

# Virginia Work Area Protection Manual

*Standards and Guidelines  
for Temporary Traffic Control*

**2011 Edition**  
REVISION 2.1: November 1, 2020





**Standard:**

- 18 **All non-retroreflective signs, including mesh signs, are not allowed and shall not be used due to fading, sunlight shining through, and lack of visibility during hours of darkness.**
- 19 **All signs used day or night, shall be retroreflective with a material that has a smooth, sealed outer surface.**
- 20 **Sign substrates for signs mounted on plastic drums, Type 3 Barricades, and portable sign stands shall be in compliance with Section 512 of the Road and Bridge Specifications. The sign substrate shall be the same material that was used when the device was tested and found to be in compliance with NCHRP Report 350, Test Level 3 or MASH requirements.**
- 21 **Rollup signs shall only be used on temporary sign supports and shall not be post-mounted.**
- 22 **Post-mounted signs shall use a rigid substrate material<sup>2</sup> and shall be in compliance with Sections 512 and 701 of the Road and Bridge Specifications.**

**Section 6F.03 Sign Placement***Guidance:*

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

**Standard:**

- 02 **On roadways having a median wider than 8 feet, right and left sign assemblies shall be required.**
- 03 **For the purpose of temporary sign installation, the median barrier is considered to be part of the shoulder and its measurement shall be used to determine the total width of the shoulder.**

Option:

- 04 Smaller sign sizes may be used in the median when the median width is between 6.5 feet and 8 feet to provide left sign assemblies on a multilane roadway.

*Guidance:*

- 05 *Portable barrier mounted sign stands should be considered for use on median barrier to meet the requirements for double indicating signs.*

**Support:**

- 06 The provisions of this Section regarding mounting height apply unless otherwise provided for a particular sign elsewhere in this Manual.
- 07 Guidelines for height and lateral clearance of temporary ground-mounted signs are shown in Figure 6F-1

**Standard:**

- 08 **The height of ground-mounted signs, measured vertically from the bottom of the sign to the elevation of the near edge of the pavement shall be a minimum of 7 feet and a maximum of 8 feet<sup>1</sup> (see Figure 6F-1).**
- 09 **The minimum height of ground-mounted signs, 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 and/or bicycle or pedestrian movements are likely to occur, or where the view of the sign might be obstructed, shall be a minimum of 7 feet and a maximum of 8 feet<sup>1</sup> (see Figure 6F-1).**
- 10 **The height of ground-mounted signs, measured vertically from the bottom of the sign to the sidewalk, shall be a minimum of 7 feet and a maximum of 8 feet<sup>1</sup>.**
- 11 **Ground-mounted sign panels shall be securely fastened to posts or supports and erected plumb and maintained in plumb condition.**

Option:

- 12 The height to the bottom of a secondary sign mounted below another sign may be 1 foot less than the height provided in Paragraphs 6 through 10.

*Guidance:*

- 13 *Neither portable nor permanent sign supports should be located on sidewalks, bicycle facilities, or areas designated for pedestrian or bicycle traffic. If the bottom of a secondary sign that is mounted below another sign is mounted, lower than 7 feet above a pedestrian sidewalk or pathway (see Section 6D.02) the secondary sign should not project more than 4 inches into the pedestrian facility.*

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 1 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
Stop	R1-1	6F.06	48 x 48	36 x 36	36 x 36
Stop (On Stop/Slow Paddle)	R1-1	6E.03	24 x 24	24 x 24	24 x 24
Stop (AFAD)	R1-1	6E.04	36 x 36	36 x 36	36 x 36
Yield	R1-2	6F.06	48 x 48 x 48	36 x 36 x 36*	36 x 36 x 36*
To Oncoming Traffic (Plaque)	R1-2aP	6F.06	48 x 36	36 x 30	36 x 30
Yield Here To Pedestrians	R1-5L, 5R	6F.08	36 x 36	30 x 30	30 x 30
In-Street (Yield) Pedestrian Crossing <sup>2</sup>	R1-6b	6F-08 TTC-36	12 x 36	12 x 36	12 x 36
Wait on Stop (AFAD)	R1-7	6E.04	24 x 30	24 x 30	24 x 30
Go on Slow (AFAD)	R1-8	6E.04	24 x 30	24 x 30	24 x 30
Proceed When Way Is Clear <sup>1</sup>	R1-V1	6F.19	48 x 18	48 x 18	48 x 18
Speed Limit	R2-1	6F.05	48 x 60	36 x 48	36 x 48
Fines Higher (Plaque)	R2-6P	6F.15	48 x 36	36 x 24	36 x 24
End Work Zone Speed Limit	R2-12	6F.15	48 x 60	36 x 54 <sup>1</sup>	24 x 30 <sup>1</sup>
Work Zone \$500 Max. Fine For Exceeding Speed Limit When Flashing <sup>1</sup>	R2-V1	6F.14	108 x 54	66 x 42	66 x 42
Movement Prohibition	R3-1,2,3,4,18,27	6F.05	48 x 48	36 x 36	36 x 36
Right Lane Must Exit	R3-33		78 X 36		
Mandatory Movement (1 lane)	R3-5L, 5R	6F.05	30 x 36	30 x 36	30 x 36
Optional Movement (1 lane)	R3-6L, 6R	6F.05	30 x 36	30 x 36	30 x 36
Mandatory Movement (text)	R3-7L, 7R	6F.05	30 x 30	30 x 30	30 x 30
Advance Intersection Lane Control	R3-8	6F.05	Var. x 30	Var. x 30	Var. x 30
Begin Right Turn Lane w/ Arrow <sup>1</sup>	R3-20L, R3-20R	6F.18 <sup>2</sup> TTC-26 TTC-27	24 x 36	24 x 36	24 x 36
Do Not Pass	R4-1	6F.13	48 x 60	36 x 48	36 x 48
Pass With Care	R4-2	6F.05	48 x 60	36 x 48	36 x 48
Trucks Use Right Lane	R4-5	6F.05	48 x 60	36 x 48	36 x 48
Keep Right	R4-7, 7a, 7b	6F.05	48 x 60	36 x 48	36 x 48
Narrow Keep Right	R4-7c	6F.05	18 x 30	18 x 30	18 x 30
Stay in Lane	R4-9	6F.13	48 x 60	36 x 48	36 x 48
Bike (Symbol) May Use Full Lane <sup>2</sup>	R4-11	WZPBG	30 X 30	30 X 30	30 X 30
Do Not Drive On Shoulder	R4-17		48 x 60	36 x 48	36 x 48
Lane Closed Do Not Pass (Vehicle-Mounted Sign)	R4-V6	6F.36	84 x 36	84 x 36	84 x 36
Keep Left (Right)	R4-V7L, V7R	6F.31	48 x 48	36 x 36	36 x 36
Do Not Enter	R5-1	6F.06	48 x 48	36 x 36	36 x 36
Wrong Way	R5-1a	6F.06	42 x 30	36 x 24	36 x 24
Restricted Width Route	R5-V1	6F.12	108 x 60	66 x 36	42 x 30
One Way	R6-1L, 1R	6F.05	54 x 18	36 x 12	36 x 12
One Way	R6-2R, 2L	6F.05	48 x 60	36 x 48	24 x 30
No Parking (Symbol)	R8-3a	6F.05	48 x 48	36 x 36	24 x 24
Do Not Stop On Tracks	R8-8	TTC-56	48 x 60	36 x 48	36 x 48
Pedestrian Crosswalk	R9-8	6F.16	36 x 18	36 x 18	36 x 18
Sidewalk Closed	R9-9	6F.17	30 x 18	30 x 18	30 x 18

\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric condition prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 2 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
Sidewalk Closed, Use Other Side	R9-10	6F.17	48 x 24	48 x 24	48 x 48
Sidewalk Closed Ahead, Cross Here	R9-11L, 11R	6F.17	48 x 36	48 x 36	48 x 24
Sidewalk Closed, Cross Here	R9-11aL, 11aR	6F.17	48 x 24	48 x 24	48 x 24
Stop Here On Red with Arrow	R10-6	6E.06	24 x 36	24 x 36	60 x 30
Turning Vehicles Yield to Pedestrians <sup>1</sup>	R10-15L, 15R	6F.08	30 x 30	30 x 30	48 x 24
Road Closed	R11-2	6F.09	48 x 30	48 x 30	48 x 30
Road Closed - Local Traffic Only	R11-3a,3b	6F.09	60 x 30	60 x 30	48 x 24
Ramp Closed	R11-V1	6F.09	48 x 30	48 x 30	48 x 30
Closed - Local Traffic Only	R11-V2	6F.10	60 x 30	60 x 30	48 x 24
Bike Lane Closed <sup>2</sup>	R11-V3	WZPBG	54 x 30	54 x 30	48 x 24
Path Closed <sup>2</sup>	R11-V4	WZPBG	48 x 30	48 x 30	48 x 24
Shoulder Closed <sup>2</sup>	R11-V5	WZPBG	54 x 30	54 x 30	54 x 30
Weight Limit	R12-1, 2	6F.11	36 x 48	36 x 48	36 x 48
Weight Limit Symbol	R12-V1	6F.11	48 x 54	36 x 42	36 x 42
Crash – No Injuries Move Vehicles	R16-4 (V)	6F.19	120 x 60	60 x 48	48 x 36
Crash Area Keep Clear <sup>1</sup>	W0-V1	6F.95	36 x 18	36 x 18	36 x 18
Turn and Curve Signs	W1-1L, 1R, 2L, 2R, 3L, 3R, 4L, 4R	6F.20	48 x 48	36 x 36	48 x 48
Reverse Curve (2 or more lanes)	W1-4bL, 4bR, 4cL, 4cR	6F.57	48 x 48	36 x 36	48 x 48
One-Direction Large Arrow (Post-Mounted)	W1-6L, 6R	6F.03	60 x 30	48 x 24	48 x 24
One-Direction Large Arrow (On 4' Type 3 Barricade)	W1-6L, 6R	6F.80	48 x 24	48 x 24	48 x 24
One-Direction Large Arrow (On 8' Type 3 Barricade)	W1-6L, 6R	6F.80	60 x 30	60 x 30	60 x 30
Two-Direction Large Arrow (Post-Mounted)	W1-7	6F.03	60 x 30	48 x 24	48 x 24
Two-Direction Large Arrow (On 4' Type 3 Barricade)	W1-7	6F.80	48 x 24	48 x 24	48 x 24
Two-Direction Large Arrow (On 8' Type 3 Barricade)	W1-7	6F.80	60 x 30	60 x 30	60 x 30
Chevron (Post-Mounted)	W1-8L, 8R	6F.03	36 x 48	30 x 36	18 x 24
Chevron (On Channelizing Device)	W1-8L, 8R	6F.80	18 x 24	18 x 24	18 x 24
One-Direction Large Arrow	W1-V1L, V1R	6F.32	96 x 48	96 x 48	96 x 48
Stop Ahead	W3-1	6F.20	48 x 48	36 x 36	48 x 48
Yield Ahead	W3-2	6F.20	48 x 48	36 x 36	48 x 48
Signal Ahead	W3-3	6F.20	48 x 48	36 x 36	48 x 48
Be Prepared to Stop	W3-4	6F.20	48 x 48	36 x 36	48 x 48
Reduced Speed Limit Ahead	W3-5	6F.22	48 x 48	36 x 36	48 x 48
Bikes Merge w/ Arrow <sup>2</sup>	W4-V1	WZPBG	48 x 48	36 x 36	48 x 48
Merging Traffic	W4-1L, 1R, 6L, 6R	6F.20	48 x 48	36 x 36	48 x 48
Lane Ends (Symbol)	W4-2L, 2R	6F.31	48 x 48	36 x 36	48 x 48
Added Lane	W4-3L, 3R	6F.20	48 x 48	36 x 36	48 x 48
No Merge Area (Plaque)	W4-5P	6F.20	24 x 30	18 x 24	24 x 30
Road Narrows	W5-1	6F.20	48 x 48	36 x 36	48 x 48
Narrow Bridge	W5-2	6F.20	48 x 48	36 x 36	48 x 48
One Lane Bridge	W5-3	6F.20	48 x 48	36 x 36	48 x 48
Ramp Narrows	W5-4	6F.35	48 x 48	36 x 36	48 x 48

\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric conditions prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 3 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
Lane Width (Plaque)	W5-VP1	6F.35	60 x 18	48 x 18	48 x 18
Divided Highway	W6-1	6F.20	48 x 48	36 x 36	48 x 48
Divided Highway Ends	W6-2	6F.20	48 x 48	36 x 36	48 x 48
Two-Way Traffic	W6-3	6F.41	48 x 48	36 x 36	48 x 48
Two-Way Traffic	W6-4	6F.41	12 x 18	12 x 18	12 x 18
Parallel Road Closed (Plaque)	W6-VP1	6F.41	48 x 36	48 x 36	48 x 36
Hill (Symbol)	W7-1	6F.20	48 x 48	36 x 36	48 x 48
Bump	W8-1	6F.20	48 x 48	36 x 36	48 x 48
Dip	W8-2	6F.20	48 x 48	36 x 36	48 x 48
Pavement Ends	W8-3	6F.20	48 x 48	36 x 36	48 x 48
Soft Shoulder	W8-4	6F.53	48 x 48	36 x 36	48 x 48
Slippery When Wet	W8-5	6F.20	48 x 48	36 x 36	48 x 48
Truck Crossing	W8-6	6F.43	48 x 48	36 x 36	48 x 48
Loose Gravel	W8-7	6F.20	48 x 48	36 x 36	48 x 48
Rough Road	W8-8	6F.44	48 x 48	36 x 36	48 x 48
Low Shoulder	W8-9	6F.53	48 x 48	36 x 36	48 x 48
Uneven Lanes	W8-11	6F.54	48 x 48	36 x 36	48 x 48
No Center Line	W8-12	6F.56	48 x 48	36 x 36	48 x 48
Fallen Rocks	W8-14	6F.20	48 x 48	36 x 36	48 x 48
Motorcycle (Plaque)	W8-15P	6F.44	30 x 24	24 x 18	30 x 24
Shoulder Drop Off (Plaque)	W8-17P	6F.53	30 x 24	24 x 18	30 x 24
Road May Flood	W8-18	6F.20	48 x 48	36 x 36	48 x 48
No Shoulder	W8-23	6F.20	48 x 48	36 x 36	48 x 48
Steel Plate Ahead	W8-24	6F.55	48 x 48	36 x 36	48 x 48
Shoulder Ends	W8-25	6F.20	48 x 48	36 x 36	48 x 48
Unmarked Pavement Ahead	W8-V4	6F.56	48 x 48	36 x 36	48 x 48
Shoulder Drop Off	W8-V5	6F.53	48 x 48	36 x 36	48 x 48
Lane Ends	W9-1L, 1R	6F.31	48 x 48	36 x 36	48 x 48
Lane Ends Merge Left	W9-2L, 2R	6F.31	48 x 48	36 x 36	48 x 48
Center Lane Closed Ahead	W9-3C, 3L, 3R	6F.30	48 x 48	36 x 36	48 x 48
Grade Crossing Advance Warning (Railroad)	W10-1	TTC-56	36 dia.	36 dia.	36 dia.
Bicycle Traffic (Symbol) <sup>2</sup>	W11-1	6F.42	48 x 48	48 x 48	36 x 36
Pedestrian Traffic (Symbol) <sup>2</sup>	W11-2	6F.42	48 x 48	48 x 48	36 x 36
Truck (Symbol)	W11-10	6F.43	48 x 48	36 x 36	48 x 48
Combined Bike and Pedestrian Crossing <sup>2</sup>	W11-15	6F.42	48 x 48	48 x 48	36 x 36
Construction Entrance	W11-V2	6F.43	48 x 48	36 x 36	48 x 48
Watch for Turning Vehicles	W11-V3	6F.43	48 x 48	36 x 36	48 x 48
Trucks Entering Highway	W11-V4	6F.43	48 x 48	36 x 36	48 x 48

