Corporate Safety & Health Procedures

Working on and Near the Roadway

CSH-518

Revision 1.0

Approval Date: 12/22/2017

Implementation Date: 2/1/2018

Document Owner: Garret J. Miller

INTERNAL

The most current revision of this document can be found in the department SharePoint Site.

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Revision History

Revision	Approval Date	Implementation Date	Revision Description
1.0	12/22/2017	2/1/2018	• Initial Document

Approvals

Area	Title	Signature	Approval Date
Corporate Safety & Health	Director of Corporate Safety	Garret J. Miller	12/22/2017

A. Purpose

This procedure covers temporary traffic control (TTC) practices and working on or near the roadway guidelines for all MDOT and non MDOT roadways, with the exception of limited access highways and freeways.

TTC is important for the safety of all employees and the public. TTC involves traffic control devices including cones, flags, signs, lighted arrow panels, and parking vehicles and equipment.

B. Scope

- This procedure applies to ALL CONSUMERS ENERGY AND CMS ENERGY COMPANIES and departments.
- Refer to *Temporary Traffic Control Questionnaire* for guidance on selecting the appropriate site plan.

C. Abbreviations and Definitions

1. **"A" Distance** – The minimum distance between traffic signs.
2. **"B" Buffer Space –** The minimum space left vacant as a buffer to separate the traffic flow from the work activities.
3. **Lateral Buffer –** Space that may also be used to separate traffic flow lateral work activities being performed.
4. **Longitudinal Buffer-** the buffer space placed in the initial portion of a closed lane in advance of the work space.
5. **Channelizing Devices –** Cones, barrels, barricades, drums, and markers that comply with the manual on uniform traffic control devices. Refer to the individual TTC plans for guidance.
6. **Cone Spacing –** Spacing between cones is dependent on the speed of the roadway in which work is being performed on.
   a. Parallel to traffic flow: Feet (max.)= 2x (posted limit in mph)
   b. Along the taper: Feet (max.)= (posted limit in mph)
7. **Employee –** A worker (company or contractor) who may be involved with the use or maintenance of company owned equipment or facilities
8. **Limited Access Highways and Freeways –** Off and on ramps, highways and freeways, expressways that occupies high speed traffic which has limited to no access to adjacent property and in some degree a separation between opposing traffic.
9. **"L" Taper Length –** The minimum length of taper used for closing a lane with channelizing devices.

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Type of taper	Taper length
Upstream tapers	
Merging taper	L minimum
Shifting taper	½ L minimum
Shoulder taper	⅓ L minimum
Two-way traffic taper	100 feet maximum
Downstream tapers	100 feet minimum
(use is optional)	
Formulas for L**	
Speed	Formula
40 mph or less	$L = \frac{WS^2}{60}$
45 mph or greater	L = W x S

** L = Taper length in feet.
W = Width of offset in feet.
S = Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

10. **Mobile Work –** Work that continuously moves without stopping (i.e. patrolling, damage assessment).
11. **MMUTCD –** Michigan Manual of Uniform Traffic Control Devices
12. **Pedestrian Facilities** - Venues of public congregation such as shopping centers, hospitals, bus stops, and like infrastructures.
13. **Restricted Visibility –** The inability for the traffic to identify our work area with the warning provided (i.e. hills, curves, weather, solid yellow lines, etc.) which may require additional TTC devices and assistance.
14. **Rural Worksites** – Outside of a city or town limits.
15. **Self-Regulating** – When traffic flow is capable of safely maneuvering around the work area while TTC is utilized (i.e. low speed, low volume, and unrestricted visibility).
16. **Short Duration** – Work that can be completed within one hour shall have cones and lights. If work extends beyond one- hour TTC must be configured based on worksite demands, use questionnaire and site plans for direction on signs and additional warning equipment (i.e. troubleshooting, diagnostic, survey, appliance light up, etc.).

NOTE When work is less than 1 hour and requires a lane closure, has restricted visibility, and/ or the ability to not self-regulate respective traffic control plans must be utilized for safety.

17. **Sign Trailer** – Trailers equipped with additional TTC equipment and guidelines assigned to gas and electric departments at service centers to be used for larger work.

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18. **Speed** –
    a. **Low** – 0 to 45 mph
    b. **High** - > 45 mph
    c. **All** – encompasses both low and high traffic speeds
19. **"S" Sight Distance** – The sight distance required for a driver to see the start of the TTC devices. If any obstruction limits the sight distance to less than "S" (indicated in the TTC plans) adjust the TTC plan to provide additional warning.
20. **TTC** – Temporary Traffic Control
21. **Traffic Regulator** – May be required when traffic lane is closed on a 2-way, 2-lane roadway or where equipment operation interrupts traffic.
22. **Traffic Volume (flow rate)** – Number of vehicles passing a point on the roadway during a specified time.
    a. **Low** - 0-17 vehicles/ hour (less than 3 vehicles in 5 minute)s on road where work activities are being performed. (based on MUTCD low volume roads of 400 vehicles/day)
    b. **High** - >17 vehicles/ hour (more than 3 vehicles in 5 minutes) on road where work activities are being performed
    c. **All** – encompasses both low and high traffic volumes
23. **Urban Worksites** – City or town limits (parking and pedestrian activity is occurring).
24. **Work Area (Utility Work Zone)** – Utility work conducted by a work crew and vehicle with flashing and high intensity lights, the portion of the roadway between the following points is the work area.
    a. A point 150' behind vehicle or if closer, the point where the lights first become visible behind the vehicle.
    b. A point 150' in front of vehicle or if closer, the point where the lights first become visible in front of the vehicle.

D. Responsibilities

1. **Employee -** Performs pre-use inspection of TTC equipment. Uses TTC plans that provide the most protection, with consideration of closing the road. Employees will report any defective equipment for replacement.
2. **Local Management (Field Leader/Supervisor) -** Provide, install, and maintain a program of signs, signals, and barricades (including sign trailers and inventory within) where employees or the general public might be or would likely be injured if not alerted to the hazard. New equipment is ordered through the purchasing department. Damaged and defective equipment is disposed of in the general disposal receptacle.
3. **Operations Management -** Ensures program and TTC plans are adhered to, and those that provide the most protection are used.
4. **Corporate Safety & Health (CS&H) -** Responsible for the Working On and Near the Roadway program. Manages changes relevant to Working On and Near the Roadway program and Temporary Traffic Control plans. Reviews plans and training for adherence with Company policy and regulatory requirements
5. **Purchasing -** Fulfills orders of new TTC equipment

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E. Procedure

1. Requirements

1.1. The TTC plans are minimum guidelines.

1.1.1. Consider utilizing more barricading devices and signs.

1.1.2. Consider speed reductions on roads above 45 mph.

1.1.3. Drive through the work area after traffic control devices are in place to ensure safe passage for motorists.

1.1.4. When work requires employee(s) to be in the roadway to perform work (operating downriggers, getting tools or supplies, welding or using equipment on the rear of the vehicle, etc.) place cones on side and/or rear of vehicle creating a barricade between employee and traffic.

1.1.5. For light duty vehicles (i.e. – cars, vans, and pick-up trucks) TTC is not required when parking is allowed on the street. Consider using cones/lights for additional visibility.

1.2. Some County and City governments require additional signage. Contact your Field Leader for local requirements (i.e. *Work Zone Begins*, *Work Zone Ends*, *Injure or Kill Worker*, etc.).

1.3. When high visibility lighting is available, the use of 4 way hazard lights is not required.

1.4. When vehicle is parked in or near road right of way high visibility lights are required.

1.5. Dos and Dont's of Working on or Near the Roadway

1.5.1. Recommended Actions:

1.5.1.1. Use the work vehicle as protection and warning whenever possible.

1.5.1.2. Find the safest location available to park or unload equipment.

1.5.1.3. Work on the same side of the road as the work vehicle and use warning lights whenever possible.

1.5.1.4. Take advantage of any resources providing protection and warning without causing additional exposure (buffer/shadow vehicle, TTC plans, etc.).

1.5.1.5. Plan ahead. Poor planning is not an excuse for lack of equipment, devices, or awareness of traffic conditions.

1.5.2. Actions to Avoid

1.5.2.1. Running across live lanes of traffic.

1.5.2.2. Surprising drivers.

1.5.2.3. Turning your back to oncoming traffic, if possible. If not possible, use a spotter.

1.5.2.4. Assuming shoulder areas are automatically safe. Distracted, aggressive, or impaired drivers or oversized loads may encroach.

1.5.2.5. Working in a live lane under adverse traffic conditions or without proper traffic control in place, even if it is only for a few minutes or a few seconds.

1.5.2.6. Taking "short cuts" or hurry to accomplish work. Identification of all work zone hazards are a must.

2. Arriving on Site

2.1. Before work begins on or near the roadway, conduct a Tailboard Conference. Discuss the following topics related to working on and near the roadway:

- Duration of work
- Ensure to follow governing municipalities TTC requirements outlined in the permit (if present in work packet or provided)
- Roadway type (2 lane or multi lane road)
- Speed postings
- Visibility (curves, hills, weather, etc.)
- Traffic control devices needed
- Traffic regulators needed (See CSH-518-JA4 Traffic Regulator Roles & Responsibilities)
- Vehicle and equipment parking and placement
- Law enforcement assistance
- Potential hazards and mitigation options, such as:
    - Exposure to traffic while retrieving tools and supplies from the vehicle
    - Distracted drivers
    - Worker distractions
    - Public Safety (pedestrian and traffic)
    - Weather conditions

2.2. Work Sites

2.2.1. Whenever possible, park vehicles and equipment:

2.2.1.1. As far off the traveled portion of the road.

2.2.1.2. Facing in the same direction as the flow of traffic.

2.2.1.3. ONLY when required ,with caution park vehicles contrary to traffic flow:

2.2.1.3.1. Position vehicles so headlights do NOT blind oncoming traffic.

2.2.1.3.2. Be sure to turn on the 4-way flasher and overhead rotating light, and turn off headlights.

2.2.1.4. On the same side of the street as the work site.

2.2.1.5. In a manner that shields workers from traffic hazards and the flow of traffic in and around the work site.

2.2.1.6. NEVER park vehicles or equipment on train tracks. Park no closer than 15ft from train tracks.

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2.3. Public Safety

2.3.1. Do NOT close a walkway solely for parking vehicles.

2.3.2. Provide a safe, convenient path for pedestrian travel with equivalent width and accessibility.

2.3.3. Do NOT lead pedestrians into conflict with traffic or work vehicles.

2.3.4. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

2.4. Traffic Regulator(s)

Traffic regulator(s) (formerly called Flaggers) may be required when a traffic lane is closed on a 2-way, 2-lane roadway or where equipment operation interrupts traffic.

