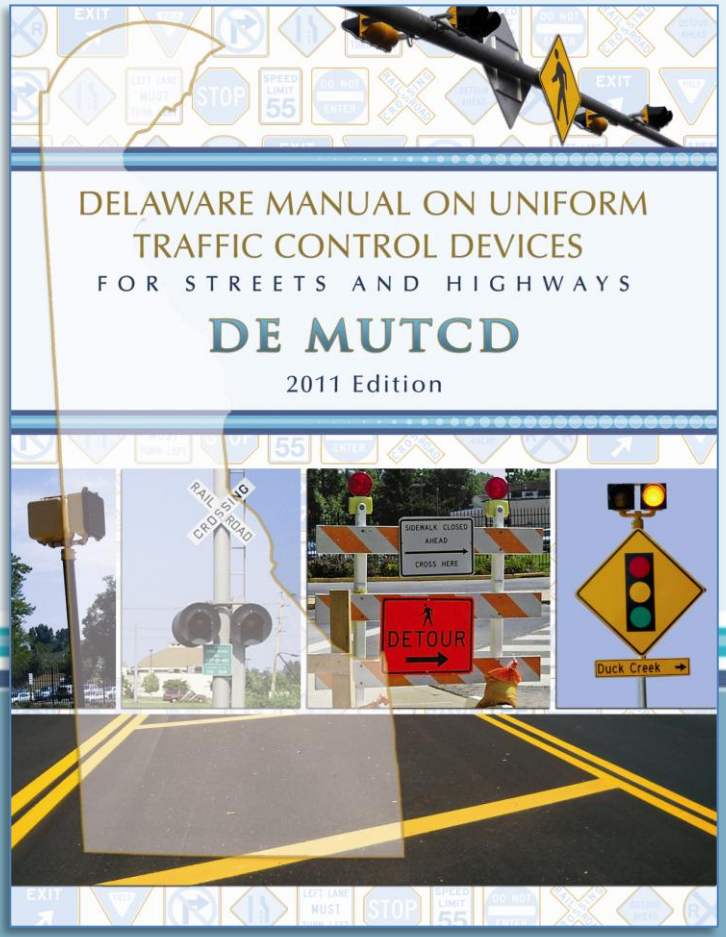
DelDOT
Delaware Department of Transportation

Delaware MUTCD

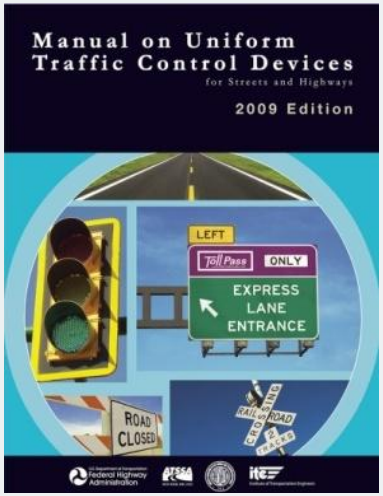


Part 6
TEMPORARY TRAFFIC CONTROL

March 16, 2011

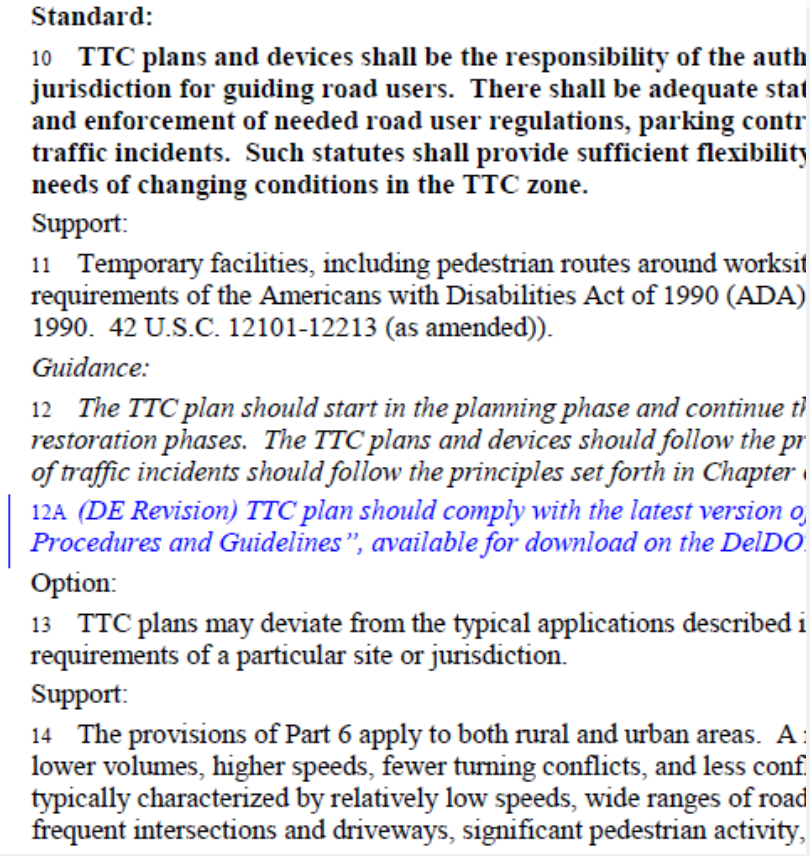
Delaware MUTCD

- Federal MUTCD published in Dec. 2009
- DE MUTCD committee began meeting in Jan. 2010 to establish DE-specific guidance
- DE MUTCD submitted to Delaware Register for public comment in Spring 2011
  http://regulations.delaware.gov/services/current_issue.shtml
- All presentation materials are DRAFT



2009 MUTCD and DE MUTCD Format Revisions

- Paragraphs are numbered
- *Guidance is italicized*
- No more metric
- Definitions relocated to Part 1
- **Standards remain bold**
- Options and support remain unformatted
- Delaware Revisions in blue with line in margin and "(DE Revision)" at beginning of paragraph



Standard:

10 **TTC plans and devices shall be the responsibility of the auth**
jurisdiction for guiding road users. There shall be adequate stat
and enforcement of needed road user regulations, parking contr
traffic incidents. Such statutes shall provide sufficient flexibility
needs of changing conditions in the TTC zone.

Support:

11 Temporary facilities, including pedestrian routes around worksit
requirements of the Americans with Disabilities Act of 1990 (ADA)
1990. 42 U.S.C. 12101-12213 (as amended)).

Guidance:

12 *The TTC plan should start in the planning phase and continue th*
restoration phases. The TTC plans and devices should follow the pr
of traffic incidents should follow the principles set forth in Chapter

12A *(DE Revision) TTC plan should comply with the latest version o*
Procedures and Guidelines", available for download on the DelDO

Option:

13 TTC plans may deviate from the typical applications described i
requirements of a particular site or jurisdiction.

Support:

14 The provisions of Part 6 apply to both rural and urban areas. A
lower volumes, higher speeds, fewer turning conflicts, and less conf
typically characterized by relatively low speeds, wide ranges of road
frequent intersections and driveways, significant pedestrian activity,

Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual

01 **(DE Revision) When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be defined as follows:**

A. **Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All Standard statements are labeled, and the text appears in bold type. The verb "shall" is typically used. The verbs "should" and "may" are not used in Standard statements. Standard statements are sometimes modified by Options.**

B. **Guidance—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. All Guidance statements are labeled, and the text appears in unbold type. The verb "should" is typically used. The verbs "shall" and "may" are not used in Guidance statements. Guidance statements are sometimes modified by Options.**

C. **Option—a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Standard or Guidance statement. All Option statements are labeled, and the text appears in unbold type. The verb "may" is typically used. The verbs "shall" and "should" are not used in Option statements.**

D. **Support—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs "shall," "should," and "may" are not used in Support statements.**

- **Standards are requirements that <u>SHALL</u> be followed unless there is an Option**
- DE Standard: **Reverted to 2003 MUTCD language allowing engineering judgment**
- *Guidance is recommended and <u>SHOULD</u> be followed*
- Options <u>MAY</u> be followed and are sometimes modifications to Standards and Guidance

PART 6 TEMPORARY TRAFFIC CONTROL

- 6A: General
- 6B: Fundamental Principles
- 6C: Temporary Traffic Control Elements
- 6D: Pedestrian and Worker Safety
- 6E: Flagger Control
- 6F: Temporary Traffic Control Zone Devices
- 6G: Type of Temporary Traffic Control Zone Activities
- 6H: Typical Applications
- 6I: Control of Traffic through Traffic Incident Management Areas

Standard:

02 **The needs and control of all road users (motorists, bicyclists, and pedestrians within the highway, or on private roads open to public travel (see definition in Section 1A.13), including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II, Paragraph 35.130) through a TTC zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents.**

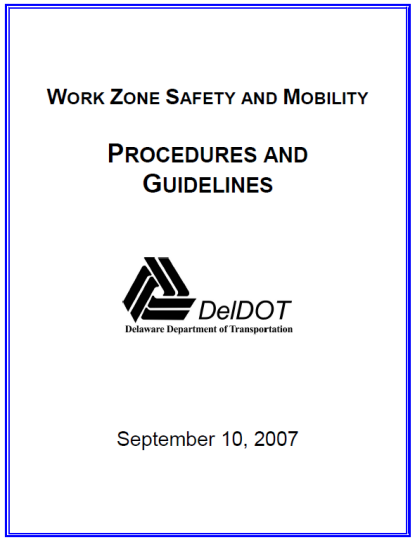
Guidance:

12 *The TTC plan should start in the planning phase and continue through the design, construction, and restoration phases. The TTC plans and devices should follow the principles set forth in Part 6. The management of traffic incidents should follow the principles set forth in Chapter 6I.*

12A *(DE Revision) TTC plan should comply with the latest version of DelDOT's "Work Zone Safety and Mobility Procedures and Guidelines", available for download on the DelDOT website at http://www.deldot.gov.*

Option:

13 TTC plans may deviate from the typical applications described in Chapter 6H to allow for conditions and requirements of a particular site or jurisdiction.



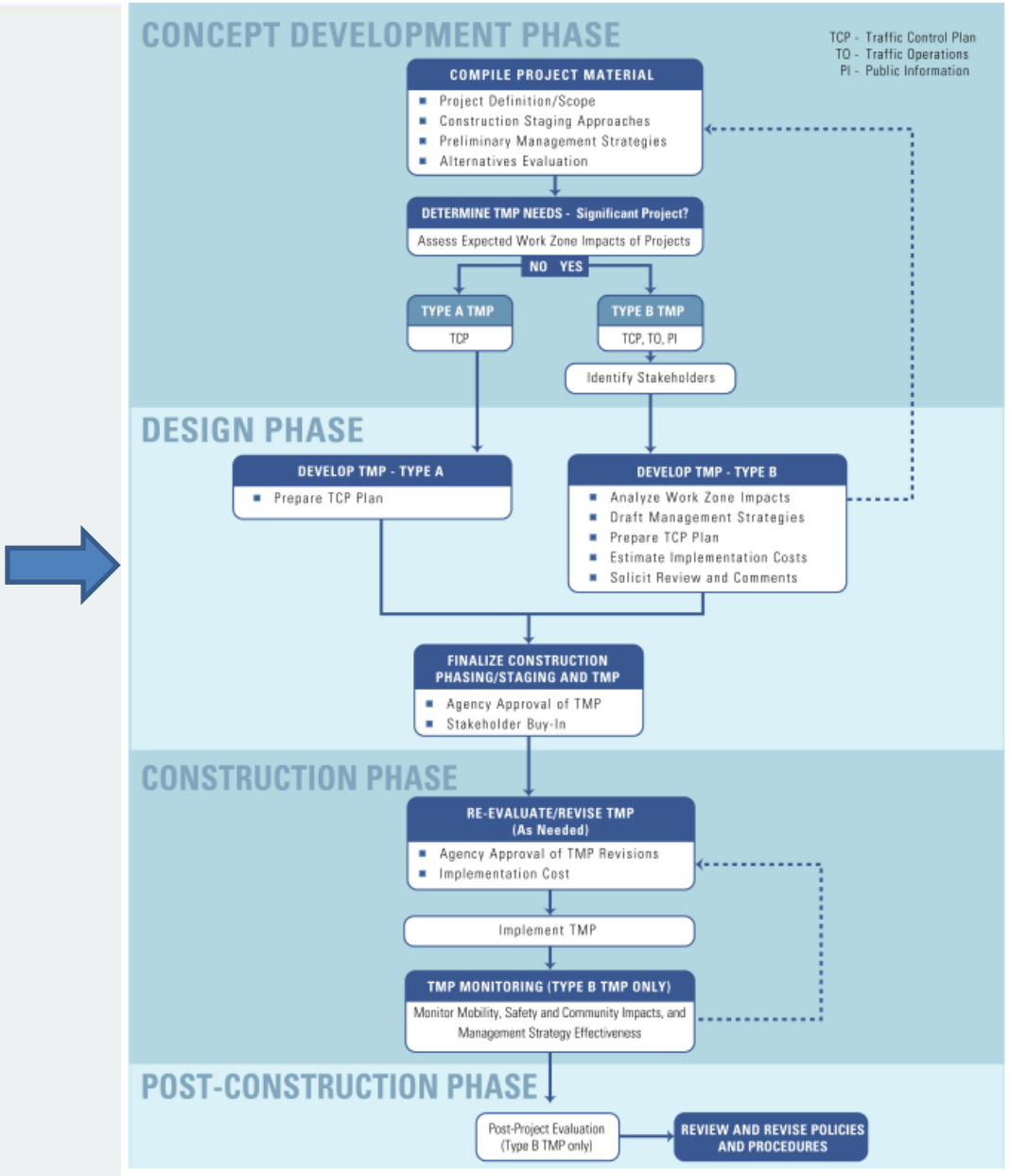
- **Consider needs of all road users**
- *TTC planning begins at project scoping and extends through final design and construction*
- DE Guidance: *TTC plan complying with "Work Zone Safety and Mobility Procedures and Guidelines"*
- TTC plans can deviate from typical applications

WORK ZONE SAFETY AND MOBILITY

PROCEDURES AND GUIDELINES

DelDOT
Delaware Department of Transportation

September 10, 2007



- *7 fundamental principles of TTC:*
  - *Develop plans to accommodate all road users, workers, and equipment*
  - *Minimize impacts on road users*
  - *Provide clear guidance to road users*
  - *Routinely inspect TTC devices*
  - *Maintain roadside safety*
  - *Train individuals involved in TTC operations*
  - *Disseminate information to public*

Standard:

08 **Before any new detour or temporary route is opened to traffic, all necessary signs shall be in place.**

09 **All TTC devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, TTC devices that are no longer appropriate shall be removed or covered.**

- **Install signs prior to opening detour or diversion routes**
- **Remove or cover TTC devices when no longer needed**

Brights Branch Rd

04 *Coordination should be made between adjacent or overlapping projects to check that duplicate signing is not used and to check compatibility of traffic control between adjacent or overlapping projects.*

- *Adjacent or overlapping projects should be coordinated*

SR 54 west of SR 1

Section 6C.01 Temporary Traffic Control Plans

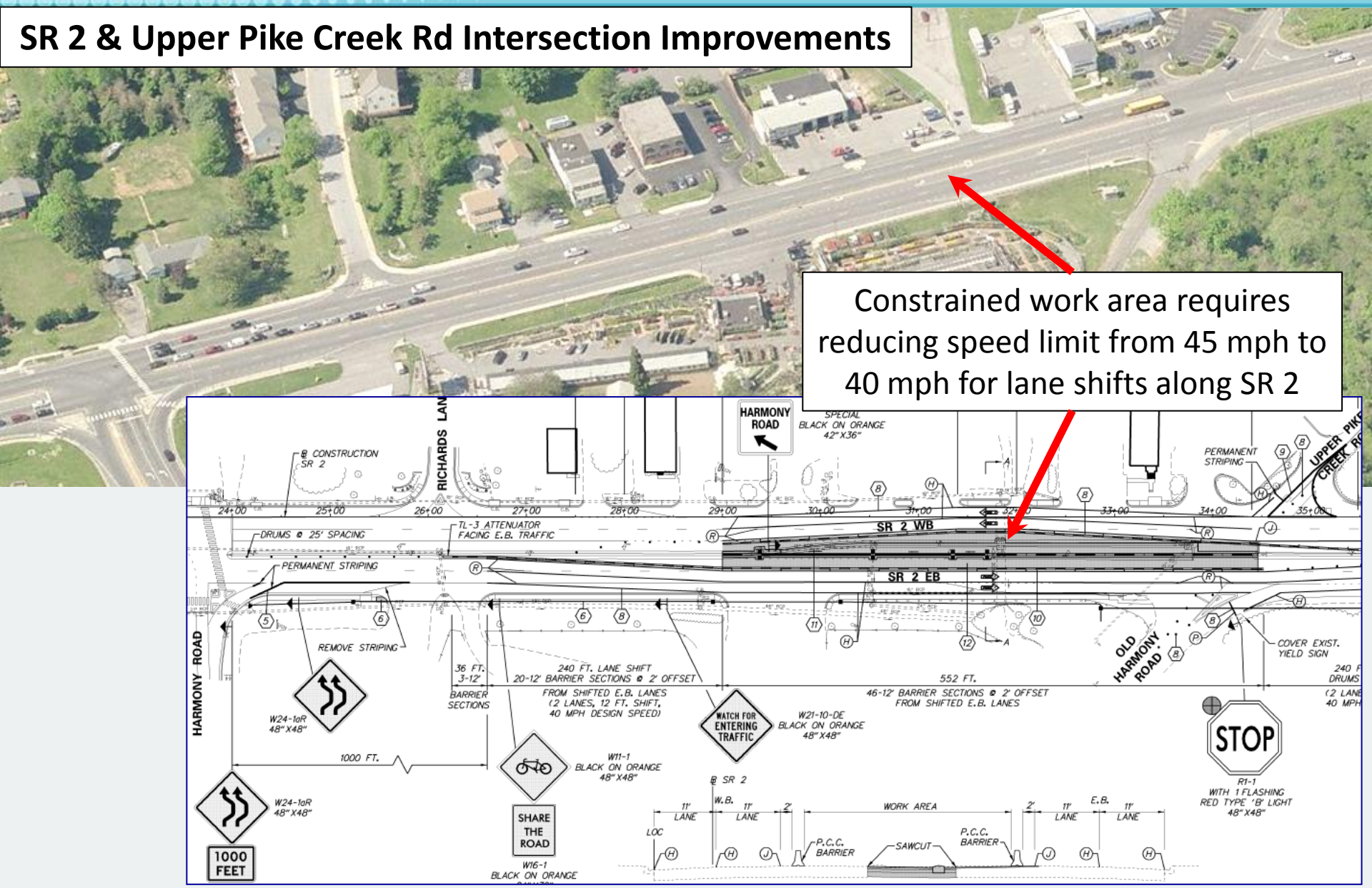
12 *Reduced speed limits should be used only in the specific portion of the TTC zone where conditions or restrictive features are present. However, frequent changes in the speed limit should be avoided. A TTC plan should be designed so that vehicles can travel through the TTC zone with a speed limit reduction of no more than 10 mph.*

12A *(DE Revision)TTC plans should be designed based on the posted speed limit or 85th-percentile speed unless conditions or restrictive features require reduced speed limits to accommodate all necessary TTC zone elements. TTC plans requiring a reduced speed limit should be approved by DelDOT Traffic.*

13 *A reduction of more than 10 mph in the speed limit should be used only when required by restrictive features in the TTC zone. Where restrictive features justify a speed reduction of more than 10 mph, additional driver notification should be provided. The speed limit should be stepped down in advance of the location requiring the lowest speed, and additional TTC warning devices should be used.*

- DE Guidance: *Design based on posted speed limit or 85th-percentile speed*
- *If design is restricted or special conditions exist:*
  - *Speed limit reduction should not exceed 10 mph*
  - *Reduction > 10 mph should be "stepped down"*
  - DE Guidance: *Reductions should be approved by DelDOT Traffic*

SR 2 & Upper Pike Creek Rd Intersection Improvements



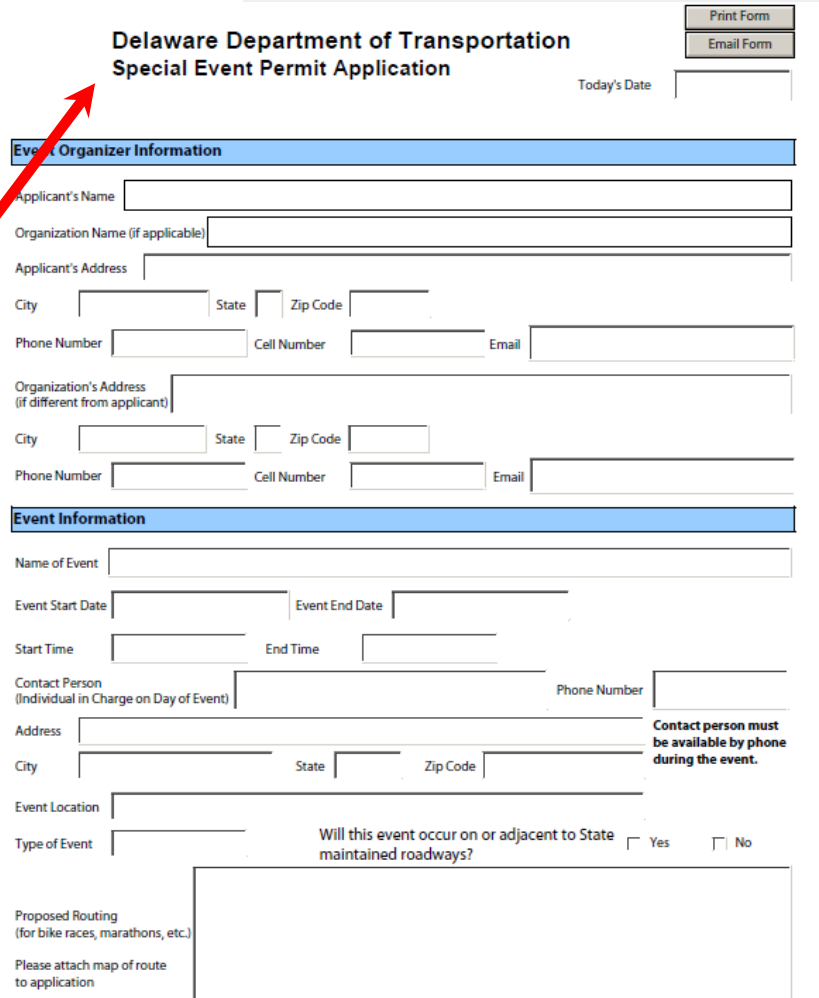
Section 6C.02 Temporary Traffic Control Zones

04 A planned special event often creates the need to establish altered traffic patterns to handle the increased traffic volumes generated by the event. The size of the TTC zone associated with a planned special event can be small, such as closing a street for a festival, or can extend throughout a municipality for larger events. The duration of the TTC zone is determined by the duration of the planned special event.

Guidance:

05 *(DE Revision) Any planned special event that impacts traffic flow on state-maintained roadways should complete a Special Event Permit Application, available for download on the DelDOT website at http://www.deldot.gov.*

- Planned special events may require TTC planning
- DE Guidance: *Complete DelDOT Special Event Permit Application for planned special events on state-maintained roads*



Print Form
Email Form

Delaware Department of Transportation
Special Event Permit Application

Today's Date

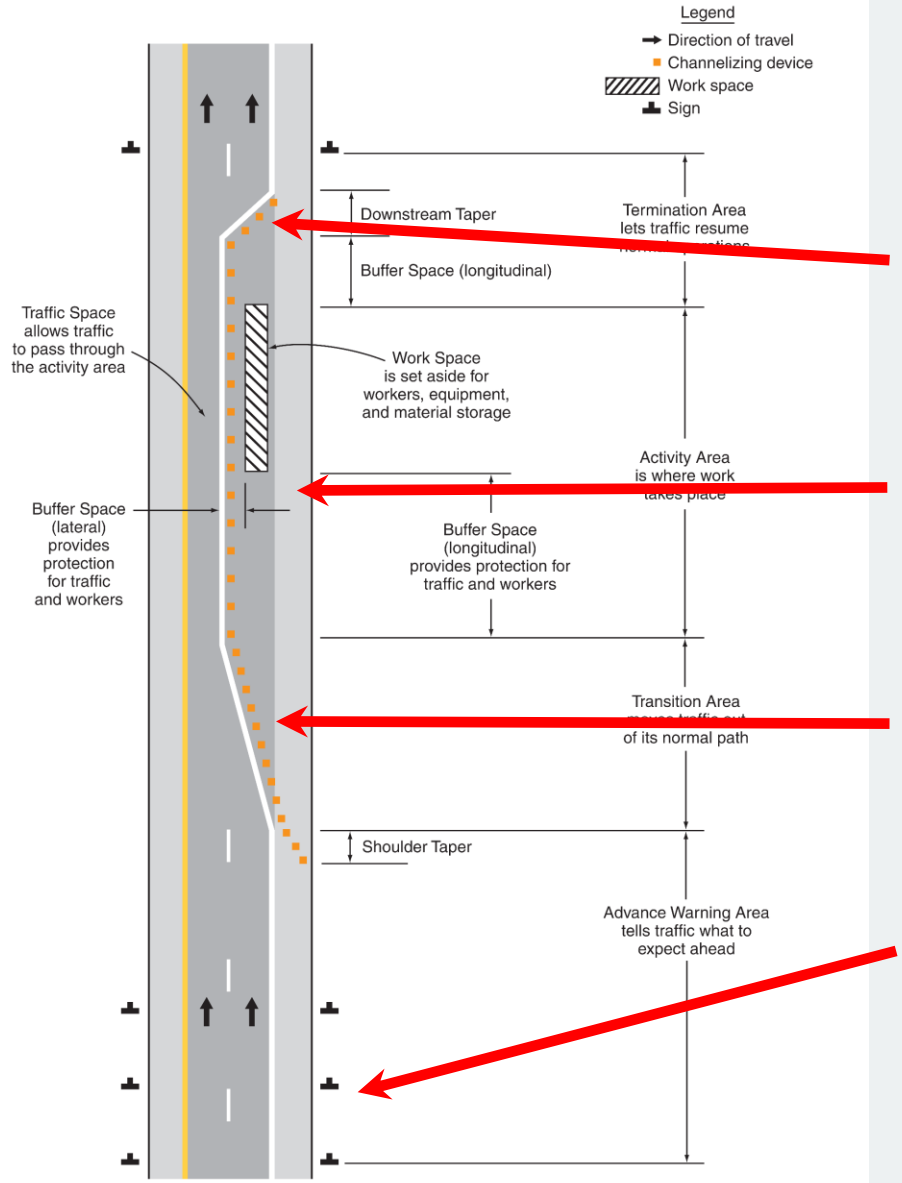
Event Organizer Information

Applicant's Name
Organization Name (if applicable)
Applicant's Address
City State Zip Code
Phone Number Cell Number Email
Organization's Address (if different from applicant)
City State Zip Code
Phone Number Cell Number Email

Event Information

Name of Event
Event Start Date Event End Date
Start Time End Time
Contact Person (Individual in Charge on Day of Event) Phone Number
Address
City State Zip Code
Contact person must be available by phone during the event.
Event Location
Type of Event
Will this event occur on or adjacent to State maintained roadways? Yes No
Proposed Routing (for bike races, marathons, etc.)
Please attach map of route to application

Figure 6C-1. Component Parts of a Temporary Traffic Control Zone



Termination area

Activity area

Transition area

Advance warning area

Section 6C.04 Advance Warning Area

OLD

Table 6C-1. Suggested Advance Warning Sign Spacing

Road Type	Distance Between Signs (ft) *		
	A	B	C
Interstate / Expressway / Freeway	1000	1640 (0.3 mi)	2640 (0.5 mi)
All other roadways	500	500	500

* The column headings A, B, and C are the dimensions shown in the Case Diagrams (see Section 6H). The A dimension is the distance from the transition distance between the first and second signs. signs. (The third sign is the first one in a three zone).

NEW

Table 6C-1. Recommended Advance Warning Sign Minimum Spacing (Delaware Revision)

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
Interstate / Expressway / Freeway	1,000 feet	1,640 feet	2,640 feet

* 40 mph or less is "low speed" and over 40 mph is "high speed" on state-maintained roadways.

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. 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.)

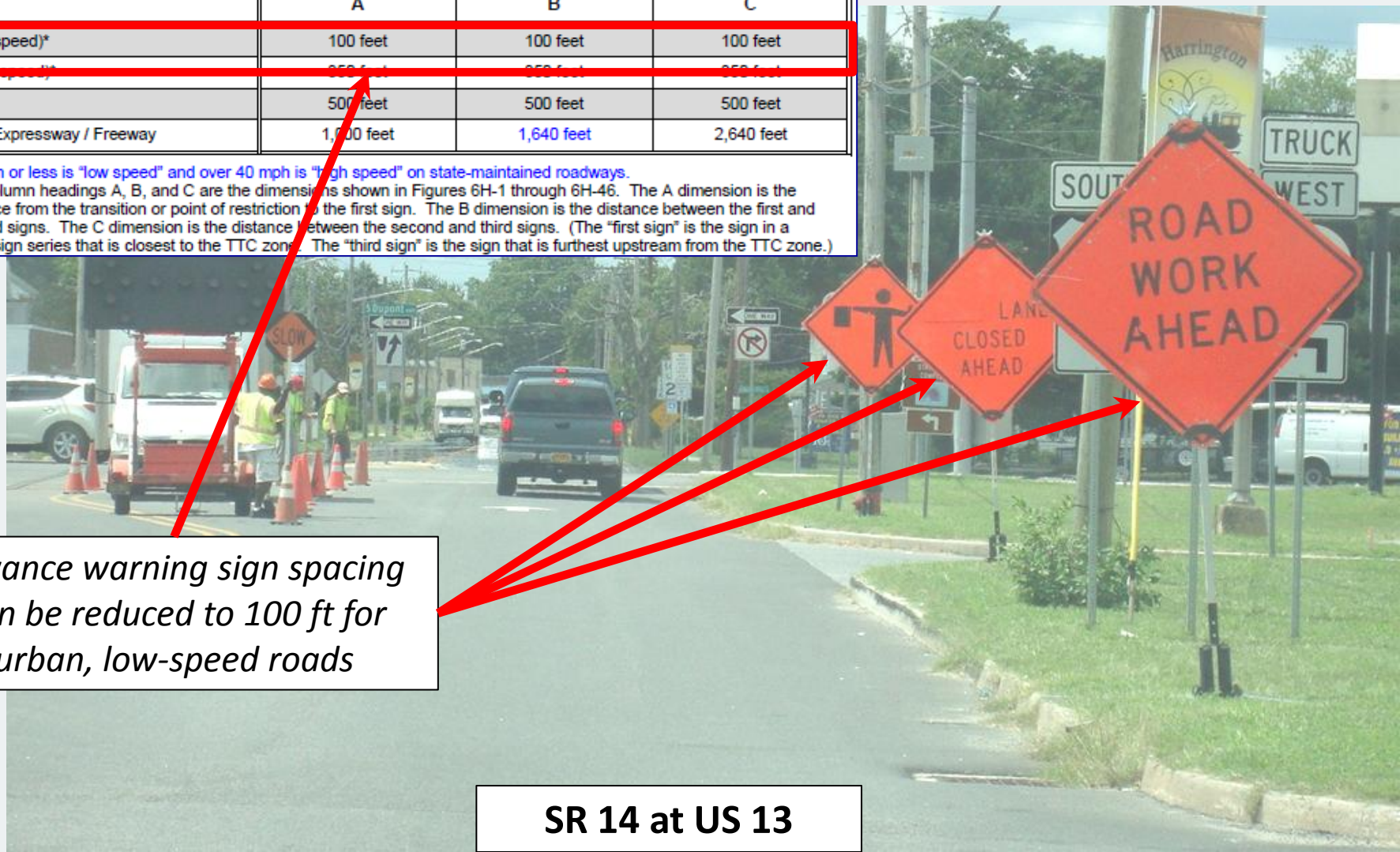
- *Varying minimum warning sign spacing for different types of conventional roads*
- DE Support:
  - *Roads ≤ 40 mph = "low speed"*
  - *Roads > 40 mph = "high speed"*

Table 6C-1. Recommended Advance Warning Sign Minimum Spacing (Delaware Revision)

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

* 40 mph or less is "low speed" and over 40 mph is "high speed" on state-maintained roadways.

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. 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.)



Advance warning sign spacing can be reduced to 100 ft for urban, low-speed roads

SR 14 at US 13

Section 6C.04 Advance Warning Area

Table 6C-1. Recommended Advance Warning Sign Minimum Spacing (Delaware Revision)

Road Type	Distance Between Signs**		
	A	B	C
[illegible]	[illegible]	[illegible]	[illegible]
Urban (high speed)*	350 feet	350 feet	350 feet
[illegible]	[illegible]	[illegible]	[illegible]
Interstate / Expressway / Freeway	1,000 feet	1,640 feet	2,6[illegible]0 feet

* 40 mph or less is "low speed" and over 40 mph is "high speed" on state-maintained roadways.

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. 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.)

Minimum advance warning sign spacing should be 350 ft for urban, high-speed roads

SR 2 at SR 7

Table 6C-1. Recommended Advance Warning Sign Minimum Spacing (Delaware Revision)

Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)*	100 feet	100 feet	100 feet
[illegible]	[illegible]	[illegible]	[illegible]
Rural	500 feet	500 feet	500 feet
[illegible]	[illegible]	[illegible]	[illegible]

* 40 mph or less is "low speed" and over 40 mph is "high speed" on state-maintained roadways.

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. 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.)

Minimum advance warning sign spacing should be 500 ft on rural roads

US 13 / DE 404 Intersection Realignment and Bridgeville Service Road

06A *(DE Revision) If the work operation requires a flagger to assist work vehicles entering or exiting the work area, flagger signs (see Section 6F.31) should be used in addition to the typical advance warning signs for each application. If used, the flagger signs should be located at the downstream end of the advance warning area, which typically corresponds with the beginning of a transition taper.*

- DE Guidance: *Supplemental Flagger signs when flagger assists work vehicles entering and exiting the work area*

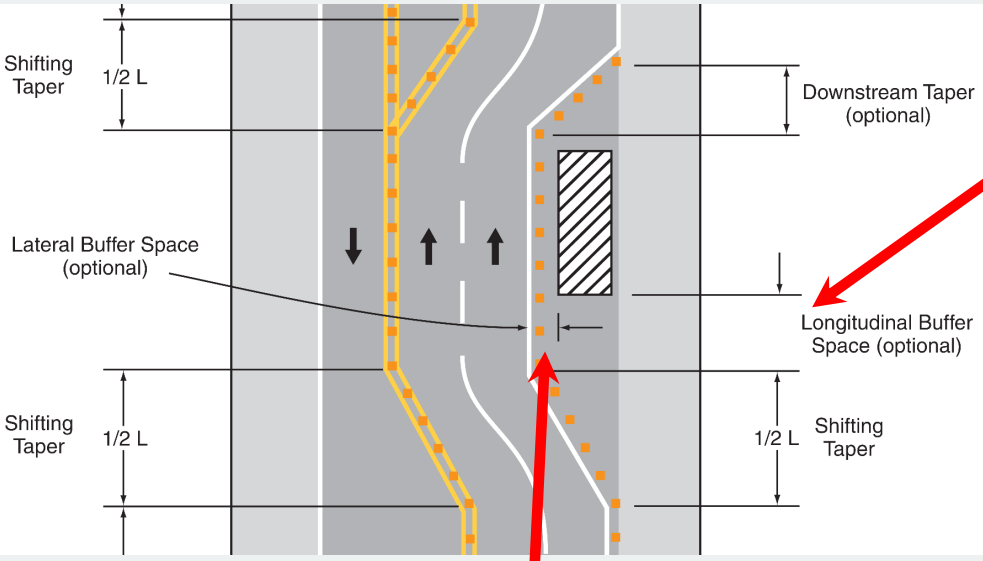
Supplemental FLAGGER AHEAD sign should be installed upstream of flagger station

SR 141, Kirkwood Hwy to Faulkland Rd

11 If a longitudinal buffer space is used, the values shown in Table 6C-2 may be used to determine the length of the longitudinal buffer space.

Guidance:

15 *(DE Revision) The width of a lateral buffer space should be determined by engineering judgment. On interstates, freeways, or expressways, a lateral buffer space of one travel lane should be used, except where temporary traffic barrier is used to separate the work area from the traveled way, or if other conditions prevent the use of a lateral buffer space.*



- Optional longitudinal buffer based on Table 6C-2

Table 6C-2. 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

- DE Guidance: *Lateral buffer of one travel lane on interstates, freeways, and expressways unless behind barrier*

Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones (Delaware Revision)

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	0.5 L to 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 6C-4 to calculate L
* A shifting taper length of L is preferred on state-maintained roads

$L = WS^2/60$ (S≤40 mph)

$L = WS$ (S>40 mph)

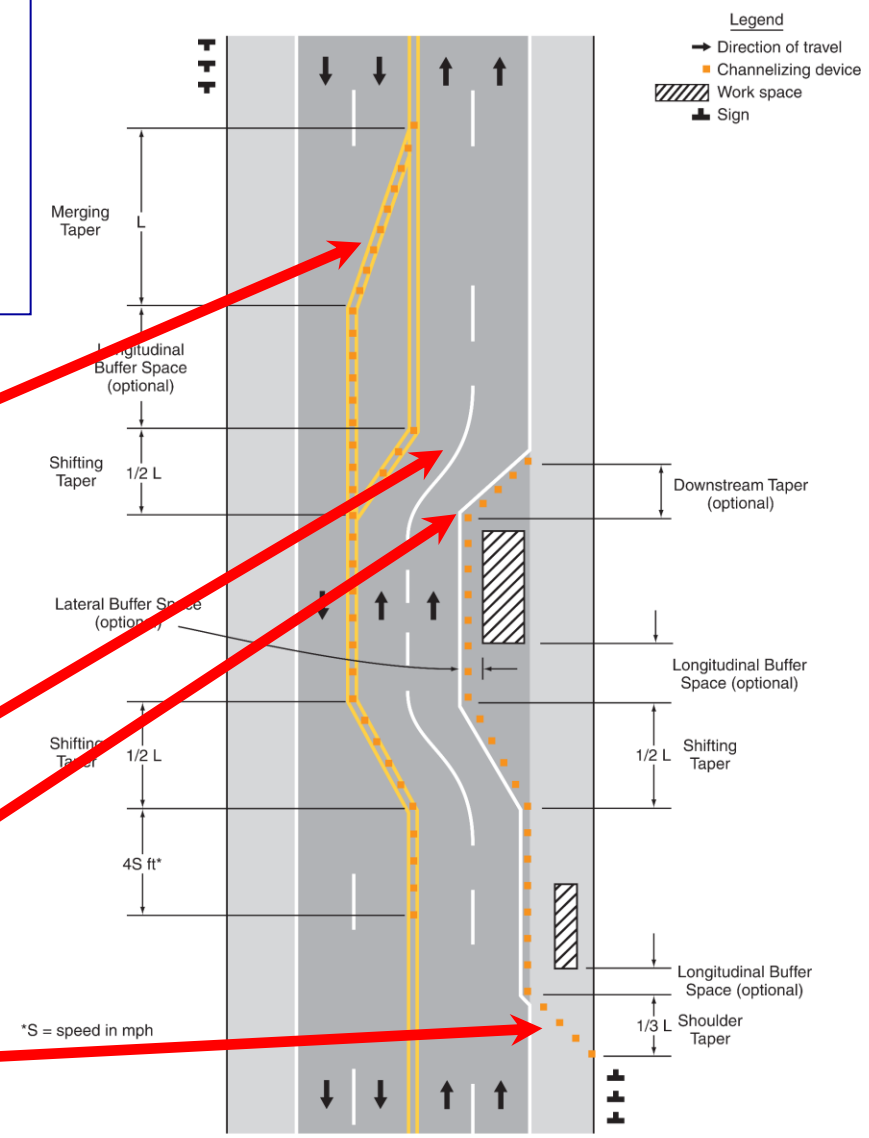
Merging = L

Shifting = L (DE Guidance)

Downstream = 50-100 ft

Shoulder = L/3

Figure 6C-2. Types of Tapers and Buffer Spaces



Section 6C.08 Tapers

Support:

08 (DE Revision) A shifting taper is used when a lateral shift is needed. When more space is available, a longer than minimum taper distance can be beneficial. Changes in alignment can also be accomplished by using horizontal curves designed for normal highway speeds in accordance with the DelDOT Road Design Manual.

Guidance:

09 *(DE Revision) A shifting taper length of L is preferred on state-maintained roads (see Tables 6C-3 and 6C-4).*

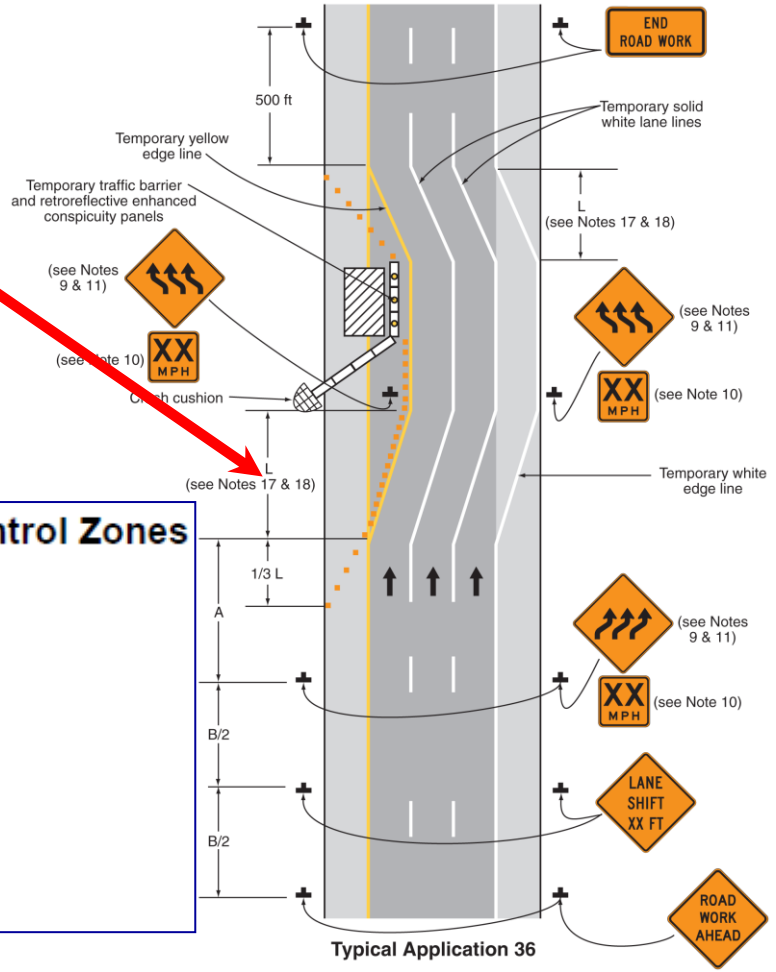
- Horizontal curve (per "DelDOT Road Design Manual") in lieu of shift taper
- DE Guidance: *Shifting taper equal to L*
- DE Option: Minimum shifting taper of 0.5L

Table 6C-3. Taper Length Criteria for Temporary Traffic Control Zones
(Delaware Revision)

Type of Taper	Taper Length
Merging Taper	at least L
Shifting Taper	0.5 L to 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 6C-4 to calculate L
* A shifting taper length of L is preferred on state-maintained roads

Figure 6H-36. Lane Shift on a Multi-Lane, Divided Highway (TA-36)
(Delaware Revision)



Typical Application 36

- *Merging taper = L*

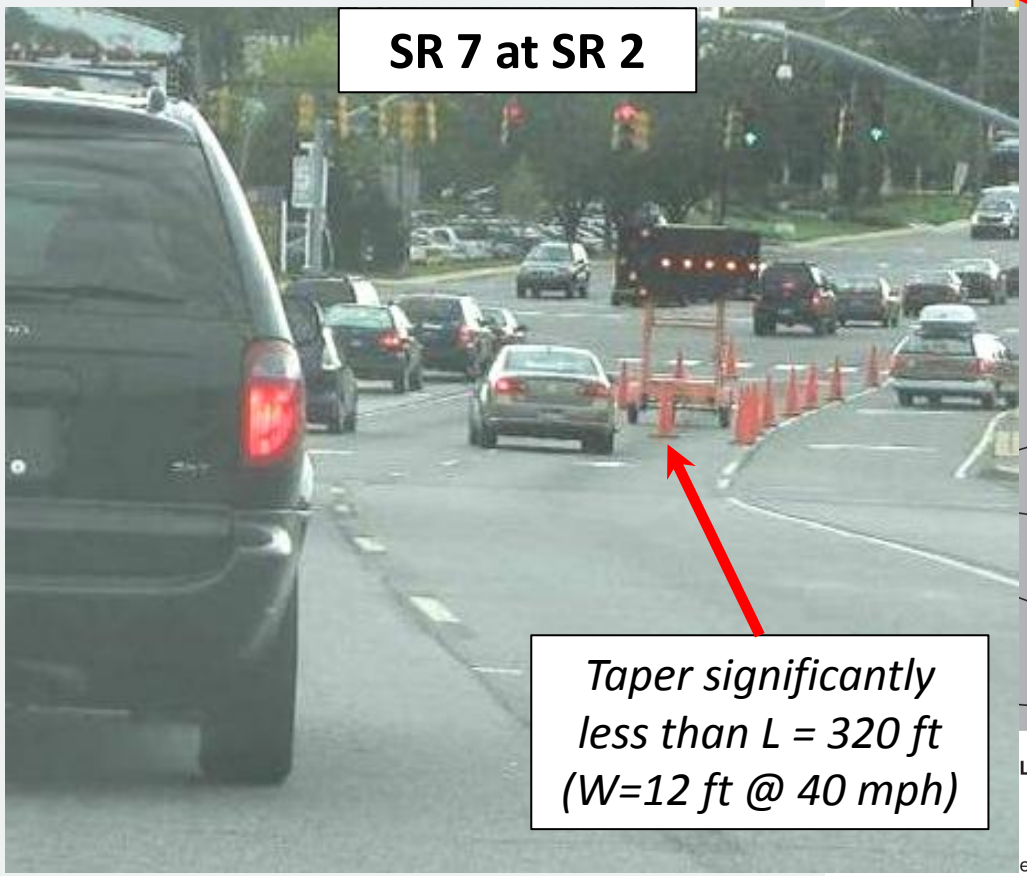
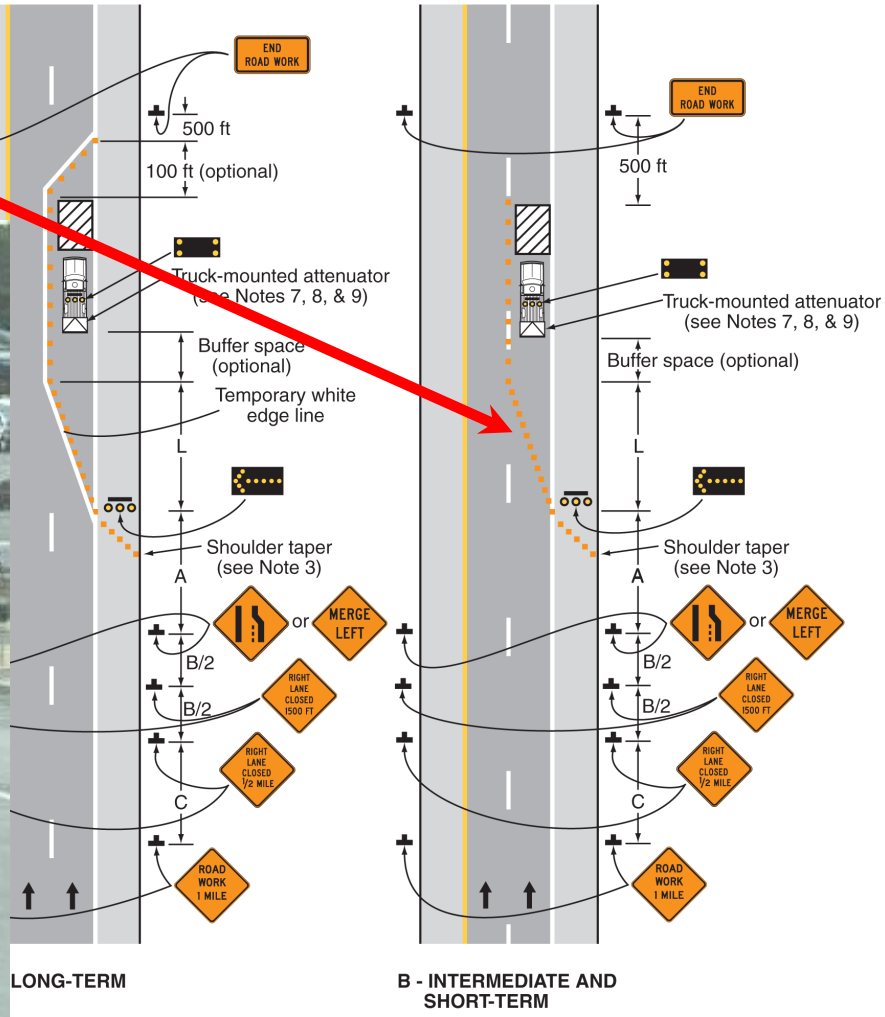


Figure 6H-33. Stationary Lane Closure on a Multi-Lane, Divided Highway (TA-33)
(Delaware Revision)



Typical Application 33

e Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

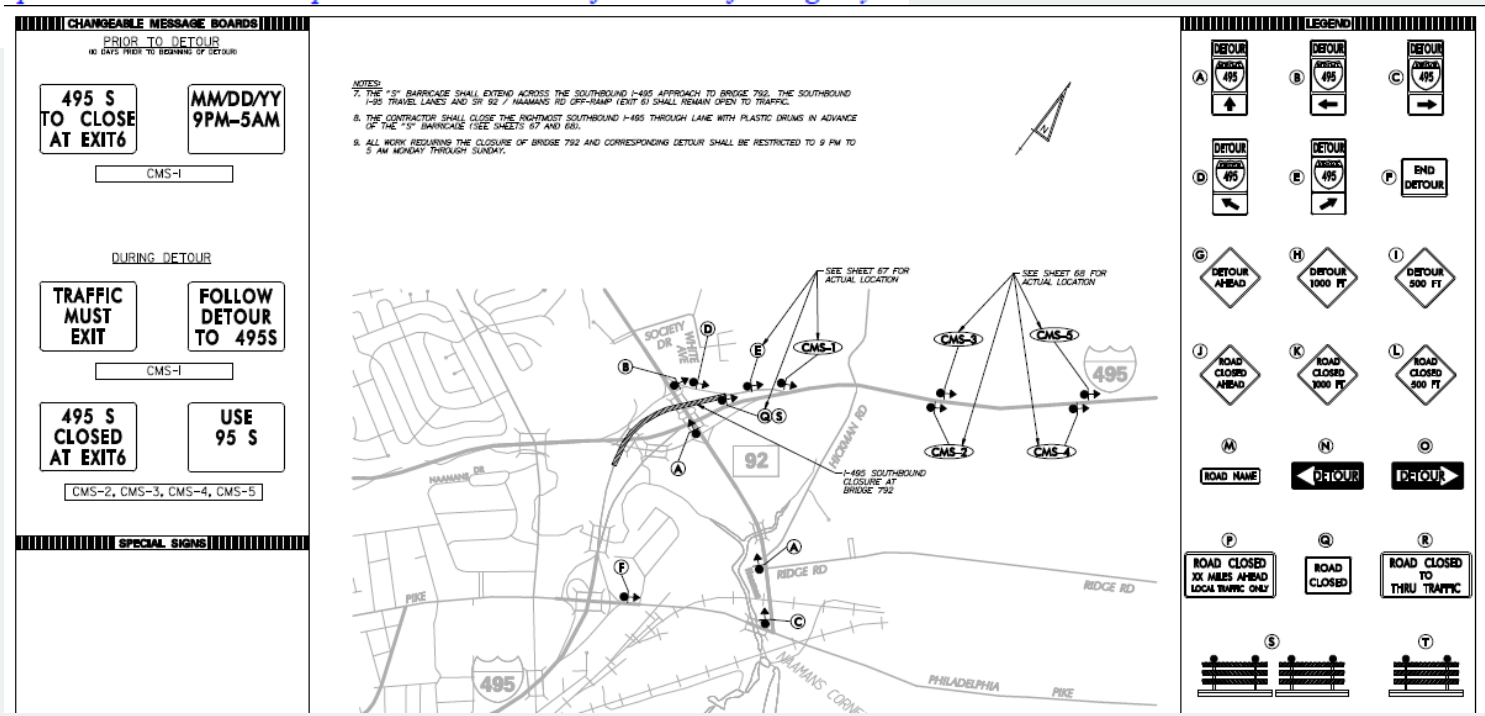
The distance between the advance warning signs and the sign legends should be based on the interstate/expressway/freeway criteria in Table 6H-3 unless site specific contraints require a reduced sign spacing.