\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric conditions prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 4 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
Double Arrow	W12-1	6F.20	48 x 48	36 x 36	48 x 48
Low Clearance	W12-2	6F.20	48 x 48	36 x 36	48 x 48
Advisory Speed (Plaque)	W13-1P	6F.61	30 x 30	24 x 24	30 x 30
On Ramp (Plaque)	W13-4	6F.33	36 x 36	36 x 36	36 x 36
No Passing Zone (Pennant)	W14-3	6F.20	64 x 64 x 48	48 x 48 x 36	48 x 48 x 36
Arrow (Plaque)	W16-5pL, 5pR	6F.20	30 x 18 <sup>2</sup>	24 x 12	30 x 18 <sup>2</sup>
Arrow (Plaque – Diagonal Downward Pointing) <sup>2</sup>	W16-7pL, 7pR	6F.42	30 x 18	30 x 18	24 x 12
	W16-7pL, 7pR		30 x 18	30 x 18	24 x 12
Ahead (Plaque) <sup>2</sup>	W16-9P	6F.42	30 x 18	30 x 18	24 x 12
	W16-9P		30 x 18	30 x 18	24 x 12
Next XX Miles (Plaque)	W16-VP1	6F.42	60 x 18	48 x 12	60 x 18
Every 1 (1/2) (3/4) Mile (Plaque)	W16-VP2	6F.46	60 x 18	48 x 12	60 x 18
XX FEET (Plaque)	W16-VP3	6F.46	60 x 18	48 x 12	60 x 18
Next Exit (Left) (Right) (Plaque)	W16-VP4E, VP4L, VP4R	6F.46	60 x 18	48 x 12	60 x 18
Exit Number (Plaque)	W16-VP5	6F.46	60 x 18	48 x 12	60 x 18
Road Work Ahead	W20-1	6F.21	48 x 48	36 x 36	48 x 48
Detour Ahead	W20-2	6F.25	48 x 48	36 x 36	48 x 48
	W20-2	6I TIMC-7 & 8	48 x 48	36 x 36	48 x 48
Road (Street) Closed Ahead	W20-3	6F.23	48 x 48	36 x 36	48 x 48
One Lane Road Ahead	W20-4	6F.27	48 x 48	36 x 36	48 x 48
Lane(s) Closed Ahead	W20-5C, 5L, 5R, 5aL, 5aR	6F.28	48 x 48	36 x 36	48 x 48
Flagger (Symbol)	W20-7	6F.40	48 x 48	36 x 36	48 x 48
<b>VEHICLE-MOUNTED SIGNS</b>					
Slow (On Stop/Slow Paddle)	W20-8 (V)	6E.03	24 x 24	24 x 24	24 x 24
Slow (AFAD)	W20-8 (V)	6E.04	36 x 36	36 x 36	36 x 36
Road Work Ahead – Left (Right) Shoulder Closed	W20-V1L, V1R	6F.36	84 x 36	84 x 36	84 x 36
Road Work Ahead – Center Lane Closed Road Work Ahead – Left (X Left) Lane(s) Closed Road Work Ahead – Right (X Right) Lane(s) Closed	W20-V2C, V2L, V2aL, V2R, V2aR	6F.36	84 x 36	84 x 36	84 x 36
Mowing Ahead – Left (Right) Shoulder Closed	W20-V3L, V3R	6F.36	84 x 36	84 x 36	84 x 36
Mowing Ahead – Left (Right) Lane Closed	W20-V4L, V4R	6F.36	84 x 36	84 x 36	84 x 36
Line Painting Ahead – Center Lane Closed Road Line Painting Ahead – Left (X Left) Lane(s) Closed “ “ “ – Right (X Right) Lane(s) Closed	W20-V5C, V5L, V5aL, V5R, V5aR	6F.36	84 x 36	84 x 36	84 x 36
Spraying Ahead – Left (Right) Shoulder Closed	W20-V6L, V6R	6F.36	84 x 36	84 x 36	84 x 36
Spraying Ahead – Left (Right) Lane Closed	W20-V7L, V7R	6F.36	84 x 36	84 x 36	84 x 36
Pre-Storm Treatment – Center Lane Closed Pre-Storm Treatment – Left (X Left) Lane(s) Closed “ “ “ – Right (X Right) Lane(s) Closed	W20-V8C, V8L, V8aL, V8R, V8aR	6F.36	84 x 36	84 x 36	84 x 36

\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric conditions prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

\*\* Sign information is found in the Virginia Supplement to the 2009 MUTCD.

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 5 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height.

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
<b>RESUME GROUND MOUNTED SIGNS UNLESS OTHERWISE NOTED</b>					
Pre-Storm Treatment	W20-V9	6F.36	48 x 18	48 x 18	48 x 18
Keep Back 100 FT	W20-V10	6F.36	18 x 18	18 x 18	18 x 18
Road Closed High Water	W20-V11	6F.26	48 x 48	36 x 36	48 x 48
Ramp Closed Ahead	W20-V12	6F.26	48 x 48	36 x 36	48 x 48
	W20-V12	6I TIMC-8	48 x 48	36 x 36	48 x 48
Center (Left) (Right) Turn Lane Closed Ahead	W20-V13C, V13L, V13R	6F.30	48 x 48	36 x 36	48 x 48
Grooved Pavement Ahead <sup>1</sup>	W20-V14	6F.44	48 x 48	36 x 36	48 x 48
Median Crossover Closed Ahead <sup>1</sup>	W20-V15	6F.28	48 x 48	36 x 36	48 x 48
Median Crossover Closed <sup>1</sup>	W20-V16	6F.28	48 x 36	48 x 36	48 x 36
Emergency Scene Ahead	W20-V25	6F.29	48 x 48	36 x 36	48 x 48
Rumble Strips Ahead <sup>1</sup>	W20-V26	TTC-23	48 x 48	36 x 36	48 x 48
Emergency Work Ahead <sup>1</sup>	W20-V27	6F.23	48 x 48	36 x 36	48 x 48
Rumble Strips with Arrow <sup>2</sup>	W20-V28	TTC-16	48 x 48	36 x 36	48 x 48
Slow Moving Vehicle (Vehicle-Mounted Sign)	W21-4	6G.06	36 x 18	36 x 18	36 x 18
Shoulder Work	W21-5	6F.45	48 x 48	36 x 36	48 x 48
Shoulder Closed	W21-5aL, 5aR	6F.45	48 x 48	36 x 36	48 x 48
Shoulder Closed Ahead	W21-5bL, 5bR	6F.45	48 x 48	36 x 36	48 x 48
Utility Work Ahead	W21-7	6F.48	48 x 48	36 x 36	48 x 48
Mowing Ahead	W21-8	6F.24	48 x 48	36 x 36	48 x 48
Watch for Slow Moving Vehicles	W21-V1	6F.24	48 x 48	36 x 36	48 x 48
Road Work Next 2 Miles	W21-V2	6F.23	48 x 48	36 x 36	48 x 48
Mowing Next 2 Miles	W21-V3	6F.24	48 x 48	36 x 36	48 x 48
Line Painting Next 5 Miles	W21-V4	6F.24	48 x 48	36 x 36	48 x 48
Spraying Next 5 Miles	W21-V5	6F.24	48 x 48	36 x 36	48 x 48
Cleanup Crew Working	W21-V6	**2H.08	48 x 48	36 x 36	48 x 48
Litter Pick Up	W21-V7	6F.20	48 x 48	36 x 36	48 x 48
Survey Crew Ahead	W21-V8	6F.47	48 x 48	36 x 36	48 x 48
All Traffic Merge Left (Right)	W21-V9L, V9R	TTC-45	48 x 48	36 x 36	48 x 48
Slow	W21-V10	6F.40	48 x 48	36 x 36	48 x 48
Both Shoulders Closed	W21-V11	6F.45	48 x 48	36 x 36	48 x 48
Both Shoulders Closed Ahead	W21-V12	6F.45	48 x 48	36 x 36	48 x 48
Pull-Off Area	W21-V13	6F.46	48 x 48	36 x 36	48 x 48
Left (Right) Pull-Off Area	W21-V14L, V14R	6F.46	48 x 48	36 x 36	48 x 48
No Pull-Off Area	W21-V15	6F.46	48 x 48	36 x 36	48 x 48
Ramp Work Ahead	W21-V16	6F.33	48 x 48	36 x 36	48 x 48
Signal Work Ahead	W21-V17	6F.34	48 x 48	36 x 36	48 x 48
Road Patching Ahead <sup>1</sup>	W21-V18	TTC-65	48 x 48	36 x 36	48 x 48
Road Patching Next X Miles <sup>1</sup>	W21-V19	TTC-65	48 x 48	36 x 36	48 x 48

\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric condition prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 6 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
Bike Lane Closed Ahead <sup>2</sup>	W21-V20	WZPBG	48 x 48	36 x 36	48 x 48
Bike (Symbol) Detour Ahead <sup>2</sup>	W21-V21	WZPBG	48 x 48	36 x 36	48 x 48
Bike (Symbol) Diversion Ahead <sup>2</sup>	W21-V22	WZPBG	48 x 48	36 x 36	48 x 48
Path Closed Ahead <sup>2</sup>	W21-V23	WZPBG	48 x 48	36 x 36	48 x 48
Path Work Ahead <sup>2</sup>	W21-V23	WZPBG	48 x 48	36 x 36	48 x 48
Bridge Inspection Ahead <sup>2</sup>	W21-V25	WZPBG	48 x 48	36 x 36	48 x 48
Blasting Zone Ahead	W22-1	6F.50	48 x 48	36 x 36	48 x 48
Turn Off 2-Way Radio And Cell Phone	W22-2	5F.51	42 x 36	42 x 36	42 x 36
End Blasting Zone	W22-3	6F.52	42 x 36	42 x 36	42 x 36
New Traffic Pattern Ahead	W23-2	6F.37	48 x 48	36 x 36	48 x 48
Double Reverse Curve	W24-1L, 1R	6F.55	48 x 48	36 x 36	48 x 48
Double Reverse Curve	W24-1aL, 1aR	6F.55	48 x 48	36 x 36	48 x 48
Double Reverse Curve	W24-1bL, 1bR	6F.55	48 x 48	36 x 36	48 x 48
All Lanes	W24-1cP	6F.55	30 x 30	24 x 24	30 x 30
Road Work Next XX Miles	G20-1 (V)	6F.61	60 x 24	48 x 24	48 x 24
End Road Work (Post-Mounted)	G20-2 (V)	6F.62	60 x 24	48 x 24	48 x 24
End Road Work (On Portable Sign Stand)	G20-2 (V)	6F.62	48 x 24	48 x 24	48 x 24
Pilot Car Follow Me (Vehicle-Mounted Sign)	G20-4	6F.63	36 x 18	36 x 18	36 x 18
Work Zone (Plaque) <sup>1</sup>	G20-5aP (V)	6F.11	48 x 36	36 x 24	36 x 24
	G20-5aP	6F.14			
Work Vehicle Frequent Turns (Vehicle-Mounted Sign) <sup>1</sup>	G20-V1a	6F.64	48 x 18	48 x 18	48 x 18
End Mowing (Post-Mounted)	G20-V2	6F.62	60 x 24	48 x 24	48 x 24
End Mowing (On Portable Sign Stand)	G20-V2	6F.62	48 x 24	48 x 24	48 x 24
End Survey (Post Mounted)	G20-V3	6F.62	60 x 24	48 x 24	48 x 24
End Survey (On Portable Sign Stand)	G20-V3	6F.62	48 x 24	48 x 24	48 x 24
Caution Frequent Stops (Vehicle-Mounted Sign)	G20-V4a, V4b, V4c	6F.65	Var.	Var.	Var.
XX Miles Ahead (Plaque)	G20-VP1	6F.11	108 x 18	66 x 18	42 x 12
Exit Open	E5-2	6F.35	48 x 36	48 x 36	48 x 36
Exit Closed	E5-2a	6F.35	48 x 36	48 x 36	48 x 36
Exit Only	E5-3	6F.36	48 x 36	48 x 36	48 x 36
Exit	E5-V1L, V1R	6F.36	48 x 48	48 x 48	48 x 48
Pull-Off Area Entrance	E5-V2L, V2R	6F.43	48 x 48	48 x 48	48 x 48
Left (Right) Turn Lane Open <sup>1</sup>	E5-V3L, V3R		48 x 36 <sup>2</sup>	48 x 36 <sup>2</sup>	48 x 36 <sup>2</sup>
Left (Right) Turn Lane Closed <sup>1</sup>	E5-V4L, V4R		48 x 36 <sup>2</sup>	48 x 36 <sup>2</sup>	48 x 36 <sup>2</sup>
Turn Lane with Arrow <sup>2</sup>	E5-V5L, 5R <sup>2</sup>		48 x 48 <sup>2</sup>	48 x 48 <sup>2</sup>	36 x 36 <sup>2</sup>
Interstate Route Shield for Independent Use (1 or 2 digits) <sup>1</sup>	M1-1		36 x 36	24 x 24	24 x 24
Interstate Route Shield for Independent Use (3 digits) <sup>1</sup>	M1-1		45 x 36	30 x 24	30 x 24
U.S. Route Marker for Independent Use (1 or 2 digits) <sup>1</sup>	M1-4		36 x 36	24 x 24	24 x 24
U.S. Route Marker for Independent Use (3 digits) <sup>1</sup>	M1-4		45 x 36	30 x 24	30 x 24

\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric condition prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

1: Revision 1 – 4/1/2015; 2: Revision 2 – 9/1/2019; 3: Revision 2.1 – 11/1/2020

**Table 6F-1, Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 7 of 7)<sup>2,1</sup>**

Dimensions are shown in inches and shown as width x height

Sign or Plaque	Sign Designation	Section	*Non-Restricted Right-of-Way Roadway	*Restricted Right-of-Way Roadway	*Residential & Urban – < 500 ADT & ≤ 30 MPH
VA Primary Route Marker for Independent Use (1 or 2 digits) <sup>1</sup>	M1-V1a, V1b		36 x 36	24 x 24	24 x 24
VA Primary Route Marker for Independent Use (3 digits) <sup>1</sup>	M1-V1c, V1d		45 x 36	30 x 24	30 x 24
VA Circular Sec. Route Marker for Independent Use (3 digits) <sup>1</sup>	M1-V2a, V2b, V2c, V2d, V2e, V2f		36 x 36	24 x 24	24 x 24
Cardinal Directional Auxiliary (NORTH, EAST, SOUTH, WEST) <sup>1</sup>	M3-1, M3-2, M3-3, M3-4		30 x 15	24 x 12	24 x 12
Directional Arrow Auxiliary <sup>1</sup>	M5-1(V), M5-2(V), M6-1(V), M6-2(V), M6-3(V), M6-4(V), M6-5(V)		21 x 15	21 x 15	21 x 15
	M5-1(V), M5-2(V), M6-1(V), M6-2(V), M6-3(V), M6-4(V), M6-5(V)		21 x 15	21 x 15	21 x 15
Detour	M4-8	6F.69	30 x 15	24 x 12	24 x 12
End Detour	M4-8a	6F.69	24 x 18	24 x 18	24 x 18
	M4-8a	6I – TIMC-8	24 x 18	24 x 18	24 x 18
End <sup>2</sup>	M4-8b	WZPBG	24 x 12	24 x 12	24 x 12
Detour with Horizontal Arrow	M4-9L, 9R,	6F.69	60 x 48	48 x 36	36 x 30
	M4-9L (V), 9R (V)				
Bike/Pedestrian (Symbol <sup>2</sup> ) Detour	M4-9aL, 9aR	6F.69	60 x 48	48 x 36	30 x 24
Pedestrian (Symbol <sup>2</sup> ) Detour	M4-9bL, 9bR	6F.69	60 x 48	48 x 36	30 x 24
Bike (Symbol <sup>2</sup> ) Detour	M4-9cL, 9cR	6F.69	60 x 48	48 x 36	30 x 24
Detour	M4-10	6F.669	48 x 18	48 x 18	48 x 18
Detour – Up Arrow	M4-V1	6F.69	60 x 48	48 x 36	36 x 30
Detour – 45° Arrow	M4-V2L, V2R	6F.69	60 x 48	48 x 36	36 x 30
Detour – Advance Turn 90° Arrow	M4-V3L, V3R	6F.69	60 x 48	48 x 36	36 x 30
Detour – Advance Turn Diagonal Arrow	M4-V4L, V4R	6F.69	60 x 48	48 x 36	36 x 30
Cardinal Direction / Route Shield (Plaque)	M4-V5a, V5b	6F.9 6F.11	66 x 84	36 x 42	48 x 60
TTC Business Entrance (One Line)	M4-V6aL, V6aR	6F.67	Var. x 24	Var. x 24	Var. x 24
TTC Business Entrance (Two Lines)	M4-V6bL, V6bR	6F.67	Var. x 30	Var. x 30	Var. x 30
Bike Detour <sup>2</sup>	M4-V7bL, V7bR		60 x 48	48 x 36	36 x 30
Bicycle (Symbol) w/ Horizontal Arrow (diversion) <sup>2</sup>	M4-V8L, V8bR		60 x 48	48 x 36	36 x 30
Bike (Symbol <sup>2</sup> ) Diversion w/ Horizontal Arrow <sup>2</sup>	M4-V9cL, 9cR		60 x 48	48 x 36	30 x 24
Street Name (Plaque) (One Line)	M4-VP1a	6F.09 6F.66	Var. x 18	Var. x 15	Var. x 12
Street Name (Plaque) (Two Lines)	M4-VP1b		Var. x 30	Var. x 24	Var. x 18
Bike (Symbol) Division <sup>2</sup>	M4 – 9(VA)	WZPBG	60 x 48	48 x 36	36 x 30
<b>Incident Management Detour (M4-V1, M4-V2L, M4-2R, M4-3L, M4-3R, M4-9L (V), M4-9R (V)) sign size shall be 36 x 30</b>					