2.4.1. Responsibilities

2.4.1.1. Wear company approved visibility vests when directing traffic, as well as head and eye protection.

2.4.1.2. DO NOT perform any other duties whiles regulating traffic flow.

2.4.1.3. DO NOT use personal electronic devices such as cell phones (when not used for traffic communication), MP3 players, etc., that can distract them or impair their vision and/or hearing.

2.4.1.4. When working at night:

2.4.1.4.1. The regulator's area must be preceded by an advance warning sign or signs, and be illuminated with high intensity lighting.

2.4.1.4.2. Ensure all lighting is directed so that it doesn't blind oncoming vehicle traffic.

2.4.2. Communications

2.4.2.1. For difficult site conditions, additional communication aids between traffic regulators may be needed, such as:

- Vehicle radios
- Portable radios
- Cell phones
- Third person relay
- Non-company traffic control services

2.5. Traffic Control – Regulator Signals

2.5.1. Traffic regulators must signal with a Company-approved, hand-held traffic regulator sign that has "STOP" on one side, "SLOW" on the other, and a staff 6' in length.

2.5.1.1. Traffic regulators must be positioned in work zones so they have an escape route or are not exposed to traffic/equipment approaching them from behind.

2.5.1.2. Remove the traffic regulator road sign when the work no longer requires a traffic regulator.

2.5.1.3. The traffic regulation station must be illuminated when working at night.

2.5.2. Stopping Traffic

2.5.2.1. Hold left hand high with palm toward traffic.

2.5.2.2. Hold the "STOP" side of the sign (facing motorist) in right hand, away from the body.

2.5.2.3. Be alert and aware of a personal escape route to use if exposed to danger

2.5.3. Signaling Traffic to Proceed

2.5.3.1. Check that the lane is clear.

2.5.3.2. Turn the sign to "SLOW" side (facing motorist).

2.5.3.3. Use the left hand to motion motorist to proceed.

2.5.4. Slowing Traffic to a Reasonable Speed

2.5.4.1. Use hand signals to slow traffic until speed is reduced to desired level.

2.5.4.2. Use hand signals from Signaling Traffic to Proceed section within this Practice.

2.5.5. Stopping Traffic from Both Directions

2.5.5.1. Position a traffic regulator on each end of work area.

2.5.5.2. Use hand signals for stopping traffic (See Stopping Traffic section within this Practice).

3. Setting up worksite for working on or near the roadway

NOTE TTC equipment needed: Cones, signs.

3.1. Refer to the *TTC Questionnaire* or use the *TTC plan list*.

3.1.1. Based on the assessment of working on and near the roadway during Tailboard Conference, identify TTC plan that outlines the required plan and equipment.

3.2. When the appropriate plan and equipment is identified inspect equipment being used for TTC.

3.2.1. Visually inspect the equipment prior to use for defects and damage. Replace equipment if equipment does not pass the visual inspection.

3.3. Follow the specific TTC plan identified for placement of channelizing devices, signs, public safety, lighting (as applicable by plan), etc.

3.3.1. **Sign Location** - Place signs 6- 12 feet of the edge of the traveled lane and no closer than 2 feed to the back of the curb.

3.3.2. **Arrow Panel Location** - Stationary lane closure, place arrow panel on the shoulder at the beginning of the taper, where the shoulder is narrow place the arrow panel in the closed lane.

3.3.3. **Public Safety** - See TTC plans identified for routing pedestrian safely around worksite.

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4. Performing Work on or Near the Roadway

4.1. Number and Placement of TTC - Ensure the correct number of signs and channelizing devices are in place prior to work being performed. Reassessment of the work space must be performed when changes take place that would put employees and public at further risk of injury by working on or near the roadway.

4.1.1. Excavated soil and materials must be barricaded if placed on road or sidewalks.

4.1.2. Do not hold Tailboard Conference or any other conversations in the roadway.

4.1.3. **Locations (including excavations) Left Unattended** - Cones, fencing, barricading and warning ribbons must be utilized to protect employees and public (including flashing lights during times of darkness).

4.1.4. **Vacated Sites (At the end of day and returning)** - When work activities are on or near the roadway and TTC signs are utilized, remove the signs or they shall be disassembled, (legs separated from bases), and laid flat on the ground, with legs pointed downstream from traffic, outside the shoulder area of the roadway.

4.1.5. **Working At Night** - When using lighting to light up a work area, make sure lighting is directed so that it does not blind oncoming vehicle traffic.

NOTE Plans may be combined to provide maximum protection, more cones and signs may be added.

CAUTION

Employees should add to TTC plans for additional safety precautions (adding cones and signs), when doing so be aware of additional exposure to traffic hazards.

4.2. When not necessary for current work conditions, any lane closure, shoulder closure, or traffic shift specified for the project, shall be taken down on a daily basis.

4.3. All TTC equipment must be collected and stowed within 1 week of the job being complete. If returning to the job the next day, refer to section 4.1.5 for proper handling of signage.

4.4. Handle and stow TTC equipment in a manner which prevents damage. Secure equipment to the vehicle to prevent unwanted release when traveling down the road.

4.5. All signs and cones used from the sign trailer must be returned.

4.6. Discard any damaged or worn TTC equipment in the trash receptacle or send to investment recovery. Damaged or worn equipment includes:

4.6.1. Reflective ribbon torn or missing

4.6.2. Broken brackets or damaged Velcro

4.6.3. Metal stand not in functioning order

NOTE Stands may need WD 40 (refer to SDS for safety information) as they have springs and metal hinges that are out in the weather.

F. Legal Requirements

1. Some County and City governments require additional signage. Contact your Field Leader for local requirements.

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2. This procedure does not apply to limited access highways and freeways or work that is considered long term (3 days or more).

G. Training

1. Employees shall receive initial and refresher training that meets the requirements of the policy.

   Refresher training may be presented in the format of a safety meeting and will be provided when:

   1.1. New procedures, safety rules, or work methods are introduced.

   1.2. Problems or deficiencies are noted.

2. Employees receive training through HSE annual training.

H. References

The following documents were used to create this procedure or should be used in conjunction with this procedure. Consult these documents for other applicable information.

- *CSH-518-JA1 TTC Tables for Warning Signs, Tapers and Sight Distance*
- *CSH-518-JA2 Recommended TTC Devices on Company Vehicles*
- *CSH-518-JA3 TTC Devices in Sign trailers*
- *TTC Questionnaire and Plan List*

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TTC Tables for Warning Signs, Tapers, & Sight Distance

Warning Signs

1. Recommended Advance Warning Sign Minimum

Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)*	100 feet	100 feet	100 feet
Urban (high speed)*	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

*Speed category to be determined by the highway agency

** The column headings A, B, and C are the dimensions shown in the Figure above. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Sight Distance

1. Stopping Sight Distance as a Function of Speed

Speed	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

*Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed.

Tapers

1. Taper Length Criteria for Temporary Traffic Control Zones

Type of Taper	Taper Length
Merging Taper	At least L
Shifting Taper	At least 0.5 L
Shoulder Taper	At least 0.33 L
One-Lane, Two-Way Traffic Taper	50 feet minimum, 100 feet maximum
Downstream Taper	50 feet minimum, 100 feet maximum

Note: Use table below to calculate L

Formulas for Determining Taper Length	
Speed (S)	**Taper Length (L) in feet**
40 mph or less	$L= \frac{WS^2}{60}$
45 mph or more	L= WS

Where: L = taper length in feet

W = width of offset in feet

S = posted speed limit, or off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph

Recommended TTC Devices on Company Vehicles

Company Trucks

1. Signs listed in the following table are in select Company trucks. Report missing or damaged signs and devices to a Field Leader for replacement. See table below.

TTC Devices on Select Company Trucks		
Description	**Quantity**	**Material No.**
Cone, traffic (28 in)	6-9	10076702
Truck sign stand	4	10174196
Wind bracing	4	10080048
Sign: Utility Work Ahead	2	10174250
Sign: One Lane Road Ahead	2	10174335

TTC Devices in Arrow Board Trailers

Arrow Board Trailers

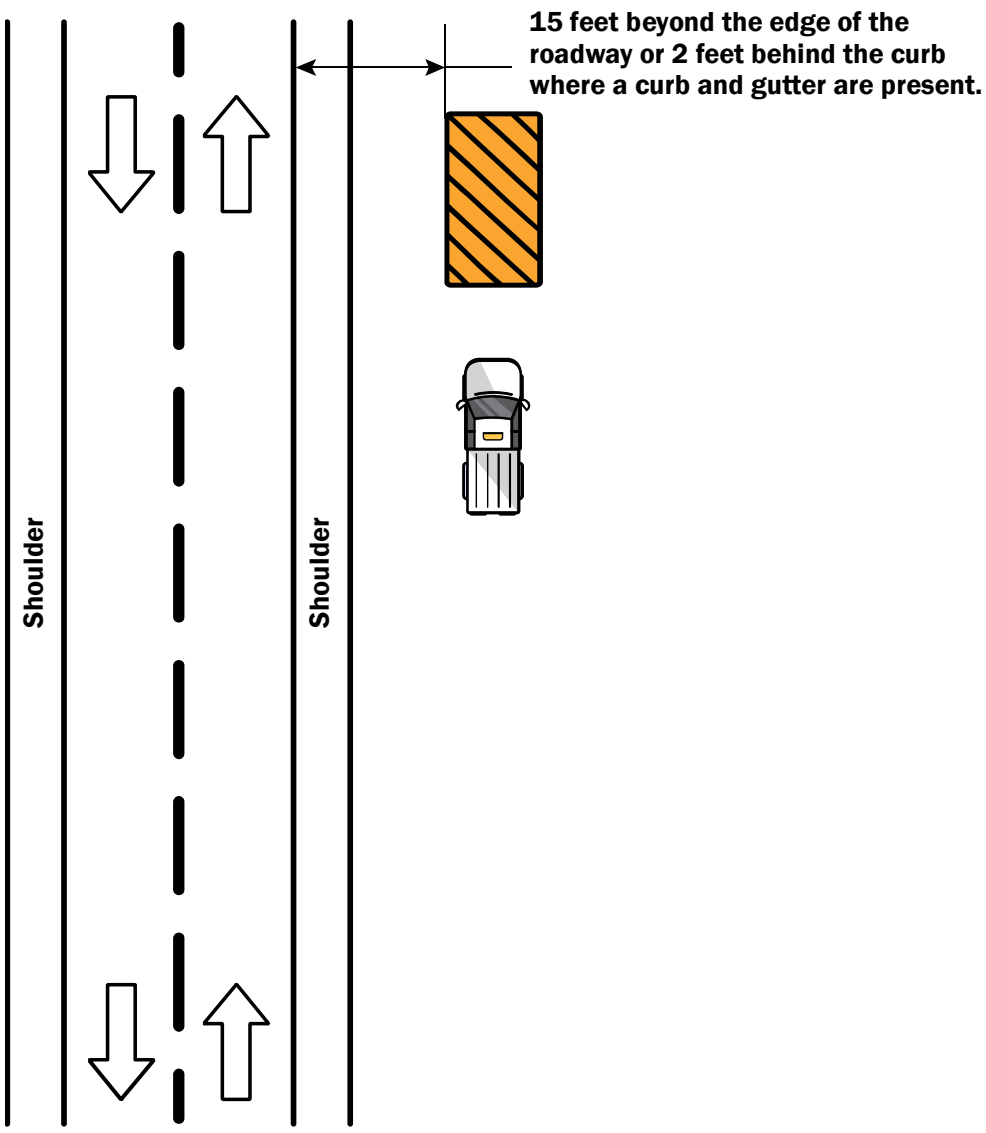
1. Signs that are listed in the following table are stored in the company "Arrow Board Trailers." Report missing or damaged signs and devices to a Field Leader for replacement. See figure below.