Standard:

01A **(DE Revision) All detours affecting state-maintained roadways shall have a detour plan approved by DelDOT Traffic.**

Guidance:

01B *(DE Revision) Under emergency conditions, personnel should be provided to ensure safe roadway closure until proper devices are in place. Proper devices should be in place within 24 hours of the start of emergency operation.*



- DE Standard: **Approved detour plan for detours affecting state-maintained roads**
- DE Guidance: *Emergency personnel provided until TTC devices are in place (within 24 hours)*

Section 6D.01 Pedestrian Considerations

04 **If the TTC zone affects the movement of pedestrians, adequate pedestrian access and walkways shall be provided. If the TTC zone affects an accessible and detectable pedestrian facility, the accessibility and detectability shall be maintained along the alternate pedestrian route.**

- **Alternate ped facilities required if TTC affects existing ped facilities**

SR 2 at Hazel Ave / VA Hospital

Section 6D.01 Pedestrian Considerations

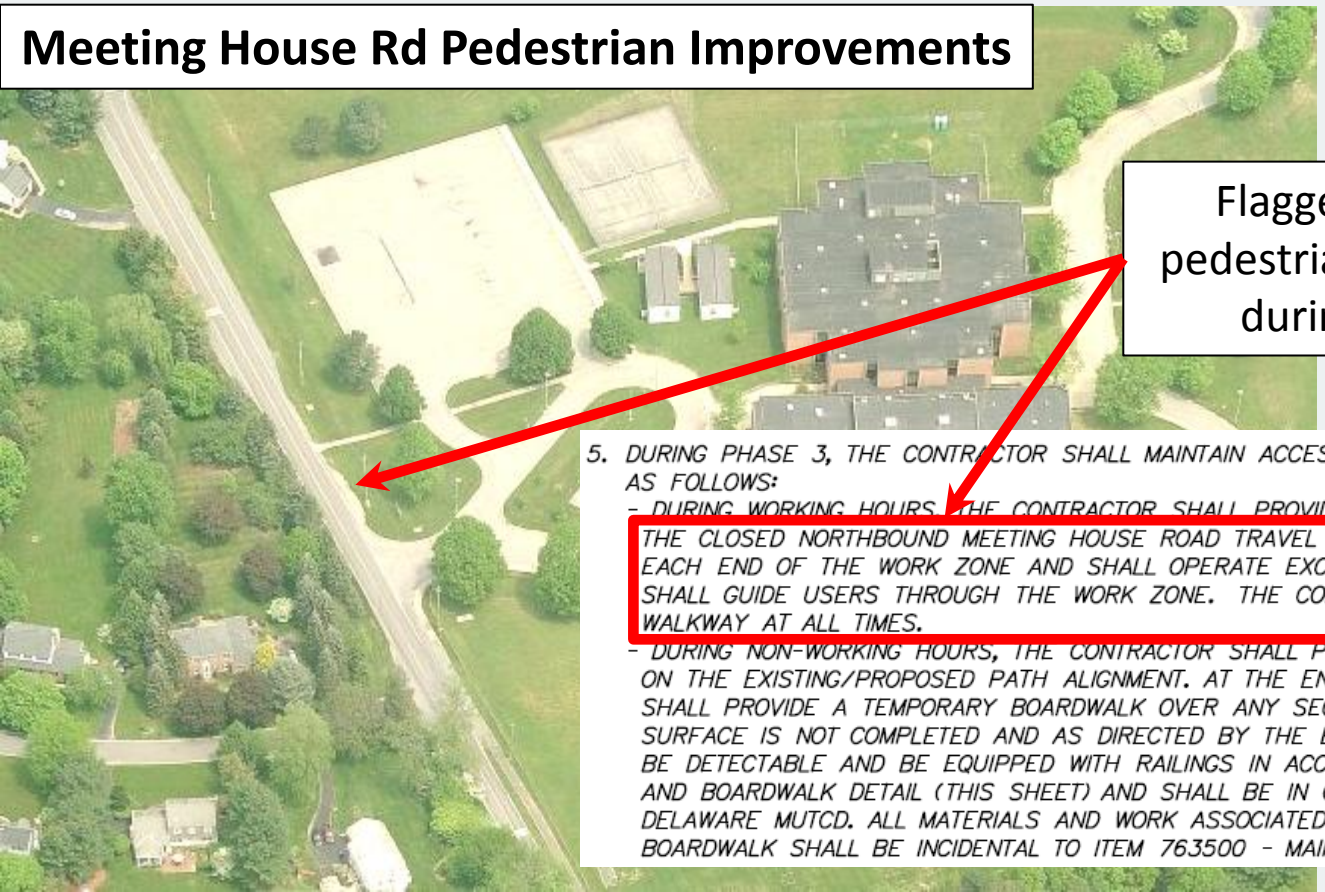
Not compliant

Option:

05 If establishing or maintaining an alternate pedestrian route is not feasible during the project, an alternate means of providing for pedestrians may be used, such as adding free bus service around the project or assigning someone the responsibility to assist pedestrians with disabilities through the project limits.

- If an alternate ped route is infeasible, providing free bus service or assigning personnel to assist are options

Meeting House Rd Pedestrian Improvements



Flaggers will be used to assist pedestrians through the work zone during path reconstruction

5. DURING PHASE 3, THE CONTRACTOR SHALL MAINTAIN ACCESS FOR PEDESTRIANS THROUGH THE WORK ZONE AS FOLLOWS:
   - DURING WORKING HOURS, THE CONTRACTOR SHALL PROVIDE ACCESS THROUGH THE WORK ZONE WITHIN THE CLOSED NORTHBOUND MEETING HOUSE ROAD TRAVEL LANE. ONE FLAGGER SHALL BE POSITIONED AT EACH END OF THE WORK ZONE AND SHALL OPERATE EXCLUSIVELY FOR PEDESTRIANS. THE FLAGGERS SHALL GUIDE USERS THROUGH THE WORK ZONE. THE CONTRACTOR SHALL MAINTAIN A FIVE-FOOT WIDE WALKWAY AT ALL TIMES.
   - DURING NON-WORKING HOURS, THE CONTRACTOR SHALL PROVIDE ACCESS THROUGH THE WORK ZONE ON THE EXISTING/PROPOSED PATH ALIGNMENT. AT THE END OF EACH WORKING DAY, THE CONTRACTOR SHALL PROVIDE A TEMPORARY BOARDWALK OVER ANY SECTION OF THE PATH WHERE THE FINAL CONCRETE SURFACE IS NOT COMPLETED AND AS DIRECTED BY THE ENGINEER. THE TEMPORARY BOARDWALK SHALL BE DETECTABLE AND BE EQUIPPED WITH RAILINGS IN ACCORDANCE WITH THE TEMPORARY CURB RAMP AND BOARDWALK DETAIL (THIS SHEET) AND SHALL BE IN COMPLIANCE WITH SECTION 6F.58 OF THE DELAWARE MUTCD. ALL MATERIALS AND WORK ASSOCIATED WITH THE TEMPORARY CURB RAMP AND BOARDWALK SHALL BE INCIDENTAL TO ITEM 763500 - MAINTANENCE OF TRAFFIC.

Section 6D.03 Worker Safety Considerations

Guidance:

02A *(DE Revision) Workers should not enter unprotected travel lanes of interstates, freeways, or expressways during planned activities, including crossing the roadway to access the median or shoulder on the opposite side from the protected work area.*

Standard:

04 **(DE Revision) All workers, including emergency responders, within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction equipment within the TTC zone shall wear high-visibility safety apparel that meets or exceeds the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Safety Apparel and Headwear" (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposure, except as provided in Paragraph 5. A person designated by the employer to be responsible for worker safety shall make the selection of the appropriate class of garment.**

- DE Guidance: *Workers should not enter or cross unprotected lanes on interstates, freeways, or expressways*

- **ANSI 107-2004 Class 2 apparel (MIN.) for all workers, except flaggers, within right-of-way**

SR 2 at Delaplane Ave

S. Governors Ave, Webbs Ln to Water St

Section 6D.03 Worker Safety Considerations

Guidance:

04A *(DE Revision) For nighttime activity and work on roadways with posted or statutory speeds of 50 mph or greater, safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" (see Section 1A.11) and labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure should be considered for all non-flagging personnel (instead of the Class 2 safety apparel in the Standard above).*

- DE Guidance: *ANSI 107-2004 Class 3 apparel for all workers within right-of-way during night work on roads ≥ 50 mph*

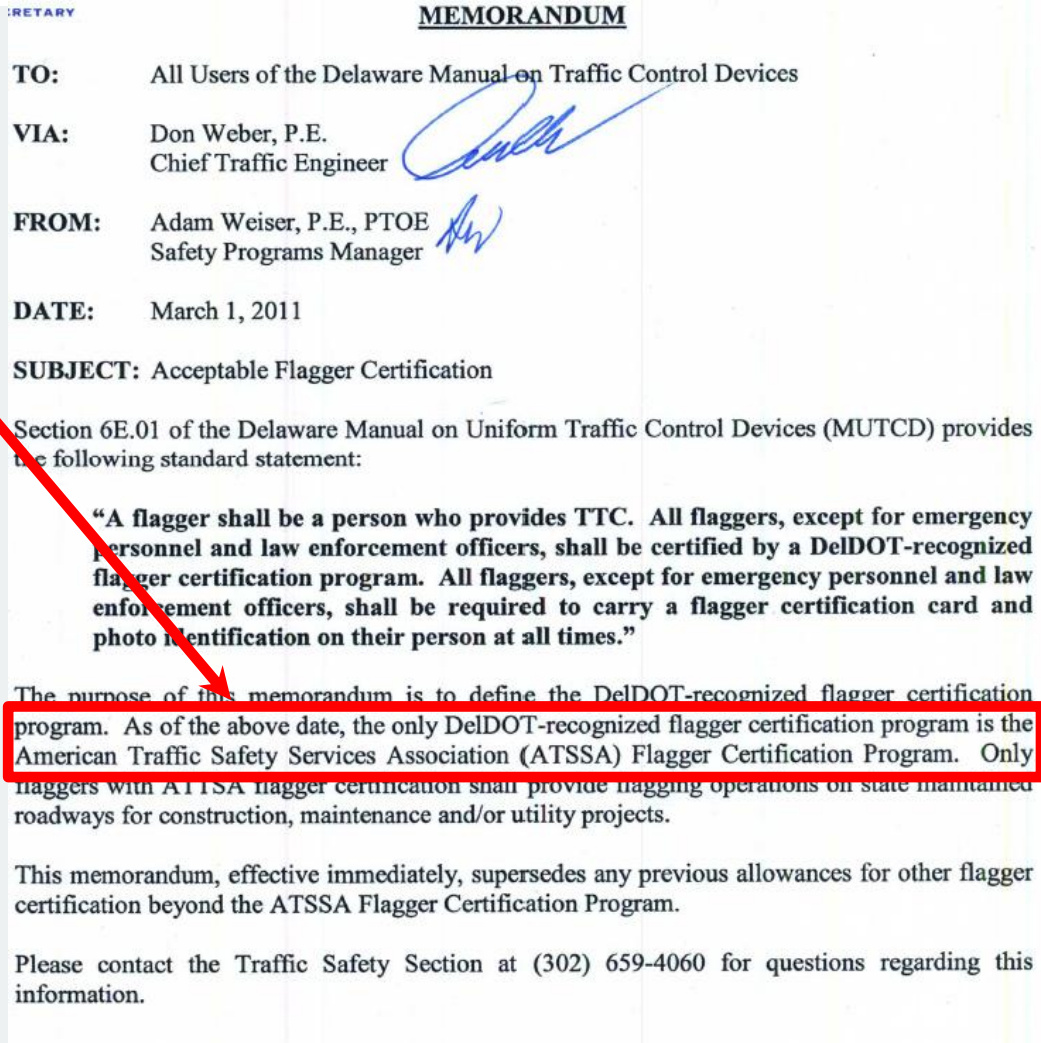
Northbound SR 1 / SR 7 at AAA Blvd

Section 6E.01 Qualifications for Flaggers

Standard:

01A **(DE Revision) All flaggers working on state-maintained roadways, except for emergency personnel and law enforcement officers, shall be certified by a DelDOT-recognized flagger certification program. All flaggers, except for emergency personnel and law enforcement officers, shall be required to carry a flagger certification card and photo identification on their person at all times.**

- DE Standard:
  - **ATSSA certified**
  - **Required to carry flagger certification card and photo identification at all times**



RETARY

MEMORANDUM

TO: All Users of the Delaware Manual on Traffic Control Devices

VIA: Don Weber, P.E.
Chief Traffic Engineer

FROM: Adam Weiser, P.E., PTOE
Safety Programs Manager

DATE: March 1, 2011

SUBJECT: Acceptable Flagger Certification

Section 6E.01 of the Delaware Manual on Uniform Traffic Control Devices (MUTCD) provides the following standard statement:

> **"A flagger shall be a person who provides TTC. All flaggers, except for emergency personnel and law enforcement officers, shall be certified by a DelDOT-recognized flagger certification program. All flaggers, except for emergency personnel and law enforcement officers, shall be required to carry a flagger certification card and photo identification on their person at all times."**

The purpose of this memorandum is to define the DelDOT-recognized flagger certification program. As of the above date, the only DelDOT-recognized flagger certification program is the American Traffic Safety Services Association (ATSSA) Flagger Certification Program. Only flaggers with ATTSA flagger certification shall provide flagging operations on state maintained roadways for construction, maintenance and/or utility projects.

This memorandum, effective immediately, supersedes any previous allowances for other flagger certification beyond the ATSSA Flagger Certification Program.

Please contact the Traffic Safety Section at (302) 659-4060 for questions regarding this information.

Section 6E.02 High-Visibility Safety Apparel

Standard:

01 **(DE Revision) For daytime and nighttime activity, flaggers shall wear high-visibility safety apparel that meets or exceeds the Performance Class 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Apparel and Headwear" (see Section 1A.11) and labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure. The apparel background (outer) material color shall be fluorescent orange-red, fluorescent yellow-green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.**

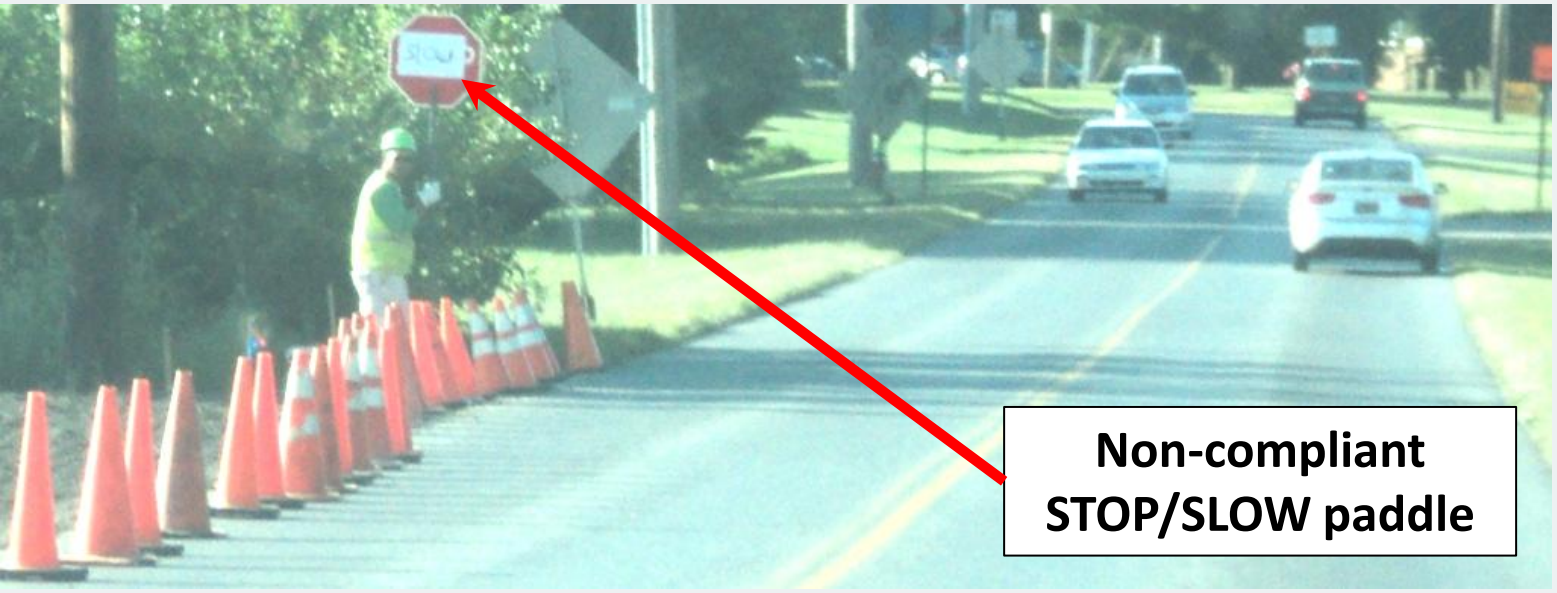
- DE Standard: **ANSI 107-2004 Class 3 apparel for all flaggers (day and night)**

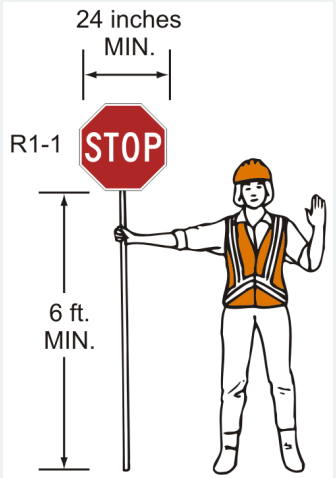
US 113 at Arrow Safety Rd

Standard:

02 **(DE Revision)** **The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 24 inches wide with letters at least 6 inches high. 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 background. When used at night, the STOP/SLOW paddle shall be retroreflectorized.**

- DE Standard:
  - **STOP/SLOW paddles shall be 24 inches wide (MIN.)**
  - **Black-on-orange SLOW (W20-8) face**





Section 6E.05 STOP/SLOW Automated Flagger Assistance Devices

Standard:

01 **A STOP/SLOW Automated Flagger Assistance Device (AFAD) (see Section 6E.04) shall include a STOP/SLOW sign that alternately displays the STOP (R1-1) face and the SLOW (W20-8) face of a STOP/SLOW paddle (see Figure 6E-1).**

DelDOT may consider issuing a formal policy when AFADs are permitted on state-maintained roads

Section 6E.07 Flagger Procedures

Section 6E.08 Flagger Stations

Standard:

04 **Except in emergency situations, flagger stations shall be preceded by an advance warning sign or signs. Except in emergency situations, flagger stations shall be illuminated at night.**

05 **(DE Revision) Except in emergency situations, flagger stations shall be illuminated at night with a minimum average horizontal luminance of 50 lux (5 foot candles).**

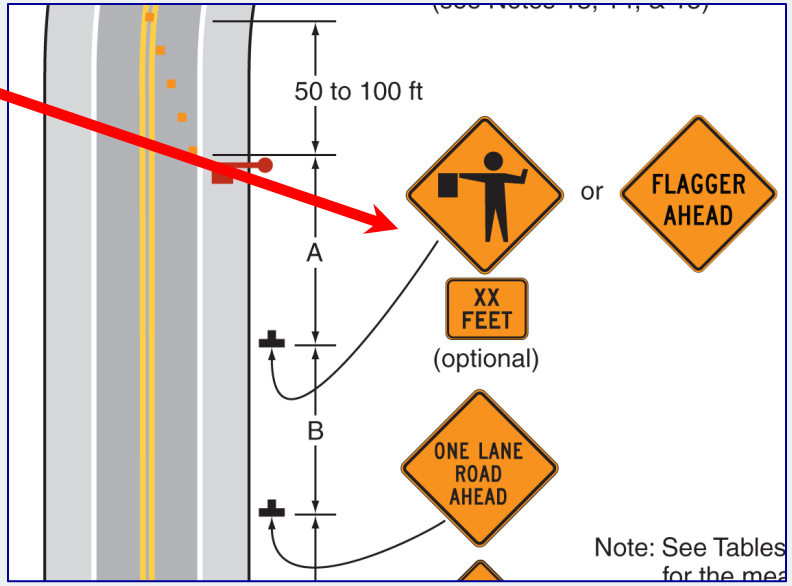
Support:

06 (DE Revision) A horizontal luminance of 50 lux (5 foot candles) can typically be achieved by a light plant featuring four (4) 1000 watt metal halide light fixtures, positioned within 15 feet of the flagging station at a minimum mounting height of 15 feet.

Guidance:

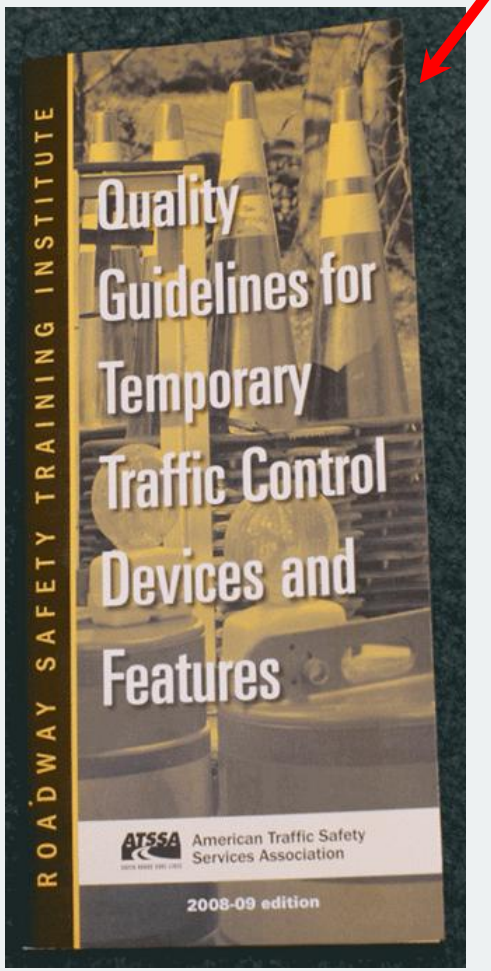
07 *(DE Revision) For flagger operations at night, a minimum of one (1) light plant should be dedicated to the flagger operation. Light fixtures should be positioned so as not to cause glare problems for vehicles approaching from any direction.*

- **Upstream advance warning sign(s)**
- **Illuminated at night (**DE Standard: **5 foot candles min. avg.), except emergencies**
- DE Guidance: *1 light plant (MIN.) exclusively for flagger station*



Section 6F.01 Types of Devices

06 (DE Revision) Information on the maintenance of TTC devices is contained in "Quality Guidelines for Work Zone Traffic Control Devices", published by the American Traffic Safety Services Association (ATSSA) and is available at the ATSSA website "http://www.atssa.com"



Standard:

18 **(DE Revision) All TTC signs, including those made of flexible material (i.e. roll-up signs), shall be made of prismatic retroreflective sign sheeting.**

19 **(DE Revision) Flexible signs made of mesh material shall not be used for TTC operations within the State of Delaware.**

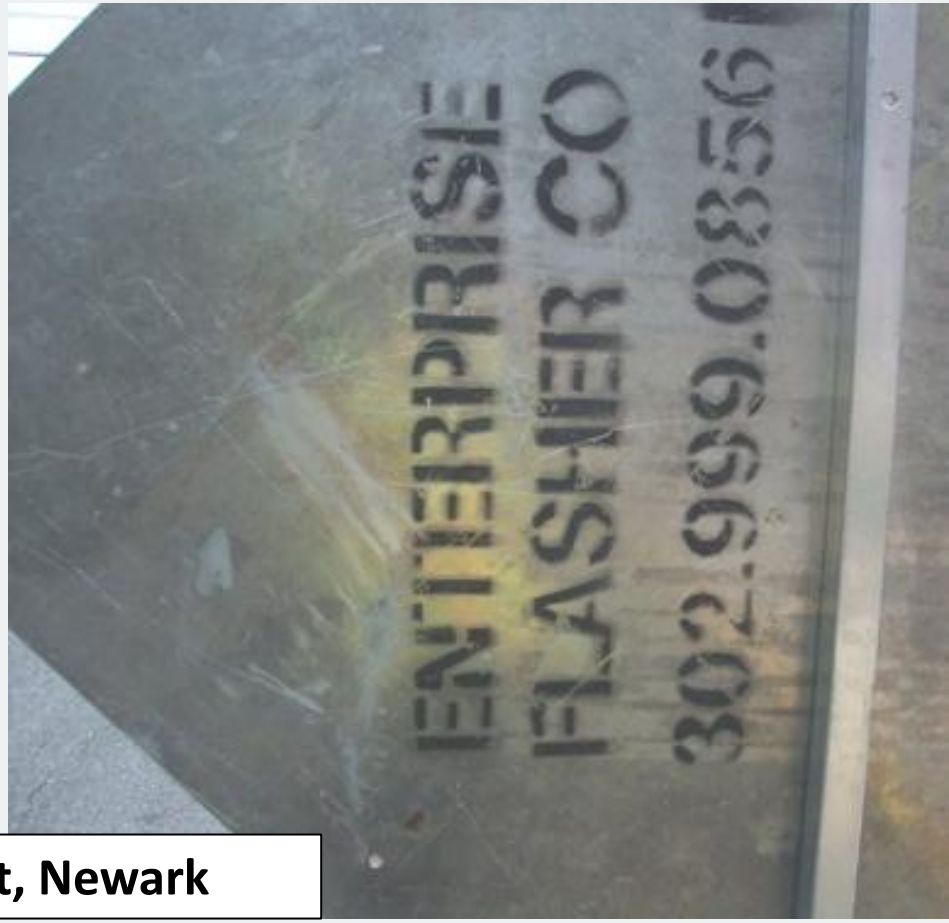
Shallcross Lake Rd at Greylag Rd

- DE Standard:
  - **Prismatic, retroreflective sheeting used for all TTC signs**
  - **Mesh flexible signs prohibited**

Guidance:

20 *(DE Revision) The backs of all signs should be clearly marked with the owner's name and contact information.*

- DE Guidance: *Owner's name and contact information on back of sign*



Main Street, Newark

Guidance:

01 *Signs should be located on the right-hand side of the roadway unless otherwise provided in this Manual.*

02 *(DE Revision) Typically, on multi-lane divided highways, signs should be placed on both the left-hand and right-hand sides of the roadway.*

- *Right-hand side of road*
- DE Guidance: *Signs installed on left and right-hand side of multi-lane, divided highways*

Should be located on right-hand side of road

US 13 / DE 404 Intersection Realignment and Bridgeville Service Road

Standard:

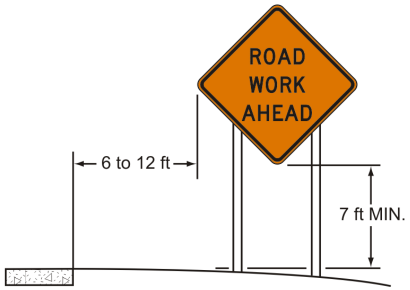
04 **(DE Revision)** **The minimum height, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement, of signs installed at the side of the road in rural areas shall be 7 feet (see Figure 6F-1).**

05 **The minimum height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way, of signs installed at the side of the road in business, commercial, or residential areas where parking or pedestrian movements are likely to occur, or where the view of the sign might be obstructed, shall be 7 feet (see Figure 6F-1).**

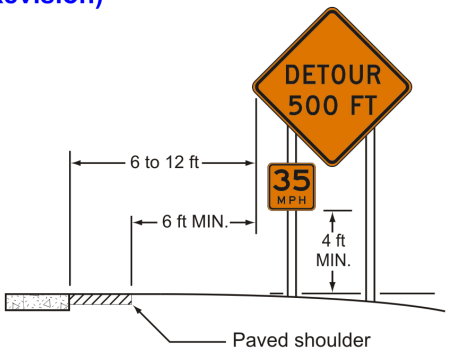
06 **The minimum height, measured vertically from the bottom of the sign to the sidewalk, of signs installed above sidewalks shall be 7 feet.**

- DE Standard: **7-ft (MIN.) mounting height along rural roads**
- **7-ft (MIN.) mounting height along urban roads**
- **7-ft (MIN.) mounting height above sidewalks**

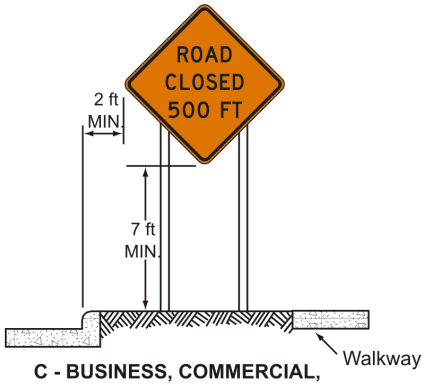
Figure 6F-1. Height and Lateral Location of Signs—Typical Installations (Delaware Revision)



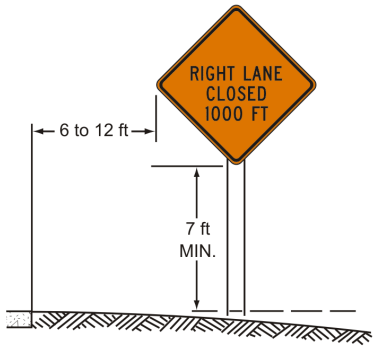
A - RURAL AREA



B - RURAL AREA WITH ADVISORY SPEED PLAQUE



C - BUSINESS, COMMERCIAL, OR RESIDENTIAL AREA

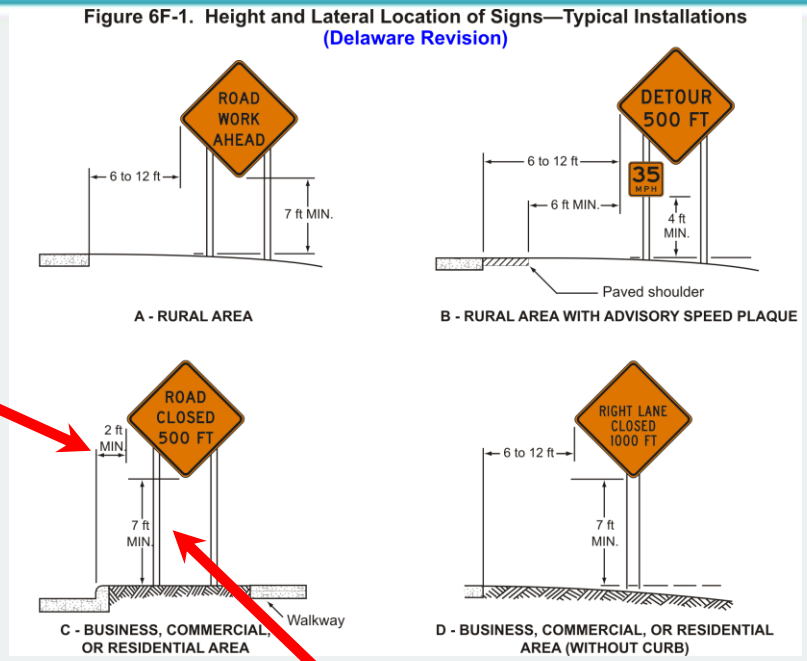


D - BUSINESS, COMMERCIAL, OR RESIDENTIAL AREA (WITHOUT CURB)

Section 6F.03 Sign Placement

Sign post spacing and lateral offset should comply with Figure 6F-1

S. Governors Ave, Webbs Ln to Water St



Mounting height shall comply with Figure 6F-1

08A *(DE Revision) Except as provided in Paragraph 8C, signs mounted on portable sign supports with a minimum mounting height of 5 feet should not be used for a duration of longer than 3 days.*

08B *(DE Revision) Except as provided in Paragraph 8C, signs mounted on portable sign supports with a minimum mounting height of 1 foot should not be used for a duration of longer than 1 hour.*

- DE Guidance: *5-ft (MIN.) portable sign mounting height ≤ 3 days*
- DE Guidance: *1-ft (MIN.) portable sign mounting height ≤ 1 hr*

BR 1-325 on Otts Chapel Rd over Persimmon Run

Portable signs with a mounting height < 5 ft should be in place for 1 hr or less

S. Governors Ave, Webbs Ln to Water St

Section 6F.03 Sign Placement

Standard:

19 **(DE Revision) When portable signs are no longer in use, the signs and their supports shall be removed or placed behind positive protection.**

- DE Standard: **Remove or place behind positive protection when not in use**

SR 1 north of SR 16

Section 6F.05 Regulatory Sign Authority

Standard:

02 **Regulatory signs shall be authorized by the public agency or official having jurisdiction and shall conform with Chapter 2B.**

Guidance:

03 *(DE Revision) A Traffic Control Device Authorization should be approved by DelDOT Traffic prior to the installation of a TTC regulatory sign or modification to an existing TTC regulatory sign.*

- DE Guidance: *Traffic Control Device Authorization approved by DelDOT Traffic for modifications to regulatory conditions*

Signed authorization on file for speed reduction from 45 mph to 30 mph on temporary road

TRAFFIC CONTROL DEVICE
AUTHORIZATION

Bethel Church Rd (N433) SR286
New Castle County

WHEREAS, The Secretary of the Department of Transportation by letter dated January 12, 1971, granted authority of the Chief Traffic Engineer to draw up and validate such restrictions as are needed to provide for the movement of traffic related to construction and maintenance projects; and

WHEREAS, it has been determined that the following traffic control devices are necessary for the safe movement of traffic in the area noted:

Reduce **45 mph** to **30 mph Speed Limit** on the temporary portion of **Bethel Church Rd (N433) SR286**. The speed limit reduction will be established on the temporary roadway, beginning at a point 584 feet west of the existing intersection of Bethel Church Rd and Choptank Rd SR15 to a point 780 feet north of the same intersection. The speed limit will be applied in both directions the time that the project demands to support State contract **#22-120-01**.

This reduced speed limit will be implemented 24 hours a day, and remain in effect from the beginning of the project until the end of the construction of the project.

NOW, THEREFORE, BE IT RESOLVED, by authority so granted, that the speed limit signs noted above were declared approved and effective when properly posted.

Donald D. Weber, P.E.
Chief Traffic Engineer

Date: 9/28/09

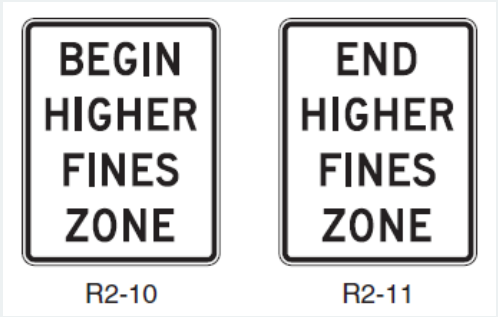
SR 15, Choptank Rd from N437 to N433

Guidance:

02 *A BEGIN HIGHER FINES ZONE (R2-10) sign (see Figure 6F-3) should be installed at the upstream end of a work zone where increased fines are imposed for traffic violations, and an END HIGHER FINES ZONE (R2-11) sign (see Figure 6F-3) should be installed at the downstream end of the work zone.*

04A (DE Revision) The BEGIN HIGHER FINES ZONE sign and FINES HIGHER plaque may be omitted within TTC zones per §4105 of Title 21 of the Delaware Code.

- *Occasionally used in work zones because fines are doubled per DE Code*
- DE Option: May be omitted within TTC zones per DE Code



NEW

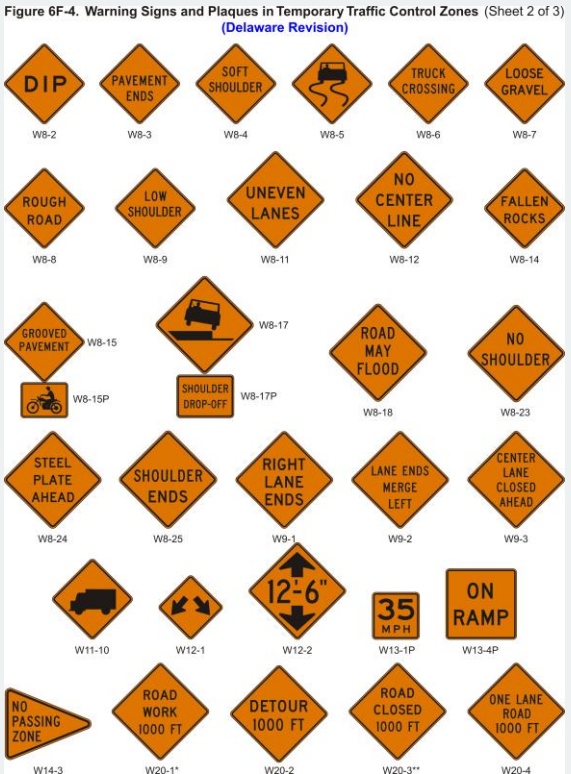
OLD

I-95 Newark Toll Plaza
Highway Speed E-ZPass Lanes

Standard:

02 **(DE Revision)** **TTC warning signs shall comply with the Standards for warning signs presented in Part 2 and in FHWA's "Standard Highway Signs and Markings" book (see Section 1A.11). Except as provided in Paragraph 3, TTC warning signs shall be diamond-shaped with a black legend and border on an fluorescent orange background, except for the W10-1 sign which shall have a black legend and border on a yellow background, and except for signs that are required or recommended in Parts 2 or 7 to have fluorescent yellow-green backgrounds.**

- DE Standard: **TTC warning signs consisting of black legend on fluorescent orange sheeting**



Section 6F.17 Position of Advance Warning Signs

03A *(DE Revision) Signs erected for individual operations within the TTC zone limits of a construction project should be placed with appropriate spacing and should not conflict with advance warning signs that are to remain for the entire duration of the project.*

- DE Guidance: *Specific TTC "application" signs should not conflict with "permanent" advance warning signs*

Elkton Rd, Casho Mill Rd to Delaware Ave

Section 6F.28 EXIT OPEN and EXIT CLOSED Signs

Option:

01 An EXIT OPEN (E5-2) or EXIT CLOSED (E5-2a) sign (see Figure 6F-5) may be used to supplement other warning signs where work is being conducted in the vicinity of an exit ramp and where the exit maneuver for vehicular traffic using the ramp is different from the normal condition.

Guidance:

02 *When an exit ramp is closed, an EXIT CLOSED sign panel with a black legend and border on an orange background should be placed diagonally across the interchange/intersection guide signs.*

- *EXIT CLOSED sign panels placed diagonally across guide signs*

I-95 Newark Toll Plaza Highway Speed E-ZPass Lanes

Standard:

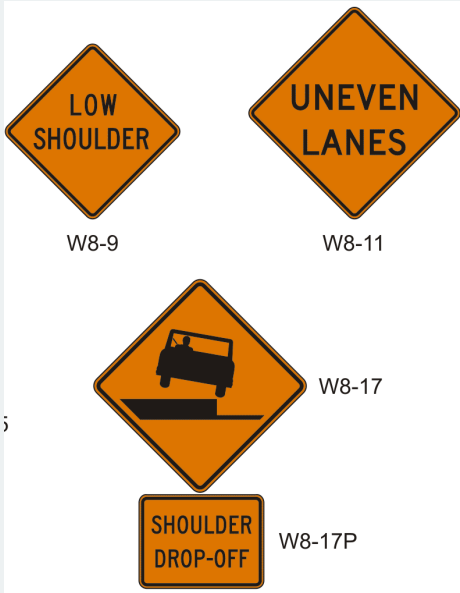
02 **(DE Revision) The LOW SHOULDER (W8-9) and Shoulder Drop Off (W8-17) signs (see Figure 6F-4) shall be used in accordance with Table 6G-1.**

01 **(DE Revision) The UNEVEN LANES (W8-11) sign (see Figure 6F-4) shall be used in accordance with Table 6G-1.**

- **Used in accordance with Table 6G-1: Vertical Difference**

Table 6G-1. Vertical Difference (Delaware Revision)

Type of Vertical Difference	Criteria	Height (H) of Vertical Difference			
		H ≤ 1 in	1 in < H ≤ 2 in	2 in < H ≤ 6 in	H > 6 in
Longitudinal ≤ 10 ft from edge of traveled way[1]	Standard	No channelizing devices required	- For differences along or between traveled ways, the UNEVEN LANES (W8-11) sign shall be used - For differences between the traveled way and shoulder or at the edge of pavement, the LOW SHOULDER (W8-9) sign shall be used	- No shoulder or shoulder < 4 ft wide: If the vertical difference is not eliminated by the end of the work day, a 4 to 1 fillet of wedge material shall be placed or temporary traffic barrier shall be installed. During the day of construction, channelizing devices shall be used to delineate the vertical difference until the vertical difference is eliminated, a 4 to 1 fillet of wedge material is placed, or temporary traffic barrier is installed. - Shoulder ≥ 4 ft wide: Drums shall be used to delineate the vertical difference for up to 5 calendar days. If the vertical difference is not eliminated by the end of the 5th calendar day, a 4 to 1 fillet of wedge material shall be placed or temporary traffic barrier shall be installed. - The Shoulder Drop Off (W8-17) sign shall be used until the vertical difference is eliminated	If the vertical difference is not eliminated by the end of the work day, a 4 to 1 fillet of wedge material shall be placed or temporary traffic barrier shall be installed.



Section 6F.48 Reverse Curve Signs

Guidance:

01 *(DE Revision) In order to give road users advance notice of a lane shift, a Reverse Curve (W1-4, W1-4b, or W1-4c) sign or LANE SHIFT XX FT (W1-4-DE) sign (see Figure 6F-4) should be used when a lane (or lanes) is being shifted to the left or right. If the design speed of the curves is 30 mph or less, a Reverse Turn (W1-3) sign should be used.*

Standard:

02 **If a Reverse Curve (or Turn) sign is used, the direction of the reverse curve (or turn) shall be appropriately illustrated. Except as provided in Paragraph 3, the number of lanes illustrated on the sign shall be the same as the number of through lanes available to road users.**

Option:

03 Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP) plaque (see Figure 6F-4) may be used instead of a sign that illustrates the number of lanes.

04 Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular

W1-4-DE

- Optional DE-specific W1-4-DE legend sign
- **W1-4 sign depicts number of travel lanes**
- May use ALL LANES plaque in place of sign depicting number of lanes


W1-4

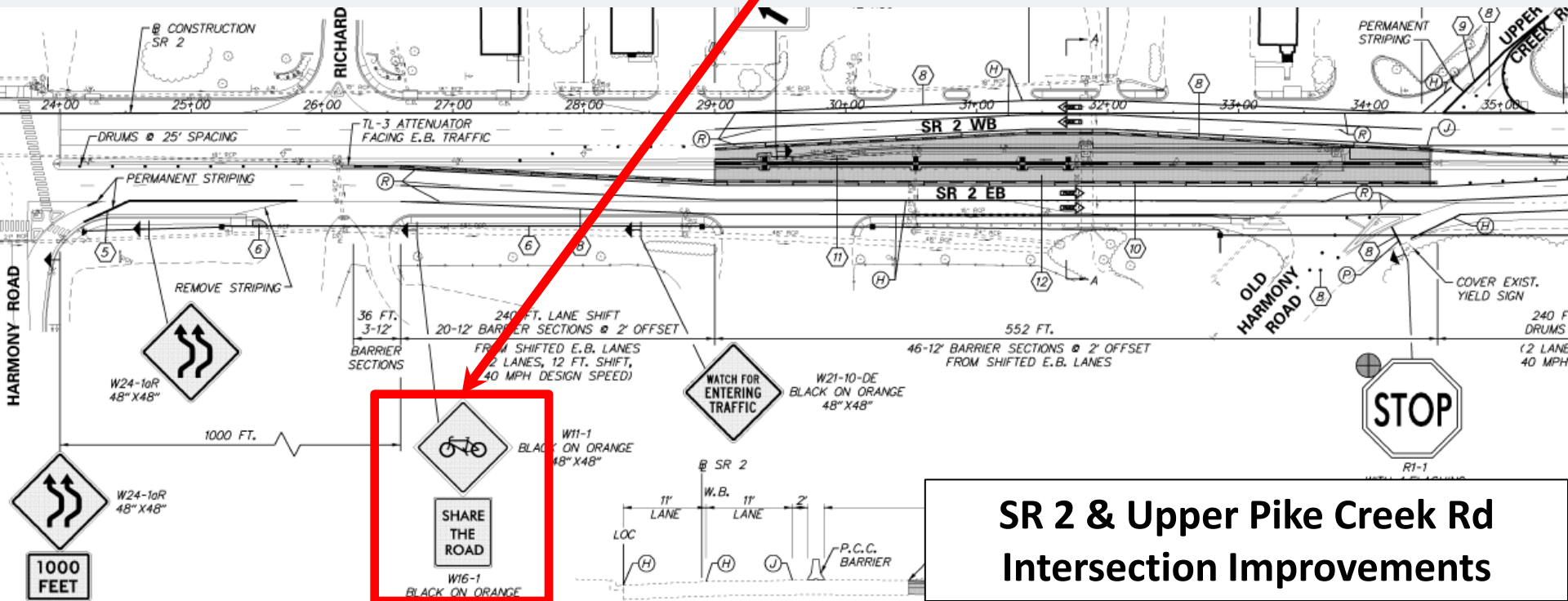

W1-4b


W1-4c

02 Besides the warning signs specifically related to TTC zones, several other warning signs in Part 2 may apply in TTC zones.

02A (DE Revision) When shoulder or lane closures affect bicycle facilities, the Bicycle Warning (W11-1) sign and Share the Road (W16-1P) plaque may be used to warn of unexpected entries by bicycles into the roadway.

- Other warning signs in Part 2 may be applicable to TTC operations
- Bicycle warning (W11-1) sign with SHARE THE ROAD (W16-1P) plaque used when TTC affects existing bicycle facility



SR 2 & Upper Pike Creek Rd Intersection Improvements

Section 6F.59 Detour Signs

04A (DE Revision) Special detour signs (see Figure 6H-20) may be used on roadways that intersect closed roadways to advise motorists of a corresponding detour.

Guidance:

04B *(DE Revision) Special detour sign legends should have a minimum letter height of 6 inches on two-lane roadways and multi-lane roadways with a posted speed limit or 85th-percentile speed less than or equal to 40 miles per hour. Special detour sign legends should have a minimum letter height of 8 inches on multi-lane roadways with a posted speed limit or 85th-percentile speed greater than 40 miles per hour.*

- DE Option: Special (custom legend) detour signs used on roads that intersect a closed road
- DE Guidance:
  - *6-inch (MIN.) legend on two-lane roads and multi-lane roads ≤ 40 mph*
  - *8-inch (MIN.) legend on multi-lane roads > 40 mph*

6-inch legend used for special detour sign on Old Baltimore Pk

I-95 Newark Toll Plaza Highway Speed E-ZPass Lanes

Section 6F.60 Portable Changeable Message Signs

Standard:

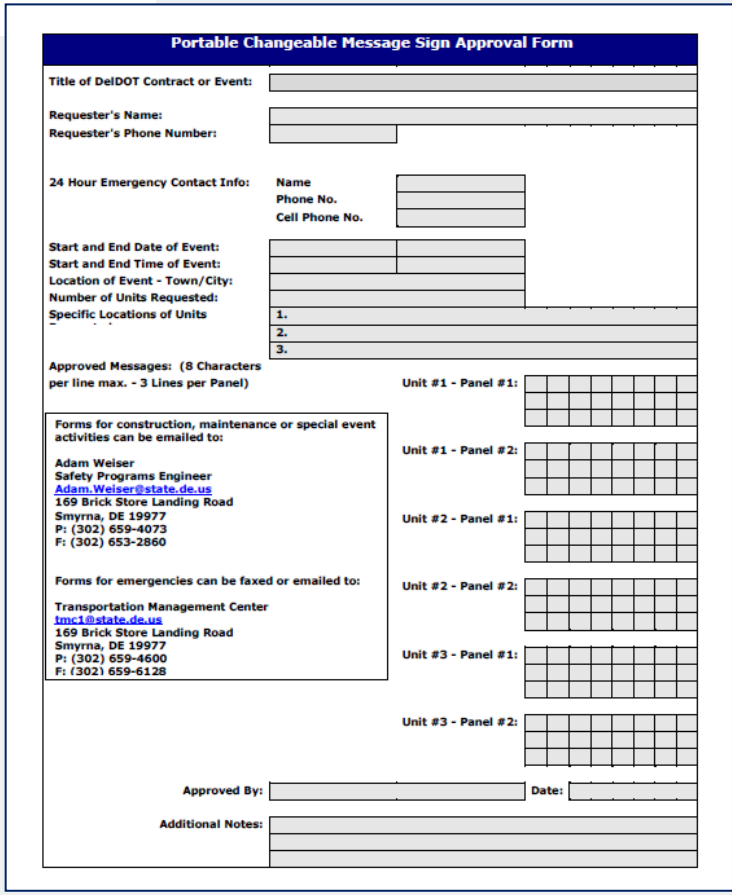
07 **Portable changeable message signs shall comply with the applicable design and application principles established in Chapter 2A. Portable changeable message signs shall display only traffic operational, regulatory, warning, and guidance information, and shall not be used for advertising messages.**

07A **(DE Revision) All portable changeable message signs to be placed within State Right of Way and the messages they display shall be approved by DelDOT Traffic prior to installation, except those used for emergency operations.**

Support:

07B (DE Revision) The Portable Changeable Message Sign Approval Form can be found on the DelDOT website at www.deldot.gov.

- **Design principles per Chapter 2A**
- **Display only operational, regulatory, warning, or guidance information**
- DE Standard: **Installations approved by DelDOT Traffic**
  - PCMS approval form if display messages are omitted from plan set



Portable Changeable Message Sign Approval Form

Title of DelDOT Contract or Event:

Requester's Name:
Requester's Phone Number:

24 Hour Emergency Contact Info: Name / Phone No. / Cell Phone No.

Start and End Date of Event:
Start and End Time of Event:
Location of Event - Town/City:
Number of Units Requested:
Specific Locations of Units: 1. 2. 3.

Approved Messages: (8 Characters per line max. - 3 Lines per Panel)

Unit #1 - Panel #1:
Unit #1 - Panel #2:
Unit #2 - Panel #1:
Unit #2 - Panel #2:
Unit #3 - Panel #1:
Unit #3 - Panel #2:

Forms for construction, maintenance or special event activities can be emailed to:

Adam Weiser
Safety Programs Engineer
Adam.Weiser@state.de.us
169 Brick Store Landing Road
Smyrna, DE 19977
P: (302) 659-4073
F: (302) 653-2860

Forms for emergencies can be faxed or emailed to:

Transportation Management Center
tmc1@state.de.us
169 Brick Store Landing Road
Smyrna, DE 19977
P: (302) 659-4600
F: (302) 659-6128

Approved By: Date:

Additional Notes:

10 **(DE Revision) All sign lettering shall be in upper-case letters as provided in the "Standard Highway Signs and Markings" book (see Section 1A.11) and the Delaware Standard Signs book, unless otherwise provided in this Manual for a particular sign or type of message.** **(from Section 2A.13)**

- **Word messages in all upper-case, unless otherwise stated**

Interstate Bridge Maintenance, Christina

- **Table 1A-2 lists acceptable PCMS abbreviations**

"RR XING" is acceptable abbreviation for PCMS displays, not "RR"

SR 4 Railroad Crossing Improvement

Table 1A-2. Abbreviations that Shall be Used Only on Portable Changeable Message Signs

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
[illegible]	[illegible]	—	Driving
Highway-Rail Grade Crossing	RR XING	—	—
[illegible]	[illegible]	—	[Number]
It Is	ITS	—	—
Lane	LN	[Roadway Name]*,Right, Left, Center	—
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	—	—

* This abbreviation, when accompanied by the prompt word, may be used on traffic control devices other than portable changeable message signs.
** A space and no dash shall be placed between the abbreviation and the number of the route.