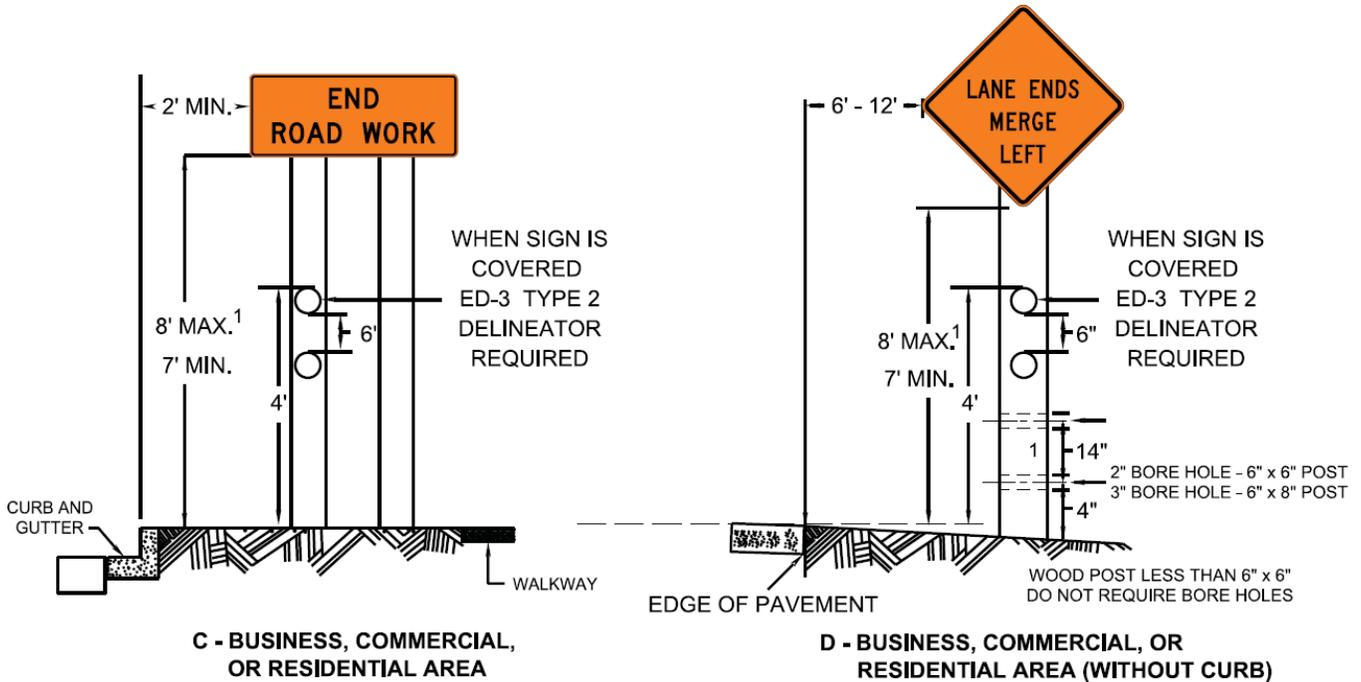
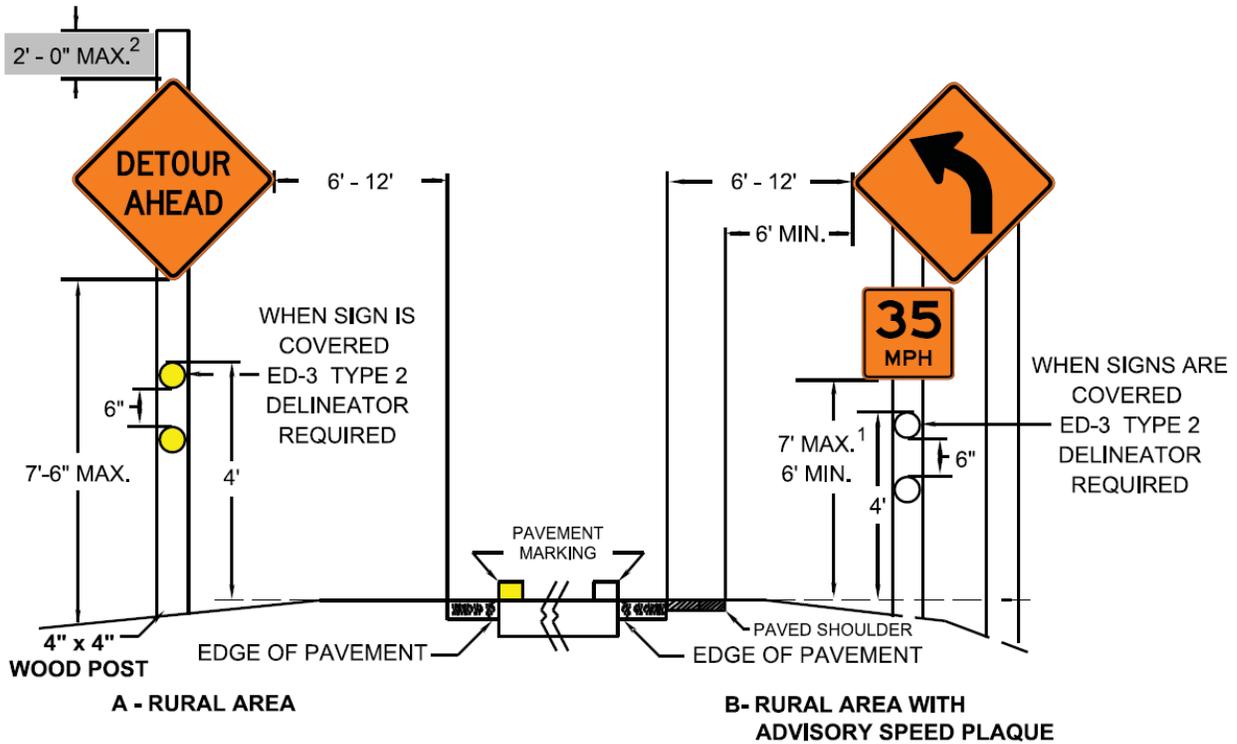
\* Sign sizes found in the Non-Restricted Right-of-Way Roadway column shall be used unless geometric condition prohibits their use; otherwise the other columns shall be used (see Section 6F-02 Paragraph 10).

All signs are from the MUTCD except for: Orange shading – Virginia specific signs, Green shading – Pedestrian/Bicycle signs, Pink shading – Incident management signs. WZPBG – VDOT Work Zone Pedestrian and Bicycle Guidance

1: Revision 1 – 4/1/2015; 2: Revision 2 – 9/1/2019; 3: Revision 2.1 – 11/1/2020

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**Figure 6F-1, Height and Lateral Location of Signs – Typical Post-Mounted Installations<sup>2</sup>**



**NOTE: FOR POST SIZE & INSTALLATION PROCEDURES SEE EITHER THE PLAN INSERTABLE SHEET OR VIRGINIA ROAD AND BRIDGE STANDARDS WSP-1 & ED-3 OR TEMPORARY SIGNS.<sup>1</sup>**

1: Revision 1 – 4/1/2015  
 2: Revision 2 – 9/1/2019

Figure 6F-3, Warning Signs and Plaques in Temporary Traffic Control (Sheet 2 of 5)



W6-2



W6-3



W6-4



W6-VP1



W7-1



W8-1



W8-2



W8-3



W8-4



W8-5



W8-6



W8-7



W8-8



W8-9



W8-11



W8-12



W8-14



W8-15p



W8-18



W8-23



W8-24



W8-25



W8-V4



W8-V5

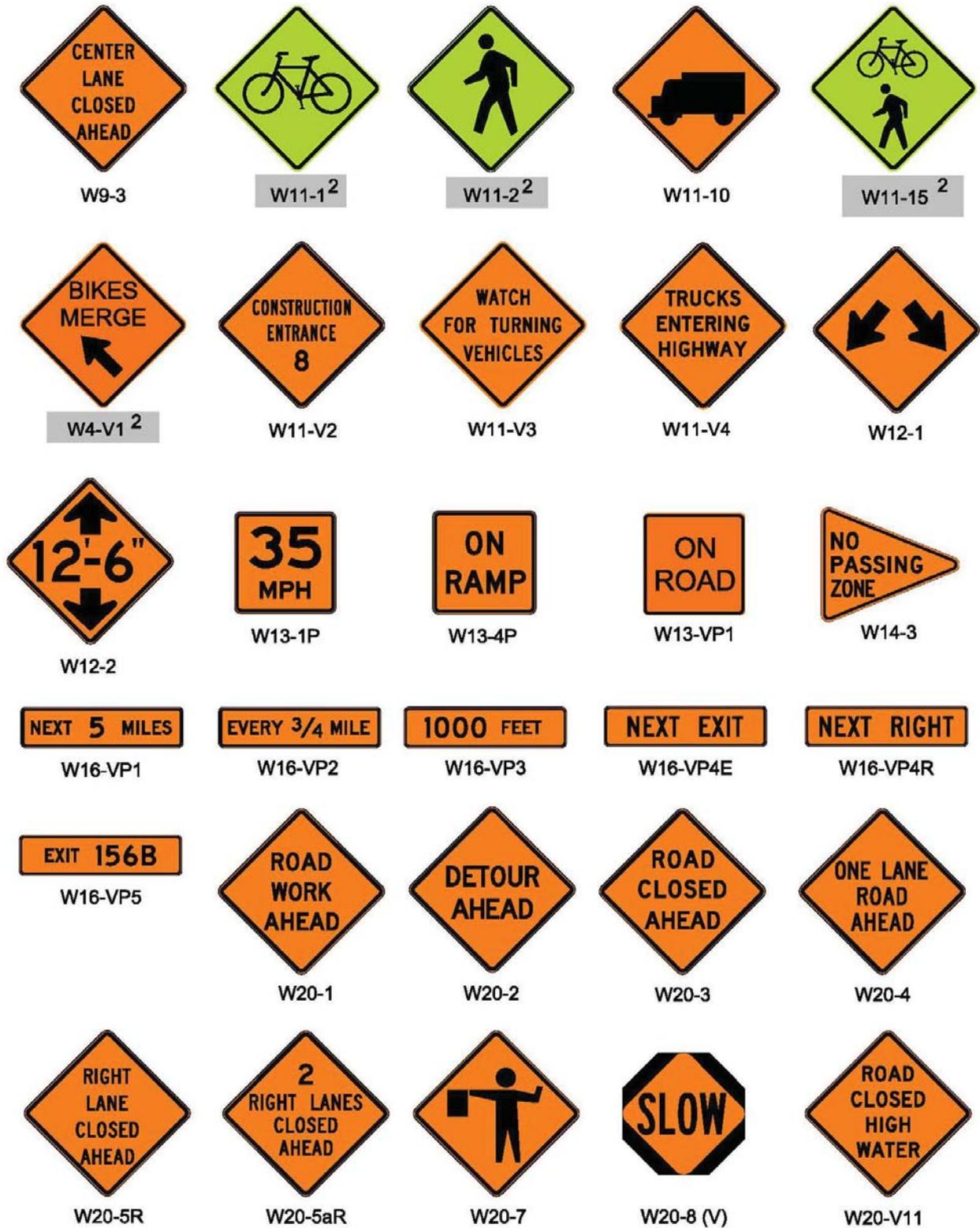


W9-1R



W9-2R

Figure 6F-3, Warning Signs and Plaques in Temporary Traffic Control (Sheet 3 of 5)<sup>2,1</sup>



1: Revision 1 – 4/1/2015  
 2: Revision 2 – 9/1/2019  
 3: Revision 2.1 – 11/1/2020

## CHAPTER 6G. TYPE OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES

### Section 6G.01 Typical Applications

Support:

- 01 Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, cars and motorcycles), and road user speeds affect the needs of each zone. The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.
- 02 Typical figures of TTC zones are organized according to duration, location, type of work, and highway type. Table 6H-1 is an index of these Typical Traffic Control figures. These typical applications include the use of various TTC methods, but do not include a layout for every conceivable work situation. Additional figures can also be found in Chapter 6H of the 2009 MUTCD.
- 03 Well-designed TTC plans for planned special events will likely be developed from a combination of treatments from several of the typical traffic control figures.

*Guidance:*

- 04 *For any planned special event that will have an impact on the traffic on any street or highway, a TTC plan should be developed in conjunction with and be approved by the agency or agencies that have jurisdiction over the affected roadways.*
- 05 *Typical applications should be altered, when necessary, to fit the conditions of a particular TTC zone.*

Option:

- 06 Other devices may be added to supplement the devices shown in the typical traffic control figures, while others may be deleted. The sign spacing and taper lengths may be increased to provide additional time or space for driver response.

Support:

- 07 Decisions regarding the selection of the most appropriate typical traffic control figure to use as a guide for a specific TTC zone require an understanding of each situation. Although there are many ways of categorizing TTC zone applications, the four factors mentioned earlier (work duration, work location, work type, and highway type) are used to characterize the typical traffic control figures illustrated in Chapter 6H.

### 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 (72 consecutive hours)<sup>2</sup>.**
  - 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 (or non-stationary operations)<sup>2</sup> is work that occupies a location for more than 1 hour but less than 12 hours<sup>2,1</sup> within a daylight period.**
  - D. Short duration is work that occupies a location up to 1 hour.**
  - E. Mobile is work that moves intermittently (1 to 15 minutes)<sup>1</sup> or continuously.**

Support:

- 03 At long-term stationary TTC zones, there is ample time to install and realize benefits from the full range of TTC procedures and devices that are available for use. Generally, larger channelizing devices, temporary roadways, and temporary traffic barriers are used.

**Standard:**

- 04 **Since long-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in long-term stationary TTC zones. In addition, Group 2 channelizing devices shall be used in place of cones when the work crew is not present to align displaced or overturned cones.**

*Guidance:*

05 *Inappropriate markings in long-term stationary TTC zones should be removed and replaced with temporary markings.*

## Support:

06 In intermediate-term stationary TTC zones, it might not be feasible or practical to use procedures or devices that would be desirable for long-term stationary TTC zones, such as altered pavement markings, temporary traffic barriers, and temporary roadways. The increased time to place and remove these devices in some cases could significantly lengthen the project, thus increasing exposure time.

**Standard:**

07 **Since intermediate-term operations extend into nighttime, retroreflective and/or illuminated devices shall be used in intermediate-term stationary TTC zones. In addition, Group 2 channelizing devices shall be used in place of cones when the work crew is not present to align displaced or overturned cones.**

## Support:

08 Most maintenance and utility operations are short-term stationary work

09 As compared to stationary operations, mobile and short-duration operations are activities that might involve different treatments. Devices having greater mobility might be necessary such as signs mounted on trucks. Devices that are larger, **more** imposing, or more visible can be used effectively and economically. The mobility of the TTC zone is important.

*Guidance:*

10 *Safety in short-duration or mobile operations should not be compromised by using fewer devices simply because the operation will frequently change its location.*

Option:

11 Appropriately colored or marked vehicles with amber high-intensity rotating, flashing, or<sup>1</sup> oscillating lights may be used in place of signs and channelizing devices for short-duration or mobile operations. These vehicles may be augmented with signs or arrow boards.

## Support:

12 During short-duration work, it often takes longer to set up and remove the TTC zone than to perform the work. Workers face hazards in setting up and taking down the TTC zone. Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed.

Option:

13 Considering these factors, simplified control procedures may be warranted for short-duration work. A reduction in the number of devices may be offset by the use of other more dominant devices such as high-intensity rotating, flashing, or<sup>1</sup> oscillating lights on work vehicles. These simplified temporary traffic control procedures are shown in TTC-3, Mobile or Short Duration Shoulder Operations, TTC-14 Moving/Mobile Operation on a Two-Lane Roadway, TTC-15 Short Duration Operation on a Multi-Lane Roadway and TTC-65 Short Duration Road Patching Operation on a Low Volume Two-Lane Roadway<sup>2</sup>.

**Standard:<sup>2</sup>**

14 **Modifications to standard TTC figures for short-duration operations require approval from the District Traffic Engineer.**

## Support:

15 Mobile operations often involve frequent short stops of 15 minutes or less for activities such as litter cleanup, pothole patching, or utility operations, and are similar to short-duration operations

**Standard:**

16 **Vehicle mounted<sup>2</sup> warning signs and supplemental warning signs shown in Chapter 6H (LINE PAINTING NEXT 5 MILES, SPRAYING NEXT 5 MILES, MOWING NEXT 2 MILES, etc.)<sup>2</sup> and high-intensity amber rotating, flashing, or<sup>1</sup> oscillating, lights shall be used on the vehicles that are participating in the mobile work.**

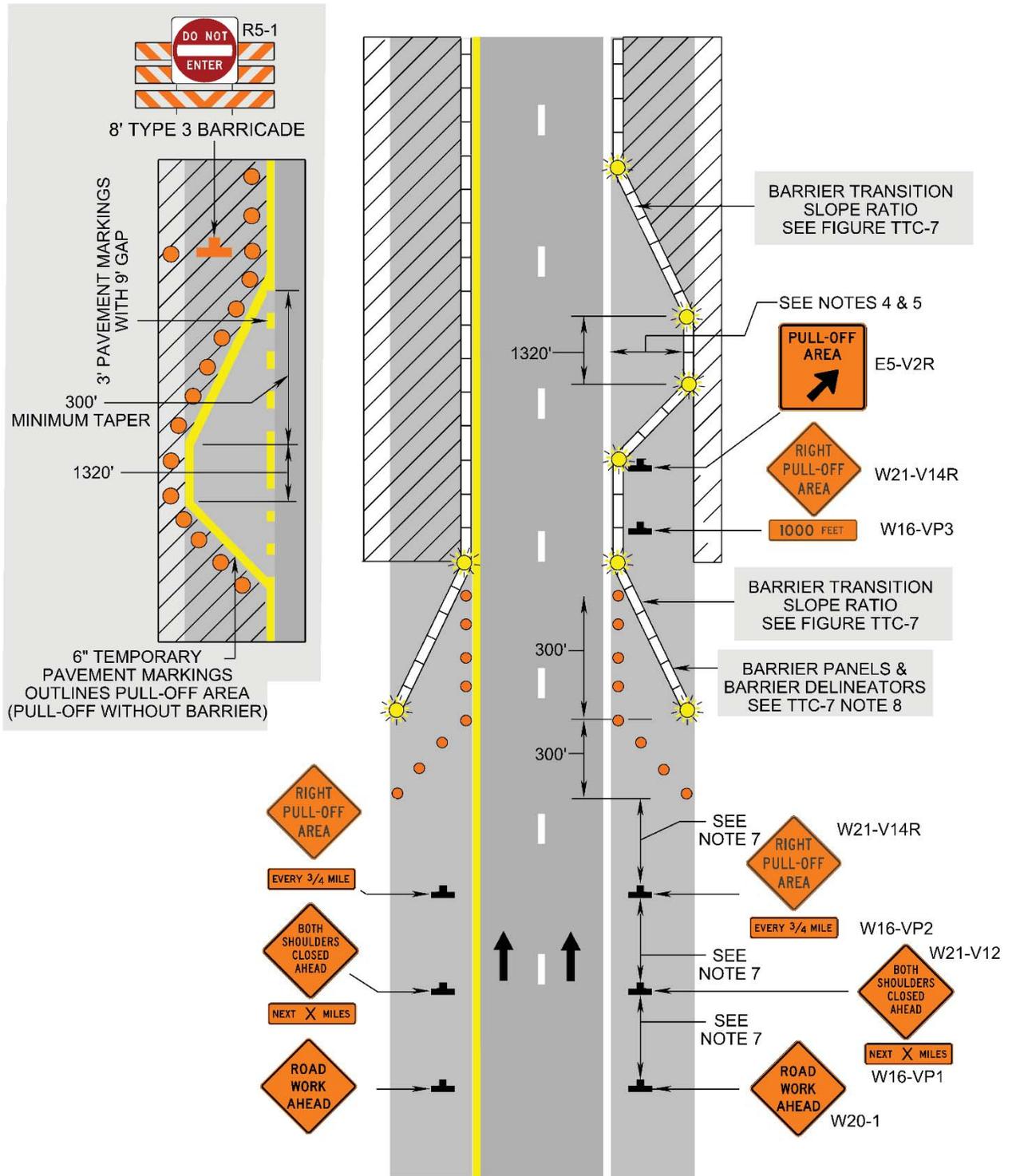
17 **Flags and/or channelizing devices may additionally be used, but shall be continuously repositioned to keep them near the mobile work area.**

