CHAPTER 6P. TYPICAL APPLICATIONS

Section 6P.01 Typical Applications

Support:

01 Chapter 6N contains discussions of typical TTC activities. Section 6A.02 contains discussions on development of TTC plans for the various activities. This Chapter presents typical applications for a variety of situations commonly encountered. While not every situation is addressed, the information illustrated can generally be adapted to a broad range of conditions. In many instances, an appropriate TTC plan is achieved by combining features from various typical applications. For example, work at an intersection might present a near-side TTC zone for one street and a far-side TTC zone for the other street. These treatments are found in two different typical applications, while a third typical application shows how to handle pedestrian crosswalk closures.

02 In general, the procedures illustrated represent minimum solutions for the situations depicted. Except for the notes (which are clearly classified using headings as being Standard, Guidance, Option, or Support), the information presented in the typical applications can generally be regarded as Guidance.

Option:

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

04 Other devices may be added to supplement the devices and device spacing may be adjusted to provide additional reaction time or delineation. Fewer devices may be used based on field conditions.

Support:

05 Figures and tables found throughout Part 6 provide information for the development of TTC plans.

06 Table 6P-1 is an index of the 54 typical applications. In the printed version, the typical applications are shown on the right-hand page with notes on the facing page to the left. In the electronic version, the notes are shown on the page preceding the figure. The legend for the symbols used in the typical applications is provided in Table 6P-2. In many of the typical applications, sign spacings and other dimensions are indicated by letters using the criteria provided in Table 6B-1. The formulas for determining taper lengths are provided in Table 6B-4.

07 Most of the typical applications show TTC devices for only one direction.

Guidance:

08 *The spacing of channelizing devices should not exceed the maximum distances shown in Table 6K-101(CA).*

Support:

09 Refer to Table 6P-1(CA) for California Typical Applications.

Table 6P-1. Index to Typical Applications (Sheet 1 of 2)

Typical Application Description	Typical Application Number
Work Outside of the Shoulder (see Section 6N.05)	
Work Beyond the Shoulder	TA-1
Blasting Zone	TA-2
Work on the Shoulder (see Sections 6N.06 and 6N.07)	
Work on the Shoulders	TA-3
Short-Duration or Mobile Operation on a Shoulder	TA-4
Shoulder Closure on a Freeway	TA-5
Shoulder Work with Minor Encroachment	TA-6
Work within the Traveled Way of a Two-Lane Highway (see Section 6N.09)	
Road Closed with a Diversion	TA-7
Roads Closed with an Off-Site Detour	TA-8
Overlapping Routes with a Detour	TA-9
Lane Closure on a Two-Lane Road Using Flaggers	TA-10
Lane Closure on a Two-Lane Road with Low Traffic Volumes	TA-11
Lane Closure on a Two-Lane Road Using Traffic Control Signals	TA-12
Temporary Road Closure	TA-13
Haul Road Crossing	TA-14
Work in the Center of a Road with Low Traffic Volumes	TA-15
Surveying Along the Center Line of a Road with Low Traffic Volumes	TA-16
Mobile Operations on a Two-Lane Road	TA-17
Work within the Traveled Way of an Urban Street (see Section 6N.10)	
Lane Closure on a Minor Street	TA-18
Detour for One Travel Direction	TA-19
Detour for One Travel Direction	TA-19(CA)
Detour for a Closed Street	TA-20
Work within the Traveled Way at an Intersection and on Sidewalks (see Section 6N.12)	
Lane Closure on the Near Side of an Intersection	TA-21
Right-Hand Lane Closure on the Far Side of an Intersection	TA-22
Left-Hand Lane Closure on the Far Side of an Intersection	TA-23
Half Road Closure on the Far Side of an Intersection	TA-24
Half Road Closure on the Far Side of an Intersection	TA-24(CA)
Multiple Lane Closures at an Intersection	TA-25
Closure in the Center of an Intersection	TA-26
Closure at the Side of an Intersection	TA-27
Sidewalk Detour or Diversion	TA-28
Crosswalk Closures and Pedestrian Detours	TA-29
Work within the Traveled Way of a Multi-Lane, Non-Access Controlled Highway (see Section 6N.11)	
Interior Lane Closure on a Multi-Lane Street	TA-30
Lane Closure on a Street with Uneven Directional Volumes	TA-31
Half Road Closure on a Multi-Lane, High-Speed Highway	TA-32
Stationary Lane Closure on a Divided Highway	TA-33
Lane Closure with a Temporary Traffic Barrier	TA-34
Mobile Operation on a Multi-Lane Road	TA-35

Table 6P-1. Index to Typical Applications (Sheet 2 of 2)

