Lane Taper Length (ft) | Buffer Space** |
|---|---|---|
| | Merging | |
| 30 | 180 | 200 |
| 35 | 245 | 250 |
| 40 | 320 | 305 |
| 45 | 540 | 360 |
| 50 | 600 | 425 |
| 55 | 660 | 495 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) - Stationary Operations |
| 50 - 55 | 100 |
| ≤ 45 | 80 |

# WZ 41


ROAD WORK AHEAD
A
A
Add these signs when work is being performed in the left lane for an undivided highway.
END WORK ZONE SPEED LIMIT
Cones:
≤ 35 mph
40 ft centers
≥ 40 mph
80 ft centers
2'
Work Area
See TMA PLACEMENT TABLE
Shadow Vehicle with Arrow board in ARROW mode.
TMA
500' min.
Buffer Space
Direction indicator barricades (↔):
≤ 35 mph
20 ft center
≥ 40 mph
40 ft center
*
A
WORK ZONE
SPEED LIMIT XX
PHOTO ENFORCED
$XXX FINE MINIMUM
3 at 25 ft centers:
- Drums
-Vertical barricades, or
-Type II barricades
B
50'
Arrow board in ARROW mode
C
500'
RIGHT LANE CLOSED ½ MILE
or
RIGHT LANE CLOSED AHEAD
≥ 45 mph
< 45 mph
D
ROAD WORK 1 MILE
or
ROAD WORK AHEAD
≥ 45 mph
< 45 mph

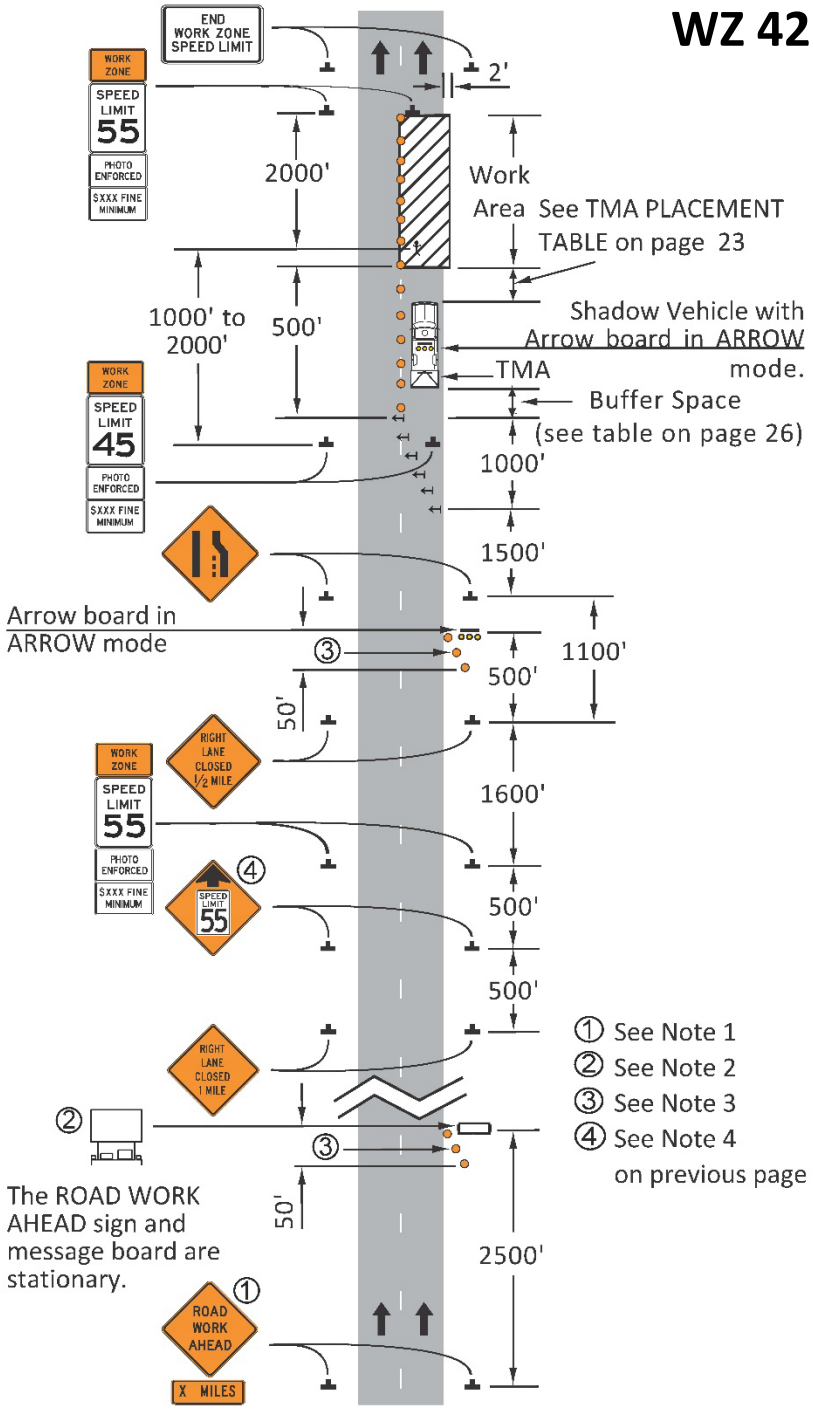
## WZ 42: INTERSTATE OPERATIONS ONE LANE CLOSURE

Notes:

1. The ROAD WORK AHEAD sign shall be located 3 to 5 miles in advance of the project limits and are optional unless the lane closure(s) last(s) overnight or traffic backups are anticipated.
2. The message board shall be used to display status of lane within the project and are optional unless the lane closure(s) last(s) overnight or traffic backups are anticipated. The primary messages shall be:

   "ALL LANES OPEN"
   "RIGHT LANE CLOSED"/ "X MILES AHEAD"
   "LEFT LANE CLOSED"/ ''X MILES AHEAD"
3. 3 drums, 3 vertical barricades, or 3 Type II barricades at 25 ft centers.
4. Only install when preexisting speed limit is 70 mph.
5. WORK ZONE SPEED LIMIT 45 mph signs shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity.
6. If signs ROAD WORK AHEAD and message board are not used, replace the RIGHT LANE CLOSED 1 MILE with ROAD WORK 1 MILE sign.
7. When work is being performed in the left lane, corresponding left lane information shall be used.
8. All vehicles operating strobe/warning lights.
9. When shadow vehicle is moved forward to protect workers or is removed if workers are no longer present, an arrow board shall be placed at the start of the taper.
10. Signs not required in median when median is less than 10 ft wide.
11. 55 MPH sign omitted when within 500 ft of END WORK ZONE SPEED LIMIT sign
12. Cones at 50 ft centers on lane line
13. Drums or barricades may be substituted for cones. When drums or barricades are used, the spacing may be doubled.
14. Direction indicator barricades at 50 ft centers on taper.

# WZ 42

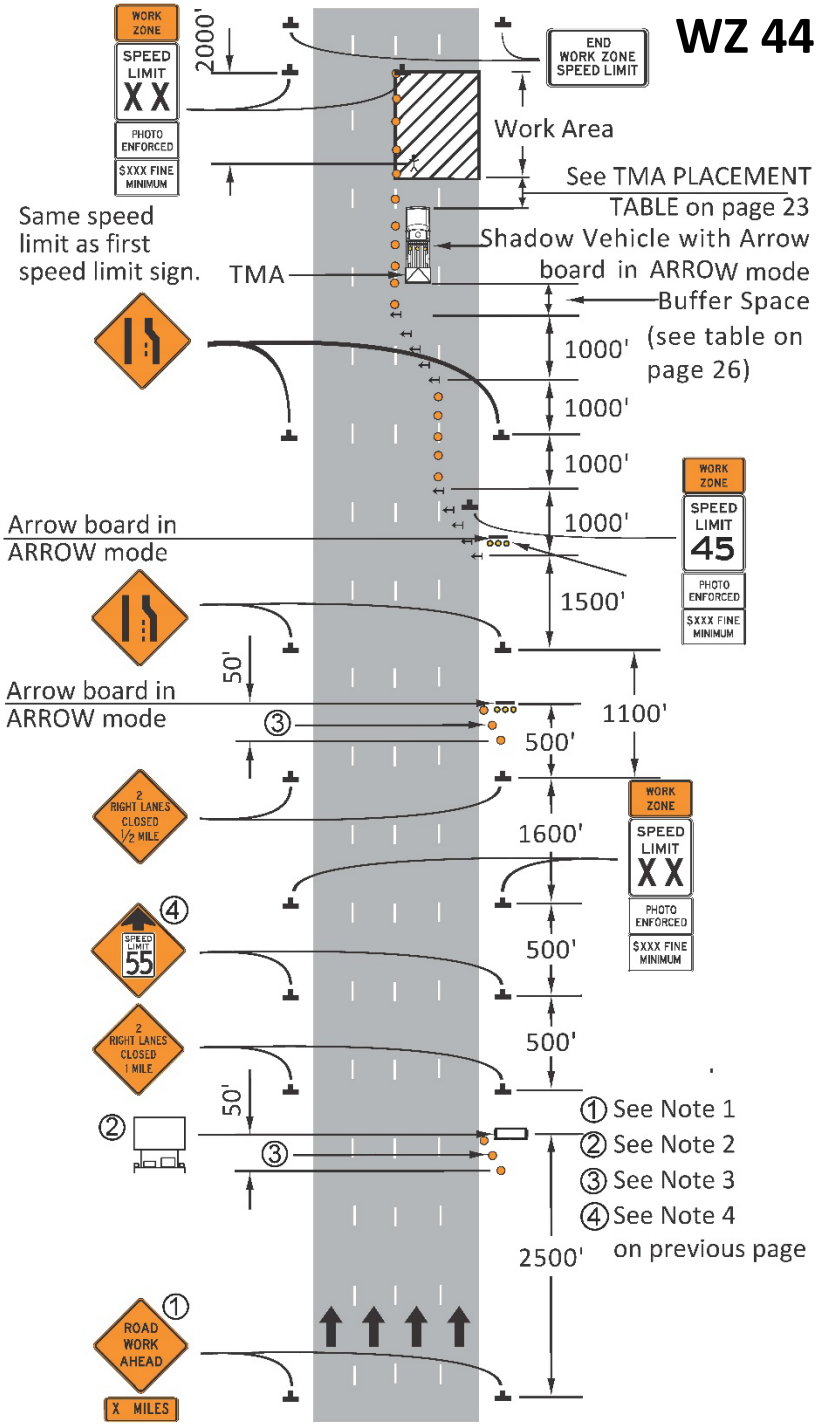

END WORK ZONE SPEED LIMIT
WORK ZONE
SPEED LIMIT 55
PHOTO ENFORCED
$XXX FINE MINIMUM
2'
2000'
Work Area See TMA PLACEMENT TABLE on page 23
1000' to 2000'
500'
Shadow Vehicle with Arrow board in ARROW mode.
TMA
Buffer Space (see table on page 26)
WORK ZONE
SPEED LIMIT 45
PHOTO ENFORCED
$XXX FINE MINIMUM
1000'
1500'
Arrow board in ARROW mode
③
1100'
500'
50'
RIGHT LANE CLOSED ½ MILE
WORK ZONE
SPEED LIMIT 55
PHOTO ENFORCED
$XXX FINE MINIMUM
1600'
④
SPEED LIMIT 55
500'
500'
RIGHT LANE CLOSED 1 MILE
② See Note 1
② See Note 2
③ See Note 3
④ See Note 4
on previous page
②
③
50'
2500'
The ROAD WORK AHEAD sign and message board are stationary.
①
ROAD WORK AHEAD
X MILES

# WZ 44: MULTILANE DIVIDED OPERATIONS TWO LANE CLOSURE FOR 55 MPH OR GREATER

Notes:

1. The ROAD WORK AHEAD sign shall be located 3 to 5 miles in advance of the project limits.
2. The message board shall be used to display status of lane within the project. The primary messages shall be:
   "All Lanes Open"
   "Right Lane Closed"/ "X Miles Ahead"
   "Left Lane Closed"/ ''X Miles Ahead"
3. 3 drums, 3 vertical barricades, or 3 Type II barricades at 25 ft centers.
4. Only install when preexisting speed limit is 70 mph.
5. Signs ① and ② are optional unless the lane closure(s) last(s) overnight or traffic backups are anticipated.
6. The WORK ZONE SPEED LIMIT 45 mph sign shall be moved as necessary to maintain the required spacing between the signs and the workers in each separate work activity.
7. If signs ① and ② are not used, replace the 2 RIGHT LANES CLOSED 1 MILE with ROAD WORK 1 MILE sign.
8. When work is being performed in the left lane, corresponding left lane information shall be used.
9. All vehicles operating strobe/warning lights.
10. When shadow vehicle is moved forward to protect workers or is removed if workers are no longer present, an arrow board shall be placed at the start of the taper.
11. Signs not required in median when median is less than 10 ft wide.
12. When center lane remains closed, use Work Zone Case 45 (WZ 45) after work is complete and workers are not present.
13. WORK ZONE SPEED LIMIT sign omitted when within 500 ft of END OF WORK ZONE SPEED LIMIT sign.
14. Cones and direction indicator barricades at 50 ft centers
15. Use speed limit of 55 mph for existing speed limits of 60 to 70 mph.
16. Use speed limit of 45 mph for existing speed limit of 55 mph.

# WZ 44


WORK ZONE
SPEED LIMIT XX
PHOTO ENFORCED
$XXX FINE MINIMUM
2000'
END WORK ZONE SPEED LIMIT
Work Area
See TMA PLACEMENT TABLE on page 23
Same speed limit as first speed limit sign.
TMA
Shadow Vehicle with Arrow board in ARROW mode
Buffer Space
(see table on page 26)
1000'
1000'
1000'
1000'
WORK ZONE
SPEED LIMIT 45
PHOTO ENFORCED
$XXX FINE MINIMUM
1500'
Arrow board in ARROW mode
50'
Arrow board in ARROW mode
1100'
500'
2 RIGHT LANES CLOSED 1/2 MILE
WORK ZONE
SPEED LIMIT XX
PHOTO ENFORCED
$XXX FINE MINIMUM
1600'
SPEED LIMIT 55
500'
2 RIGHT LANES CLOSED 1 MILE
500'
50'
① See Note 1
② See Note 2
③ See Note 3
④ See Note 4
on previous page
2500'
ROAD WORK AHEAD
X MILES

# WZ 44a: MULTILANE DIVIDED OPERATIONS TWO LANE CLOSURE FOR 50 MPH OR LESS

Notes:

1. All vehicles operating strobe/warning lights.
2. When shadow vehicle is moved forward to protect workers or is removed if workers are no longer present, an arrow board shall be placed at the start of the taper.
3. When work is being performed in the left lane, corresponding left lane information shall be used.
4. Signs not required in median when median is less than 10 ft wide.
5. When center lane remains closed, use Work Zone Case 45a (WZ 45a) after work is complete and workers are not present.
6. Use existing speed limit. Existing speed limit may be reduced up to 10 mph with approval of District Operations Engineer.
7. Cones on lane lines:
   a. ≤ 35 mph – 40 ft centers
   b. ≥ 40 mph – 80 ft centers
8. Direction indicator barricades on tapers:
   a. ≤35 mph – 20 ft centers
   b. ≥40 mph – 40 ft centers

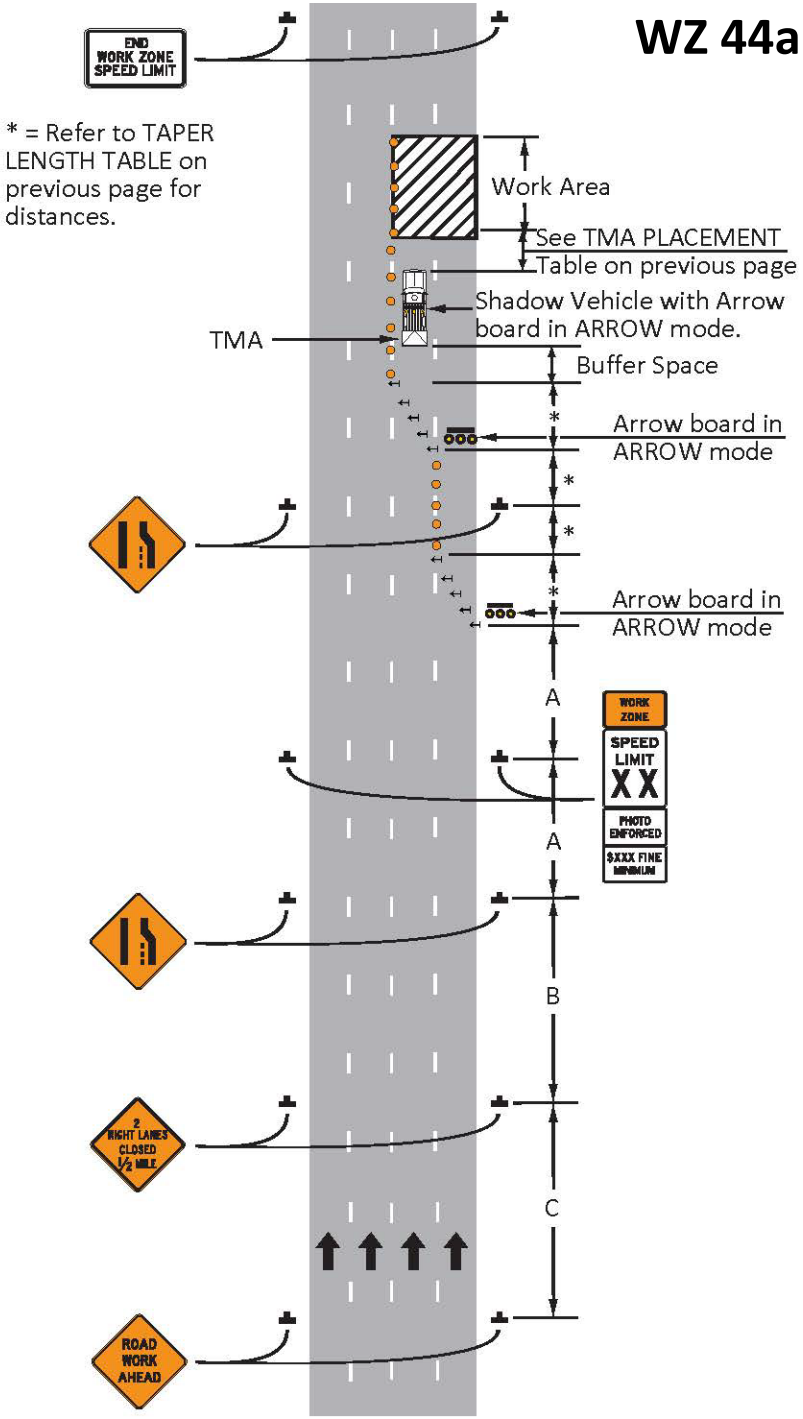
| Speed (mph) | Advance Sign | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) Stationary Operations |
| 50 - 55 | 100 |
| ≤ 45 | 80 |

| Speed (mph) | Lane Taper Length (ft) Merging | Buffer Space** |
|---|---|---|
| 30 | 180 | 200 |
| 35 | 245 | 250 |
| 40 | 320 | 305 |
| 45 | 540 | 360 |
| 50 | 600 | 425 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 44a






Drawing Not to Scale

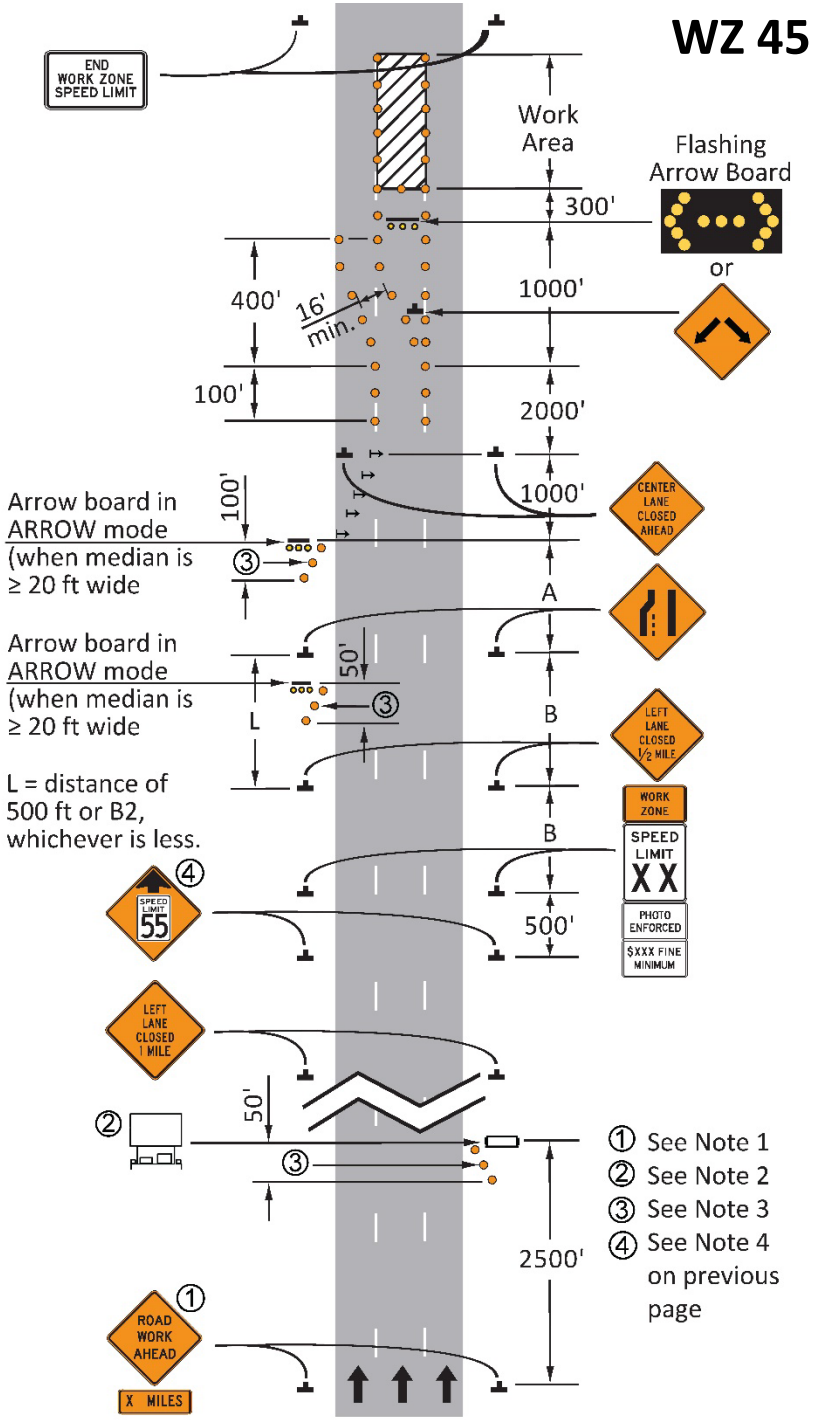
# WZ 45: MULTILANE DIVIDED CENTER LANE CLOSURE FOR 55 MPH OR GREATER – NO WORKERS PRESENT

Notes:

1. The ROAD WORK AHEAD sign shall be located 3 to 5 miles in advance of the project limits.
2. The message board shall be used to display status of lane within the project. The primary messages shall be:
   "All Lanes Open"
   "Right Lane Closed"/ "X Miles Ahead"
   "Left Lane Closed"/ ''X Miles Ahead"
3. 3 drums, 3 vertical barricades, or 3 Type II barricades at 25 ft centers.
4. Only install when preexisting speed limit is 70 mph.
5. The ROAD WORK AHEAD sign, and message board are stationary.
6. This Work Zone Case may only be utilized when workers are not present.
7. Use Work Zone Case 44 (WZ 44) when workers are present.
8. Cones at 80 ft centers on lane lines.
9. Cones at 40 ft centers on shift taper.
10. Direction indicator barricades at 40 ft centers on taper.
11. Use existing speed limit. Existing speed limit may be reduced up to 10 mph with approval of District Operations Engineer.

| **Speed (mph)** | **Advance Sign Spacing** | | |
|---|---|---|---|
| | A | B | C |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ 45






Drawing Not to Scale

# WZ 45a: MULTILANE DIVIDED CENTER LANE CLOSURE FOR 50 MPH OR LESS – NO WORKERS PRESENT

Notes:

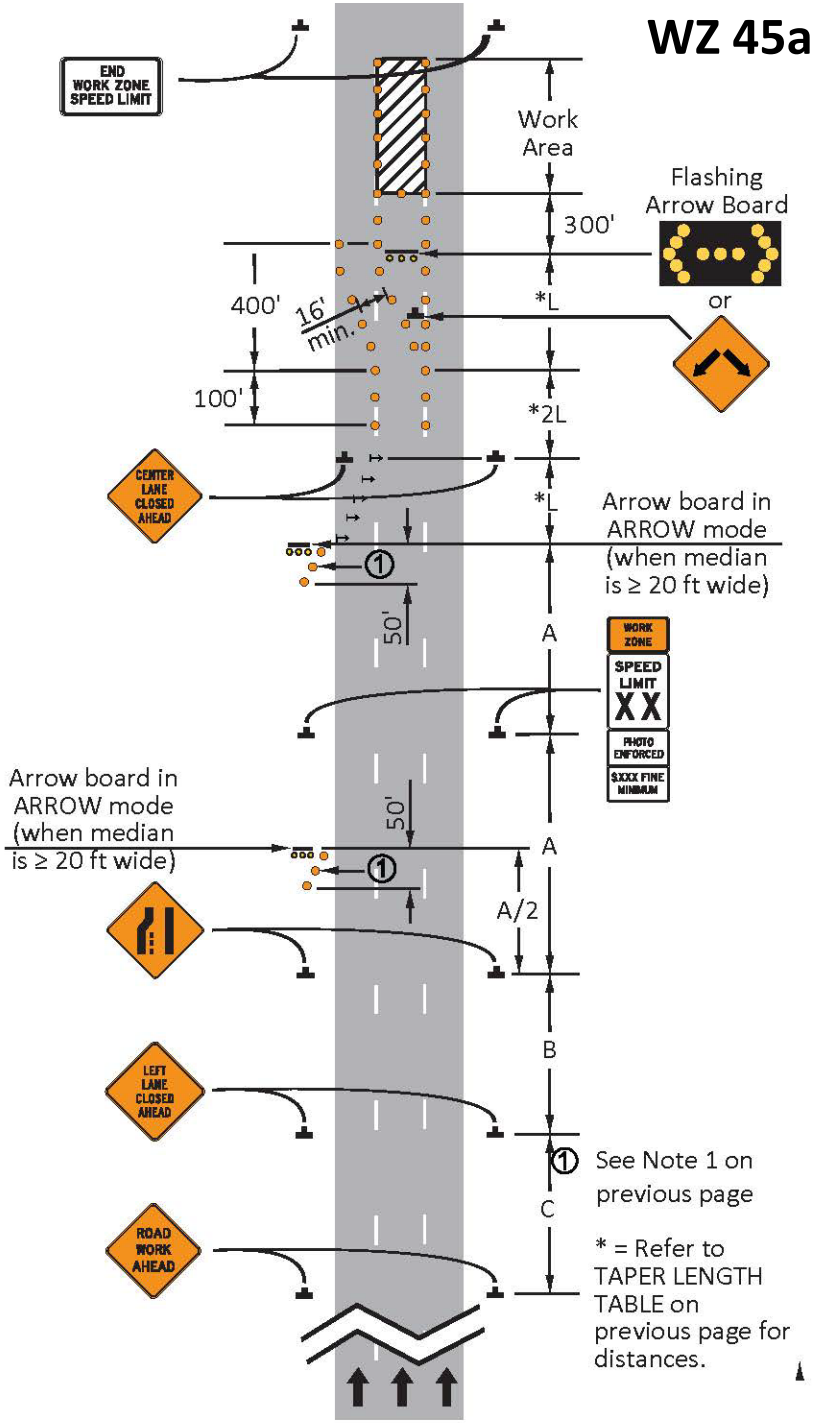
1. 3 drums, 3 vertical barricades, or 3 Type II barricades at 25 ft centers.
2. This Work Zone Case may only be utilized when workers are not present.
3. Use Work Zone Case 44a (WZ 44a) when workers are present.
4. Cones on shift taper:
   a. ≤ 35 mph – 20 ft centers
   b. ≥ 40 mph – 40 ft centers
5. Cones on lane lines:
   a. ≤ 35 mph – 40 ft centers
   b. ≥ 40 mph – 80 ft centers
6. Direction indicator barricades on tapers:
   a. ≤35 mph – 20 ft centers
   b. ≥40 mph – 40 ft centers
7. Use existing speed limit. Existing speed limit may be reduced up to 10 mph with approval of District Operations Engineer.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |

| Speed (mph) | Lane Taper Length (ft) | Buffer Space** |
|---|---|---|
| | Merging | |
| 30 | 180 | 200 |
| 35 | 245 | 250 |
| 40 | 320 | 305 |
| 45 | 540 | 360 |
| 50 | 600 | 425 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 45a


END WORK ZONE SPEED LIMIT
Work Area
Flashing Arrow Board
300'
400'
16' min.
*L
or
100'
*2L
CENTER LANE CLOSED AHEAD
*L
Arrow board in ARROW mode (when median is ≥ 20 ft wide)
50'
A
WORK ZONE
SPEED LIMIT
XX
PHOTO ENFORCED
$XXX FINE MINIMUM
Arrow board in ARROW mode (when median is ≥ 20 ft wide)
50'
A
A/2
B
LEFT LANE CLOSED AHEAD
1 See Note 1 on previous page
C
ROAD WORK AHEAD
* = Refer to TAPER LENGTH TABLE on previous page for distances.