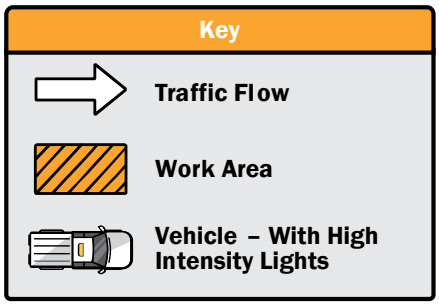
TTC Devices in Arrow Board Trailers		
Description	**Quantity**	**Material No.**
Cone, traffic (28 in.)	30	10076702
Sign stand (5 ft. & 7 ft. sign height)	12	10076907
Sign: Utility Work Ahead	4	10080031
Sign: Shoulder Closed Ahead	2	10080043
Sign: One Lane Road Ahead	2	10080029
Sign: Yield to Oncoming Traffic	2	10079523
Sign: Right Lane Closed Ahead	2	10080062
Sign: Overlay: Left Lane – Center Lane	2	10080045
Sign: Reduce Speed Ahead	2	10080023
Sign: Be Prepared to Stop	2	10079511
Symbol: Right Lane Reduction	2	10080064
Symbol: Left Lane Reduction	2	10080066
Symbol: Traffic Regulator	4	10080027
Sign: Stop/Slow – 6 ft. shaft	2	10079873
Sign: Speed Limit 45	4	10076903
Sign: Overlay: 50-55	4	10076909

TTC Plan 1

Work Beyond Shoulder – Parking Beyond Shoulder (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Parking/Work Area –**
  - 15 feet beyond the edge of the roadway.
    OR
  - 2 feet beyond the curb where a curb and gutter are present.
- **Requirements –** Lights.



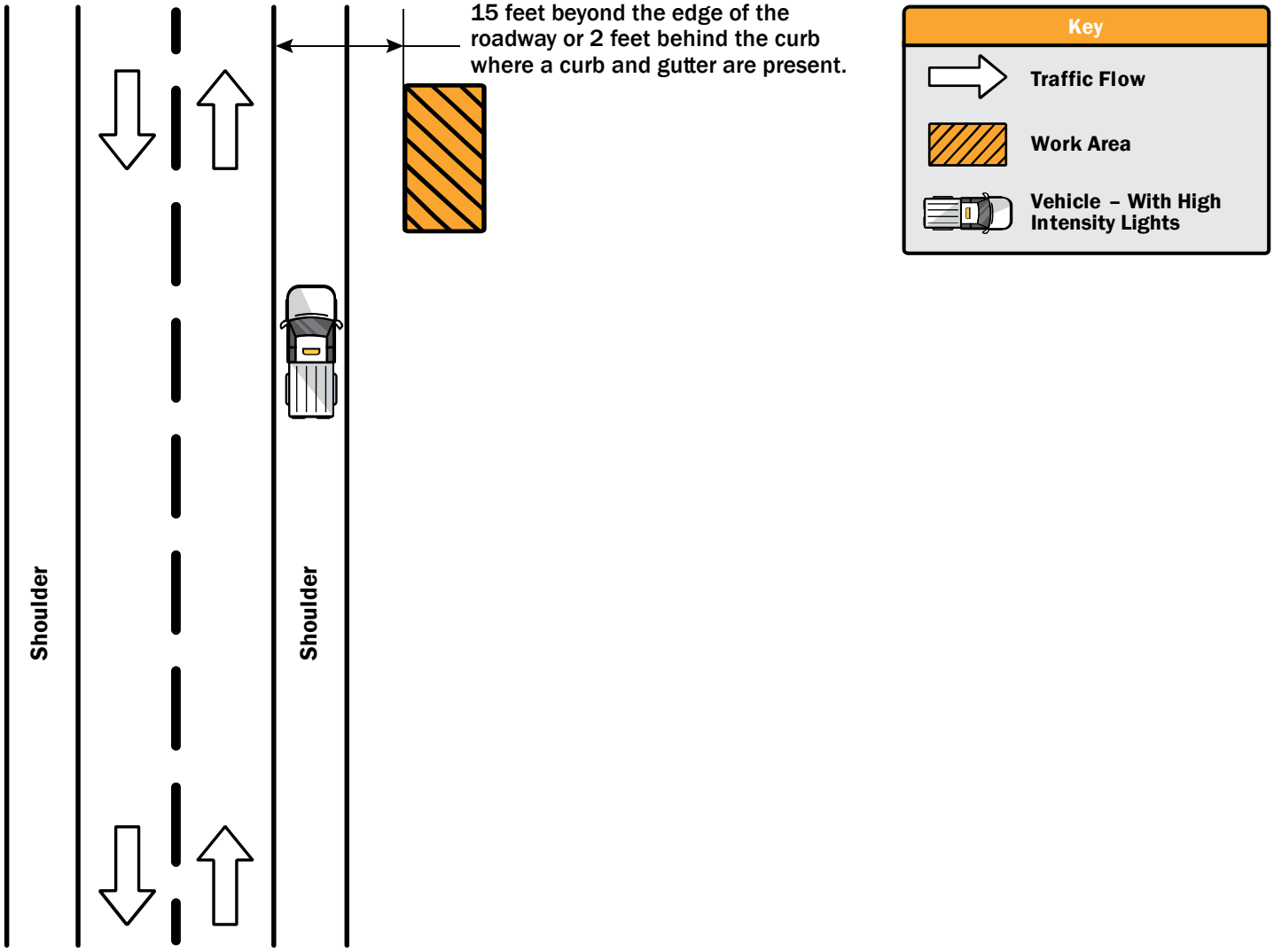


TTC Plan 2

Work Beyond Shoulder – Parking on Shoulder (Low Volume/45 MPH and below)

- **Speed –** 45 MPH and below
- **Traffic Volume –** Low
- **Parking –** On the shoulder
- **Work Area –**
  - 15 feet beyond the edge of the roadway
    OR
  - 2 feet beyond the curb where a curb and gutter are present
  - No encroachment (for minor encroachment use TTC Plan 3)
- **Requirements –** Lights.

NOTE: When work requires employee(s) to be in the roadway to perform work, use TTC Plan 3.

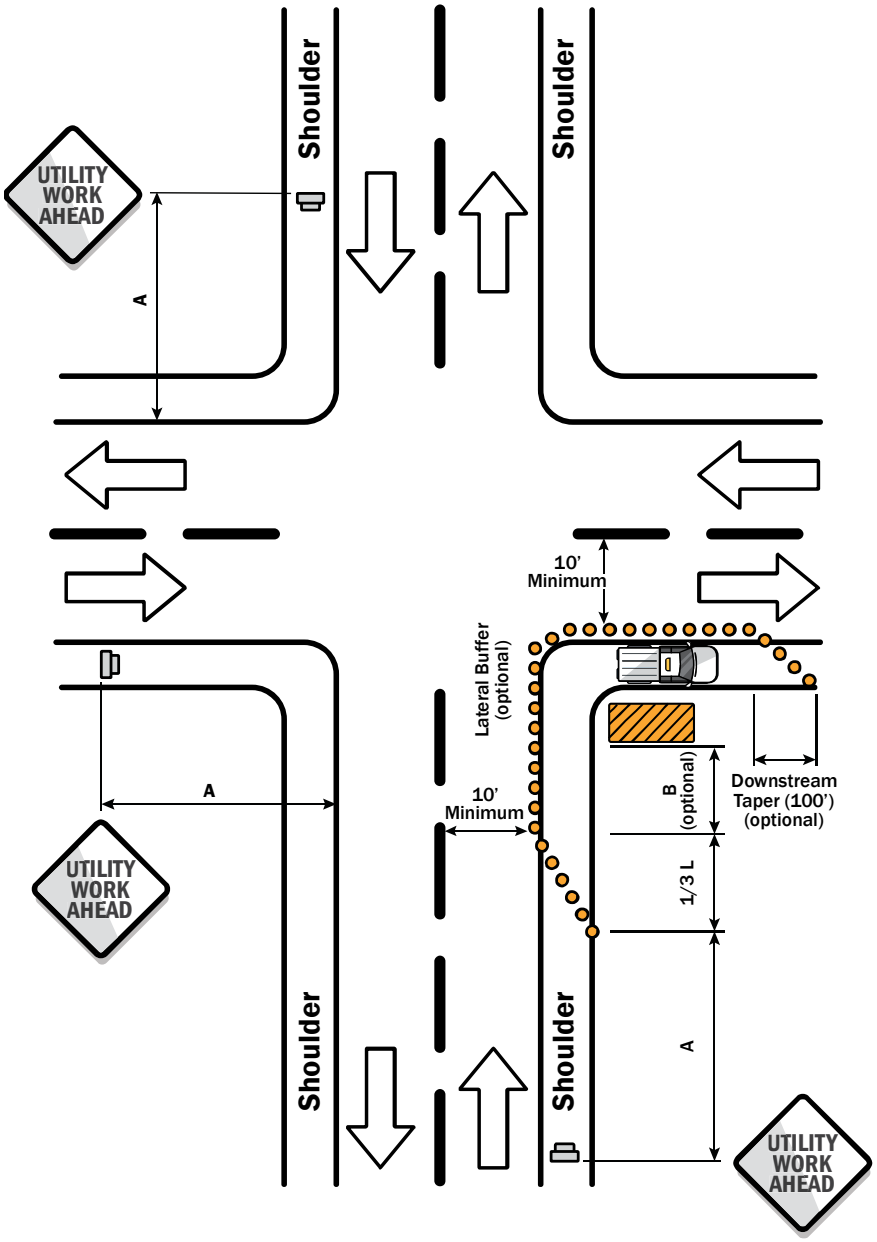


TTC Plan 7

Work Beyond Shoulder at Corner of Intersection – Parking on Shoulder (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Parking –** On the shoulder
- **Work Area –**
  - Beyond the shoulder at the corner of an intersection.
  - A minimum of 10 feet of the traveled lane is available (minor encroachment).