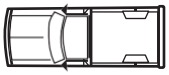
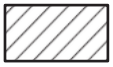
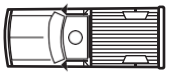
Typical Application Description	Typical Application Number
Work within the Traveled Way of a Freeway or Expressway (see Section 6N.13)	
Lane Shift on a Freeway	TA-36
Double Lane Closure on a Freeway	TA-37
~~Interior Lane Closure on a Freeway~~	~~TA-38~~
Median Crossover on a Freeway	TA-39
Median Crossover for an Entrance Ramp	TA-40
Median Crossover for an Exit Ramp	TA-41
Work in the Vicinity of an Exit Ramp	TA-42
Partial Exit Ramp Closure	TA-43
Work in the Vicinity of an Entrance Ramp	TA-44
Temporary Reversible Lane Using Movable Barriers	TA-45
Work in the Vicinity of a Grade Crossing (see Section 6N.17)	
Work in the Vicinity of a Grade Crossing	TA-46
Work in the Vicinity of Bicycle Lanes and Shared Use Paths (see Section 6N.04)	
Bicycle Lane Closure without a Detour	TA-47
Bicycle Lane Closure with an On-Road Detour	TA-48
Shared-Use Path Closure with a Diversion	TA-49
On-Road Detour for a Shared-Use Path	TA-50
Paved Shoulder Closure with a Bicycle Diversion onto a Temporary Path	TA-51
Paved Shoulder Closure with a Bicycle Diversion onto a Temporary Path	TA-51(CA)
Work in the Traveled Way of Roundabouts	
Short-Term or Short-Duration Work in a Circular Intersection	TA-52
Flagging Operation on a Single-Lane Circular Intersection	TA-53
Inside Lane Closure on a Multi-Lane Circular Intersection	TA-54

Table 6P-1(CA). Index to Typical Applications

Typical Application Description	Typical Application Number
Work affecting Pedestrian and Bicycle Facilities (See Section 6N.04)	
Right Lane and Bike Lane Closure on Far Side of Intersection	TA-101(CA)
Work Within the Traveled Way of a Two-Lane Highway (See Section 6N.09)	
Lane Shift on Road with Low Traffic Volumes	TA-102(CA)

Table 6P-2. Meaning of Symbols on Typical Application Diagrams

	Arrow board
	Arrow board support or trailer (shown facing down)
	Changeable message sign or support trailer
	Channelizing device
	Crash cushion
	Direction of temporary traffic detour
	Direction of travel
	Flagger
	High-level warning device (Flag tree)
	Longitudinal channelizing device
	Luminaire
	Pavement markings that should be removed for a long-term project

	Shadow vehicle
	Sign (shown facing left)
	Surveyor
	Temporary barrier
	Temporary barrier with warning light
	Traffic or pedestrian signal
	Truck-mounted attenuator
	Type 3 barricade
	Warning light
	Work space
	Work vehicle

Notes for Figure 6P-1—Typical Application 1
Work Beyond the Shoulder

Guidance:

1. *If the work space is in the median of a divided highway, an advance warning sign should also be placed on the left-hand side of the directional roadway.*