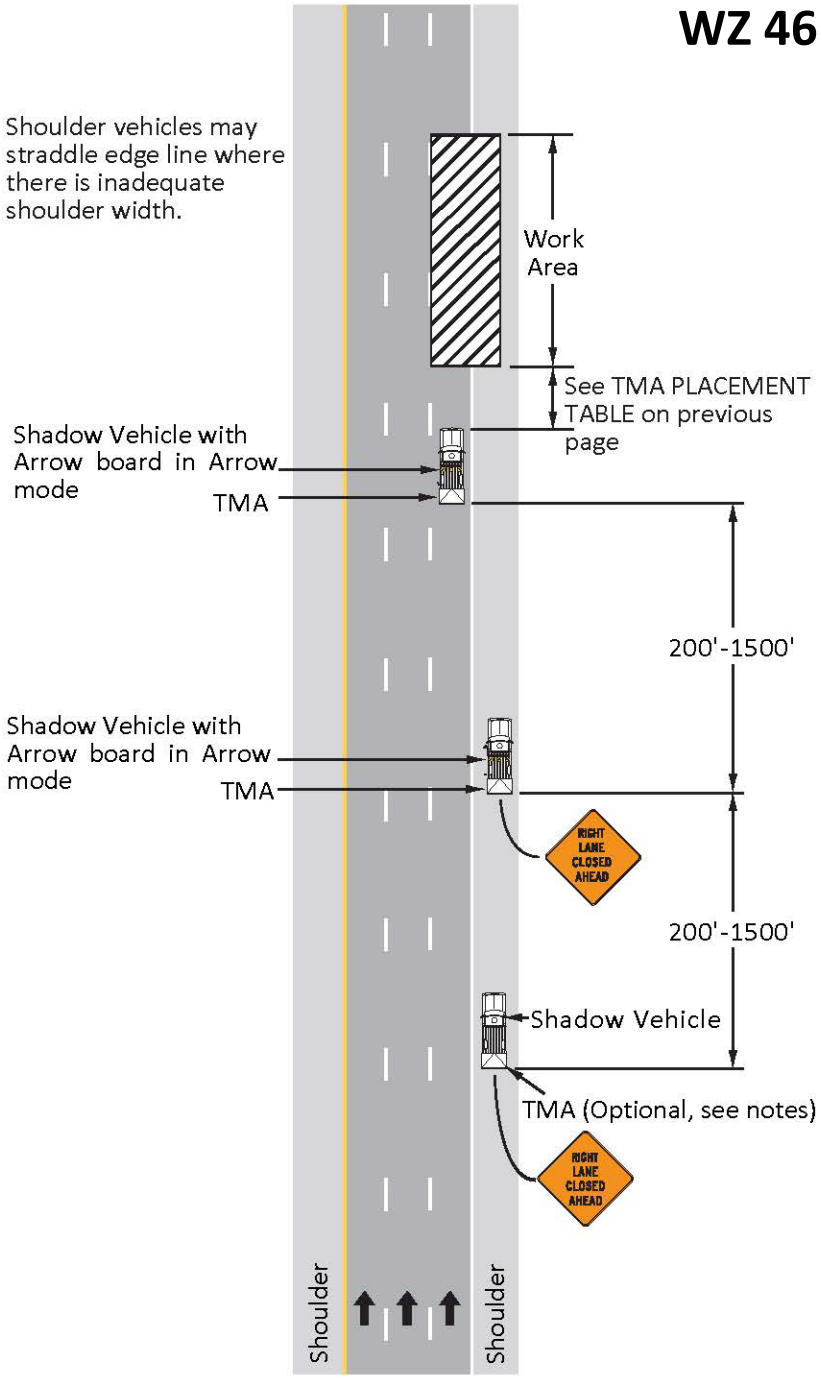
# WZ 46: MULTILANE FAST-MOVING OPERATIONS (MORE THAN 4 MILES PER DAY)

Notes:

1. If work production is < 4 miles/day, Work Zone Case 48 (WZ 48) must be utilized.
2. All vehicles operating strobe/warning lights.
3. On roadways with ADT > 25,000, all vehicles can travel on shoulder, then move into the traffic lane for intermittent operations such as pothole patching.
4. TMA is required when truck encroaches onto roadway.

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Moving Operations |
| 60 - 70 | 180 |
| 50 - 55 | 180 |
| ≤ 45 | 120 |

# WZ 46

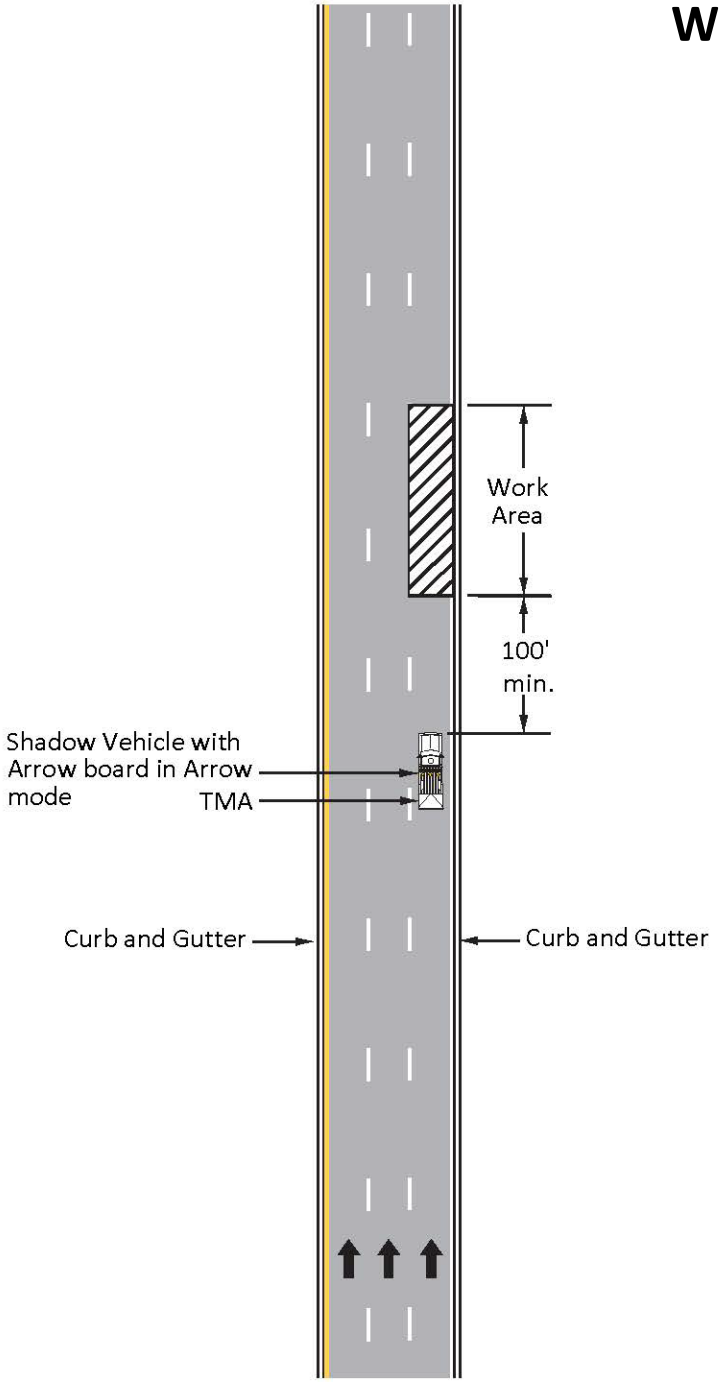

Shoulder vehicles may straddle edge line where there is inadequate shoulder width.
Work Area
See TMA PLACEMENT TABLE on previous page
Shadow Vehicle with Arrow board in Arrow mode
TMA
200'-1500'
Shadow Vehicle with Arrow board in Arrow mode
TMA
RIGHT LANE CLOSED AHEAD
200'-1500'
Shadow Vehicle
TMA (Optional, see notes)
RIGHT LANE CLOSED AHEAD
Shoulder
Shoulder

# WZ 47: MULTILANE MOVING OPERATIONS WITH CURB AND GUTTER FOR 45 MPH OR LESS

Notes:

1. All vehicles operating strobe/warning lights.

# WZ 47






Drawing Not to Scale

# WZ 48: MULTILANE MOVING OPERATIONS TWO LANE CLOSURE

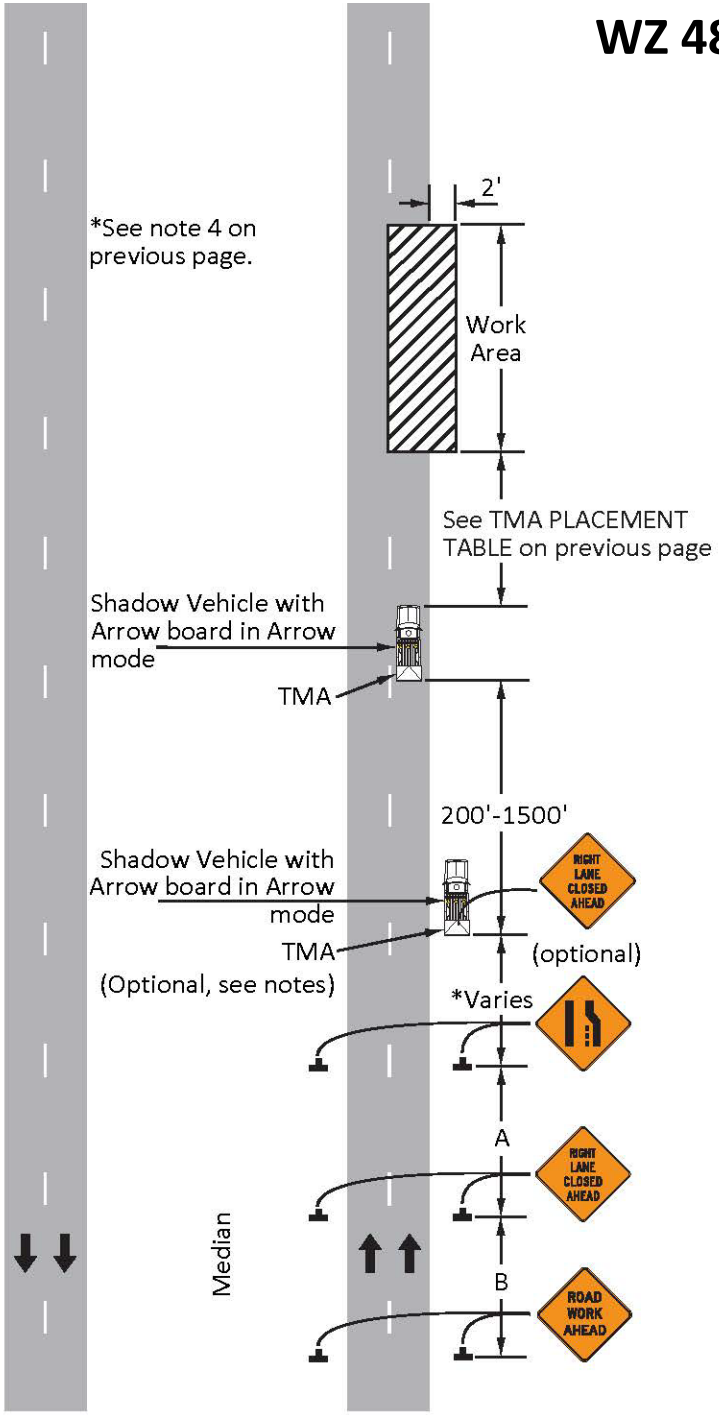
Notes:

1. Signs not required in median when median is less than 10 ft wide.
2. For left lane closure use corresponding left lane signage.
3. All vehicles operating strobe/warning lights.
4. Minimum distance is 200 ft at start of operation. Maximum distance is 2 miles, but in no case to exceed one half the distance required for one day's operations whichever is less.
5. TMA is required when truck encroaches onto roadway.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Moving Operations |
| 60 - 70 | 180 |
| 50 - 55 | 180 |
| ≤ 45 | 120 |

# WZ 48


*See note 4 on previous page.
2'
Work Area
See TMA PLACEMENT TABLE on previous page
Shadow Vehicle with Arrow board in Arrow mode
TMA
200'-1500'
Shadow Vehicle with Arrow board in Arrow mode
TMA
(Optional, see notes)
RIGHT LANE CLOSED AHEAD
(optional)
*Varies
A
RIGHT LANE CLOSED AHEAD
Median
B
ROAD WORK AHEAD

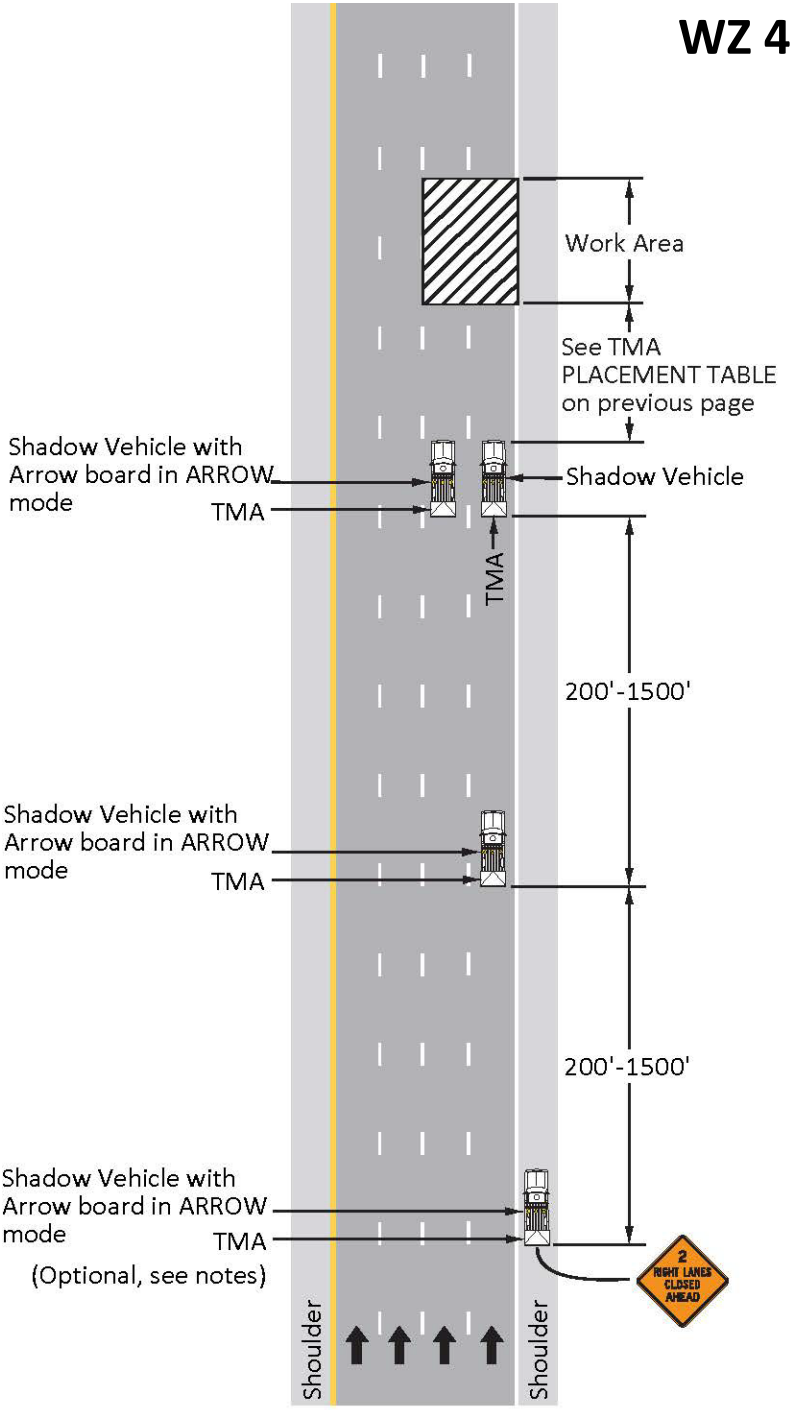
# WZ 49: MULTILANE MOVING OPERATIONS TWO LANE CLOSURE

Notes:

1. TMA is required when truck encroaches onto roadway.
2. All vehicles operating strobe/warning lights.

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Moving Operations |
| 60 - 70 | 180 |
| 50 - 55 | 180 |
| ≤ 45 | 120 |

# WZ 49

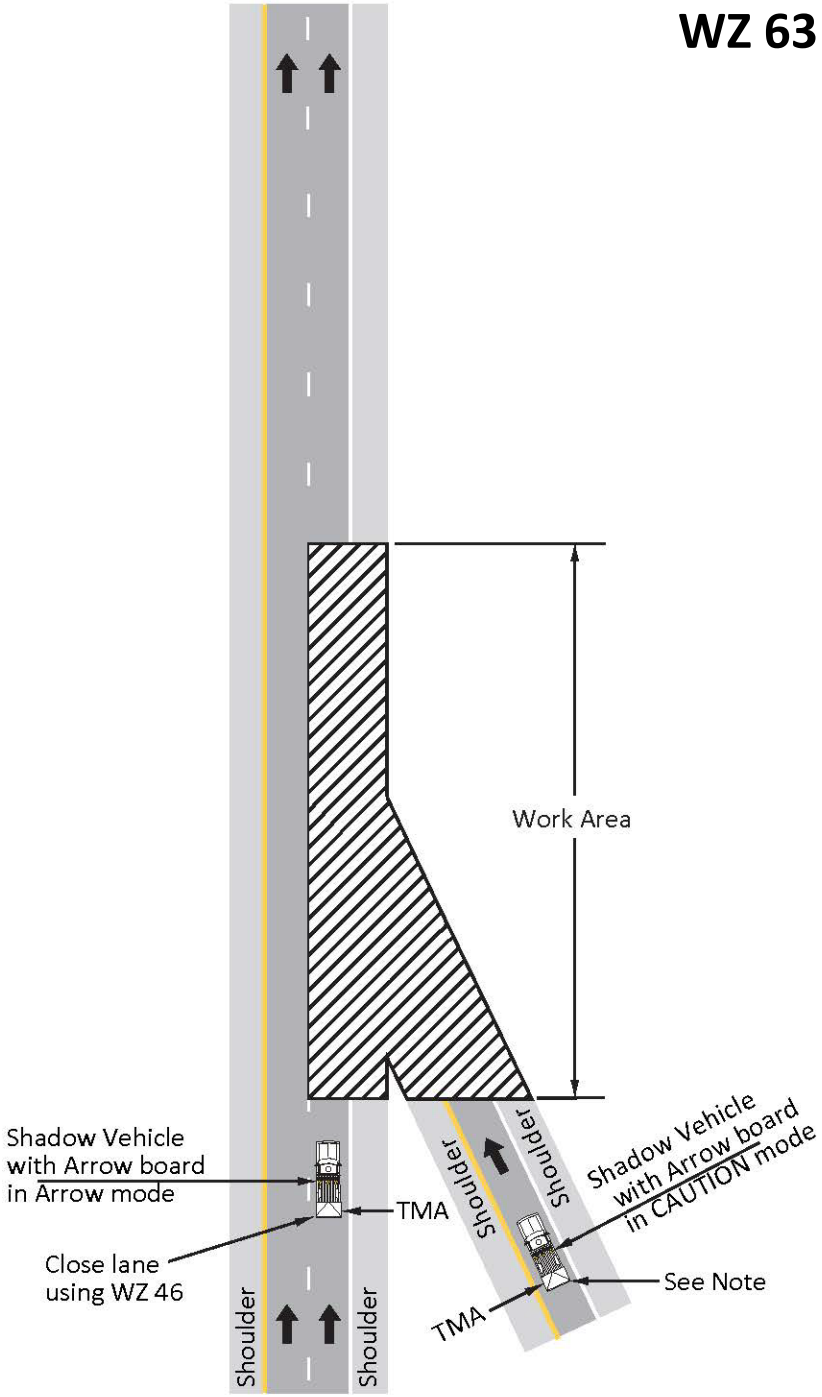

Work Area
See TMA PLACEMENT TABLE on previous page
Shadow Vehicle with Arrow board in ARROW mode
TMA
Shadow Vehicle
TMA
200'-1500'
Shadow Vehicle with Arrow board in ARROW mode
TMA
200'-1500'
Shadow Vehicle with Arrow board in ARROW mode
TMA
(Optional, see notes)
2 RIGHT LANES CLOSED AHEAD
Shoulder
Shoulder

# WZ 63: ON-RAMP MOVING OPERATIONS FOR 15 MINUTES OR LESS

Notes:

1. Close ramp using truck, TMA and Arrow Board in CAUTION mode. This vehicle should be on crossroad or ramp shoulder and move on to ramp, slowing and stopping traffic, when crew on mainline is ready to move into work area (radio communications required).

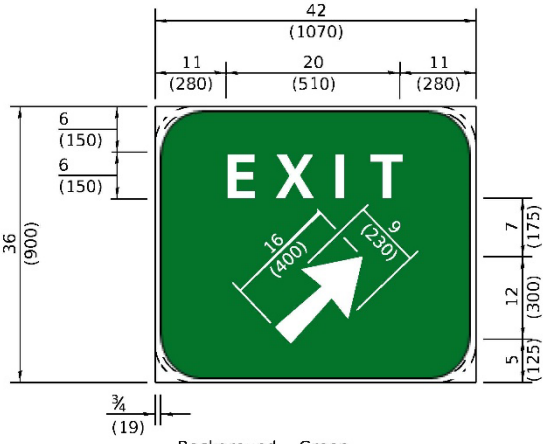
# WZ 63


Work Area
Shadow Vehicle
with Arrow board
in Arrow mode
TMA
Close lane
using WZ 46
Shoulder
Shoulder
Shoulder
Shadow Vehicle
with Arrow board
in CAUTION mode
See Note
TMA

## WZ 64: OFF-RAMP STATIONARY OPERATIONS

Notes:

1. Cones at 40 ft centers on mainline
2. Cones at 20 ft centers on ramp




Background - Green
Border and legend - White
"D" size letters

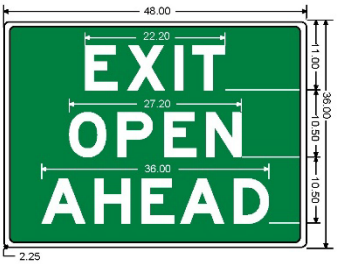
EXIT SIGN - SPECIAL

**DETAIL A**

(To be utilized where distance between the two rows of channelizing devices is 6' (1.8 m) in width.)