NOTE: When possible, park vehicles in a manner that shields workers from traffic hazards and the flow of traffic in and around the work site.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

Minimum Di stances

Road Type	A
Urban ≤ 30 MPH	100 Feet
Urban > 30 MPH	350 Feet
Rural	500 Feet

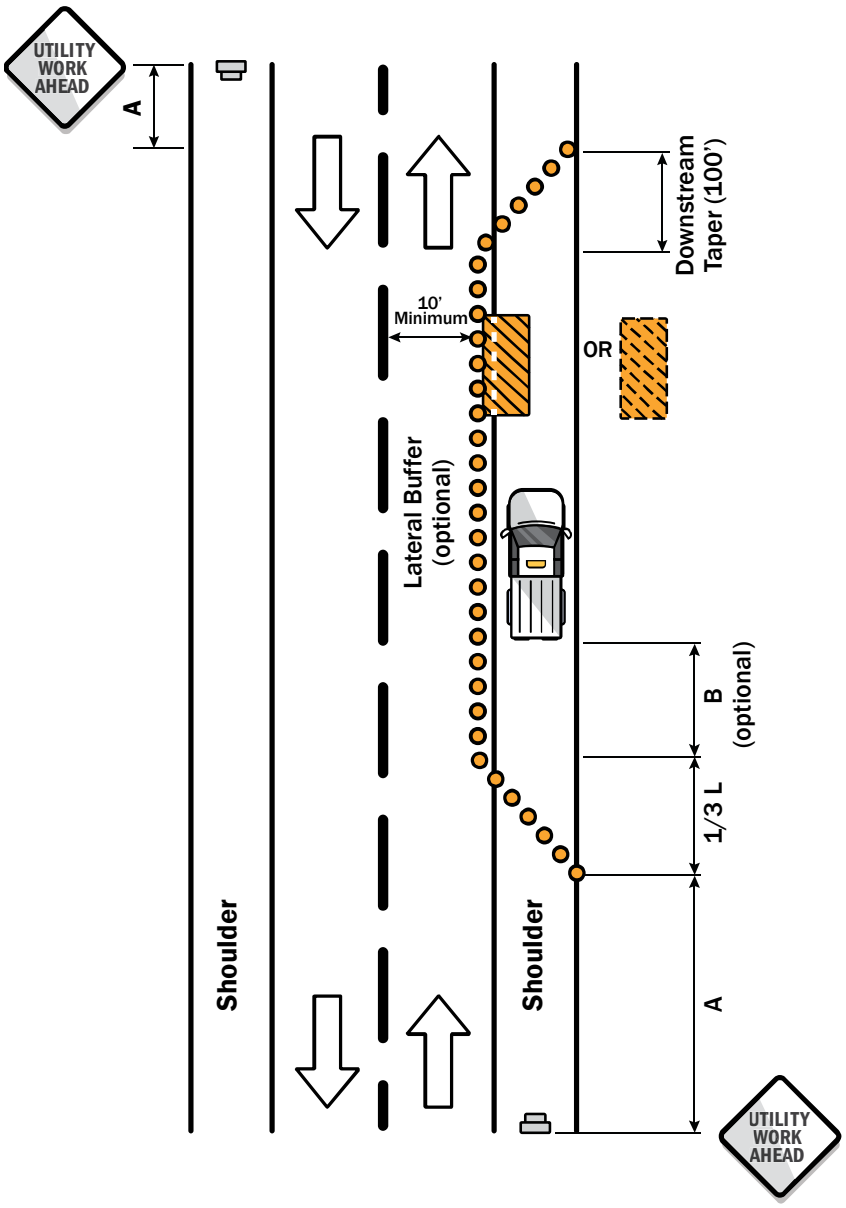
TTC Plan 3

Work Outside Roadway – Minor Encroachment (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Parking –** On the shoulder
- **Work Area –**
  - No lane closure on two-lane road.
  - A minimum of 10 feet of the traveled lane is available (minor encroachment).

NOTE:

1. For optional speed reduction, see TTC Plan 8.
2. For less than 10 feet of traveled lane refer to lane closure TTC Plan 15 or TTC Plan 16.
3. When parking is permitted on a residential street (25 MPH or less) and traffic can self-regulate, the minimum lane requirement of 10 feet can be reduced.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

Minimum Di stances

Road Type	A
Urban ≤ 30 MPH	100 Feet
Urban > 30 MPH	350 Feet
Rural	500 Feet

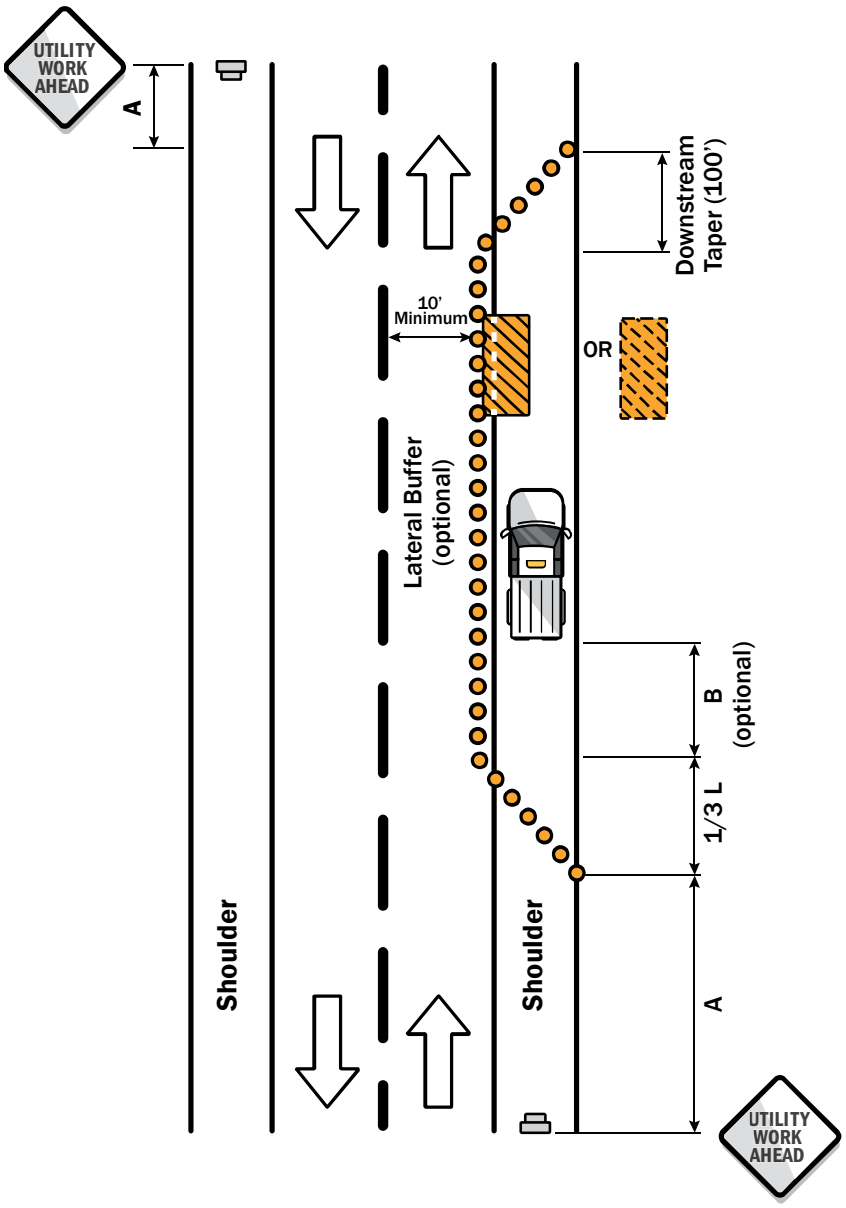
TTC Plan 3

Work Outside Roadway – Minor Encroachment (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Parking –** On the shoulder
- **Work Area –**
  - No lane closure on two-lane road.
  - A minimum of 10 feet of the traveled lane is available (minor encroachment).

NOTE:

1. For optional speed reduction, see TTC Plan 8.
2. For less than 10 feet of traveled lane refer to lane closure TTC Plan 15 or TTC Plan 16.
3. When parking is permitted on a residential street (25 MPH or less) and traffic can self-regulate, the minimum lane requirement of 10 feet can be reduced.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

Minimum Di stances

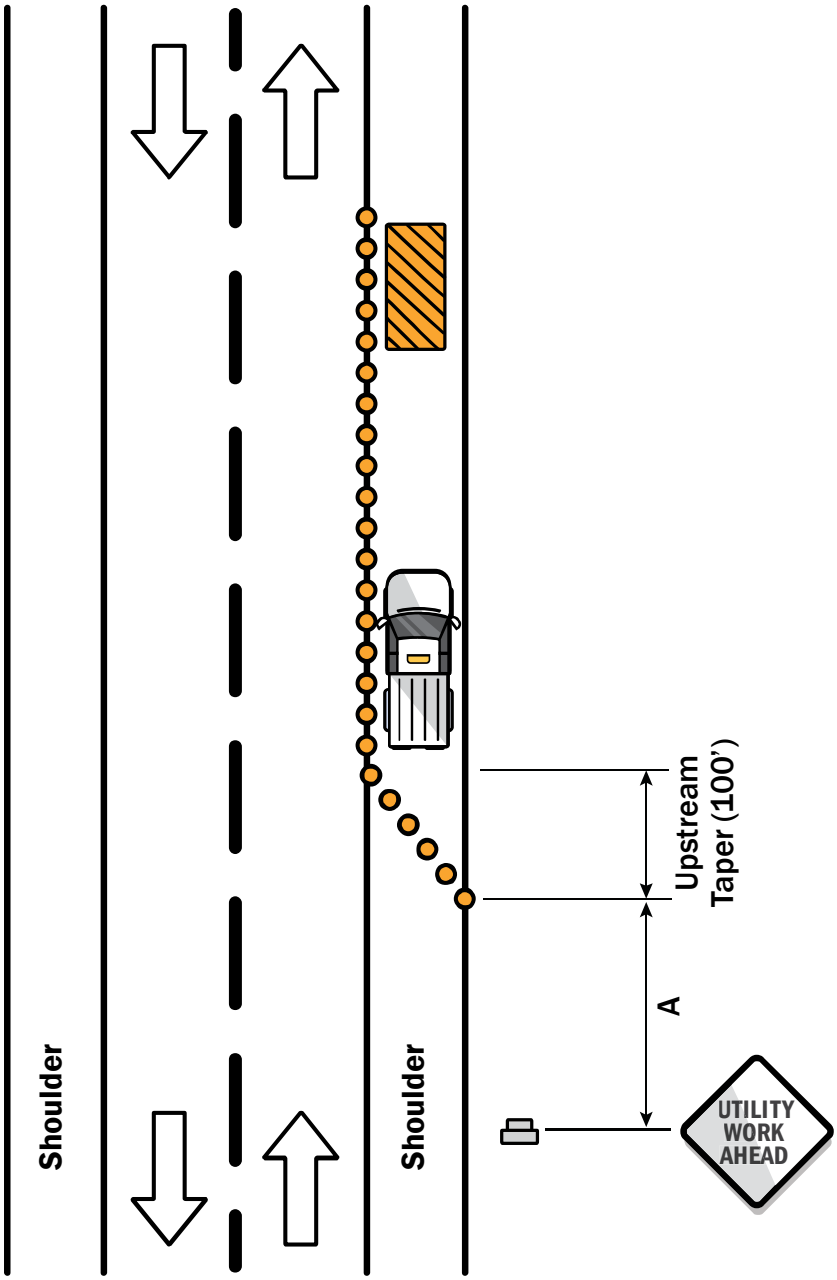
Road Type	A
Urban ≤ 30 MPH	100 Feet
Urban > 30 MPH	350 Feet
Rural	500 Feet

TTC Plan 6

Work on Shoulder – No Encroachment (Low Volume/All Speeds)

- **Speed –** All
- **Traffic Volume –** Low
- **Parking/Work Area –**
  - On the shoulder of a two-lane road.
  - No encroachment into the travel lane.
- **Requirements –** Lights and cones.