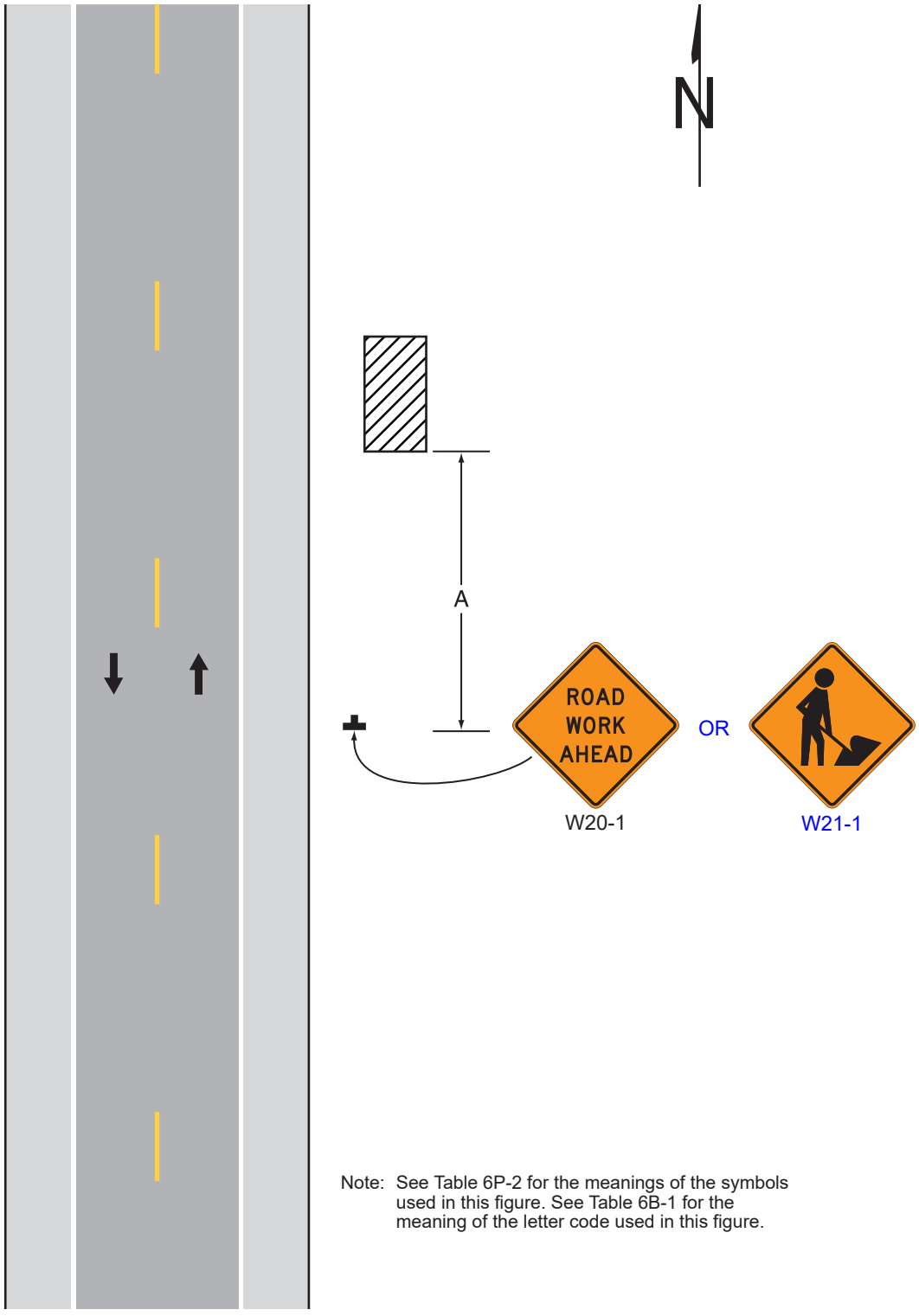
Option:

2. The ROAD WORK AHEAD sign or Workers (W21-1a) sign may be replaced with other appropriate signs such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.
3. The ROAD WORK AHEAD sign or Workers (W21-1a) sign may be omitted where the work space is behind a barrier, more than 24 inches behind the curb, or 15 feet or more from the edge of any roadway.
4. For short-term, short duration or mobile operation, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
5. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6P-1. Work Beyond the Shoulder (TA-1)



Note: See Table 6P-2 for the meanings of the symbols used in this figure. See Table 6B-1 for the meaning of the letter code used in this figure.