Detail A

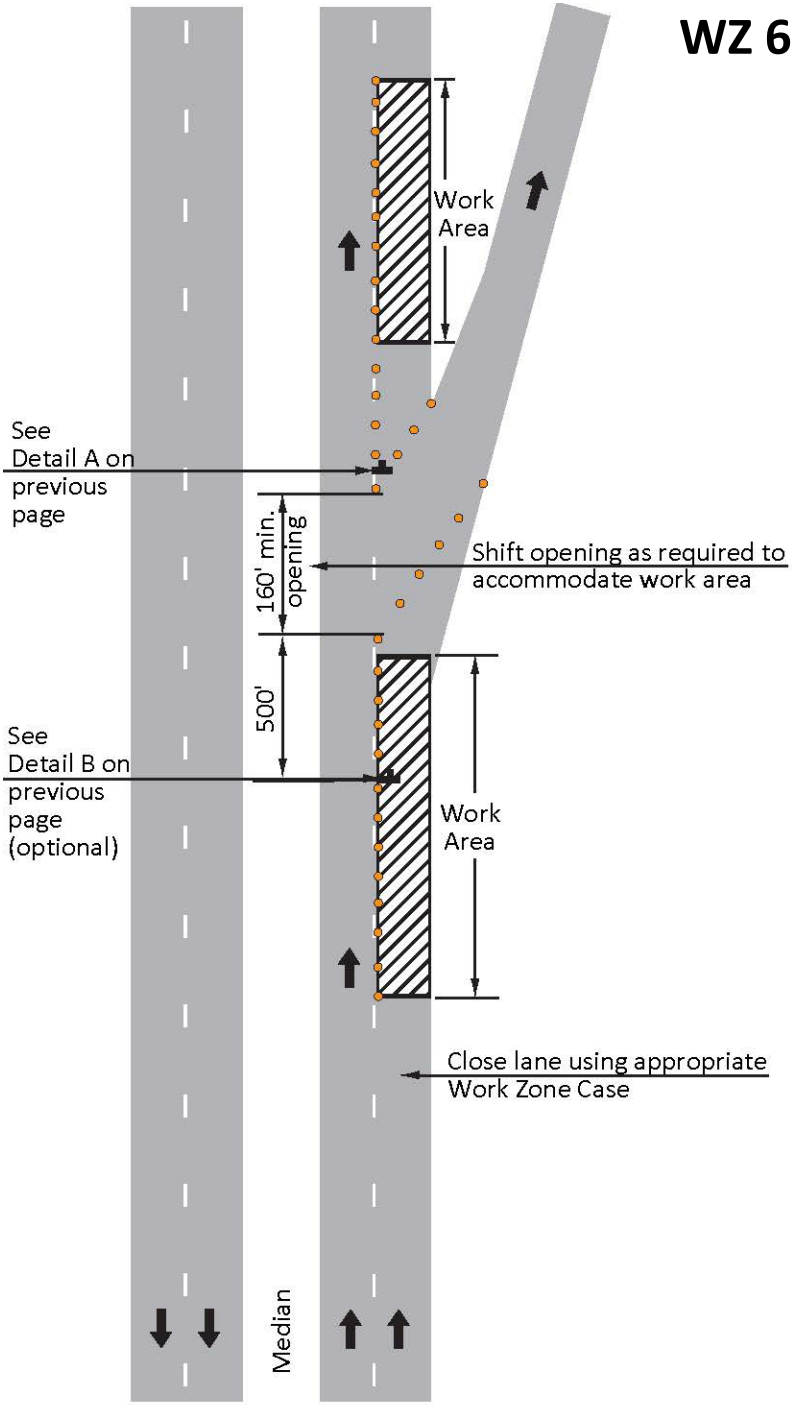
(Exit sign may be omitted for operations of 15 minutes or less)




Detail B

(Optional)

# WZ 64

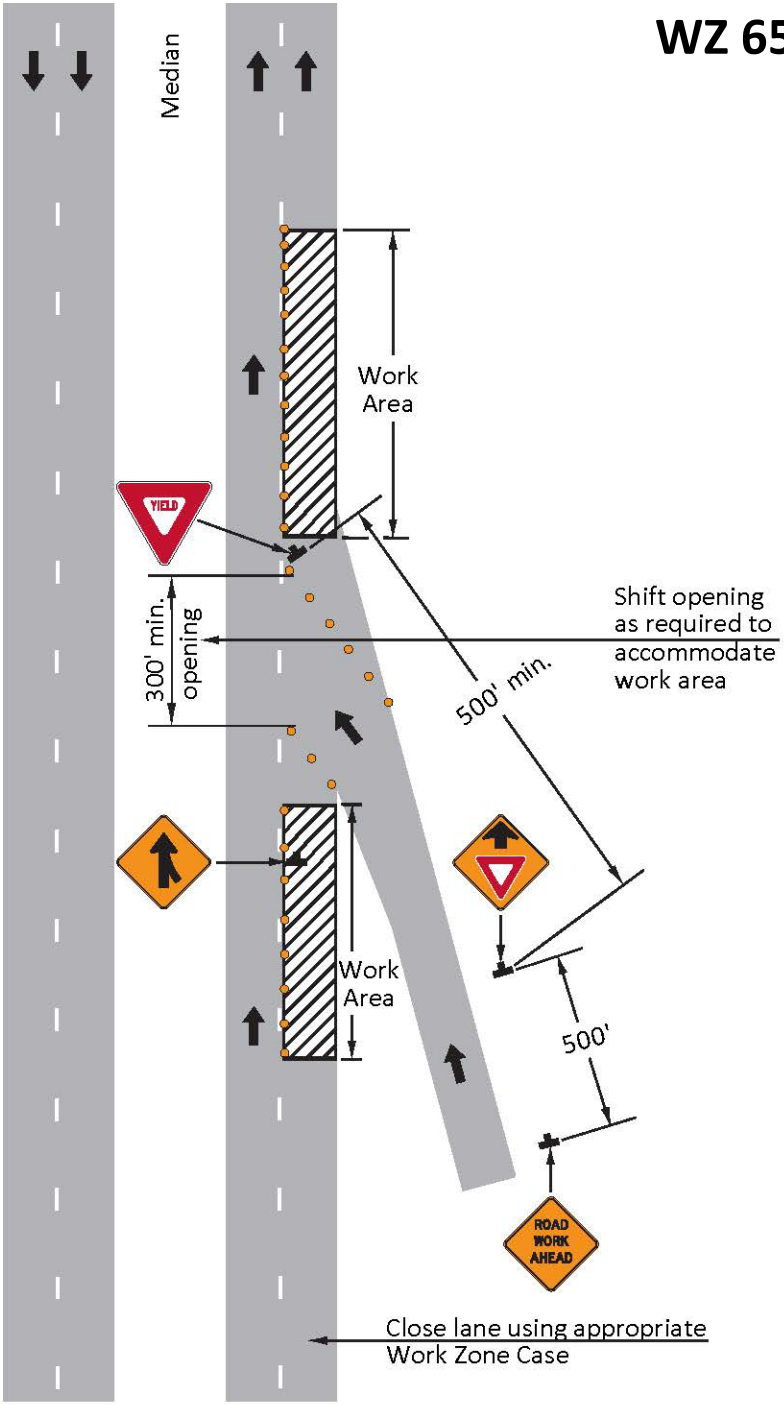

Work Area
See Detail A on previous page
160' min. opening
Shift opening as required to accommodate work area
500'
See Detail B on previous page (optional)
Work Area
Close lane using appropriate Work Zone Case
Median

## WZ 65: ON-RAMP STATIONARY OPERATIONS

Notes:

1. Cones at 40 ft centers on mainline
2. Cones at 20 ft centers on ramp.

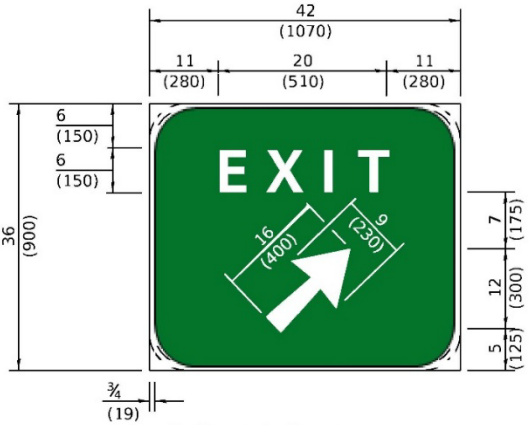
# WZ 65


Median
Work Area
YIELD
300' min. opening
Shift opening as required to accommodate work area
500' min.
Work Area
500'
ROAD WORK AHEAD
Close lane using appropriate Work Zone Case

# WZ 66: INTERCHANGE WEAVING AREA STATIONARY OPERATIONS

Notes:

1. Cones at 40 ft centers on mainline
2. Cones at 20 ft centers on ramp.
3. When auxiliary lane is present, work area shall include both auxiliary lane and through lane.




Background - Green
Border and legend - White
"D" size letters

EXIT SIGN - SPECIAL

**DETAIL A**

(To be utilized where distance between the two rows of channelizing devices is 6' (1.8 m) in width.)

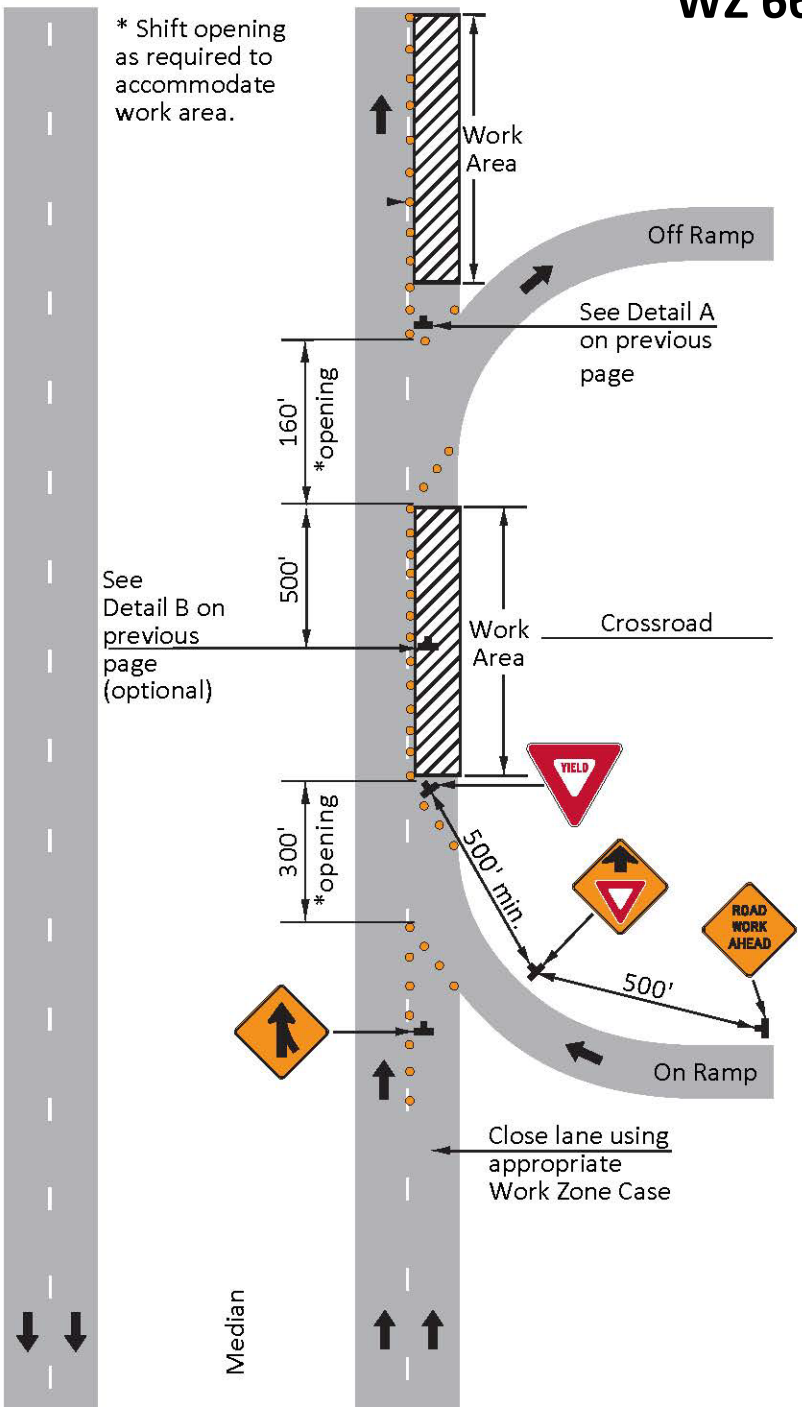
Detail A

(Exit sign may be omitted for operations of 15 minutes or less)


Detail B

(Optional)

# WZ 66

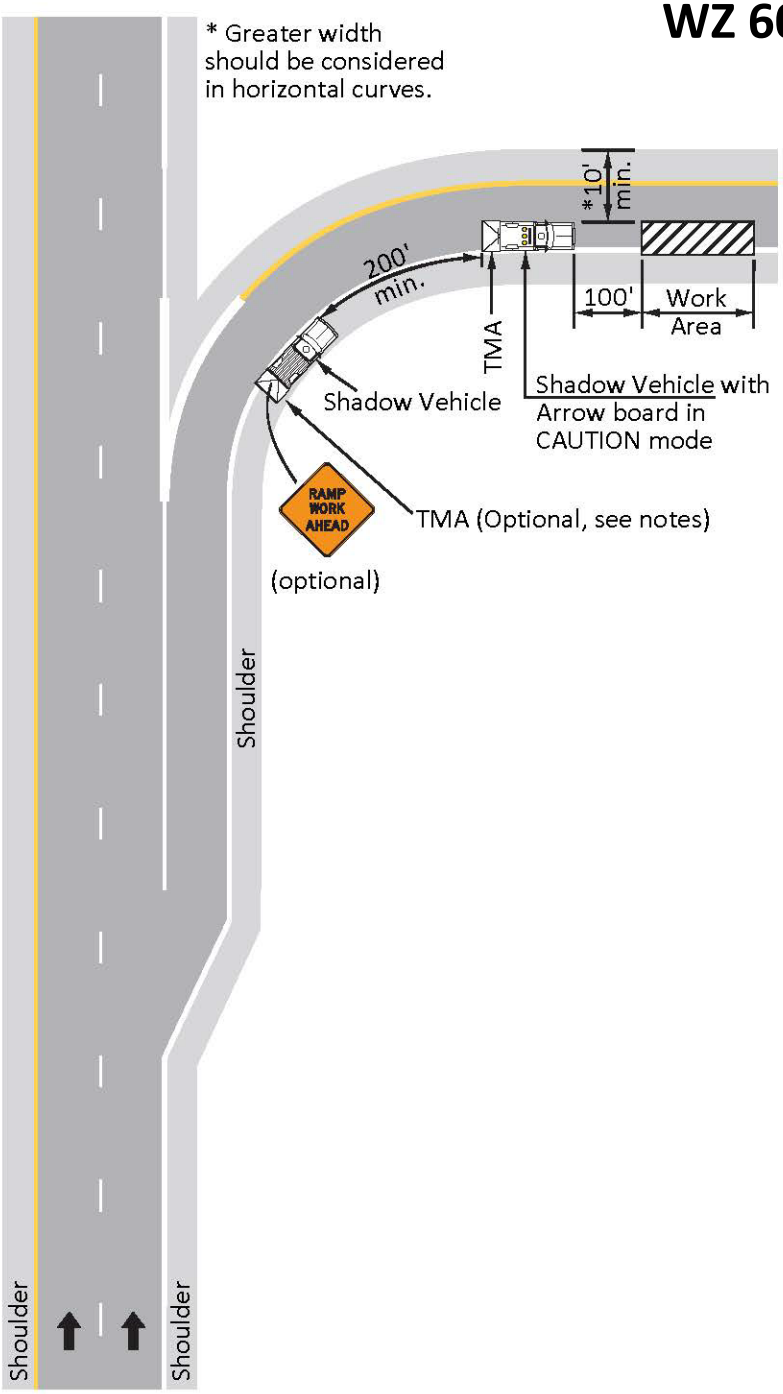

* Shift opening as required to accommodate work area.
Work Area
Off Ramp
See Detail A on previous page
160'
*opening
500'
See Detail B on previous page (optional)
Work Area
Crossroad
YIELD
300'
*opening
500' min.
ROAD WORK AHEAD
500'
On Ramp
Close lane using appropriate Work Zone Case
Median

## WZ 60: RAMP OPERATIONS 60 MINUTES OR LESS

Notes:

1. This case can be utilized for either side of ramp.
2. All vehicles operating strobe/warning lights.
3. TMA is required when truck encroaches onto roadway.

# WZ 60


* Greater width
should be considered
in horizontal curves.
* 10'
min.
200'
min.
100'
Work
Area
TMA
Shadow Vehicle
Shadow Vehicle with
Arrow board in
CAUTION mode
RAMP
WORK
AHEAD
TMA (Optional, see notes)
(optional)
Shoulder
Shoulder
Shoulder

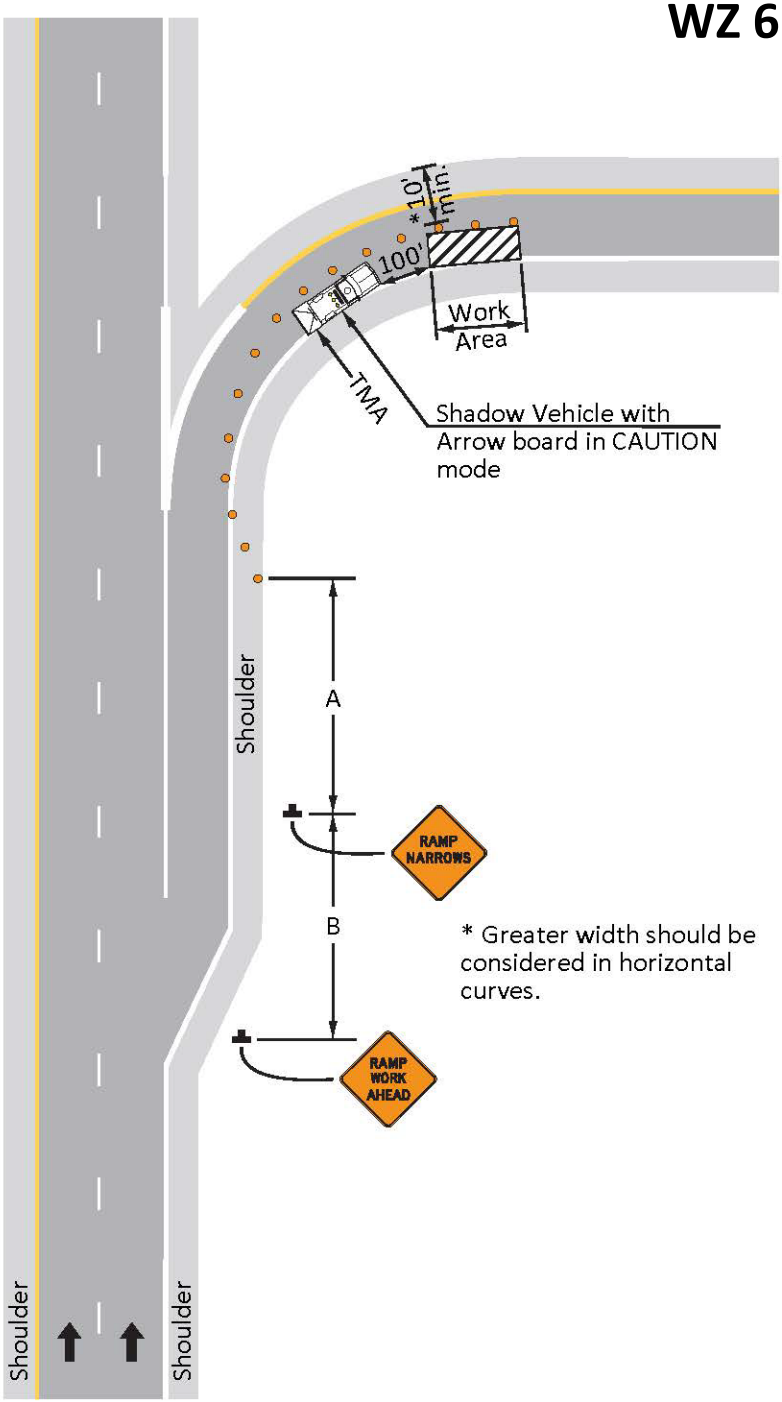
## WZ 61: OFF-ROAD PARTIAL LANE CLOSURE

Notes:

1. This case can be utilized for either side of ramp.
2. All vehicles operating strobe/warning lights.
3. Cones at 20 ft centers.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ 61


* 10' min.
100'
Work Area
TMA
Shadow Vehicle with Arrow board in CAUTION mode
Shoulder
A
RAMP NARROWS
B
RAMP WORK AHEAD
* Greater width should be considered in horizontal curves.
Shoulder
Shoulder

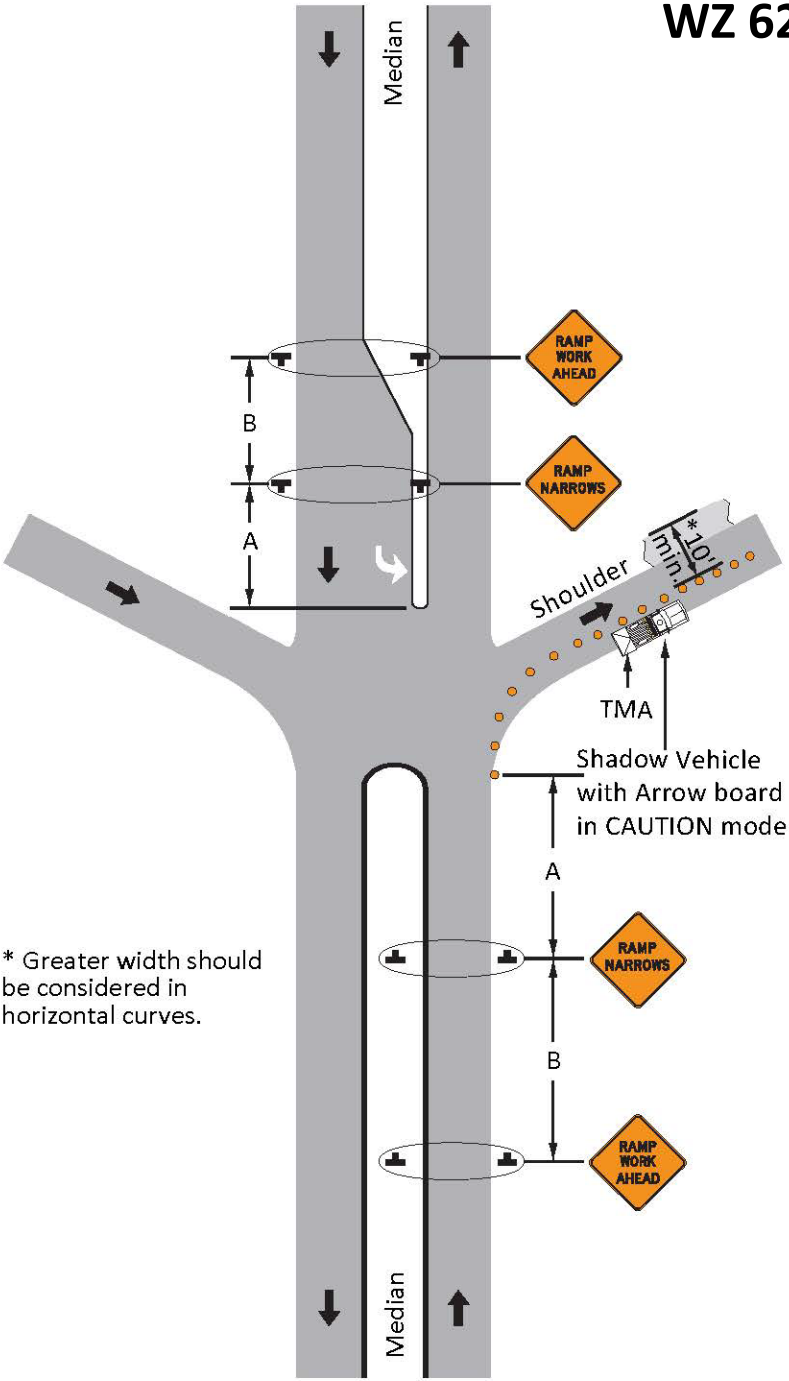
## WZ 62: ON-RAMP PARTIAL LANE CLOSURE

Notes:

1. Cones at 20 ft centers.
2. If there is sufficient room on ramp, space signs on ramp.
3. Signs not required in median when median is less than 10 ft wide.

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ 62




* Greater width should be considered in horizontal curves.