Section 6F.60 Portable Changeable Message Signs

Guidance:

27 *Portable changeable message signs should be used as a supplement to and not as a substitute for conventional signs and pavement markings.*

30 *(DE Revision) Portable changeable message signs should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the portable changeable message sign, it should be placed off the shoulder and outside of the clear zone.*

- *Supplement conventional signs and markings*
- *Not crashworthy; placed behind barrier or outside clear zone, if practical*

I-295 northbound north of I-95 diverge

Section 6F.60 Portable Changeable Message Signs

Guidance:

13 *A portable changeable message sign should be limited to three lines of eight characters per line or should consist of a full matrix display.*

17 *Messages on a portable changeable message sign should consist of no more than two phases, and a phase should consist of no more than three lines of text. Each phase should be capable of being understood by itself, regardless of the order in which it is read. Messages should be centered within each line of legend. If more than one portable changeable message sign is simultaneously legible to road users, then only one of the signs should display a sequential message at any given time.*

30B **(DE Revision) Six (6) channelizing devices (drums or cones) shall be provided to close the shoulder in advance of each portable changeable message sign located within the shoulder during the daytime. When a portable changeable message sign will be on site at night, drums shall be utilized.**

32B **(DE Revision) All portable changeable message signs no longer in use shall be removed from the work area within 48 hours, unless approved by DelDOT Traffic.**

- *Maximum message criteria:*
  - *2 phases per PCMS*
  - *3 lines per phase*
  - *8 characters per line*
- DE Standard: **6 drums close shoulder in advance of PCMS**
- DE Standard: **PCMSs no longer in use removed within 48 hrs**

SR 4 Railroad Crossing Improvement

Guidance:

30C *(DE Revision) If a portable changeable message sign is placed on the median of a divided roadway and is less than 30 feet from either direction of travel, the portable changeable message sign should be delineated with 6 drums in that direction of travel.*

- DE Guidance: *6 drums in each direction within median of divided highway if PCMS is within 30 ft of travel lane*

SR 4 Railroad Crossing Improvement

Section 6F.61 Arrow Boards

08A **(DE Revision) A One-Direction Large Arrow (W1-6) sign shall be centered below and attached to the bottom of all trailer-mounted arrow boards.**

08B **(DE Revision) The One-Direction Large Arrow (W1-6) sign shall point in the direction that traffic should merge and shall be covered or removed when not in use or when caution mode is being displayed on the trailer mounted arrow board.**

- DE Standard: **W1-6 sign shall match direction of arrow board**
- DE Standard: **W1-6 sign removed or covered during caution mode**

Boyds Corner Intersection Improvements

16 **An arrow board shall have the following three mode selections:**

A. A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode;
B. A Flashing Double Arrow mode; and
C. A Flashing Caution or Alternating Diamond mode.

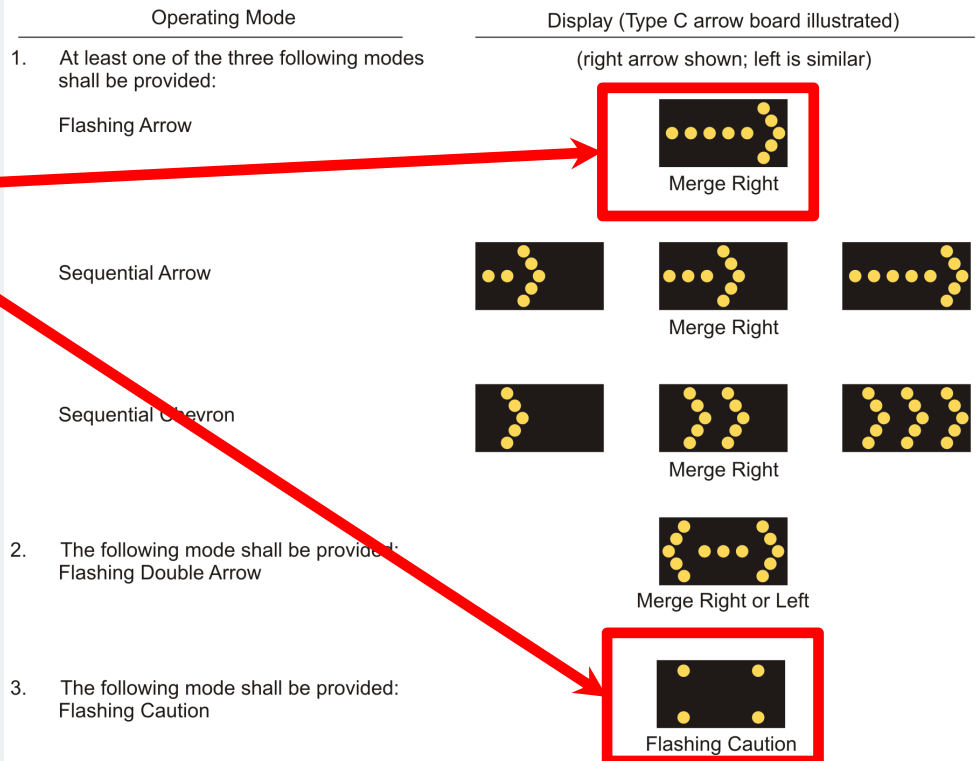
Guidance:

16A *(DE Revision) Only the Flashing Arrow or Flashing Caution operating modes should be used on state-maintained roadways.*

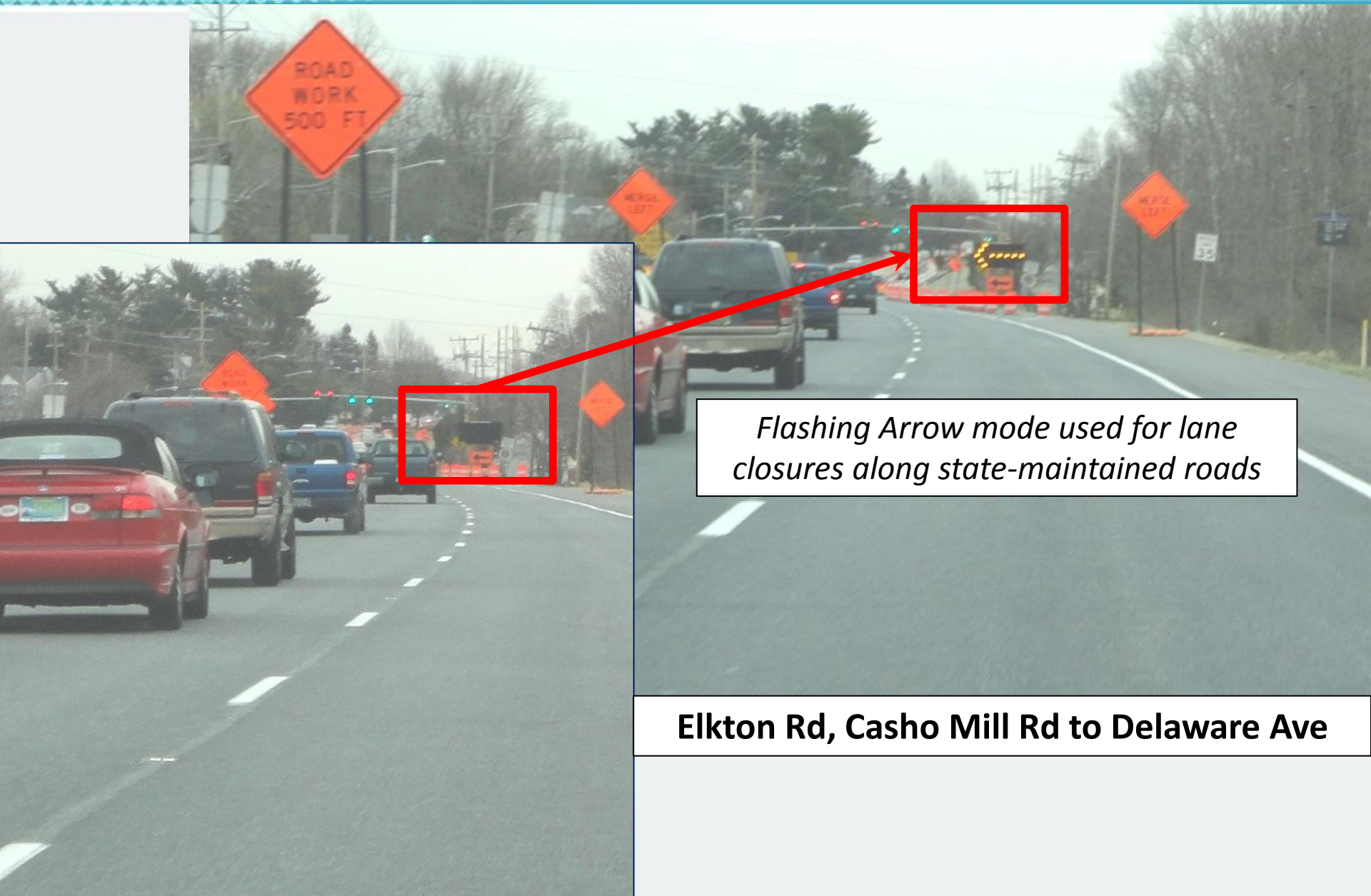
25 **Arrow boards shall only be used to indicate a lane closure. Arrow boards shall not be used to indicate a lane shift.**

- DE Guidance: *Flashing Arrow or Flashing Caution modes on state-maintained roads*
- **Shall not be used for lane shifts**

Figure 6F-6. Advance Warning Arrow Board Display Specifications (Delaware Revision)



Section 6F.61 Arrow Boards



Flashing Arrow mode used for lane closures along state-maintained roads

Elkton Rd, Casho Mill Rd to Delaware Ave

Section 6F.63 Channelizing Devices

Standard:

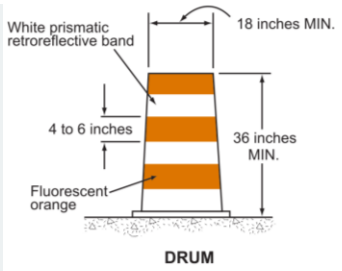
01 **(DE Revision) Designs of various channelizing devices shall be as shown in Figure 6F–7. All channelizing devices shall be crashworthy and shall have retroreflective sheeting.**

01A **(DE Revision) The retroreflective material used on channelizing devices shall have a smooth, sealed outer surface that will display a similar color day or night.**

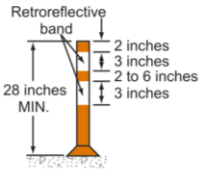
Guidance:

01B *(DE Revision) The retroreflective material used on channelizing devices should be prismatic.*

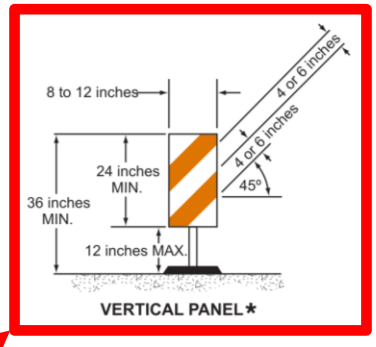
- DE Standard: **Crashworthy devices with retroreflective sheeting displaying similar color day or night**
- DE Guidance:
  - *Prismatic retroreflective sheeting*
  - *Vertical panels should not be used on state-maintained roads*



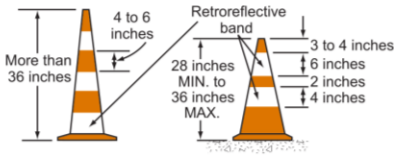
DRUM



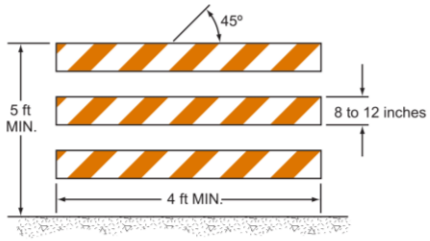
TUBULAR MARKERS



VERTICAL PANEL*



CONES



TYPE 3 BARRICADE **

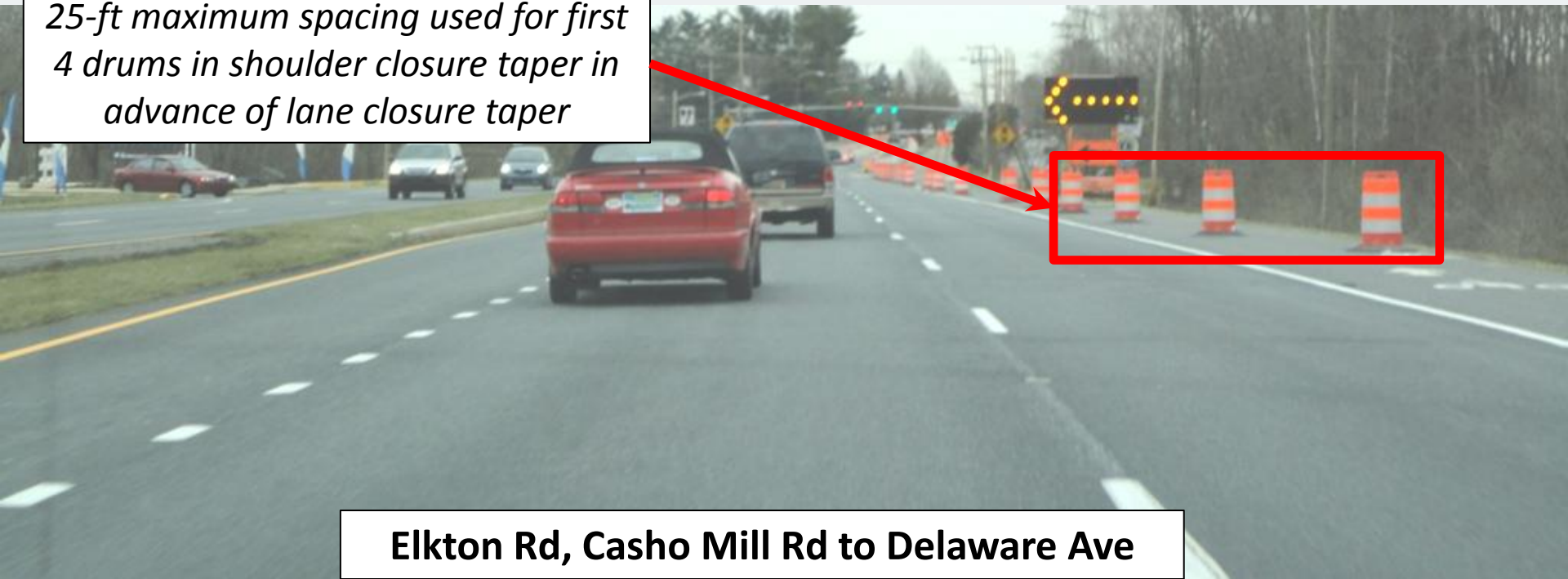
Section 6F.63 Channelizing Devices

08 (DE Revision) The spacing between cones, tubular markers, vertical panels, drums, and barricades should not exceed a distance in feet equal to 1.0 times the speed limit in mph and should not exceed 60 feet when used for both taper channelization and tangent channelization.

08A (DE Revision) The spacing of the first four channelizing devices in a series used for taper channelization should not exceed 25 feet.

- DE Guidance:
  - *Longitudinal spacing (ft) = Speed limit (mph); 60 ft MAX.*
  - *Spacing of first 4 devices in taper = 25 ft MAX.*

25-ft maximum spacing used for first 4 drums in shoulder closure taper in advance of lane closure taper



Elkton Rd, Casho Mill Rd to Delaware Ave

Section 6F.64 Cones

02 **(DE Revision) Except as noted in Paragraphs 3A, 3B and 3C, cones shall not be used for nighttime operations. Retroreflectorization of cones that are 28 to 36 inches in height shall be provided by a 6-inch wide white band located 3 to 4 inches from the top of the cone and an additional 4-inch wide white band located approximately 2 inches below the 6-inch band.**

Option:

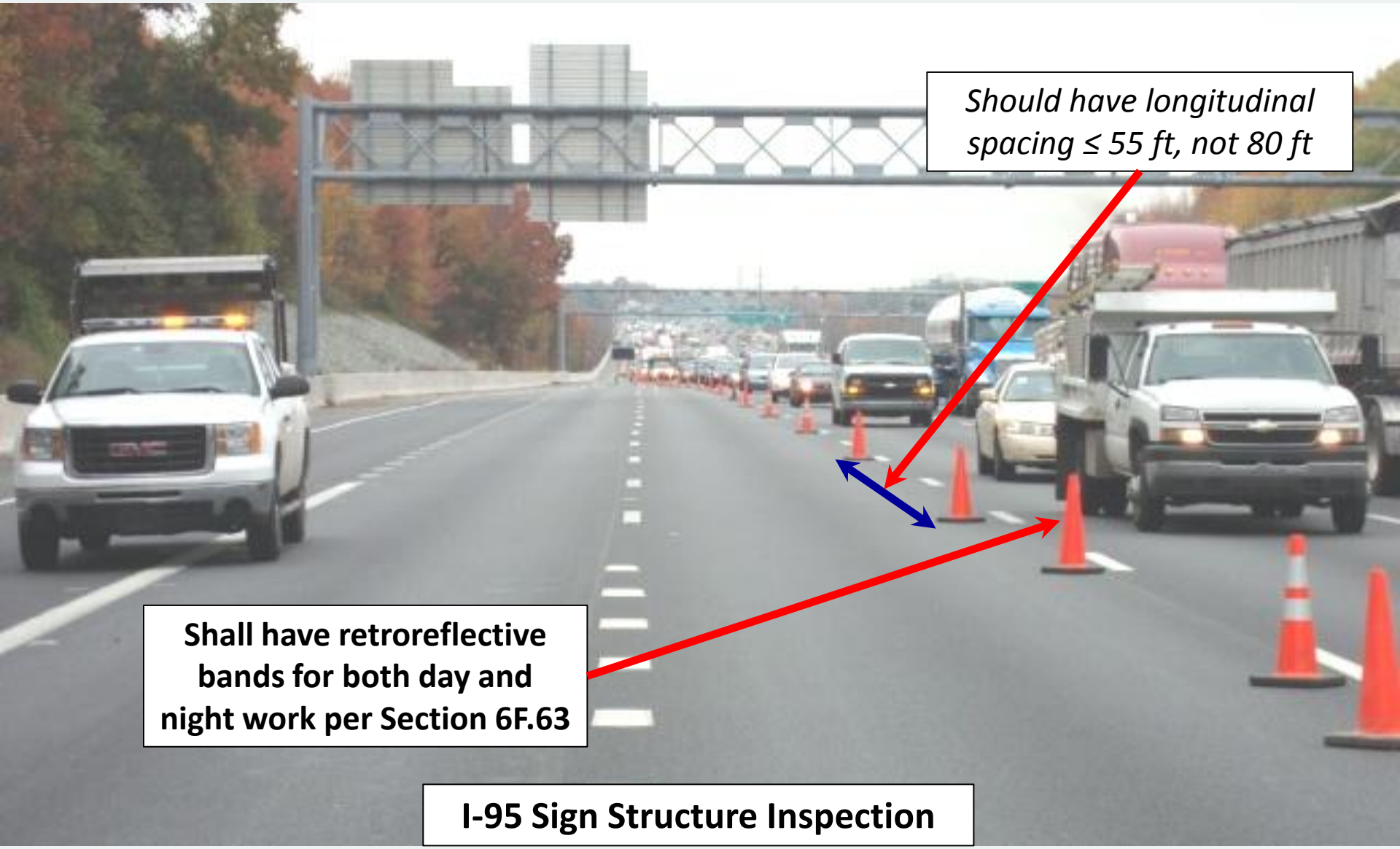
03A (DE Revision) Due to the unique and temporary nature of traffic management for special events, including complex traffic shifts to accommodate ingress and egress, retroreflective cones may be used at night during planned special events.

03B (DE Revision) Retroreflective cones may be used in lieu of drums during a single nighttime emergency operation.

03C (DE Revision) Retroreflective cones may be used to supplement a mobile striping operation.

- DE Standard: **Shall not be used at night**
- DE Option: May only be used at night during:
  - Special events requiring complex traffic shifts for ingress and egress traffic
  - Emergencies
  - Mobile striping operations to protect wet markings

Section 6F.64 Cones



I-95 Sign Structure Inspection

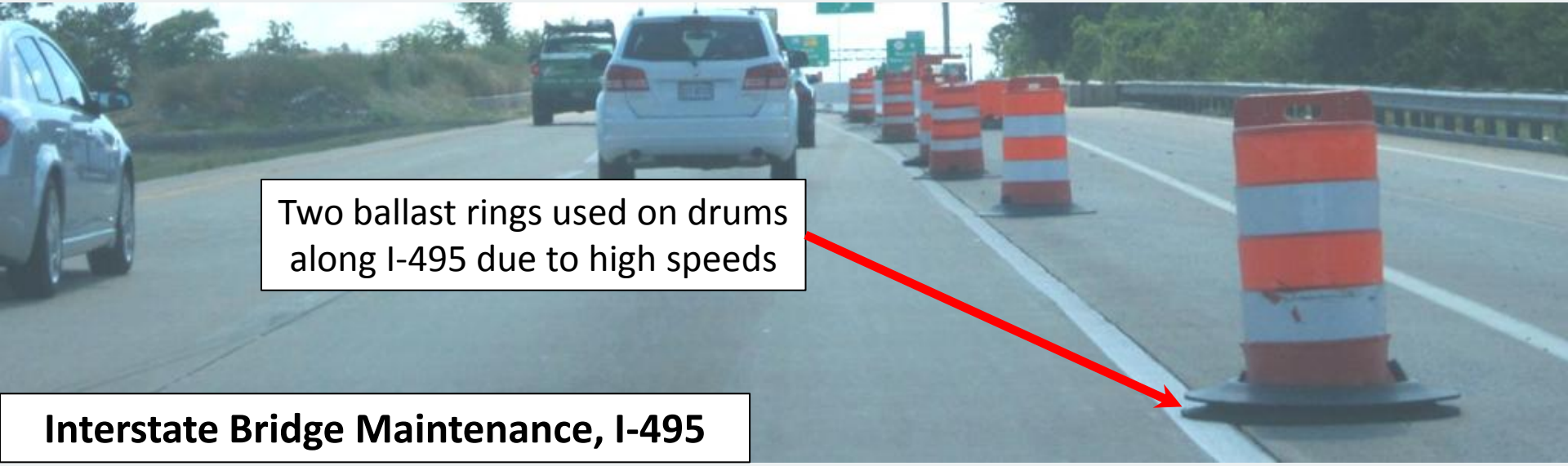
Option:

06 (DE Revision) Two ballast rings ("tire rings") may be used to minimize drum displacement due to passing vehicles or high winds.

Support:

07 (DE Revision) The use of two ballast rings has been found to minimize the chance a drum could be blown over by a truck or other vehicle passing by at high speed, particularly on roads with posted speed limits of 55 mph or higher, or having the drum blow over due to high winds.

- DE Option: Two ballast rings to minimize drum displacement on high-speed roads or in areas with high winds



Interstate Bridge Maintenance, I-495

Section 6F.68 Type 1, 2, or 3 Barricades

Standard:

01A **(DE Revision) Type 1 Barricades shall not be used for TTC operations on state-maintained roads.**

01B **(DE Revision) Type 2 Barricades shall only be used for pedestrian channelization along temporary pedestrian paths. Type 2 Barricades shall not be used to close a roadway, sidewalk or crosswalk.**

01C **(DE Revision) When used for pedestrian channelization, Type 2 Barricades shall be continuous and the rails shall be mounted in accordance with ADA in order to provide for a cane rail (bottom rail) and hand rail (top rail).**

- DE Standard:
  - **Type 1 barricades prohibited**
  - **If used, Type 2 barricades for ped diversions only**

Section 6F.68 Type 1, 2, or 3 Barricades

Standard:

19 **(DE Revision) Type 3 Barricades used at a road closure shall be placed completely across a roadway, from curb to curb, or from edge of road to edge of road, with the stripes positioned downward toward the center of the roadway.**

- DE Standard: **At road closure, Type 3 barricades placed completely across roadway with stripes pointing toward center of road**

SR 15, Choptank Rd from N437 to N433

Option:

23 Signs may be installed on barricades (see Section 6F.03).

Guidance:

24 *(DE Revision) Signs mounted on Type 3 Barricades should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails.*

- DE Guidance: *Signs should not cover more than 50 percent of top two rails or 33 percent of all three rails*

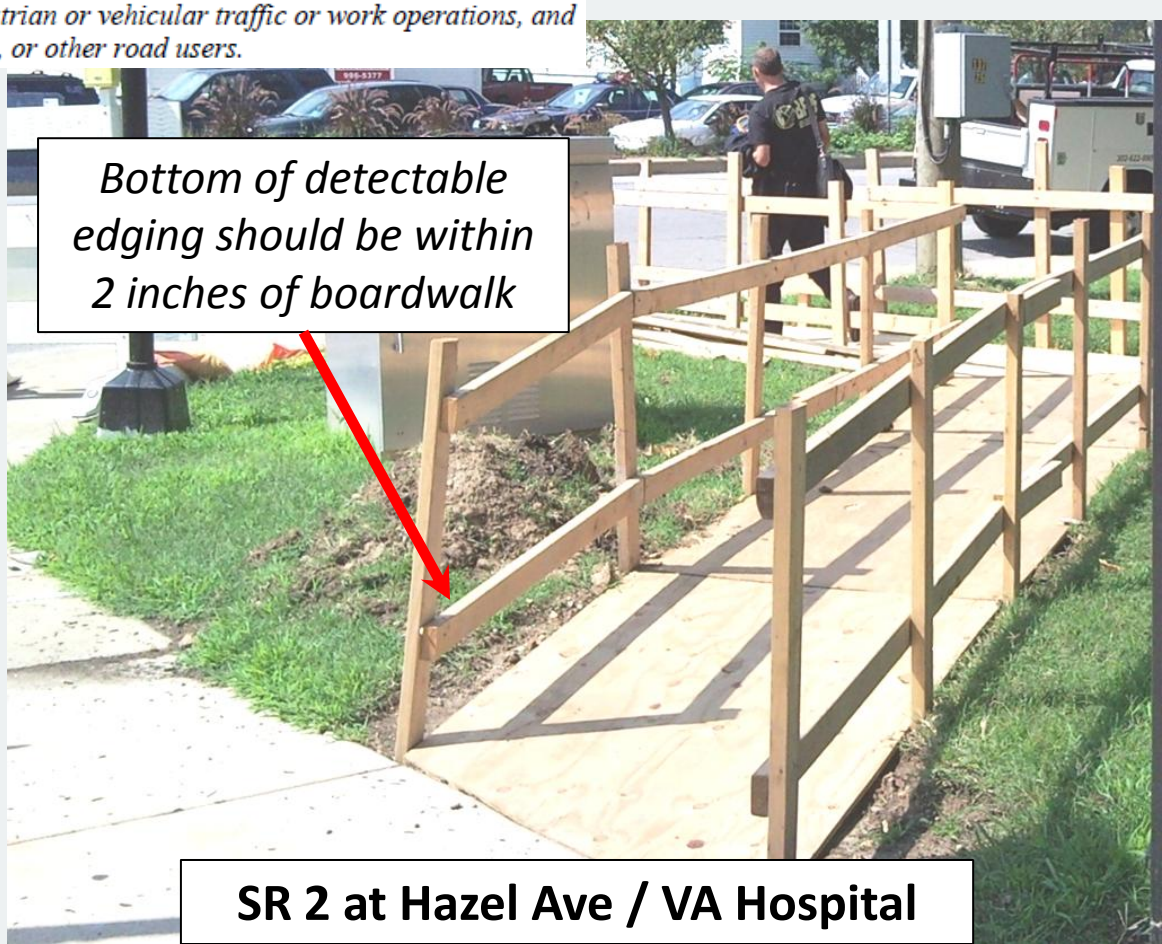
SR 9 at St. Augustine Rd / Bayview Rd

Section 6F.74 Detectable Edging for Pedestrians

Guidance:

02 *(DE Revision) When it is determined that a facility should be accessible to and detectable by pedestrians with visual disabilities, a continuously detectable edging should be provided throughout the length of the facility such that it can be followed by pedestrians using long canes for guidance. This edging should protrude at least 6 inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2 inches above the surface. This edging should be continuous throughout the length of the facility except for gaps at locations where pedestrians or vehicles will be turning or crossing. This edging should consist of a prefabricated or formed-in-place curbing or other continuous device that is placed along the edge of the sidewalk or walkway. This edging should be firmly attached to the ground or to other devices. Adjacent sections of this edging should be interconnected such that the edging is not displaced by pedestrian or vehicular traffic or work operations, and such that it does not constitute a hazard to pedestrians, workers, or other road users.*

- *Continuous detectable edging provided for accessible temporary facilities*
- *Extend ≥ 6 in above surface*
- *Bottom of edging ≤ 2 in above surface*



SR 2 at Hazel Ave / VA Hospital

Section 6F.74 Detectable Edging for Pedestrians

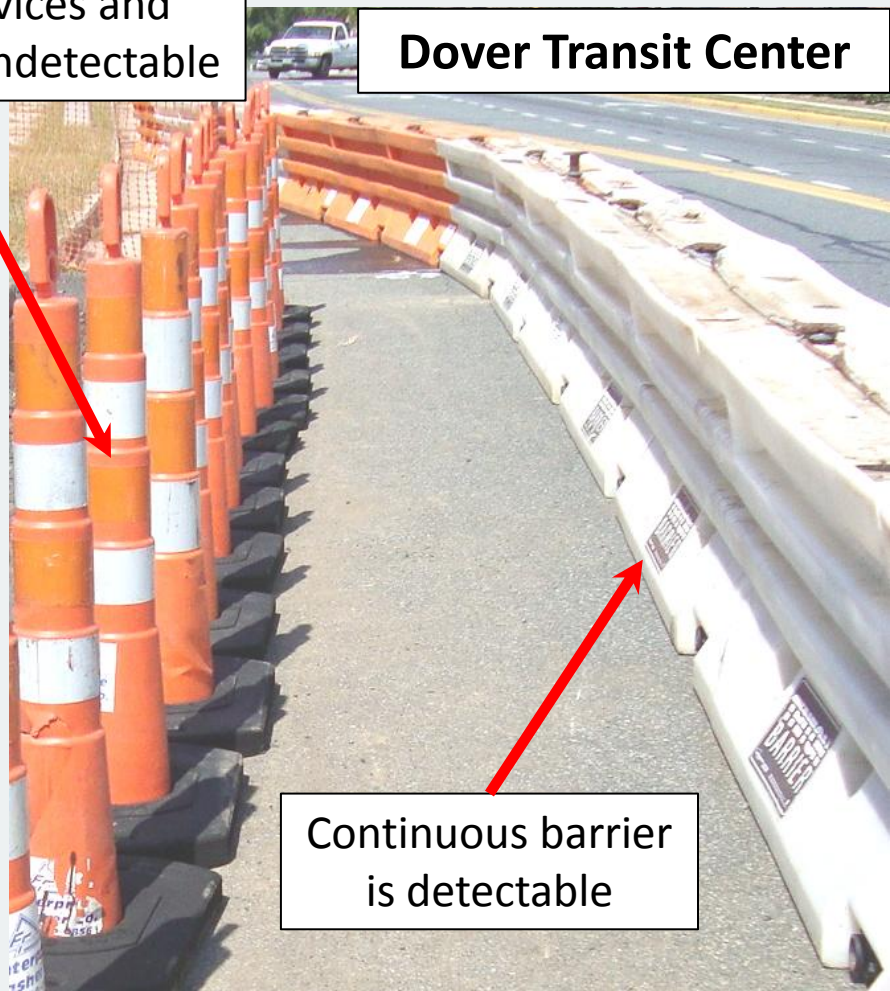
Support:

01 Individual channelizing devices, tape or rope used to connect individual devices, other discontinuous barriers and devices, and pavement markings are not detectable by persons with visual disabilities and are incapable of providing detectable path guidance on temporary or realigned sidewalks or other pedestrian facilities.

Channelizing devices and caution tape are undetectable

Town of Clayton Sidewalk Improvements

Dover Transit Center



Continuous barrier is detectable

Section 6F.77 Pavement Markings

Standard:

03 **Existing pavement markings shall be maintained in all long-term stationary (see Section 6G.02) TTC zones in accordance with Chapters 3A and 3B, except as otherwise provided for temporary pavement markings in Section 6F.78. Pavement markings shall match the alignment of the markings in place at both ends of the TTC zone. Pavement markings shall be placed along the entire length of any paved detour or temporary roadway prior to the detour or roadway being opened to road users.**

04 **(DE Revision) For long-term stationary operations, pavement markings, including raised pavement markers, in the temporary traveled way that are no longer applicable shall be removed or obliterated as soon as practical. Pavement marking obliteration shall remove the non-applicable pavement marking material, and the obliteration method shall minimize pavement scarring. Painting over existing pavement markings with black paint or spraying with asphalt shall not be accepted as a substitute for removal or obliteration.**

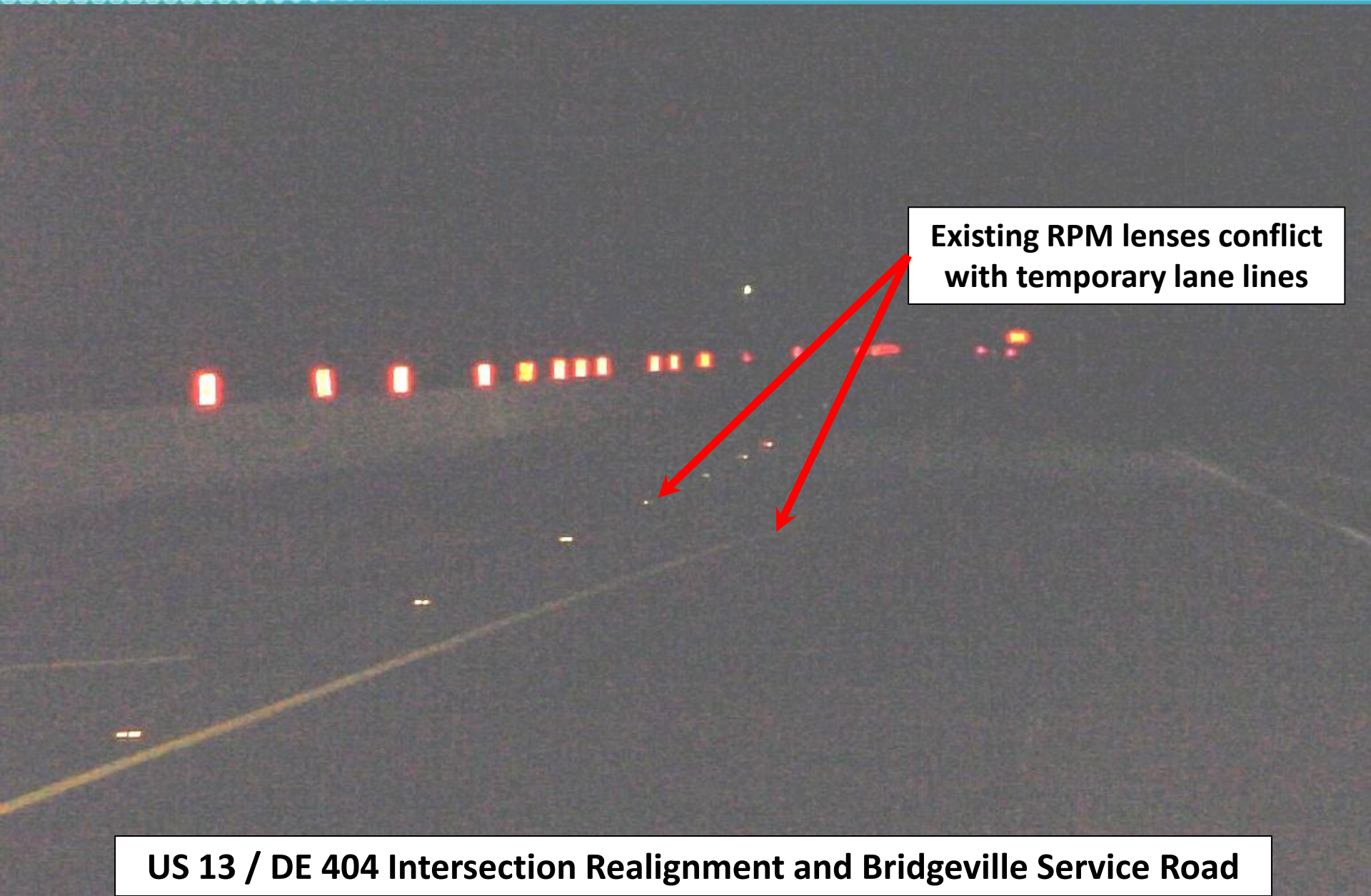
Option:

05 Removable, non-reflective, preformed tape that is approximately the same color as the pavement surface may be used where markings need to be covered temporarily.

06 (DE Revision) If a permanent raised pavement marker needs to be obscured in a TTC zone, the retroreflective lens of the raised pavement marker may be removed rather than removing the entire housing.

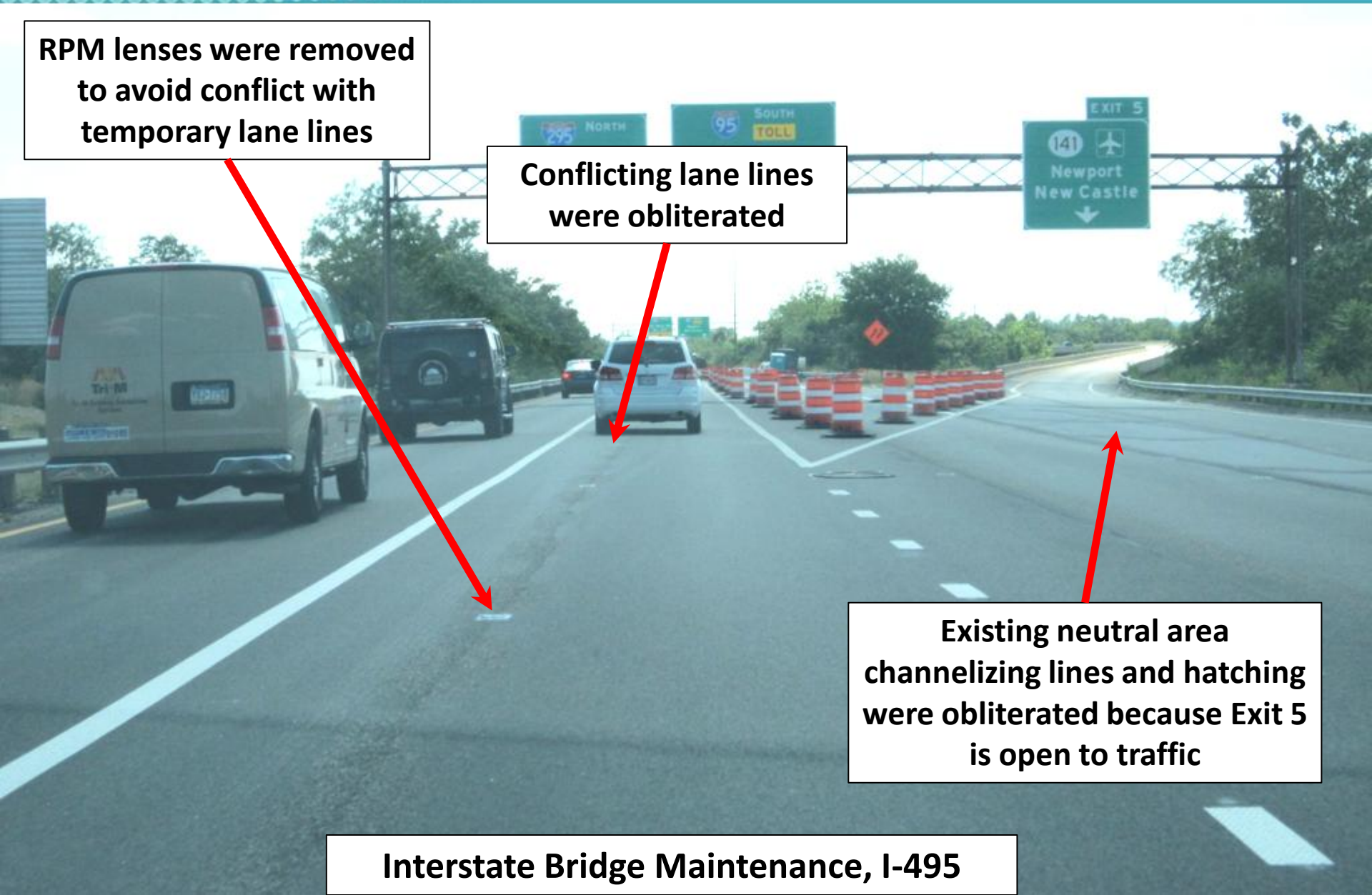
- **Maintained in long-term stationary zones**
- **Installed prior to opening detour or diversion road**
- DE Standard: **Conflicting markings, including RPMs, shall be removed or obliterated**
- "Blackout" tape used to cover conflicting markings only if tape is approximately same color as pavement
- DE Option: Remove RPM lens rather than entire housing

Section 6F.77 Pavement Markings



US 13 / DE 404 Intersection Realignment and Bridgeville Service Road

Section 6F.77 Pavement Markings



Interstate Bridge Maintenance, I-495


"Blackout" tape shall not be used on concrete because it does not match the pavement color
EXIT 6B
WEST
2 Newark
NORTH
41 Lancaster
EXIT 6A
2 EAST
Elsmere
141
SR 141, Kirkwood Hwy to Faulkland Rd

Section 6F.78 Temporary Pavement Markings

Guidance:

02 *(DE Revision) Unless justified based on engineering judgment, temporary pavement markings should not remain in place for more than 30 days after the application of the pavement surface treatment or the construction of the final pavement surface on new roadways or over existing pavements.*

03 *The temporary use of edge lines, channelizing lines, lane-reduction transitions, gore markings, and other longitudinal markings, and the various non-longitudinal markings (such as stop lines, railroad crossings, crosswalks, words, symbols, or arrows) should be in accordance with the State's or highway agency's policy.*

- DE Guidance: *Should not remain in place longer than 30 days*
- *Installed based on DelDOT's Temporary Pavement Markings Policy*
  - **Shall comply with Part 3**
  - **Width of longitudinal lines: 4 in MIN.**
  - http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/pdf/Temporary_Pavement_Markings_Policy.pdf

MEMORANDUM

To: All Users of the Delaware Manual on Uniform Traffic Control Devices

From: Adam S. Weiser, P.E., PTOE
Safety Programs Manager

Date: January 7, 2011

Subject: Temporary Pavement Markings Policy

Section 6F.72 of the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD) suggests that the State develop a policy regarding the use of temporary pavement markings for highway work zones. As such, this memorandum defines the policy for the use of temporary pavement markings within highway work zones on roadways within the jurisdiction of the Delaware Department of Transportation (DelDOT). This policy covers the widths of longitudinal pavement markings, the required markings for long-term stationary operations and the required markings between lifts of pavement during paving operations.

A. Temporary Pavement Marking Dimensions

The widths of all temporary pavement markings, including centerlines, edge lines and other longitudinal pavement markings shall comply with Section 3A.05 of the DE MUTCD. This Section requires that the minimum width of a normal line be 4-inches. As such, longitudinal temporary pavement markings on all roadways shall be no less than 4-inches wide. The layout of temporary pavement markings shall match the layout of existing pavement markings, i.e, provide a 6-inch wide gap between centerlines, no single solid yellow centerlines, etc. The width of transverse pavement markings shall be as described in the applicable sections of Part 3 of the DE MUTCD. Typical dimensions for common transverse markings are as follows:

- Stop lines = 16 inches wide
- Crosswalk markings:
  - Piano key markings = 24 inches wide
  - Parallel transverse markings = 12 inches wide with a minimum 6 feet separation between lines (allowable for temporary crosswalk markings only)

Section 6F.78 Temporary Pavement Markings

Section 3B.01 Yellow Center Line Pavement Markings and Warrants

Standard:

05 **A single solid yellow line shall not be used as a center line marking on a two-way roadway.**

Section 6F.78 Temporary Pavement Markings

Section 6F.81 Lighting Devices

Standard:

01A **(DE Revision) All work-related vehicles and equipment operating within a TTC zone shall be equipped with and display flashing lights.**

06 **(DE Revision) Flashing lights shall be either a separate large rotating amber beacon or strobe light(s). Flashing lights shall be mounted on the vehicle in such a manner as to be clearly visible for 360 degrees around the vehicle. The flashing lights shall be visible from a distance of not less than 3,000 feet under normal atmospheric conditions at night.**

- DE Standard:
  - **Flashing lights on all work-related vehicles and equipment**
  - **Large rotating amber beacon or strobe light(s) visible for 360 degrees for ≥ 3,000 ft**

Section 6F.83 Warning Lights

Guidance:

01A *(DE Revision) Except as provided in Paragraph 1B, warning lights should not be used on state-maintained roads.*

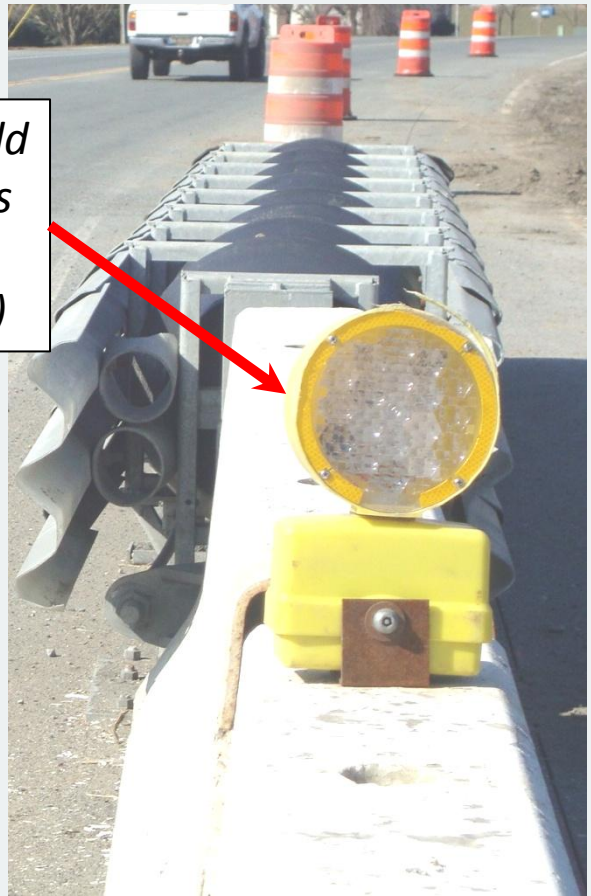
Option:

01B (DE Revision) When added conspicuity is desired, only Type B warning lights may be used.

- DE Guidance: *Warning lights no longer used on TTC devices*

SR 2 at Hazel Ave / VA Hospital

Type B warning lights should not be used on TTC devices (e.g., barricades and temporary traffic barriers)



Guidance:

04 *Because the protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers, their use should be based on an engineering study.*

- *Use of temporary traffic barrier based on engineering study*

Movable barrier provides positive protection for nighttime double lane closure

Movable barrier provides shoulder closure during non-working hours

I-95 Median Barrier Replacement

Section 6F.85 Temporary Traffic Barriers

11 (DE Revision) More specific information on the use of temporary traffic barriers is contained in Chapters 8 and 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) and DelDOT's Design Guidance Memorandum No. 1-21.

- DelDOT DGM 1-21 provides guidance for use of positive protection in work zones
  - Work area with no escape route
  - Long-term stationary projects
  - Vertical differences (Table 6G-1)
  - Storage of equipment (Table 6G-2)

Delaware Department of Transportation
Division of Transportation Solutions
Design Guidance Memorandum

Memorandum Number 1-21

1. Road Design Manual	2. Bridge Design Manual	3. Utilities Design Manual
4. Real Estate Manual	5. Standard Specifications	6. Standard Construction Details

Title: Use of Temporary Traffic Barrier in Work Zones Effective date: 12/4/2008

Sections to Implement:

X Project Development	X Planning	X DTC
X Bridge	X Quality	X Construction
X Team Support	X Maintenance & Operations	X Traffic
X Utilities		_ Other _____

I. Purpose

To provide guidance on the use of positive protection devices to decrease the likelihood of fatalities and injuries to road users and workers in accordance with FHWA's ruling on Temporary Traffic Control Devices (23 CFR 630 Subpart K).

II. Design Guidance

Applicability: Applies to all projects on streets and highways under the Department's jurisdiction.

These guidelines should be applied to all new projects and all existing projects that have a semi-final plan due date after December 4, 2008. For existing projects with a semi-final plan due date before December 4, 2008, these guidelines may be applied on a case-by-case basis. These guidelines apply to all projects not requiring plans (e.g., maintenance projects, utility projects, etc.) as of December 4, 2008. These guidelines do not apply to work related to emergency repairs.

Temporary Traffic Barrier Evaluation: As part of the development of a Traffic Control Plan (TCP), the need for and usefulness of temporary traffic barrier protection should be evaluated throughout the project development process. In general, temporary traffic control barriers should only be installed if it is determined that the barrier offers the least hazard potential. During concept development and design, exposure control measures should be considered to avoid or minimize worker exposure to motorized traffic and road user exposure to work zone activities, while also providing adequate consideration to the potential impacts on mobility. Example exposure control measures include:

- Full road closures
- Ramp closures
- Median crossovers (i.e., half road closure)
- Full or partial detours
- Protection of work zone setup and removal operations using rolling road blocks

Section 6F.85 Temporary Traffic Barriers

Standard:

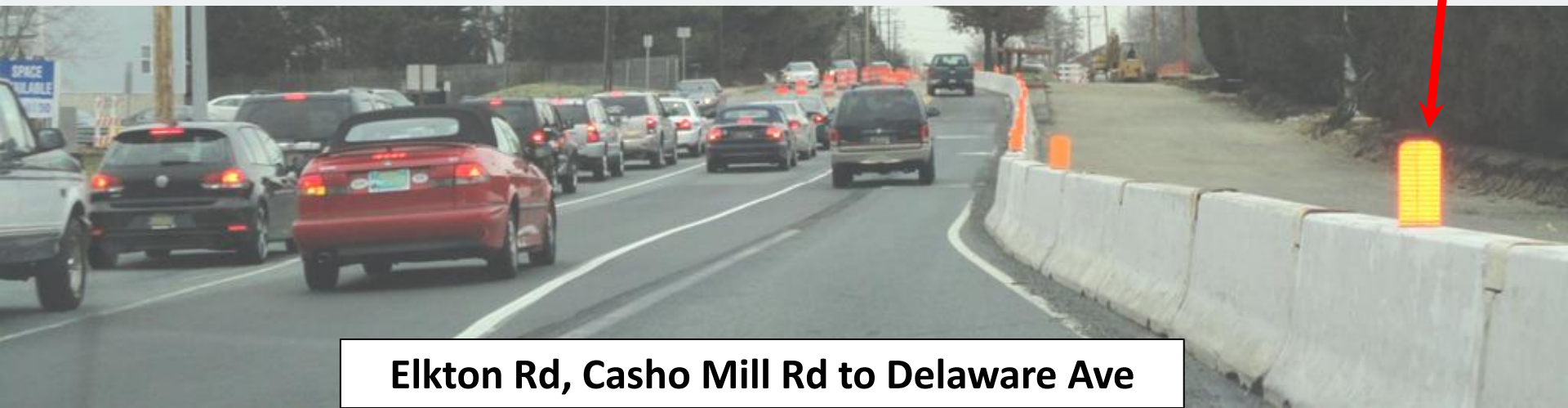
05 **Temporary traffic barriers shall be supplemented with standard delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility if they are used to channelize vehicular traffic. The delineation color shall match the applicable pavement marking color.**

Standard:

05D **(DE Revision) For enhanced conspicuity, non-directional retroreflective panels (see Figure 6F-8) shall be 6-inch wide and 12-inch high with rounded corners. The non-directional retroreflective panel shall have fluorescent orange, prismatic retroreflective sheeting on both sides.**

05E **(DE Revision) When used, non-directional retroreflective panels shall be placed at 50-foot intervals. The first panel shall be mounted within 10 feet of the leading edge of barrier.**

- DE Standard:
  - **Enhanced conspicuity, non-directional retroreflective panels used to delineate barrier**
  - **50-ft panel spacing; first panel within 10 ft of leading edge**



Elkton Rd, Casho Mill Rd to Delaware Ave

Section 6F.85 Temporary Traffic Barriers

Guidance:

05A *(DE Revision) Prior to installation, temporary Portland cement concrete traffic barrier should be painted white on the side adjacent to traffic. If the temporary Portland cement concrete traffic barrier is in place longer than one year, the temporary Portland cement concrete traffic barrier should be painted white on the side adjacent to traffic once per year until the barrier is no longer needed and removed from the roadway.*

Option:

05B (DE Revision) Temporary Portland cement concrete traffic barrier manufactured with white cement may be used to eliminate the need for painting the temporary Portland cement concrete traffic barrier

Guidance:

05C *(DE Revision) Temporary traffic barriers should be cleaned once every three months while in place on the roadway unless otherwise directed by DelDOT Traffic. Cleaning of the temporary traffic barrier during winter months should be completed in a manner that does not create ice on the roadway.*

- DE Guidance:
  - *Painted prior to initial installation and once per year*
  - *Cleaned every 3 months*
- DE Option: White cement barrier does not require painting

SR 1, North Frederica Grade Separated Intersection

Section 6F.85 Temporary Traffic Barriers

06 Temporary traffic barriers, including their end treatments, shall be crashworthy. In order to mitigate the effect of striking the upstream end of a temporary traffic barrier, the end shall be installed in accordance with AASHTO's "Roadside Design Guide" (see Section 1A.11) by flaring until the end is outside the acceptable clear zone or by providing crashworthy end treatments.