1: Revision 1 – 4/1/2015

2: Revision 2 – 9/1/2019

### Pull-Off Areas on Limited Access Highways

(Figure TTC-8.1)



2: Revision 2 – 9/1/2019  
3: Revision 2.1 – 11/1/2020

**Typical Traffic Control**  
***Mowing Operation with Encroachment on Non-Limited Access Roadways***  
**(Figure TTC-9.1)**

**NOTES**

**Standard:**

1. **Each vehicle involved in the operation shall be equipped with at least one rotating amber light or high intensity amber flashing<sup>1</sup> or oscillating light, visible from 360°.**
2. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
3. **Connecting roads entering into the work area shall be signed as shown.**
4. **All vehicles traveling at speeds below 25 mph shall display a slow moving vehicle emblem per OSHA regulation 1910.145(d)(10).**

**Guidance:**

5. *Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph.*
6. *No more than 2 complete setups (2 miles each) should be exposed to motorist at any one time.*
7. *To prevent multiple lane changing by motorists and constriction of traffic flow, mowing operations should be limited to one side of the roadway at a time, or separated by a minimum of 1000 feet between right and left side operations.*
8. *For high volume, high speed multi-lane highways, if the mower encroaches into the roadway for extended periods of time, or prevents vehicles from passing, TTC-13.2<sup>1</sup>, Moving/Mobile Operations on a Multi-Lane Roadway should be considered.*
9. *All mowing operations, including but not limited to weed eating and push mowing, should be performed using the mowing series of warning signs.<sup>1</sup>*

**Option:**

10. Litter pick up operations may be performed using the mowing series of warning signs (MOWING NEXT 2 MILES and WATCH FOR SLOW MOVING VEHICLES) during mowing operations.<sup>1</sup>

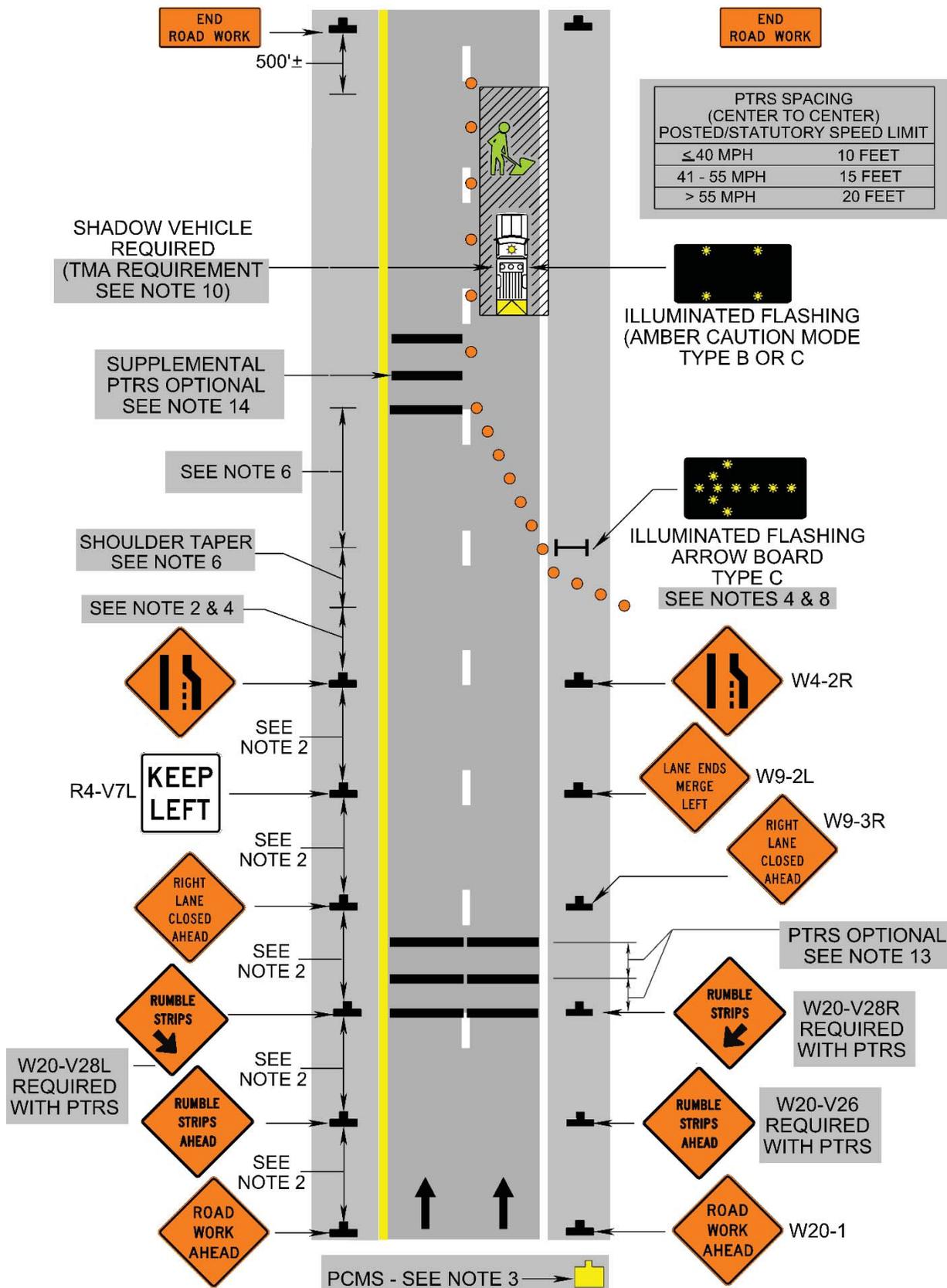
**Standard:**

11. **If only litter pick up operation is being performed, then the appropriate LITTER PICK UP signs shall be used.<sup>1</sup>**
12. **If the warning signs mowing and litter pick up operations cannot be seen by ramp traffic then they shall be signed to warn motorists of the operation being performed.<sup>1</sup>**

**Option:**

13. The warning signs for mowing and litter pick up may be placed where they are visible to both mainline and ramp traffic.<sup>1</sup>
14. A shadow vehicle with a TMA may be placed 80' to 120' behind the slow moving vehicle to protect the motorists and the slow moving vehicle's operator.<sup>1</sup>

### Outside Lane Closure Operation on a Four-Lane Roadway (Figure TTC-16.2)



2: Revision 2 - 9/1/2019  
3: Revision 2.1 - 11/1/2020

**Typical Traffic Control**  
**Inside Lane Closure Operation on a Four-Lane Roadway**  
**(Figure TTC-17.2)**

**NOTES**

**Standard:**

1. On divided highways having a median wider than 8', right and left sign assemblies shall be required.

*Guidance:*

2. Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
3. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.<sup>2</sup>
4. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.
5. All vehicles, equipment, workers, and their activities should be restricted to one side of the pavement.

**Standard:**

6. Taper length (L) and channelizing device spacing shall be at the following:

Taper Length L											
Speed Limit (mph)	Lane Width (Feet)				Remarks	Speed Limit (mph)	Lane Width (Feet)				Remarks
	9	10	11	12			9	10	11	12	
25	95	105	115	125	L=S <sup>2</sup> W/60	50	450	500	550	600	L=SW
30	135	150	165	180	L=S <sup>2</sup> W/60	55	495	550	605	660	L= SW
35	185	205	225	245	L=S <sup>2</sup> W/60	60	540	600	660	720	L=SW
40	240	270	295	320	L=S <sup>2</sup> W/60	65	585	650	715	780	L=SW
45	405	450	495	540	L=SW	70	630	700	770	840	L=SW
Limited Access highways shall use a 1000' merging taper regardless of the posted speed.											
Shifting Tapers see Table 6H-2. <sup>2</sup>						Shoulder Taper = 1/3 L Minimum					

7. Channelizing device spacing shall be at the following:

Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)	
	0 -35	36 +		0 -35	36 +		0 -35	36 +
Transition	20'	40'	Travelway	40'	80'	*Construction Access	80'	120'

\*Construction access spacing may be increased to this distance, but shall not exceed one access per 1/4 mile.

8. An arrow board shall be used when a lane is closed. When more than one lane is closed, a separate arrow board shall be used for each closed lane (see Figure TTC-18).
9. The buffer space length shall be shown in Table 6H-3 on Page 6H-5 for the posted speed limit.
10. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one high intensity amber rotating, flashing, or<sup>1</sup> oscillating light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.
11. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or<sup>1</sup> oscillating lights but can be used to supplement the amber rotating, flashing, or<sup>1</sup> oscillating lights.
12. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.

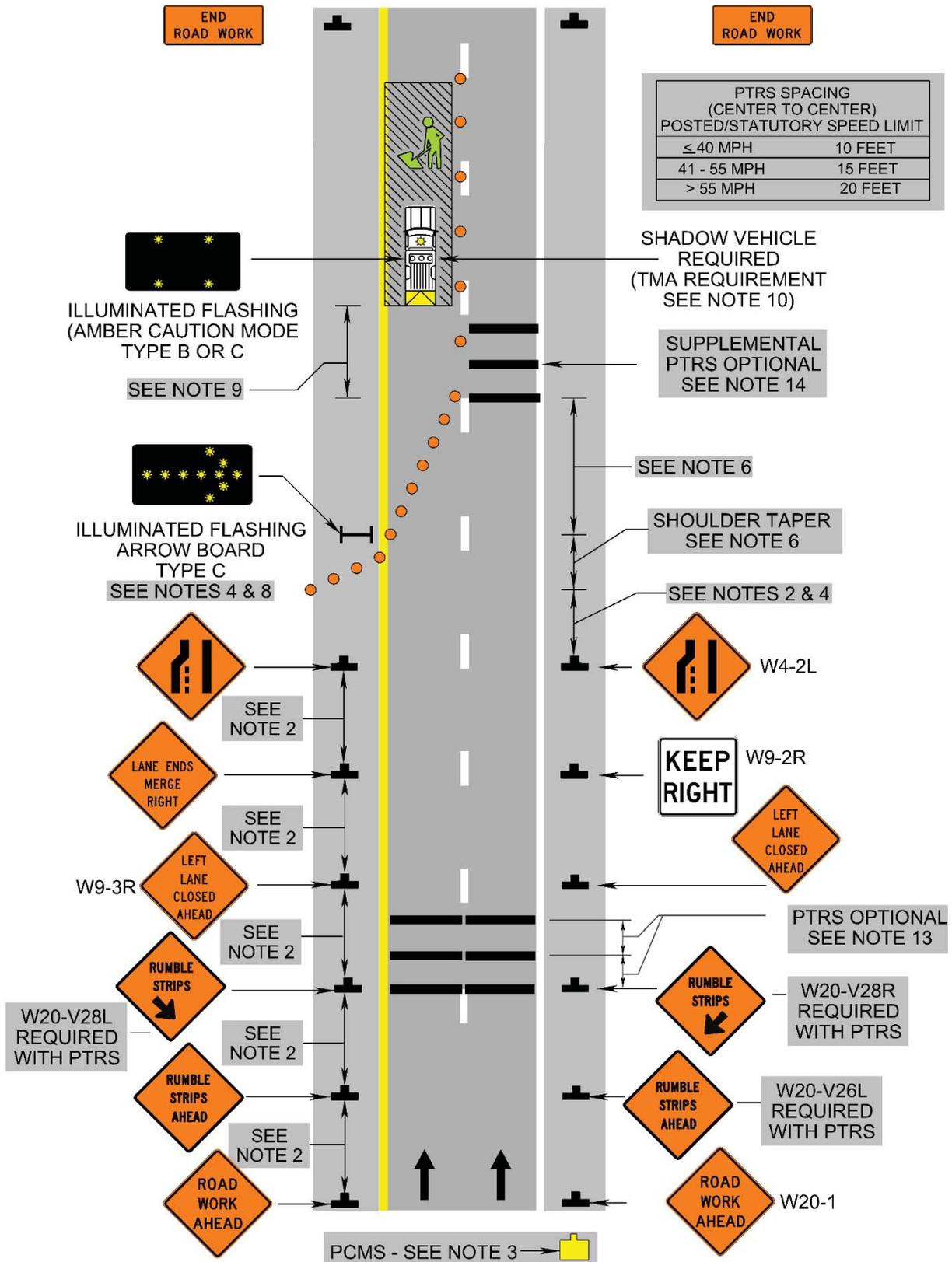
Option:<sup>2</sup>

13. PTRS and their supporting signs may be used, see sections 6F.99 and 6G.25. Long-term transverse rumble strips may be used in long-term situations, see Section 6F.99 and TTC-20.<sup>2</sup>
14. The supplemental PTRS may be eliminated.

2: Revision 2 – 9/1/2019

### Inside Lane Closure Operation on a Four-Lane Roadway

(Figure TTC-17.2)



2: Revision 2 – 9/1/2019

3: Revision 2.1 – 11/1/2020

**Typical Traffic Control  
Multi-Lane Closure Operation  
(Figure TTC-18.2)**

**NOTES**

**Standard:**

1. On divided highways having a median wider than 8', right and left sign assemblies shall be required.

*Guidance:*

2. Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
3. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.<sup>2</sup>
4. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.
5. All vehicles, equipment, workers, and their activities should be restricted to one side of the pavement.

**Standard:**

6. Taper length (L) and channelizing device spacing shall be at the following:

Taper Length L											
Speed Limit (mph)	Lane Width (Feet)				Remarks	Speed Limit (mph)	Lane Width (Feet)				Remarks
	9	10	11	12			9	10	11	12	
25	95	105	115	125	L=S <sup>2</sup> W/60	50	450	500	550	600	L=SW
30	135	150	165	180	L=S <sup>2</sup> W/60	55	495	550	605	660	L=SW
35	185	205	225	245	L=S <sup>2</sup> W/60	60	540	600	660	720	L=SW
40	240	270	295	320	L=S <sup>2</sup> W/60	65	585	650	715	780	L=SW
45	405	450	495	540	L=SW	70	630	700	770	840	L=SW
Limited Access highways shall use a 1000' merging taper regardless of the posted speed.											
Shifting taper see Table 6H-2 <sup>2</sup>						Shoulder Taper = 1/3 L Minimum					

7. Channelizing device spacing shall be at the following:

Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)	
	0 -35	36 +		0 -35	36 +		0 -35	36 +
Transition	20'	40'	Travelway	40'	80'	*Construction Access	80'	120'

\*Construction access spacing may be increased to this distance, but shall not exceed one access per 1/4 mile.