# WZ 93: MULTILANE DIVIDED LEFT TURN LANE CLOSURE

Notes:

1. If work encroaches into side road, flagger and flagger signs are required.
2. Signs not required in median when median is less than 10 ft wide.
3. A work zone speed limit assembly may be installed. The work zone speed limit must equal the existing regulatory speed limit. If used, additional work zone speed limit assemblies and End Work Zone Speed Limit signs will be required in the median of divided highways if median width is 10 ft or greater.
4. Cone spacing on lane line:
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers

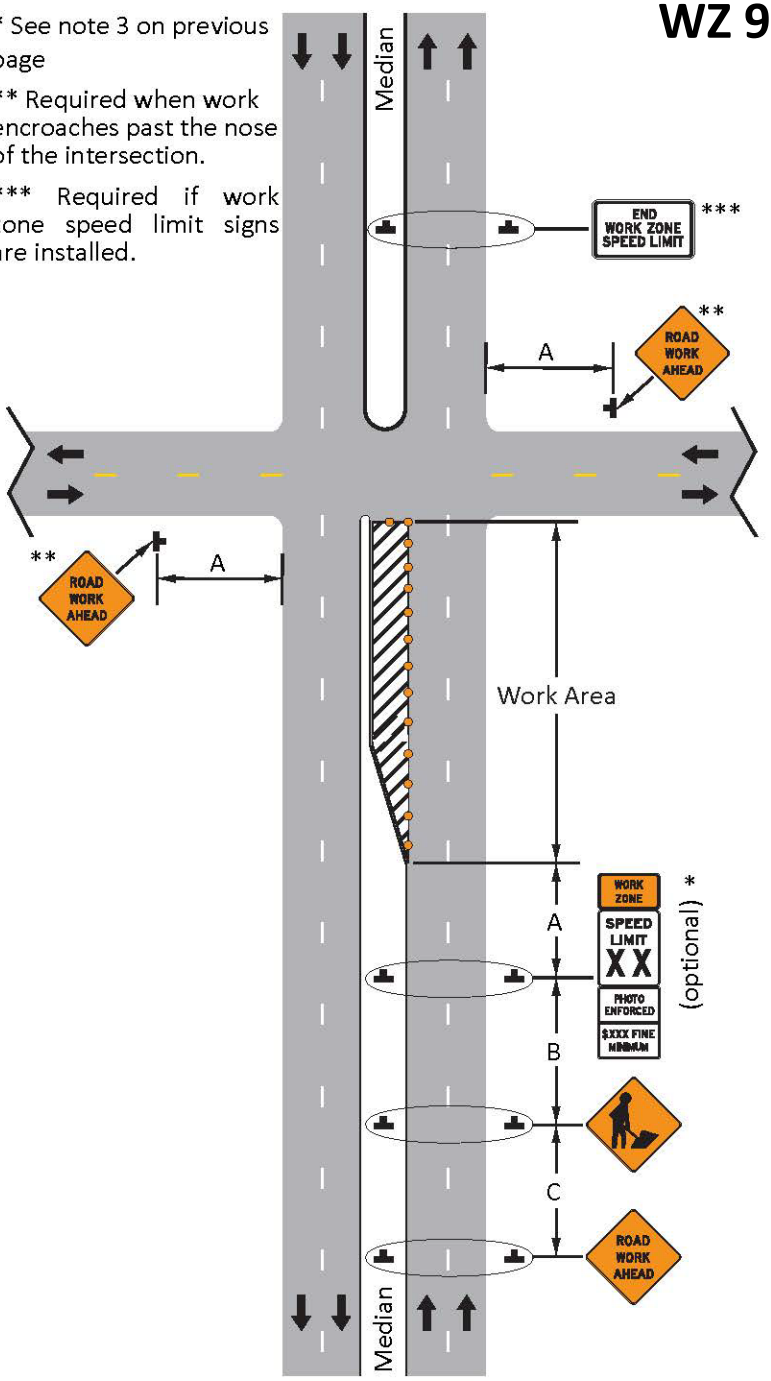
| **Speed (mph)** | **Advance Sign Spacing** | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ 93

* See note 3 on previous page

** Required when work encroaches past the nose of the intersection.

*** Required if work zone speed limit signs are installed.



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# Special Cases

Work Zone (WZ) Case No.: 03, 04, 05, 06, 07a, and 07b

Bridge Inspection WZ Case NB1, B2, and B3

Survey WZ Case No.: S2, S4, S5, 07a, and 07b

Weigh Scales WZ Case No.: W1, W2, W3, W4, W5, and W6

## WZ 03: SHOULDER OPERATIONS WITH MINOR LANE ENCROACHMENT FOR 60 MINUTES OR LESS

Notes:

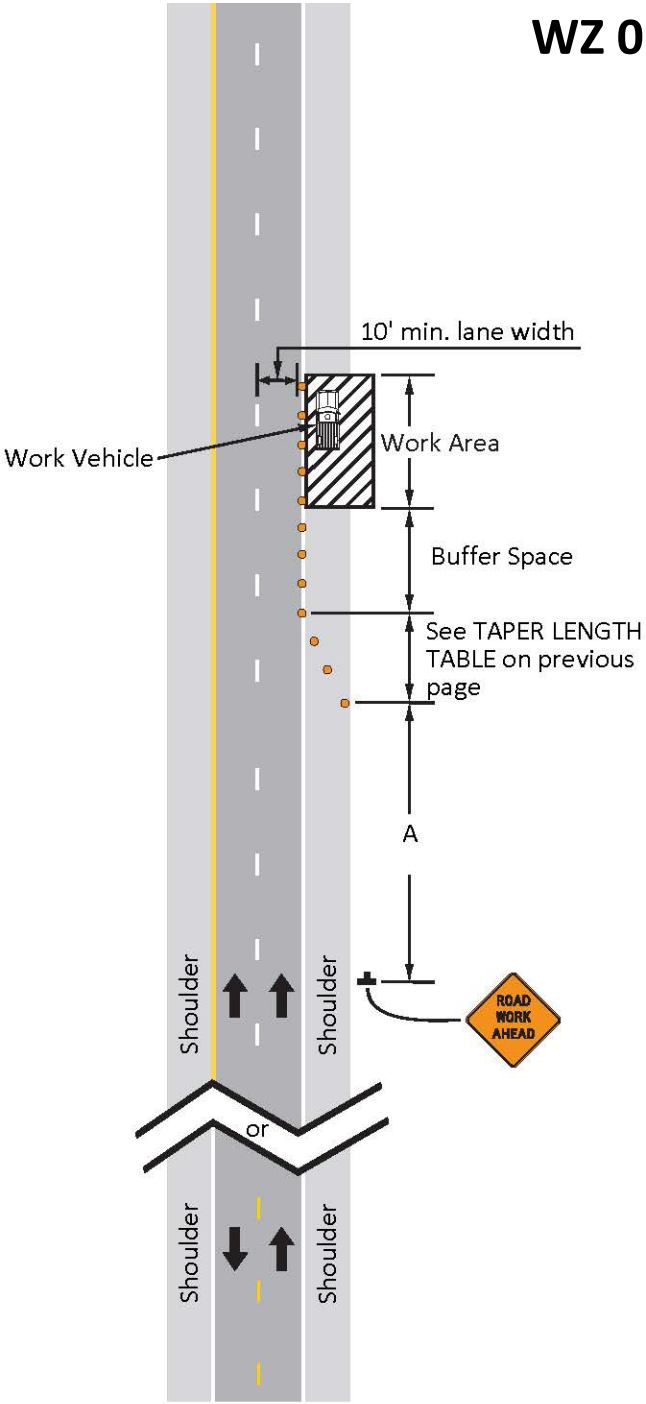
1. THIS CASE IS ONLY ALLOWED DURING NON-PEAK TRAFFIC.
2. Sight distance of 1000' to approaching traffic is required.
3. When workers encroach onto roadway, a shadow vehicle with TMA is required (see pg. 23).
4. All vehicles operating strobe/ warning lights.
5. Cone spacing on pavement edge:
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers
6. Cones at 20 ft centers on taper

| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| Speed (mph) | Shoulder Taper Lengths (ft) | | | | | | | Buffer Space ** |
|---|---|---|---|---|---|---|---|---|
| | Shoulder Width (ft) | | | | | | | |
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | |
| 30 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 200 |
| 35 | 15 | 30 | 40 | 55 | 70 | 85 | 95 | 250 |
| 40 | 20 | 35 | 55 | 70 | 90 | 110 | 125 | 305 |
| 45 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 360 |
| 50 | 35 | 70 | 100 | 135 | 170 | 200 | 235 | 425 |
| 55 | 40 | 75 | 110 | 150 | 185 | 220 | 260 | 495 |
| 60 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 570 |
| 65 | 45 | 90 | 130 | 175 | 220 | 260 | 305 | 645 |
| 70 | 50 | 95 | 140 | 190 | 235 | 280 | 330 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 03


10' min. lane width
Work Vehicle
Work Area
Buffer Space
See TAPER LENGTH TABLE on previous page
A
Shoulder
Shoulder
ROAD WORK AHEAD
or
Shoulder
Shoulder

## WZ 04: SHOULDER OPERATIONS FOR 60 MINUTES OR LESS

Notes:

1. All vehicles operating strobe/warning lights.
2. Cones required when work is withing 2 ft of pavement.
3. Cones on pavement edge (minimum of 3 cones):
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers
4. Cones at 20 ft centers on taper
5. TMA is required when truck encroaches onto roadway.

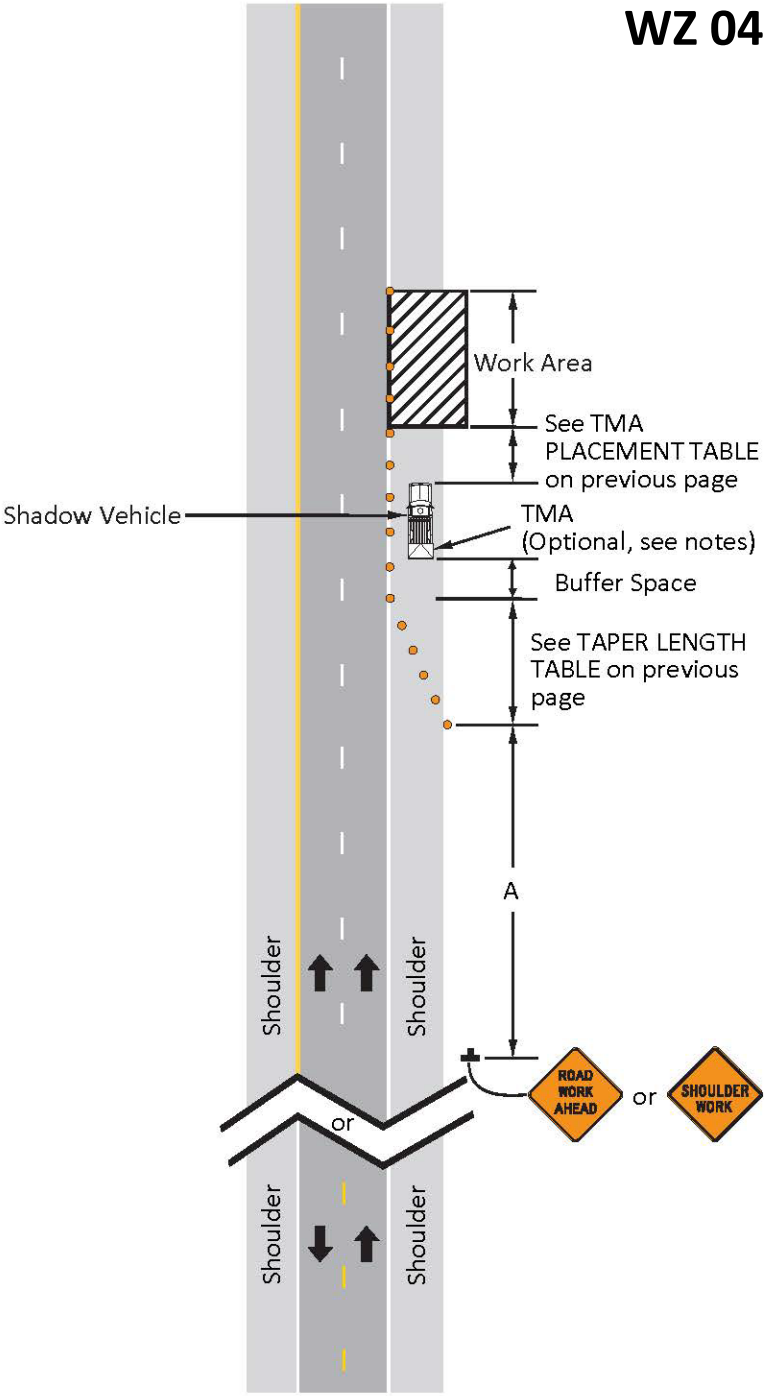
| Speed (mph) | Advance Sign Spacing | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| Speed (mph) | Shoulder Taper Lengths (ft) Shoulder Width (ft) | | | | | | | Buffer Space ** |
|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | |
| 30 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 200 |
| 35 | 15 | 30 | 40 | 55 | 70 | 85 | 95 | 250 |
| 40 | 20 | 35 | 55 | 70 | 90 | 110 | 125 | 305 |
| 45 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 360 |
| 50 | 35 | 70 | 100 | 135 | 170 | 200 | 235 | 425 |
| 55 | 40 | 75 | 110 | 150 | 185 | 220 | 260 | 495 |
| 60 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 570 |
| 65 | 45 | 90 | 130 | 175 | 220 | 260 | 305 | 645 |
| 70 | 50 | 95 | 140 | 190 | 235 | 280 | 330 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) |
| | Stationary Operations |
| 60 - 70 | 120 |
| 50 - 55 | 100 |
| ≤ 45 | 80 |

# WZ 04

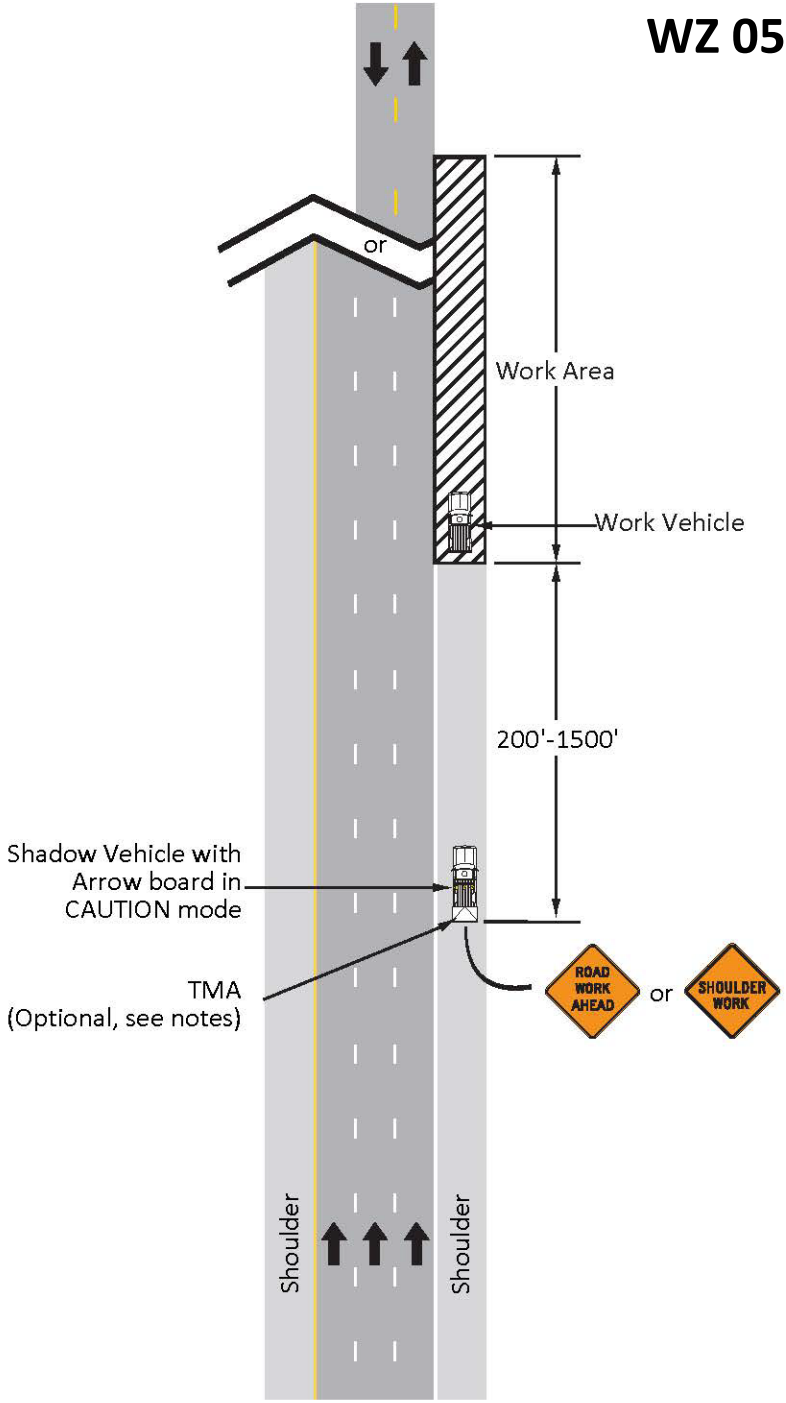

Work Area
See TMA PLACEMENT TABLE on previous page
Shadow Vehicle
TMA (Optional, see notes)
Buffer Space
See TAPER LENGTH TABLE on previous page
A
Shoulder
Shoulder
or
ROAD WORK AHEAD
or
SHOULDER WORK
Shoulder
Shoulder

## WZ 05: SHOULDER MOVING OPERATIONS

Notes:

1. TMA is required when truck encroaches onto roadway.
2. All vehicles operating strobe/warning lights.

# WZ 05


or
Work Area
Work Vehicle
200'-1500'
Shadow Vehicle with
Arrow board in
CAUTION mode
TMA
(Optional, see notes)
ROAD WORK AHEAD
or
SHOULDER WORK
Shoulder
Shoulder

# WZ 06: SHOULDER OPERATIONS GREATER THAN 60 MINUTES

Notes:

1. Signs required on both sides of multilane divided highway if median width is 10 ft or greater.
2. If work area is > 15 ft from pavement edge, no signs are required.
3. All vehicles operating strobe/warning lights.
4. Cones required when work is within 2 ft of pavement.
5. A work zone speed limit assembly may be installed. The work zone speed limit must equal the existing regulatory speed limit. If used, additional work zone speed limit assemblies and End Work Zone Speed Limit signs will be required in the median of divided highways if median width is 10 ft or greater.
6. Arrow board required for work of more than 2 hours or when sight distance is not available
7. Cones on pavement edge (minimum of 3 cones):
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers
8. Cones at 20 ft centers on taper

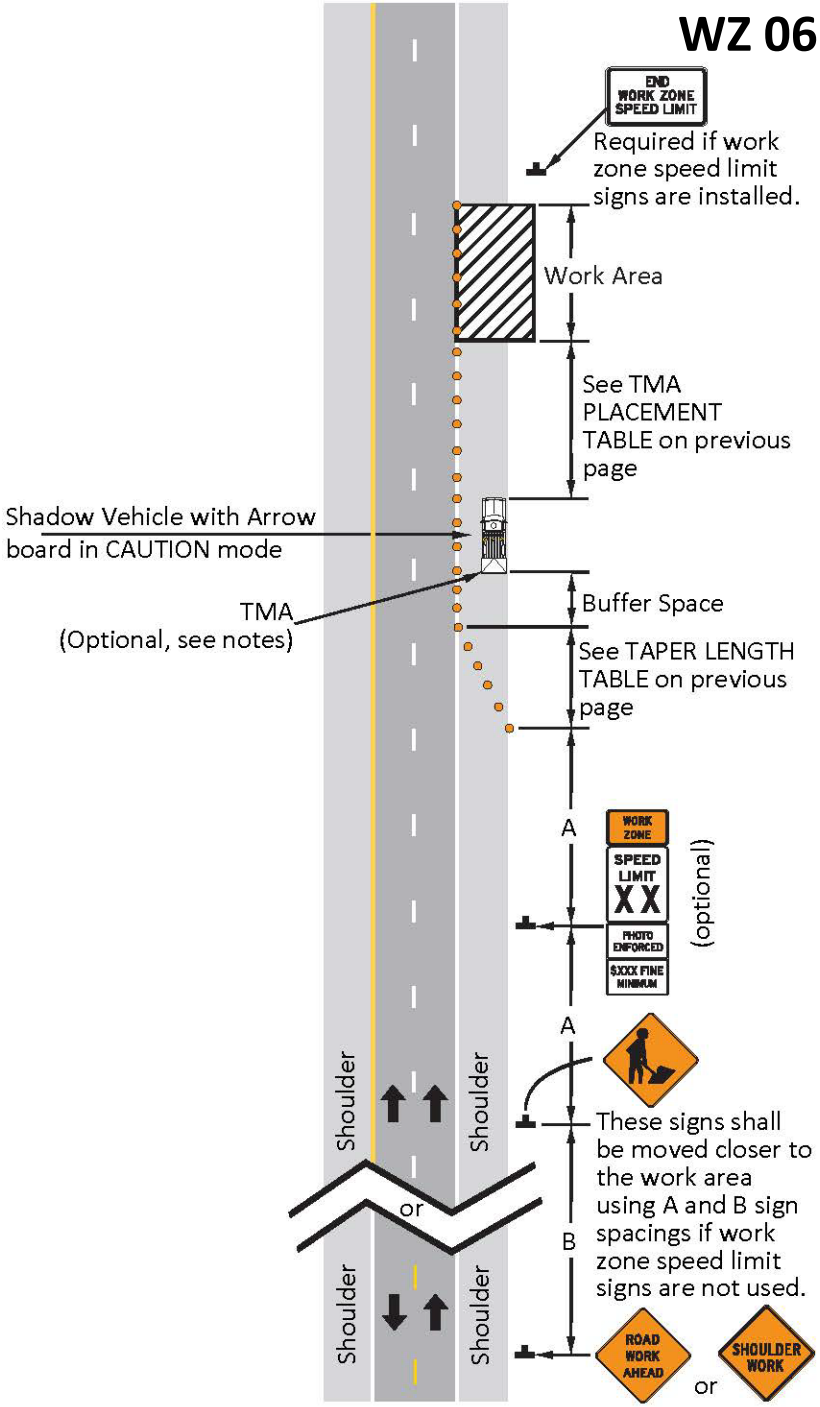
| Speed (mph) | Advance Sign | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| TMA PLACEMENT TABLE | |
|---|---|
| Speed (mph) | Distance (ft) Stationary |
| 60 - 70 | 120 |
| 50 - 55 | 100 |
| ≤ 45 | 80 |

| Speed (mph) | Shoulder Taper Lengths (ft) Shoulder Width (ft) | | | | | | | Buffer Space ** |
|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | |
| 30 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 200 |
| 35 | 15 | 30 | 40 | 55 | 70 | 85 | 95 | 250 |
| 40 | 20 | 35 | 55 | 70 | 90 | 110 | 125 | 305 |
| 45 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 360 |
| 50 | 35 | 70 | 100 | 135 | 170 | 200 | 235 | 425 |
| 55 | 40 | 75 | 110 | 150 | 185 | 220 | 260 | 495 |
| 60 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 570 |
| 65 | 45 | 90 | 130 | 175 | 220 | 260 | 305 | 645 |
| 70 | 50 | 95 | 140 | 190 | 235 | 280 | 330 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ 06


END WORK ZONE SPEED LIMIT
Required if work zone speed limit signs are installed.
Work Area
See TMA PLACEMENT TABLE on previous page
Shadow Vehicle with Arrow board in CAUTION mode
TMA (Optional, see notes)
Buffer Space
See TAPER LENGTH TABLE on previous page
A
WORK ZONE
SPEED LIMIT XX
PHOTO ENFORCED
$XXX FINE MINIMUM
(optional)
A
Shoulder
Shoulder
or
Shoulder
Shoulder
These signs shall be moved closer to the work area using A and B sign spacings if work zone speed limit signs are not used.
B
ROAD WORK AHEAD
or
SHOULDER WORK

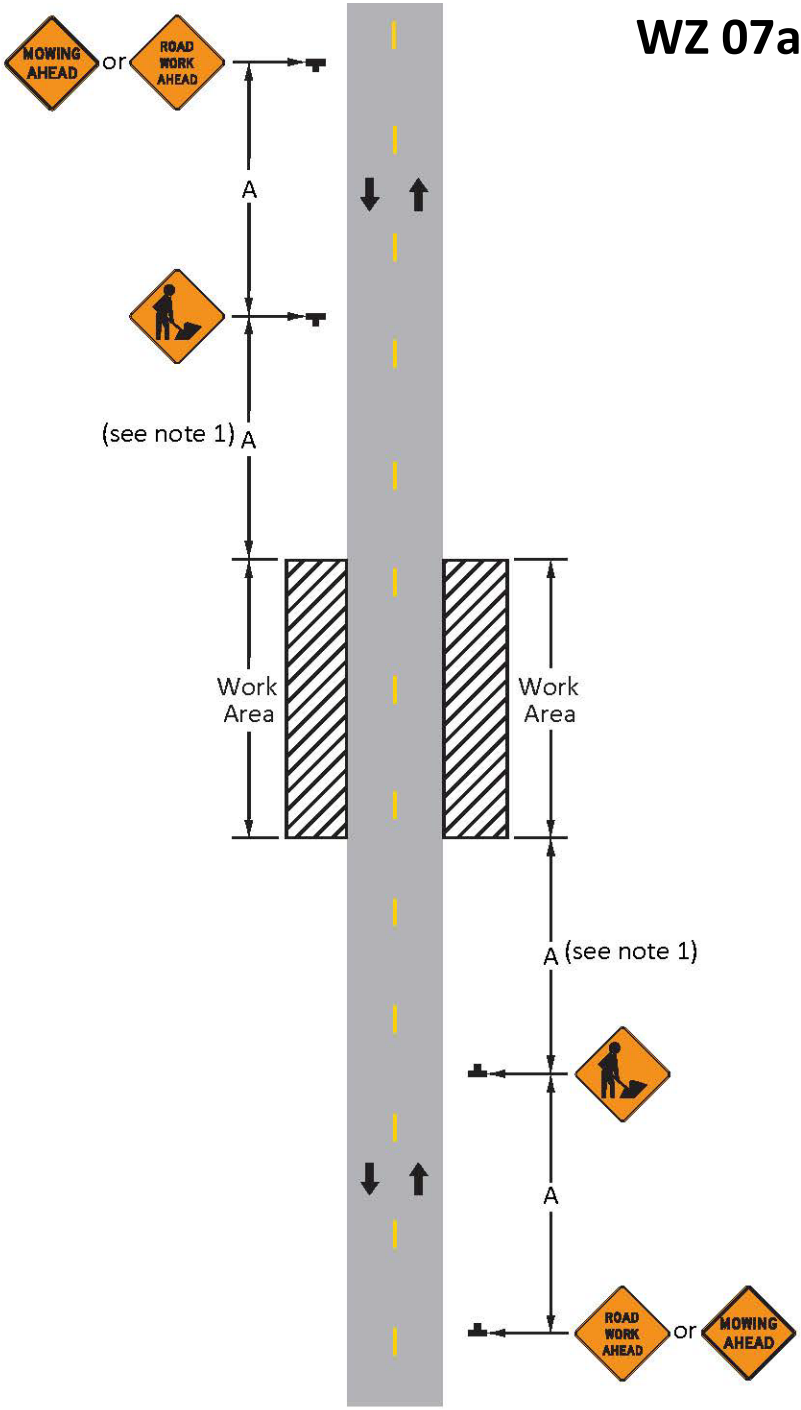
# WZ 07a: 2L2W OFF-ROAD MOVING OPERATIONS

Notes:

1. Minimum distance is from SIGN SPACING TABLE at the start of the operation. Maximum distance is not to exceed one half the length required for one normal day's operation (4 miles maximum).
2. If work area is more than 15 ft from pavement edge, no signs are required.
3. May be used for maintenance mowing operations.

| **Speed (mph)** | **Advance Sign** | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ 07a


MOWING AHEAD
or
ROAD WORK AHEAD
A
(see note 1) A
Work Area
Work Area
A (see note 1)
A
ROAD WORK AHEAD
or
MOWING AHEAD

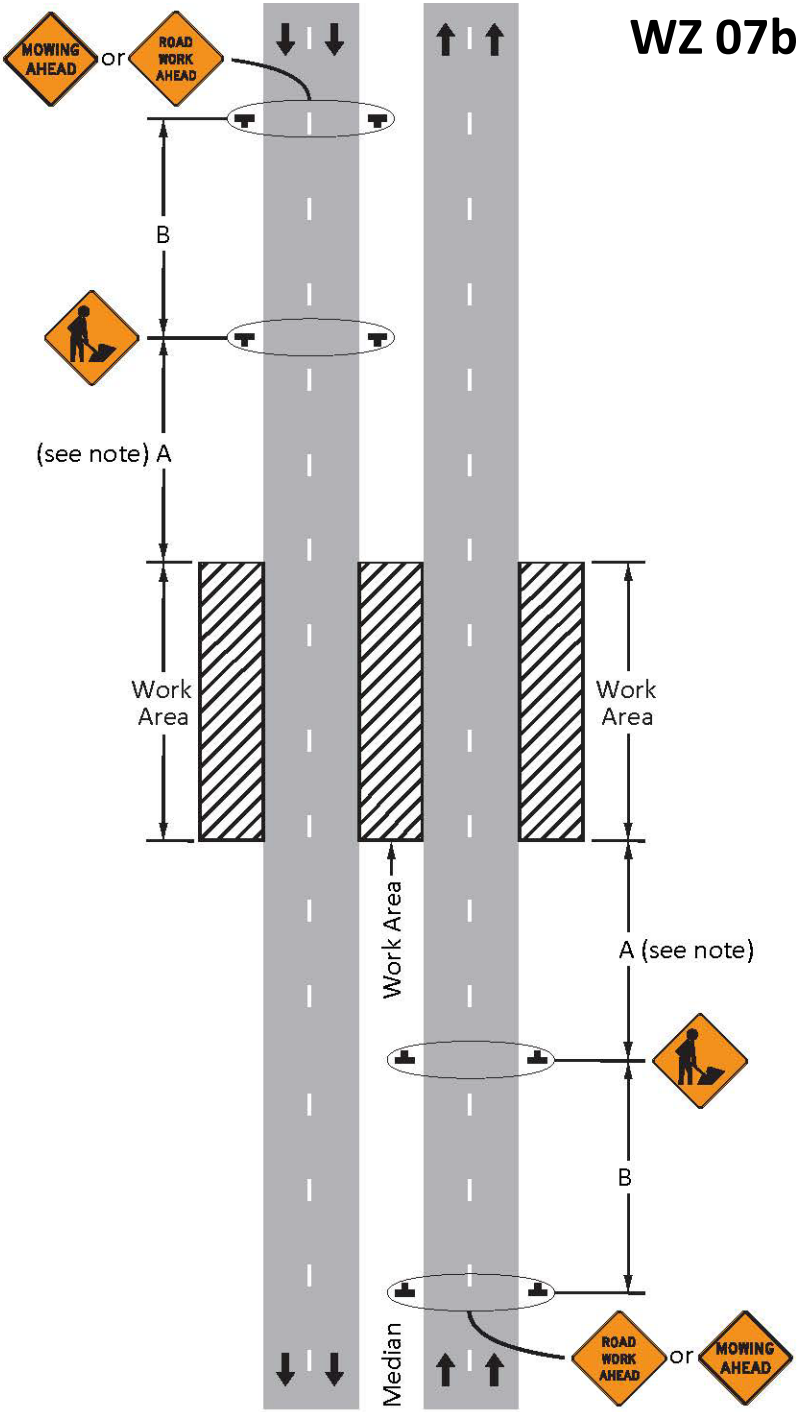
## WZ 07b: MULTILANE OFF-ROAD MOVING OPERATIONS