- **Barrier and corresponding end treatment shall be crashworthy**
- **End treatments per AASHTO "Roadside Design Guide"**
  - **Flare end outside clear zone**
  - **Install crashworthy cushion**

Milton Rail to Trail Conversion

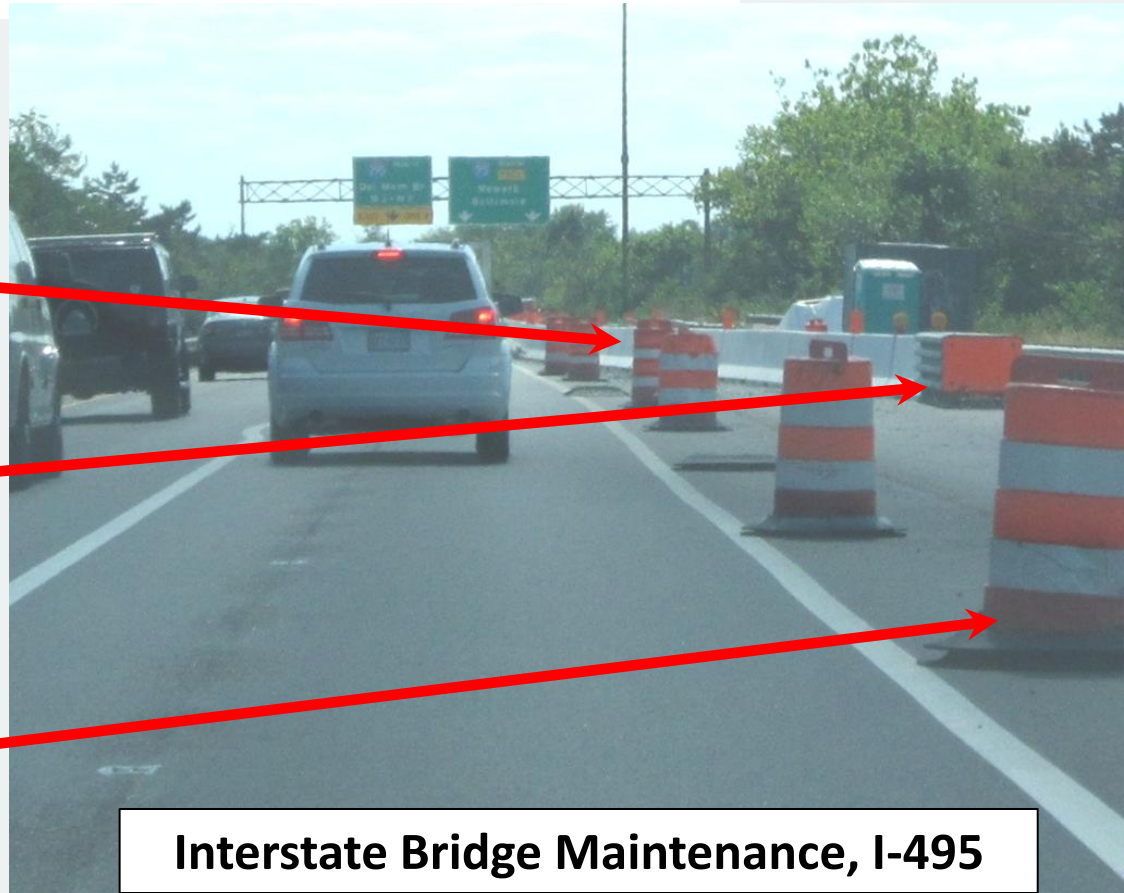
Guidance:

06E *(DE Revision) On state-maintained roads with a posted or 85th percentile speed greater than 40 mph, the rate of taper for the flare of a traffic barrier should be 17:1. If space constraints limit the length of flare, a minimum taper rate of 11:1 should be used.*

06F *(DE Revision) When space permits, the leading edge of the attenuator/barrier should have a lateral offset of at least 12 feet from the traveled way.*

06H *(DE Revision) When space permits, channelizing devices should be placed along the tangent section of the traveled way for a distance equal to the buffer space measured from the intersection of the barrier and the right-hand edge of the closed travel lane (see Figure 6H-34).*

- DE Guidance:
  - *17:1 flare rate*
  - *12 ft MIN. lateral offset at leading edge*
  - *Buffer space along tangent*



Interstate Bridge Maintenance, I-495

Section 6F.85 Temporary Traffic Barriers

06G *(DE Revision) If unpinned barrier is used, a lateral offset of at least 5 feet should be provided between the barrier and the work area. Consideration should be given to pinning the barrier if work is performed within 5 feet of the barrier.*

- DE Guidance: *Consider pinned barrier if working < 5 ft behind barrier*

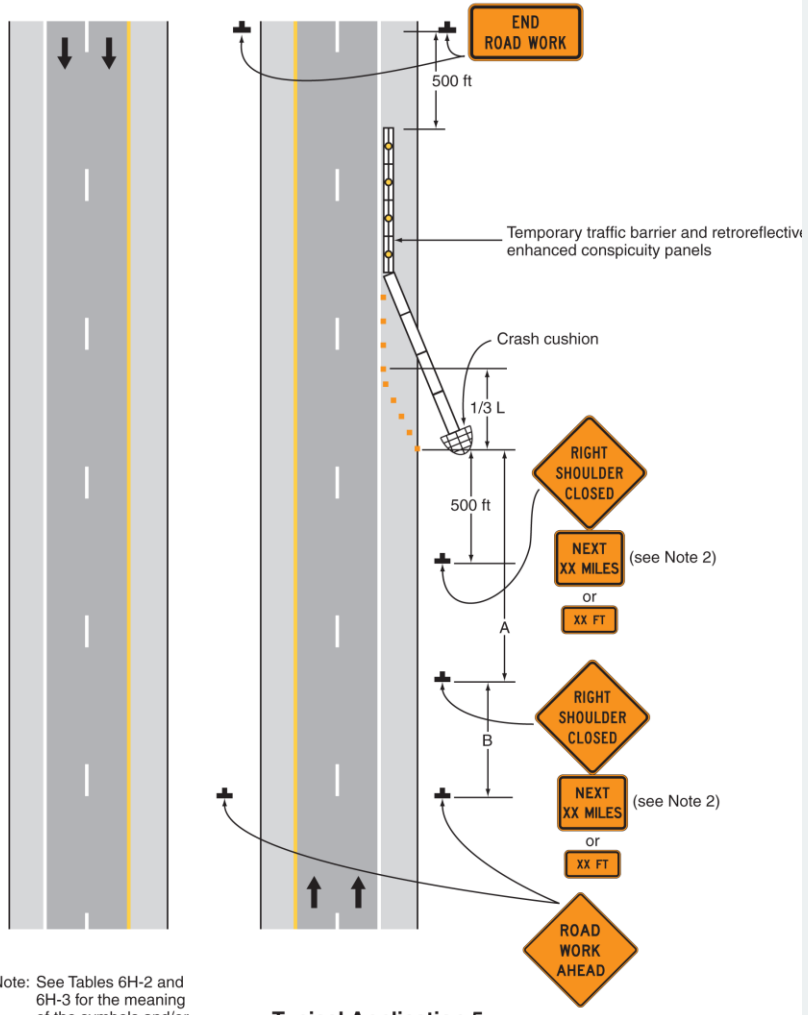
Interstate Bridge Maintenance, I-495

Section 6F.85 Temporary Traffic Barriers

SR 1, North Frederica Grade Separated Intersection

New typical applications depicting barrier applications

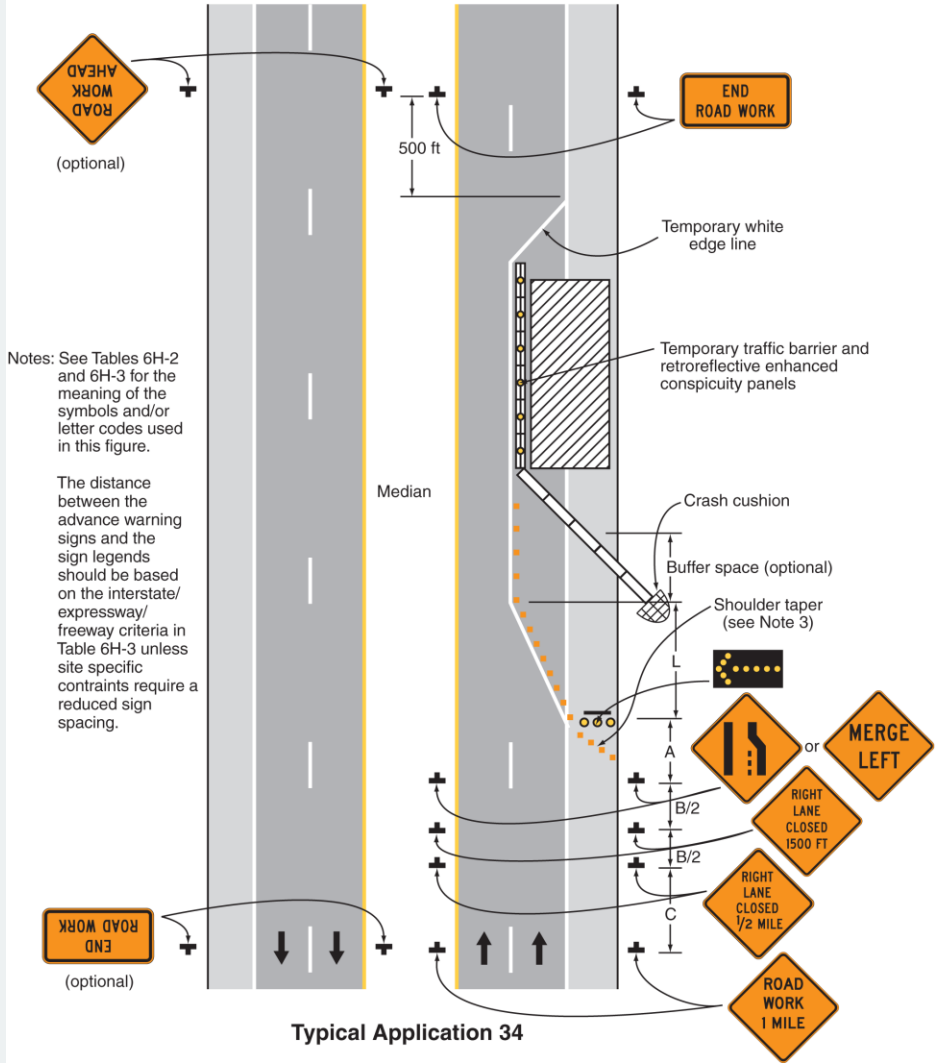
Figure 6H-5. Shoulder Closure on an Interstate, Freeway, or Expressway with a Temporary Traffic Barrier (TA-5)
(Delaware Revision)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 5

Figure 6H-34. Lane Closure on a Multi-Lane, Divided Highway with a Temporary Traffic Barrier (TA-34)
(Delaware Revision)



Notes: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

The distance between the advance warning signs and the sign legends should be based on the interstate/ expressway/ freeway criteria in Table 6H-3 unless site specific contraints require a reduced sign spacing.

Typical Application 34

04B *(DE Revision) Sand crash cushion arrays should not be used in applications that could result in a reverse strike by vehicles traveling in the opposite direction. It is acceptable to use sand crash cushion arrays if they are outside the clear zone of the opposite direction of traffic.*

Option:

04E (DE Revision) Sand crash cushions may be used for short-duration maintenance purposes or for long-term projects where it is infeasible to install an impact attenuator.

Guidance:

04F *(DE Revision) Stationary impact attenuators should be used instead of sand crash cushions for most long-term projects and, where practical, for short-duration maintenance purposes.*

04G *(DE Revision) Except for short-duration maintenance purposes, sand crash cushions should not be used without DelDOT Traffic approval.*

- DE Guidance: *Sand crash cushions generally reserved for short-duration maintenance*
- DE Guidance: *Sand crash cushions should not be installed where reverse strikes are possible*

SR 12, Frederica

Section 6F.86 Crash Cushions

Impact attenuators should be installed per manufacturer's instructions (to avoid "snagging" motorists)

Boyds Corner Intersection Improvements

Section 6F.86 Crash Cushions

05A **(DE Revision) For long-term, intermediate-term, short-term, and mobile operations requiring shoulder and/or lane closures, a truck-mounted attenuator shall be used on roadways with a posted speed limit or 85th-percentile speed greater than 40 miles per hour, except as provided in Paragraphs 5B, 5C and 5F.**

Option:

05B (DE Revision) For short-duration operations of 15 minutes or less along roadways with a posted speed limit or 85th-percentile speed greater than 40 miles per hour, a truck-mounted attenuator may be omitted if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used or if the shoulder width is less than the width of a truck-mounted attenuator.

05C (DE Revision) Truck-mounted attenuators may be omitted from specialized work vehicles, such as sweeper, vacuum, and pothole patching trucks, and other work vehicles that cannot support the installation of a truck-mounted attenuator.

05D (DE Revision) Truck-mounted attenuators may be used for all operations along roadways with a posted speed limit or 85th-percentile speed less than or equal to 40 miles per hour based on engineering judgment.

- DE Standard: **Truck-mounted attenuator (TMA) required for shoulder and lane closures for long-term, intermediate, short-term, and mobile operations on roads > 40 mph**
- DE Option: TMA can be omitted for short duration work less than 15 min if vehicle displays high-intensity, flashing, oscillating, or strobe lights
- DE Option: TMA can be omitted from specialized work vehicles that cannot support TMA installation

Section 6G.02 Work Duration

Section 6G.02 Work Duration

Support:

01 Work duration is a major factor in determining the number and types of devices used in TTC zones. The duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location.

Standard:

02 **The five categories of work duration and their time at a location shall be:**

- **A. Long-term stationary is work that occupies a location more than 3 days.**
- **B. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.**
- **C. Short-term stationary is daytime work that occupies a location for more than 1 hour within a single daylight period.**
- **D. Short duration is work that occupies a location up to 1 hour.**
- **E. Mobile is work that moves intermittently or continuously.**

- **Long-term stationary: > 3 days**
- **Intermediate stationary: > 1 daylight period or 1 hr at night**
- **Short-term stationary: > 1 hr within single daylight period**
- **Short duration: ≤ 1 hr**
- **Mobile: Moving intermittently or continuously**

- Primarily support and guidance material for Typical Applications in Chapter 6H

Section 6G.10 Work Within the Traveled Way of a Two-Lane Highway

Support:

01 Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

02 (DE Revision) Detour signs are used to direct road users onto another roadway. At diversions, road users are directed onto a temporary roadway or alignment placed within or adjacent to the right-of-way. Typical applications for detouring or diverting road users on two-lane highways are shown in Figures 6H-7 and 6H-20. Figure 6H-7 illustrates the controls around an area where a section of roadway has been closed and a diversion has been constructed. Channelizing devices and pavement markings are used to indicate the transition to the temporary roadway.

Guidance:

03 *When a detour is long, Detour (M4-8, M4-9) signs should be installed to remind and reassure road users periodically that they are still successfully following the detour.*

04 *(DE Revision) When an entire roadway is closed, as illustrated in Figure 6H-20, a detour should be provided and road users should be warned in advance of the closure. If local road users are allowed to use the roadway up to the closure, the ROAD CLOSED AHEAD, LOCAL TRAFFIC ONLY (R11-3a) sign should be used. The portion of the road open to local road users should have adequate signing, marking, and delineation.*

05 *(DE Revision) Detours should be signed so that road users will be able to traverse the entire detour route and back to the original roadway as shown in Figure 6H-20.*

Support:

06 Techniques for controlling vehicular traffic under one-lane, two-way conditions are described in Section 6C.10.

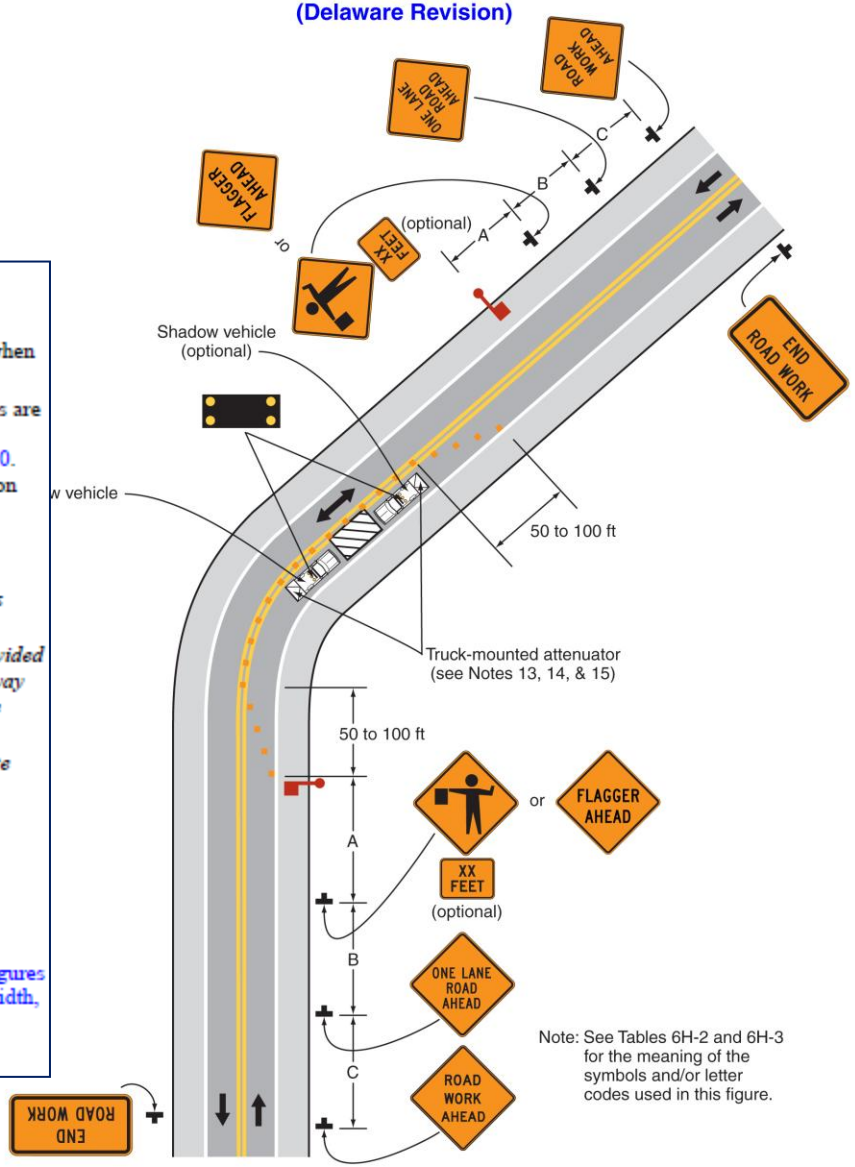
Option:

07 Flaggers may be used as shown in Figure 6H-10.

08 (DE Revision) STOP/YIELD sign control may be used on roads with low traffic volumes as shown in Figures 6H-11 and 6H-11A. Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may be shifted along two-lane roads with low traffic volumes as shown in Figure 6H-11B.

09 A temporary traffic control signal may be used as shown in Figure 6H-12.

Figure 6H-10. Lane Closure on a Two-Lane Road Using Flaggers (TA-10)
(Delaware Revision)



Typical Application 10

Section 6G.20 Vertical Difference

- DE Standard: **Vertical difference treatments based on Table 6G-1 criteria**

Sussex Road 213

Table 6G-1. Vertical Difference (Delaware Revision)

Type of Vertical Difference	Criteria	Height (H) of Vertical Difference: H ≤ 1 in	1 in < H ≤ 2 in	2 in < H ≤ 6 in	H > 6 in
Longitudinal ≤ 10 ft from edge of traveled way[1]	Standard	No channelizing devices required	- For differences along or between traveled ways, the UNEVEN LANES (W8-11) sign shall be used - For differences between the traveled way and shoulder or at the edge of pavement, the LOW SHOULDER (W8-9) sign shall be used	- No shoulder or shoulder < 4 ft wide: If the vertical difference is not eliminated by the end of the work day, a 4 to 1 fillet of wedge material shall be placed or temporary traffic barrier shall be installed. During the day of construction, channelizing devices shall be used to delineate the vertical difference until the vertical difference is eliminated, a 4 to 1 fillet of wedge material is placed, or temporary traffic barrier is installed. - Shoulder ≥ 4 ft wide: Drums shall be used to delineate the vertical difference for up to 5 calendar days. If the vertical difference is not eliminated by the end of the 5th calendar day, a 4 to 1 fillet of wedge material shall be placed or temporary traffic barrier shall be installed. - The Shoulder Drop Off (W8-17) sign shall be used until the vertical difference is eliminated	If the vertical difference is not eliminated by the end of the work day, a 4 to 1 fillet of wedge material shall be placed or temporary traffic barrier shall be installed.
	Guidance		- For differences between the traveled way and shoulder or at the edge of pavement, wedge material is not required if the vertical difference exists for less than 5 calendar days. If the vertical difference is not eliminated by the end of the 5th calendar day, a 4 to 1 fillet of wedge material should be placed. - Throughout the duration of the vertical difference condition, drums should be placed between the traveled way and shoulder or along the edge of pavement		
	Option			TTC devices and correction may be omitted for new pavement surfaces with the Safety Edge	
Longitudinal > 10 ft to ≤ 30 ft from edge of traveled way[1,2]	Standard	No channelizing devices required	No channelizing devices required	- Throughout the duration of the vertical difference condition, drums shall be placed between the traveled way and shoulder or along the edge of pavement - If the vertical difference is within the traveled way or shoulder, the Shoulder Drop Off (W8-17) sign shall be used until the vertical difference is eliminated	Throughout the duration of the vertical difference condition, drums shall be placed between the traveled way and shoulder or along the edge of pavement
	Guidance				Temporary traffic barrier should be considered
Transverse	Standard	No channelizing devices required	- Except for roadway obstacles such as manholes and utility valves, BUMP (W8-1) or DIP (W8-2) signs shall be installed - A ramp of bituminous temporary roadway material shall be installed at a slope of 20 to 1 across the limits of the vertical difference, including the perimeter of an obstacle	- Except for roadway obstacles such as manholes and utility valves, BUMP (W8-1) or DIP (W8-2) signs shall be installed - A ramp of bituminous temporary roadway material shall be installed at a slope of 20 to 1 across the limits of the vertical difference, including the perimeter of an obstacle	- Except for roadway obstacles such as manholes and utility valves, BUMP (W8-1) or DIP (W8-2) signs shall be installed - A ramp of bituminous temporary roadway material shall be installed at a slope of 20 to 1 across the limits of the vertical difference, including the perimeter of an obstacle

[1] – Per Section 1A.13, the traveled way is defined as the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes
[2] – Channelizing devices are not required if the vertical difference is located behind guardrail, barrier, or vertical curb

Section 6G.20 Vertical Difference

Type of Vertical Difference	Criteria	Height	
		H ≤ 1 in	1 in < H ≤ 2 in
Longitudinal ≤ 10 ft from edge of traveled way[1]	Standard	No channelizing devices required	- For differences along or between traveled ways, the UNEVEN LANES (W8-11) sign shall be used - For differences between the traveled way and shoulder or at the edge of pavement, the LOW SHOULDER (W8-9) sign shall be used

W8-11

US 113 south of Milford

Section 6G.20 Vertical Difference

Type of Vertical Difference	Criteria	Height (H) of Vertical Difference			
		H ≤ 1 in	1 in < H ≤ 2 in	2 in < H ≤ 6 in	H > 6 in
Transverse	Standard	No channelizing devices required	- Except for roadway obstacles such as manholes and utility valves, BUMP (W8-1) or DIP (W8-2) signs shall be installed - A ramp of bituminous temporary roadway material shall be installed at a slope of 20 to 1 across the limits of the vertical difference, including the perimeter of an obstacle	- Except for roadway obstacles such as manholes and utility valves, BUMP (W8-1) or DIP (W8-2) signs shall be installed - A ramp of bituminous temporary roadway material shall be installed at a slope of 20 to 1 across the limits of the vertical difference, including the perimeter of an obstacle	- Except for roadway obstacles such as manholes and utility valves, BUMP (W8-1) or DIP (W8-2) signs shall be installed - A ramp of bituminous temporary roadway material shall be installed at a slope of 20 to 1 across the limits of the vertical difference, including the perimeter of an obstacle

- DE Standard: **Bituminous temporary roadway material (TRM) at 20:1 slope around perimeter of transverse obstacle**

S. Governors Ave, Webbs Ln to Water St

Section 6G.20 Vertical Difference

05 **(DE Revision) Where a fillet of wedge material is used at the edge of pavement in accordance with Table 6G-1, pavement millings, or a similar suitable material, shall be used for the wedge material.**

Guidance:

06 *(DE Revision) Where a fillet of wedge material is used between a traveled way and pavement box in accordance with Table 6G-1, base course material should be used for the wedge material and should be placed at no greater than the slope specified in Table 6G-1. The base course material should be compacted after placement.*

- DE Standard: **Pavement millings (or similar) used for wedge material at edge of pavement**
- DE Guidance: *Base course material used for wedge material between traveled way and pavement box*

HSIP NCC, SR 896 and Four Seasons Pkwy Intersection Improvement

Table 6G-2. Storage of Equipment (Delaware Revision)

Road Type	Distance (L) from Edge of Traveled Way	Posted Speed Limit or 85th-Percentile Speed	Minimum Required Channelizing Devices
Equipment and Non-flammable Materials			
Interstate, Freeway, or Expressway	L ≤ 30 ft	All	Temporary traffic barrier
	L > 30 ft	All	Drums
All other roadways	0 ≤ L ≤ 10 ft	25 mph or less	Drums
		More than 25 mph	Temporary traffic barrier
	10 ft < L ≤ 30 ft	25 mph or less	None
		More than 25 mph	Drums
	L > 30 ft	All	None
Flammable Materials (fuel, propane, etc.)			
Interstate, Freeway, or Expressway	L ≤ 30 ft	All	Temporary traffic barrier
	L > 30 ft	All	Drums
All other roadways	L ≤ 30 ft	All	Temporary traffic barrier
	L > 30 ft	All	None

- DE Standard: **Treated as roadside obstacle per Table 6G-2**

Oak Orchard Rd

Table 6H-1. Index to Typical Applications (Sheet 1 of 2) (Delaware Revision)

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Outside of the Shoulder (see Section 6G.06)			
Work Beyond the Shoulder > 10 Feet from the Edge of the Traveled Way	TA-1	TA-3A	TA-5 or TA-5A
Work Beyond the Shoulder ≤ 10 Feet from the Edge of the Traveled Way	TA-3	TA-3A	TA-5 or TA-5B
Off-Roadway Mowing Operations	TA-1A	TA-1B	TA-1B
Blasting Zone	TA-2	TA-2	TA-2
Work on the Shoulder (see Sections 6G.07 and 6G.08)			
Work on the Shoulders	TA-3	TA-3A	TA-5 or TA-5B
Short Duration or Mobile Operation on a Shoulder	TA-4	TA-4A	TA-4A
Shoulder Work with Minor Encroachment	TA-6 (≤ 40 MPH) or TA-10 (> 40 MPH)	TA-33	TA-33
Work Within the Traveled Way of a Two-Lane Highway (see Section 6G.10) – also applicable to other roadway types, as noted			
Road Closed with a Diversion	TA-7	TA-7	TA-7
Roads Closed with an Off-Site Detour	TA-20	TA-20	TA-20
Overlapping Routes with a Detour	TA-20	TA-20	TA-20
Lane Closure on a Two-Lane Road Using Flaggers	TA-10	-	-
Lane Closure on a Two-Lane Road with Low Traffic Volumes	TA-11 or TA-11A	-	-
Lane Diversion on a Two-Lane Road with Low Traffic Volumes	TA-11B	-	-
Lane Closure on a Two-Lane Road Using Traffic Control Signals	TA-12	-	-
Temporary Road Closure	TA-13	-	-
Haul Road Crossing	TA-14	TA-14	-
Work in the Center of a Road with Low Traffic Volumes	TA-15	-	-
Surveying Along a Two-Lane Road	TA-16	TA-35	TA-35
Mobile Operations on a Two-Lane Road	TA-17	-	-
Mobile Striping Operations on a Two-Lane Road	TA-17A or TA-17B	-	-
Work Within the Traveled Way of an Urban Street (see Section 6G.11) – also applicable to other roadway types, as noted			
Lane Closure on a Minor Street	TA-18	-	-
Detour for One Travel Direction	TA-20	TA-20	TA-20
Detour for a Closed Street	TA-20	TA-20	TA-20
Work Within the Traveled Way at an Intersection and on Sidewalks (see Section 6G.13)			
Lane Closure on the Near Side of an Intersection	TA-21 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-21 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Right-Hand Lane Closure on the Far Side of an Intersection	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Left-Hand Lane Closure on the Far Side of an Intersection	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Half Road Closure on the Far Side of an Intersection	Not applicable in Delaware	Not applicable in Delaware	-
Multiple Lane Closures at an Intersection	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Closure in the Center of an Intersection	Not applicable in Delaware	Not applicable in Delaware	-
Closure at the Side or Center of an Intersection	TA-27	TA-27	-
Sidewalk Detour or Diversion	TA-28	TA-28	-
Crosswalk Closures and Pedestrian Detours	TA-29	TA-29	-
Work Within the Traveled Way of a Multi-Lane, Non-Access Controlled Highway (see Section 6G.12) – also applicable to other roadway types, as noted			
Interior Lane Closure on a Multi-Lane Street	-	TA-30 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Lane Closure on a Street with Uneven Directional Volumes	-	TA-31 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Half Road Closure on a Multi-Lane, High-Speed Highway	-	TA-32	-
Stationary Lane Closure on a Divided Highway	-	TA-33	TA-33
Lane Closure with a Temporary Traffic Barrier	-	TA-34	TA-34
Short Duration and Mobile Operations on a Multi-Lane Road	-	TA-35 or TA-35A	TA-35 or TA-35A
Mobile Striping Operations on a Multi-Lane Road		TA-35B or TA-35C	TA-35D, TA-35E, TA-35F, or TA-35G

Table 6H-1. Index to Typical Applications (Sheet 2 of 2) (Delaware Revision)

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way of an Interstate, Freeway, or Expressway (see Section 6G.14) – also applicable to other roadway types, as noted			
Lane Shift on a Multi-Lane, Divided Highway	-	TA-36	TA-36
Double Lane Closure on a Multi-Lane, Divided Highway	-	TA-37	TA-37
Interior Lane Closure on a Multi-Lane, Divided Highway	-	TA-37 or TA-38	TA-37 or TA-38
Median Crossover on a Multi-Lane, Divided Highway	-	TA-39	TA-39
Median Crossover for an Entrance Ramp	-	TA-40	TA-40
Median Crossover for an Exit Ramp	-	TA-41	TA-41
Work in the Vicinity of an Exit Ramp	-	TA-42	TA-42
Partial Exit Ramp Closure	-	TA-43	TA-43
Work in the Vicinity of an Entrance Ramp	-	TA-44	TA-44
Temporary Reversible Lane Using Movable Barriers	-	Not applicable in Delaware	Not applicable in Delaware
Work in the Vicinity of a Grade Crossing (see Section 6G.18)			
Work in the Vicinity of a Grade Crossing	TA-46	TA-33	-

- Cases are now Typical Applications (TAs)
- Table 6H-1 provides index for TAs

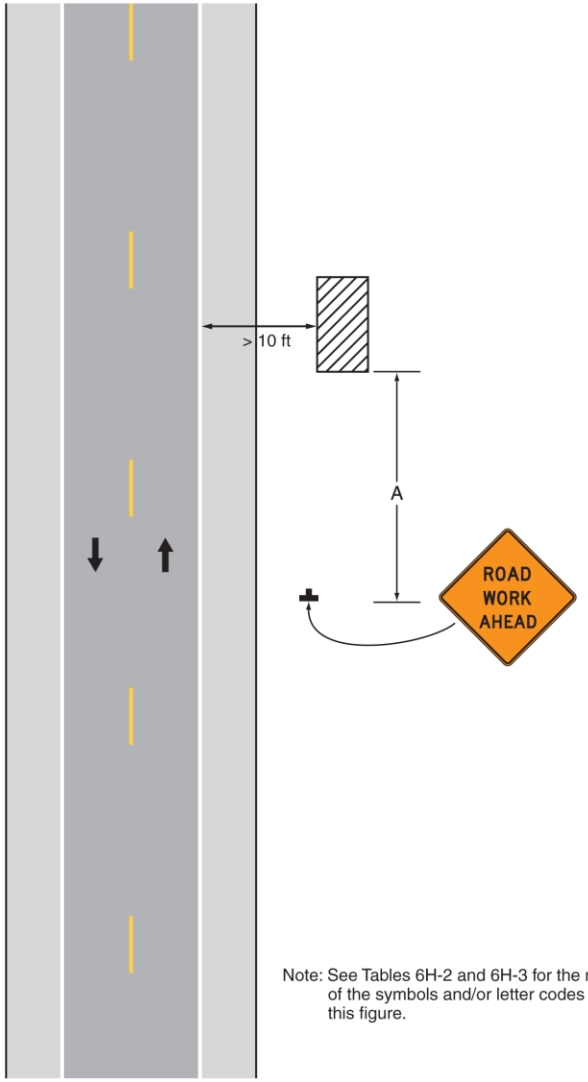
- Off-roadway work
  - Mowing
- Shoulder work

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Outside of the Shoulder (see Section 6G.06)			
Work Beyond the Shoulder > 10 Feet from the Edge of the Traveled Way	TA-1	TA-3A	TA-5 or TA-5A
Work Beyond the Shoulder ≤ 10 Feet from the Edge of the Traveled Way	TA-3	TA-3A	TA-5 or TA-5B
Off-Roadway Mowing Operations	TA-1A	TA-1B	TA-1B
Blasting Zone	TA-2	TA-2	TA-2
Work on the Shoulder (see Sections 6G.07 and 6G.08)			
Work on the Shoulders	TA-3	TA-3A	TA-5 or TA-5B
Short Duration or Mobile Operation on a Shoulder	TA-4	TA-4A	TA-4A
Shoulder Work with Minor Encroachment	TA-6 (≤ 40 MPH) or TA-10 (> 40 MPH)	TA-33	TA-33

TA-1. Work Beyond the Shoulder Greater Than 10 Feet from the Edge of the Traveled Way

- Case 1 = TA-1
- *Additional ROAD WORK AHEAD sign on left-hand side of divided highway when working in median*

Figure 6H-1. Work Beyond the Shoulder > 10 Feet from the Edge of the Traveled Way (TA-1)
(Delaware Revision)



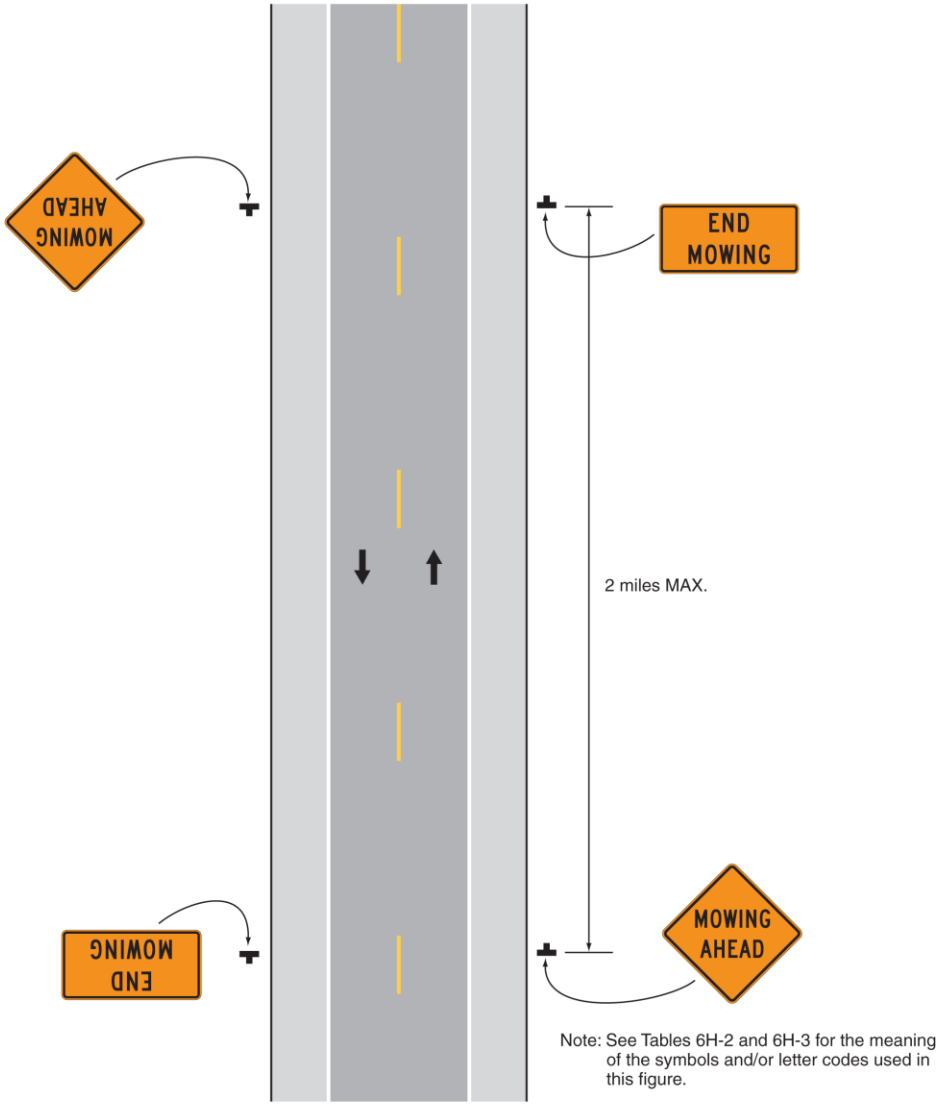
Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 1

TA-1A. Mowing Operations along a Two-Lane Road Greater Than 10 Feet from the Edge of the Traveled Way

- Case 24 = TA-1A
- DE Standard:
  - **Performed during daylight hours only**
  - **Work area limited to 2 miles or less**
- DE Guidance: *Use mobile shoulder closure (TA-4) or mobile lane closure (TA-17) if mowing encroaches upon shoulder or traveled way*

Figure 6H-1A. Mowing Operations along a Two-Lane Road > 10 Feet from the Edge of the Traveled Way (TA-1A)
(Delaware Revision)

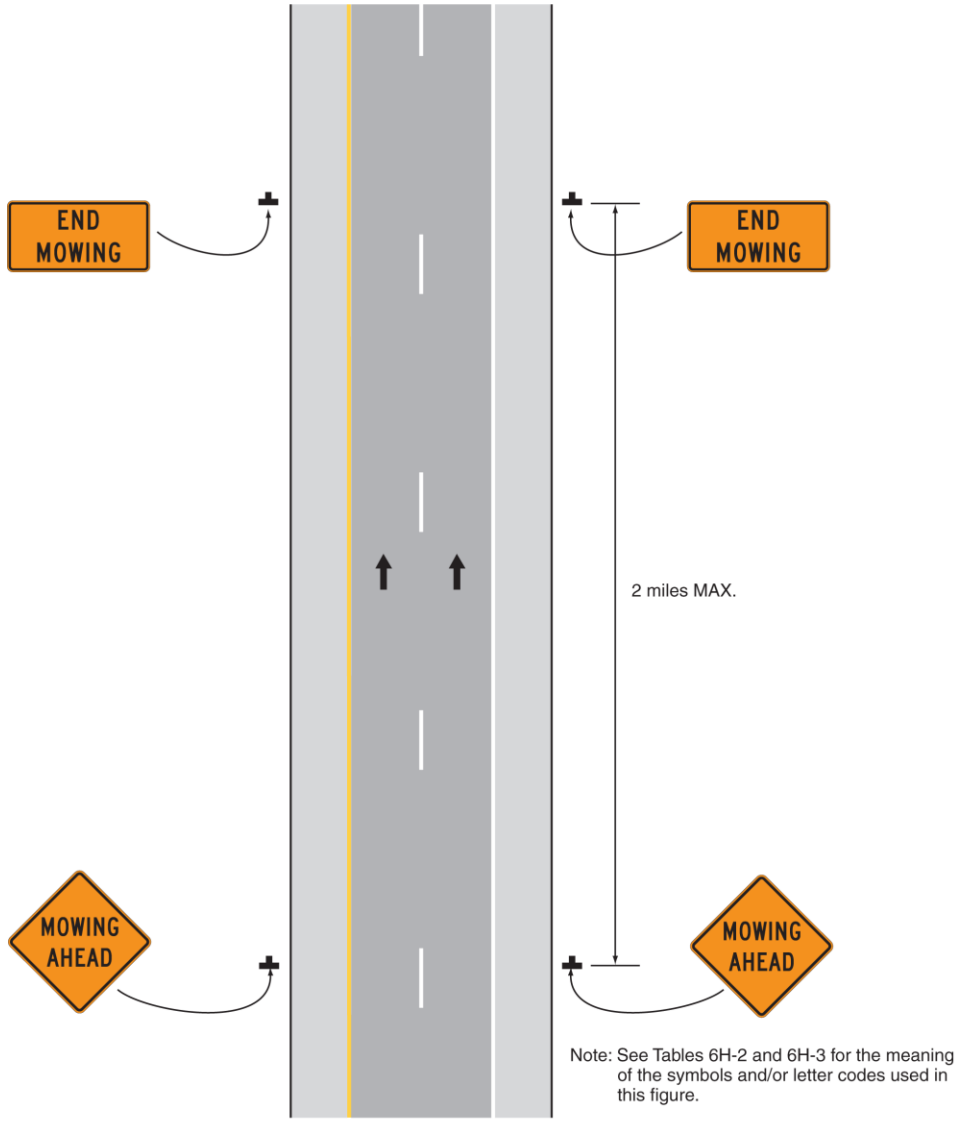


Typical Application 1A

TA-1B. Mowing Operations along a Multi-Lane, Divided Highway Greater Than 10 Feet from the Edge of the Traveled Way

- Case 25 = TA-1B
- DE Standard:
  - **Performed during daylight hours only**
  - **Work area limited to 2 miles or less**
  - **Signs in both directions when mowing median**
- DE Guidance: *Use mobile shoulder closure (TA-4A) or mobile lane closure (TA-35) if mowing encroaches upon shoulder or traveled way*

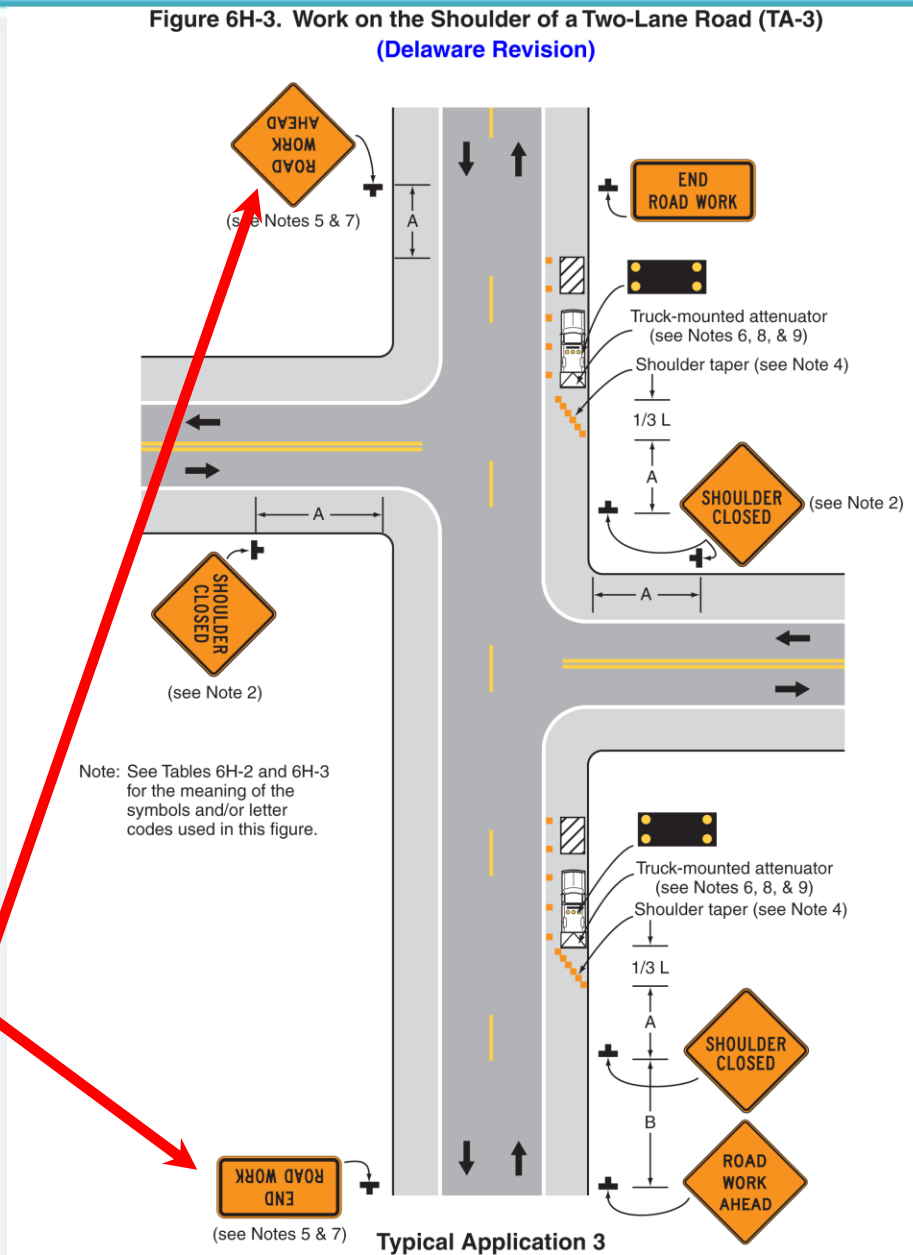
Figure 6H-1B. Mowing Operations along a Multi-Lane, Divided Highway > 10 Feet from the Edge of the Traveled Way (TA-1B)
(Delaware Revision)



Typical Application 1B

TA-3. Work on the Shoulder of a Two-Lane Road

- Case 2 = TA-3
- **At least 1 sign when closing shoulder ≥ 8 ft**
- **Arrow board(s) in caution mode**
- Omit SHOULDER CLOSED on side road if turning motorists will encounter mainline sign
- DE Standard: **Warning signs in opposing direction when closure occurs in passing zone**



TA-3A. Work on the Shoulder of a Multi-Lane, Divided Highway

- Case 3 = TA-3A
- *On multi-lane, divided highways, shoulder work signs only on side of affected shoulder*

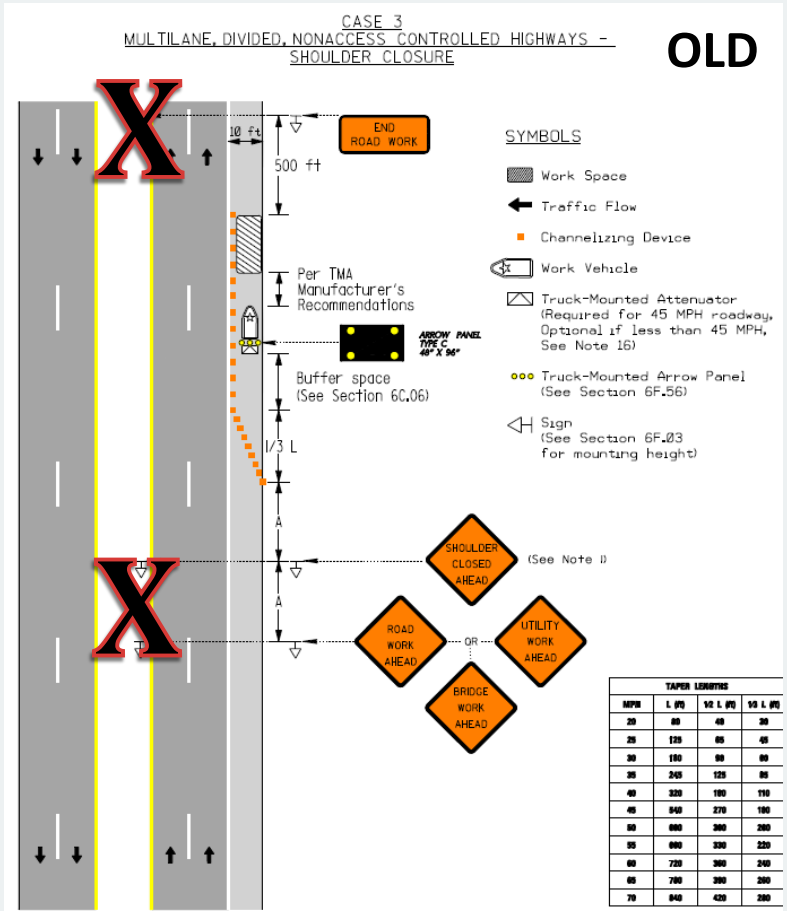
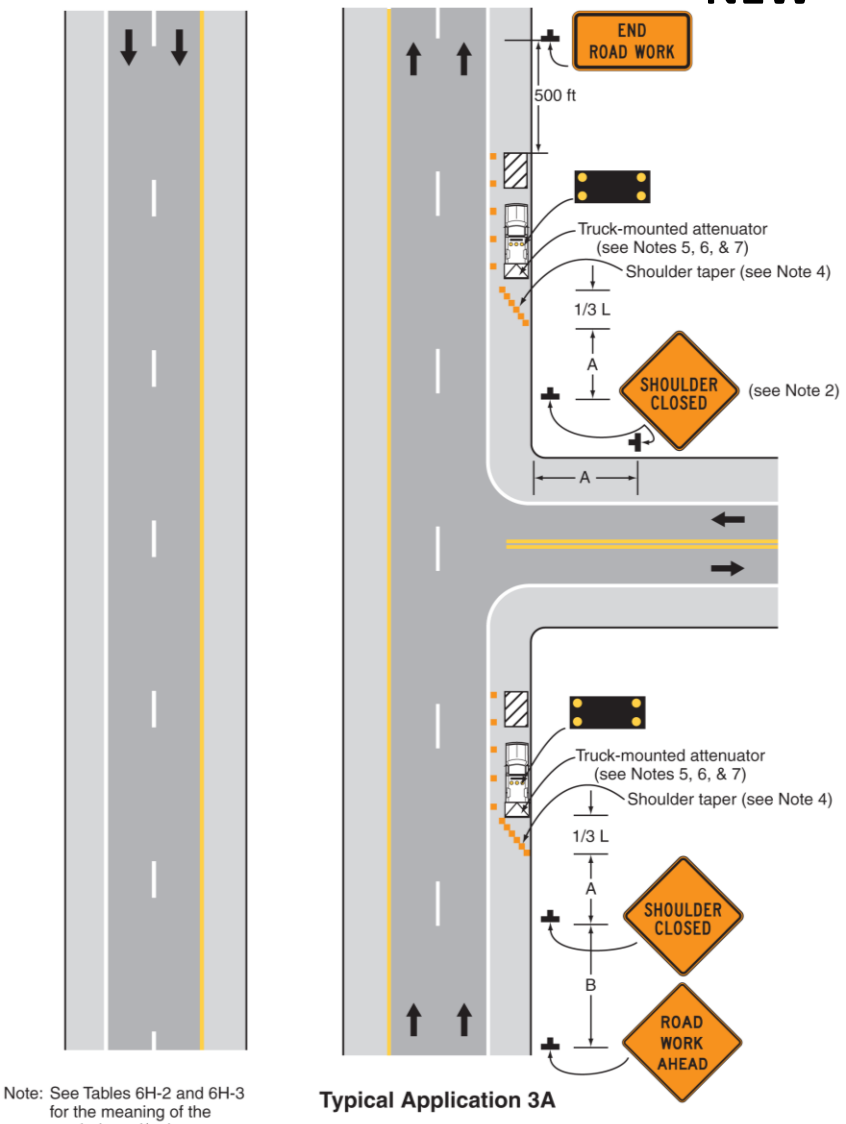