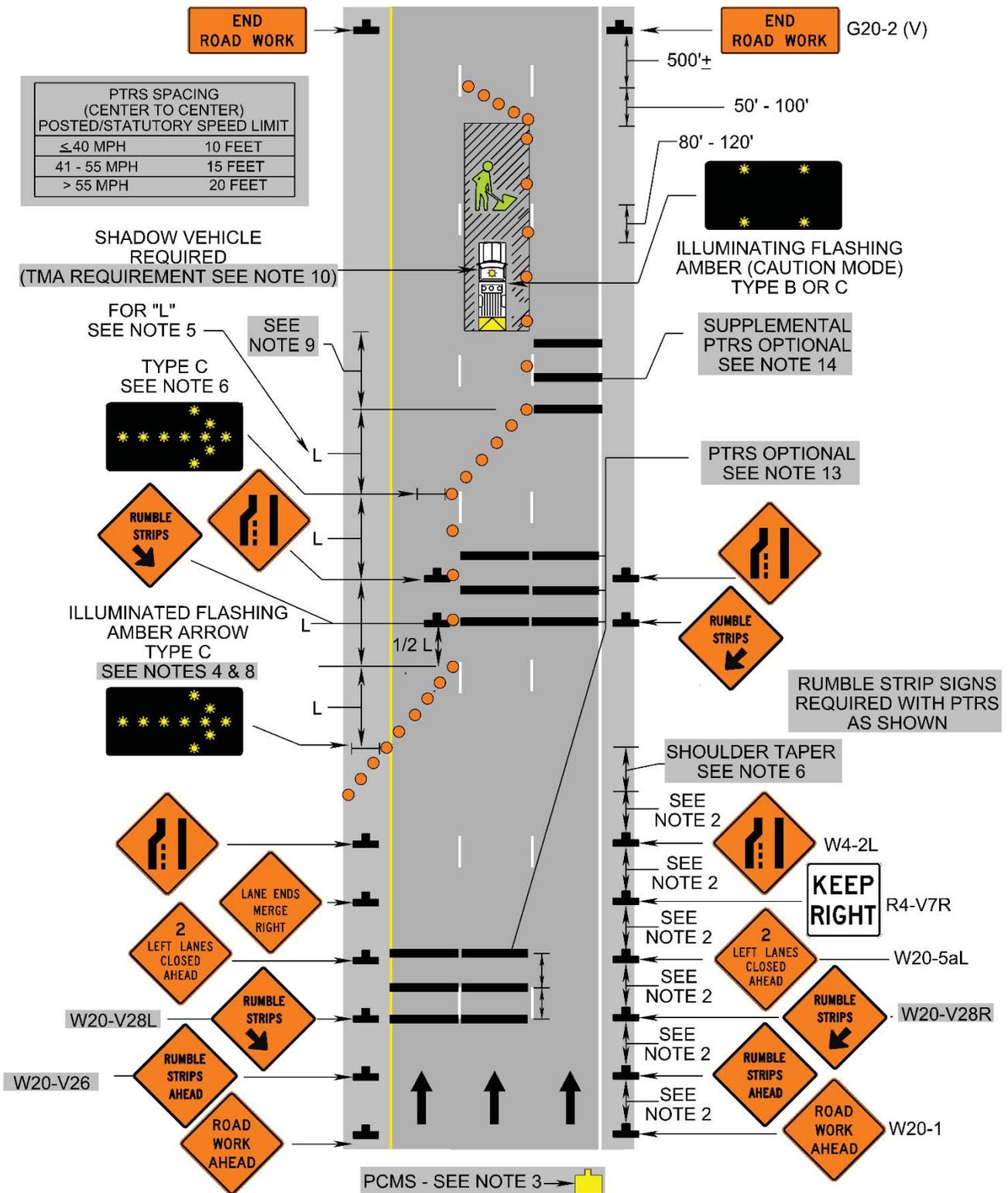
8. An arrow board shall be used when a lane is closed. When more than one lane is closed, a separate arrow board shall be used for each closed lane (see Figure TTC-18).
9. The buffer space length shall be shown in Table 6H-3 on Page 6H-5 for the posted speed limit.
10. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one high intensity amber rotating, flashing, or<sup>1</sup> oscillating light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.
11. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or<sup>1</sup> oscillating lights but can be used to supplement the amber rotating, flashing, or<sup>1</sup> oscillating lights.
12. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.

**Option:<sup>2</sup>**

13. PTRS and their supporting signs may be used, see sections 6F.99 and 6G.25. Long-term transverse rumble strips may be used in long-term situations, see Section 6F.99 and TTC-20.<sup>2</sup>
14. The supplemental PTRS may be eliminated.<sup>2</sup>

1: Revision 1 – 4/1/2015  
2: Revision 2 – 9/1/2019

### Multi-Lane Closure Operation (Figure TTC-18.2)



2: Revision 2 - 9/1/2019  
3: Revision 2.1 - 11/1/2020

**Typical Traffic Control**  
**Lane Closure Operation with Lane Weave**  
**(Figure TTC-19.2)**

**NOTES**

**Standard:**

1. On divided highways having a median wider than 8', right and left sign assemblies shall be required.

**Guidance:**

2. Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
3. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.<sup>2</sup>
4. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.
5. All vehicles, equipment, workers, and their activities should be restricted to one side of the pavement.

**Standard:**

6. Taper length (L) shall be at the following:

Taper Length L											
Speed Limit (mph)	Lane Width (Feet)				Remarks	Speed Limit (mph)	Lane Width (Feet)				Remarks
	9	10	11	12			9	10	11	12	
25	95	105	115	125	L=S <sup>2</sup> W/60	50	450	500	550	600	L=SW
30	135	150	165	180	L=S <sup>2</sup> W/60	55	495	550	605	660	L=SW
35	185	205	225	245	L=S <sup>2</sup> W/60	60	540	600	660	720	L=SW
40	240	270	295	320	L=S <sup>2</sup> W/60	65	585	650	715	780	L=SW
45	405	450	495	540	L=SW	70	630	700	770	840	L=SW

**Limited Access highways shall use a 1000' merging taper regardless of the posted speed.<sup>2</sup>**

**Shifting Tapers - full lane width shifts on Limited Access Highways shall use a 750' shifting taper for posted speeds less than 65 mph and a 1000' shifting taper for posted speeds equal to or greater than 65 mph. For all other roadways ¾ L should be used.<sup>2</sup>**

**Shoulder Taper = ¼ L Minimum**

7. Channelizing device spacing shall be at the following:

Channelizing Device Spacing								
Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)		Location	Speed Limit (mph)	
	0 -35	36 +		0 -35	36 +		0 -35	36 +
Transition	20'	40'	Travelway	40'	80'	*Construction Access	80'	120'

\*Construction access spacing may be increased to this distance, but shall not exceed one access per ¼ mile.

8. An arrow board shall be used when a lane is closed. When more than one lane is closed, a separate arrow board shall be used for each closed lane (see Figure TTC-18).
9. The buffer space length shall be shown in Table 6H-3 on Page 6H-5 for the posted speed limit.
10. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one high intensity amber rotating, flashing, or<sup>1</sup> oscillating light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.
11. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or<sup>1</sup> oscillating lights but can be used to supplement the amber rotating, flashing, or<sup>1</sup> oscillating lights.
12. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.

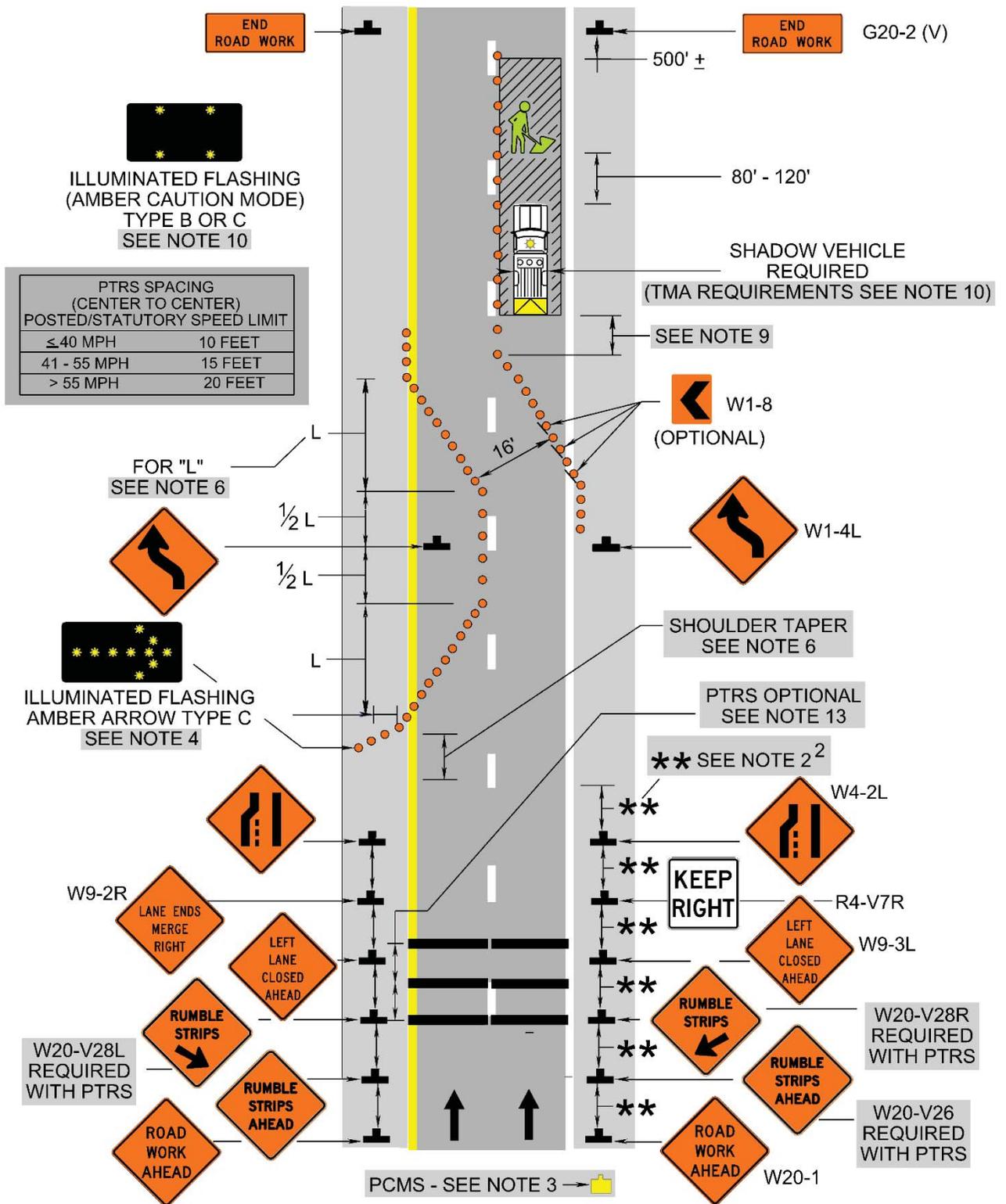
**Option:<sup>2</sup>**

13. PTRS and their supporting signs may be used, see sections 6F.99 and 6G.25. Long-term transverse rumble strips may be used in long-term situations, see Section 6F.99 and TTC-20.<sup>2</sup>

1: Revision 1 – 4/1/2015  
 2: Revision 2 – 9/1/2019

### Lane Closure Operation with Lane Weave

(Figure TTC-19.2)



2: Revision 2 – 9/1/2019  
 3: Revision 2.1 – 11/1/2020

**Typical Traffic Control**  
**Lane Closure Operation with Temporary Traffic Barrier <sup>1</sup>**  
**(Figure TTC-20.2)**

**NOTES**

*Guidance:*

1. See Table 6H-5, page 6H-6, for recommended spacing of advance warning signs.
2. SHOULDER CLOSED (W21-5a) signs should be used on Limited-Access Highways where there is no opportunity for disabled vehicles to pull off the roadway (see Figure TTC-6).
3. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.<sup>2</sup>
4. If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure should be provided in feet or miles, as appropriate.
5. An emergency pull-off area should be provided per Section 6G.18 and Temporary Traffic Control Figure TTC-8.

**Standard:**

6. On divided highways having a median wider than 8', right and left sign assemblies shall be required.
7. Group 2 channelizing device spacing shall be at the following:

Group 2 Channelizing Device Spacing						
Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)		Location Spacing
	0 -35	36 +		0 -35	36 +	
Transition	20'	40'	Travelway	40'	80'	Construction Access
Construction access spacing may be increased to this distance, but shall not exceed one access per ¼ mile.						

8. For taper lengths, see TTC-19.<sup>2</sup>
9. See Table 6H-6 for barrier transition flare rate.<sup>2</sup> When the barrier transition flare<sup>1</sup> is on a horizontal alignment, the total offset shall be prorated around the curve in lieu of a straight-line flare.
10. End treatment of a barrier in order of preference:
  - a. Where guardrail exists, attach to barrier with appropriate fixed object attachment.
  - b. Where cut slope exists, bury barrier into cut slope and provide for drainage as needed.
  - c. Extend end of barrier until it is beyond the established clear zone (see Figure 2 on Page A-4 of Appendix A for clear zone values).
  - d. When barrier end is inside the established clear zone, attenuator service Type I or Type II shall be used. Refer to L&D special design drawings.
11. Barrier panels 8 inches in width and 12 inches in height shall be placed on top of the concrete barrier and spaced on 40' centers along the transition or taper sections and spaced on 80' centers along the parallel or tangent sections. Reflectorized surface shall be fluorescent orange prismatic lens sheeting. The light at the beginning of the barrier run and at the breakpoint where the barrier becomes parallel to the roadway shall be a Type B flashing light. Barrier delimiters shall be spaced on 20' centers along the transition or taper sections and spaced on 80' centers and centered<sup>2</sup> in-between the barrier panels along the parallel or tangent sections<sup>2</sup> approximately 24 inches up from the roadway surface.

*Guidance:*

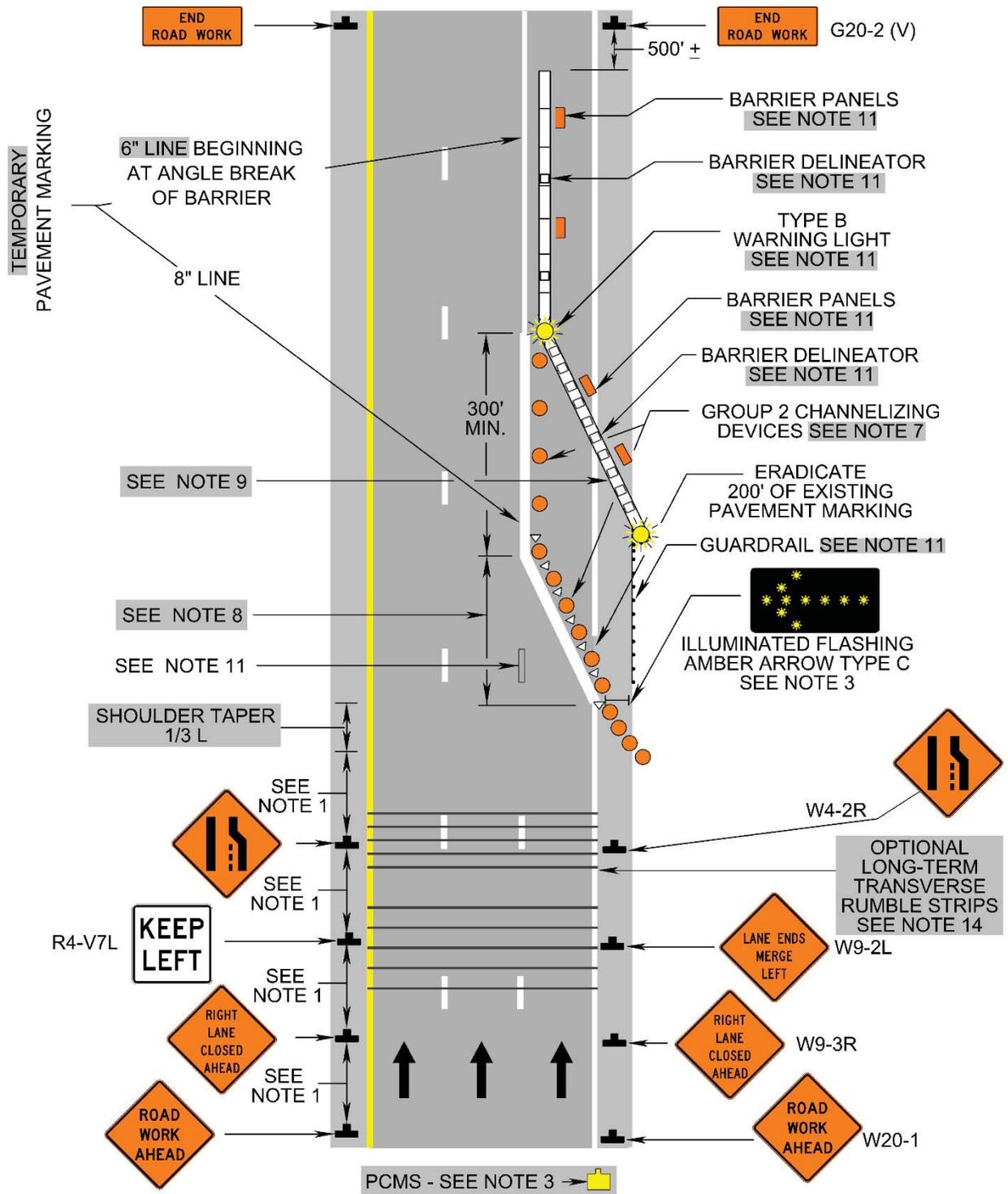
12. Eradication of existing pavement markings should be as shown in Figure TTC-55.