NOTE: For high traffic volume, see TTC Plan 8.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign

Minimum Distances

Road Type	A
Urban ≤ 30 MPH	100 Feet
Urban > 30 MPH	350 Feet
Rural	500 Feet

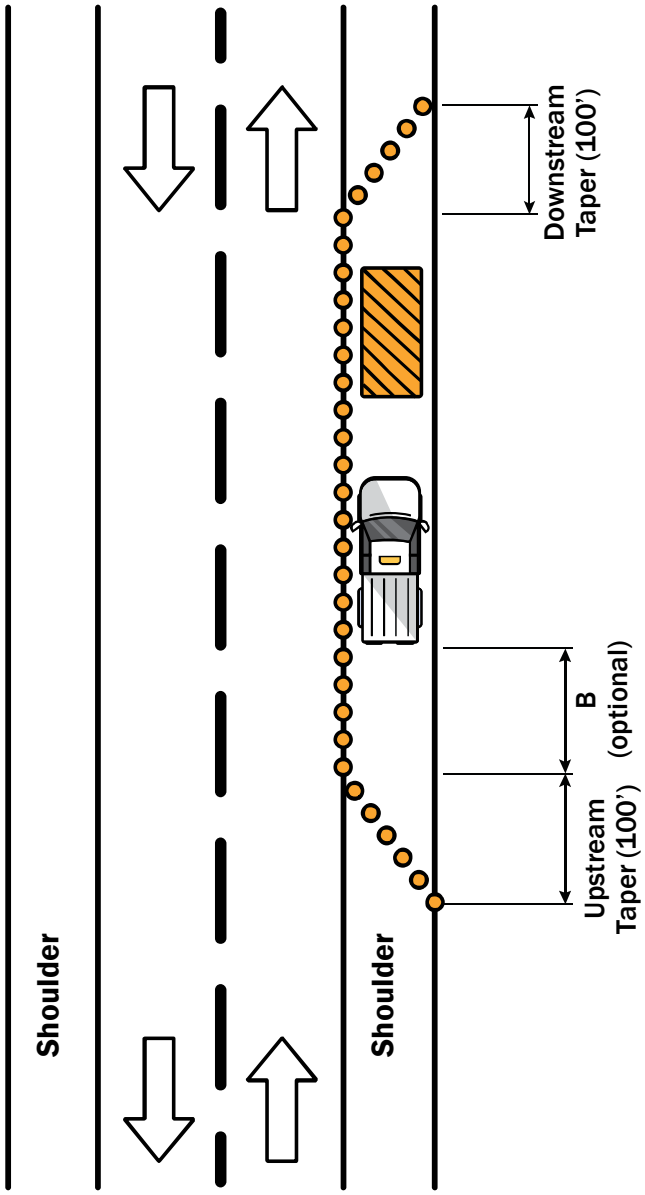
TTC Plan 4

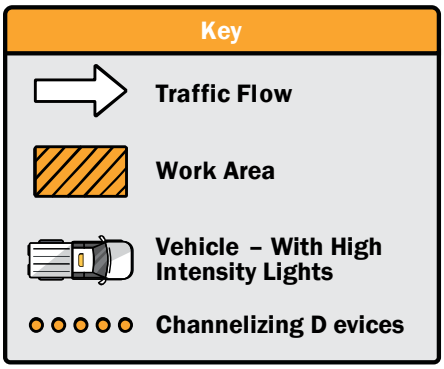
Work on Shoulder – Short Duration (1 hour or less)

- **Speed –** All
- **Traffic Volume –** All
- **Parking/Work Area –** On or beyond the shoulder with no encroachment
- **Requirements –** High intensity lights and cones.

NOTE:

1. For minor encroachment into lane see TTC Plan 3.
2. When parking is permitted on a residential street and traffic can self-regulate, the minimum lane requirement of 10 feet can be reduced.
3. If less than 10 feet of the travel lane is available and traffic **cannot** self-regulate, see lane closure Plan 15.
4. If less than 10 feet of the travel lane is available and traffic **can** self-regulate, see lane closure Plan 16.
5. If using a spec. 65 and employees **do not** have to exit the vehicle, this plan can be used without the cones.





Minimum Di stances (Feet)							
Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

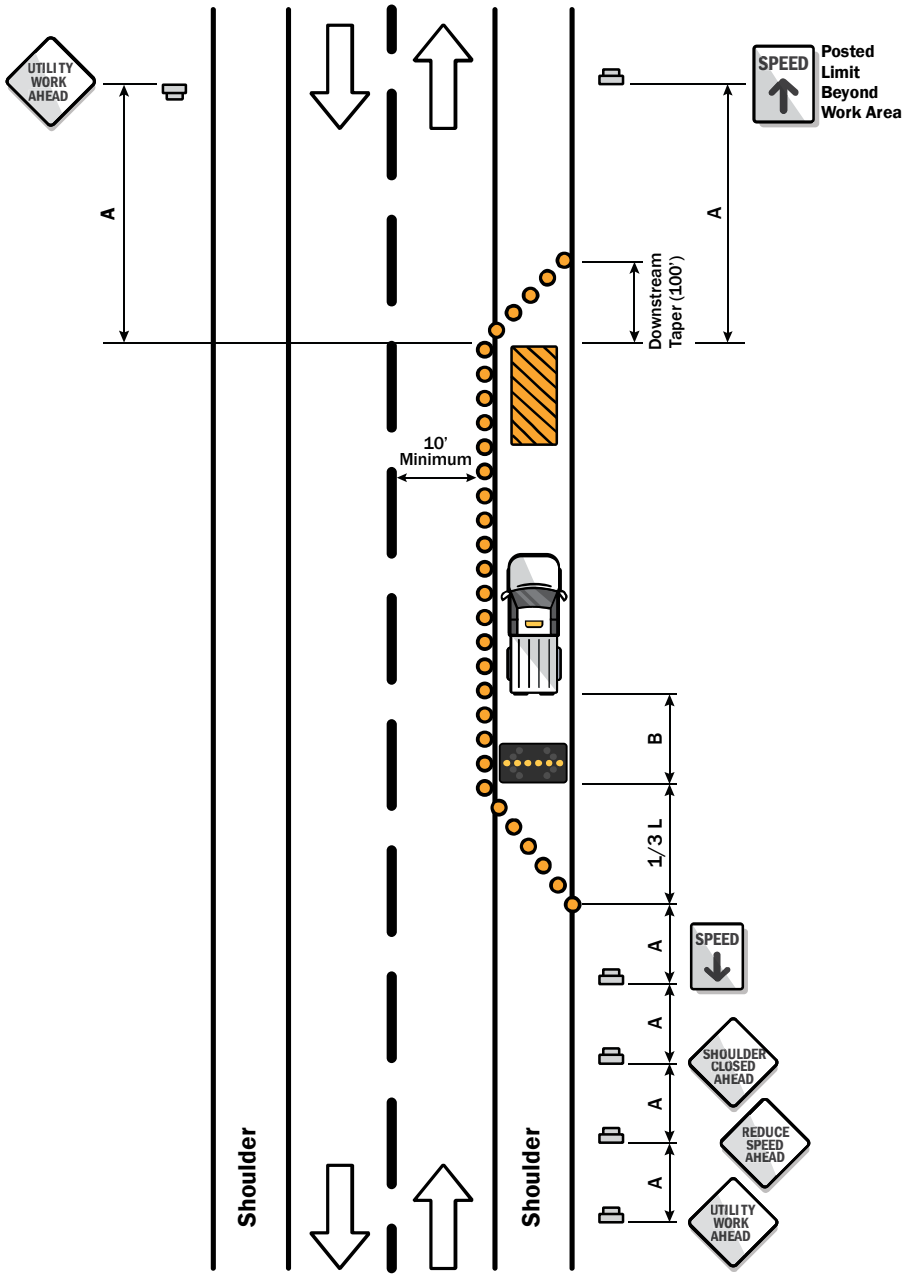
TTC Plan 8

Work on Shoulder – Speed Reduction (All Volumes/Reduce to 45 MPH)

- **Speed –** Reduce to 45 MPH
- **Traffic Volume –** All
- **Parking/Work Area –** On the shoulder
  - No lane closure on two-lane or multi-lane road.
  - A minimum of 10 feet of the travel lane is available (minor encroachment).