Figure 6H-3A. Work on the Shoulder of a Multi-Lane, Divided Highway (TA-3A)
(Delaware Revision)

NEW



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 3A

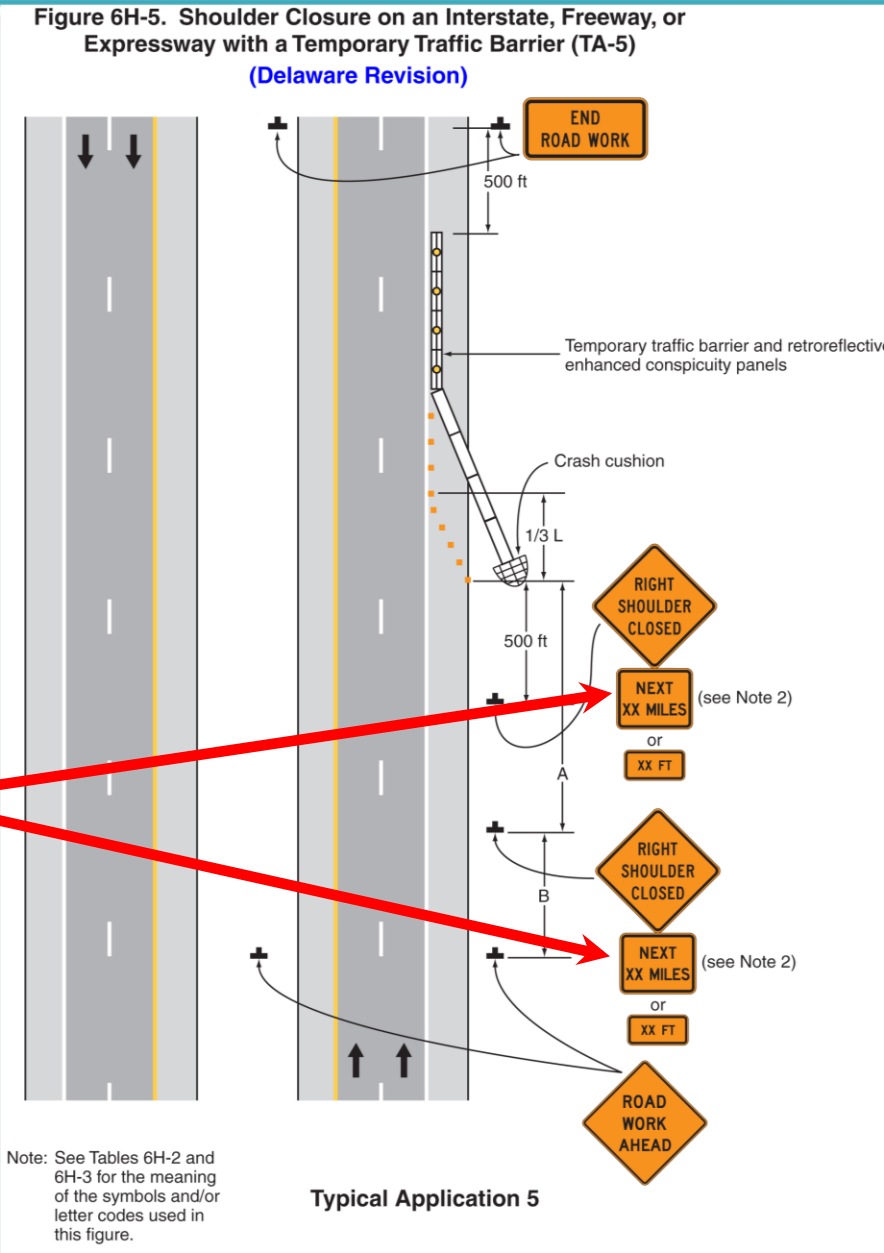
Guidance:

03 *(DE Revision) When paved shoulders having a width of 8 feet or more are closed on interstates, freeways, and expressways, road users should be warned about potential disabled vehicles that cannot get off the traveled way. An initial general warning sign, such as ROAD WORK AHEAD (W20-1), should be used, followed by a RIGHT or LEFT SHOULDER CLOSED (W21-5a) sign. Where the downstream end of the shoulder closure extends beyond the distance that can be perceived by road users, a supplementary plaque bearing the message NEXT XX FEET (W16-4P) or MILES (W7-3aP) should be placed below the SHOULDER CLOSED (W21-5a) sign. On multi-lane, divided highways, signs advising of shoulder work or the condition of the shoulder should be placed only on the side of the affected shoulder.*

- *On multi-lane, divided highways, shoulder work signs only on side of affected shoulder*

TA-5. Shoulder Closure on an Interstate, Freeway, or Expressway with a Temporary Traffic Barrier

- Example of one method for long-term shoulder closure
- *Use of barrier based on engineering judgment*
- *Distance plaques if motorists cannot see downstream pull-off area*



TA-5. Shoulder Closure on an Interstate, Freeway, or Expressway with a Temporary Traffic Barrier

- Design criteria in TA-5 may be applicable to other road types for shoulder closures with barrier

Drums used to channelize shoulder closure on Boulden Blvd in advance of barrier

NCC Greenway, Industrial Track - Phase I

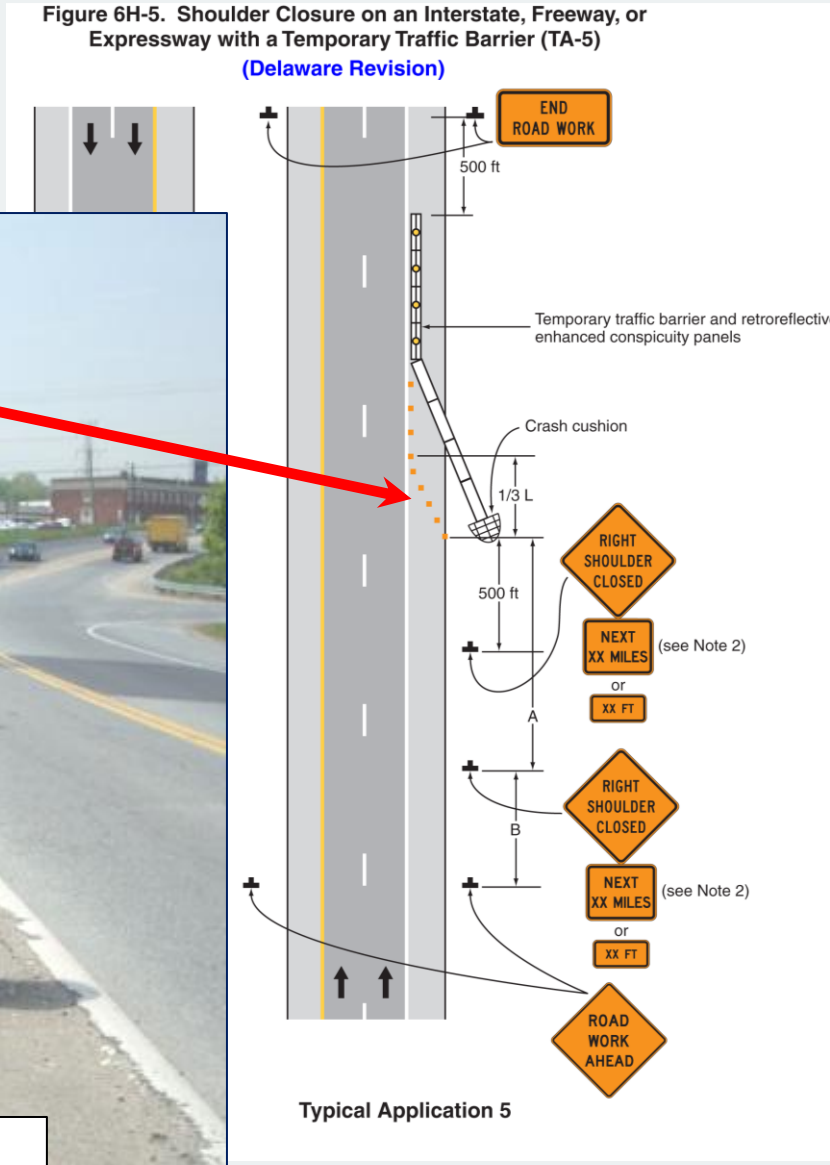


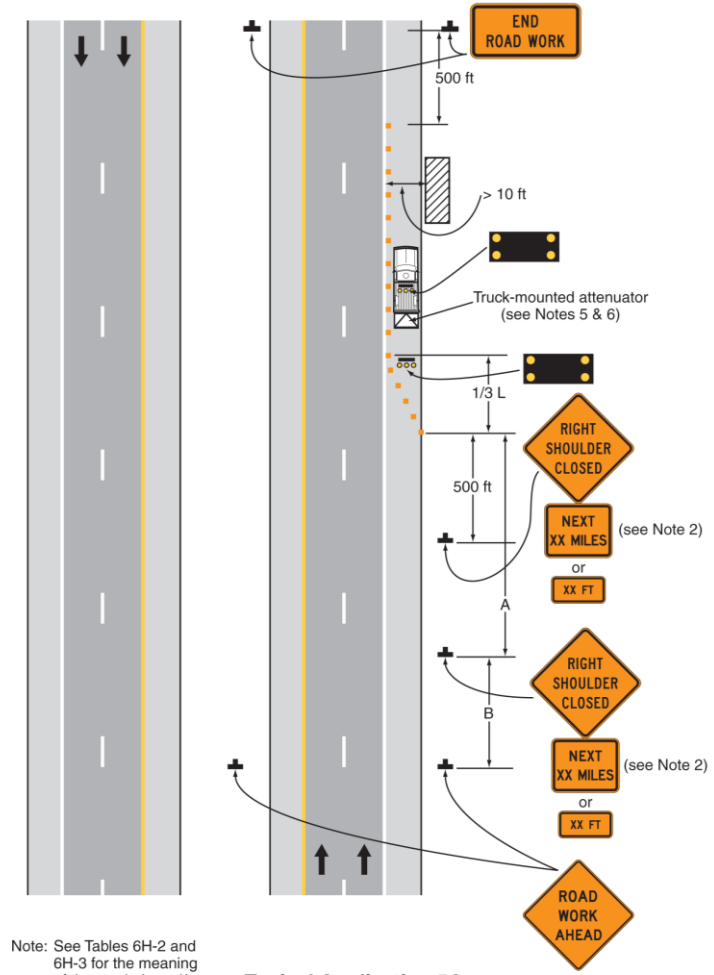
Figure 6H-5. Shoulder Closure on an Interstate, Freeway, or Expressway with a Temporary Traffic Barrier (TA-5)
(Delaware Revision)

Typical Application 5

TA-5A & TA-5B Shoulder Closure on an Interstate, Freeway, or Expressway

- Case 4 = TA-5A. Work > 10 ft from traveled way

Figure 6H-5A. Shoulder Closure on an Interstate, Freeway, or Expressway for Work > 10 Feet from the Edge of the Traveled Way (TA-5A)
(Delaware Revision)



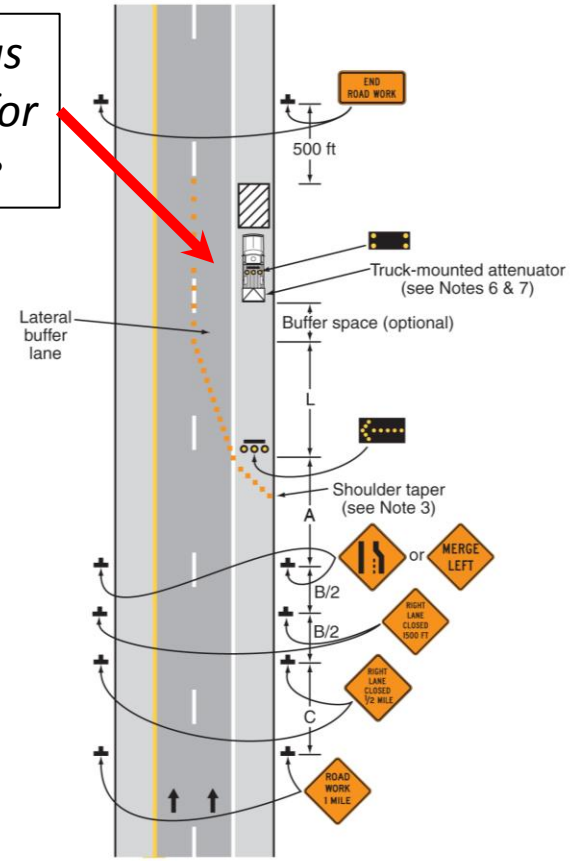
Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 5A

- Case 5 = TA-5B. Work ≤ 10 ft from traveled way

Similar operation as TA-33 due to need for lateral buffer lane

Figure 6H-5B. Stationary Lane Closure for Shoulder Work ≤ 10 Feet from the Edge of the Traveled Way on an Interstate, Freeway, or Expressway (TA-5B)
(Delaware Revision)

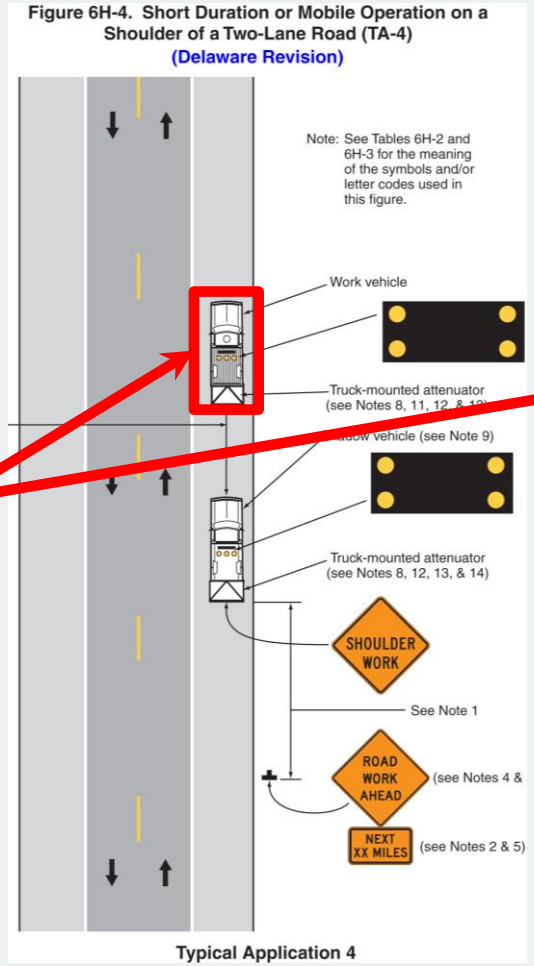


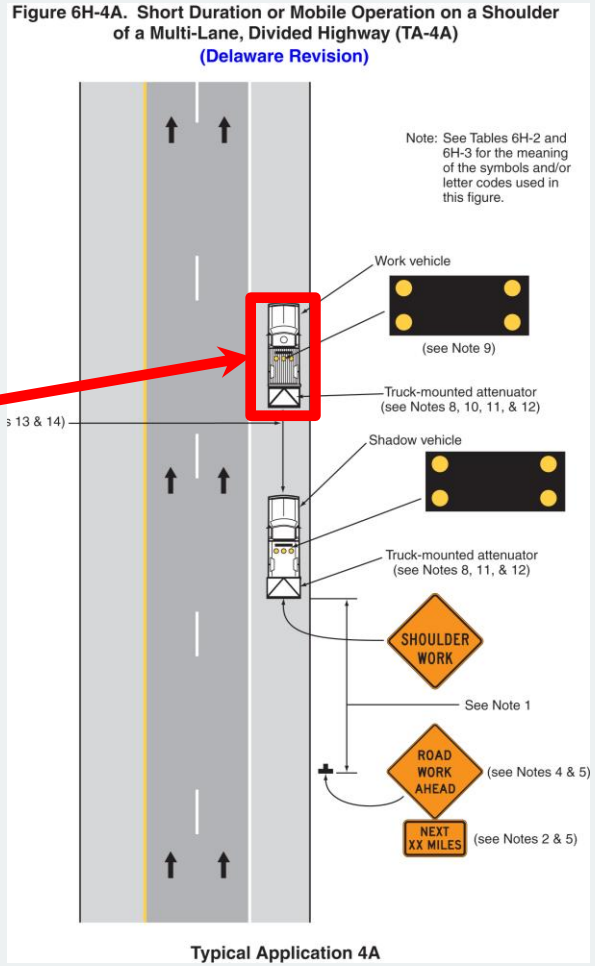
Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 5B

TA-4 & TA-4A Short Duration or Mobile Operation on a Shoulder

- Case 20-A = TA-4 & TA-4A
- DE Standard: **TMA required for mobile operations on roads > 40 mph**
- DE Option: TMA can be omitted for short duration work < 15 min if vehicle displays high-intensity, flashing, oscillating, or strobe lights
- DE Option: TMA and arrow board omitted from work vehicles that cannot support devices
- **Arrow board(s) in caution mode**

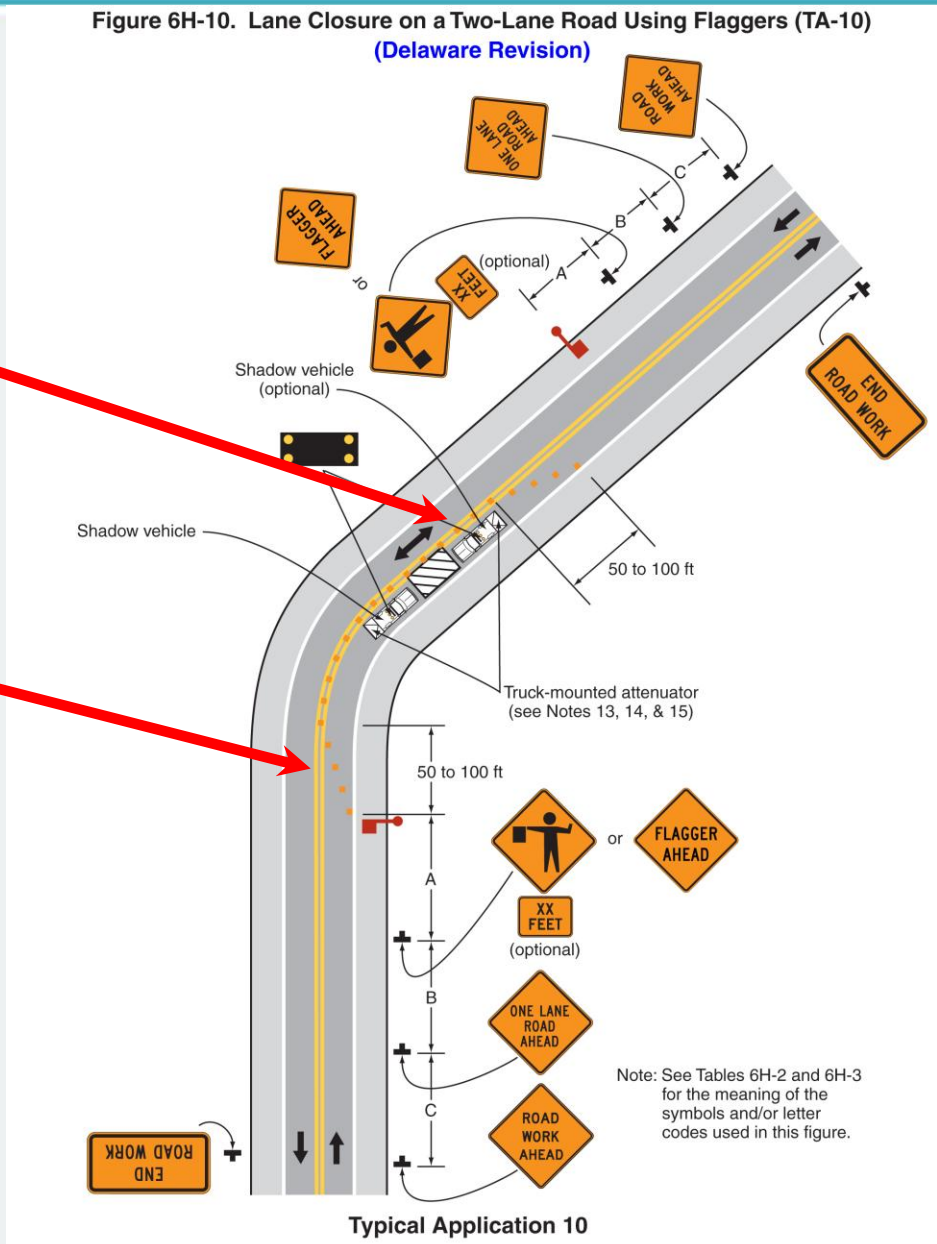


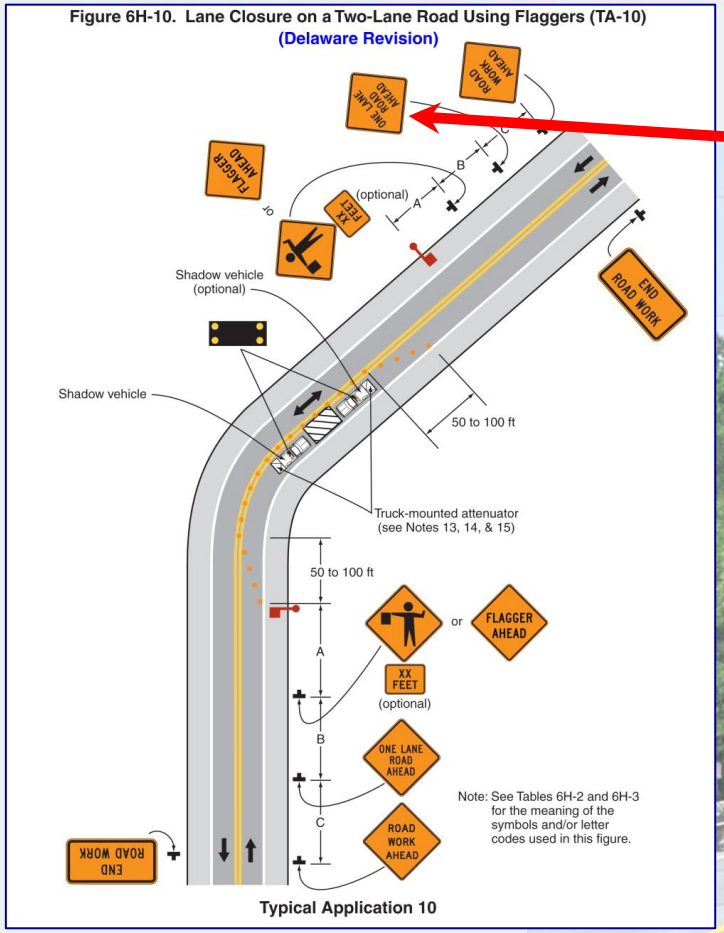


Work within traveled way of a two-lane road

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way of a Two-Lane Highway (see Section 6G.10) – also applicable to other roadway types, as noted			
Road Closed with a Diversion	TA-7	TA-7	TA-7
Roads Closed with an Off-Site Detour	TA-20	TA-20	TA-20
Overlapping Routes with a Detour	TA-20	TA-20	TA-20
Lane Closure on a Two-Lane Road Using Flaggers	TA-10	-	-
Lane Closure on a Two-Lane Road with Low Traffic Volumes	TA-11 or TA-11A	-	-
Lane Diversion on a Two-Lane Road with Low Traffic Volumes	TA-11B	-	-
Lane Closure on a Two-Lane Road Using Traffic Control Signals	TA-12	-	-
Temporary Road Closure	TA-13	-	-
Haul Road Crossing	TA-14	TA-14	-
Work in the Center of a Road with Low Traffic Volumes	TA-15	-	-
Surveying Along a Two-Lane Road	TA-16	TA-35	TA-35
Mobile Operations on a Two-Lane Road	TA-17	-	-
Mobile Striping Operations on a Two-Lane Road	TA-17A or TA-17B	-	-

- Case 6 = TA-10
- DE Option: TMA on downstream end of work area
- *One-lane, two-way taper now 50 ft to 100 ft*
- *Downstream taper also 50 ft to 100 ft*





Signs should follow TA-10

SR 18 / SR 404, west of Georgetown

TA-10. Lane Closure on a Two-Lane Road using Flaggers

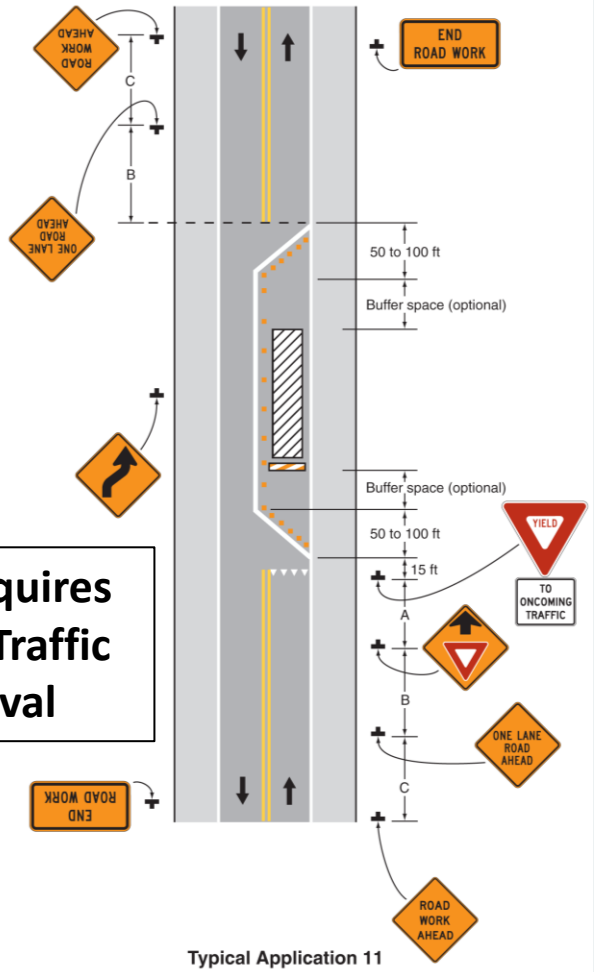
Optional single flagger application reserved for short work zones along low-volume roads

Utility work along Old Lancaster Pk

- Alternate applications for TA-10 (flagger control) reserved for low-volume roads

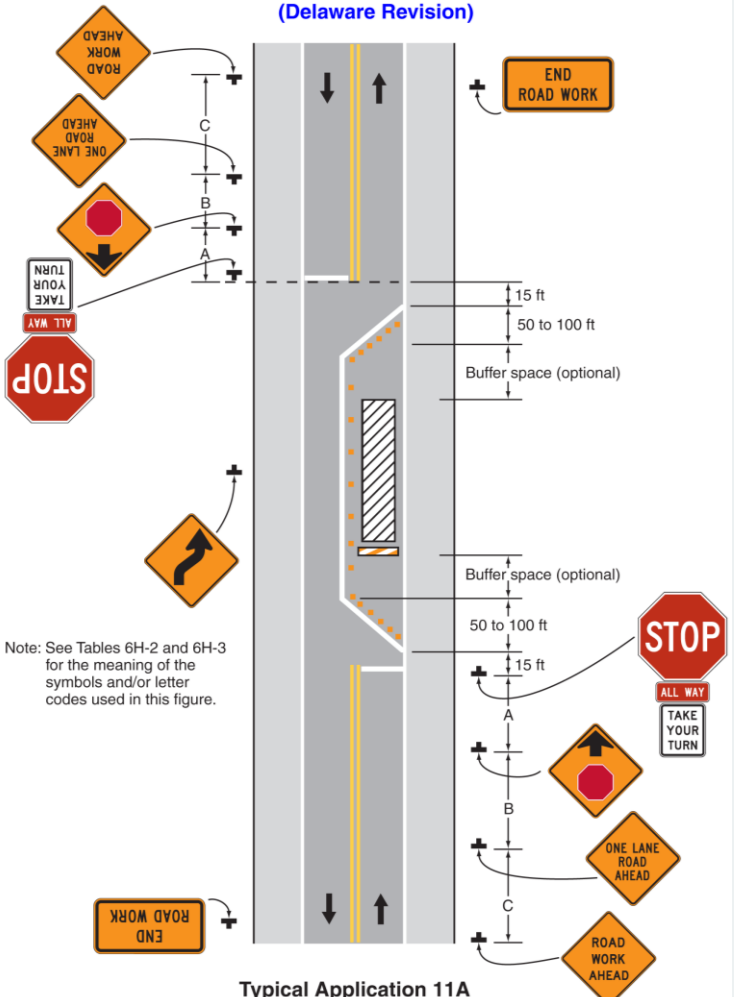
TA-11 requires DelDOT Traffic approval

Figure 6H-11. Lane Closure on a Two-Lane Road with Low Traffic Volumes Using a YIELD Sign (TA-11)
(Delaware Revision)



Typical Application 11

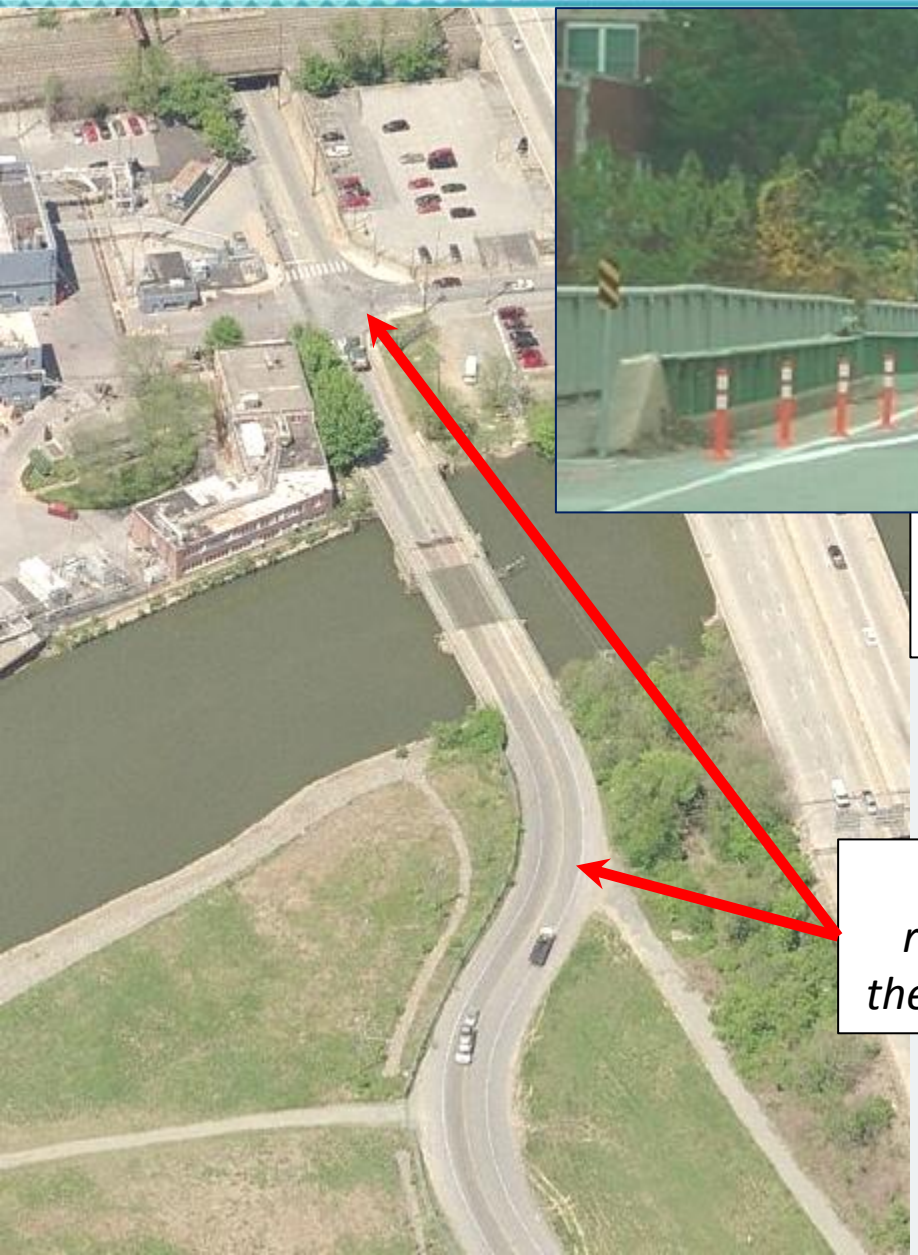
Figure 6H-11A. Lane Closure on a Two-Lane Road with Low Traffic Volumes Using STOP Signs (TA-11A)
(Delaware Revision)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 11A

TA-11A. Lane Closure on a Two-Lane Road with Low Traffic Volumes using STOP Signs

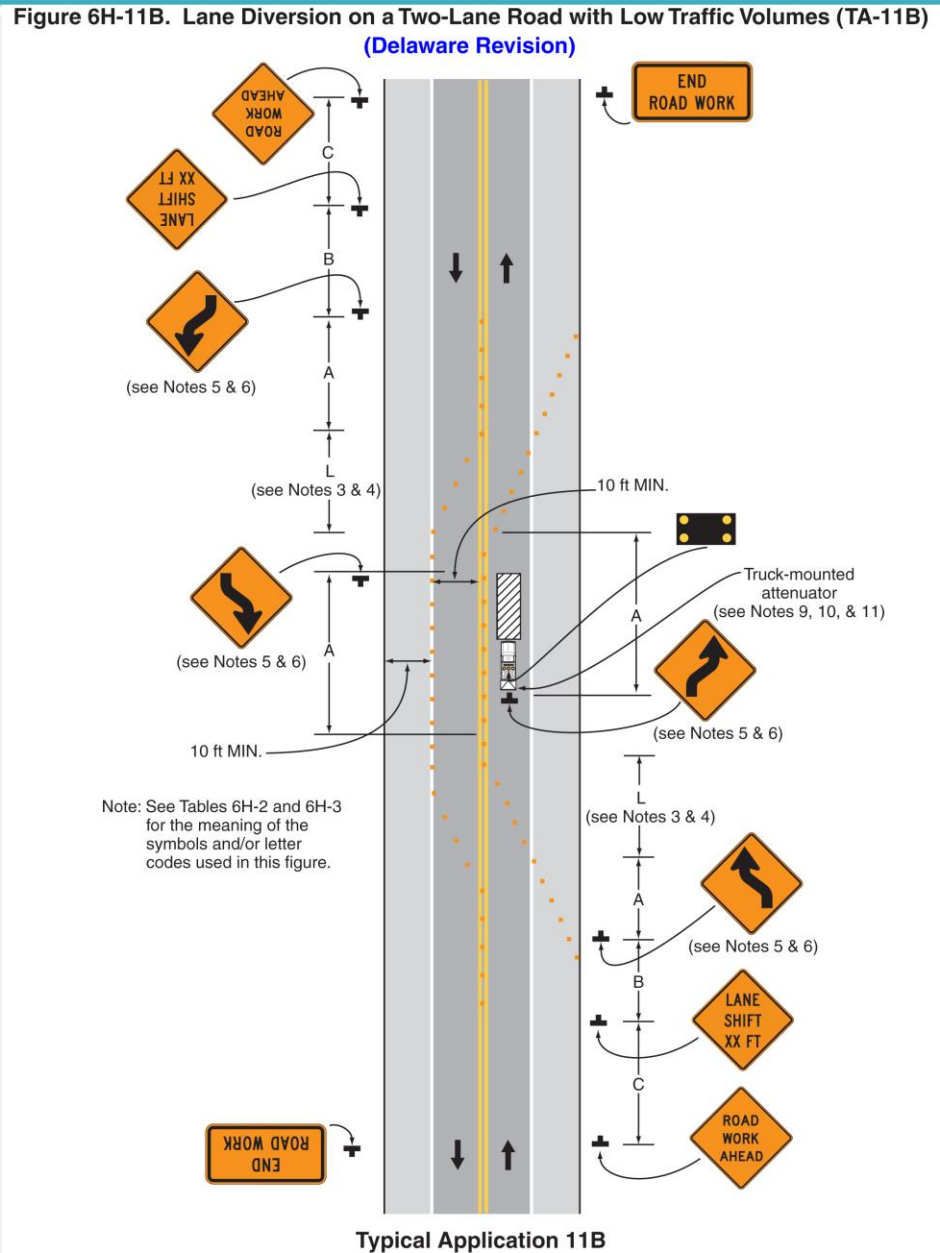


James St bridge, Newport
Emergency one-lane bridge conversion

Horizontal curve and adjacent intersection restricted use of self-regulating, YIELD control; therefore, STOP control used during bridge repairs

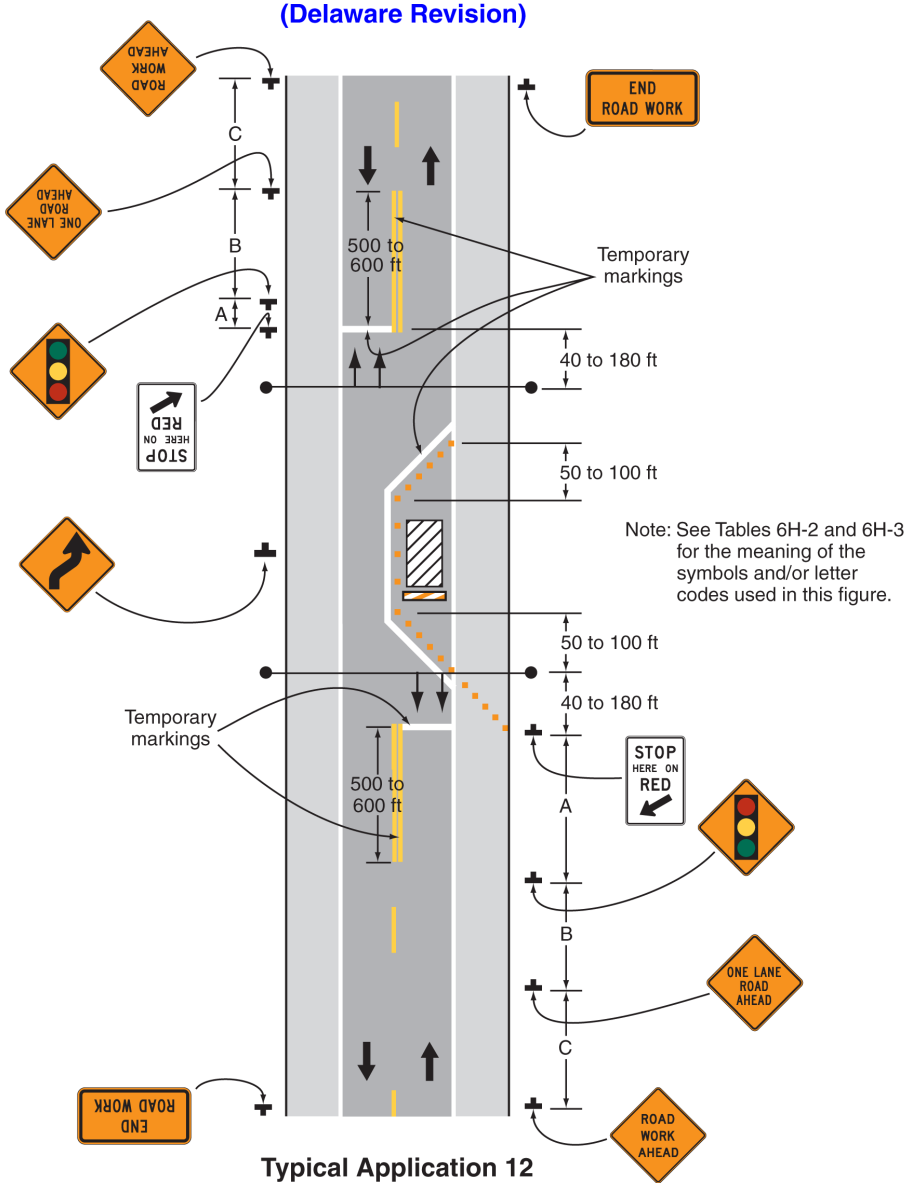
TA-11B. Lane Diversion on a Two-Lane Road with Low Traffic Volumes

- Case 10 = TA-11B
- DE Option: Alternative to lane closure where opposing shoulder is travel-bearing and of adequate width
- DE Guidance:
  - *10-ft (MIN.) lane widths*
  - *Shift taper = L*
  - *Illuminate shift area at night*



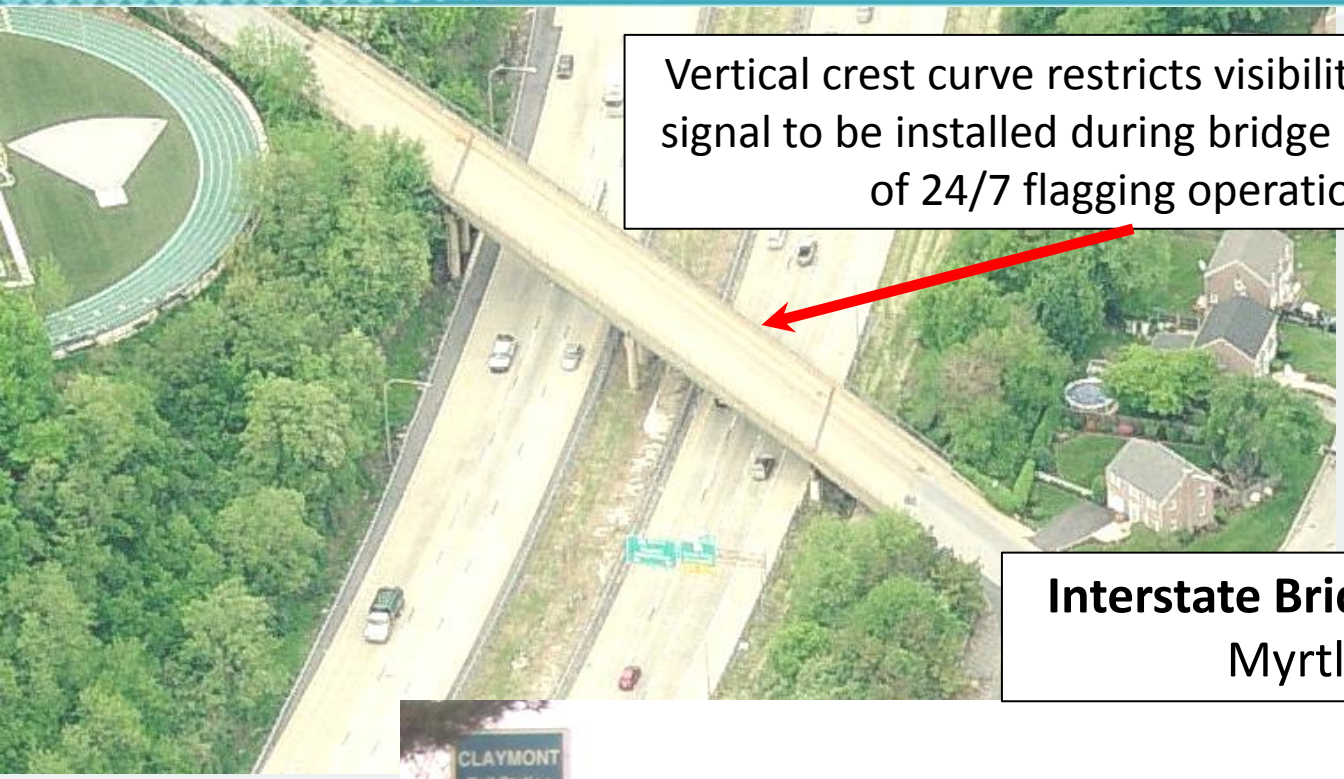
- DE Standard: **Require approved signal plan by DelDOT Traffic**
- **Installed and operated in accordance with Part 4**
- DE Guidance: *Primary signal faces located overhead*

Figure 6H-12. Lane Closure on a Two-Lane Road Using Traffic Control Signals (TA-12)
(Delaware Revision)



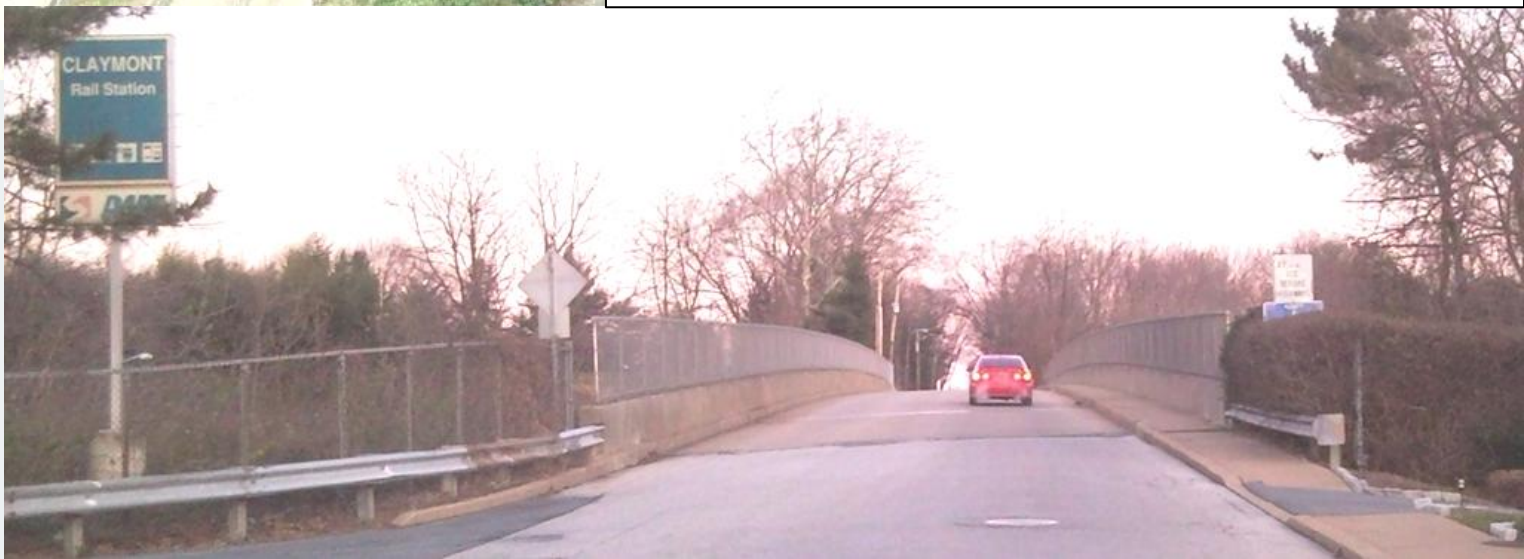
Typical Application 12

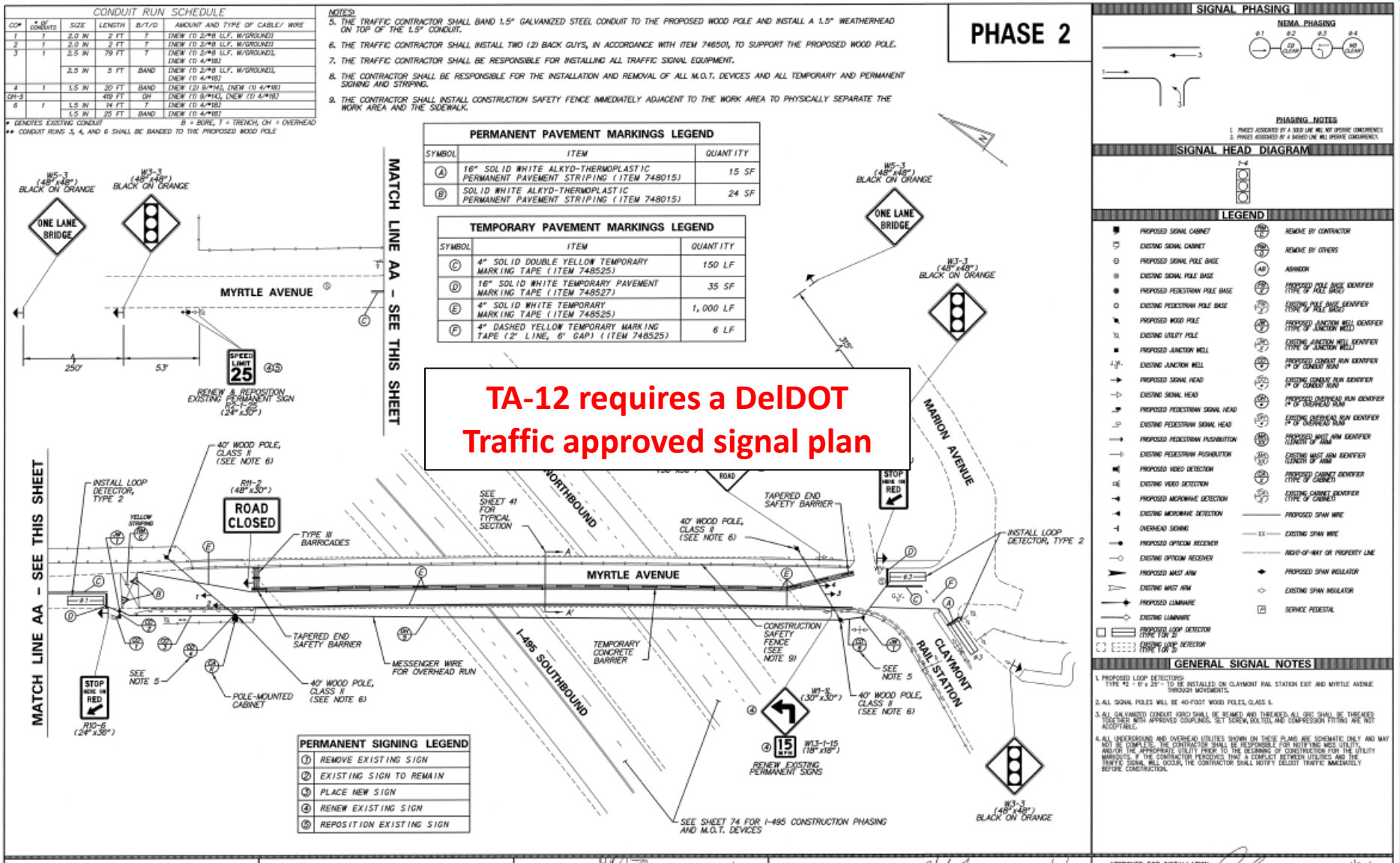
TA-12. Lane Closure on a Two-Lane Road using Traffic Control Signals



Vertical crest curve restricts visibility; temporary signal to be installed during bridge repairs in lieu of 24/7 flagging operations

Interstate Bridge Maintenance, North
Myrtle Ave over I-495





CONDUIT RUN SCHEDULE					
CR*	# OF CONDUITS	SIZE	LENGTH	B/T/O	AMOUNT AND TYPE OF CABLE/ WIRE
1	1	2.0 IN	2 FT	T	(NEW (1) 2/#8 ULF. W/GROUND)
2	1	2.0 IN	2 FT	T	(NEW (1) 2/#8 ULF. W/GROUND)
3	1	2.5 IN	79 FT	T	(NEW (1) 2/#8 ULF. W/GROUND), (NEW (1) 4/#18)
		2.5 IN	5 FT	BAND	(NEW (1) 2/#8 ULF. W/GROUND), (NEW (1) 4/#18)
4	1	1.5 IN	20 FT	BAND	(NEW (2) 0/#14), (NEW (1) 4/#18)
CR-5			419 FT	OH	(NEW (1) 0/#14), (NEW (1) 4/#18)
6	1	1.5 IN	14 FT	T	(NEW (1) 4/#18)
		1.5 IN	25 FT	BAND	(NEW (1) 4/#18)

* DENOTES EXISTING CONDUIT
** CONDUIT RUNS 3, 4, AND 6 SHALL BE BANDED TO THE PROPOSED WOOD POLE
B = BORE, T = TRENCH, OH = OVERHEAD

PERMANENT PAVEMENT MARKINGS LEGEND		
SYMBOL	ITEM	QUANTITY
(A)	16" SOLID WHITE ALKYD-THERMOPLASTIC PERMANENT PAVEMENT STRIPING (ITEM 748015)	15 SF
(B)	SOLID WHITE ALKYD-THERMOPLASTIC PERMANENT PAVEMENT STRIPING (ITEM 748015)	24 SF

TEMPORARY PAVEMENT MARKINGS LEGEND		
SYMBOL	ITEM	QUANTITY
(C)	4" SOLID DOUBLE YELLOW TEMPORARY MARKING TAPE (ITEM 748525)	150 LF
(D)	16" SOLID WHITE TEMPORARY PAVEMENT MARKING TAPE (ITEM 748527)	35 SF
(E)	4" SOLID WHITE TEMPORARY MARKING TAPE (ITEM 748525)	1,000 LF
(F)	4" DASHED YELLOW TEMPORARY MARKING TAPE (2' LINE, 6' GAP) (ITEM 748525)	6 LF

PERMANENT SIGNING LEGEND	
①	REMOVE EXISTING SIGN
②	EXISTING SIGN TO REMAIN
③	PLACE NEW SIGN
④	RENEW EXISTING SIGN
⑤	REPOSITION EXISTING SIGN

GENERAL SIGNAL NOTES

1. PROPOSED LOOP DETECTORS TYPE "2 - 6' x 25' - TO BE INSTALLED ON CLAYMONT RAIL STATION EXIT AND MYRTLE AVENUE THROUGH MOVEMENTS.
2. ALL SIGNAL POLES WILL BE 40-FOOT WOOD POLES, CLASS II.
3. ALL GALVANIZED CONDUIT (GRC) SHALL BE REAMED AND THREADED. ALL GRC SHALL BE THREADED TOGETHER WITH APPROVED COUPLINGS. SET SCREW, BOLTED, AND COMPRESSION FITTING ARE NOT ACCEPTABLE.
4. ALL UNDERGROUND AND OVERHEAD UTILITIES SHOWN ON THESE PLANS ARE SCHEMATIC ONLY AND MAY NOT BE COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING MISS UTILITY, AND/OR THE APPROPRIATE UTILITY PRIOR TO THE BEGINNING OF CONSTRUCTION FOR THE UTILITY MARKOUTS. IF THE CONTRACTOR PERCEIVES THAT A CONFLICT BETWEEN UTILITIES AND THE TRAFFIC SIGNAL WILL OCCUR, THE CONTRACTOR SHALL NOTIFY DELDOT TRAFFIC IMMEDIATELY BEFORE CONSTRUCTION.