Typical Application 1

Notes for Figure 6P-2—Typical Application 2
Blasting Zone

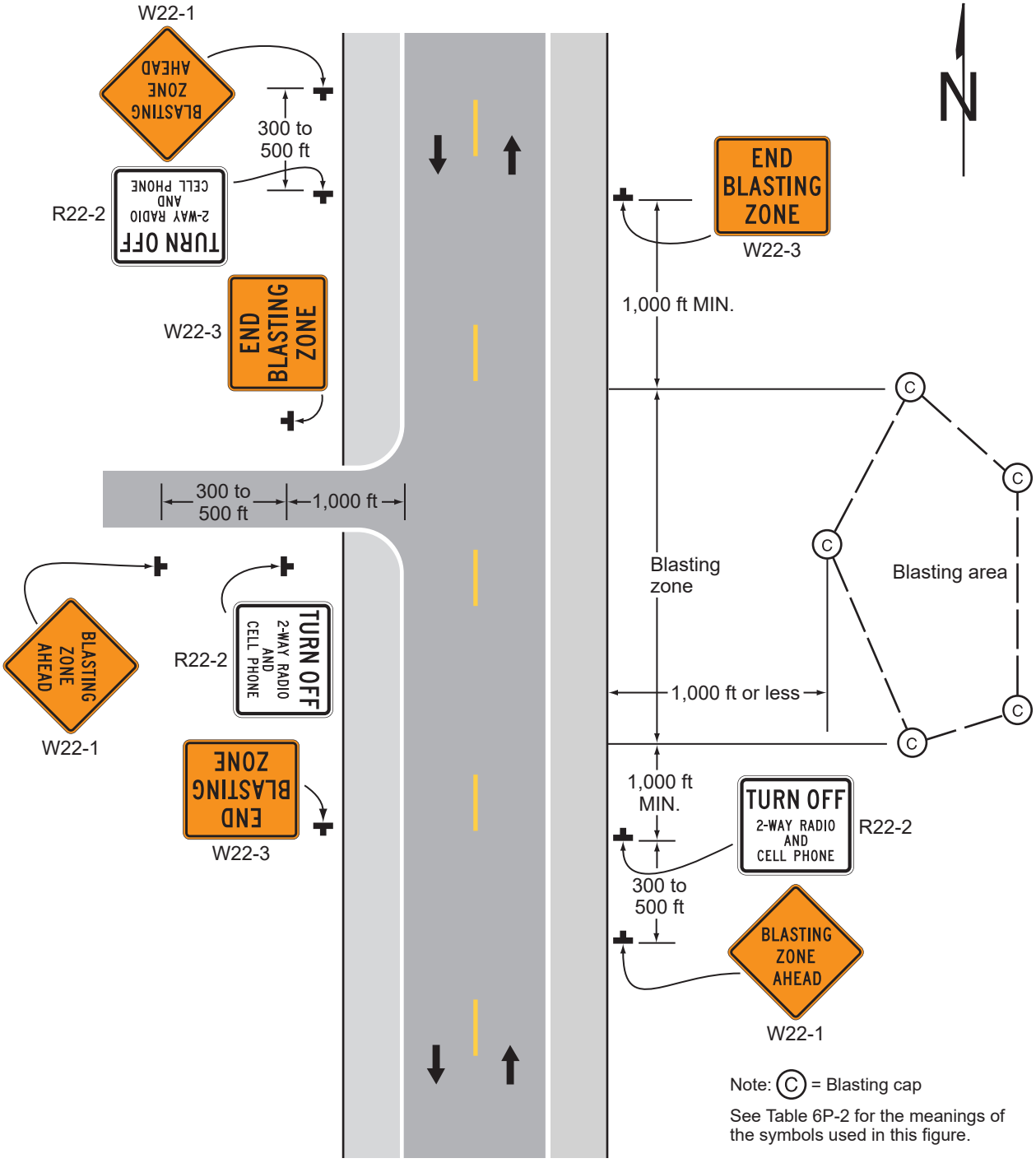
Standard:

1. **Whenever blasting caps are used within 1,000 feet of a roadway, the signing shown shall be used.**
2. **The signs shall be covered or removed when there are no explosives in the area or the area is otherwise secure.**
3. **Whenever a side road intersects the roadway between the BLASTING ZONE AHEAD (W22-1) sign and the END BLASTING ZONE (W22-3) sign, or a side road is within 1,000 feet of any blasting cap, similar signing, as on the mainline, shall be installed on the side road.**
4. **Prior to blasting, the blaster in charge shall determine whether road users in the blasting zone will be endangered by the blasting operation. If there is danger, road users shall not be permitted to pass through the blasting zone during blasting operations.**

Guidance:

5. *On a divided highway, the signs should be mounted on both sides of the directional roadways.*

Figure 6P-2. Blasting Zone (TA-2)



Typical Application 2

Notes for Figure 6P-3—Typical Application 3
Work on the Shoulders

Guidance:

1. *A SHOULDER WORK (W21-5) sign should be placed on the left-hand side of the roadway for a divided or one-way street only if the left-hand shoulder is affected.*