NOTE:

1. For work/parking outside of the roadway without a speed reduction or minor encroachment, see TTC Plan 3
2. For scheduled work, consult with appropriate agencies (i.e. MDOT, county, city, etc.) for requirements and/or guidance on speed reduction.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Lighted Arrow Panel
- Channelizing Devices
- Sign

Minimum Distances (Feet)

Type	Posted Speed Limit (MPH)		
	45	50	55
L	540	600	660
B	230	279	329
S	425	495	570

Minimum Distances

Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

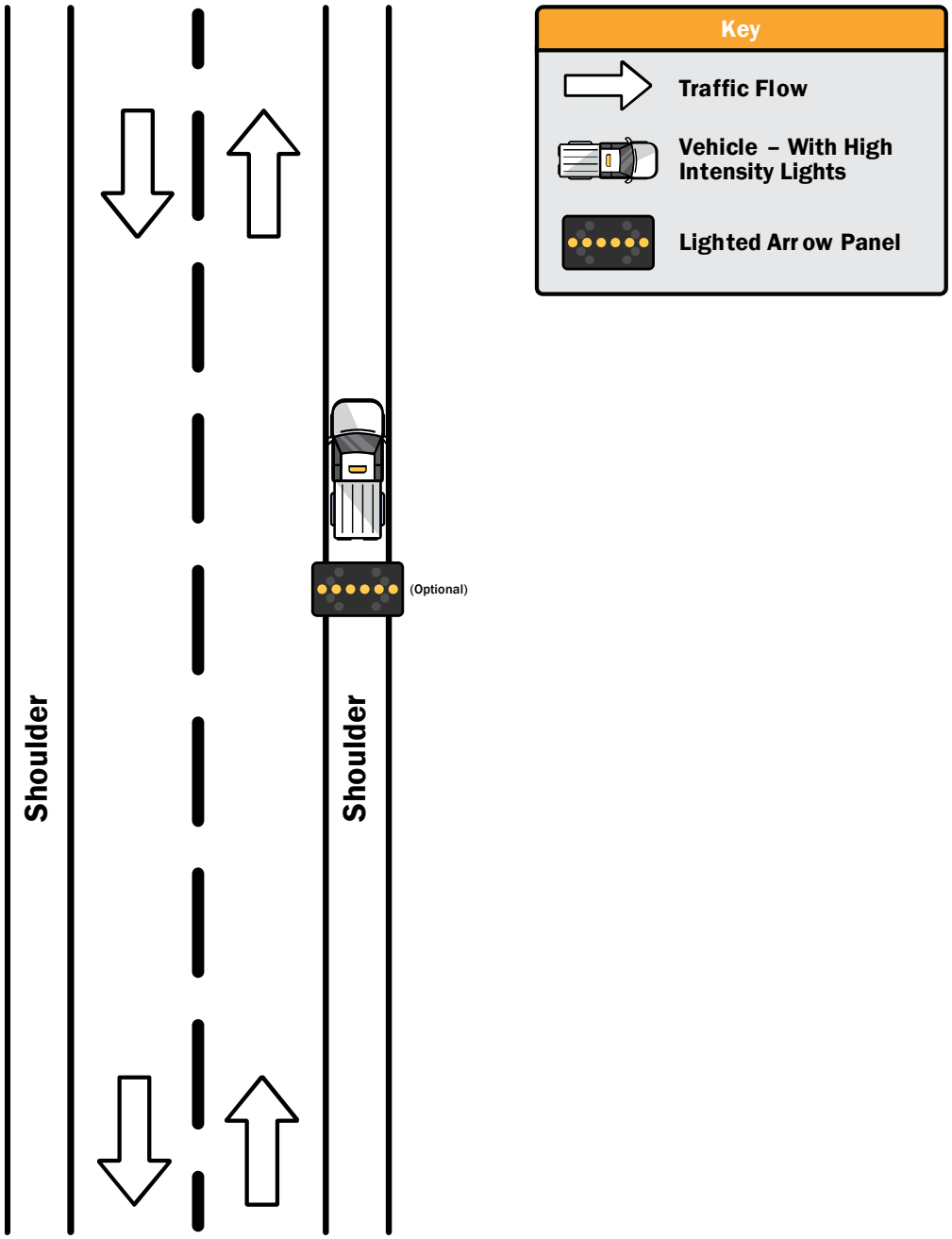
TTC Plan 9

Mobile – On the Shoulder (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Work Area –** Mobile: Work that moves continuously.
- **Requirements –** One or both of the options below must be used:
  - Option 1 – High intensity lighting must be used to ensure optimal visibility when traveling in roadway or shoulder in place of a caution panel.
  - Option 2 - Lighted caution panel can be on or towed by vehicle.

NOTE:

1. For mobile lane closure, see TTC Plan 20.



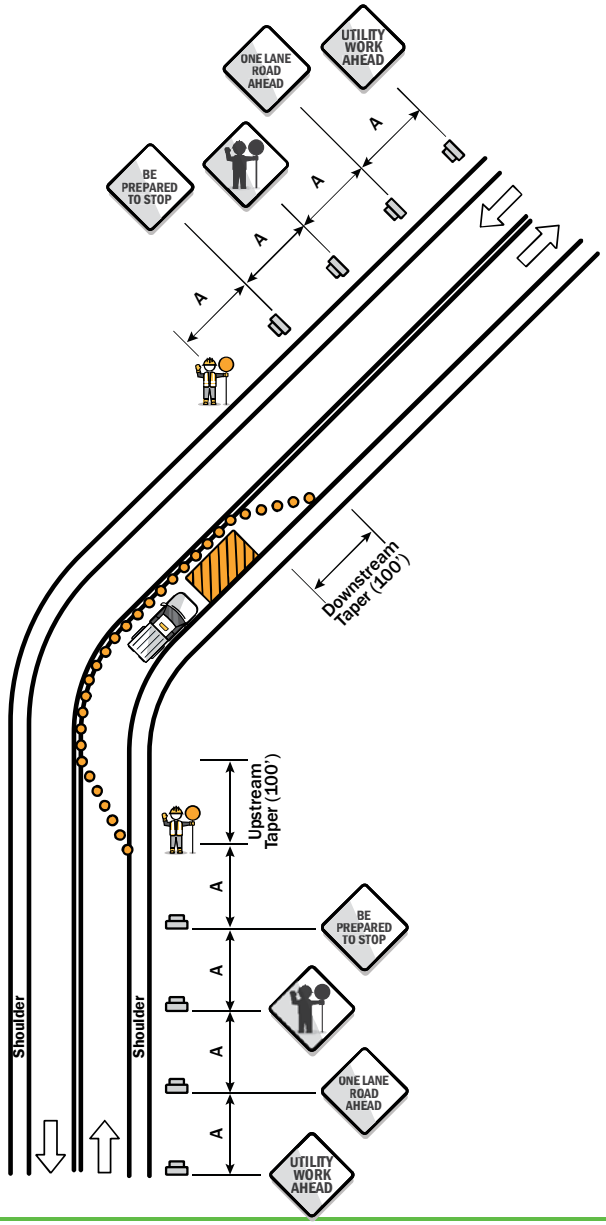
TTC Plan 15

Lane Closure on Two-Lane Road – Traffic CANNOT Self-Regulate (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Parking/Work Area –**
  - Lane closure on a two-lane road.
  - Traffic CANNOT self-regulate – i.e.:
    - Restricted visibility near the closure (trees, hill, curve, etc.).
    - Unrestricted visibility with high traffic volume.
  - Traffic regulators are used.

NOTE:

1. For low volumes where traffic CAN self-regulate, see TTC Plan 16.
2. Additional communication aids (radios, etc.) may be needed between traffic regulators.



Key
Traffic Flow
Work Area
Vehicle – With High Intensity Lights
Channelizing D evices
Sign
Traffic Regulator

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

Minimum Di stances

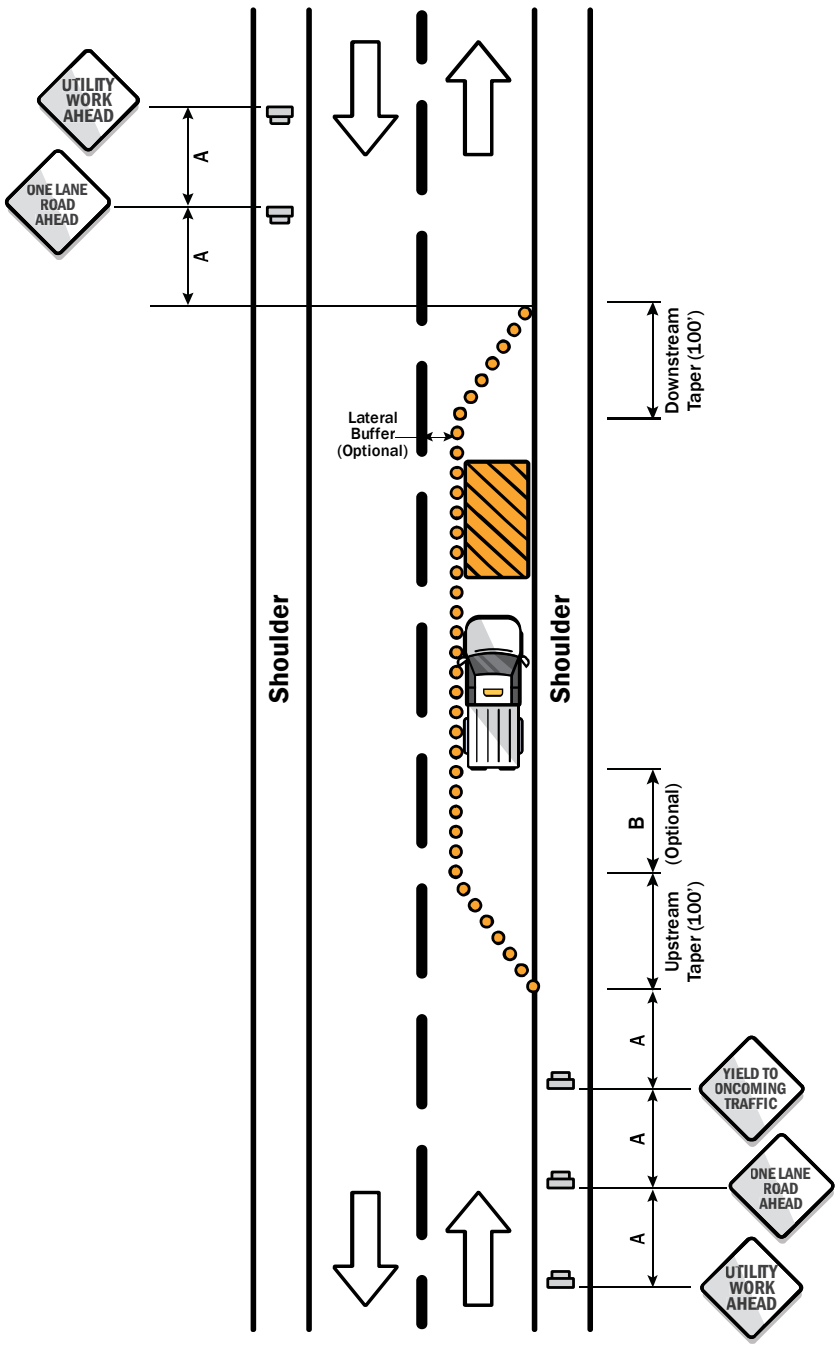
Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

TTC Plan 16

Lane Closure on Two-Lane Road – Traffic CAN Self-Regulate (Low Volume/All Speeds)

- **Speed –** All
- **Traffic Volume –** Low
- **Parking/Work Area –** Lane closure on two-lane road
- **Requirements –**
  - Traffic CAN self-regulate.
  - Unrestricted visibility.