RECOMMENDED _____ DATE: _____
RECOMMENDED _____ DATE: _____
RECOMMENDED _____ DATE: 11/26/10
APPROVED TRAFFIC ENGINEER _____ DATE: 11/26/10
APPROVED FOR INSTALLATION CHIEF TRAFFIC ENGINEER _____ DATE: 11/26/10

DELAWARE DEPARTMENT OF TRANSPORTATION

ADDENDUM / REVISIONS

SCALE 0 30 60 90 FEET

INTERSTATE BRIDGE MAINTENANCE, NORTH

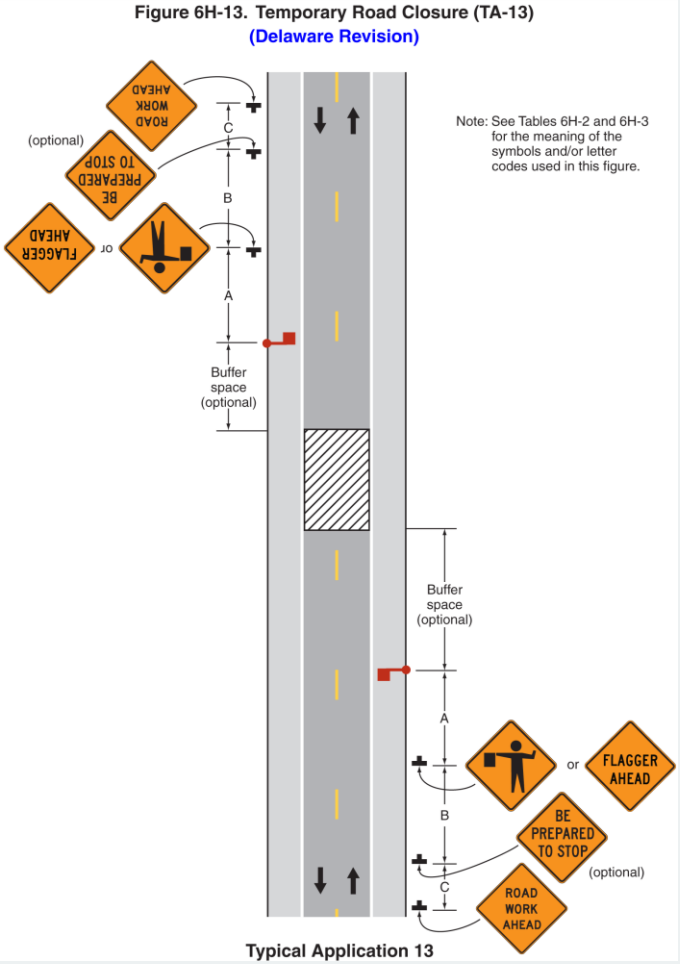
CONTRACT 29-074-06
COUNTY NEW CASTLE
PERMIT NO. N-745
DESIGNED BY: D.M.C. (WR&A)
CHECKED BY: M.J.B. (WR&A)

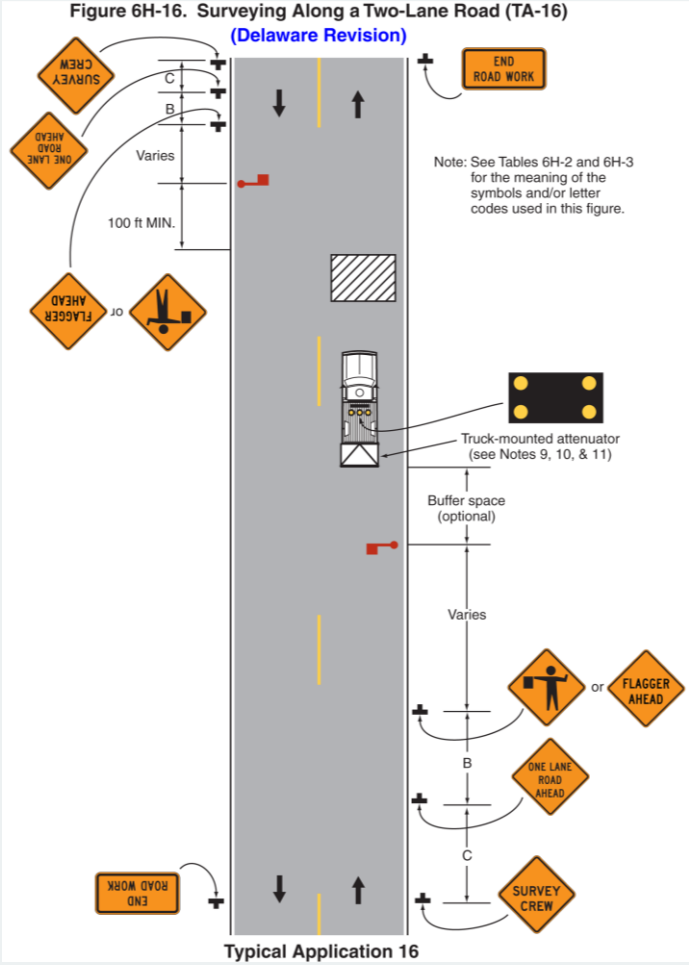
TEMPORARY SIGNAL PLAN
MYRTLE AVENUE @
BRIDGE 1-829
(OVER INTERSTATE 495)

SHEET NO. 75
TOTAL SHTS. 76

- Reserve for closures < 20 min during off-peak hours
- **Use flaggers or law enforcement officers**

- DE Standard:
  - **MAX. work area = ½ day's operation or 1 mile**
  - **Flaggers within sight or in communication at all times**

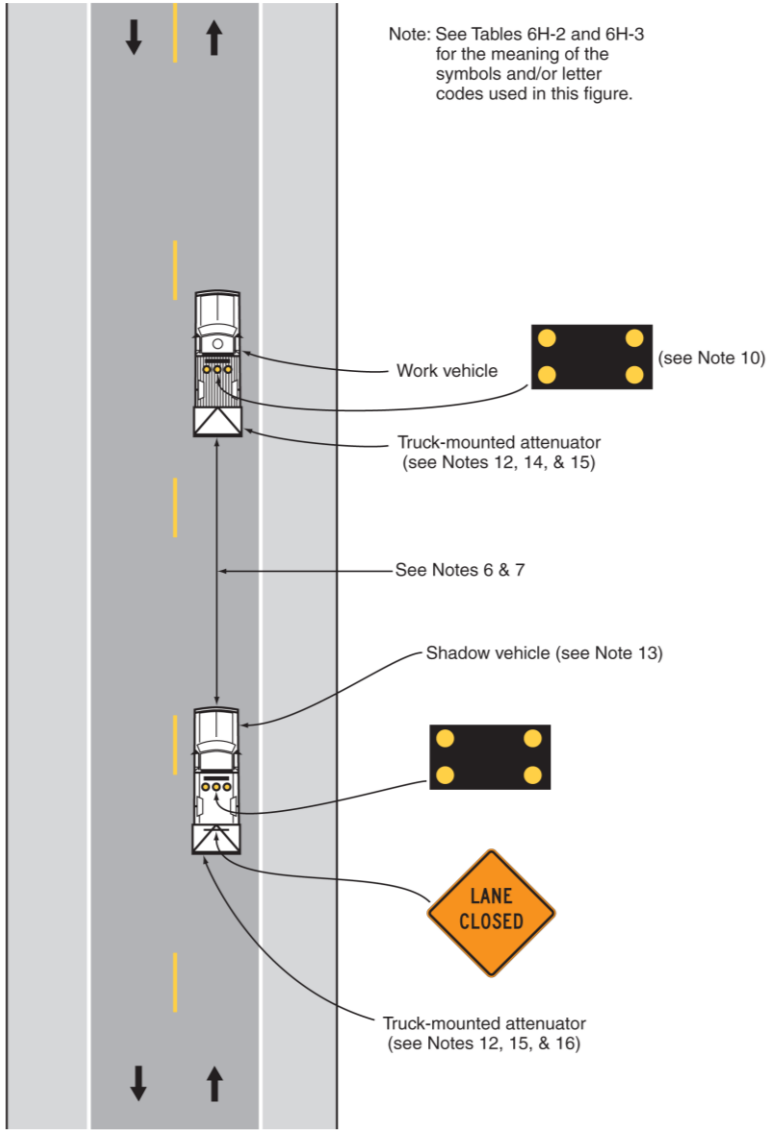




TA-17. Mobile Operations on a Two-Lane Road

- Case 20-B = TA-17
- DE Standard: **TMAs required for mobile operations on roads > 40 mph**
- DE Option: TMA and arrow board omitted from work vehicles that cannot support devices
- **Arrow board(s) in caution mode**

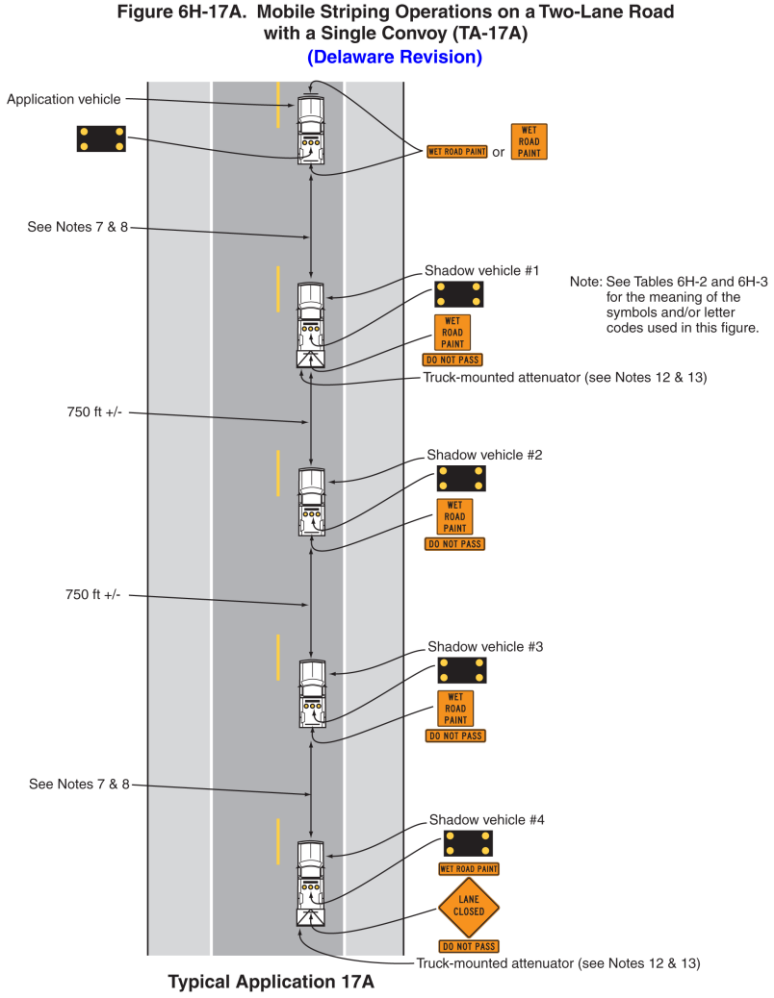
Figure 6H-17. Mobile Operations on a Two-Lane Road (TA-17)
(Delaware Revision)

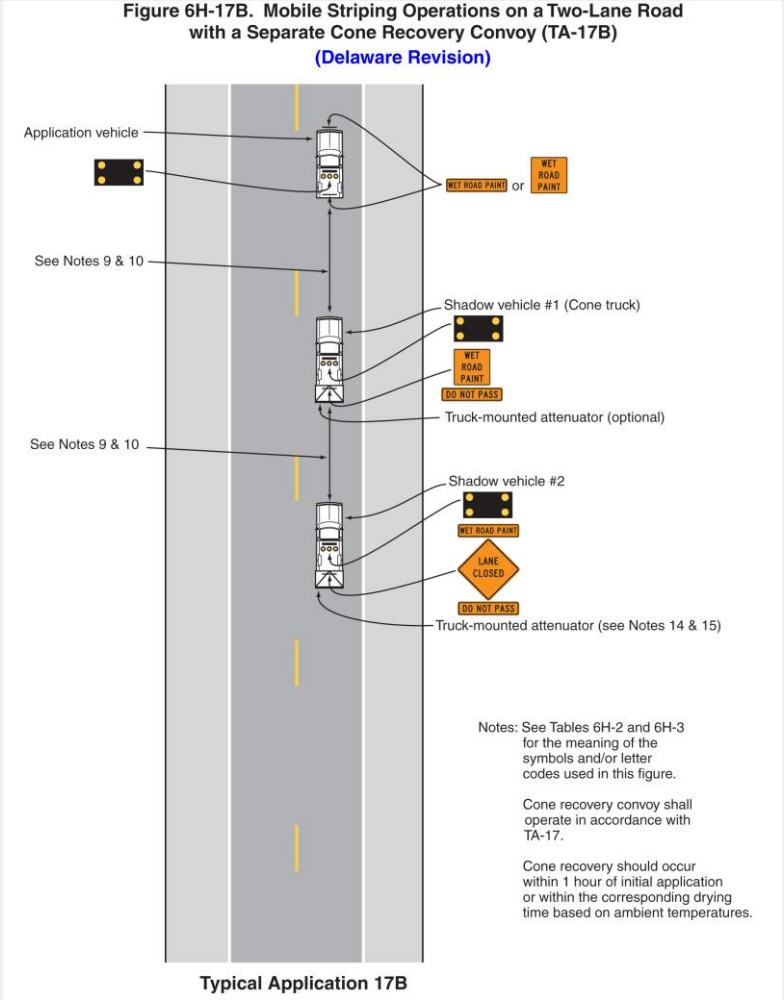


Typical Application 17

TA-17A & TA-17B Mobile Striping on a Two-Lane Road

- Case 23-A = TA-17A
- DE Option: 2 separate convoys (TA-17B) – application and cone recovery
  - **TA-17 (mobile lane closure) required for cone recovery convoy**





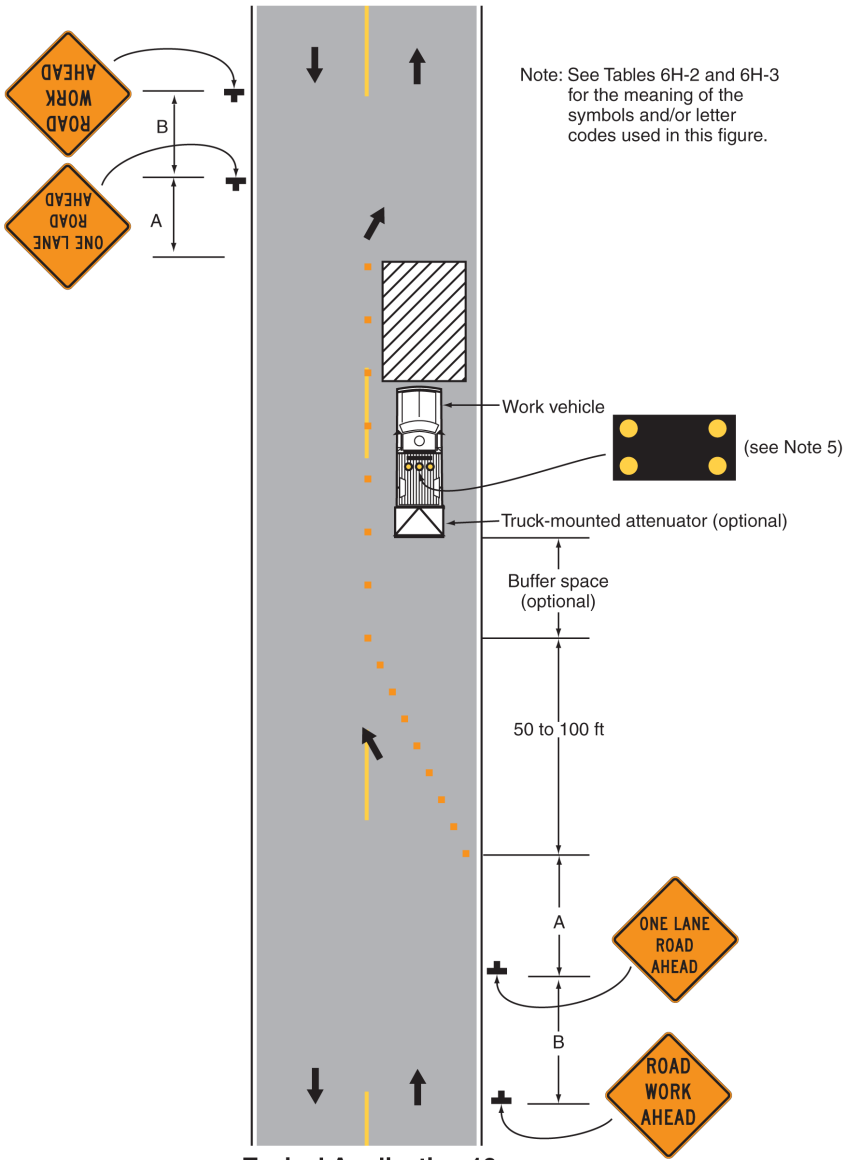
- Work within traveled way of urban street
  - Lane closure on subdivision street
  - Detour

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way of an Urban Street (see Section 6G.11) – also applicable to other roadway types, as noted			
Lane Closure on a Minor Street	TA-18	-	-
Detour for One Travel Direction	TA-20	TA-20	TA-20
Detour for a Closed Street	TA-20	TA-20	TA-20

TA-18. Lane Closure on a Minor Street

- DE Standard: **Only for low-speed roads with low traffic volumes, such as subdivision streets**
- **Use TA-10 (lane closure with flaggers) where traffic cannot self regulate**

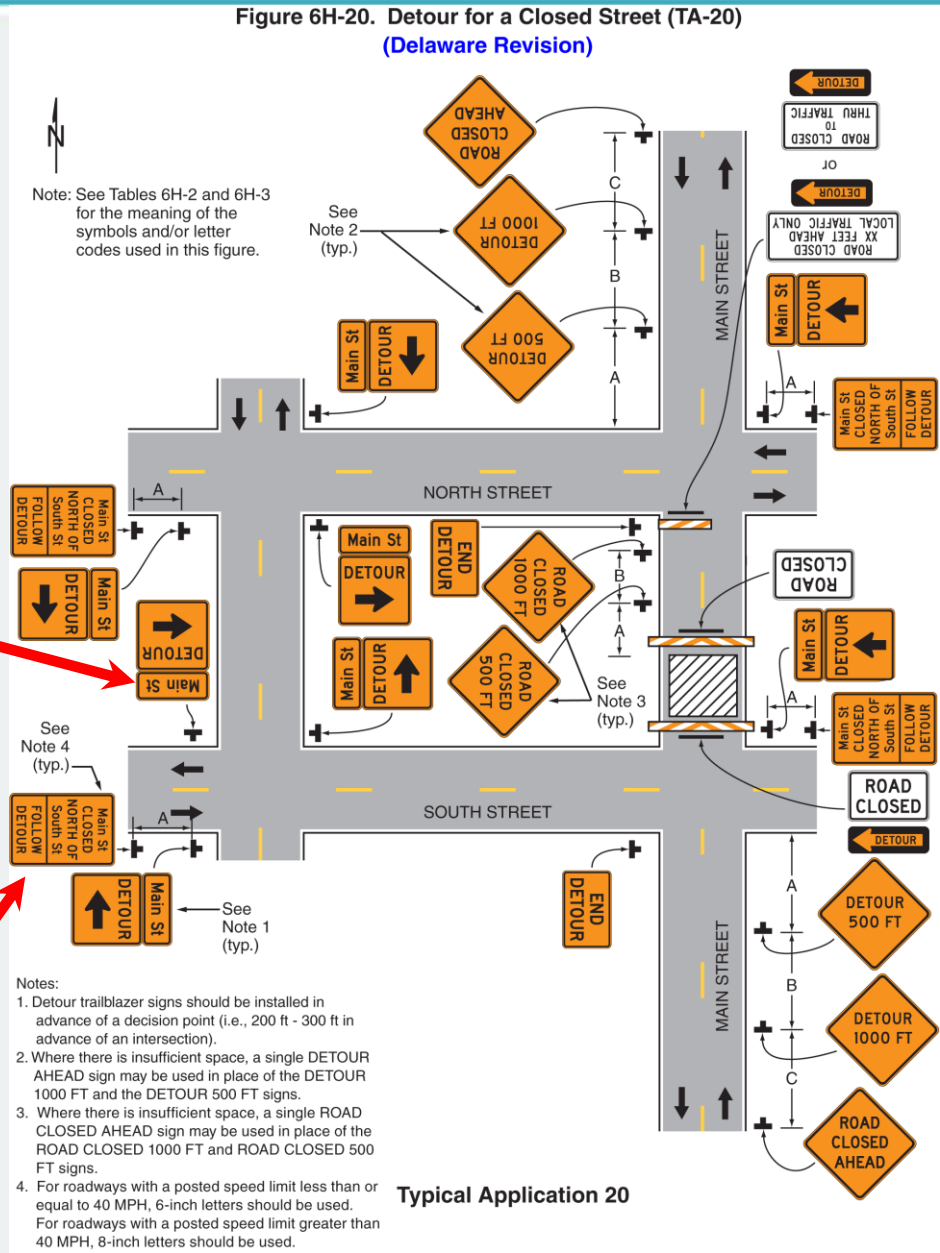
Figure 6H-18. Lane Closure on a Minor Street (TA-18)
(Delaware Revision)



Typical Application 18

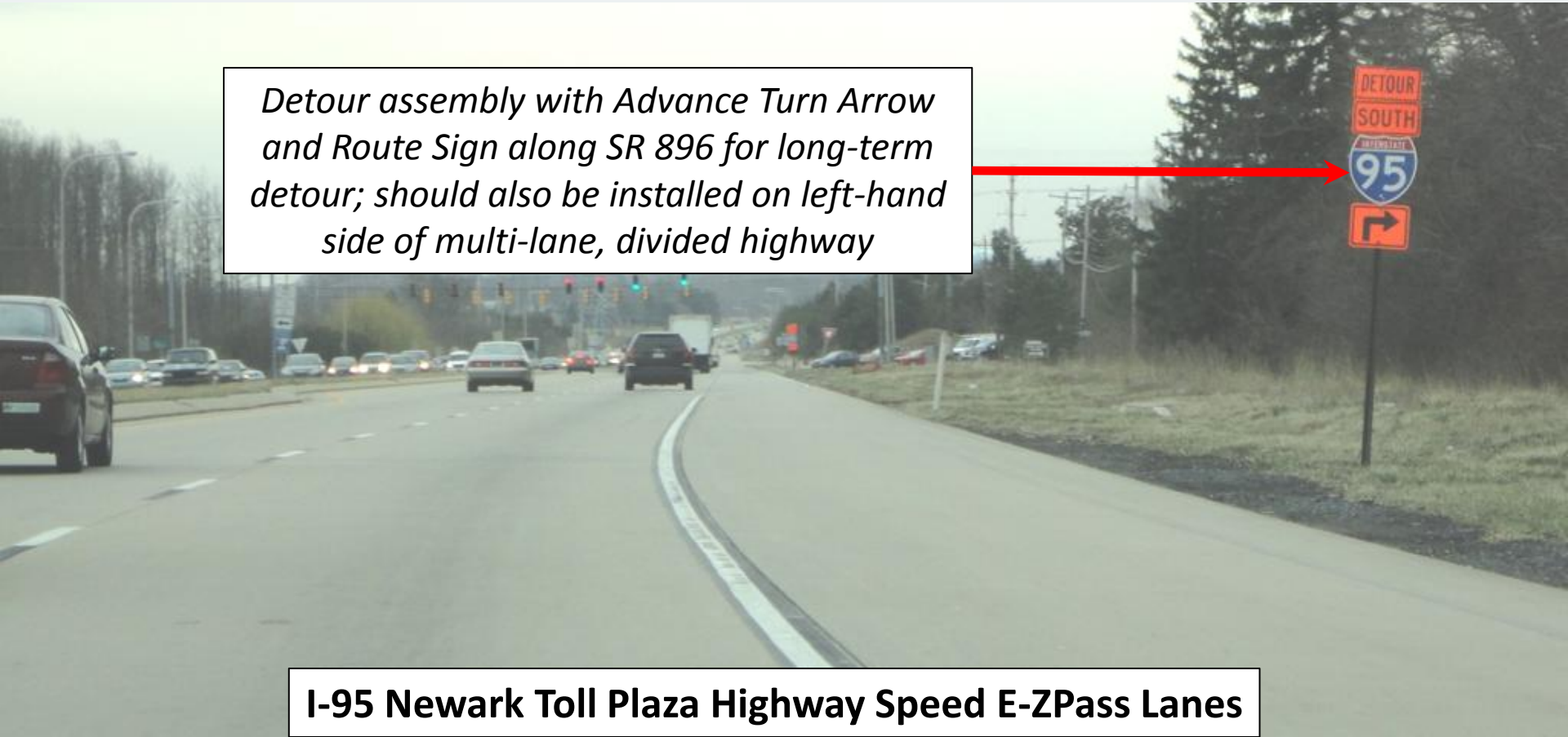
TA-20. Detour for a Closed Street

- Case 15 = TA-20
- DE Guidance:
  - *Detour signs on both left and right-hand side of multi-lane, divided roads*
  - *Street name plaque for complex or overlapping detours*
  - *6-inch (MIN.) legend on two-lane roads and multi-lane roads ≤ 40 mph*
  - *8-inch (MIN.) legend on multi-lane roads > 40 mph*



TA-20. Detour for a Closed Street

- DE Guidance: *Route Sign Directional assemblies for long-term detours on numbered routes*
- *Detour signs with Advance Turn Arrow on multi-lane roads*

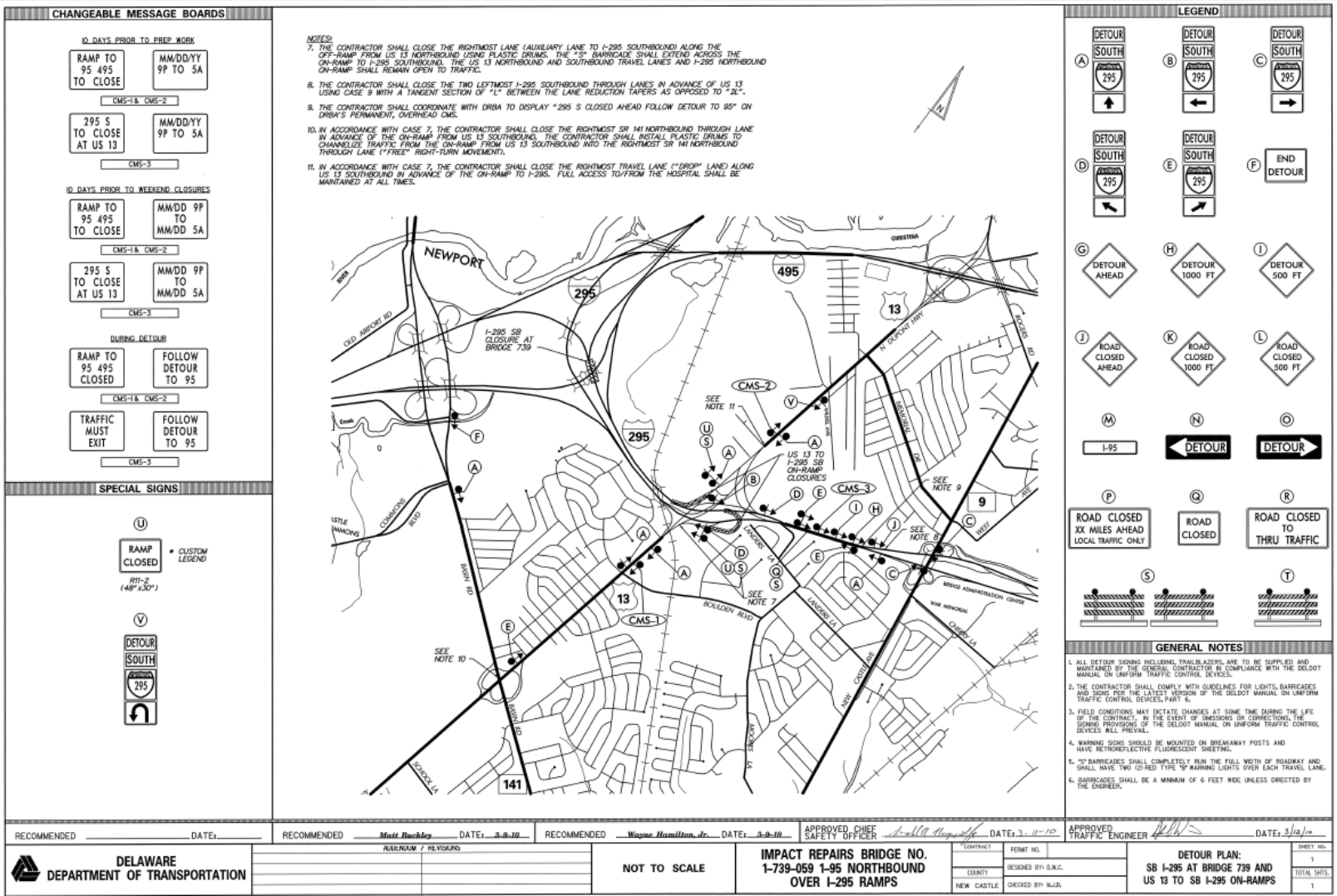


Detour assembly with Advance Turn Arrow and Route Sign along SR 896 for long-term detour; should also be installed on left-hand side of multi-lane, divided highway

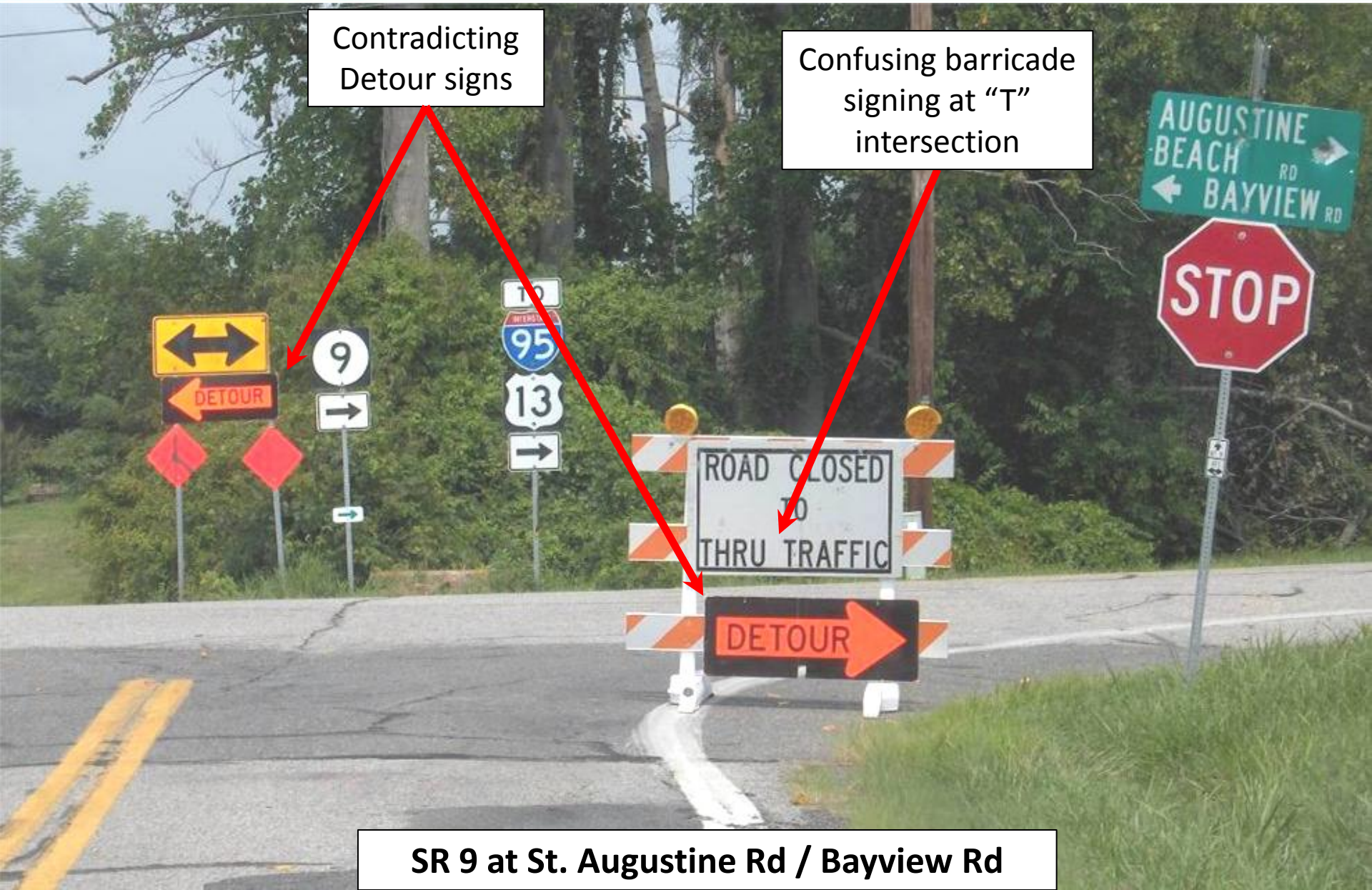
I-95 Newark Toll Plaza Highway Speed E-ZPass Lanes

TA-20. Detour for a Closed Street

- DE Standard: **Approved detour plan for detours affecting state-maintained roads**



TA-20. Detour for a Closed Street



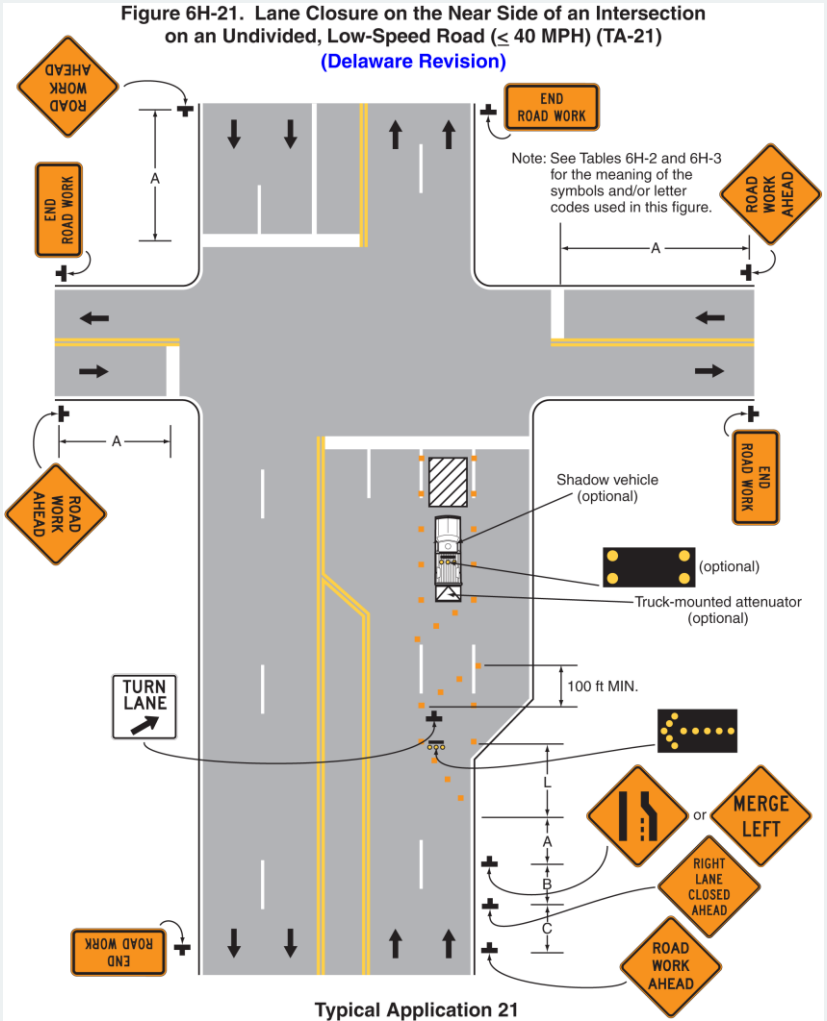
SR 9 at St. Augustine Rd / Bayview Rd

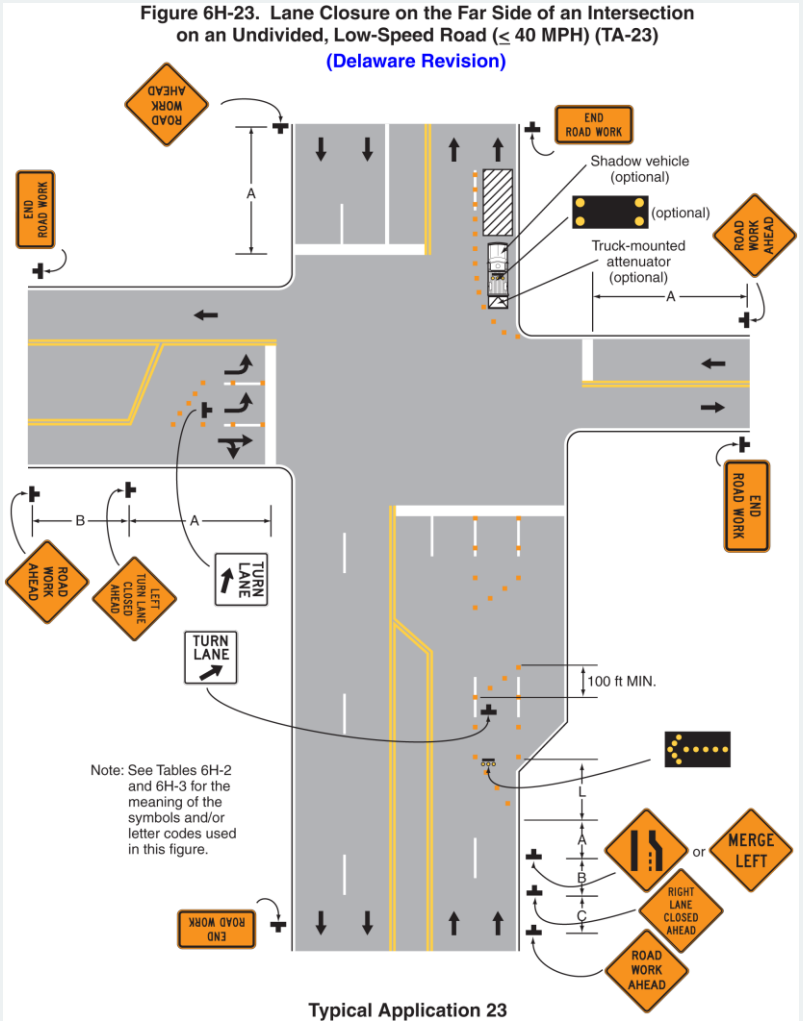
Work at an intersection and on sidewalks

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way at an Intersection and on Sidewalks (see Section 6G.13)			
Lane Closure on the Near Side of an Intersection	TA-21 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-21 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Right-Hand Lane Closure on the Far Side of an Intersection	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Left-Hand Lane Closure on the Far Side of an Intersection	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Half Road Closure on the Far Side of an Intersection	Not applicable in Delaware	Not applicable in Delaware	-
Multiple Lane Closures at an Intersection	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	TA-23 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Closure in the Center of an Intersection	Not applicable in Delaware	Not applicable in Delaware	-
Closure at the Side or Center of an Intersection	TA-27	TA-27	-
Sidewalk Detour or Diversion	TA-28	TA-28	-
Crosswalk Closures and Pedestrian Detours	TA-29	TA-29	-

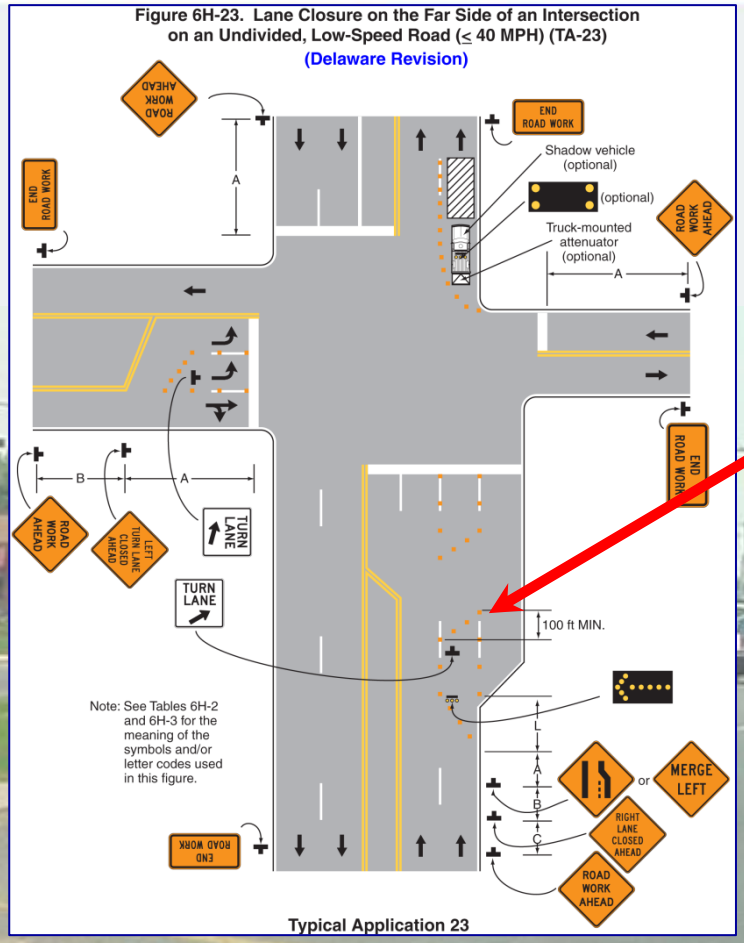
TA-21 & TA-23 Lane Closure at an Intersection

- Upstream lane closure(s) in advance of intersection
  - DE Guidance: *Use TA-33 for roads > 40 mph*





TA-23. Lane Closure on the Far Side of an Intersection on an Undivided, Low Speed Road



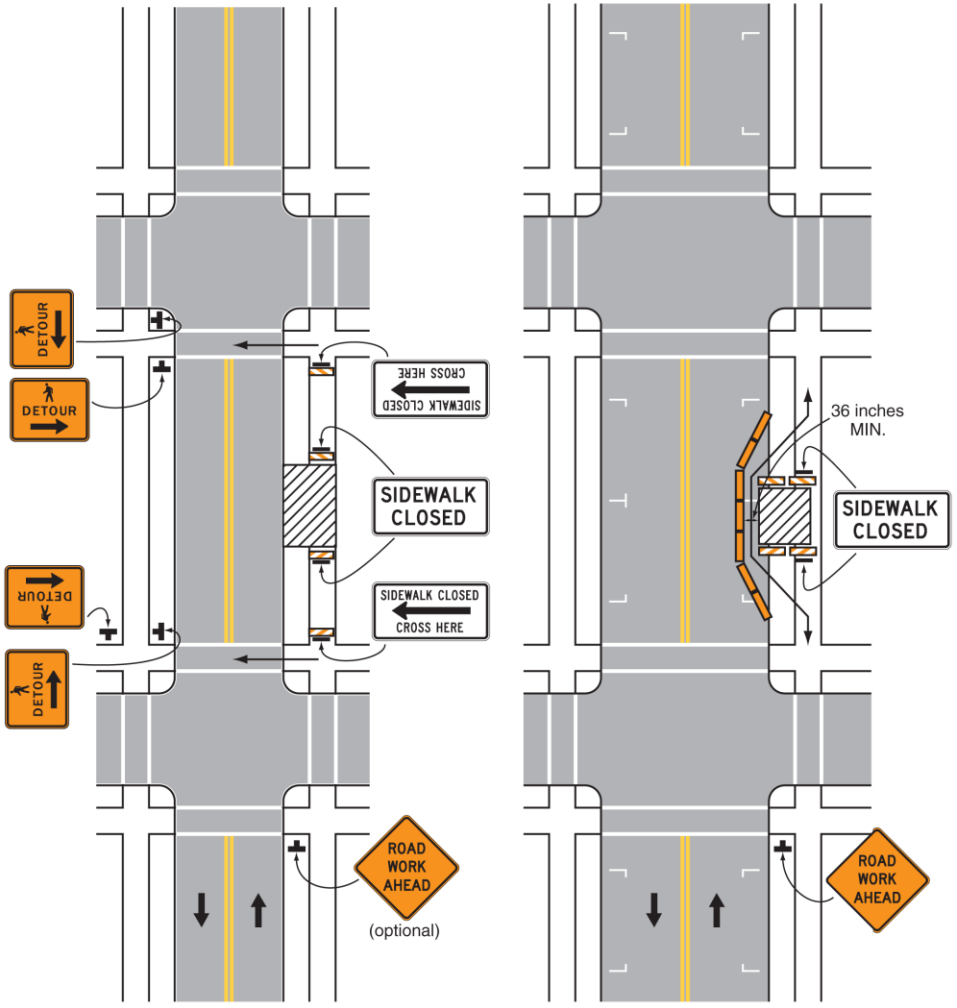
Far side intersection lane closures should follow TA-23 with merging taper farther upstream of intersection

US 13 at Thomas Harmon Dr

TA-28. Sidewalk Detour or Diversion

- Pedestrian detours are generally preferred over in-street diversions on state-maintained roads

Figure 6H-28. Sidewalk Detour or Diversion (TA-28)
(Delaware Revision)



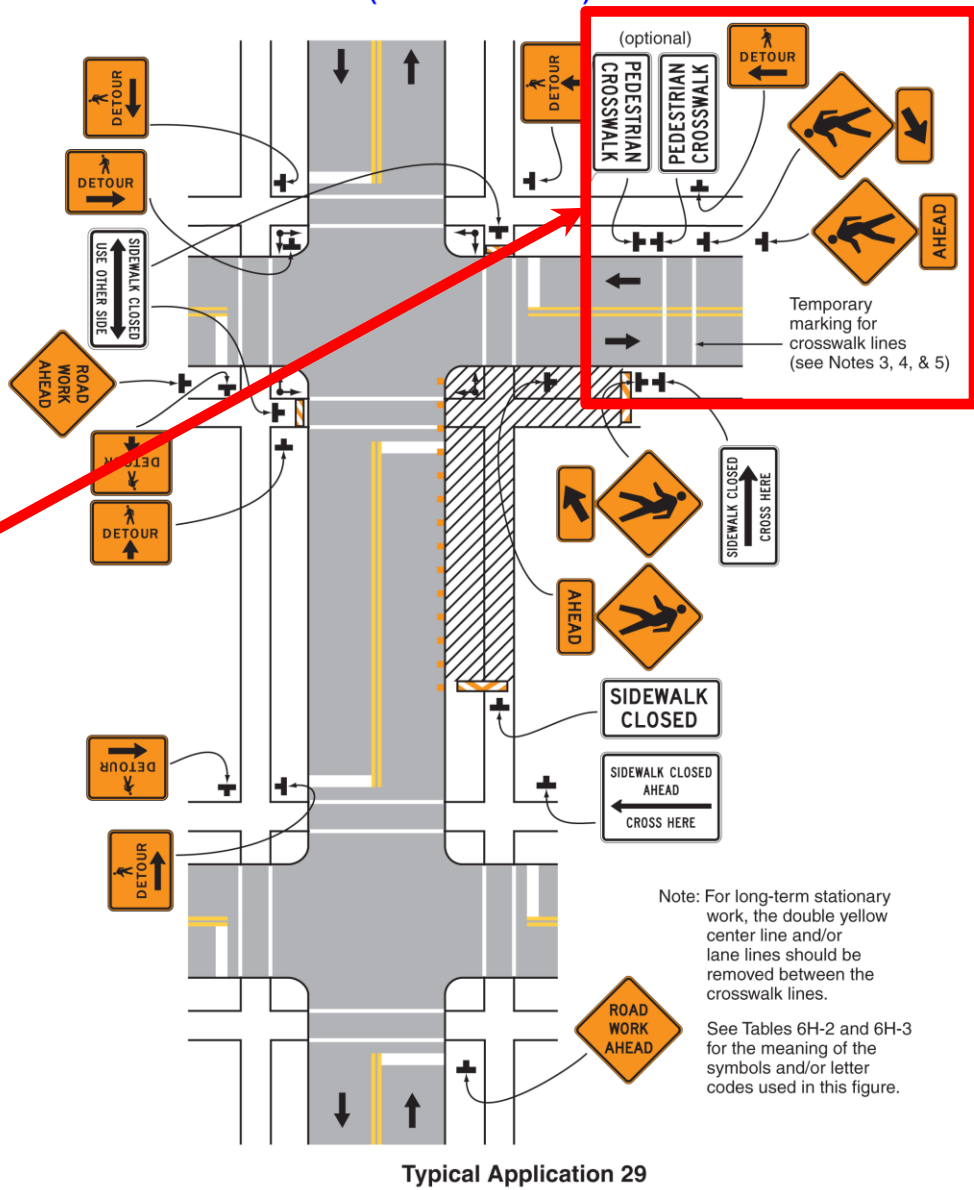
Typical Application 28

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

* Preferred application on state-maintained roadways

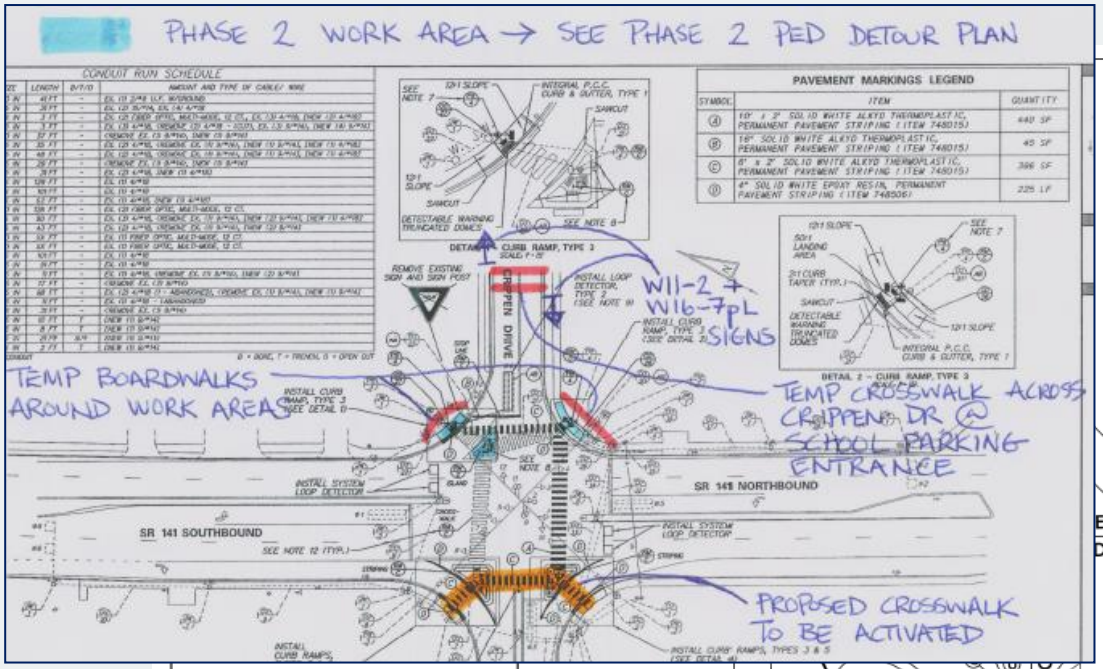
- DE Standard:
  - **Approved detour plan for pedestrian detours along state-maintained roads**
  - **Temporary midblock crosswalks require DelDOT Traffic approval**
  - **If approved, temporary midblock crosswalks signed and marked in accordance with Parts 2 and 3**