Option:

13. The barrier shown in this typical application is an example of one method that may be used to close a shoulder and lane<sup>2</sup> on a long-term project.
14. Long-term transverse rumble strips may be installed to enhance the work zone see Chapter 6F, Section 6F-99 paragraph 12 and 13 for installation guidance and spacing.<sup>2</sup>

1: Revision 1 – 4/1/2015  
 2: Revision 2 – 7/1/2018

### Lane Closure Operation with Temporary Traffic Barrier <sup>1</sup> (Figure TTC-20.2)



1: Revision 1 – 4/1/2015  
2: Revision 2 – 7/1/2018

**Typical Traffic Control**  
**Center Turn Lane Closure Operation**  
**(Figure TTC-21.1)**

**NOTES**

*Guidance:*

1. *The distance between signs should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.<sup>2</sup> The distance of the beginning of channelizing device transition should be a minimum of 500' and a maximum of 800'.*
2. *The buffer space length should be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.*
3. *For locations with a high volume of left turning movements, the graphic NO LEFT TURN (R3-2) signs should be used within the closed lane.*

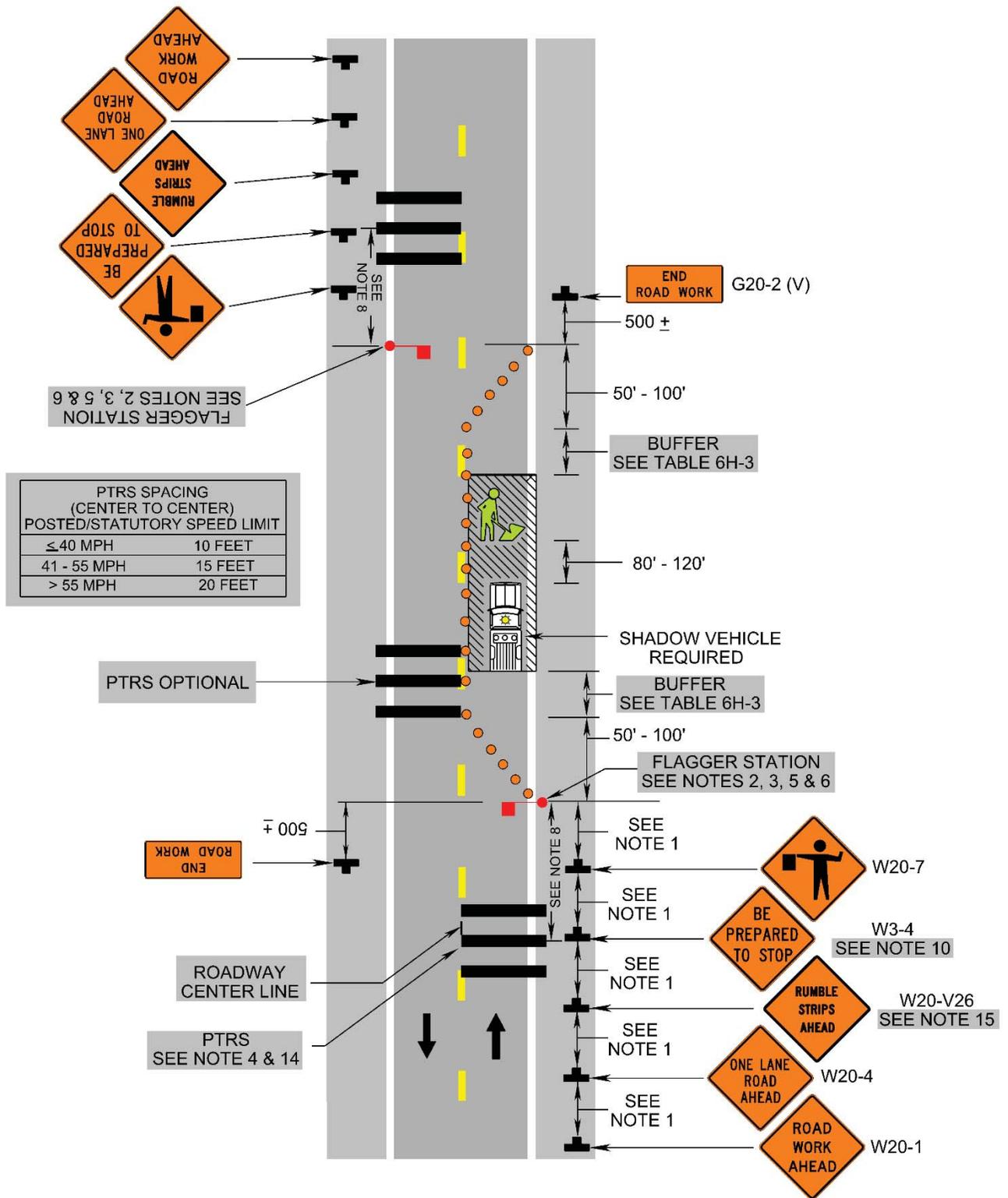
Option:

4. Where Right-of-Way or geometric conditions prevent use of 48" x 48" signs, 36" x 36" signs may be used.

**Standard:**

5. **To prevent vehicles from entering into the work zone, channelizing device spacing shall be a maximum of 20' on center.**
6. **A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one rotating amber light or high intensity amber flashing or oscillating<sup>1</sup> light shall be parked 80'-120' in advance of the work crew in both directions of travel. If multiple lanes are present (four or more lanes, excluding the center turn lane) and the posted speed limit is 45 mph or greater, the vehicles shall be equipped with a truck-mounted attenuator (TMA).**
7. **When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**

### Lane Closure on a Two-Lane Roadway Using Flaggers (Figure TTC-23.2)



- 1: Revision 1 – 4/1/2015
- 2: Revision 2 – 9/1/2019
- 3: Revision 2.1 – 11/1/2020

**Typical Traffic Control**  
***Non-Stationary Operation on a Two-Lane Roadway Using Flaggers***  
**(Figure TTC-24.2)**

**NOTES**

**Guidance:**

1. Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph.
2. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the flagger station and transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. Generally speaking, motorists should have a clear line of sight from the graphic flagger symbol sign to the flagger.
3. To maintain efficient traffic flow in a flagging operation on a two-lane roadway the maximum time motorist should be stopped at a flagger station is 8 minutes for high volume roadways (average daily traffic of 500 or more vehicles per day) to a maximum of 12 minutes for low volume roadways (less than 500 vehicles per day). For additional information see Section 6E.07.<sup>2</sup>

**Standard:**

4. PTRS shall be used as noted in Section 6F.99.<sup>2</sup>
5. Flagging stations shall be located far enough in advance of the work space to permit approaching traffic to reduce speed and/or stop before passing the work space and allow sufficient distance for departing traffic in the left lane to return to the right lane before reaching opposing traffic (see Table 6H-3 on Page 6H-5).
6. The Flagger (W20-7) symbol sign shall stay within ½ mile of each flagger.

**Guidance:**

7. Additional Flagger symbol signs should be erected by the flagger or others at ½ mile intervals or taken down as the operation proceeds past this point.<sup>2</sup>
8. When a highway-rail crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the highway-rail grade crossing, the temporary traffic control zone should be extended so that the transition area precedes the highway-rail crossing (see Figure TTC-56 for additional information on highway-rail crossings).
9. If the queue of traffic reaches the BE PREPARED TO STOP (W3-4) sign, then the advance warning signs should be readjusted at greater distances

**Option:<sup>2</sup>**

10. A SLOW (W21-V10) sign may be installed after the first FLAGGER symbol sign.<sup>2</sup>

**Standard:**

11. All flaggers shall be state certified and have their certification card in their possession when performing flagging duties (see Section 6E.01, Qualifications for Flaggers).
12. A shadow vehicle with at least one amber rotating, flashing or<sup>1</sup> oscillating lights shall be parked 80'-120' in advance of the first work crew.
13. The maximum length of the work area shall be two miles.



**Typical Traffic Control**  
***Outside Lane Closure Operation on a Multi-Lane Roundabout***  
**(Figure TTC-33.2)**

**NOTES**

**Support:**

1. Each roundabout is unique and the traffic control must be developed to meet the specific conditions of the location and the work operation. A detour could possibly better serve traffic movement and must be considered as an alternative to the flagger operation. This traffic control layout can be used on a traffic circle.

**Standard:**

2. **Multi-lane approaches to the roundabout shall be reduced to one lane and a flagger shall control traffic flow on each approach of the roundabout.**
3. **All flaggers shall be state certified and have their certification card in their possession when performing flagging duties. A lead flagger shall be designated and radio communication shall be used by the flaggers.**
4. **Only one quadrant of traffic shall be released at a time.**
5. **Taper length (L) and channelizing device spacing shall be as shown in Note 4 in TTC 32.0.**
6. **At night, flagger stations shall be illuminated, except in emergencies. Street lights and vehicle headlights shall not be used to illuminate the flagger station.**
7. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
8. **A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one amber high intensity rotating, oscillating, or flashing<sup>1</sup> light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.**
9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or<sup>1</sup> oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or<sup>1</sup> oscillating lights.**
10. **A minimum of four (4) drum channelizing devices shall be placed on the shoulder in advance of the PCMS in a taper for delineation (see Figure 6F-6).**

**Guidance:**

11. *Sign spacing distance should be 350'- 500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph.*
12. *Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance to the flagger station, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. Generally speaking, motorists should have a clear line of sight from the graphic flagger symbol sign to the flagger.*
13. *Time limits for stopping traffic by a flagger should be followed, see Section 6E.07.<sup>2</sup>*
14. *A PCMS should be used as part of the traffic control plan to provide clear guidance to motorist on all approaches of the roundabout that must reverse traffic flow.*
15. *When designing the traffic control and installing the channelizing devices for work activities at roundabouts, accommodations for the turning radius of tractor trailer vehicles and other large vehicles should be considered and the work zone designed accordingly.*

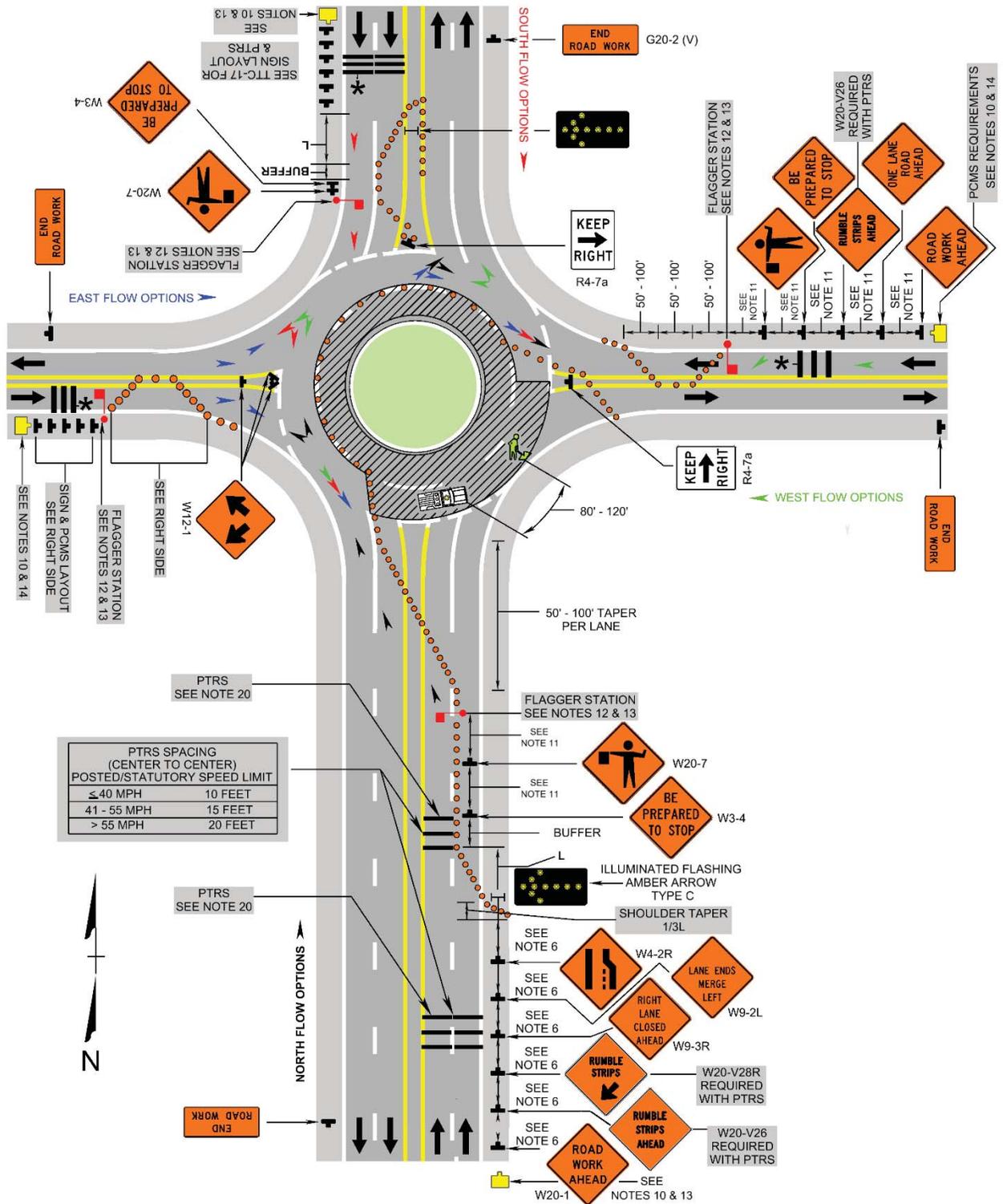
**Option**

16. Periodic adjustments to the channelizing devices may be allowed in an active work zone to accommodate the turning movements of tractor trailer vehicles and other large vehicles.
17. A supplemental flagger may be used in the roundabout island to help direct traffic and may be required on the approaches in advance warning of the flagging operation to slow traffic prior to reaching the flagger station or queued traffic.
18. A guide sign with road names may be used in lieu of the Double Arrow (W12-1) sign.
19. On the approaches where traffic flow will be split, two pilot vehicles may be used to guide traffic through the roundabout.
20. PTRS may be used on multi-lane roadways, see Section 6F.99, TTC-16 and TTC-23.<sup>2</sup>

1: Revision 1 – 4/1/2015

2: Revision 2 – 9/1/2019

### Outside Lane Closure Operation on a Multi-Lane Roundabout (Figure TTC-33.2)



- 1: Revision 1 – 4/1/2015
- 2: Revision 2 – 9/1/2019
- 3: Revision 2.1 – 11/1/2020

**Typical Traffic Control**  
***Street Closure Operation with Detour***

**(Figure TTC-34.2)**

**NOTES**

*Guidance:*

1. *This plan should be used for streets without posted route numbers.*
2. *On multi-lane streets, Detour signs with an Advance Turn Arrow should be used in advance of a turn.*
3. *Sign spacing distance should be 225'-275' where the posted speed limit is 30 to 35 mph, and 100'-200' where the posted speed is 25 mph or less.*
4. *If the road is opened for a significant distance beyond the intersection and/or there are significant origin/destination points beyond the intersection, the ROAD CLOSED (R11-2) and Detour Arrow (M4-10) signs on Type 3 Barricades should be located at the corners of intersecting closed roadway or the traveled way.*
5. *In urban areas, signs on an eight foot Type 3 barricade, should not cover more than half of the top two rails. On a four foot Type 3 barricade, a sign should not cover more than the top rail. When used alone on a four foot Type 3 barricade, the ROAD CLOSED (R11-1) sign or the ROAD CLOSED TO THRU TRAFFIC (R11-4) sign should be installed above the Type 3 barricade.<sup>2</sup>*

Option:

6. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
7. Flashing warning lights may be used on Type 3 Barricades.
8. Detour signs may be located on the far side of intersections. A Detour sign with an advance arrow may be used in advance of a turn.
9. A Street Name (M4-VP1a) plaque may be mounted with the Detour sign. The Street Name plaque may be either white on green or black on orange.

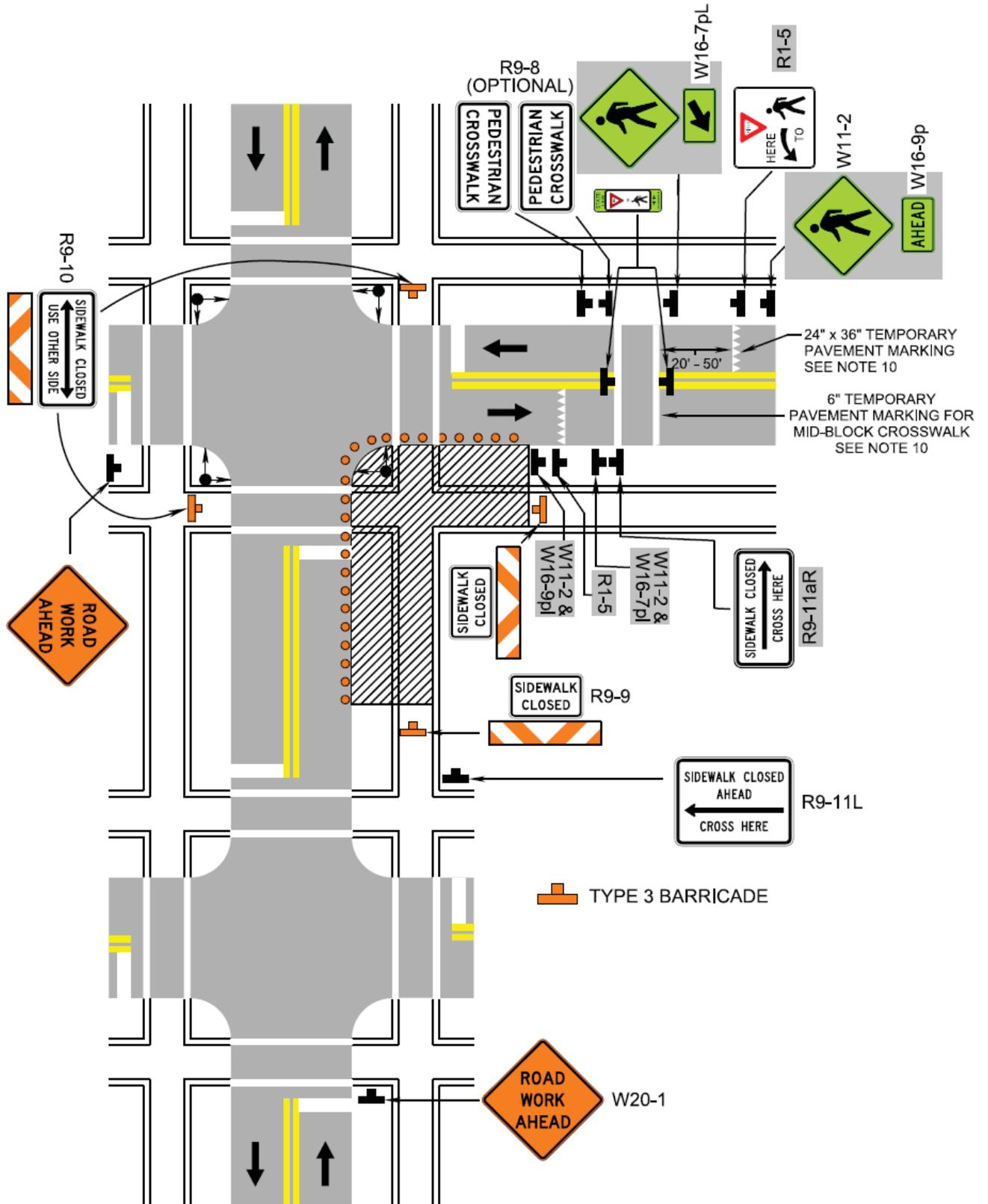
**Standard:**

10. **When used, the Street Name plaque shall be placed above the Detour sign.**

Support:

11. See Chapter 6I for additional information on incident management traffic control.

### Crosswalk Closure and Pedestrian Detour Operation (Figure TTC-36.2)



1: Revision 1 – 4/1/2015  
2: Revision 2 – 7/1/2018

**Typical Traffic Control**  
**Work Operation in the Vicinity of an Exit Ramp**  
**(Figure TTC-37.2)**

**NOTES**

*Guidance:*

1. Sign spacing distance should be 1300'-1500' for Limited Access highways, and on all other roadways 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
2. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.<sup>2</sup>
3. When flaggers are used, care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the flagger station and transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. Generally speaking, motorists should have a clear line of sight from the graphic flagger symbol sign to the flagger.