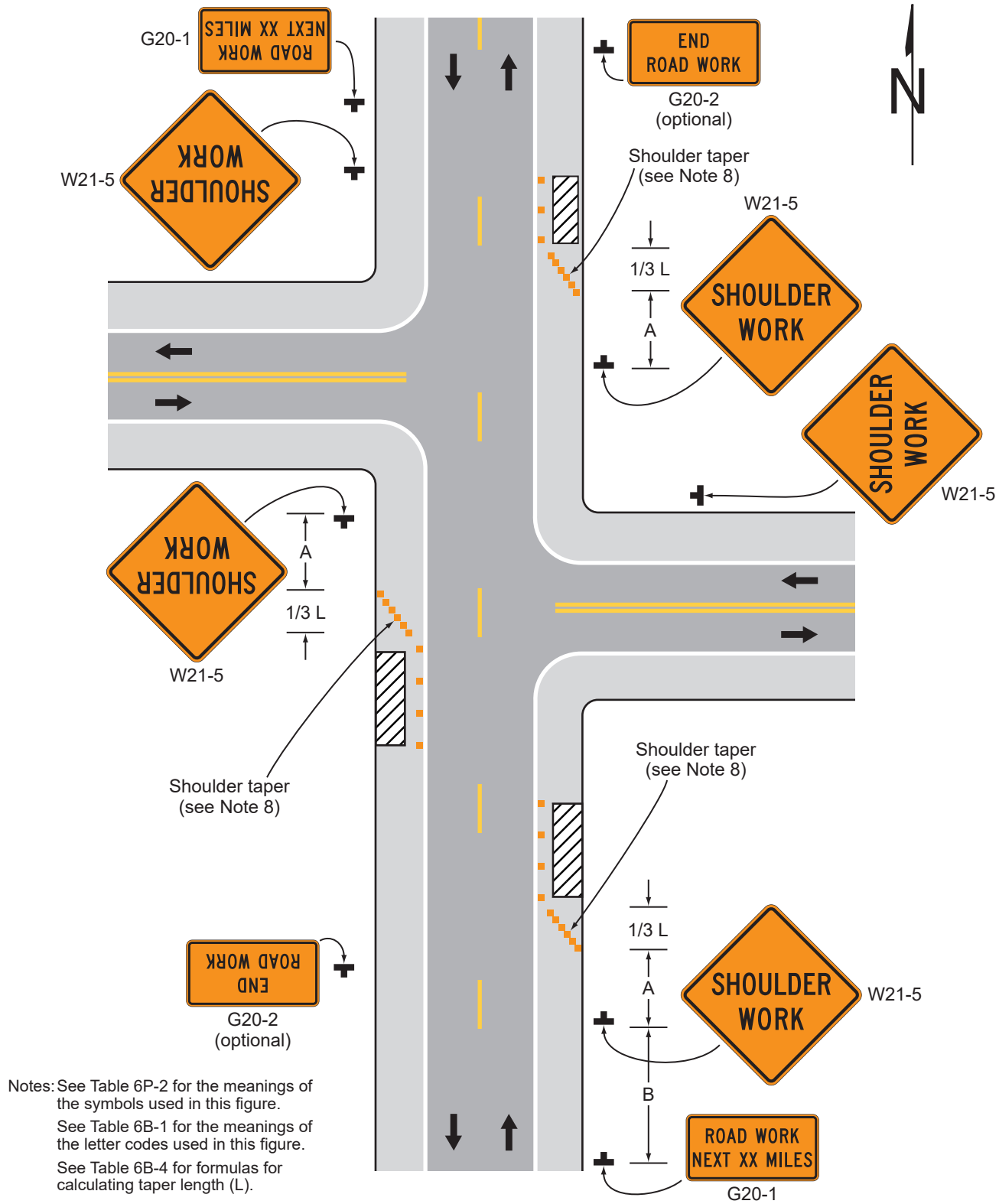
Option:

2. Positive protection devices may be used per Section 6M.02.
3. The Workers symbol signs may be used instead of SHOULDER WORK (W21-5) signs.
4. The SHOULDER WORK (W21-5) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
5. For short duration operations of 60 minutes or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
6. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

7. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
8. **When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and to direct vehicular traffic to remain within the traveled way.**

Figure 6P-3. Work on the Shoulders (TA-3)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 3

Notes for Figure 6P-4 —Typical Application 4
Short-Duration or Mobile Operation on a Shoulder

Guidance:

1. *In those situations where multiple work locations within a limited distance make it practicable to place stationary signs, the distance between the advance warning sign and the work should not exceed 5 miles.*
2. *In those situations where the distance between the advance signs and the work is 2 miles to 5 miles, a Supplemental Distance plaque should be used with the ROAD WORK AHEAD (W20-1) sign or SHOULDER WORK AHEAD (C24(CA)) sign.*