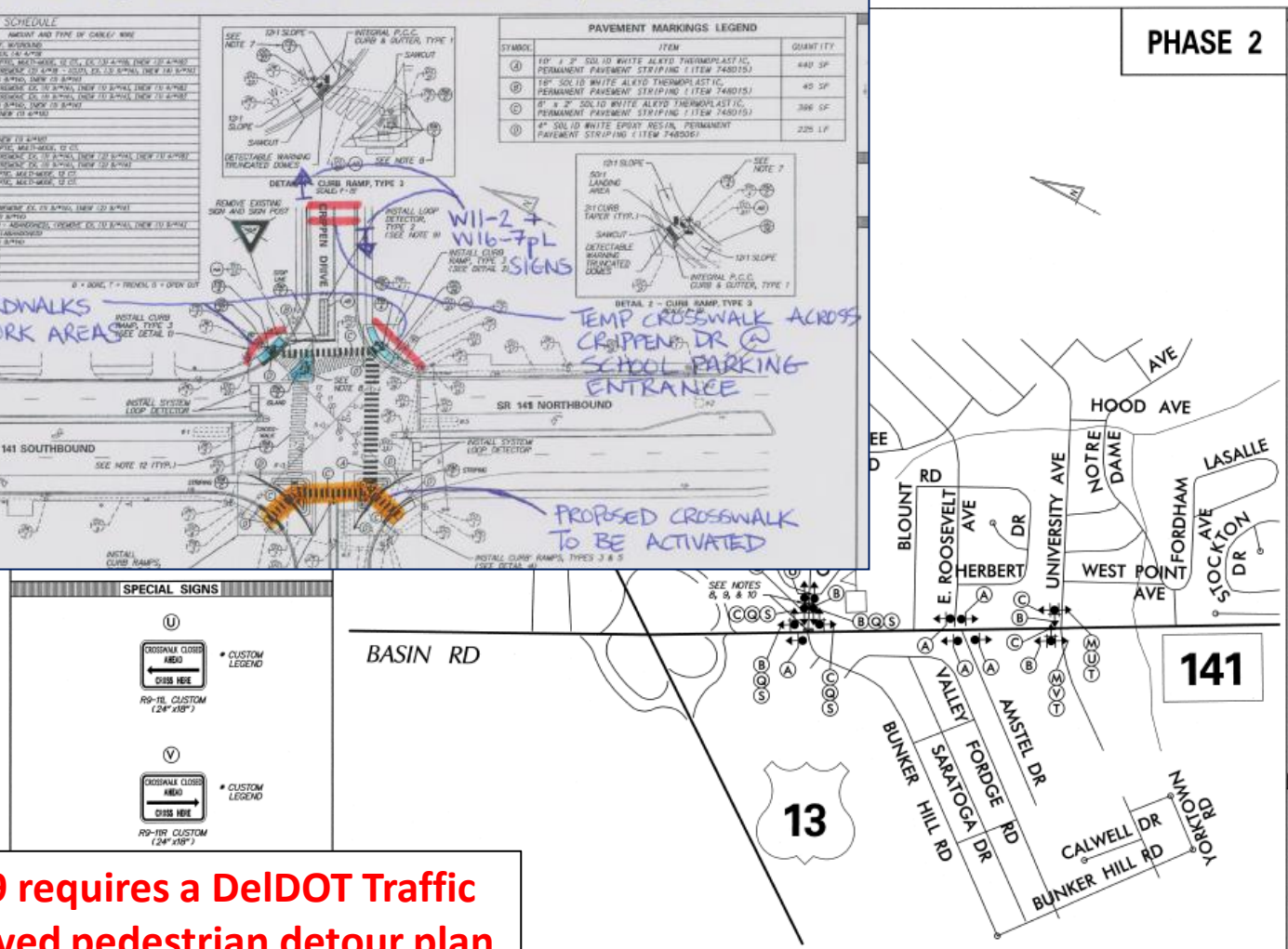
Figure 6H-29. Crosswalk Closures and Pedestrian Detours (TA-29)
(Delaware Revision)

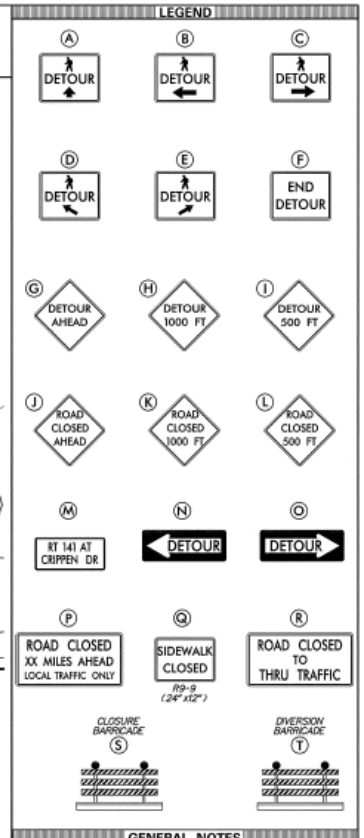


Typical Application 29

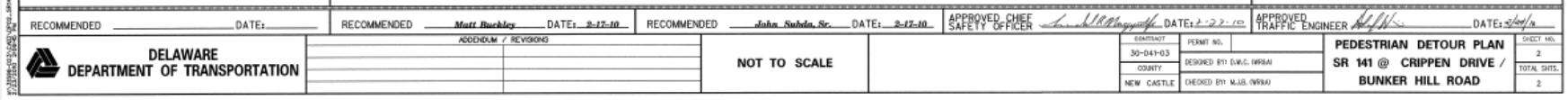
TA-29. Crosswalk Closures and Pedestrian Detours







TA-29 requires a DelDOT Traffic approved pedestrian detour plan



Work within the traveled way of a multi-lane highway

Relatively uncommon applications requiring project-specific plans

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way of a Multi-Lane, Non-Access Controlled Highway (see Section 6G.12) – also applicable to other roadway types, as noted			
Interior Lane Closure on a Multi-Lane Street	-	TA-30 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Lane Closure on a Street with Uneven Directional Volumes	-	TA-31 (≤ 40 MPH) or TA-33 (> 40 MPH)	-
Half Road Closure on a Multi-Lane, High-Speed Highway	-	TA-32	-
Stationary Lane Closure on a Divided Highway	-	TA-33	TA-33
Lane Closure with a Temporary Traffic Barrier	-	TA-34	TA-34
Short Duration and Mobile Operations on a Multi-Lane Road	-	TA-35 or TA-35A	TA-35 or TA-35A
Mobile Striping Operations on a Multi-Lane Road		TA-35B or TA-35C	TA-35D, TA-35E, TA-35F, or TA-35G

- Case 7 = TA-33
- Removed upstream Merge signs

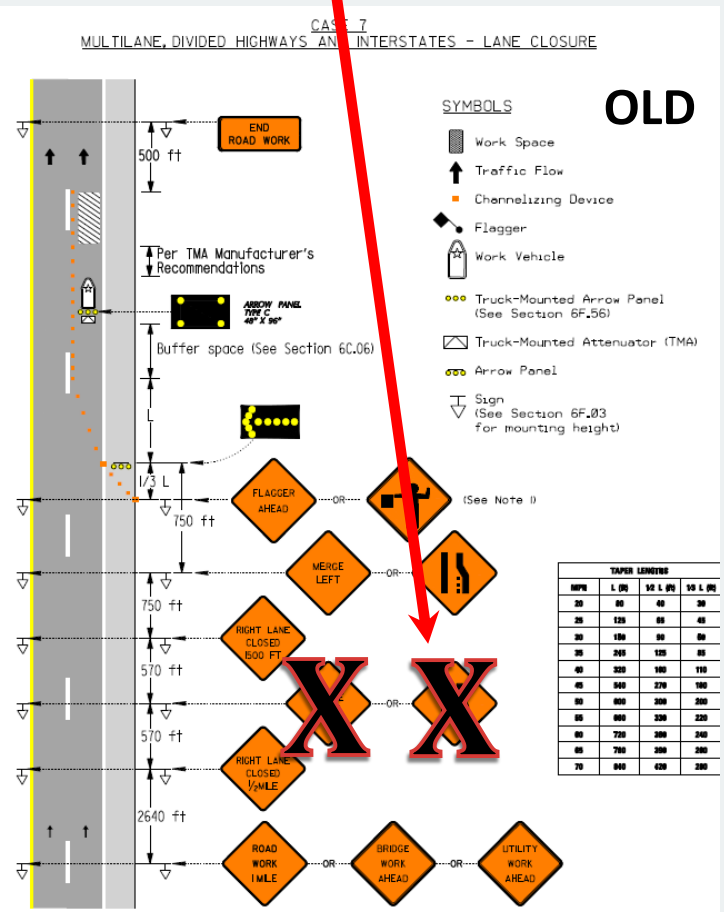
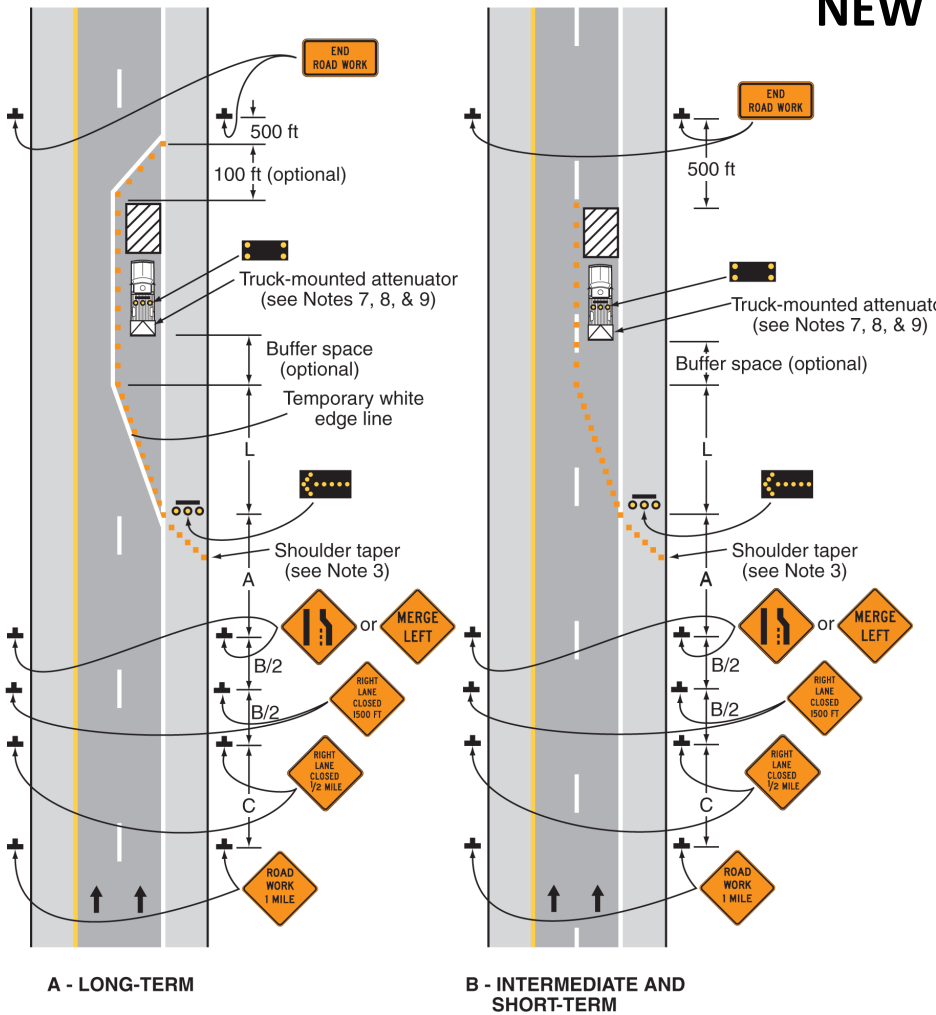


Figure 6H-33. Stationary Lane Closure on a Multi-Lane, Divided Highway (TA-33)

(Delaware Revision)

NEW



Typical Application 33

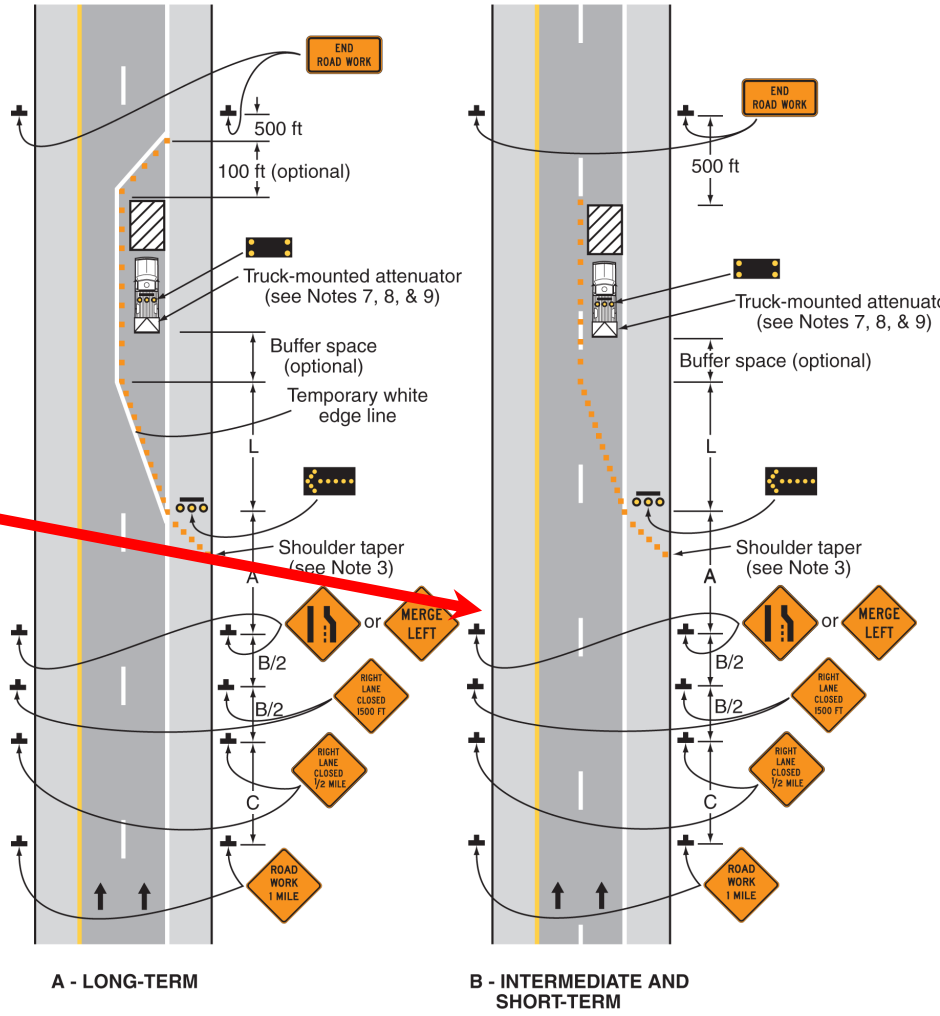
Notes: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

The distance between the advance warning signs and the sign legends should be based on the interstate/expressway/freeway criteria in Table 6H-3 unless site specific contraints require a reduced sign spacing.

TA-33. Stationary Lane Closure on a Multi-Lane, Divided Highway

- **TTC devices on side road when intersection is within TTC zone**
- DE Guidance: *Omit signs on left-hand side along undivided highways and divided highways with narrow medians*
- DE Standard: **TMA required for long-term, intermediate, and short-term operations on roads > 40 mph**

Figure 6H-33. Stationary Lane Closure on a Multi-Lane, Divided Highway (TA-33)
(Delaware Revision)



Typical Application 33

Notes: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

The distance between the advance warning signs and the sign legends should be based on the interstate/expressway/freeway criteria in Table 6H-3 unless site specific contraints require a reduced sign spacing.

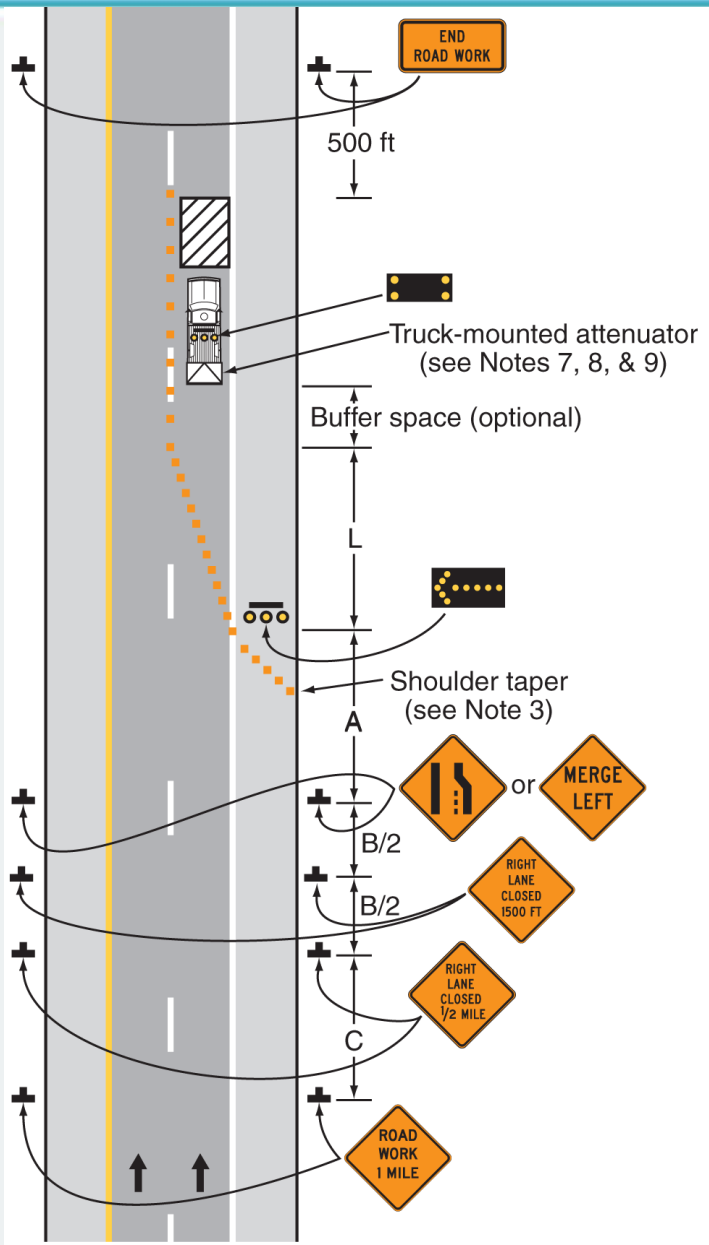
TA-33. Stationary Lane Closure on a Multi-Lane, Divided Highway

- DE Guidance: *For all multi-lane roads, sign spacing follows I/F/E criteria in Table 6H-3*

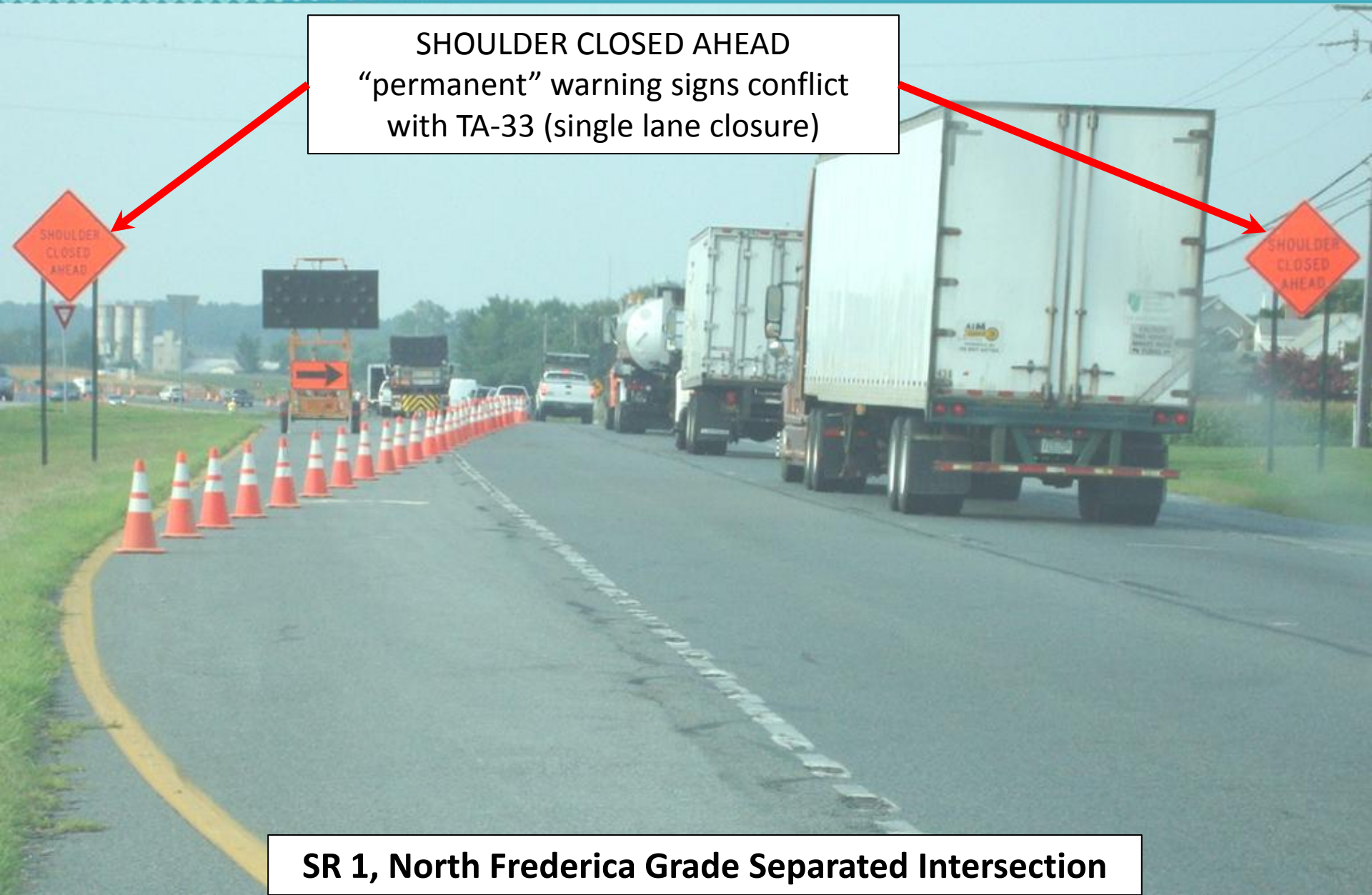
Table 6C-1. Recommended Advance Warning Sign Minimum Spacing
(Delaware Revision)

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			
Interstate / Expressway / Freeway	1,000 feet	1,640 feet	2,640 feet

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. 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.)



TA-33. Stationary Lane Closure on a Multi-Lane, Divided Highway



SR 1, North Frederica Grade Separated Intersection

TA-33. Stationary Lane Closure on a Multi-Lane, Divided Highway

Incorrect warning sign for downstream lane closure application

BR 1-325 on Otts Chapel Rd over Persimmon Run

TA-34. Lane Closure on a Multi-Lane, Divided Highway with a Temporary Traffic Barrier

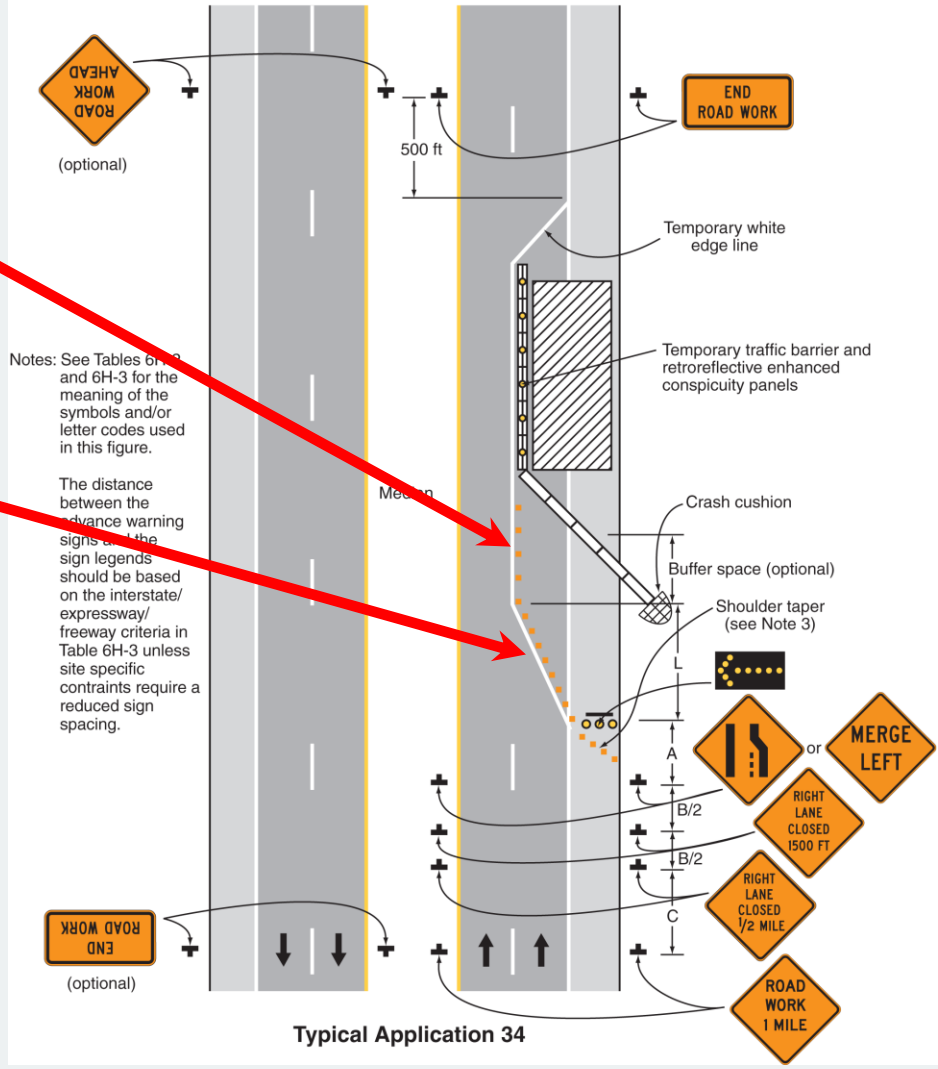
- Example of one method for long-term lane closure
- *Use of barrier based on engineering judgment*
- Optional longitudinal buffer space based on Table 6C-2
- **Barrier shall not be placed on merging taper; closed in advance with drums**

Table 6C-2. 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

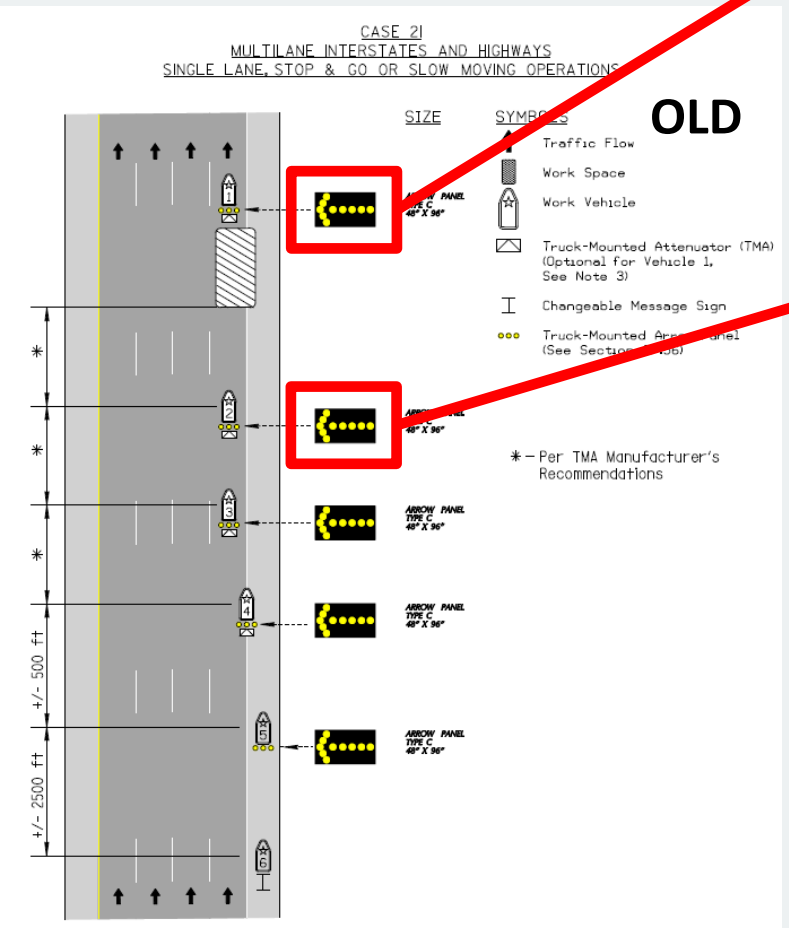
Figure 6H-34. Lane Closure on a Multi-Lane, Divided Highway with a Temporary Traffic Barrier (TA-34)
(Delaware Revision)

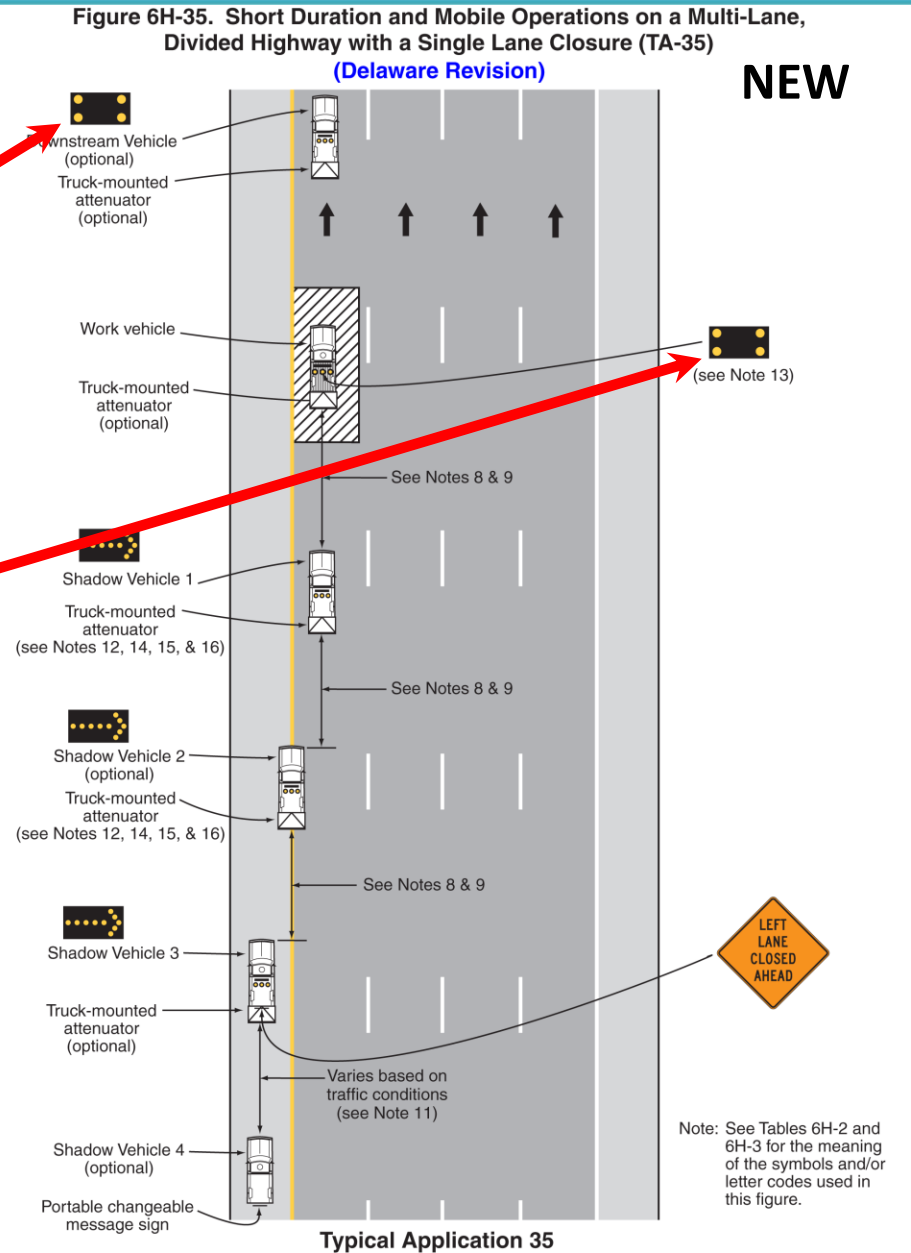


Typical Application 34

TA-35. Short Duration and Mobile Operations on a Multi-Lane, Divided Highway with a Single Lane Closure

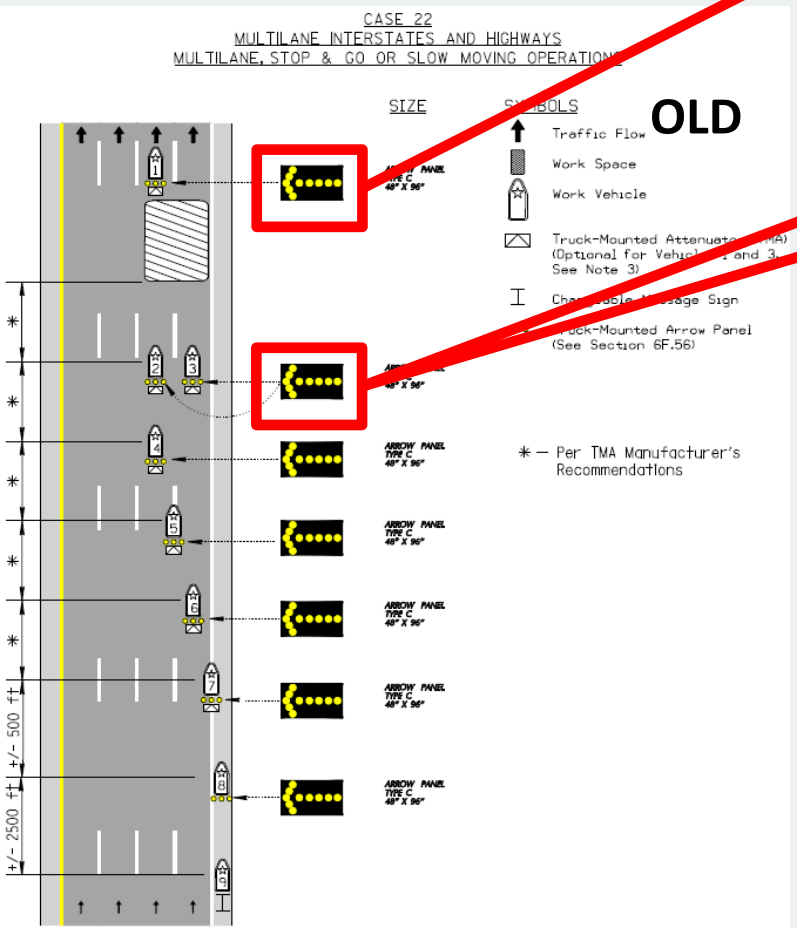
- Case 21 = TA-35
- Fewer shadow vehicles
- Corrected arrow boards

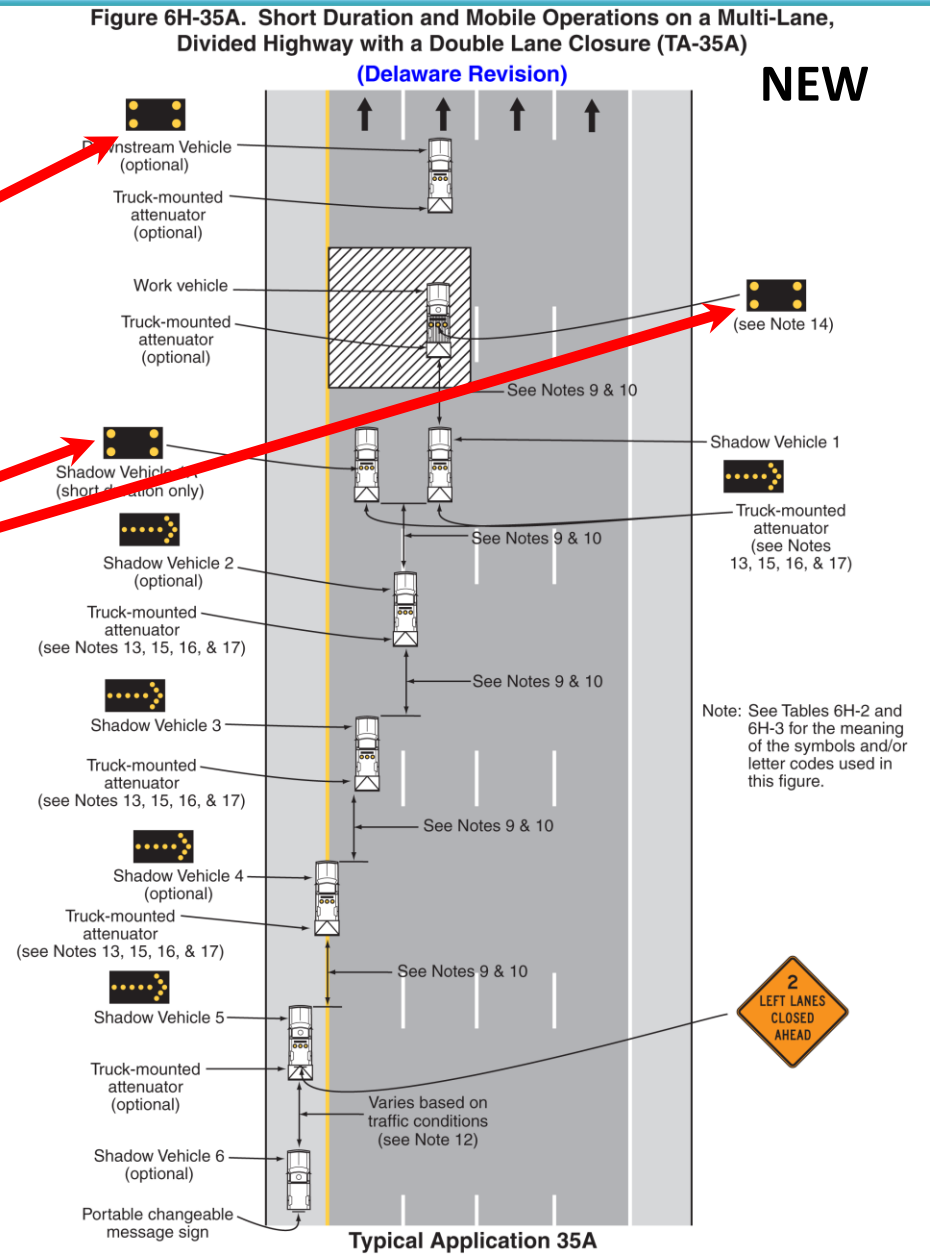




TA-35A. Short Duration and Mobile Operations on a Multi-Lane, Divided Highway with a Double Lane Closure

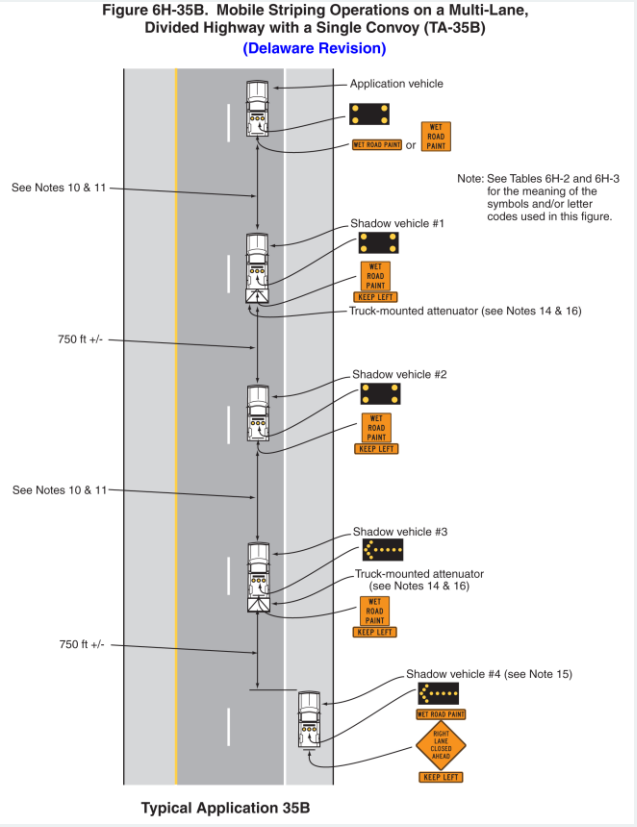
- Case 22 = TA-35A
- Fewer shadow vehicles
- Corrected arrow boards

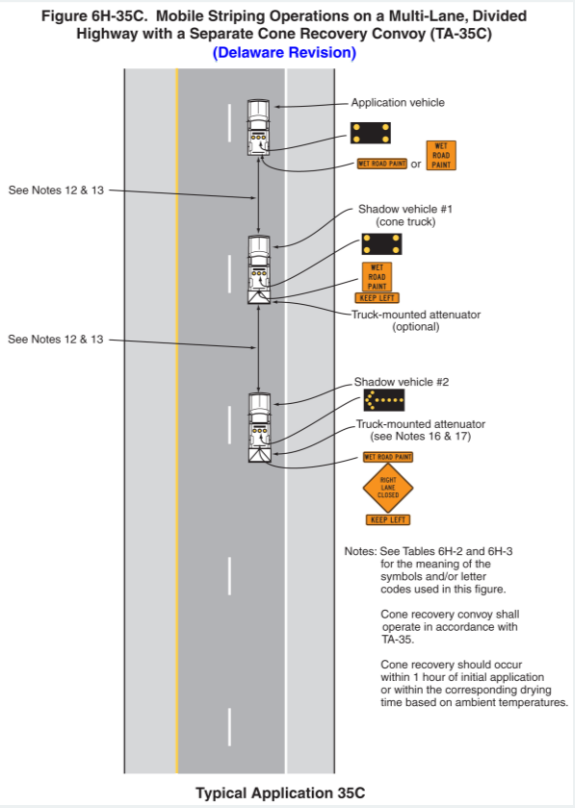


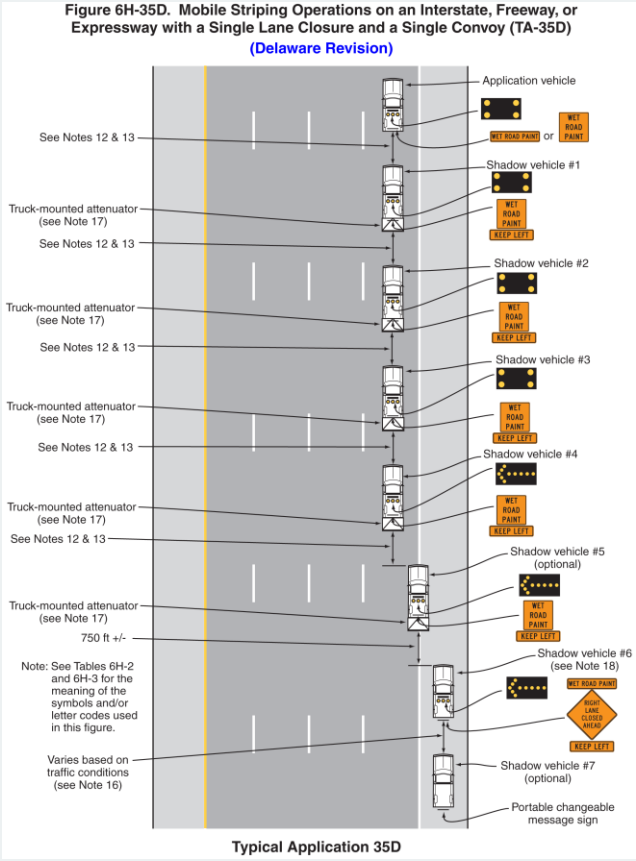


TA-35B – 35G Mobile Striping on a Multi-Lane Road

- Case 23-B = TA-35B & TA-35C (multi-lane, conventional roads)
- Case 23-C = TA-35D – TA-35G (interstates, freeways, & expressways)
- DE Option: 2 separate convoys – application and cone recovery
  - **TA-35 or TA-35A required for cone recovery convoy**





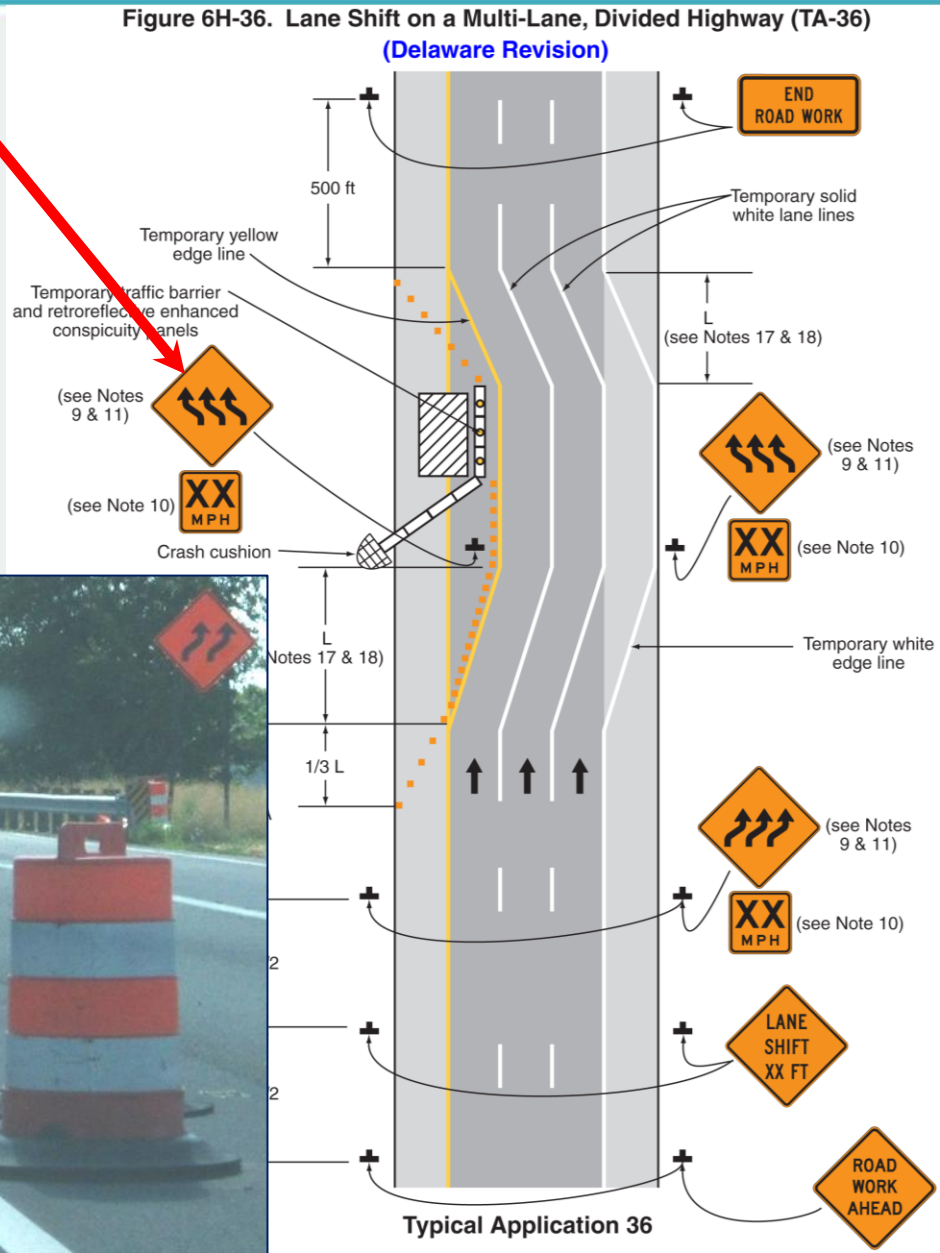


Work within traveled way of an interstate, freeway, or expressway

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way of an Interstate, Freeway, or Expressway (see Section 6G.14) – also applicable to other roadway types, as noted			
Lane Shift on a Multi-Lane, Divided Highway	-	TA-36	TA-36
Double Lane Closure on a Multi-Lane, Divided Highway	-	TA-37	TA-37
Interior Lane Closure on a Multi-Lane, Divided Highway	-	TA-37 or TA-38	TA-37 or TA-38
Median Crossover on a Multi-Lane, Divided Highway	-	TA-39	TA-39
Median Crossover for an Entrance Ramp	-	TA-40	TA-40
Median Crossover for an Exit Ramp	-	TA-41	TA-41
Work in the Vicinity of an Exit Ramp	-	TA-42	TA-42
Partial Exit Ramp Closure	-	TA-43	TA-43
Work in the Vicinity of an Entrance Ramp	-	TA-44	TA-44
Temporary Reversible Lane Using Movable Barriers	-	Not applicable in Delaware	Not applicable in Delaware

- **W1-4 sign depicts number of travel lanes**
- **10-ft (MIN.) shoulder lane**
- *Use W24-1 if tangent < 600 ft*
- DE Guidance:
  - *Shift taper = L*
  - *Illuminate shift area*