Notes:

1. If work area is more than 15 ft from pavement edge, no signs are required.
2. Signs not required in median when median is less than 10 ft wide.
3. Minimum distance is A from SIGN SPACING TABLE at the start of the operation. Maximum distance is not to exceed one half the length required for one normal day's operation (4 miles maximum).
4. No Advance Warning Signs are required in opposite direction if work is on outside shoulder only.
5. May be used for maintenance mowing operations.
6. DO NOT work on both sides of the road simultaneously.

| **Speed (mph)** | **Advance Sign** | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ 07b

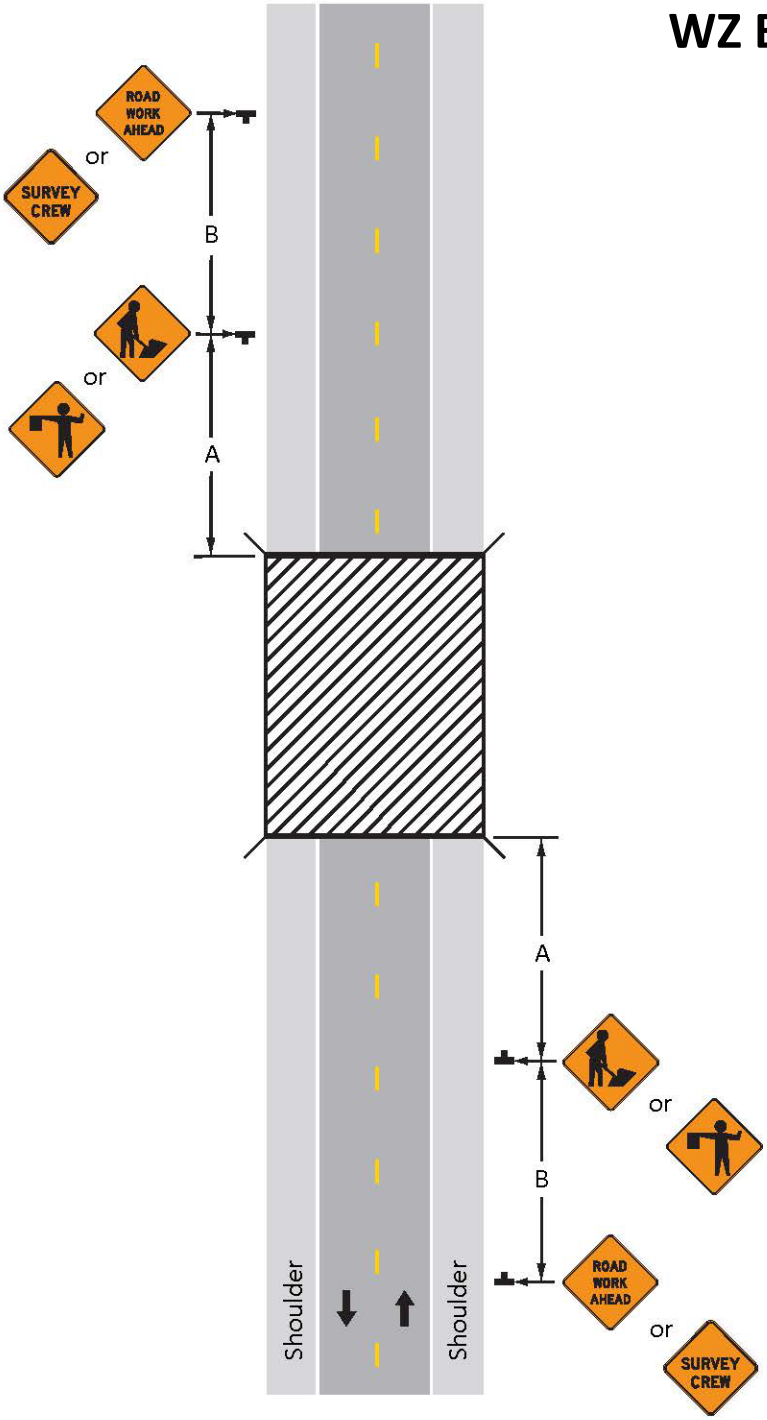

MOWING AHEAD
or
ROAD WORK AHEAD
B
(see note) A
Work Area
Work Area
Work Area
A (see note)
B
Median
ROAD WORK AHEAD
or
MOWING AHEAD

# WZ B1: BRIDGE INSPECTION TWO-LANE, TWO-WAY ROADWAY

Notes:

1. May be performed without a flagger, provided:
   a. Each task must be performed with extreme care.
   b. The amount of time the workers are on the pavement shall be minimized.
   c. Workers shall enter onto the pavement only during appropriate gaps in traffic.
   d. Adequate sight distance must be available to utilize this case.
   e. Vehicle may not encroach onto the pavement.
   f. Vehicle shall have its strobe/warning lights on.
2. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly equipped flagger with proper warning signs in place.
3. When it is necessary for the vehicle to stop on the roadway, traffic control shall be in accordance with the proper WZ case.
4. Workers, vehicles, and equipment should remain on one side of the road.
5. Full lane closure should be considered when work at one location would exceed one hour.
6. If workers must remain in traffic lane and appropriate gaps do not exist, the lane must be closed with proper traffic control signs and devices.

# WZ B1

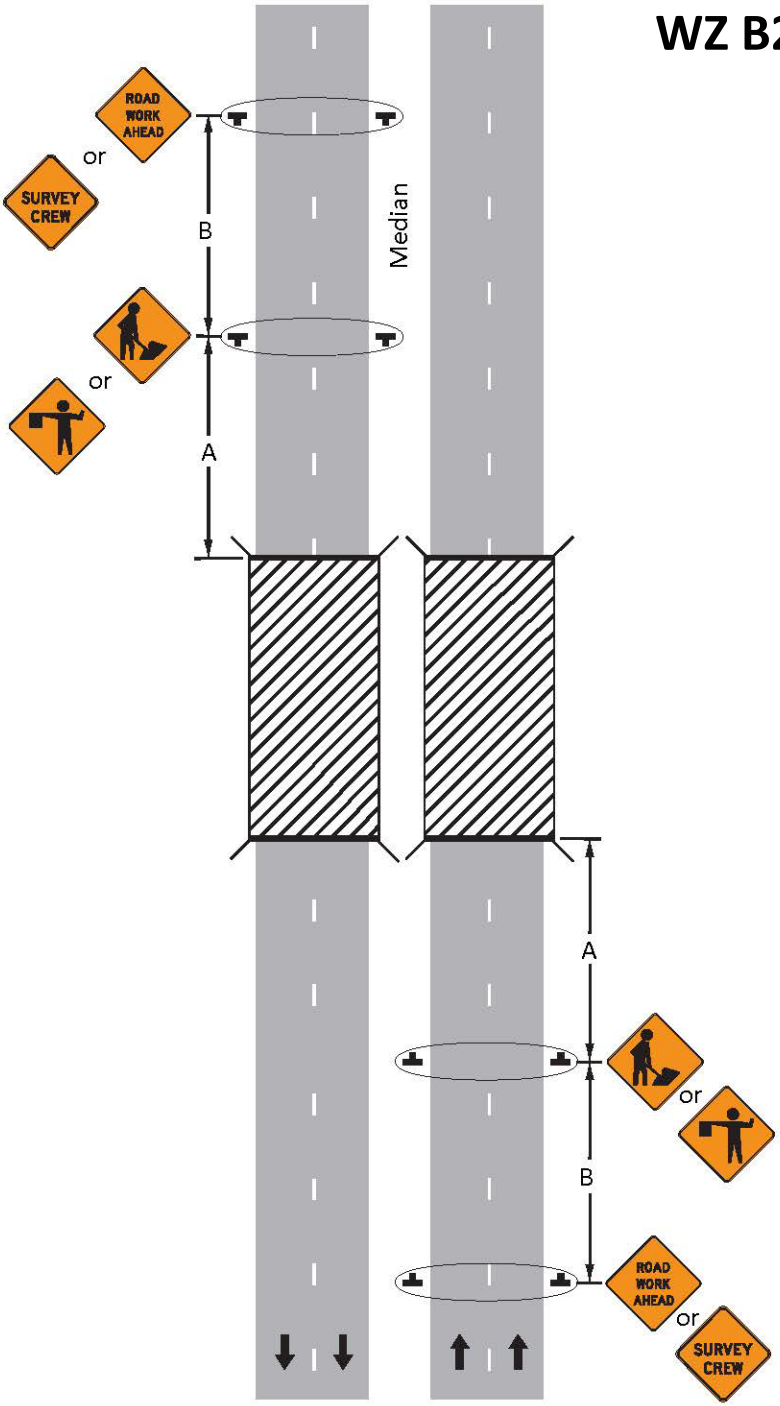

ROAD WORK AHEAD
or
SURVEY CREW
B
or
A
Shoulder
Shoulder
A
or
B
ROAD WORK AHEAD
or
SURVEY CREW

## WZ B2: BRIDGE INSPECTION MULTILANE DIVIDED HIGHWAY

Notes:

1. May be performed without a flagger, provided:
   a. Each task must be performed with extreme care.
   b. The amount of time the workers are on the pavement shall be minimized.
   c. Workers shall enter onto the pavement only during appropriate gaps in traffic.
   d. Adequate sight distance must be available to utilize this case.
   e. Vehicle may not encroach onto the pavement.
   f. Vehicle shall have its strobe/warning lights on.
2. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly equipped flagger with proper warning signs in place.
3. Signs not required in median when median is less than 10 ft wide.
4. When it is necessary for the vehicle to stop on the roadway, traffic control shall be in accordance with the proper WZ case.
5. Workers, vehicles, and equipment should remain on one side of the road.
6. Full lane closure should be considered when work at one location would exceed one hour.
7. If workers must remain in traffic lane and appropriate gaps do not exist, the lane must be closed with proper traffic control signs and devices.

# WZ B2

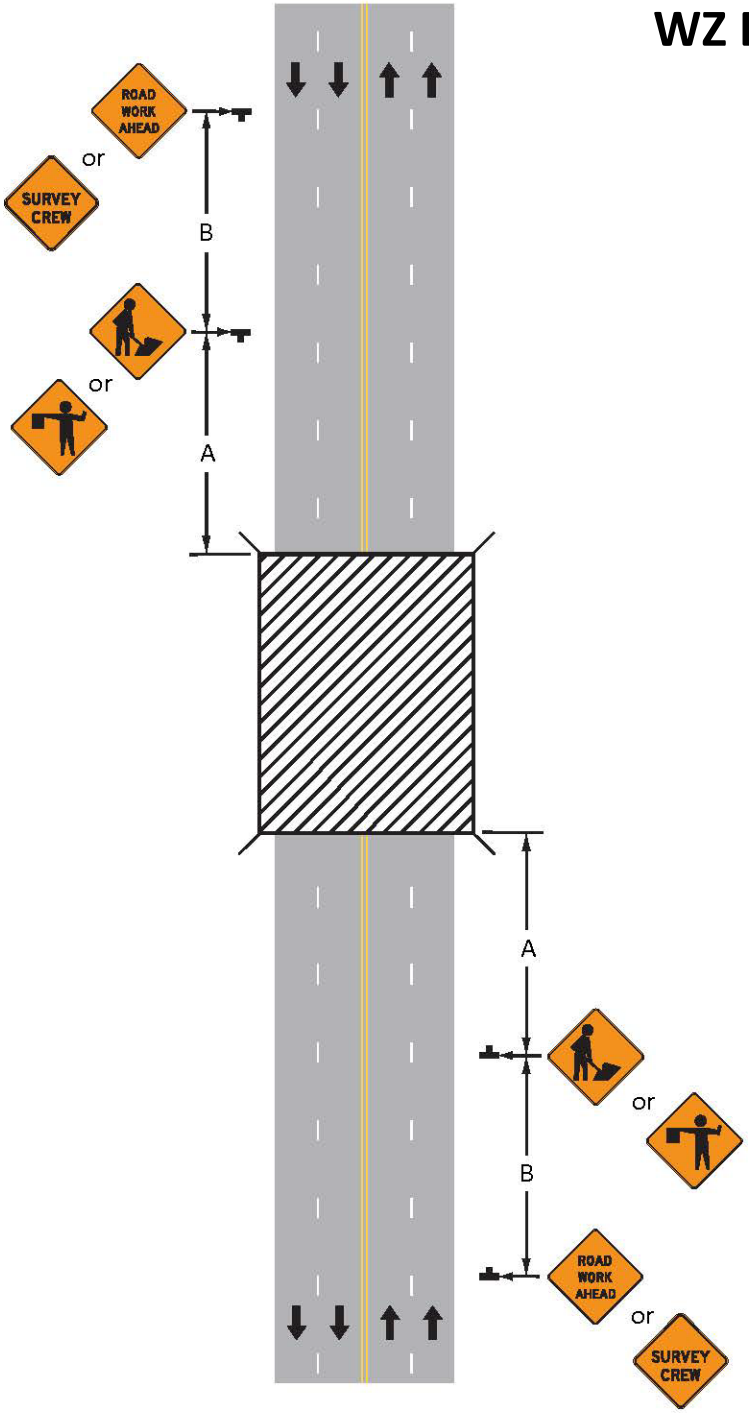

ROAD WORK AHEAD
or
SURVEY CREW
B
Median
or
A
A
or
B
ROAD WORK AHEAD
or
SURVEY CREW

# WZ B3: BRIDGE INSPECTION MULTILANE UNDIVIDED HIGHWAY

Notes:

1. May be performed without a flagger, provided:
   a. Each task must be performed with extreme care.
   b. The amount of time the workers are on the pavement shall be minimized.
   c. Workers shall enter onto the pavement only during appropriate gaps in traffic.
   d. Adequate sight distance must be available to utilize this case.
   e. Vehicle may not encroach onto the pavement.
   f. Vehicle shall have its strobe/warning lights on.
2. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly equipped flagger with proper warning signs in place.
3. When it is necessary for the vehicle to stop on the roadway, traffic control shall be in accordance with the proper WZ case.
4. Workers, vehicles, and equipment should remain on one side of the road.
5. Full lane closure should be considered when work at one location would exceed one hour.
6. If workers must remain in traffic lane and appropriate gaps do not exist, the lane must be closed with proper traffic control signs and devices.

# WZ B3

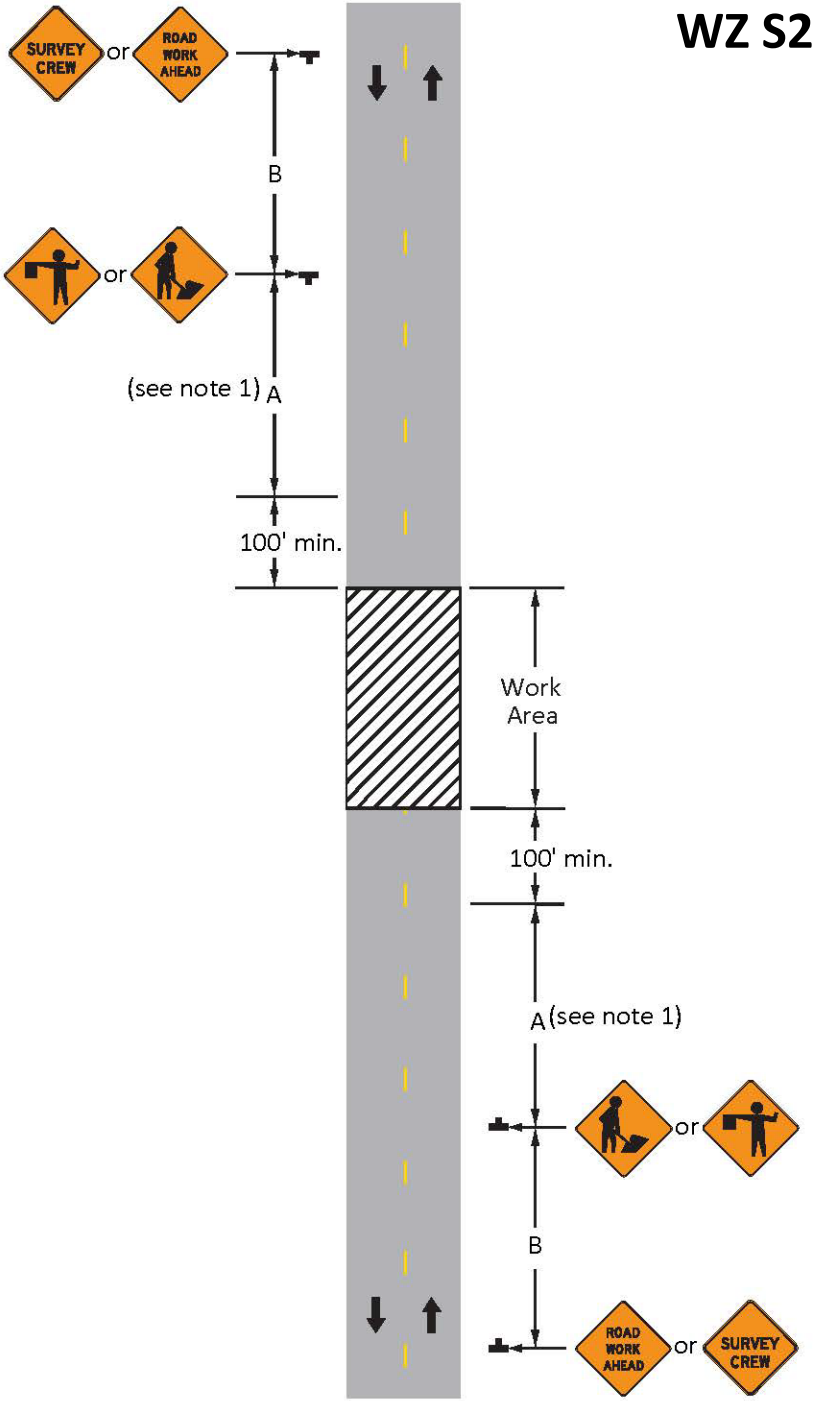

ROAD WORK AHEAD
or
SURVEY CREW
B
or
A
A
or
B
ROAD WORK AHEAD
or
SURVEY CREW

# WZ S2: SURVEY WORK SHORT-TERM, MOVING OPERATION ON PAVEMENT TWO-LANE, TWO-WAY

Notes:

1. May be performed without a flagger, provided:
   a. Each task must be performed with extreme care.
   b. The amount of time the workers are on the pavement shall be minimized.
   c. Workers shall enter onto the pavement only during appropriate gaps in traffic.
   d. Adequate sight distance must be available to utilize this case.
   e. Vehicle may not encroach onto the pavement.
   f. Vehicle shall have its strobe/warning lights on.
2. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly equipped flagger with proper warning signs in place.
3. Workers, vehicles, and equipment should remain on one side of the road.
4. This WZ case is allowed during non-peak traffic. Flagging shall be in accordance with the Flaggers' Guide.
5. Minimum distance is from SIGN SPACING TABLE.
6. Maximum distance in no case to exceed one half the length required for one normal day's operation or 2 miles, whichever is less.
7. When it is necessary for the vehicle to stop on the roadway, traffic control shall be in accordance with the proper WZ case.
8. Full lane closure should be considered when work at one location would exceed one hour.
9. If workers must remain in traffic lane and appropriate gaps do not exist, the lane must be closed with proper traffic control signs and devices.

# WZ S2


SURVEY CREW
or
ROAD WORK AHEAD
B
or
(see note 1) A
100' min.
Work Area
100' min.
A (see note 1)
or
B
ROAD WORK AHEAD
or
SURVEY CREW

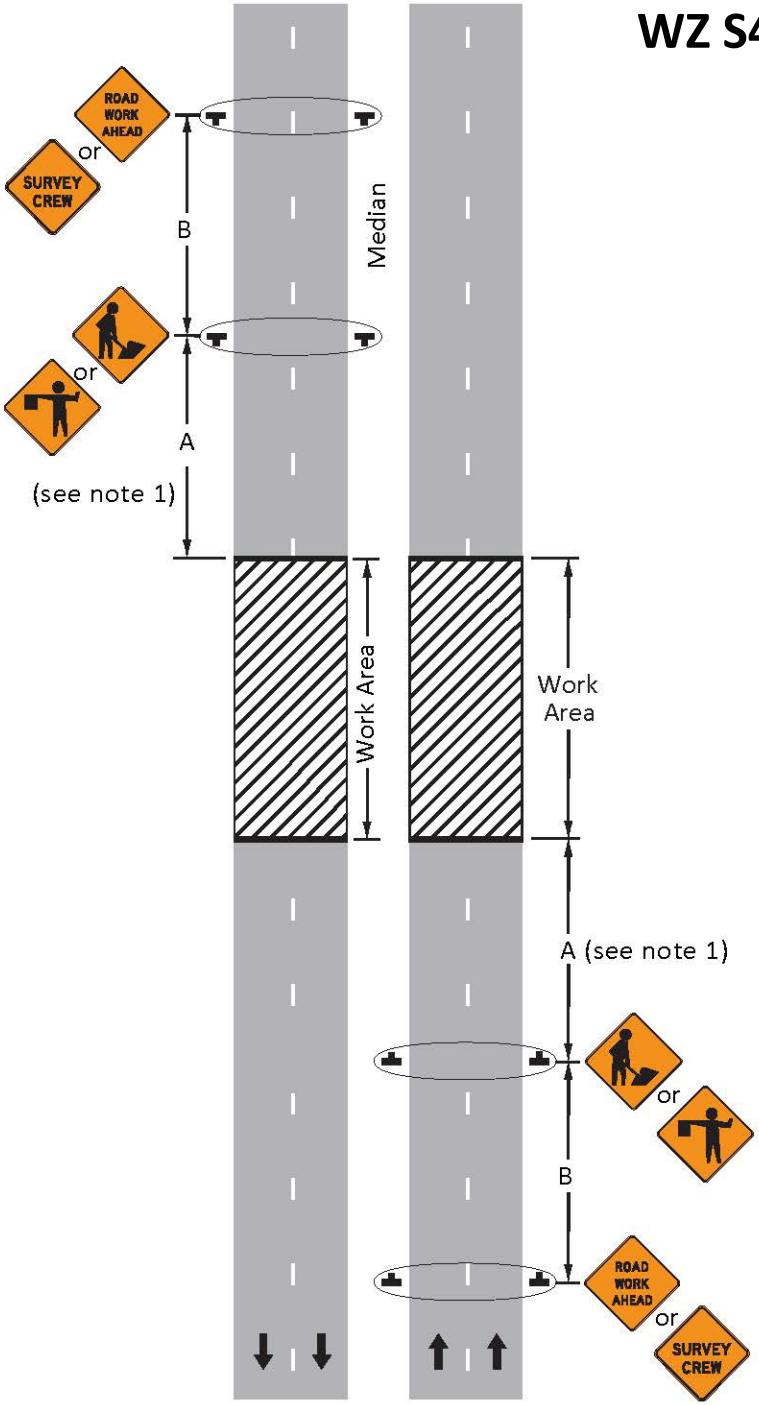
# WZ S4: SURVEY WORK SHORT-TERM MOVING OPERATION ON PAVEMENT MULTILANE ROADWAY

Notes:

1. May be performed without a flagger, provided:
   a. Each task must be performed with extreme care.
   b. The amount of time the workers are on the pavement shall be minimized.
   c. Workers shall enter onto the pavement only during appropriate gaps in traffic.
   d. Adequate sight distance must be available to utilize this case.
   e. Vehicle may not encroach onto the pavement.
   f. Vehicle shall have its strobe/warning lights on.
2. No attempts shall be made to stop, slow, or direct traffic into another lane except by a properly equipped flagger with proper warning signs in place.
3. Workers, vehicles, and equipment should remain on one side of the road.
4. This WZ case is allowed during non-peak traffic.
5. Signs not required in median when median is less than 10 ft wide.
6. Minimum distance is A from SIGN SPACING TABLE. Maximum distance is one half the length required for one normal day's operation or 2 miles, whichever is less.
7. When it is necessary for the vehicle to stop on the roadway, traffic control shall be in accordance with the proper WZ case.
8. Full lane closure should be considered when work at one location would exceed one hour.
9. If workers must remain in traffic lane and appropriate gaps do not exist, the lane must be closed with proper traffic control signs and devices.

| **Speed (mph)** | **Advance Sign** | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

# WZ S4


ROAD WORK AHEAD
or
SURVEY CREW
B
Median
or
A
(see note 1)
Work Area
Work Area
A (see note 1)
or
B
ROAD WORK AHEAD
or
SURVEY CREW

# WZ S5: SURVEY WORK, STATIONARY WORK AREA CENTERLINE WORK, LOW VOLUME ROADWAY ADEQUATE SIGHT DISTANCE FOR ADT ≤ 400

Notes:

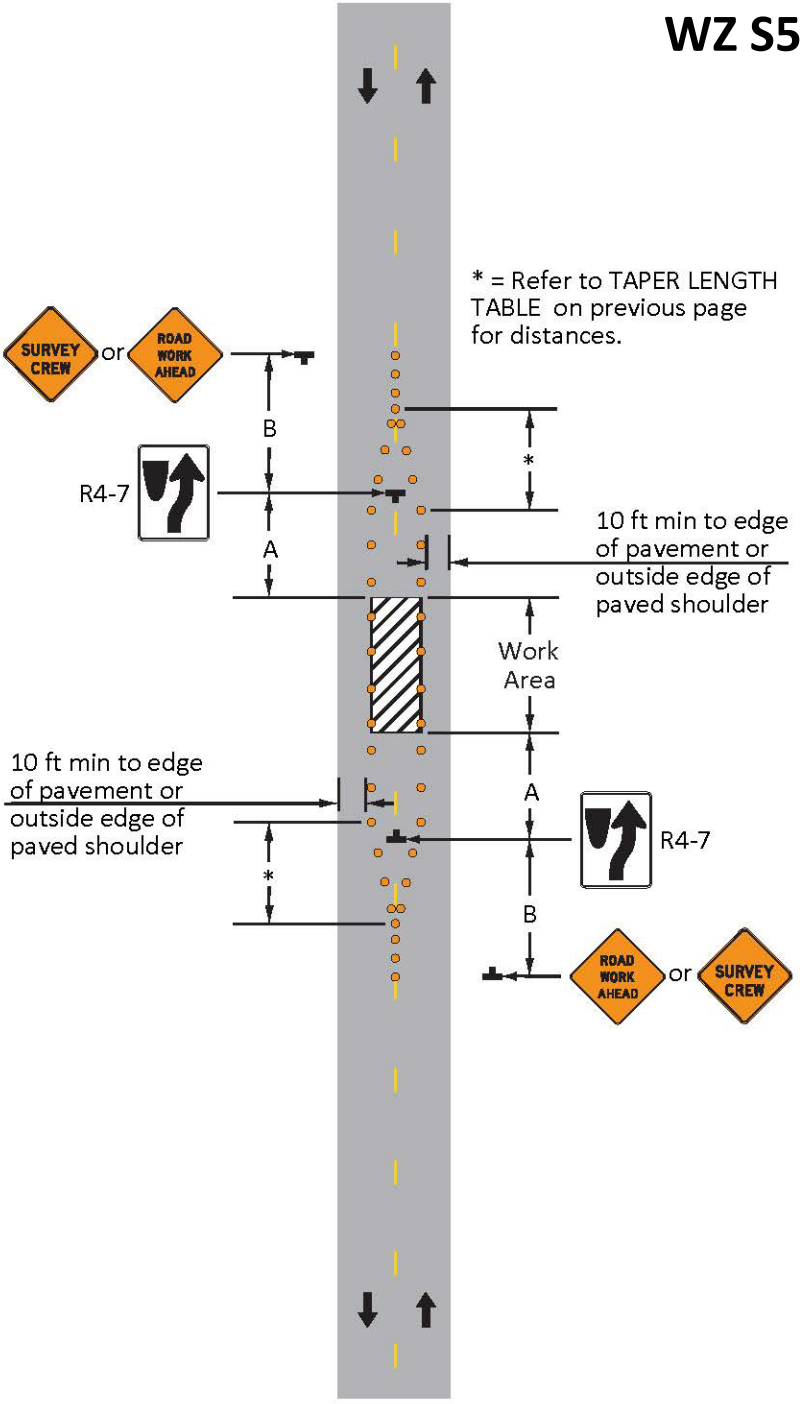
1. Each task must be performed with extreme care.
2. Workers shall cross the pavement only during appropriate gaps in traffic.
3. No attempts shall be made to stop, slow, or direct traffic into another lane except by properly equipped flagger with proper warning signs in place.
4. Cones at:
   a. ≤ 45 mph – 20 ft centers
   b. ≥ 50 mph – 40 ft centers

| Speed (mph) | Advance Sign | | |
|---|---|---|---|
| | A | B | C |
| ≤40 | 100 | 100 | 100 |
| 45 – 50 | 350 | 350 | 350 |
| 55 – 60 | 500 | 500 | 500 |
| 65 – 70 | 1000 | 1600 | 2600 |

| Speed (mph) | Lane Taper Length (ft) | Buffer Space** |
|---|---|---|
| | Shifting | |
| 30 | 90 | 200 |
| 35 | 125 | 250 |
| 40 | 160 | 305 |
| 45 | 270 | 360 |
| 50 | 300 | 425 |
| 55 | 330 | 495 |
| 60 | 360 | 570 |
| 65 | 390 | 645 |
| 70 | 420 | 730 |

** The buffer space length may be adjusted to meet individual work site conditions or may be eliminated by supervisor/Engineer Approval

# WZ S5

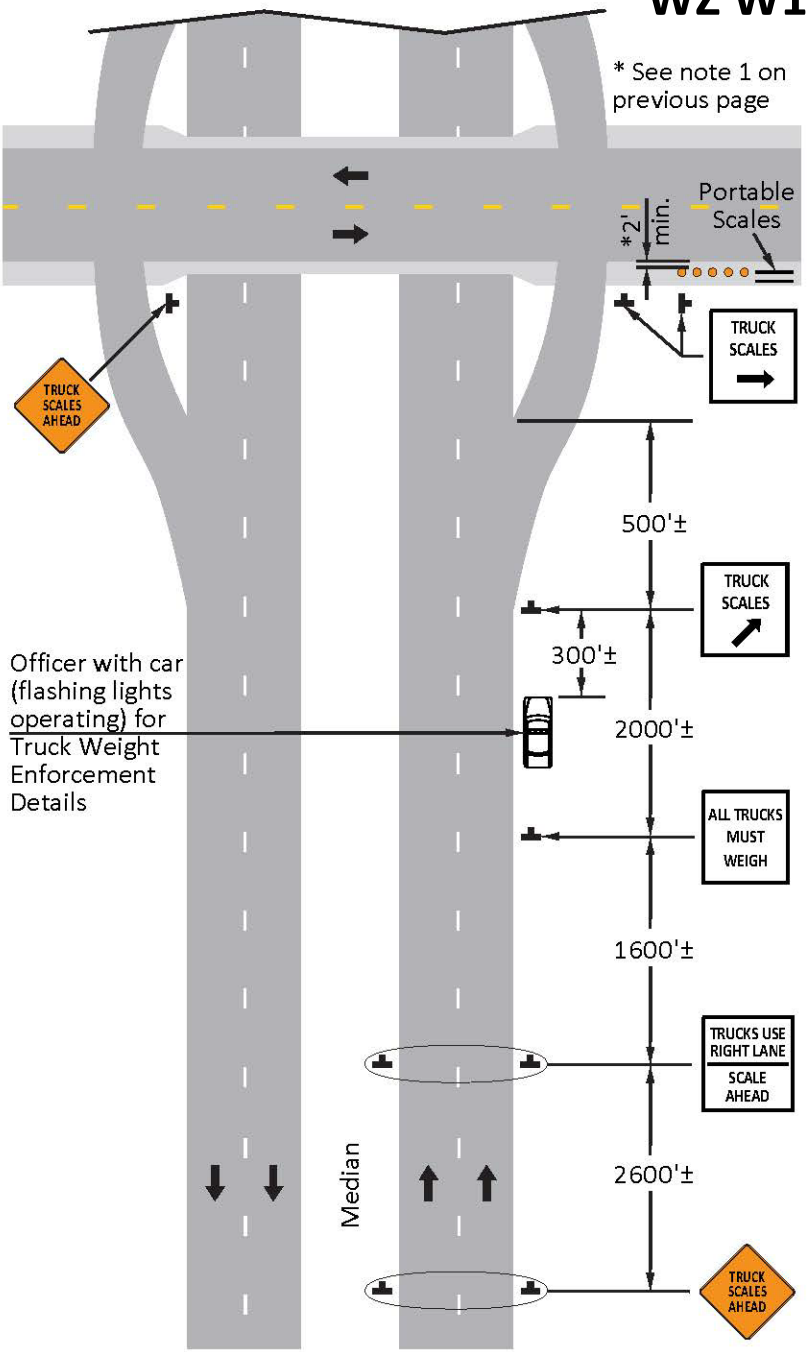

* = Refer to TAPER LENGTH TABLE on previous page for distances.
SURVEY CREW
or
ROAD WORK AHEAD
B
R4-7
A
*
10 ft min to edge of pavement or outside edge of paved shoulder
Work Area
A
10 ft min to edge of pavement or outside edge of paved shoulder
R4-7
*
B
ROAD WORK AHEAD
or
SURVEY CREW

# WZ W1: STATE POLICE / IDOT TRUCK WEIGH SCALES OR OFFICE OF QUALITY COMPLIANCE AND REVIEW CREW, MULTILANE ROADWAY AT INTERCHANGE

Notes:

1. Scales and cones shall be at least 2 ft from edge of roadway. If the posted speed or operating speeds at the location exceed 40 mph, scales shall be at least 4 ft from edge of roadway.
2. Cones on tangent:
   ≤ 45 mph - 40 ft centers
   ≥ 50 mph - 80 ft centers

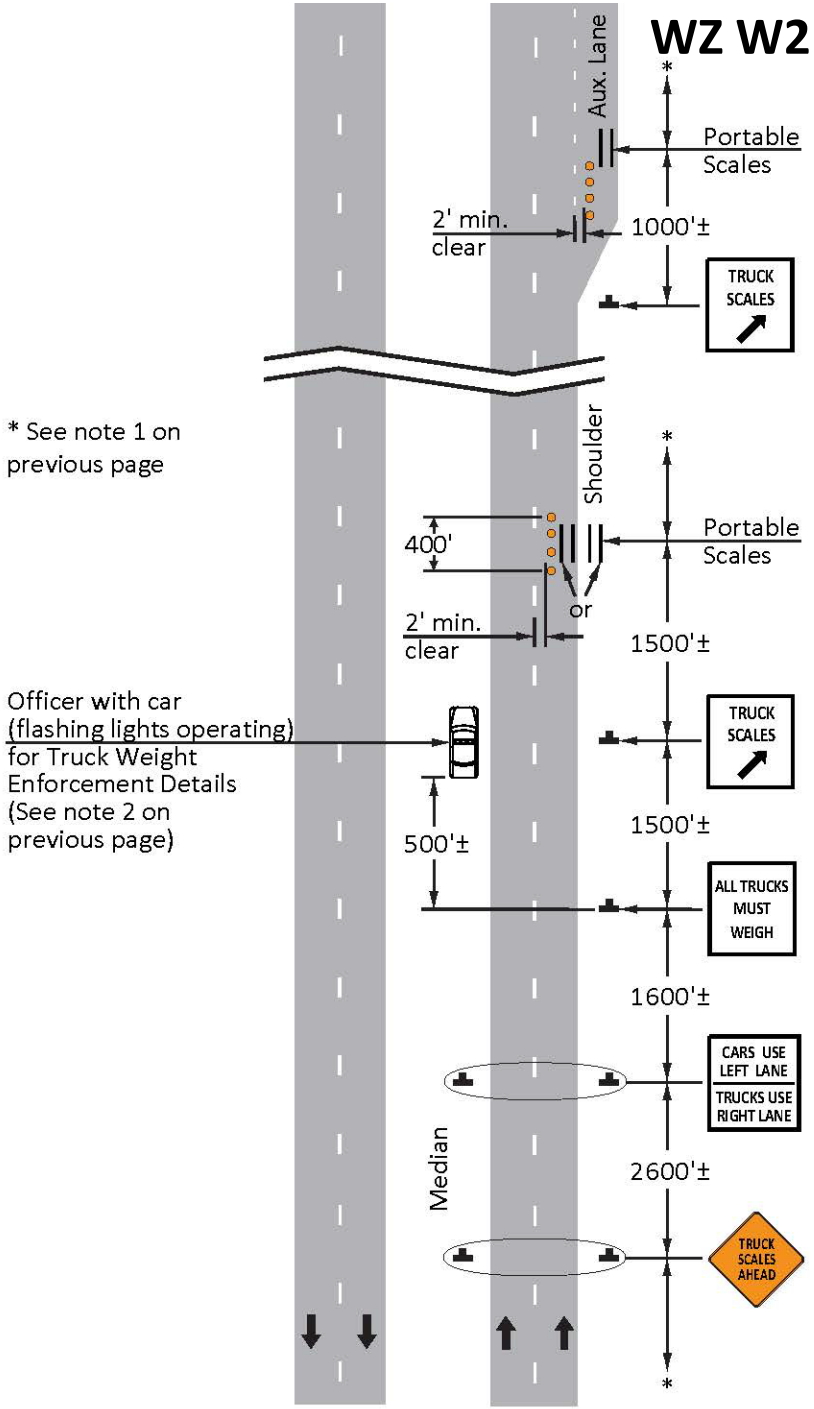
# WZ W1


* See note 1 on previous page
Portable Scales
*2' min.
TRUCK SCALES
TRUCK SCALES AHEAD
500'±
TRUCK SCALES
300'±
Officer with car (flashing lights operating) for Truck Weight Enforcement Details
2000'±
ALL TRUCKS MUST WEIGH
1600'±
TRUCKS USE RIGHT LANE
SCALE AHEAD
Median
2600'±
TRUCK SCALES AHEAD

# WZ W2: STATE POLICE / IDOT TRUCK WEIGH SCALES – ONLY MULTILANE ROADWAY ON/ALONG ROADWAY

Notes:

1. For full access control, signing should be at least 5000 ft beyond preceding interchange entrance ramp and scales should be at least 2000 ft in advance of the exit gore for the next interchange. On other highways, scales should be located away from major intersections, when practical.
2. Police car may be located off the edge of the right shoulder when there is insufficient space to park on left.
3. For all other highways, intersections within the advance warning area shall be signed with "ROAD WORK AHEAD" 200 ft in advance of the intersection.
4. Weighing on Interstate Routes is allowed only at approved locations.
5. Lane closure not allowed on non-divided highways having a posted speed of greater than 45 mph.
6. Signs not required in median when median is less than 10 ft wide.
7. Cones on tangent:
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers

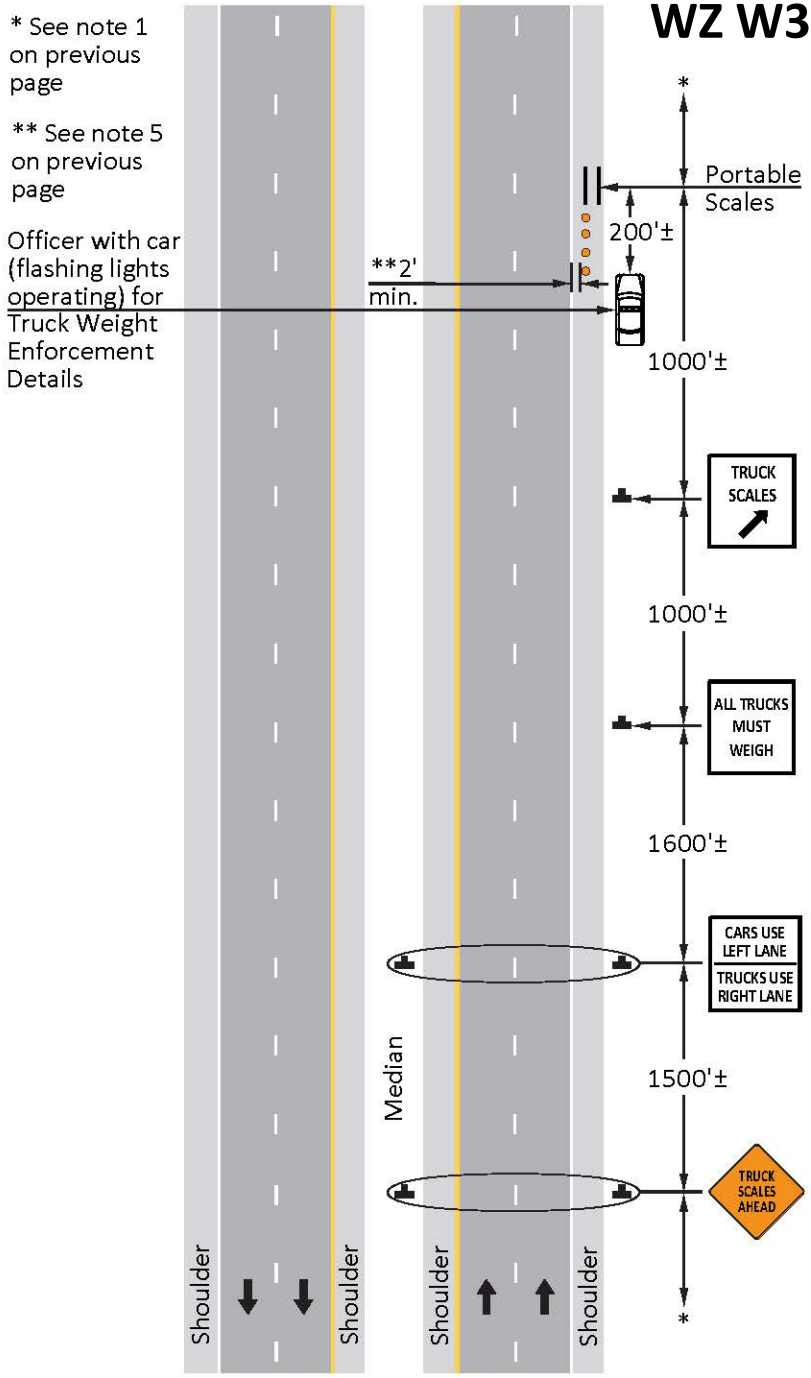

WZ W2
Aux. Lane
Portable Scales
2' min. clear
1000'±
TRUCK SCALES
* See note 1 on previous page
Shoulder
Portable Scales
400'
or
2' min. clear
1500'±
Officer with car (flashing lights operating) for Truck Weight Enforcement Details (See note 2 on previous page)
TRUCK SCALES
1500'±
500'±
ALL TRUCKS MUST WEIGH
1600'±
CARS USE LEFT LANE
TRUCKS USE RIGHT LANE
Median
2600'±
TRUCK SCALES AHEAD

# WZ W3: STATE POLICE / IDOT TRUCK WEIGH SCALES OR OFFICE OF QUALITY COMPLIANCE AND REVIEW CREW, MULTILANE ROADWAY NON-INTERSTATE

Notes:

1. For full access control, signing should be at least 5000 ft beyond preceding interchange entrance ramp and scales should be at least 2000 ft in advance of the exit gore for the next interchange. On other highways, scales should be located away from major intersections, when practical.
2. For all other highways, intersections within the advance warning area shall be signed with "ROAD WORK AHEAD" 200 ft in advance of the intersection.
3. Lane closure not allowed on non-divided highways having a posted speed of greater than 45 mph.
4. Signs not required in median when median is less than 10 ft wide.
5. Scales and cones shall be at least 2 ft from edge of roadway. If the posted speed or operating speeds at the location exceed 40 mph, scales shall be at least 4 ft from edge of roadway.
6. Cones on tangent:
   ≤ 45 mph - 40 ft centers
   ≥ 50 mph - 80 ft centers

# WZ W3

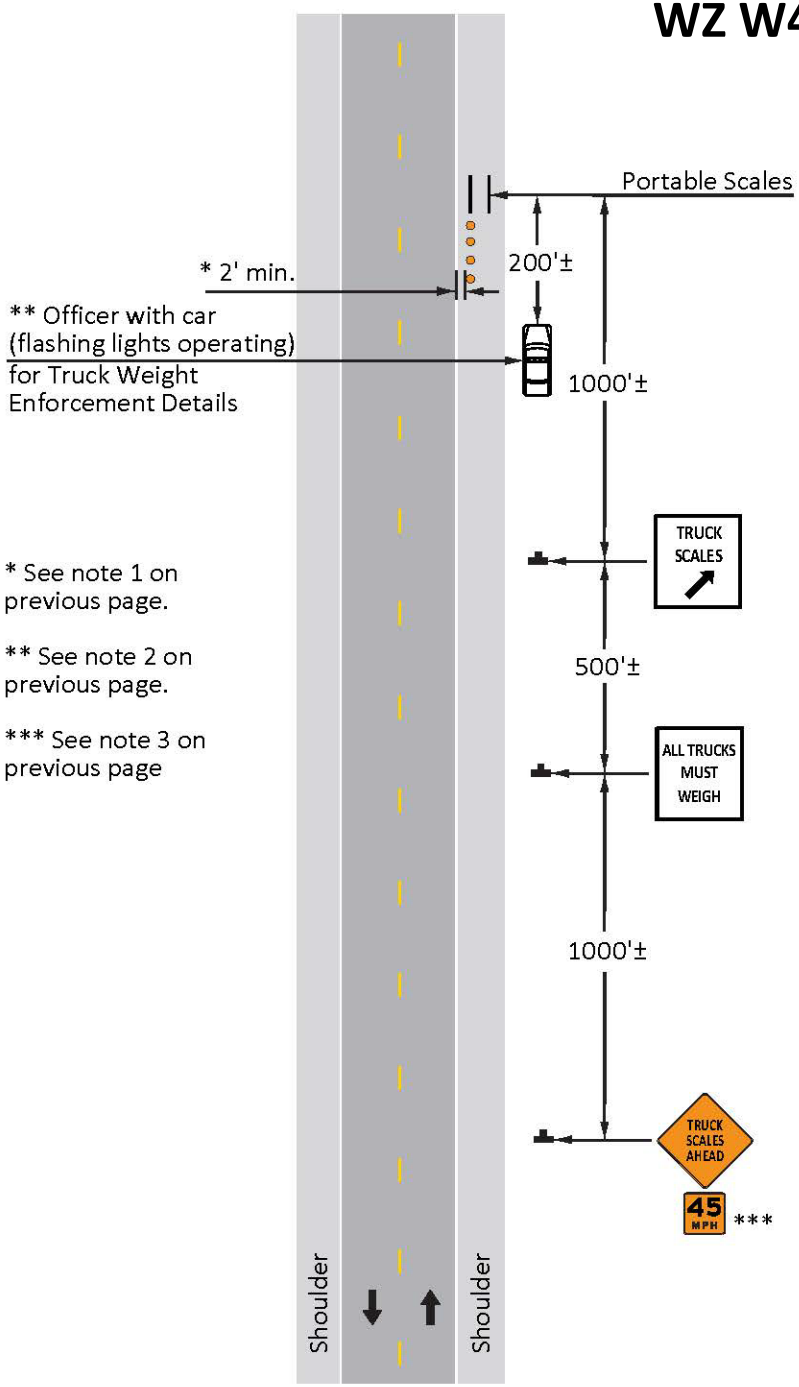

* See note 1 on previous page
** See note 5 on previous page
Officer with car (flashing lights operating) for Truck Weight Enforcement Details
**2' min.
*
Portable Scales
200'±
1000'±
TRUCK SCALES
1000'±
ALL TRUCKS MUST WEIGH
1600'±
CARS USE LEFT LANE
TRUCKS USE RIGHT LANE
1500'±
TRUCK SCALES AHEAD
*
Median
Shoulder
Shoulder
Shoulder
Shoulder

# WZ W4: STATE POLICE / IDOT TRUCK WEIGH SCALES OR OFFICE OF QUALITY COMPLIANCE AND REVIEW CREW, TWO-LANE, TWO-WAY ROADWAY

Notes:

1. Scales and cones shall be at least 2 ft from edge of roadway. If the posted speed or operating speeds at the location exceed 40 mph, scales shall be at least 4 ft from edge of roadway.
2. Workers, vehicles, and equipment should remain on one side of the road.
3. Use advisory speed plaque on highways having posted speed of greater than 45 mph.
4. Cones on tangent:
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers

# WZ W4




* See note 1 on previous page.