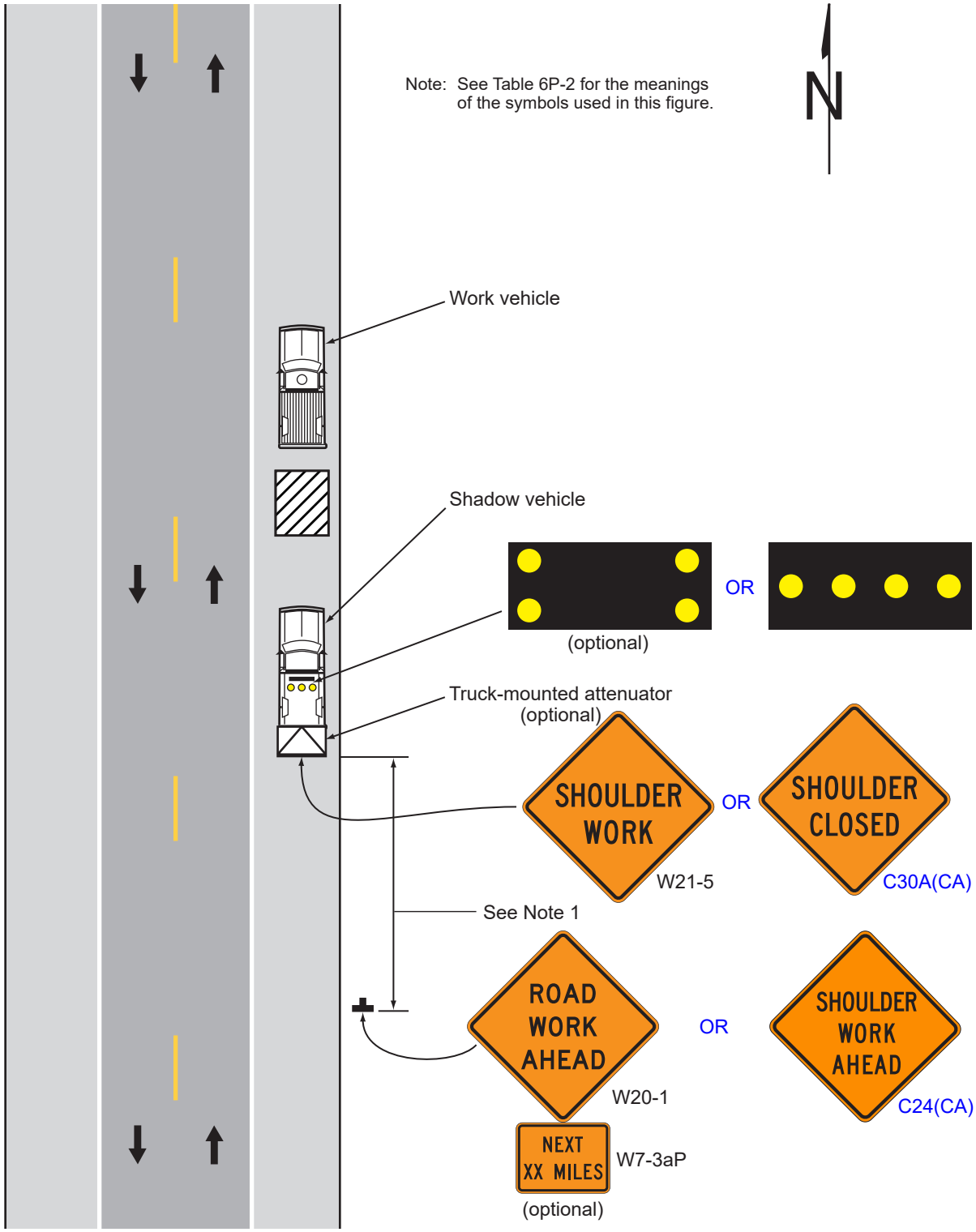
Option:

3. Additional positive protection devices may be used per Section 6M.02.
4. The ROAD WORK NEXT XX MILES sign may be used instead of the ROAD WORK AHEAD sign or SHOULDER WORK AHEAD (C24(CA)) sign if the work locations occur over a distance of more than 2 miles.
5. Stationary warning signs may be omitted for short duration or mobile operations if the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights.
6. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

7. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
8. **If an arrow board is used for an operation on the shoulder, the caution mode shall be used.**
9. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**

Figure 6P-4. Short-Duration or Mobile Operation on a Shoulder (TA-4)



Typical Application 4

Notes for Figure 6P-5 —Typical Application 5
Shoulder Closure on a Freeway

Guidance:

1. *RIGHT (LEFT) 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.*
2. *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.*
3. *The use of a temporary traffic barrier should be based on engineering judgment.*