Interstate Bridge Maintenance, I-495



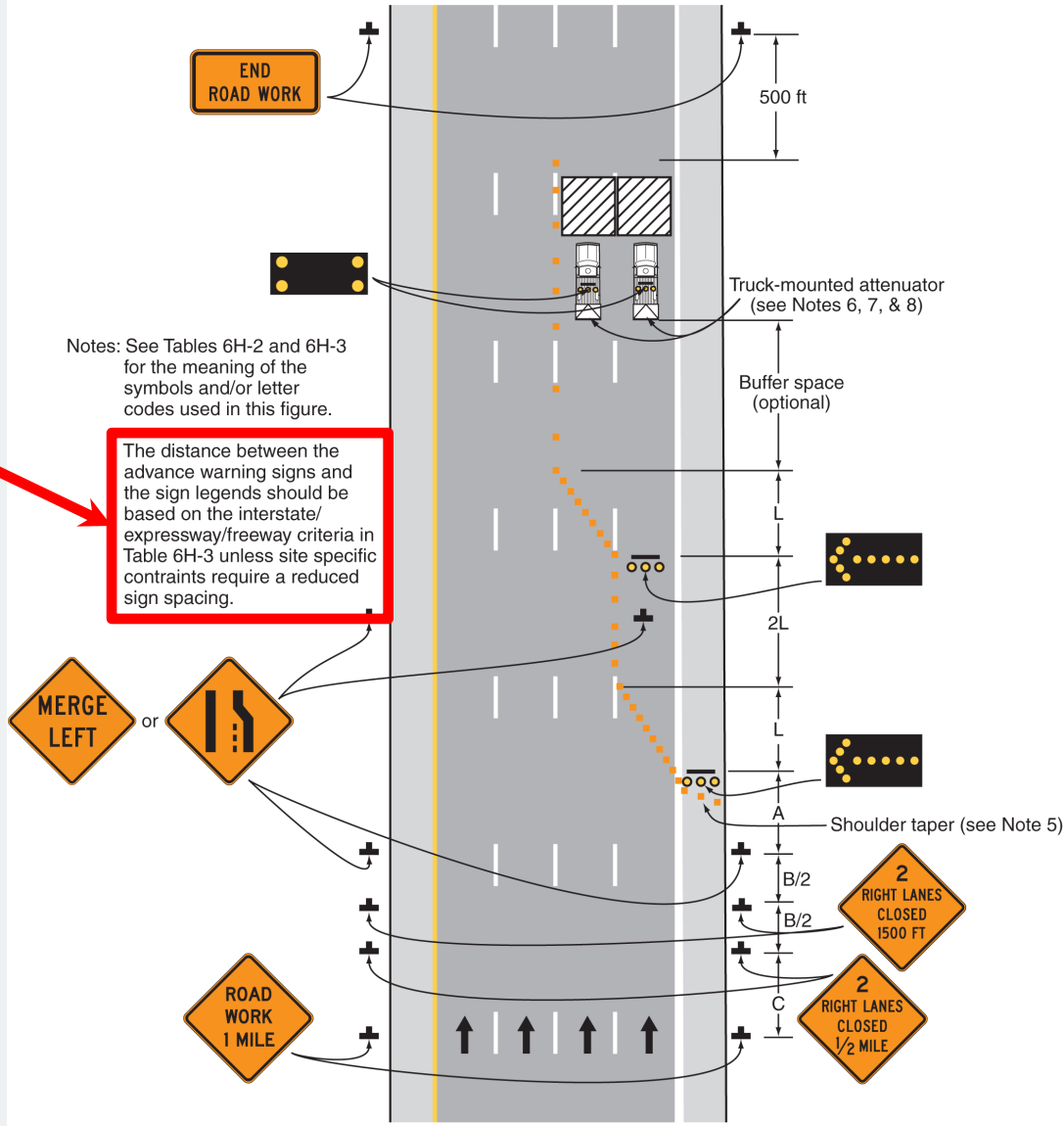
- Case 9 = TA-37
- **Separate arrow board for each closed lane**
- DE Guidance: *For all multi-lane roads, sign spacing follows I/F/E criteria in Table 6H-3*
- **New standard sign**

OLD

NEW

W20-5a

Figure 6H-37. Double Lane Closure on a Multi-Lane, Divided Highway (TA-37)
(Delaware Revision)



Typical Application 37

TA-37. Double Lane Closure on a Multi-Lane, Divided Highway

- Case 9 = TA-37
- Removed upstream Merge signs

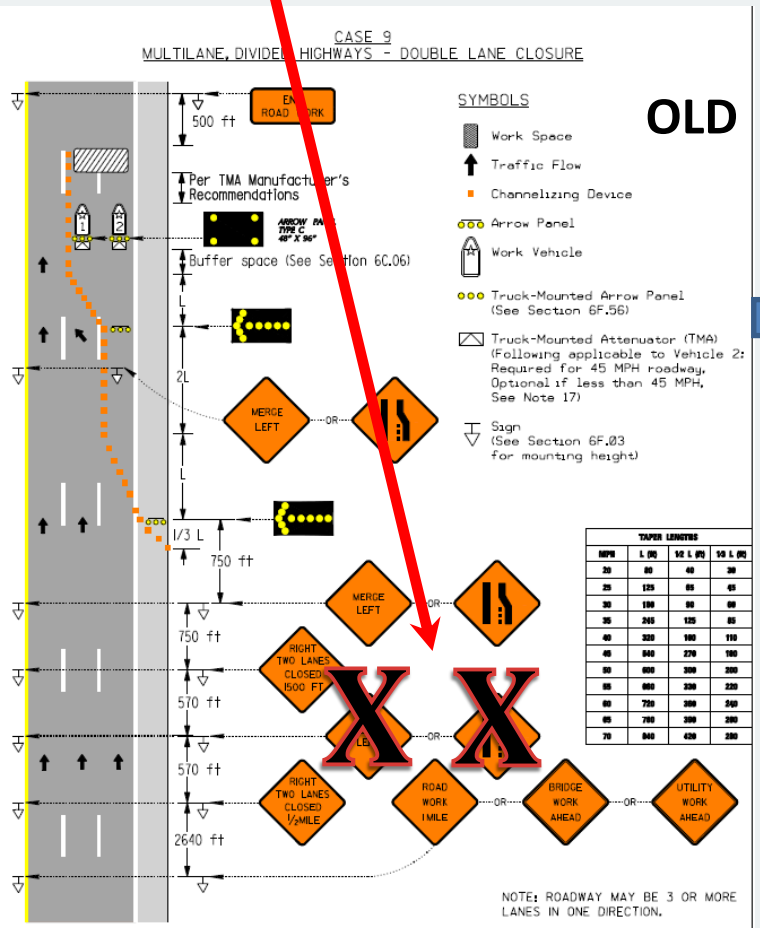
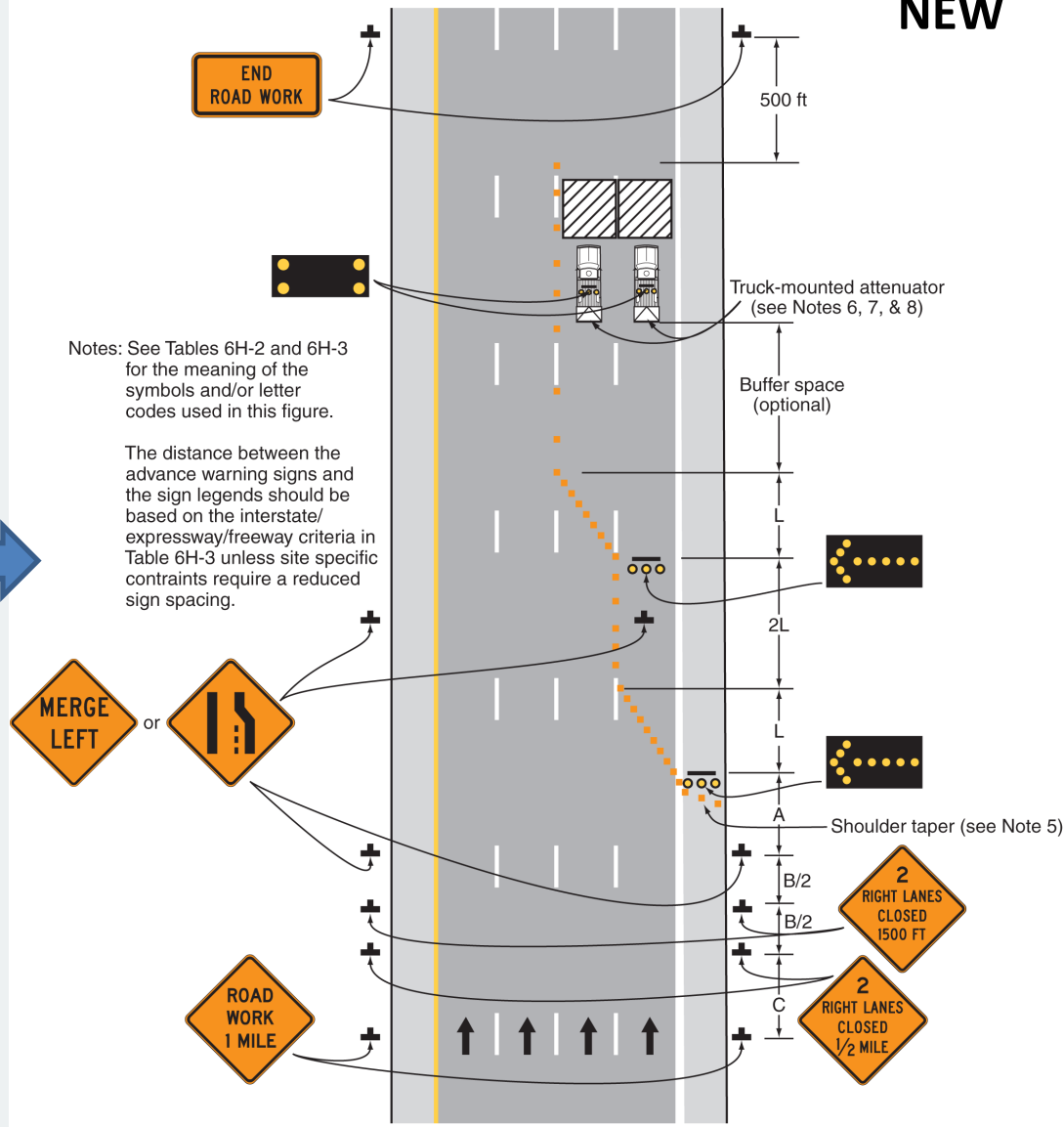


Figure 6H-37. Double Lane Closure on a Multi-Lane, Divided Highway (TA-37)

(Delaware Revision)

NEW

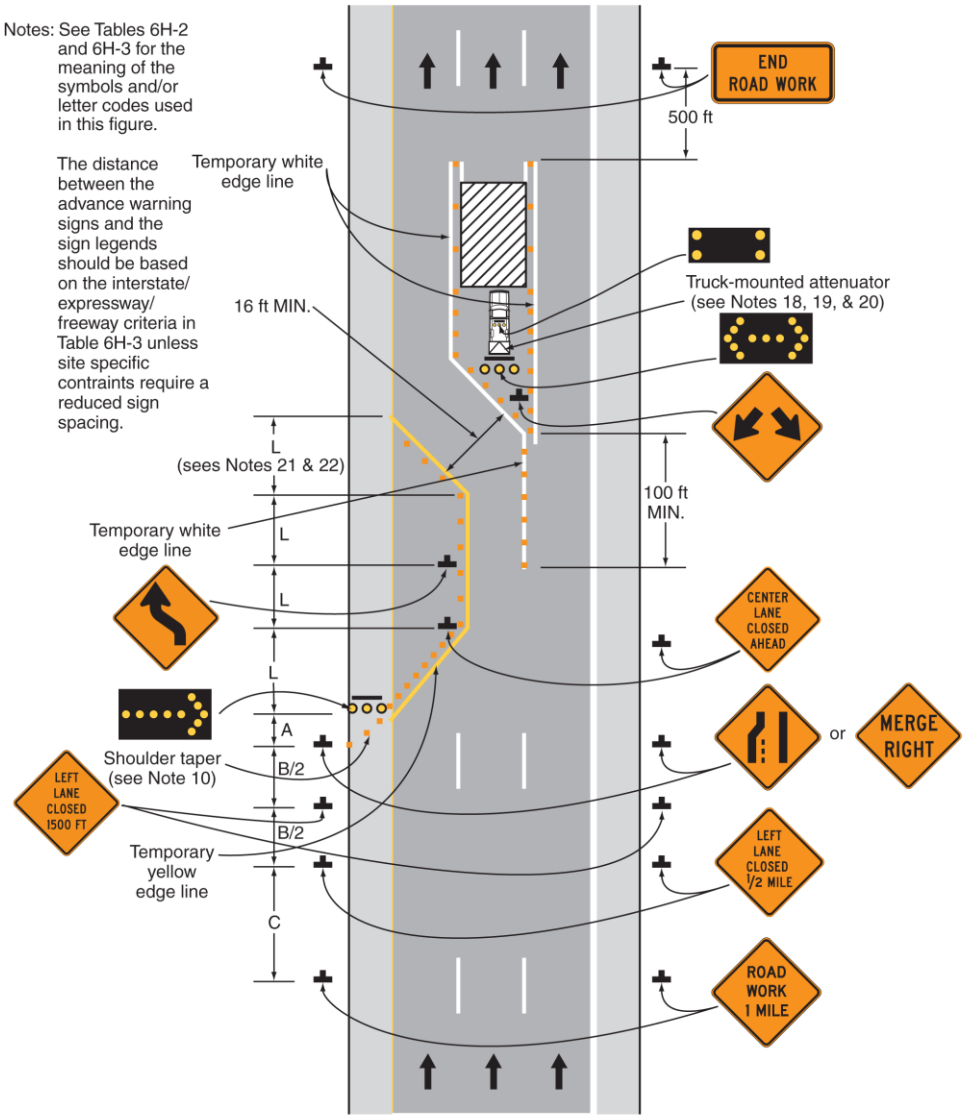


Typical Application 37

TA-38. Interior Lane Closure on a Multi-Lane, Divided Highway

- Case 8 = TA-38
- DE Guidance: *TA is <u>strongly discouraged</u>*
  - *Worker safety concerns*
  - *Driver expectancy issues*
  - *Consider double lane closure (TA-37) prior to implementation*
  - *Approval based primarily on detailed work zone impact analysis*

Figure 6H-38. Interior Lane Closure on a Multi-Lane, Divided Highway (TA-38)
(Delaware Revision)

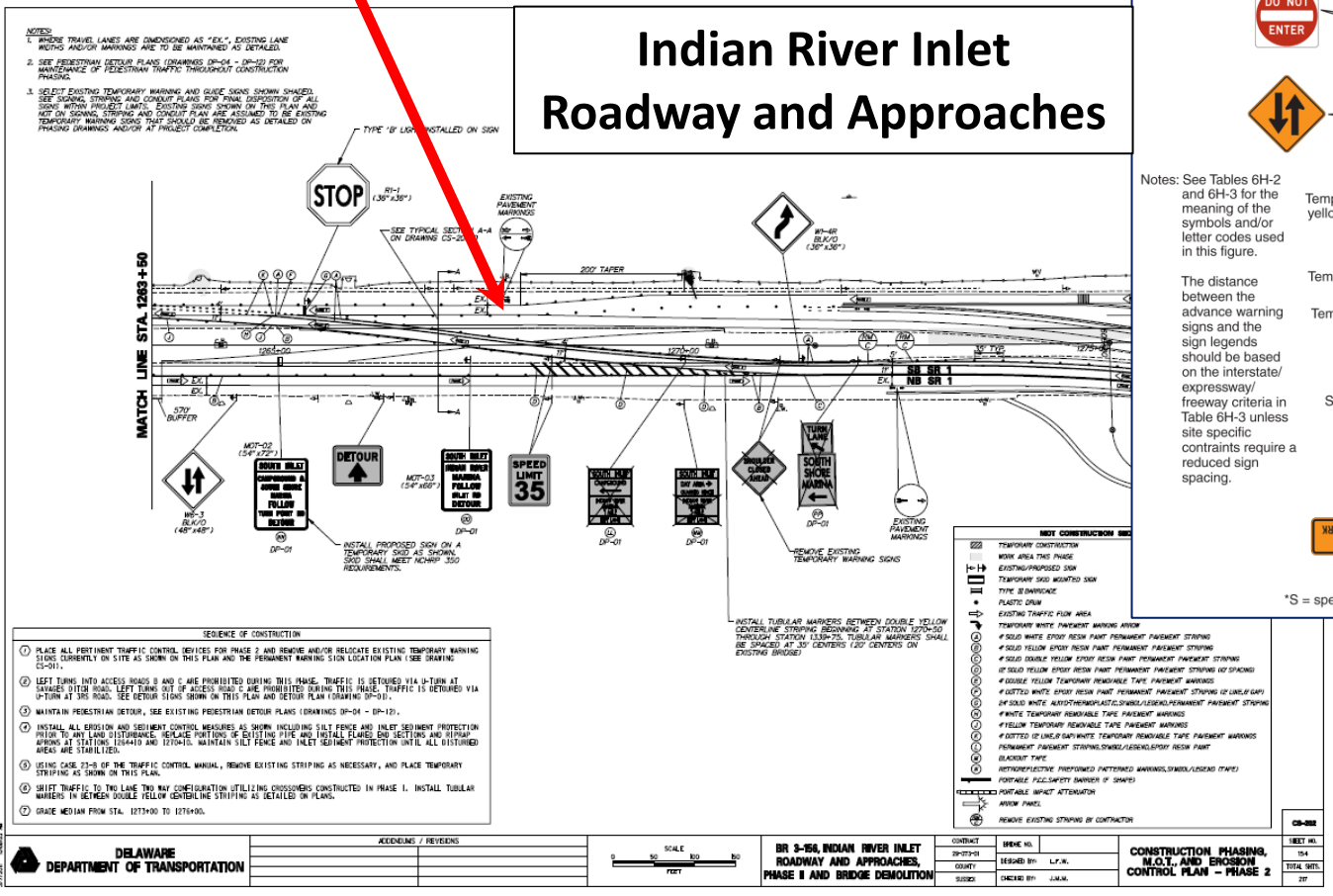


Typical Application 38

TA-39, TA-40, & TA-41 Median Crossovers

- Case 12 = TA-39
- Generally require full design plans (per AASHTO) for specific locations

Indian River Inlet Roadway and Approaches



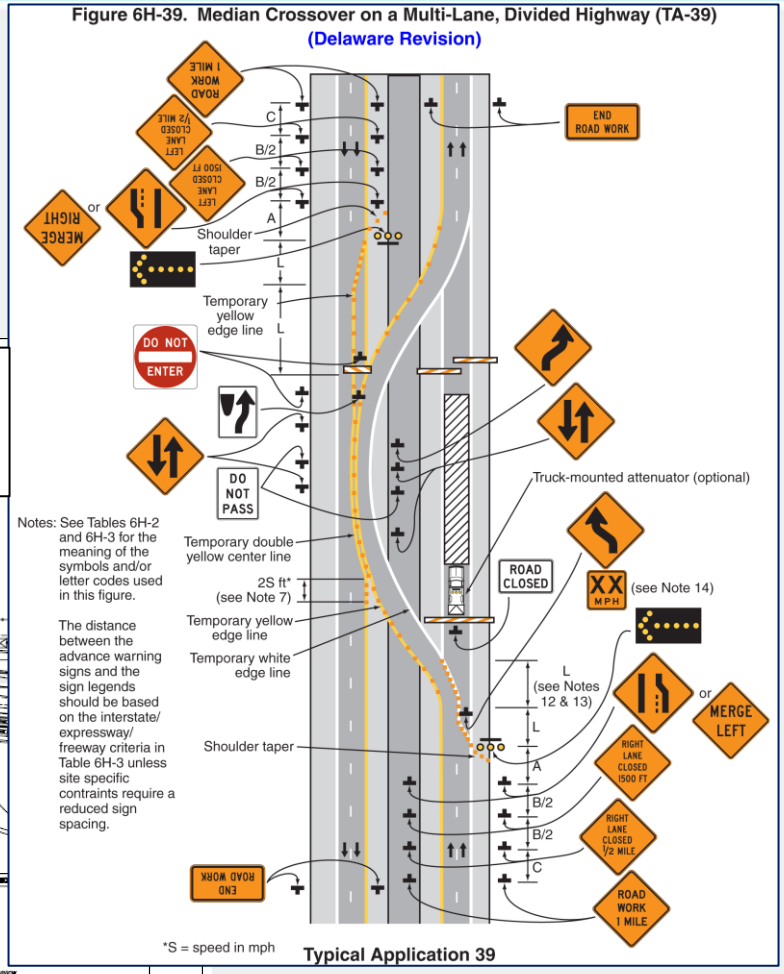
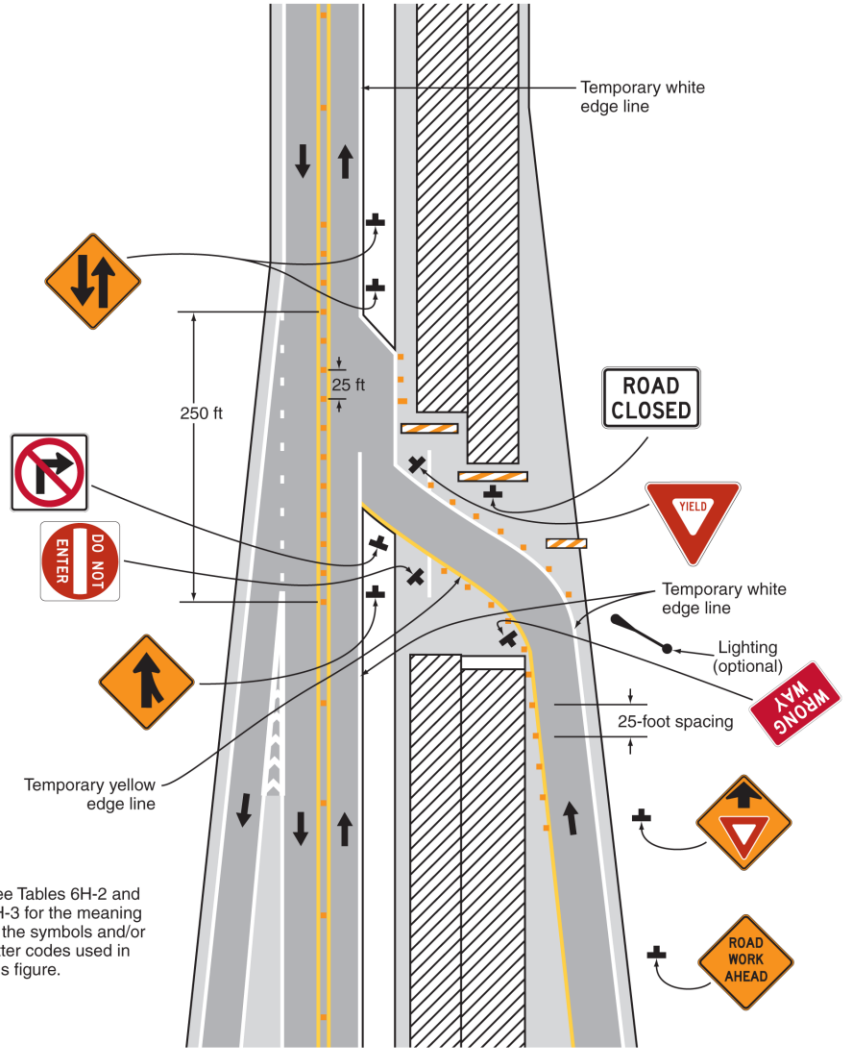


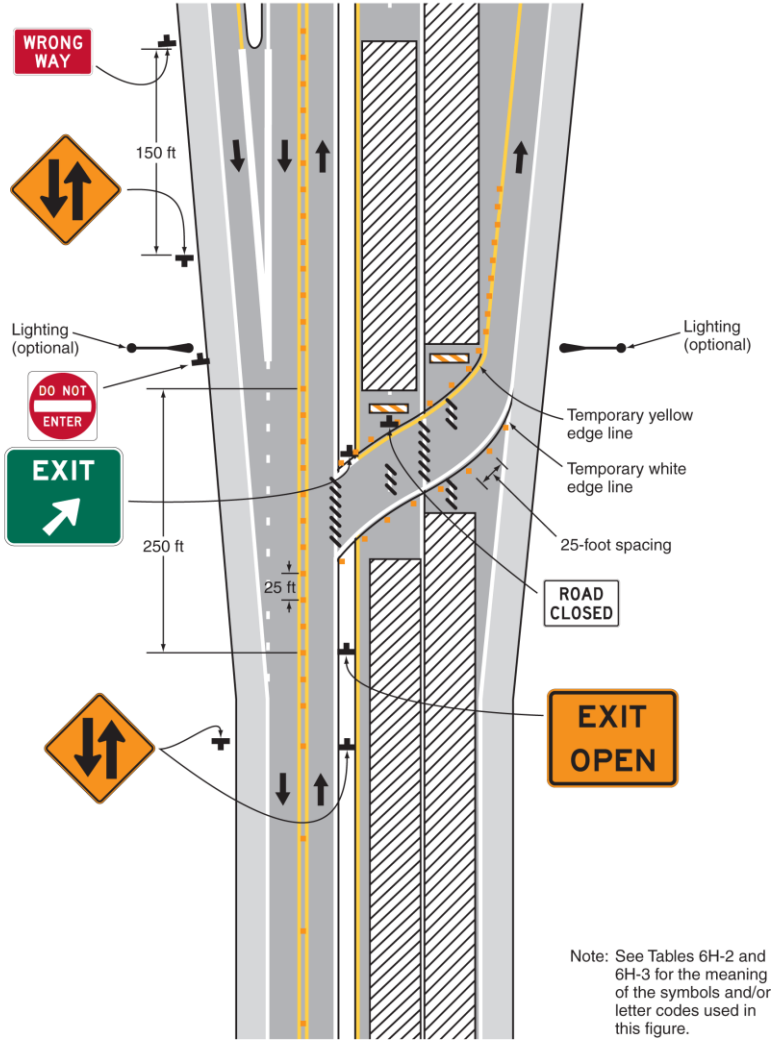
Figure 6H-40. Median Crossover for an Entrance Ramp on a Multi-Lane, Divided Highway (TA-40)
(Delaware Revision)



Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 40

Figure 6H-41. Median Crossover for an Exit Ramp on a Multi-Lane, Divided Highway (TA-41)
(Delaware Revision)



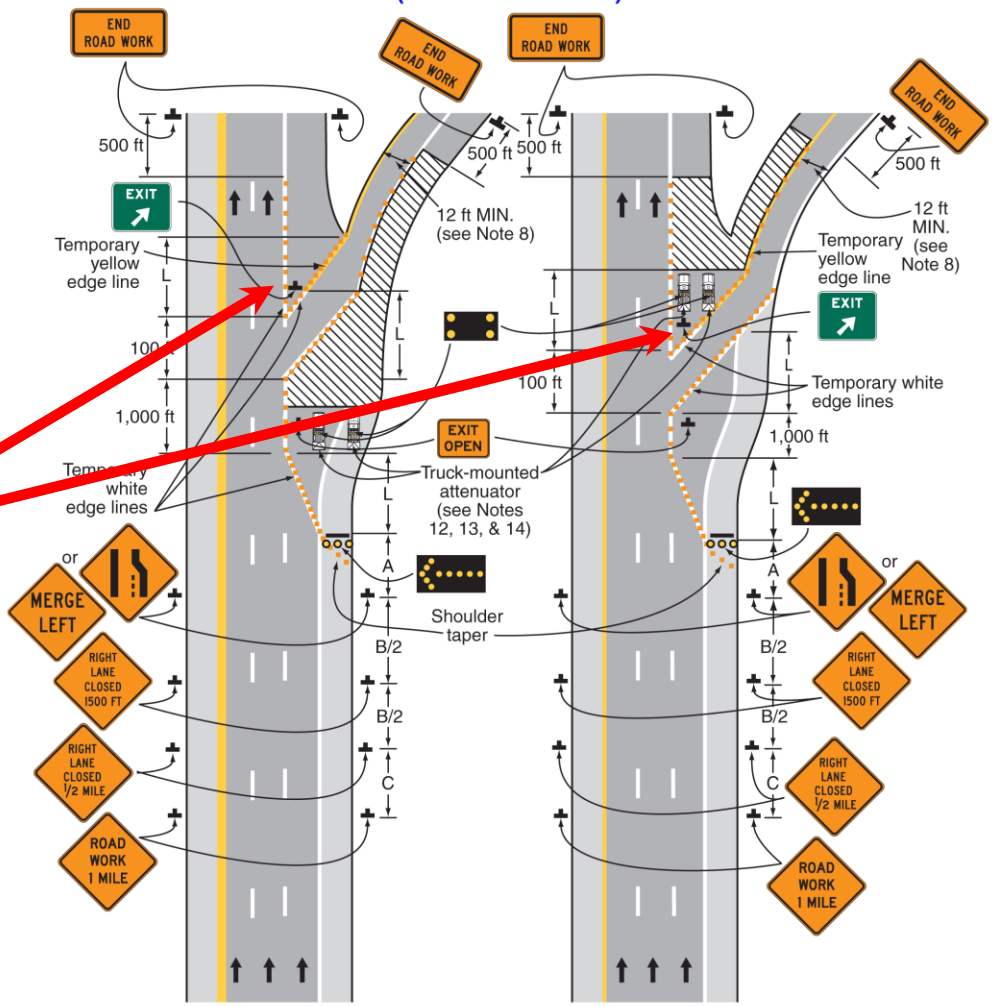
Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 41

TA-42. Work in the Vicinity of an Exit Ramp on a Multi-Lane, Divided Highway

- Case 14 = TA-42
- Lane closure(s) (TA-33 or TA-37) upstream of exit ramp
- **EXIT sign located in temporary gore**
- *Truck off-tracking should be considered*
- DE Option: Close ramp if traffic conditions permit

Figure 6H-42. Work in the Vicinity of an Exit Ramp on a Multi-Lane, Divided Highway (TA-42)
(Delaware Revision)



Typical Application 42

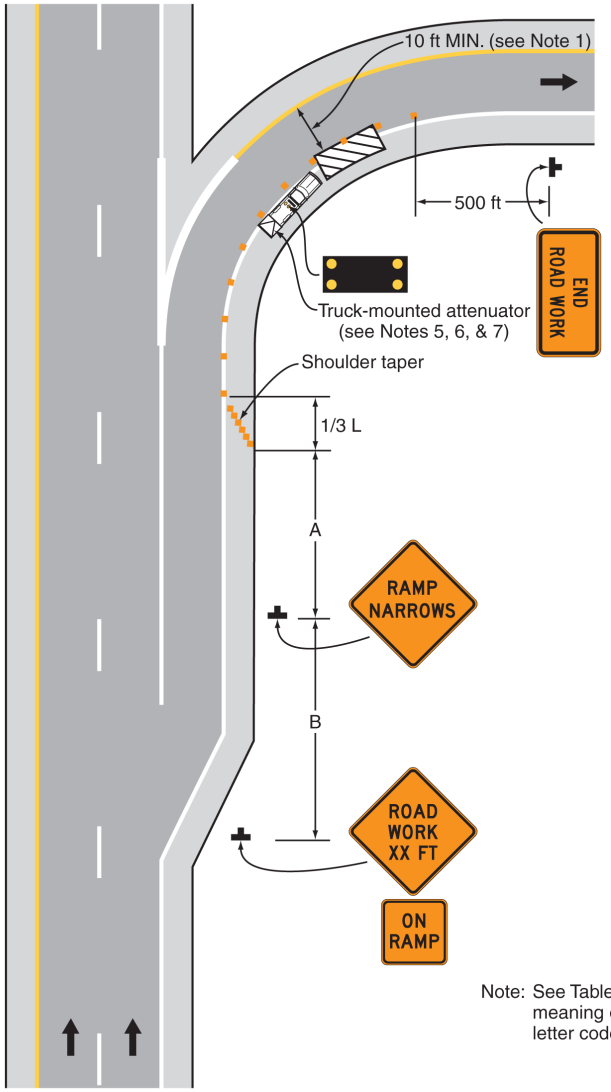
Notes: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

The distance between the advance warning signs and the sign legends should be based on the interstate/expressway/freeway criteria in Table 6H-3 unless site specific contraints require a reduced sign spacing.

TA-43. Partial Exit Ramp Closure

- *Truck off-tracking should be considered*
- DE Option: Close ramp if traffic conditions permit

Figure 6H-43. Partial Exit Ramp Closure (TA-43)
(Delaware Revision)



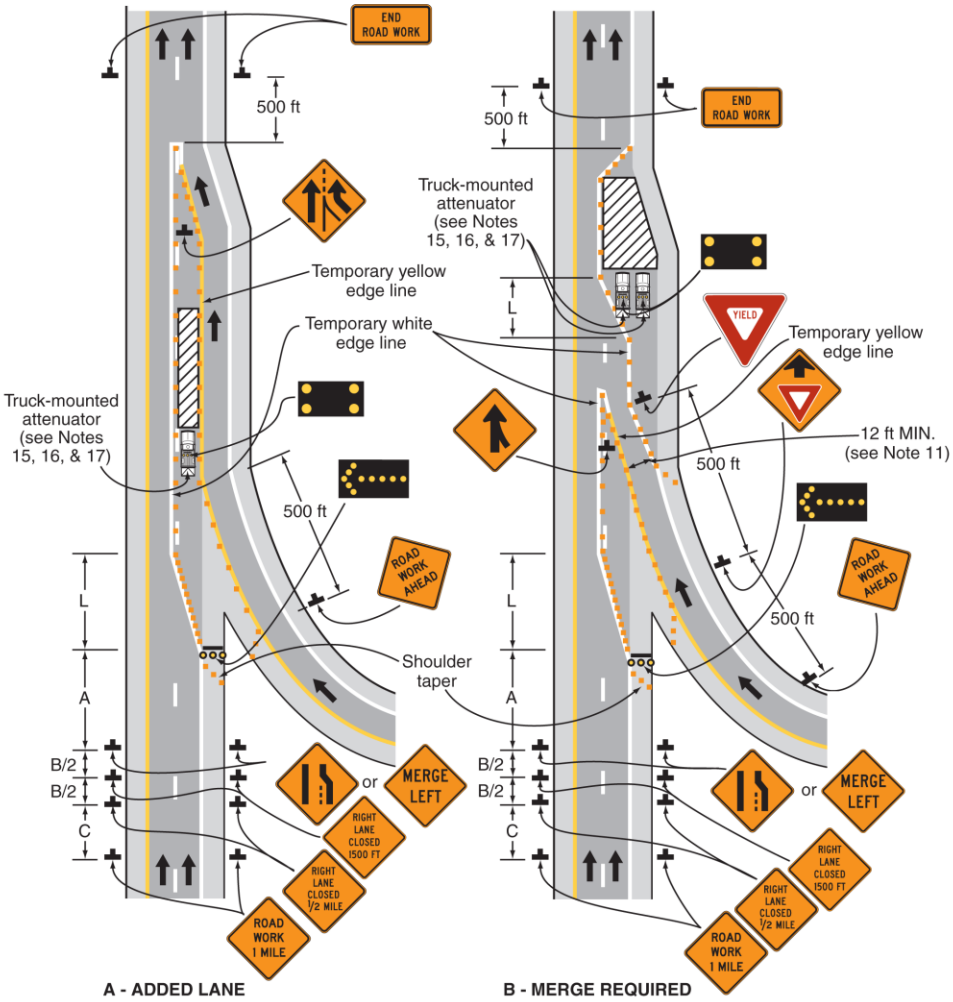
Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 43

TA-44. Work in the Vicinity of an Entrance Ramp on a Multi-Lane, Divided Highway

- Case 13 = TA-44
- Lane closure(s) (TA-33 or TA-37) upstream of exit ramp
- Two options
  - Lane addition
  - Merge condition
- DE Guidance: *AASHTO criteria used for acceleration lane (right figure)*
- *Truck off-tracking should be considered*
- DE Option: Close ramp if traffic conditions permit

Figure 6H-44. Work in the Vicinity of an Entrance Ramp on a Multi-Lane, Divided Highway (TA-44)
(Delaware Revision)



Typical Application 44

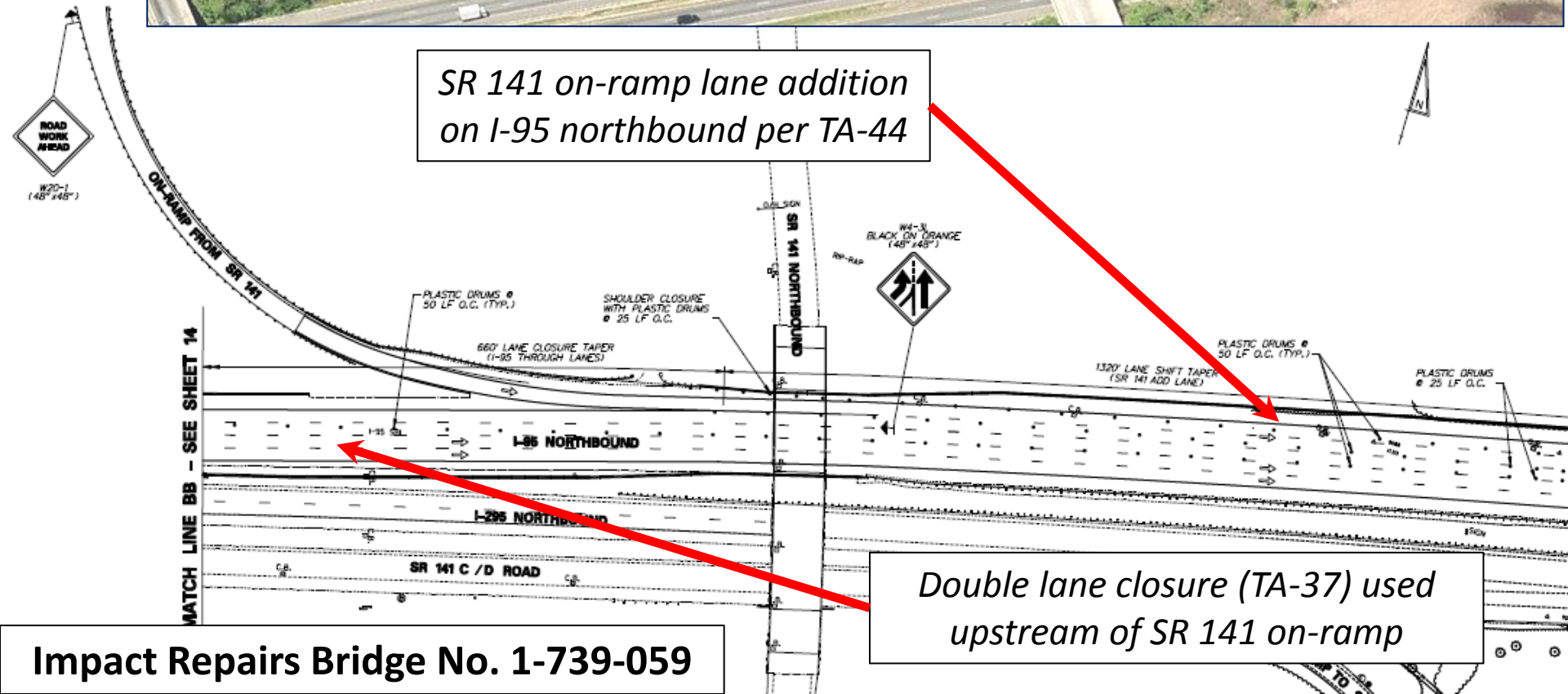
Notes: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

The distance between the advance warning signs and the sign legends should be based on the interstate/expressway/freeway criteria in Table 6H-3 unless site specific contraints require a reduced sign spacing.

TA-44. Work in the Vicinity of an Entrance Ramp on a Multi-Lane, Divided Highway

SR 141 on-ramp to northbound I-95

SR 141 on-ramp lane addition on I-95 northbound per TA-44



Double lane closure (TA-37) used upstream of SR 141 on-ramp

Impact Repairs Bridge No. 1-739-059

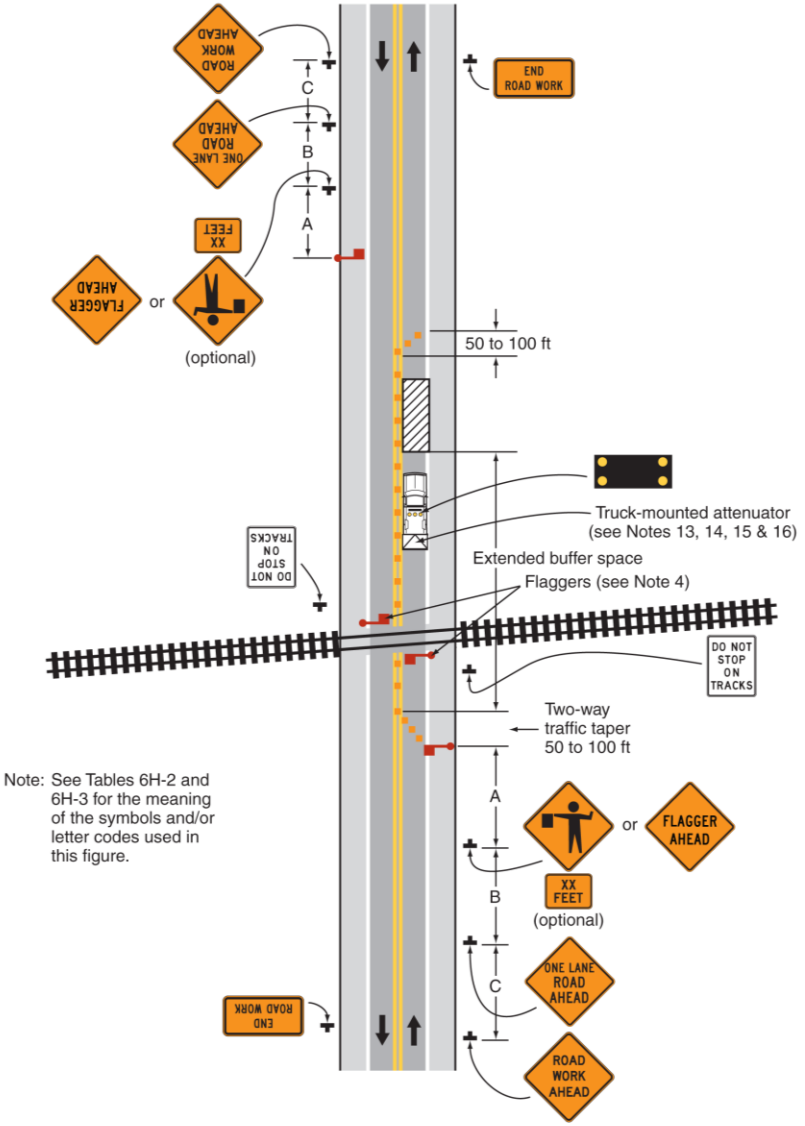
Work in the vicinity of a grade crossing

Typical Application Description	Typical Application Number		
	Two-Lane Conventional Road	Multi-Lane Conventional Road	Interstate, Freeway, or Expressway
Work Within the Traveled Way of an Interstate, Freeway, or Expressway (see Section 6G.14) – also applicable to other roadway types, as noted			
Lane Shift on a Multi-Lane, Divided Highway	-	TA-36	TA-36
Double Lane Closure on a Multi-Lane, Divided Highway	-	TA-37	TA-37
Interior Lane Closure on a Multi-Lane, Divided Highway	-	TA-37 or TA-38	TA-37 or TA-38
Median Crossover on a Multi-Lane, Divided Highway	-	TA-39	TA-39
Median Crossover for an Entrance Ramp	-	TA-40	TA-40
Median Crossover for an Exit Ramp	-	TA-41	TA-41
Work in the Vicinity of an Exit Ramp	-	TA-42	TA-42
Partial Exit Ramp Closure	-	TA-43	TA-43
Work in the Vicinity of an Entrance Ramp	-	TA-44	TA-44
~~Temporary Reversible Lane Using Movable Barriers~~	-	~~Not applicable in Delaware~~	~~Not applicable in Delaware~~
Work in the Vicinity of a Grade Crossing (see Section 6G.18)			
Work in the Vicinity of a Grade Crossing	TA-46	TA-33	-

TA-46. Work in the Vicinity of a Grade Crossing

- Case 17-A = TA-46
- DE Guidance: *TA-33 on multi-lane roads (former Case 17-B)*
- DE Guidance: *50-ft "influence area" on both sides of grade crossing*
- *Begin TTC zone upstream of crossing to reduce potential for queuing problems*
- **Provide law enforcement or flagger at crossing when queues extend across crossing**
- DE Standard: **TMA roll-ahead buffer space shall not extend across crossing**

Figure 6H-46. Work in the Vicinity of a Grade Crossing (TA-46)
(Delaware Revision)



Typical Application 46

04 Traffic incidents can be divided into three general classes of duration, each of which has unique traffic control characteristics and needs. These classes are:

A. Major—expected duration of more than 2 hours,
B. Intermediate—expected duration of 30 minutes to 2 hours, and
C. Minor—expected duration under 30 minutes.

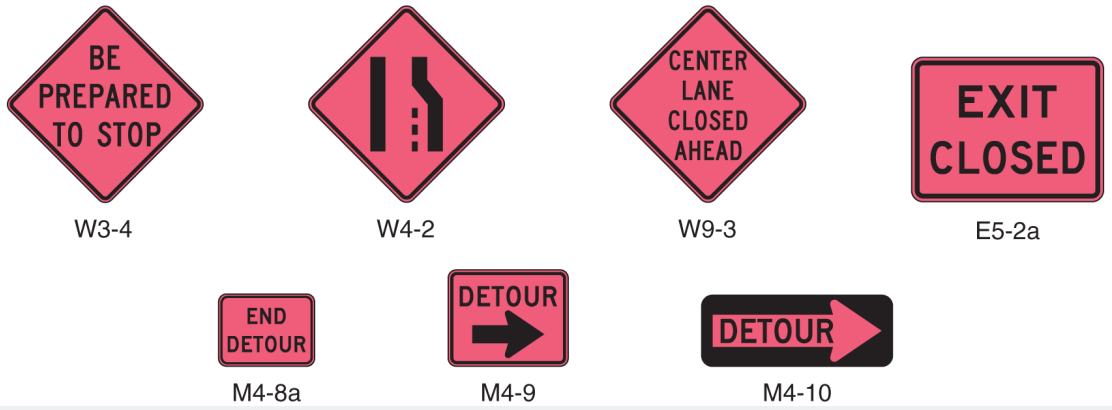
- 3 general classes of incidents
  - Major: > 2 hrs
  - Intermediate: 30 min – 2 hrs
  - Minor: < 30 min

Option:

10 Warning and guide signs used for TTC traffic incident management situations may have a black legend and border on a fluorescent pink background (see Figure 6I-1).

- Optional black-on-fluorescent pink warning and guide signs

Figure 6I-1. Examples of Traffic Incident Management Area Signs



Section 6I.02 Major Traffic Incidents

Support:

01 Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding 2 hours.

Guidance:

02 *If the traffic incident is anticipated to last more than 24 hours, applicable procedures and devices set forth in other Chapters of Part 6 should be used.*

07 *All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for all major traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage early diversion to an appropriate alternative route.*

08 *Attention should be paid to the upstream end of the traffic queue such that warning is given to road users approaching the back of the queue.*

- Partial or full road closure > 2 hrs
- *TTC complying with Chapters 6A – 6H for incidents lasting > 24 hrs*
- *TTC including diversions, tapered lane closures, and upstream warning devices*
- *Warning devices at back of queue*

I-95 Newark Toll Plaza
Highway Speed E-ZPass Lanes

Section 6I.03 Intermediate Traffic Incidents

Support:

01 Intermediate traffic incidents typically affect travel lanes for a time period of 30 minutes to 2 hours, and usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish their tasks.

Guidance:

03 *All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for intermediate traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage early diversion to an appropriate alternative route.*

04 *Attention should be paid to the upstream end of the traffic queue such that warning is given to road users approaching the back of the queue.*

- Lane closures 30 min to 2 hrs
- Intermittent road closure to clear incident
- *TTC including diversions, tapered lane closures, and upstream warning devices*
- *Warning devices at back of queue*

Support:

01 Minor traffic incidents are typically disabled vehicles and minor crashes that result in lane closures of less than 30 minutes. On-scene responders are typically law enforcement and towing companies, and occasionally highway agency service patrol vehicles.

02 Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally possible or practical to set up a lane closure with traffic control devices for a minor traffic incident. Traffic control is the responsibility of on-scene responders.

Guidance:

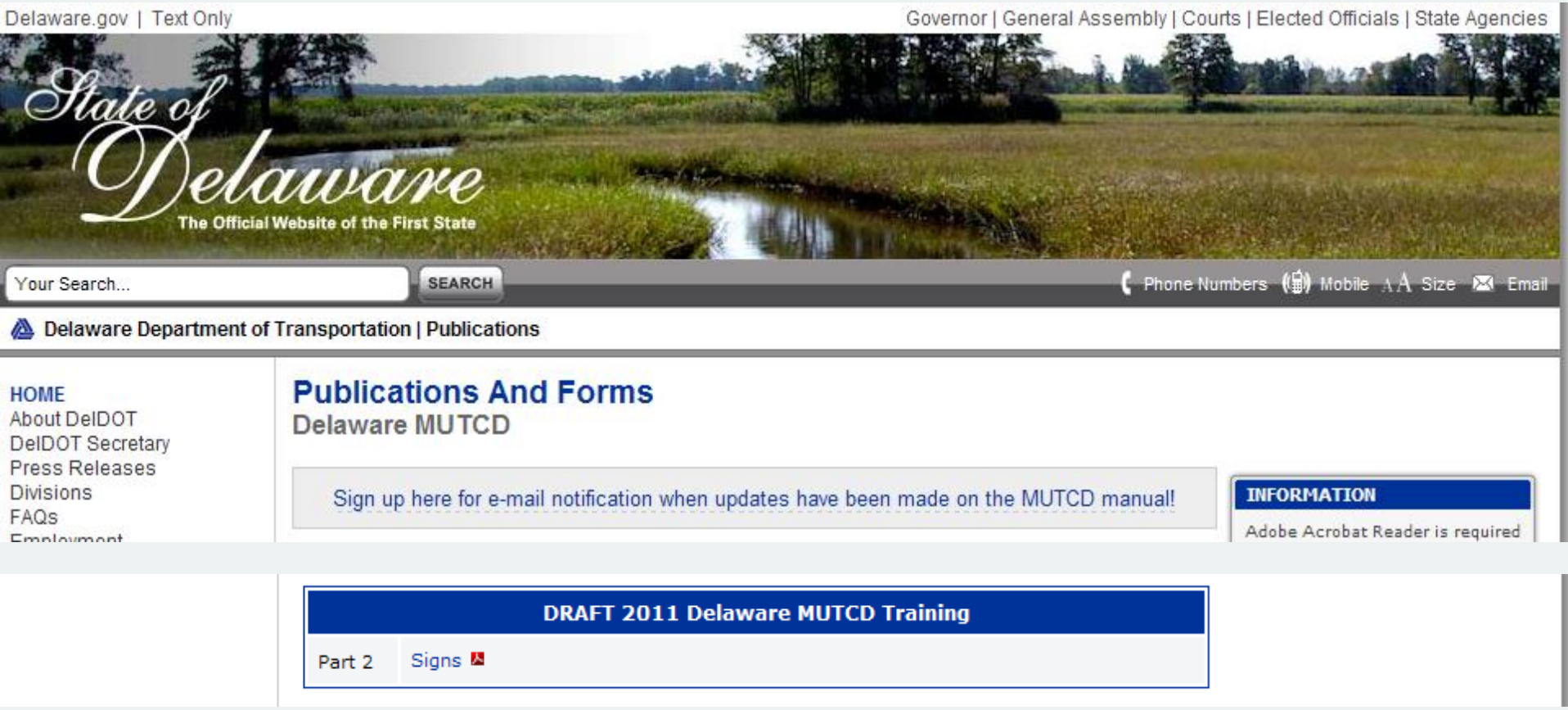
03 *When a minor traffic incident blocks a travel lane, it should be removed from that lane to the shoulder as quickly as possible.*

- Disabled vehicles and minor crashes
- Lane closures < 30 min
- Responders include law enforcement, tow companies, and highway patrol vehicles (e.g., DelDOT MAP)
- Generally impractical to install TTC devices

SR 1, SR 24 to north of US 9 (Third Lane)

Today's presentation will be posted on DelDOT's DE MUTCD website

http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml



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Future DE MUTCD Training

- April 12th – Part 3 (Markings)
- May 16th – Parts 4 & 7 (Traffic Signals & School Areas)
- June 15th – Parts 8 & 9 (Railroads & Bicycle Facilities)
- T2 course registration

  http://www.ce.udel.edu/dct/T2Courses.html