NOTE: For restricted visibility (curves, hills, trees, etc.) or high traffic volumes, see TTC Plan 15.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

Minimum Di stances

Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

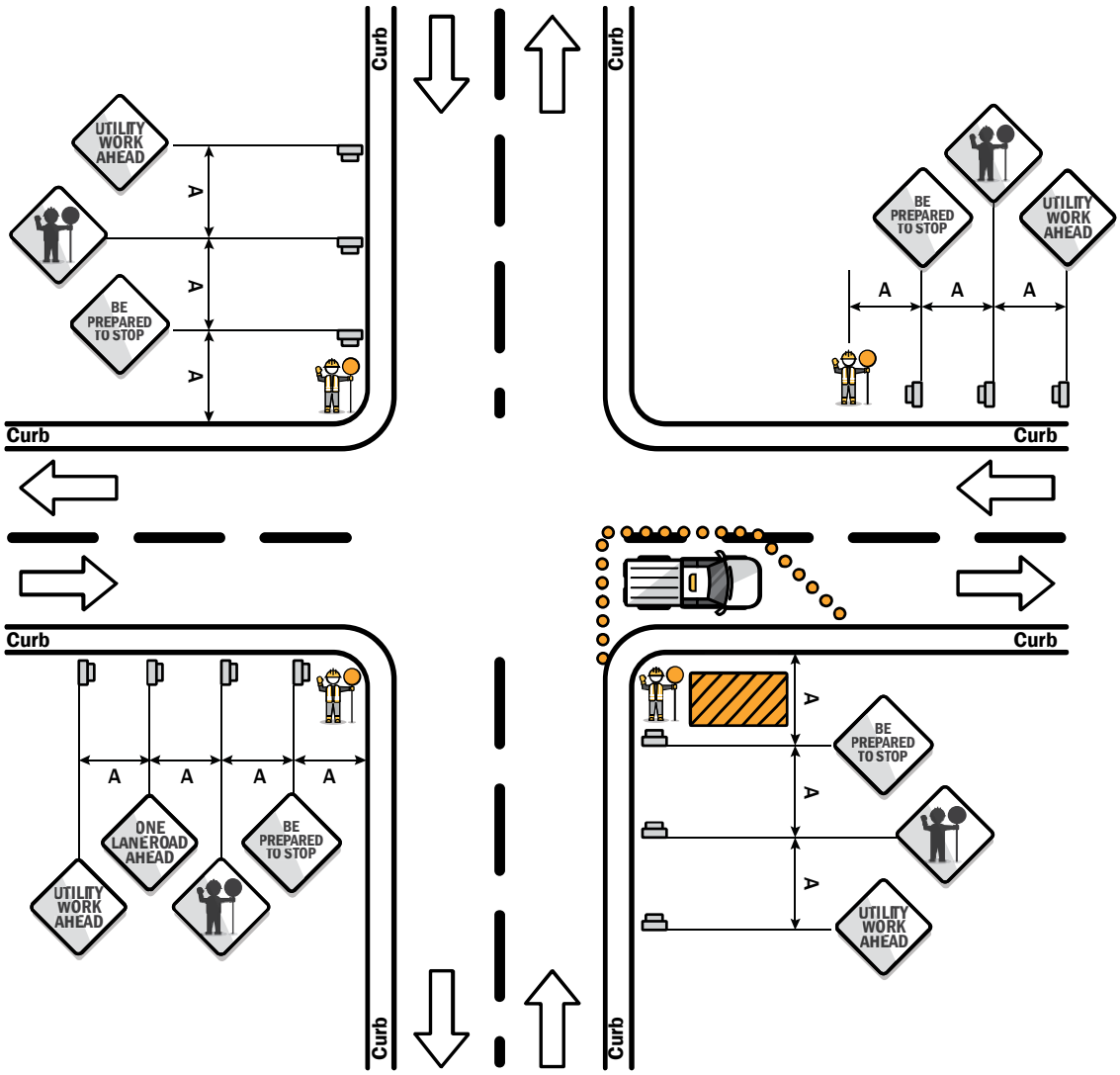
TTC Plan 23

Lane Closure on Two-Lane Road –at Intersection (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –**All
- **Parking/Work Area –**
  - Traffic regulators are used.
  - Intersection is a 4-way stop or a flashing signal – not a traffic signal. When a traffic signal is present, law enforcement is required.
  - When possible, park vehicles in a manner that shields workers from traffic hazards and the flow of traffic in and around the work site.

NOTE:

1. For scheduled work, consult with appropriate agencies (i.e. MDOT, county, city, etc.) for requirements and/or guidance on lane closures.
2. The situation depicted can be simplified by closing one or more of the approaches. If this cannot be done or when capacity is a problem, through traffic should be directed to other routes.
3. A uniformed law enforcement officer may be used to direct traffic within the intersection.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign
- Traffic Regulator

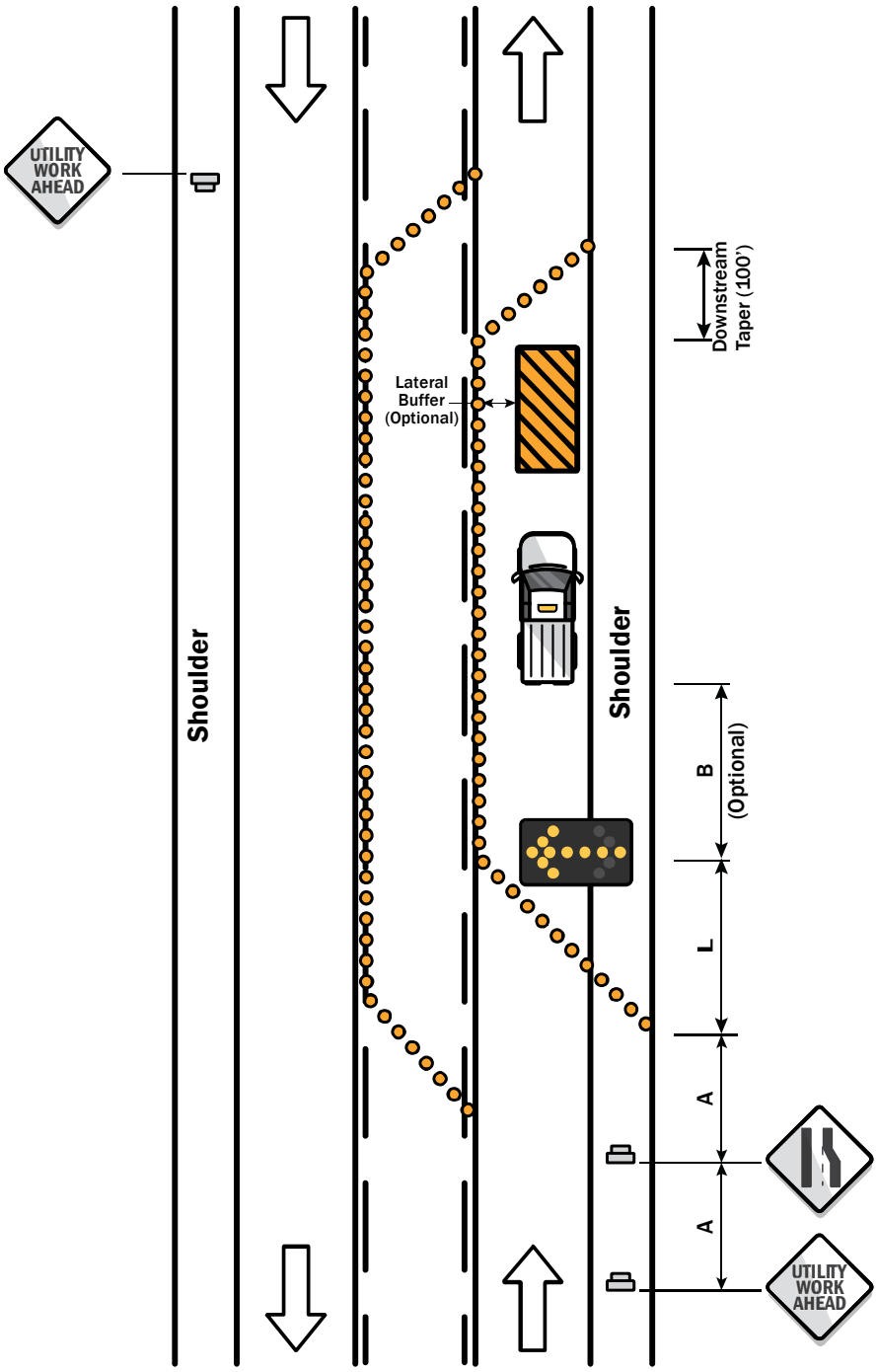
Minimum Di stances

Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

TTC Plan 22

Lane Closure on Three-Lane Road – Center Turn Lane (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –**All
- **Parking/Work Area –** Lane closure on a three-lane road (center turn lane).



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Lighted Arrow Panel
- Channelizing Devices
- Sign

Minimum Distances (Feet)

Type	Posted Speed Limit (MPH)		
	45	50	55
L	540	600	660
B	230	279	329
S	425	495	570

Minimum Distances

Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

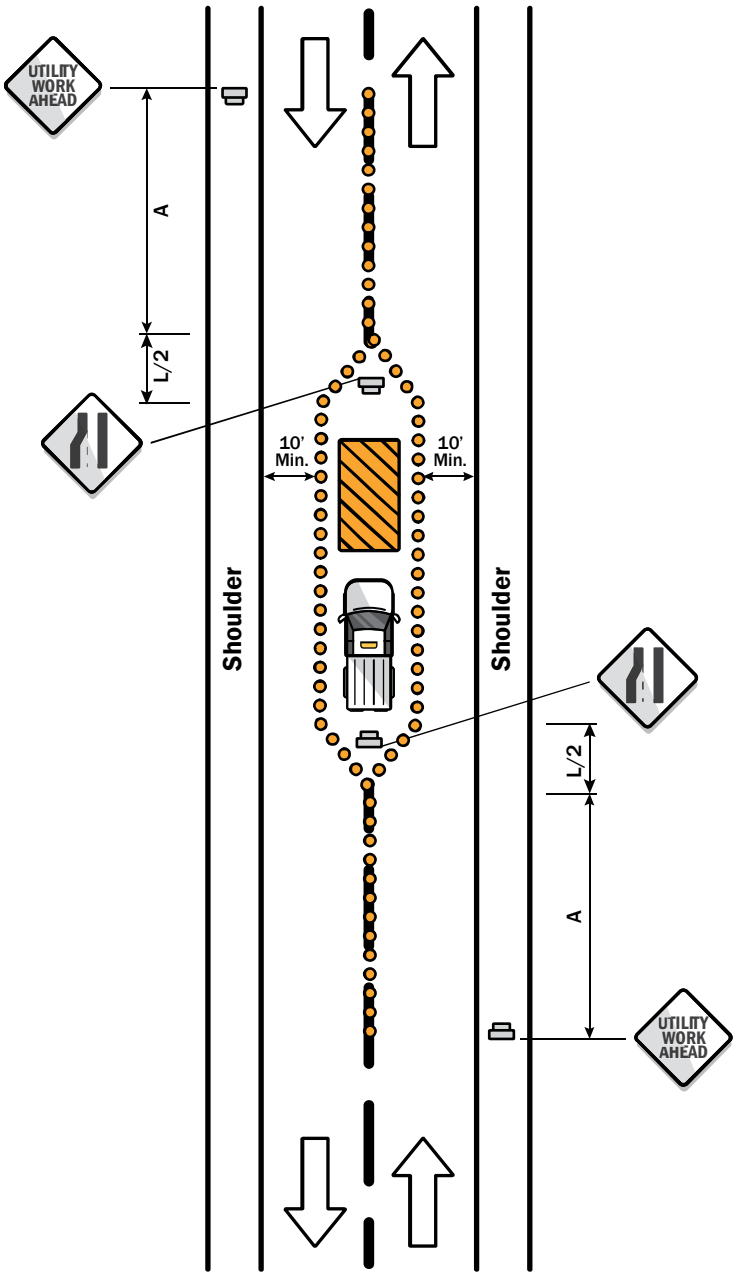
TTC Plan 17

Work and Parking in the Center of Two-Lane Road (Low Volume/45 MPH and Below)