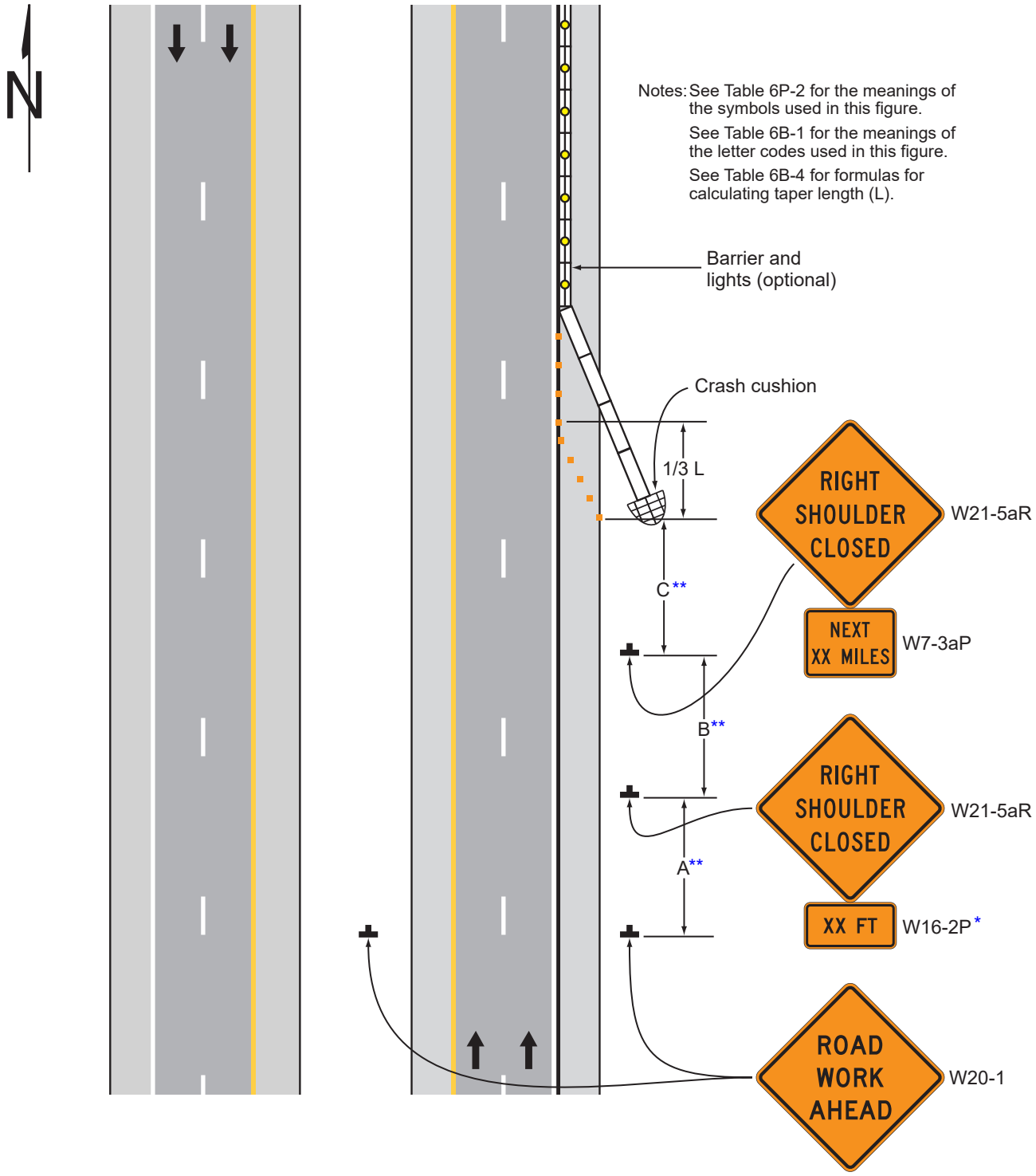
Standard:

4. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6M.02.**

Option:

5. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
6. The warning lights shown on the barrier may be used.

Figure 6P-5. Shoulder Closure on a Freeway (TA-5)



Typical Application 5

* Refer to FHWA's List of Known Errors for error in sign designation. Refer to Section 1A.04 for more details.

** Refer to FHWA's List of Known Errors for error in sign spacing. Refer to Section 1A.04 for more details.

Notes for Figure 6P-6 —Typical Application 6
Shoulder Work with Minor Encroachment

Guidance:

1. *All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing devices.*
2. *The treatment shown should be used on a minor road having low speeds. For higher-speed traffic conditions, a lane closure should be used.*

Option:

3. Additional positive protection devices may be used per Section 6M.02.
4. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.
5. Where the opposite shoulder is suitable for carrying vehicular traffic and of adequate width, lanes may be shifted by use of closely-spaced channelizing devices, provided that the minimum lane width of 10 feet is maintained.
6. Additional advance warning may be appropriate, such as a ROAD NARROWS (W5-1) sign.
7. Temporary traffic barriers may be used along the work space.
8. The shadow vehicle may be omitted if a taper and channelizing devices are used.
9. A truck-mounted attenuator may be used on the shadow vehicle.
10. For short-duration work, the taper and channelizing devices may be omitted if a shadow vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used.
11. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