**Standard:**

4. On divided highways having a median wider than 8', right and left sign assemblies shall be required.
5. A temporary EXIT (E5-V1) sign shall be located in the temporary gore. For better visibility, the EXIT, EXIT OPEN (E5-2) and EXIT CLOSED (E5-2a) signs<sup>1</sup> shall be mounted a minimum of 5'<sup>2,1</sup> feet from the pavement surface to the bottom of the sign. The EXIT OPEN or the EXIT CLOSED sign shall be installed 500 feet in advance of the ramp's taper.<sup>2</sup>
6. Taper length (L) shall be installed in accordance to Table 6H-2.<sup>2</sup>
7. The minimum distance between the end of the taper and the beginning of the off ramp shall be 1000'.<sup>2</sup>
8. Channelizing device spacing shall be installed in accordance to Table 6H-4. On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.<sup>2</sup>
9. In stationary lane closures, the right side exit ramps drums shall be used on the left side taper (L) starting at the work zone's gore and extending down the ramp. On left side exit ramps, drums shall be used on the right side taper (L) starting at the work zone's gore and extending down the ramp. Cones shall be used on the opposite side of the taper.<sup>2</sup>
10. For long term stationary operations, pavement markers and 8 inch pavement markings shall be installed to provide clear guidance to motorists exiting the highway. Pavement markers and pavement markings shall be installed in accordance to Section 1300 of the the Road and Bridge Standards.<sup>2</sup>
11. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or equipped with at least one high intensity amber<sup>1</sup> rotating, oscillating, or flashing<sup>1</sup> light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.

*Guidance:*

12. The guide signs should indicate that the ramp is open, and where the temporary ramp is located. However, if the ramp is closed, guide signs should indicate that the ramp is closed.
13. When the exit ramp is closed, a black on orange EXIT CLOSED (E5-2a) sign should be placed diagonally across the interchange/intersection guide signs.
14. An END ROAD WORK (G20-2 (V)) sign should be placed 500' past the temporary traffic control devices on the off ramp.

**Option:**

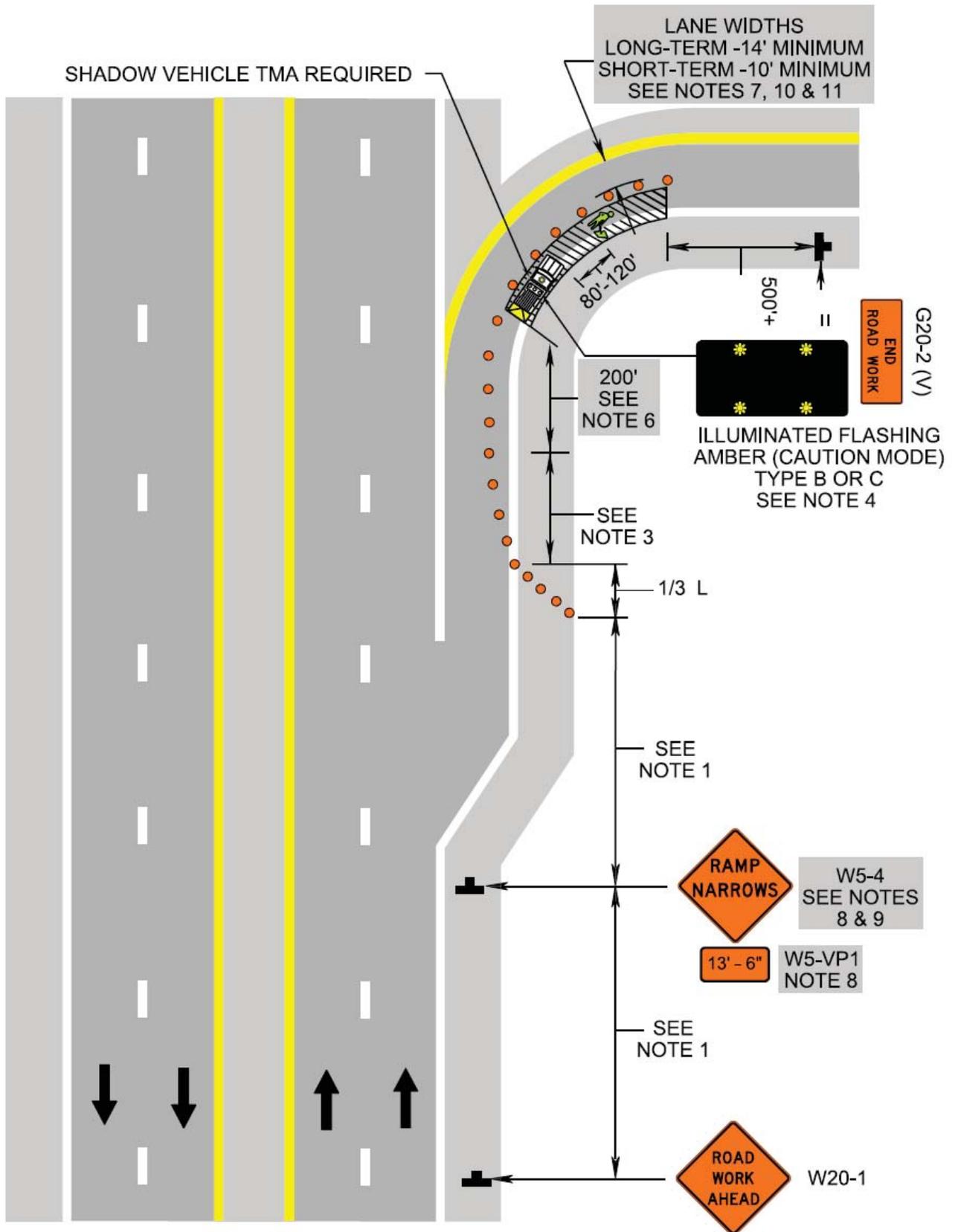
15. The temporary EXIT sign placed in the temporary gore may be either black on orange or white on green.
16. An alternative procedure that may be used is to channelize exiting vehicular traffic onto the right-hand shoulder and close the lane as necessary.

1: Revision 1 – 4/1/2015

2: Revision 2 – 9/1/2019

3: Revision 2.1 – 11/1/2020

### Partial Exit Ramp Closure Operation (Figure TTC-38.2)



**Typical Traffic Control**  
**Work Operation in the Vicinity of an Entrance Ramp**

**(Figure TTC-39.2)**

**NOTES**

*Guidance:*

1. Sign spacing distance should be 1300'-1500' for Limited Access highways, and on all other roadways 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
2. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.<sup>2</sup>
3. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3.
4. An acceleration lane of sufficient length should be provided whenever possible as shown on the left diagram.

**Standard:**

5. For the information shown on the diagram on the right-hand side of the typical application, where inadequate acceleration distance exists for the temporary entrance, the YIELD (R1-2) sign shall be replaced with STOP (R-1-1) signs (one on each side of the approach). For better visibility, the STOP and YIELD signs shall be mounted a minimum of 5<sup>2.1</sup> feet from the pavement surface to the bottom of the sign.<sup>1</sup>
6. For taper lengths and channelizing device spacing, Note 5 of TTC-37 shall be used. The minimum length of a lane closure taper on a Limited Access highway shall be 1000'.
7. For long-term stationary operations, pavement markers and 8-inch wide pavement markings, regardless of the pavement markings type, shall be installed to provide clear guidance to motorists exiting the highway. Pavement markers and pavement marking shall be installed in accordance to Section 1300 of the the Road and Bridge Standards.<sup>2</sup>
8. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.
9. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or equipped with at least one high intensity amber rotating, oscillating, or flashing<sup>1</sup> light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.
10. For long-term work zones existing conflicting pavement markings and markers shall be removed and temporary pavement markings and markers shall be installed per Figure TTC-60.
11. Where the acceleration distance is significantly reduced, a NO MERGE AREA (W4-5P) supplemental plaque shall be placed below the Yield Ahead (W3-2) sign.<sup>2</sup>

*Guidance:*

12. When used, the YIELD or STOP sign should be located so that ramp vehicular traffic has adequate sight distance of oncoming mainline vehicular traffic to select an acceptable gap in the mainline vehicular traffic flow, but should not be located so far forward that motorists will be encouraged to stop in the path of the mainline traffic. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap size needed. If insufficient gaps are available, consideration should be given to closing the ramp.
13. Where STOP signs are used, a temporary stop line should be placed across the ramp at the desired stop location.
14. The mainline merging taper with the arrow board at its starting point should be located sufficiently in advance so that the arrow board does not confuse the drivers on the entrance ramp, and so that the mainline merging vehicular traffic from the lane closure has the opportunity to stabilize before encountering the vehicular traffic merging from the ramp.
15. If the ramp curves sharply to the right, warning signs with advisory speeds located in advance of the entrance terminal should be placed in pairs (one on each side of the ramp).

Option:

16. A Type B high-intensity flashing warning light with a red lens may be placed above the STOP sign.

1: Revision 1 – 4/1/2015

2: Revision 2 – 9/1/2019

3: Revision 2.1 – 11/1/2020



## Typical Traffic Control Interior Lane Closure Operation on a Multi-Lane Roadway

**(Figure TTC-42.2)**

### NOTES

**Guidance:**

1. Sign spacing distance should be 1300'-1500' for Limited Access highways, and on all other roadways 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.
2. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.

**Standard:**

3. On divided highways having a median wider than 8', right and left sign assemblies shall be required.
4. Taper length (L) shall be at the following:

Taper Length L												
Speed Limit (mph)	Lane Width (Feet)				Remarks		Speed Limit (mph)	Lane Width (Feet)				Remarks
	9	10	11	12				9	10	11	12	
25	95	105	115	125	L=S <sup>2</sup> W/60		50	450	500	550	600	L=SW
30	135	150	165	180	L=S <sup>2</sup> W/60		55	495	550	605	660	L= SW
35	185	205	225	245	L=S <sup>2</sup> W/60		60	540	600	660	720	L=SW
40	240	270	295	320	L=S <sup>2</sup> W/60		65	585	650	715	780	L=SW
45	405	450	495	540	L=SW		70	630	700	770	840	L=SW
<b>Limited Access highways shall use a 1000' merging taper regardless of the posted speed.</b>												
<b>Shoulder Taper = 1/3 L Minimum</b>												

5. Channelizing device spacing shall be at the following:

Channelizing Device Spacing								
Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)		Location Spacing	Speed Limit (mph)	
	0 -35	36 +		0 -35	36 +		0 -35	36 +
Transition	20'	40'	Travelway	40'	80'	*Construction Access	80'	120'
*Construction access spacing may be increased to this distance, but shall not exceed one access per 1/4 mile.								

6. On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.
7. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.
8. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least one high intensity amber rotating, oscillating, or flashing<sup>1</sup> light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-mounted attenuator shall be used.
9. For long-term work zones existing conflicting pavement markings and markers shall be removed and temporary pavement markings and markers shall be installed per Figure TTC-60.

**Option:**

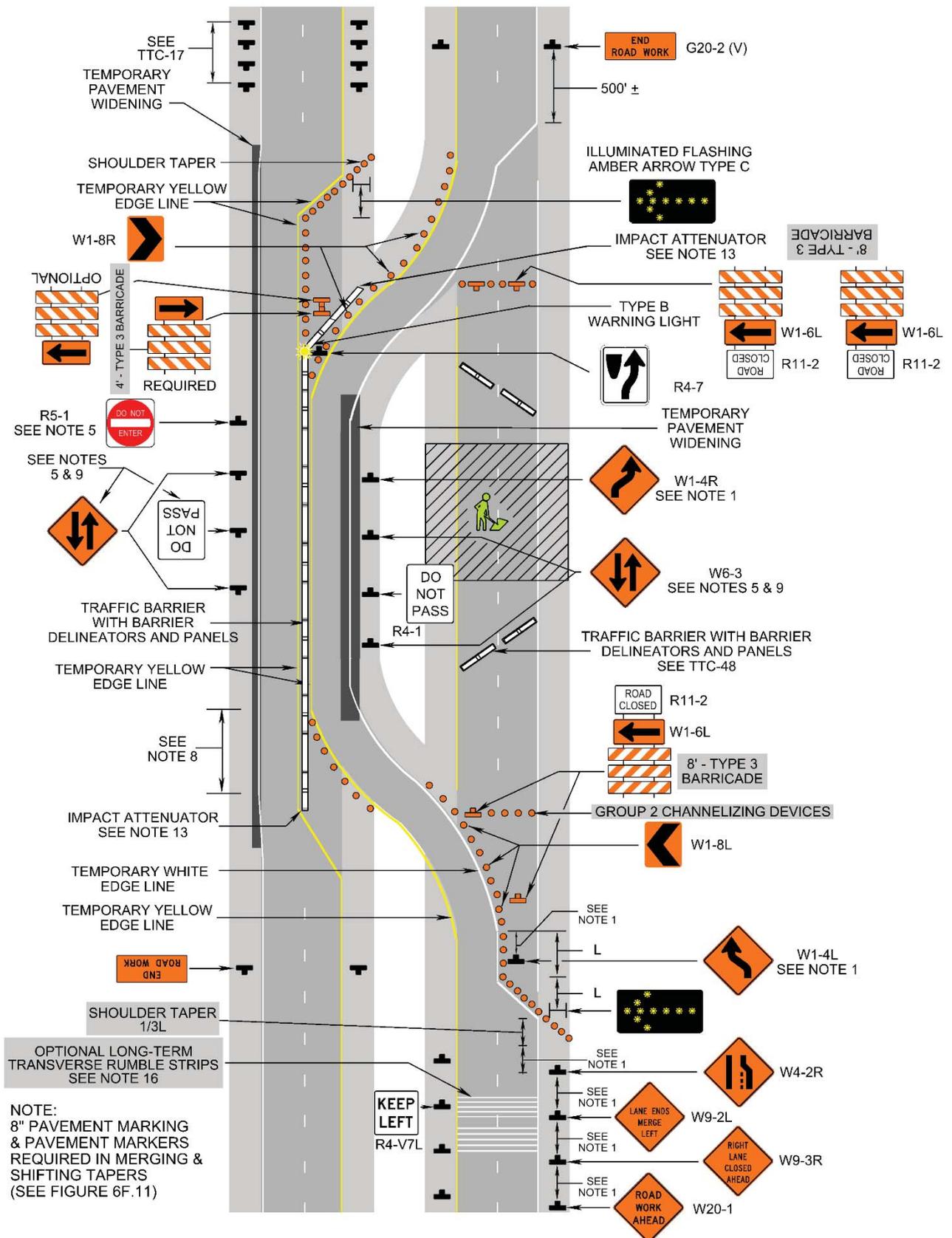
10. For short-term stationary work (less than 3 days duration), lanes may be delineated by channelizing devices or removable pavement markings instead of temporary pavement markings.
11. PTRS may be used on undivided roadways, see section 6F.99 for proper spacing of PTRS and Figures TTC-17.<sup>2</sup>

**Guidance:**

12. When channelizing devices have the potential of leading vehicular traffic out of the intended traffic space, the channelizing devices should be extended a distance with 4 additional channelizing devices<sup>1</sup> beyond the downstream end of the transition area as depicted.
13. For locations with a high volume of left turning movements, the graphic NO LEFT TURN (R3-2) signs should be used.<sup>1</sup>

1: Revision 1 – 4/1/2015  
2: Revision 2 – 9/1/2019

### Median Cross-Over Operation on a Multi-Lane Roadway (Figure TTC-44.2)



- 1: Revision 1 – 4/1/2015
- 2: Revision 2 – 9/1/2019
- 3: Revision 2.1-11/1/2020

**Typical Traffic Control**  
**Total Limited Access Highway Closure Operation**  
**(Figure TTC-45.2)**

**NOTES**

**Support:**

1. Conditions in this TTC represent planned work activities. See Chapter 6I for additional information on incident management traffic control.