- **Speed –** Low (45 MPH and below)
- **Traffic Volume –** Low
- **Parking/Work Area –**
  - Closure of the center of a two-lane road.
  - Traffic is routed around the closure.

NOTE:

1. For temporary road closure see TTC Plan 21.
2. When 10 feet of traveled is not available, a paved shoulder may be utilized if safe to do so.
3. This plan can be used for center suspension street light work, use of street light truck is preferred.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

Minimum Di stances

Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

TTC Plan 21

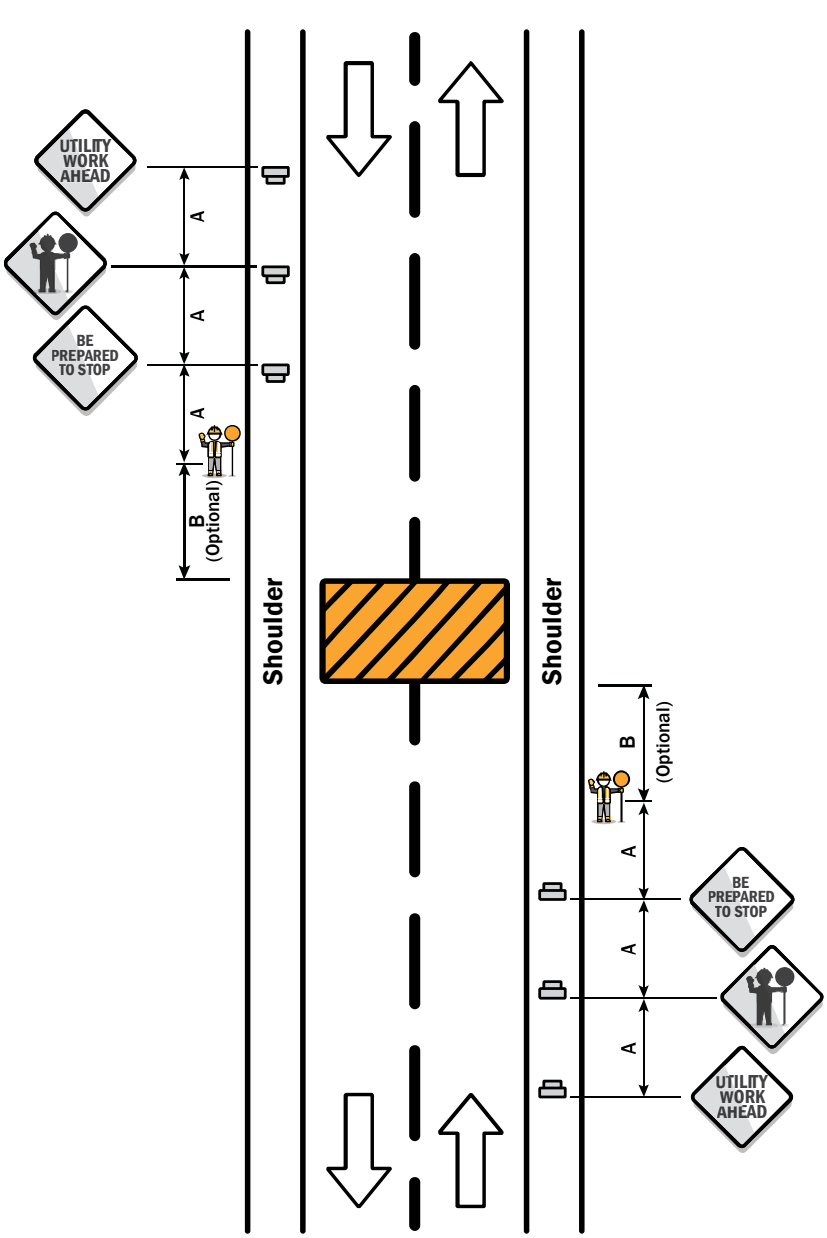
Temporary Road Closure on Two-Lane Road (All Volumes/All Speeds)

IMPORTANT: The two-lane road can ONLY be closed for 20 minutes or less.

- **Speed –** All
- **Traffic Volume –**All
- **Parking/Work Area –**
  - Temporary road closure (20 minutes or less) of both lanes on a two-lane road.
  - Traffic regulators are used.

NOTE:

1. If traffic volume is low and traffic can self-regulate, one traffic regulator and one bucket truck can be used in place of this plan (i.e. for pulling conductors across road).
2. If traffic volume is high, contact local law enforcement for road closure in place of this plan.



Key

- Traffic Flow
- Work Area
- Vehicle – With High Intensity Lights
- Channelizing D evices
- Sign
- Traffic Regulator

Minimum Di stances (Feet)

Type	Posted Speed Limit (MPH)						
	25	30	35	40	45	50	55
L	125	180	245	320	540	600	660
B	50	83	132	181	230	279	329
S	200	250	305	360	425	495	570

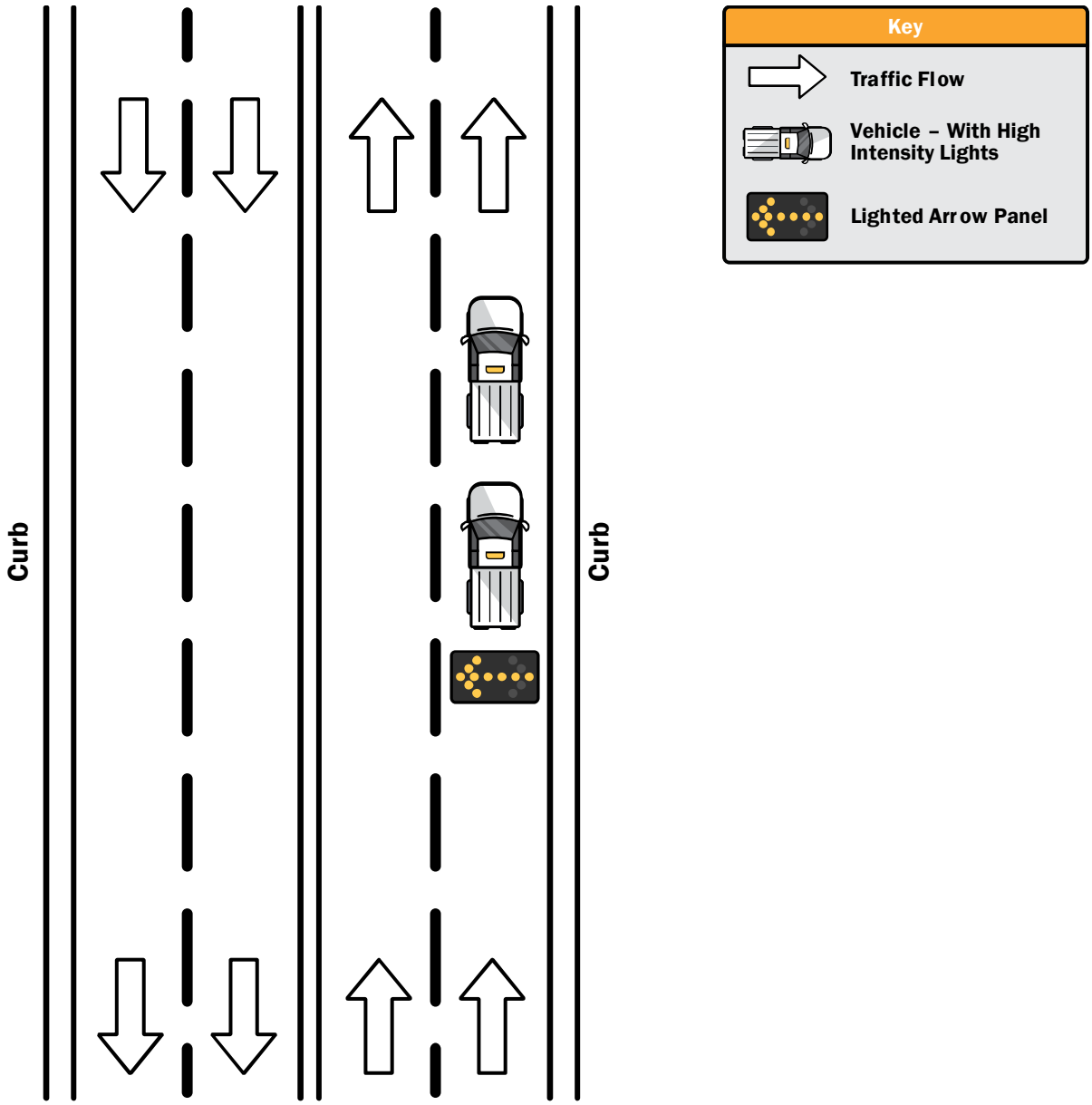
Minimum Di stances

Road Type	A
Urban > 30 MPH	350 Feet
Rural	500 Feet

TTC Plan 20

Mobile Lane Closure (All Volumes/All Speeds)

- **Speed –** All
- **Traffic Volume –** All
- **Work Area –**
  - Mobile: Work that moves continuously.
  - Lane closure on a multi-lane road.
- **Requirements –**
  - High intensity lights.
  - Follow vehicle with lighted arrow panel mounted on it or towed behind it.

NOTE:

1. When possible, drive vehicle on shoulder (see TTC Plan 9).
2. If parking and working in the roadway while using a **spec. 65** with a follow vehicle, this plan may be used if employees **do not** have to exit the vehicle.