** See note 2 on previous page.

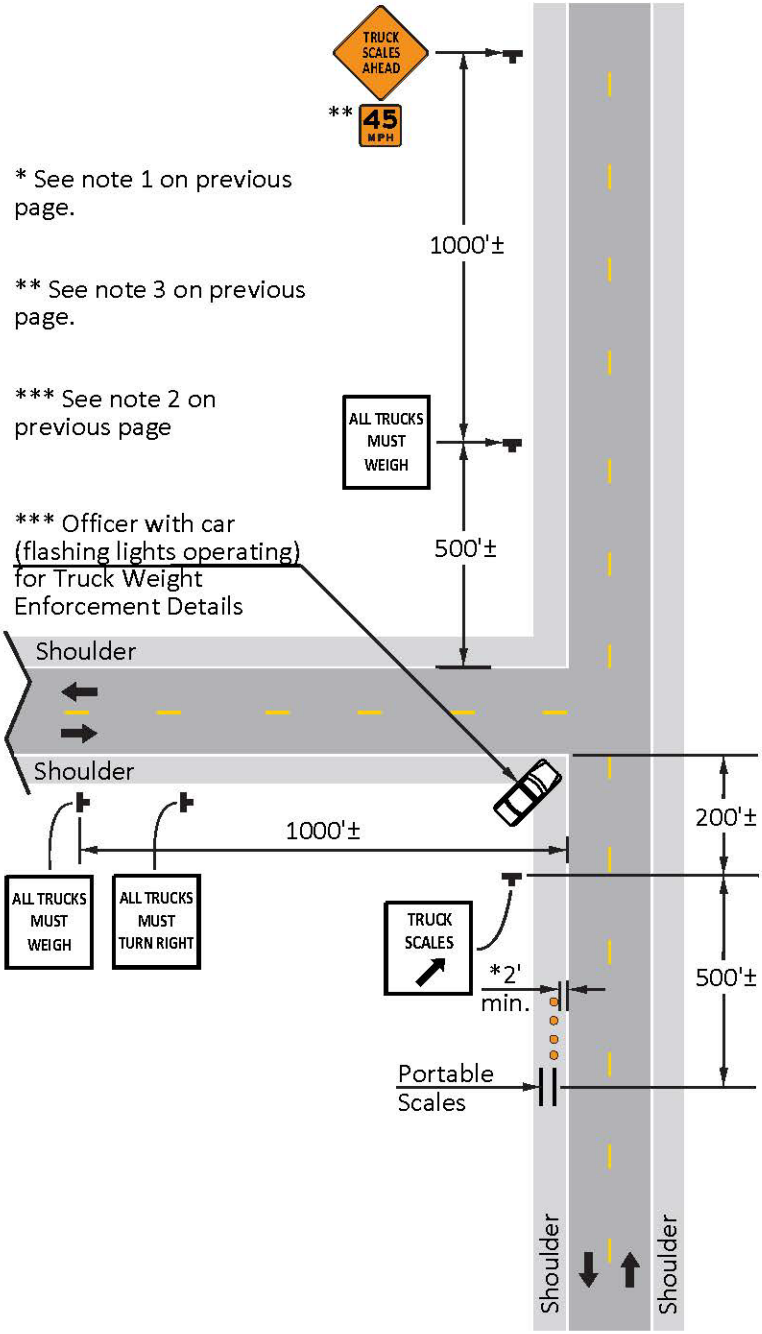
*** See note 3 on previous page

# WZ W5: STATE POLICE / IDOT WEIGH SCALES-ONLY TWO-LANE, TWO-WAY ROADWAY AT INTERSECTION, THREE-WAY INTERSECTION

Notes:

1. Scales and cones shall be at least 2 ft from edge of roadway. If the posted speed or operating speeds at the location exceed 40 mph, scales shall be at least 4 ft from edge of roadway.
2. Workers, vehicles, and equipment should remain on one side of the road.
3. Use advisory speed plaque on highways having posted speed of greater than 45 mph.
4. Cones on tangent:
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers

# WZ W5

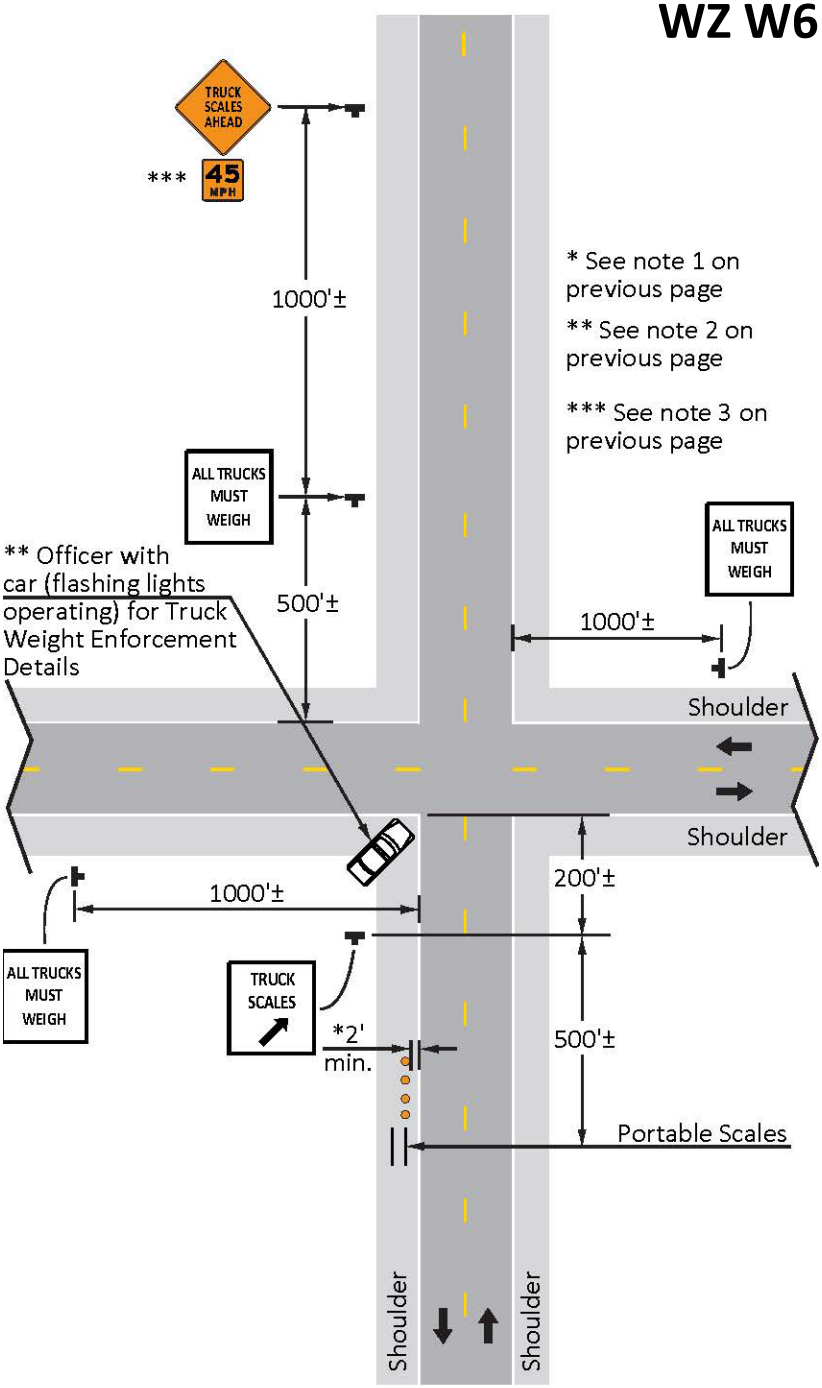

TRUCK SCALES AHEAD
** 45 MPH
* See note 1 on previous page.
1000'±
** See note 3 on previous page.
*** See note 2 on previous page
ALL TRUCKS MUST WEIGH
*** Officer with car (flashing lights operating) for Truck Weight Enforcement Details
500'±
Shoulder
Shoulder
1000'±
200'±
ALL TRUCKS MUST WEIGH
ALL TRUCKS MUST TURN RIGHT
TRUCK SCALES
*2' min.
500'±
Portable Scales
Shoulder
Shoulder

# WZ W6: STATE POLICE / IDOT WEIGH SCALES – ONLY TWO-LANE, TWO-WAY ROADWAY AT INTERSECTION, FOUR-WAY INTERSECTION

Notes:

1. Scales and cones shall be at least 2 ft from edge of roadway. If the posted speed or operating speeds at the location exceed 40 mph, scales shall be at least 4 ft from edge of roadway.
2. Workers, vehicles, and equipment should remain on one side of the road.
3. Use advisory speed plaque on highways having posted speed of greater than 45 mph.
4. Cones on tangent:
   a. ≤ 45 mph – 40 ft centers
   b. ≥ 50 mph – 80 ft centers

# WZ W6


TRUCK SCALES AHEAD
***
45 MPH
1000'±
ALL TRUCKS MUST WEIGH
500'±
** Officer with car (flashing lights operating) for Truck Weight Enforcement Details
* See note 1 on previous page
** See note 2 on previous page
*** See note 3 on previous page
ALL TRUCKS MUST WEIGH
1000'±
Shoulder
Shoulder
200'±
1000'±
ALL TRUCKS MUST WEIGH
TRUCK SCALES
*2' min.
500'±
Portable Scales
Shoulder
Shoulder

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# Flaggers' Guide

## Preface

The Flaggers' Guide has been prepared to assist IDOT employees to understand the requirements to be a flagger. The procedures, equipment, and recommendations apply to anyone working as a flagger on roadways under the jurisdiction of the Department. Local public agencies (LPAs), contractors, and permit holders may use this guide for work on roadways under other jurisdictions; however, these organizations' employee safety code may be different.

## To the Flagger

- The flagger shall be physically able, mentally alert, and sufficiently commanding in appearance to be obeyed by the road users.
- Flaggers have direct responsibility for the safe passage of traffic in a work area. The lives of workers, the traveling public and the flagger depend upon the flagger's alertness and ability to control traffic with the STOP/SLOW paddle. Flaggers should attempt to immediately warn the work crew when a motorist disregards a flagger's signal causing an emergency.
- Flaggers shall be on duty during the installation and removal of equipment and traffic control devices located on any portion of a through traffic lane.
- The flagger is an important position and is one to be carried out with authority and dignity.
- This guide has been prepared to assist the flagger in understanding the flagger duties and should be properly studied and available for immediate reference. Remember, workers and the road users are depending on the flagger.

## The Flagger and Public Relations

- When stopping traffic, the flagger should advise the first motorist of the situation in a brief, courteous statement, including an estimate of the delay.
- Do not lean on vehicles or argue with the occupants. Keep your voice calm. The flagger's job demands full concentration.
- All work area signs required by the MUTCD and other approved traffic control plans (Contract Plans, Work Zone Cases, etc.), shall be installed prior to beginning any operation. The flagger should not be required to control traffic without proper placement of these signs. The signs shall be removed or covered when they are not actually in effect.
- When on duty the flagger should present a neat appearance, be appropriately dressed for protection from the sun, flying objects, and insects. A neat appearance gains respect and makes the flagger's job more effective.
- Any driver that fails to stop when signaled to do so by a flagger or fails to remain in such position until signaled to proceed is in violation of 625 ILCS 5/11-908(c). If the situation warrants, a description of the driver and the vehicle's license plate number should be recorded and the circumstances reported immediately to the flagger's supervisor or the appropriate law enforcement agency.

## Number of Flaggers

- At least two (2) flaggers should be utilized on two-lane roadways at all times when one lane is closed. Additional flaggers should be considered by supervising resident or lead worker due to intersection site restrictions, commercial driveways, or other issues that may impact the safety of motorists.
- The number of flaggers may be reduced for spot lane closures where adequate sight distance is available for the reasonably safe handling of traffic. No reduction of flaggers is allowed when a road is open to local traffic only.

  **For Local Public Agencies only, the following apply:**

  - For highways with an ADT < 100, no flagger is required unless the operation encroaches into the open lane.
  - For highways with an ADT ≥ 100 where the operation encroaches into the open lane and for highways with an ADT

≤ 400, one (1) flagger is required. When a single flagger is used, the flagger should be stationed on the shoulder opposite the spot lane closure or work space, or in a position where good visibility and traffic control can be maintained at all times.

- Approved temporary traffic signals may be substituted for flaggers at bridge repair projects or other operations where lane closures will last overnight or longer.
- Contractors, Permit Holders, and Utility Companies should refer to page 175 for additional requirements.

## Flagger Duties

- One (1) of the two (2) flaggers should be designated as the chief flagger for purposes of coordinating movement.
- Flaggers shall use a STOP/SLOW paddle, a flag, or an Automated Flagger Assistance Device (AFAD) to control road users approaching a temporary traffic control zone. The use of hand movements alone without a paddle, flag, or AFAD to control road users shall be prohibited except for law enforcement personnel or emergency responders at incident scenes.
- Flaggers shall be able to communicate with each other verbally, visually, or by two-way radios. Headsets shall not be used.
- Where the end of a one-lane section is not visible from the other end, the last vehicle can be identified by description or license plate and relayed to the other flagger.
- Each flagger shall be stationed in accordance with the appropriate Work Zone Case or Highway Standard.
- Flaggers shall comply with all current and applicable safety standards which may include organization employee safety code, MUTCD, Illinois Department of Labor, and/or OSHA.
- Flagging procedures for multilane closures, urban areas and/or other work activities that are not outlined in this Manual and require special consideration should be furnished by the flagger's supervisor.

## Flagger Equipment

IDOT's (or respective organization's) Employee Safety Code shall be consulted for detailed information concerning required and recommended employee personal protection equipment.

## Required Flagger Equipment for IDOT Personnel

## (LPAs refer to agencies' safety codes)

- STOP/SLOW paddle
- High-Visibility Safety Apparel meeting current ANSI/ISEA Standard 107 Performance Class 2 meeting the Department's color and reflective striping pattern.
- Flagger Ahead (Symbol) Sign (W20-7)
- 2-way radios if flaggers are not able to see the other flaggers (Cell phones or direct connect cellular devices are not allowed. Headsets shall not be used.)
- High visibility Department approved headwear in accordance with the Employee Safety Code
- Eye protection meeting current ANSI Z87.1
- Protective helmets meeting current ANSI Z89.1 where there is a possible danger of head injury from impact, or from falling or flying objects.
- 6 in. work boots meeting current ASTM F2413 Class 75 for Impact and Compression
- At night, Illuminated Flagger Stations
- At night, High-Visibility Safety Apparel meeting current ANSI/ISEA Standard 107 Performance Class 2 with leggings meeting the Department's color and reflective striping pattern.

## Recommended Flagger Equipment

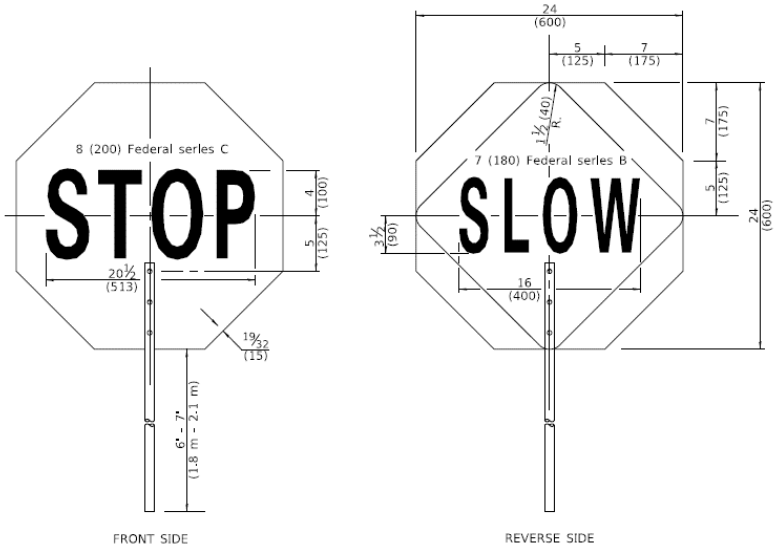
- Appropriate fluorescent clothing for weather conditions (outer garment shall comply with High-Visibility Safety Apparel for day or night) such as thermal coat, raingear, layers.

## Additional Flagger Equipment

- Red flags may be used during emergency situations if a STOP/ SLOW paddle is not available. The flag shall be of retroreflective material when used at night.
- When flagging in an emergency situation at night in a non-illuminated flagger station, a flashlight with red glow-cone may be used to supplement the STOP/SLOW paddle or flag.
- Automated Flagger Assistance Devices (AFAD) complying with the MUTCD may be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

## STOP/SLOW Paddle

- The STOP/SLOW paddle:
  - Should be the primary and preferred hand-signaling device.
  - Should be properly maintained and cared for to ensure condition and legibility (shall be able to read from a minimum distance of 400 ft).
  - Shall have an octagonal shape on a rigid handle.
  - Shall be at least 24 in. wide with letters at least 8 in. high. For LPAs on roadways under local jurisdiction, the STOP/SLOW paddle may be 18 in. wide with letters at least 6 in. high. (See Figure 1 on pg. 170)
- The STOP (R1-1) face shall have white letters and a white border on a red background.
- The SLOW (W20-8) face shall have black letters and a black border on an orange or fluorescent orange background.
- The STOP/SLOW paddle sign faces shall consist of retroreflective sheeting.
- The STOP/SLOW paddle may be modified to improve conspicuity by incorporating either white or red flashing lights on the STOP face, or either white or yellow flashing lights on the SLOW face. The flashing lights shall meet the requirements of MUTCD.




**FLAGGER TRAFFIC CONTROL SIGN**

**Figure 1**

## Flagging Procedures to Stop Road Users

- The flagger shall stand in a safe position on the shoulder and shall be visible to traffic.
- The flagger shall face road users and aim the STOP paddle face toward the road users in a stationary position with the arm extended horizontally away from the body.
- The flagger's free arm shall be held with the palm of the hand above the shoulder level toward approaching traffic.
- After the first vehicle has stopped, the flagger shall move to a position near the centerline to ensure the STOP paddle face and flagger are visible to approaching traffic (See Figure 2)

## To Direct Stopped Road Users to Proceed

- When releasing traffic, the flagger shall move to a safe position out of open traffic lanes and face traffic.
- The flagger shall face road users and aim the SLOW paddle face toward road users in a stationary position with the arm extended horizontally away from the body.
- The flagger shall motion with the free hand for road users to proceed (See Figure 3).

## To Alert or Slow Traffic

- The flagger shall stand in a safe position on the shoulder, be visible to traffic and facing traffic.
- The flagger shall face road users and aim the SLOW paddle face toward road users in a stationary position with the arm extended horizontally away from the body.
- To further alert or slow traffic, the flagger aiming the SLOW paddle face toward road users may motion up and down with the free hand, palm down (See Figure 4).


Figure 2

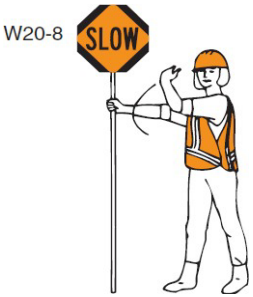



Figure 3

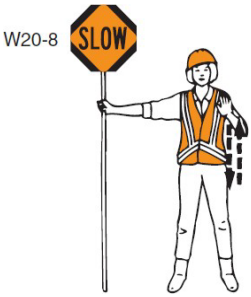



Figure 4

## Multilane Roadways

- Traffic control devices shall be used to control traffic through the work zone.
- When used on multilane roadways, the flagger's responsibility is to protect workers while maintaining traffic speeds at a reasonable level.
- Flaggers shall not aggressively reduce speeds unnecessarily which will result in backups.
- While flagging on a multilane road, the flagger shall remain on the shoulder or in the closed lane. Flaggers and the STOP/SLOW paddles shall not encroach into the open lane of traffic.
- Flaggers on multilane projects shall be positioned in accordance with the appropriate Work Zone Case or Highway Standard.

## Signaling with a Flag

- Red Flags may be used during emergency situations if a STOP/ SLOW paddle is not available.
- The flag shall be RED, 24 in. X 24 in., and on a 3 ft staff.
- The flag shall be of retroreflective material when used at night.
- The flagger shall stand in a safe position on the shoulder and shall be visible to traffic.
- To stop road users, the flagger shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. After the first vehicle has stopped, the flagger shall move to a position near the centerline to ensure the flag and flagger are visible to approaching traffic. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic. (See Figure 5)
- To direct stopped road users to proceed, the flagger shall face road users with the flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed. (See Figure 6)
- To alert or slow traffic, the flagger shall face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger shall keep the free hand down. (See Figure 7)

.

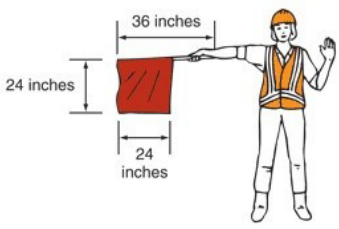



**Figure 5**

**Figure 6**

**Figure 7**

## Flagger Rules to "Live" By

- FLAGGERS shall meet the flagger requirements outlined in this Manual and other applicable safety codes and be trained prior to performing flagger duties.
- FLAGGERS shall be relieved at appropriate intervals to avoid fatigue and remain alert.
- FLAGGERS shall not be more than one (1) mile apart on two-lane highways.
- FLAGGERS shall not mingle with the work crew.
- FLAGGERS shall not use a cell phone, text, or use the internet.
- FLAGGERS should always maintain two (2) safety escape routes.
- FLAGGERS shall not leave their post unless authorized to do so or when replaced by another flagger.
- FLAGGERS shall not turn their back on approaching traffic.
- FLAGGERS shall not sit while on duty.
- FLAGGERS shall be aware of where equipment and traffic are at all times.
- FLAGGERS shall be visible to oncoming traffic at all times. To be visible:
    - Wear approved high visibility garments at all times.
    - Avoid standing in the shade.
    - Avoid standing in front of equipment.
    - Locate the flagger station in advance of curves, horizontal and vertical.

## Additional Requirements for Contract and Permit Work

* 430 ILCS 105/2 requires "the contractor or his authorized agent in charge of such construction will be required to furnish no fewer than 2 flagmen..."

* All flaggers shall be certified by an agency approved by the Department. While on the job site, each flagger shall have in their possession a current flagger certification identification card and a valid driver's license or a current Secretary of State identification card. This flagger certification requirement may be waived by the Engineer for emergency situations beyond the contractor's control.

* For flagger operations at night, flagger stations shall be illuminated according to the Standard Specifications for Road and Bridge Construction.

For information on approved flagger certification and training programs contact the Bureau of Safety Programs and Engineering at DOT.BSPEWZ@illinois.gov.

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# Quality Standard for Work Zone Traffic Control Devices

## Introduction

When the normal function of the roadway is changed due to work zone activities, temporary traffic control provides for the continuity of movement of motor vehicle, bicycle, and pedestrian traffic. The primary function of temporary traffic control is to provide for the reasonably safe and efficient movement of road users through or around work zones while protecting workers and equipment.

Temporary traffic control is established through a system of devices. The success of this system depends upon the quality and placement of each device.

Routine use of work zone traffic control devices subjects them to greater wear than permanent devices. This wear may be caused by carelessness during the storage, shipping, relocating, and removal of these devices, impacts from traffic or equipment, or simply age. This wear causes deterioration of their appearance. A high percentage of these worn and damaged devices in a project results in a loss of positive guidance to the road user, and an unprofessional appearance that reduces motorist confidence and compliance.

This standard aids the inspector in determining the quality of work zone devices. However, the Engineer is the sole judge of device quality. The devices should be inspected at several stages: while in storage, during preparation for delivery to the work zone, during initial set-up, and periodically during the course of the work.
Suppliers and contractors are encouraged to apply this standard prior to delivery of devices to the job site. Doing so will minimize Department involvement and reduce time, effort, and costs related to on-site rejection and required replacement.

All devices and combinations of devices shall meet the requirements of the National Cooperative Highway Research Program (NCHRP) Report 350 or the American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH) for their respective categories, in accordance with Bureau of Design and Environment or Bureau of Safety Programs and Engineering special provisions, or the Standard Specifications.

## Application of This Standard

Any traffic control device which has become ineffective due to damage, wear, or defacement shall be replaced by the Contractor. All traffic control devices shall be maintained and kept clean such that the device maintains its appearance and retroreflectivity (if applicable) according to the guidance of this standard at a minimum. The Engineer shall be the sole judge as to the acceptability of the quality, placement, and maintenance of all traffic control devices.

## Quality Classifications and Requirements

The quality of the work zone devices in this standard is divided into three (3) categories, acceptable, marginal, and unacceptable.

> **Acceptable devices** are in new or like-new condition. They meet all applicable IDOT standards, specifications, and manufacturer's specifications.
>
> **Marginal devices** are similar to acceptable, but are worn.
>
> **Unacceptable devices** do not meet IDOT standards, specifications, or manufacturer's specifications. Any unacceptable device shall be replaced.

At the time of the initial set-up and at the time of major stage changes, 100 percent of each type of device shall be acceptable. The following table describes the percentage of each device type that shall be rated as acceptable and the maximum allowed to be rated as marginal for the entire installation to remain acceptable.

***DEVICE RATING TABLE on page 179***

| Device Rating Table | | | |
|---|---|---|---|
| | | DURING PROJECT | |
| DEVICE | INITIAL SET-UP | ACCEPTABLE | MARGINAL |
| SIGNS | 100 % | 75 % | 25 % |
| BARRICADES | 100 % | 75 % | 25 % |
| VERTICAL PANELS | 100 % | 75 % | 25 % |
| DRUMS | 100 % | 75 % | 25 % |
| CONES | 100 % | 75 % | 25 % |
| STOP/SLOW PADDLE | 100 % | 75 % | 25 % |
| TEMPORARY CONCRETE BARRIER | 100 % | 75 % | 25 % |
| SAND IMPACT ATTENUATOR | 100 % | 95 % | 5 % |
| WARNING LIGHTS | 100 % | 90 % | 10 % |
| TEMPORARY PAVEMENT MARKING | 100 % | 90 % | 10 % |
| REFLECTORS | 100 % | 90 % no more than 2 consecutive missing | N/A |

**Devices used in a small quantity, such as Arrow Boards and Portable Changeable Message Signs (PCMS), shall be evaluated individually.**

**When required, inspections shall be documented using Form BSPE 726, Traffic Control Inspection Report.**

The following photographs, together with the contract requirements of each specific project, shall be used as a guide to determine if the device is acceptable, marginal, or unacceptable. A direct comparison of each device to this standard is not required for the rejection of devices.

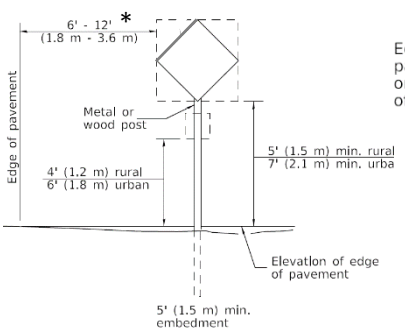
## Quality Standard for Signs

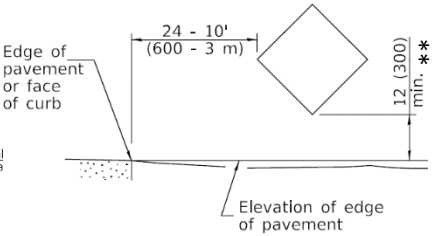
This standard applies to all signs, warning, regulatory and guide, furnished by a supplier, subcontractor, or contractor to be used for traffic control in work zones.

All standard signs shall conform to the requirements of the contract documents, the MUTCD, and supporting manuals. In complying with these requirements, the Contractor and suppliers will furnish signs that are correct in size, shape, color, and legend. The Standard Specifications provides the requirements for retroreflectivity of work zone signs.

Page 181 is used to evaluate the quality of the sign face only**. If any sign is bent, dented, or deformed to the extent that its shape is nonstandard or a portion of the sign is missing, the sign is unacceptable.**

### Typical Sign Installations




**Post Mounted Signs**

* When curb or paved shoulder are present this dimension shall be 24 in. to the face of curb or 6 ft to the outside edge of the paved shoulder.

**Signs on Temporary Supports**

** When work operations exceed four days, this dimension shall be 5 ft min. If located behind other devices, the height shall be sufficient to be seen completely above the devices

**All heights shall be measured above the edge of pavement surface.**

## Sign Sheeting Condition Evaluation Guide

Orange work zone signs shall be fluorescent orange in color. Signs shall have retroreflective sheeting. Signs with bends and dents that alter the size and/or shape of the sign are unacceptable. These photos are examples of the condition of the sheeting.

**Acceptable -** An acceptable sign is new, or in like-new condition. There may be abrasions on the surface but very little loss of lettering. There has been no touch-up of the lettering. The following are examples of an acceptable sign.




**Marginal -** A marginal sign has wear, but is readable. It may have many surface abrasions throughout the sign face or within the individual letters of the message. The sign surface is free of any residue. Although some color fading is evident, the background color and retroreflectivity are still apparent at night. The following are examples of a marginal sign.




**Unacceptable -** The following are examples of an unacceptable sign. Signs with asphalt splatter and/or cement slurry, or large areas of missing and/or covered reflective material are unacceptable. Letters are more than 50 percent deteriorated. There is noticeable color fading.



## Quality Standard for Barricades and Vertical Panels

This standard applies to Type I, II and Ill barricades, vertical barricades, direction indicator barricades and panels furnished by a supplier, subcontractor, or contractor for traffic control use in work zones.

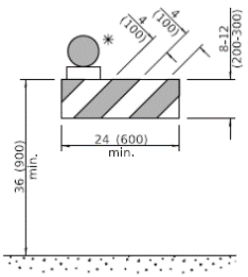
Barricade type and placement of barricades and vertical panels are specified in the contract documents. Vertical panels shall be erected and maintained in a vertical position.