**Guidance:**

2. *A Portable Changeable Message Sign (PCMS) should be placed a minimum of one mile in advance of the exit proceeding the beginning of the first lane closure activity or queued traffic advising of the road closure ahead. An additional PCMS should be placed one mile in advance of the stationary signing advising ROAD WORK AHEAD, ALL LANES EXIT RIGHT.*
3. *Sign spacing distance should be 1300'-1500' for Limited Access highways.*

**Standard:**

4. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
5. **Channelizing device spacing shall be a maximum of 40' in transitions, and 80' along the travelway. Transitions shall be a minimum of 1000' in length.**

**Guidance:**

6. *When detour signing has been installed along the detour route (see Figures TTC-46 or TTC-47), a DETOUR with directional arrow or Detour with a Route Assembly sign should be placed halfway up the ramp or loop. Additionally, a third message should be added to the one mile Portable Changeable Message Sign advising "DETOUR AHEAD."*

**Option:**

7. Other sign layouts for "Total Limited Access Highway Closure" may be substituted as directed by the District<sup>2</sup> Traffic Engineer.

**Standard:**

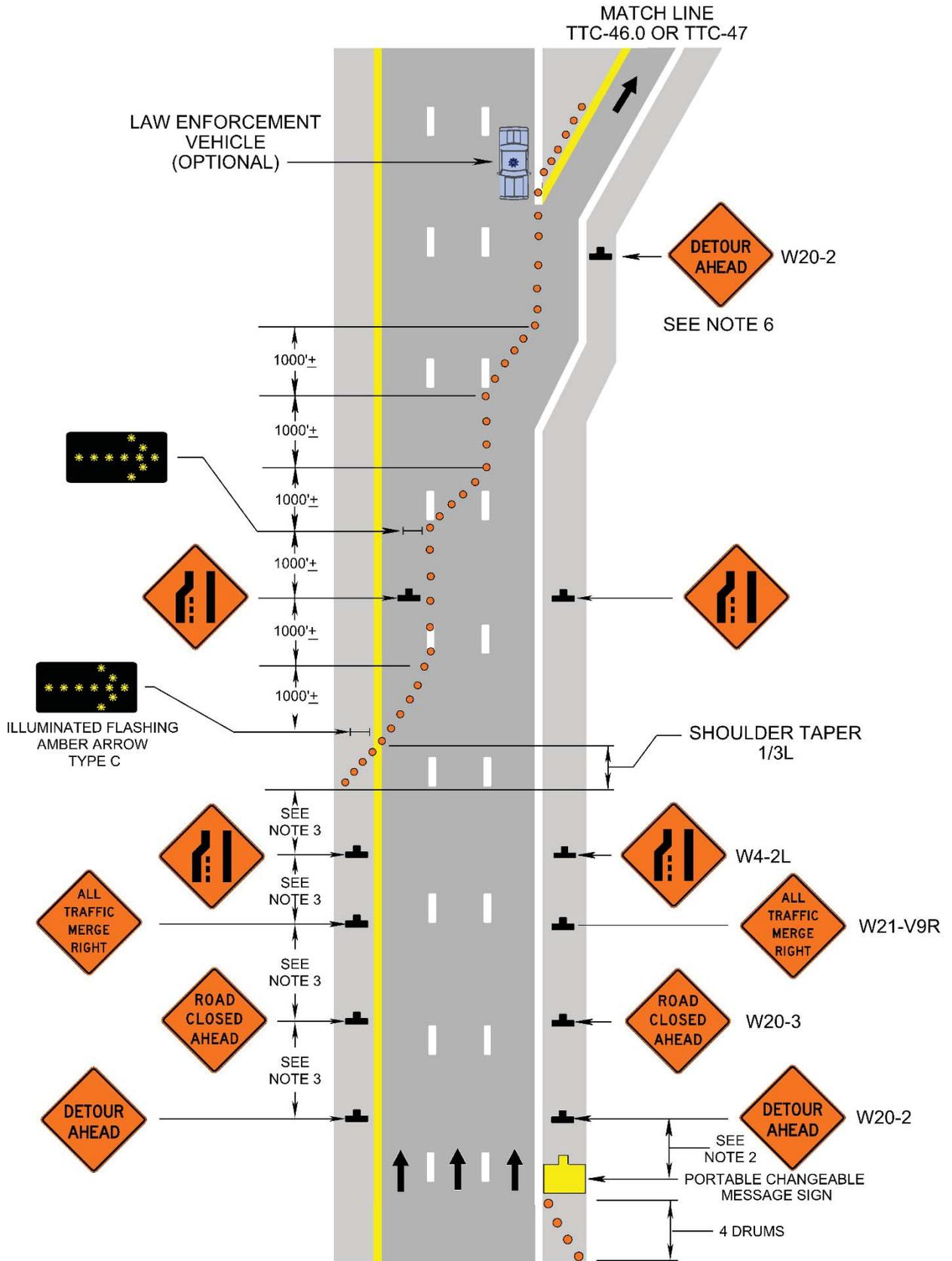
8. **A minimum of four (4) drum channelizing devices shall be placed on the shoulder in advance of the PCMS in a taper for delineation (see Figure 6F-6).**

**Guidance:**

9. *Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.*

### Total Limited Access Highway Closure Operation

(Figure TTC-45.2)



- 1: Revision 1 – 4/1/2015
- 2: Revision 2 – 9/1/2019
- 3: Revision 2.1-11/1/2020

**Typical Traffic Control**  
***Limited Access Highway Closure Operation with a Short-Term Detour***  
**(Figure TTC-46.2)**

**NOTES**

*Guidance:*

1. *Regulatory traffic control devices should be modified as needed for the duration of the detour.*
2. *Figure TTC-46 illustrates a general layout of detour signs. Additional detour signs should be erected at all connecting roadways.*
3. *Detour signs with an Advanced Turn Arrow (M4-V3) should have a spacing distance of 300' minimum in advance of the intersection. The Detour signs with the Point of Turn Arrow (M4-9) should be placed at the intersection.*
4. *When closing a ramp, the channelizing device spacing should be a maximum of 10'.*

Option:

5. *Other sign layouts may be substituted as directed by the District<sup>2</sup> Traffic Engineer.*
6. *Flashing warning lights and/or flags may be used to call attention to the advance warning signs.*

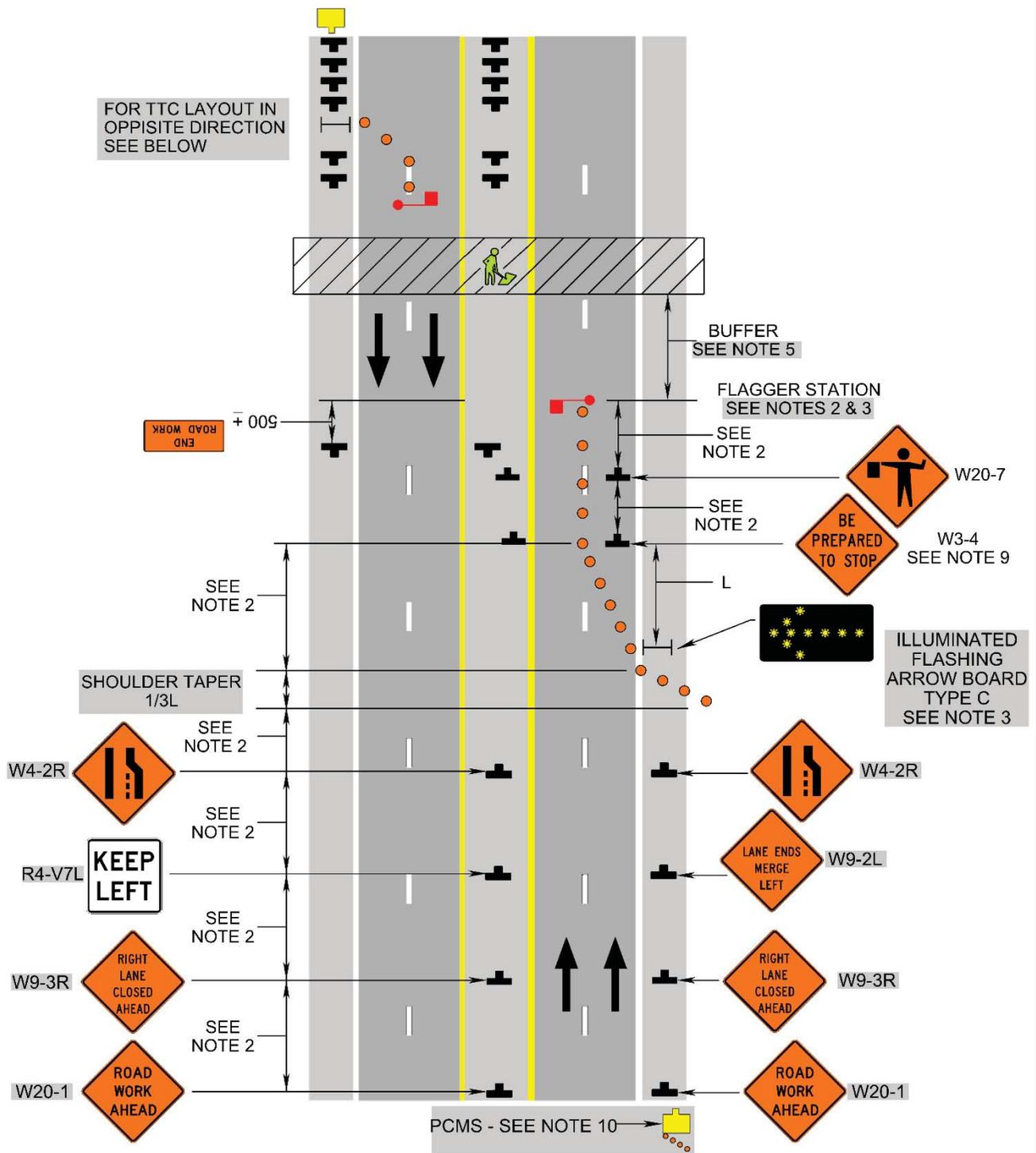
**Standard:**

7. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
8. **A minimum of four (4) drum channelizing devices shall be placed on the shoulder in advance of the PCMS in a taper for delineation (see Figure 6F-6).**

**Support:**

9. Short-term stationary operation is daytime work that occupies a location for more than 1 hour within a single daylight period.
10. See Chapter 6I for additional information on incident management traffic control.

### Disruption Operation on a Multi-Lane Roadway (Figure TTC-50.2)



2: Revision 2 – 9/1/2019  
3: Revision 2.1 -11/1/2020

**Typical Traffic Control**  
**Haul Road Crossing Operation**  
**(Figure TTC-51.2)**

**NOTES**

*Guidance:*

1. Overhead temporary lighting should be used to illuminate haul road crossings where existing light is inadequate.
2. Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph.
3. Time limits for stopping traffic by a flagger should be followed, see Section 6E.07.<sup>2</sup>
4. Where no passing lines are not already in place, they should be added.

**Standard:**

5. The traffic control signing shall be the same in both directions.
6. A NO PASSING ZONE (W14-3) sign shall be used directly across from the DO NOT PASS (R4-1) sign.
7. When a road used exclusively as a haul road is not in use, 8 foot<sup>2</sup> Type 3 barricade with a ROAD CLOSED (R11-2) sign shall be in place and the Flagger (W20-7) symbol or Signal Ahead (W3-3) and BE PREPARED TO STOP (W3-4) signs covered or removed. The responsibility for ensuring the placement of Type 3 Barricades shall be assigned to a person who will ensure proper closure at the end of each work day.<sup>2</sup>
8. All flaggers shall be state certified and have their certification card in their possession when performing flagging duties.

**Flagging Method**

*Guidance:*

9. The buffer space length should be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.

**Standard**

10. PTRS shall be installed in accordance to Section 6F.99 and TTC-23.<sup>2</sup>
11. At night, flagger stations shall be illuminated, see Section 6E.08.<sup>2</sup>

**Signalized Method**

12. When the haul road is not in use, the signals shall either flash yellow on the main road or be covered, and the Signal Ahead and STOP HERE ON RED (R10-6) signs shall be covered or removed.
13. The temporary traffic control signals shall control both the highway and the haul road and shall meet the physical display and operational requirements of conventional traffic control signals as described in Part 4 of the 2009 MUTCD. Authorized officials shall establish traffic control signal timing.
14. Stop lines shall be used on existing highway with temporary traffic control signals.
15. Existing conflicting pavement markings and raised pavement marker reflectors between the stop lines shall be removed.
16. After the temporary traffic control signal is removed, the stop lines and other temporary pavement markings shall be removed and the permanent pavement markings restored.
17. Safeguards shall be incorporated to avoid the possibility of conflicting signal indications at each end of the TTC zone.

- One open lane for traffic with a stop/yield condition or temporary traffic signal controlling traffic.
- **Minimum<sup>2.1</sup>** lane width of 10 feet with a maximum posted speed of 25 mph.

Designers and engineers should refer to the Road and Bridge Standards for specific details on MB-10A and MB-11A.<sup>1a</sup>

Traffic Barrier Service Concrete (TBSC) Deflection

See VDOT’s NCHRP Approved list.<sup>1a</sup>

**Acceptance based on the following NCHRP 350 Test Criteria**

Dynamic deflection is based on:

- ¾ Ton pick-up truck at 45 mph and 25° impact angle (TL-2).
- ¾ Ton pick-up truck at 62 mph and 25° impact angle (TL-3).
- 18,000 lb Single unit truck at 50 mph and 15° impact angle (TL-4).

For additional information on longitudinal barriers, length of need and impact attenuator application, please refer to IIM-LD-93, Construction Work Zone/ Safety Guidelines and Pay Items for Construction Work Zone: <http://www.extranet.vdot.state.va.us/locdes/electronic%20pubs/iim/IIM93.pdf>

**Table 2, Traffic Barrier Service Concrete Deflection Table**

Barrier types most likely to be used on VDOT projects are shown in **bold** and highlighted.

FHWA Code	Manufacturer	Device Description	Test Level	Dynamic Deflection	Anchorage (a)
<b>B-79</b>	<b>Pennsylvania DOT</b>	<b>12.5' Long F-Shape temporary barrier w/plate connection.</b>	TL-3	8'- 7"	80'
<b>B-63</b>	<b>Barrier Systems, Inc.</b>	<b>Quickchange Moveable Barrier (QMB)</b>	TL-3	4'- 6"	10'- 4"
<b>B-54</b>	<b>Virginia DOT</b>	<b>20' Long F-Shape barrier w/pin &amp; loop connection.</b>	TL-3	6'	60'
<b>B-42</b>	<b>Rockingham Precast</b>	<b>12' Long F-Shape w/T-Bar connection.</b>	TL-3	3'- 10"	60'
<b>B-40</b>	<b>Barrier Systems, Inc.</b>	<b>Narrow Quickchange Moveable Barrier.</b>	TL-3	2'- 11"	(b)

a – Anchorage is defined as the additional length of barrier needed, upstream and downstream of the work zone, to ensure the system does not exceed the maximum dynamic deflection noted in the adjacent column.

b – System was anchored using two 6" steel tubes and two 1" by 4" steel straps w/turnbuckles. These were attached to two 3' diameter by 8' deep reinforced concrete anchors.

1a: Revision 1a – 10/30/2015  
 3: Revision 2.1 – 11/1/2020

Temporary Longitudinal Steel Barriers<sup>1</sup>**Acceptance based on the following NCHRP 350/Mash08 Test Criteria**

[See VDOT's NCHRP Approved list.](#)<sup>1a</sup>

Dynamic deflection is based on:

¾ Ton pick-up truck at 45 mph and 25° impact angle (TL-2).

¾ Ton pick-up truck at 62 mph and 25° impact angle (TL-3).

**Table 3, Acceptable Longitudinal Steel Barriers**

FHWA Code	Manufacturer	Device Description	Test Level	Dynamic Deflection	Anchorage
B134	Energy Absorption Systems, Inc.	Vulcan Barrier	TL-3	13'- 2"	302' Lg. (a)
B134	Energy Absorption Systems, Inc.	Vulcan Barrier with Anchoring System VAS	TL-3	6'- 11"	(b)
B-131	Highway Care, Inc.	Barrier Guard 800	TL-3	4'- 11"	(c)
B-158	Highway Care, Inc.	Barrier Guard 800 MDS	TL-3	0'- 3"	(d)
B-176A	Hill & Smith, Inc.	Zone Guard Standard	TL-3	6'- 4"	(e)
B-176A	Hill & Smith, Inc.	Zone Guard Minimum Deflection	TL-3	1'- 4"	(f)

- a – Freestanding barrier with no anchorage and is defined as the additional length of barrier needed, upstream and downstream of the work zone, to ensure the system does not exceed the maximum dynamic deflection noted in the adjacent column.
- b – System was anchored using a QuadGuard CZ<sup>®</sup>. This system is acceptable for uni-directional (run-on only) conditions. Refer to FHWA acceptance letter B-131 for additional guidance for this application.
- c – System was anchored each end with four anchors. System must be terminated outside of clear zone or shielded with a crashworthy device.
- d – System was anchored each end with four anchors. Each barrier of the system was also anchored every 20 feet with either joint anchors or intermediate anchors. System must be terminated outside of clear zone or shielded with a crashworthy device.
- e – System was anchored with four anchors at each end. System must be terminated outside of clear zone or shielded with a crashworthy device.
- f – System was anchored with four anchors at each end. The system was also anchored every 33'- 4" along the barrier. System must be terminated outside of clear zone or shielded with a crashworthy device.

**Longitudinal Channelizing Devices (Portable Water-Filled Devices)**

**Please Note:** Longitudinal channelizing devices (water-filled plastic devices) can only be used in lieu of Group 2 devices (Drums & Vertical Panels). Longitudinal channelizing devices shall not be substituted for Traffic Barrier Service Concrete (temporary concrete barriers) due to their severe dynamic deflections.

1: Revision 1 – 4/1/2015

1a: Revision 1a – 10/30/2015