Page 184 is used to evaluate the quality of the retroreflective portions of barricades and vertical panels. In addition to this evaluation, device supports must also be evaluated. **Any one or combination of the following will cause the device to be unacceptable:**

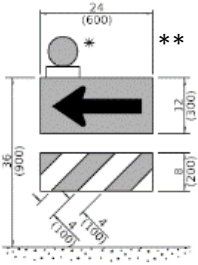
- **Deformation of the support assembly so the sheeted panel is not oriented correctly.**
- **Device is bent or legs are twisted.**
- **Rusty metal parts.**
- **Unpainted wooden rails.**
- **Broken panels.**
- **Does not meet NCHRP 350 or MASH requirements.**

## Typical Drawings of Barricades and Vertical Panels

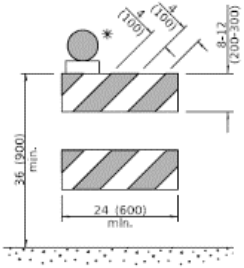
### Type I, II, and III Barricades, Direction Indicator Barricades and Vertical Panels



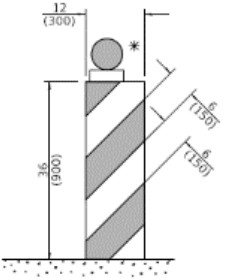

TYPE I BARRICADE



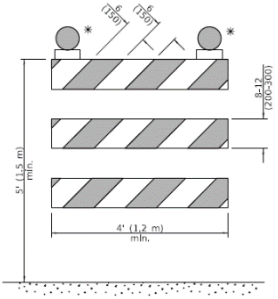

DIRECTION INDICATOR BARRICADE



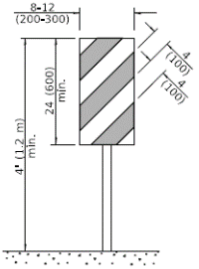

TYPE II BARRICADE




VERTICAL BARRICADE




TYPE III BARRICADE




VERTICAL PANEL
POST MOUNTED

*Warning light, if required.

**The arrow panel in direction indicator barricades shall conform to the Quality Standard for Signs.

## Barricade and Vertical Panel Condition Evaluation Guide

**Acceptable -** An acceptable panel is new, or in like-new condition. There may be abrasions on the surface but very little loss of retroreflective sheeting. The orange is vivid, and the stripes provide contrast that is clearly visible with low beam headlights at night.
The following are examples of an acceptable panel.

**Marginal -** A marginal panel has wear, but is in good condition. There are surface abrasions throughout the panel surface. Some color fading is evident. However, it is free of large areas of residue or missing reflective material. The following are examples of a marginal panel.

**Unacceptable -** The following are examples of an unacceptable panel. The surface is marred over large portions of the panel area. There is noticeable loss of reflectivity and obvious color fading.
Panels with asphalt splatter and/or cement slurry, or large areas of missing and/or covered reflective material are unacceptable.

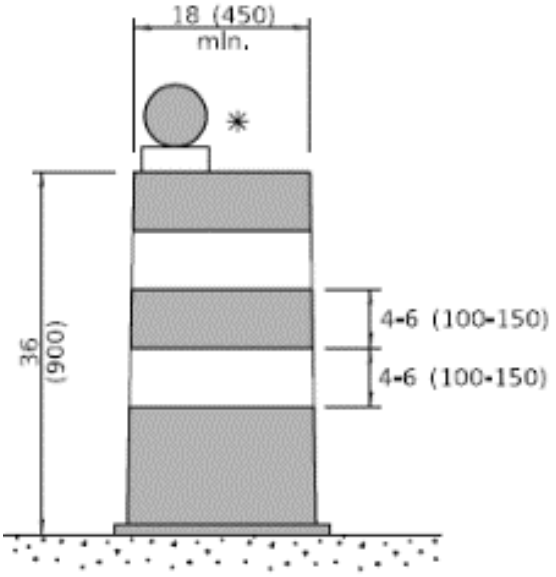
# Quality Standard for Drums and Cones

**Quality Standard for Drums**

This standard applies to drums that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Drum placement is specified in the contract documents. Page 187 is used to evaluate the general appearance of drums. In addition, drums that are dented severely enough to affect their overall dimension and shape, or contain fractures that affect their stability or ability to retain the retroreflective sheeting are unacceptable.

## Typical Drawings of Drums




**DRUM**

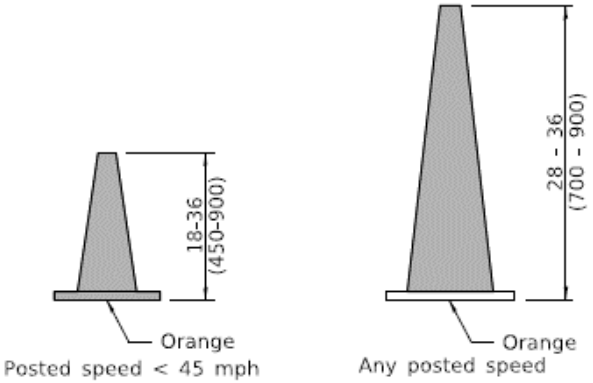
**Quality Standard for Cones**

This standard applies to cones that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

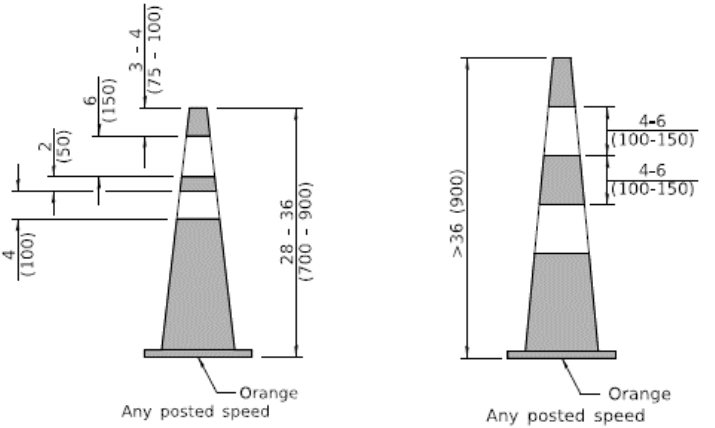
Cone placement and required minimum height is specified in the contract documents. Cones used in work zones shall be orange in color.

Page 188 is used to evaluate the general appearance of cones. In addition, cones that contain fractures that affect their stability are unacceptable.

Typical Drawings of Cones




**DAYTIME USE**




**DAY OR NIGHTTIME USE**

**CONES**

## Drum Condition Evaluation Guide

Alternating white and fluorescent orange retroreflective sheeting is required on drums. All non-reflectorized portions of the drums shall be orange**.**

**Acceptable -** An acceptable drum is new, or in like-new condition. The sheeting has only minor tears and scratches. It will readily respond to washing. The following are examples of an acceptable drum.



**Marginal -** A marginal drum has wear, but is in good condition. The sheeting has tears and scratches; however, it is free of large areas of residue or missing retroreflective material. Some fading is evident. It may not readily respond to washing. The following are examples of a marginal drum.



**Unacceptable -** The following are examples of an unacceptable drum. The large areas of missing retroreflective material make these drums unacceptable. Drums with asphalt splatter and/or cement slurry, or any large areas of missing and/or covered retroreflective material are unacceptable. Large areas of fading are evident. It will not respond to washing.



## Cone Condition Evaluation Guide

**Acceptable -** An acceptable cone is new or in like-new condition. Surfaces are free of punctures and abrasions, and the color is bright. The surfaces may be dirty, but will readily respond to washing. The following are examples of an acceptable cone.




**Marginal -** A marginal cone has wear, but is in good condition. The sheeting has tears and scratches, but it is free of large areas of residue or missing retroreflective material. Some fading is evident. It may not readily respond to washing. The following are examples of a marginal cone.




**Unacceptable -** The following are examples of an unacceptable cone. It has punctures or large areas of missing and/or covered retroreflective material. Large areas of asphalt splatter and/or cement slurry make cones unacceptable.




## Quality Standard for STOP/SLOW Paddle

This standard applies to paddles furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Paddles used in work zones shall meet the requirements of the Highway Standards and the Standard Specifications. In complying with these requirements, the Contractor and suppliers will furnish signs that are correct in size, shape, color and legend.

The "STOP" face shall consist of white letters and border on a background of red retroreflective sheeting. The "SLOW' face shall consist of black letters and border on a background of fluorescent orange retroreflective sheeting. Area outside sign borders shall be light blue or black. The staff may consist of two (2) sections joined by a coupling.

The following and page 190 should be used to evaluate the general appearance of STOP/SLOW paddles.

### STOP/SLOW Paddle Condition Evaluation Guide

**Acceptable -** An acceptable paddle is new or in like-new condition. There may be abrasions on the surface but very little loss of lettering. There has been no touch-up of the lettering. The sheeting color is vivid with contrasting colors. The paddle is not less than 6 ft or more than 7 ft from pavement to bottom of sign. The surface may be dirty but will readily respond to washing. The following are examples of an acceptable paddle.


**Marginal -** A marginal paddle has wear, but is readable. It may have many surface abrasions throughout the sign face or within the individual letters of the message. The paddle surface is free of any residue. Although some color fading is evident, the background color and retroreflectivity are still apparent at night. The surface is dirty and may not be readily cleaned. The following are examples of a marginal paddle.



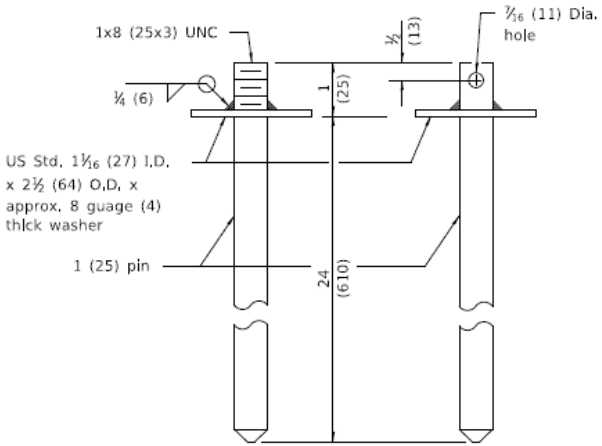
**Unacceptable -** The following are examples of an unacceptable paddle. Paddles with asphalt splatter and/or cement slurry throughout the face of the sign are unacceptable. Large areas of sheeting are missing. Some letters have a loss of more than 20 percent. Color fading is noticeable.


## Quality Standard for Temporary Concrete Barrier

This standard applies to temporary concrete barrier furnished by a supplier, subcontractor, or contractor for traffic control in work zones. Temporary concrete barrier shall conform to the Standard Specifications and Highway Standards. Temporary concrete barrier shall be identified as Illinois F Shape by stamp or paint. Temporary concrete barrier shall meet FHWA crashworthy standards Category 3, Test Level 3 requirements.

The barrier unit at each end of the installation shall be secured to the pavement or paved shoulder using six (6) anchoring pins fully embedded and protected with an accepted FHWA crashworthy device of the specified Test Level as shown on the Plans. Each approach end of the barrier shall be shielded with an approved crashworthy end treatment, regardless of placement within or outside the clear zone.

Connecting pins and anchor pins shall be according to the Highway Standards.




**CONNECTING AND ANCHOR PINS**

(End may be beveled ¼ (6) max.)

Pages 192 - 194 should be used to evaluate the general appearance of temporary concrete barrier. See page 203 for criteria regarding barrier wall reflectors.

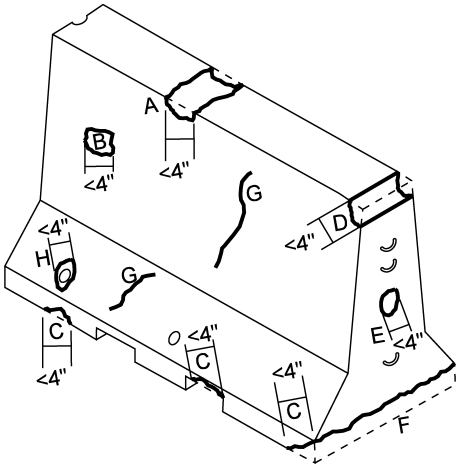
## Temporary Concrete Barrier Condition Evaluation Guide

**Acceptable -** Acceptable temporary concrete barrier wall is new or in like-new condition with few blemishes. Spalls and chipped concrete are no greater than 1.5 in. in depth. Connecting loop bars are in place and in good condition.


**Marginal -** Marginal temporary concrete barrier wall has minor spalls with hairline cracks, and minor imperfections along the base. It is still structurally sound. There are no exposed rebar. Connecting loop bars are in place and in good condition.

**Typical Safety Shape Defects**

(Not All Inclusive)




This diagram illustrates some defects that are considered marginal conditions for temporary concrete barrier units. The following page describes these defects deemed to be marginal.

**Marginal**

A. Spall on top of barrier, less than 4 in. measured horizontally, vertically, or diagonally and less than 1.5 in. in depth.
B. Spall on surface of barrier, less than 4 in. measured horizontally, vertically, or diagonally and less than 1.5 in. in depth.
C. Spall on bottom of barrier, less than 4 in. measured horizontally, vertically, or diagonally, provided the condition does not create a snag point or compromise the safety shape.
D. Spall on top corner of barrier, less than 4 in. measured horizontally, vertically, or diagonally, provided the condition does not create a snag point or compromise the safety shape.
E. Spall on the end face of barrier, less than 4 in. measured horizontally, vertically, or diagonally, provided the condition does not interfere with connecting loop bars.
F. Spall on bottom corner of barrier, less than 4 in. measured horizontally, vertically, or diagonally, provided the condition does not create a snag point or compromise the safety shape.
G. Crack tightly compressed, no longer than 1 ft, exhibiting no surface displacement and not combined with other defects.
H. Spall around pin hole, less than 4 in. measured horizontally, vertically, or diagonally.

The following are examples of marginal temporary concrete barrier wall.

**Unacceptable -** The following are examples of unacceptable temporary concrete barrier wall. The barrier wall has large spalls and cracks, with unsound concrete that could easily dislodge when hit. Rebar is exposed. The spalled wall may cause tire damage if hit, especially along the base. Spalled concrete may cause the vehicle to "snag" and twist from the direction it is going. Any spall greater than 1.5 in. in depth or a broken/damaged connecting loop is cause for rejection.

# Quality Guideline for Temporary Impact Attenuators and Temporary Sand Module Impact Attenuators

This guideline applies to sand module impact attenuators furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Sand module impact attenuator placement is specified in the contract documents. Temporary impact attenuators shall be fitted with alternating Type AA or AP fluorescent orange and retroreflective white horizontal circumferential stripes. Striping shall encircle the entire drum, and there shall be two (2) of each stripe on each module.

Sand module arrays shall retain the correct number and size of modules throughout construction, as shown in the Plans and per manufacturer specifications.

Lids shall be secured and shall prevent water infiltration. Only sand shall be placed within the attenuator modules. Sand that exceeds the maximum allowable moisture content as stated in the Standard Specifications shall be replaced. For winter applications, sodium chloride should be blended with the sand in accordance with the manufacturer's recommendations.

The Engineer shall be the sole judge as to the acceptability of damaged sand attenuators.

Pages 196 and 197 should be used to evaluate the general appearance of sand module impact attenuators.

**Other Temporary Impact Attenuators**
When other temporary impact attenuators are allowed, the following guidelines shall apply:

- Any element of the impact attenuator that has been damaged, deformed or bent will not be allowed and shall be repaired to meet NCHRP 350 or MASH requirements.
- All elements of the device shall be in place and installed in accordance with the manufacturer's specifications to meet NCHRP 350 or MASH requirements.
- The devices shall be delineated with a terminal marker on the nose, and reflectors along the sides, when specified.

## Sand Module Impact Attenuator Condition Evaluation Guide

**Acceptable -** No cracks or holes. All retroreflective stripes are present and fully encircle the device. Device has not been damaged. Sand has no more moisture content than as stated in the Standard Specifications. The following are examples of acceptable sand module impact attenuator.

**Marginal -** When any of the following conditions exist:

1) Any small holes can be easily patched.
2) Cracks are shorter than 1/4 of the smallest diameter of the drum in any direction.
3) The structural integrity of the drum has not been affected.
4) Stripes have some loss of material.

The following are examples of marginal sand module impact attenuator.

**Unacceptable -** When any of the following conditions exist:

1) All holes cannot be easily patched.
2) There is a crack which is longer than 1/4 of the smallest diameter of the drum in any direction.
3) The attenuator has been damaged such that it affects the structural integrity of the drum.
4) Retroreflective stripes are missing or do not fully encircle the drum.
5) Missing module(s).
6) Sand has become saturated.
7) Sand is bagged or other materials than sand is used.

The following is an example of unacceptable sand module impact attenuator.

# Quality Guideline for Warning Lights

This guideline applies to Type A low intensity flashing lights and Type C low intensity steady burning lights furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Warning light type, placement, and material requirements shall be as specified in the applicable traffic control standard and the Standard Specifications. Lights shall face the approaching traffic. For lights to be used in work zones, all the above requirements shall be met to the satisfaction of the Engineer.

Batteries for the lights shall be replaced on a group basis at such times as may be specified by the Engineer.

Lights shall be maintained so as to be visible on a clear night from a distance of 3000 ft.

## Evaluation Guide - Lights

**Acceptable -** When one hundred percent (100%) of the Type A or Type C lights are functioning and meet the above requirements.

**Marginal -** When all the following conditions exist:

1) More than ninety percent (90%) of the Type A or Type C lights are functioning.
2) No more than three (3) consecutive failed lights.
3) The lights meet the above requirements.

**Marginal for Tapers -** When all the following conditions exist:

1) No more than two (2) failed lights.
2) The lights meet the above requirements.

**Unacceptable -** When any of the following conditions exist:

1) Less than ninety percent (90%) of the Type A or Type C lights are functioning.
2) Four (4) or more consecutive failed lights.
3) The lights do not meet the above requirements.

**Unacceptable for Tapers -** When any of the following conditions exist:

1) More than two (2) failed lights.
2) The lights do not meet the above requirements.

## Quality Guideline for Arrow Boards

This guideline applies to arrow boards that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Arrow board placement shall be as specified in the applicable traffic control standard, the Standard Specifications, and the Traffic Control Plan. For arrow boards to be used in work zones, all the above requirements shall be met to the satisfaction of the Engineer.

Any arrow board which is out of alignment from the driver's line of vision or not placed within five (5) degrees of a horizontal position (1 in./1 ft) shall be an unacceptable device.

The Standard Specifications indicate minimum legibility distances.

### Evaluation Guide - Arrow Boards

#### Flashing Arrow Mode

**Acceptable** - All lamps or LEDs are functioning and the arrow board is dimming properly.

**Marginal** - Two (2) or less lamps or LEDs non-functioning total, with only one (1) lamp or LED non-functional in the head of the arrow. The arrow board is dimming properly.

**Unacceptable** - When any of the following conditions exist:

1) Three (3) or more lamps or LEDs non-functioning total.
2) Two (2) or more lamps or LEDs non-functioning in the head of the arrow.
3) The arrow board is not dimming properly.

#### Caution Mode

**Acceptable** - All lamps or LEDs are functioning and the arrow board is dimming properly.

**Marginal** - Minimum of four (4) lamps or LEDs functioning and dimming properly.

**Unacceptable** - When the following conditions exist:

1) Three (3) or less lamps or LEDs functioning.
2) The arrow board is not dimming properly.

# Quality Guideline for Work Zone Pavement Markings

This guideline applies to work zone pavement markings that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

Work zone pavement marking placement shall be as specified in the applicable traffic control standard, the Standard Specifications, and the Traffic Control Plan. The Standard Specifications provide requirements for pavement marking materials. All the above requirements shall be met to the satisfaction of the Engineer.

## Work Zone Pavement Markings Evaluation Guide

**Acceptable -** All pavement markings required are in place and meets the above specifications.

**Marginal -** Ninety percent (90%) or more of all pavement markings are present, and no more than two (2) consecutive skip lines are missing, and less than 50 ft of continuous solid line is missing or nonreflective.

**Unacceptable -** When any of the following conditions exist:

1) Less than ninety percent (90%) of all pavement markings are present.
2) Three (3) or more consecutive skip lines are missing.
3) More than 50 ft of continuous solid line is missing or nonreflective.

# Quality Guideline for Removal of Conflicting Pavement Markings

This guideline applies to the removal of conflicting pavement markings by a subcontractor or contractor for traffic control in work zones.

Work zone pavement markings removal shall be as specified in the applicable traffic control standard, the Standard Specifications, and the Traffic Control Plan.

Consideration should be given to removal of existing pavement markings adjacent to edge lines, but outside the traveled way, which conflict with the new travel pattern.

All the above requirements shall be met to the satisfaction of the Engineer.

This guideline applies to pavement markings removal performed by the Contractor for traffic control in work zones.

The following and page 202 should be used to evaluate the general appearance of removal of conflicting pavement markings.

## Removal of Conflicting Pavement Markings Evaluation Guide

**Acceptable -** All conflicting pavement markings have been removed, and the removal meets the above specifications. The following are examples of acceptable removal of conflicting pavement markings.

**Marginal -** No more than ten percent (10%) of conflicting pavement markings are present. No more than ten percent (10%) of any individual conflicting line is present. The following are examples of marginal removal of conflicting pavement markings.

**Unacceptable -** When any of the following conditions exist:

1) More than ten percent (10%) of conflicting markings are present.
2) Conflicting letters or symbols are present.
3) More than ten percent (10%) of any individual conflicting line is present.
4) Lines or pavement markings are present outside of new traveled way that may confuse road users.

The following are examples of unacceptable removal of conflicting pavement markings.

# Quality Guideline for Reflectors on Pavement or Barrier Wall

This guideline applies to reflectors used in work zones to delineate the pavement or temporary concrete barrier that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

The placement of pavement or temporary concrete barrier reflectors shall be as specified in the applicable traffic control standard and the Traffic Control Plan. The Standard Specifications provide requirements for the reflectors. All the above requirements shall be met to the satisfaction of the Engineer.

The color of the reflectors shall be as specified in the Contract or shall match the color of the pavement marking they are supplementing; otherwise the reflectors are unacceptable.

## Reflectors on Pavement or Barrier Wall Evaluation Guide

**Acceptable -** All reflectors are in place and meet the above specifications.

**Marginal -** Ninety percent (90%) or more of all reflectors are present, having no more than two (2) consecutive reflectors missing.

**Unacceptable -** When any of the following conditions exist:

1) Less than ninety percent (90%) of all reflectors are present.
2) Three (3) or more consecutive reflectors are missing.
3) Reflector colors are incorrect.
4) Reflectors are not bi-directional or placed back-to-back, where required.

# Quality Guideline for Painting Curbs and the Slope of Temporary Concrete Barrier

This guideline applies to painting the slope of curb and lower slope of temporary concrete barrier to supplement the delineation of the pavement markings that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

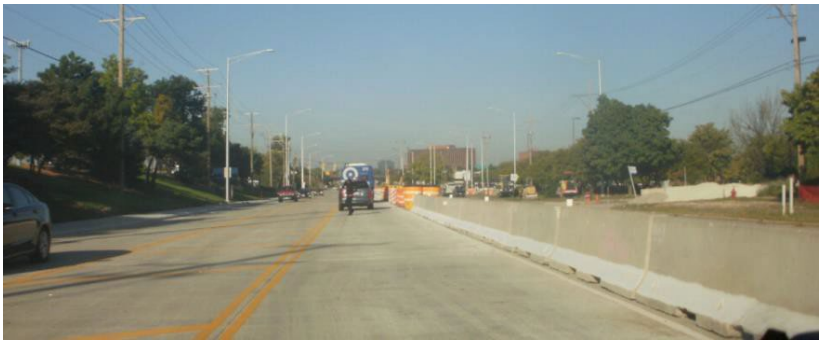
The placement of paint on curb or the lower slope of temporary concrete barrier shall be as specified in the applicable contract documents and the Traffic Control Plan. All the above requirements shall be met to the satisfaction of the Engineer.

The curb or lower slope of temporary concrete barrier wall color shall be as specified in the Contract or shall match the color of the pavement marking it is supplementing.

The following and page 205 should be used to evaluate the general appearance of painting the lower slope of temporary concrete barrier.

## Curb and the Lower Slope of TCB Painting Evaluation Guide

**Acceptable -** Curb or lower slope of temporary concrete barrier has correct temporary marking in place and meet the above requirements. The following is an example of acceptable painting the lower slope of temporary concrete barrier.



**Marginal -** When any of the following conditions exist:

1) No more than two (2) consecutive barrier units have different colors on the lower slope of the barrier wall.
2) No more than 25 ft of curb or no more than one (1) barrier unit has different color than the pavement marking it is supplementing.

The following is an example of marginal painting the lower slope of temporary concrete barrier.

**Unacceptable -** When any of the following conditions exist:

1) Two (2) or more consecutive barrier units have different colors on the lower slope of the barrier wall.
2) More than 25 ft of curb or the lower slope of the barrier unit has incorrect colors not matching the pavement marking it is supplementing.

The following are examples of unacceptable painting the lower slope of temporary concrete barrier.

# Quality Guideline for Portable Changeable Message Signs

This guideline applies to portable changeable message signs (PCMS) that are furnished by a supplier, subcontractor, or contractor for traffic control in work zones.

PCMS placement shall be as specified in the applicable traffic control standard, the Standard Specifications, and the Traffic Control Plan. The Standard Specifications provide the requirements for PCMS. For PCMS to be used in work zones, all the above requirements shall be met to the satisfaction of the Engineer.

Any PCMS which is not visible from 1300 ft under both day and night conditions and the letters are not visible from 750 ft shall be considered an unacceptable device.

Any PCMS which is out of alignment from the driver's line of vision or not placed within five (5) degrees of a horizontal position (1 in./1 ft) shall be considered to be an unacceptable device.

## Portable Changeable Message Signs (PCMS) Evaluation Guide

**Acceptable -** All lamps, discs, or LEDs are functioning and the PCMS is dimming properly.

**Marginal -** No more than two (2) lamps, discs, or LEDs are non-functioning per each character, with no more than four (4) lamps or discs non-functioning per message, and the PCMS is dimming properly.

**Unacceptable -** When any of the following conditions exists:

1) Three (3) or more lamps, discs, or LEDs are non-functioning per each character, or five (5) or more are non-functioning per message.
2) The PCMS is not dimming properly.
3) More than three (3) phases are displayed.

# Quality Guideline for Personal Protective Equipment

This guideline applies to all personnel on foot, excluding flaggers, within the highway right-of-way.

The Standard Specifications require that "All personnel on foot, excluding flaggers, within the highway right-of-way shall wear a fluorescent orange, fluorescent yellow/green, or a combination of fluorescent orange and fluorescent yellow/green vest meeting the requirements of ANSI/ISEA 107-2004 or ANSI/ISEA 107-2010 for Conspicuity Class 2 garments."

The following should be used to evaluate the general appearance of garments (vests shown).

## Vest Condition Evaluation Guide

**Acceptable**
An acceptable garment is new, or in like-new condition. The color contrast is vivid, has high reflectivity, is not faded or soiled, and is visible from 1000 ft.

**Marginal**
A marginal garment has good reflectivity, but exhibits some soiling and light fading of material.

**Unacceptable**
An unacceptable garment has poor reflectivity. It has significant fading or soiling. Colors have poor contrast. It is not visible from 1000 ft away day or night.

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