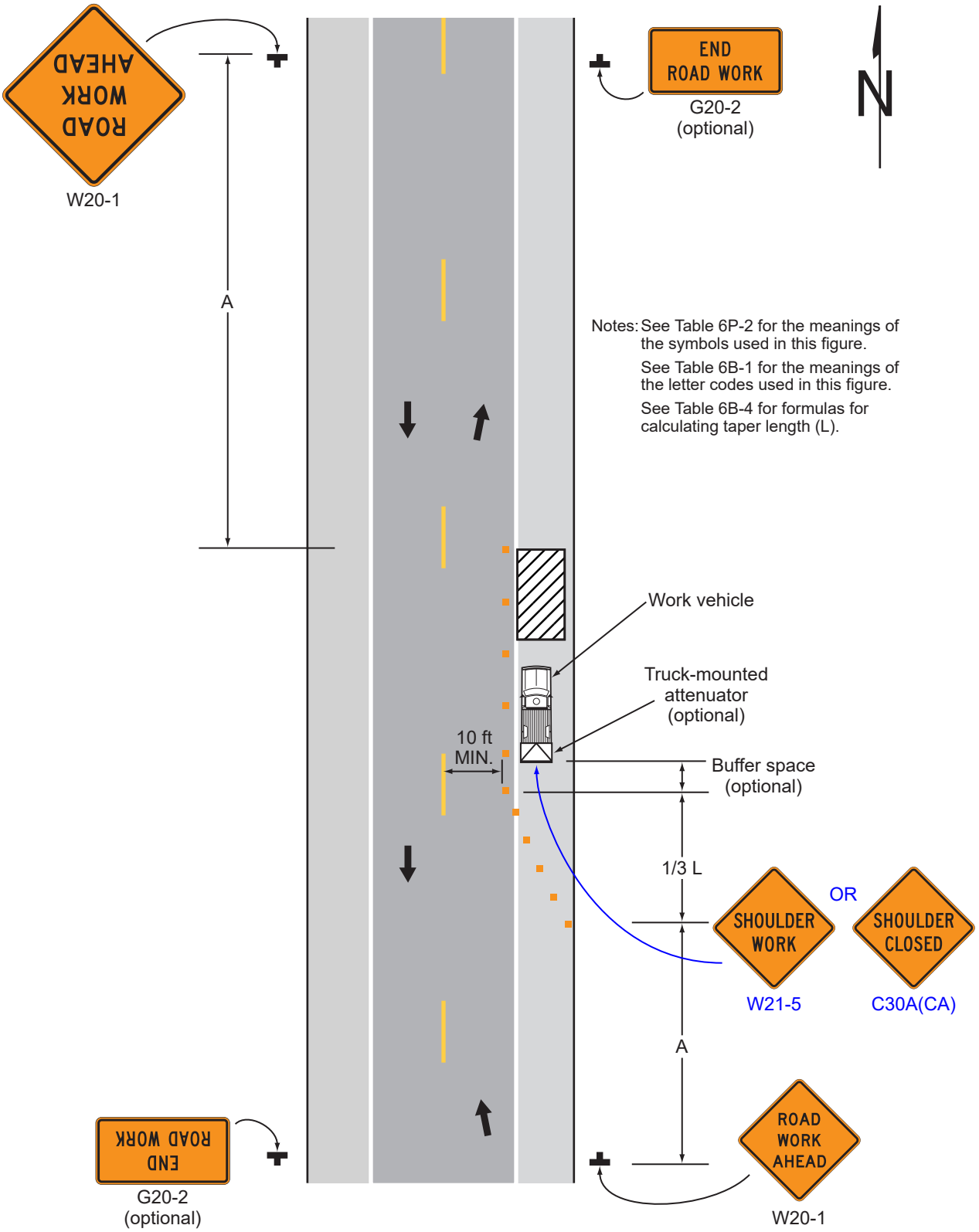
Standard:

12. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**
13. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
14. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Guidance:

15. *All advance warning signs should be placed so that the path of travel for bicycles is not blocked, while maintaining visibility for road users.*
16. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Warning (W11-1) sign and the IN ROAD (W16-1P) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*
17. *Except for short durations and mobile operations, when a highway shoulder is occupied and bicyclists would be sharing a lane with vehicular traffic, as a result of the TTC zone, speed reduction countermeasures should be used to reduce traffic speeds in the TTC zone. Refer to Sections 6B.01 and 6C.04.*
18. *Except for short durations and mobile operations, when a highway shoulder is occupied and bicyclists would be sharing a lane with vehicular traffic, as a result of the TTC zone, before narrowing the outside lane other measures such as widening the outside shoulder to allow bicyclists and motor vehicles to travel side by side through the TTC zone should be considered.*
19. *If traffic volumes make it feasible, the two left lanes should be merged into one lane to avoid using the shoulder as a traveled way lane and allowing continued use for emergency purposes and bicycle travel.*
20. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, a separate path should be considered for bicyclists.*

Figure 6P-6. Shoulder Work with Minor Encroachment (TA-6)



Typical Application 6

Notes for Figure 6P-7 —Typical Application 7
Road Closure with a Diversion

Support:

1. Signs and object markers are shown for one direction of travel only.

Standard:

2. **Devices similar to those depicted shall be placed for the opposite direction of travel.**
3. **Pavement markings no longer applicable to the traffic pattern of the roadway shall be removed or obliterated before any new traffic patterns are open to traffic.**
4. **Temporary traffic barriers and end treatments shall be crashworthy.**

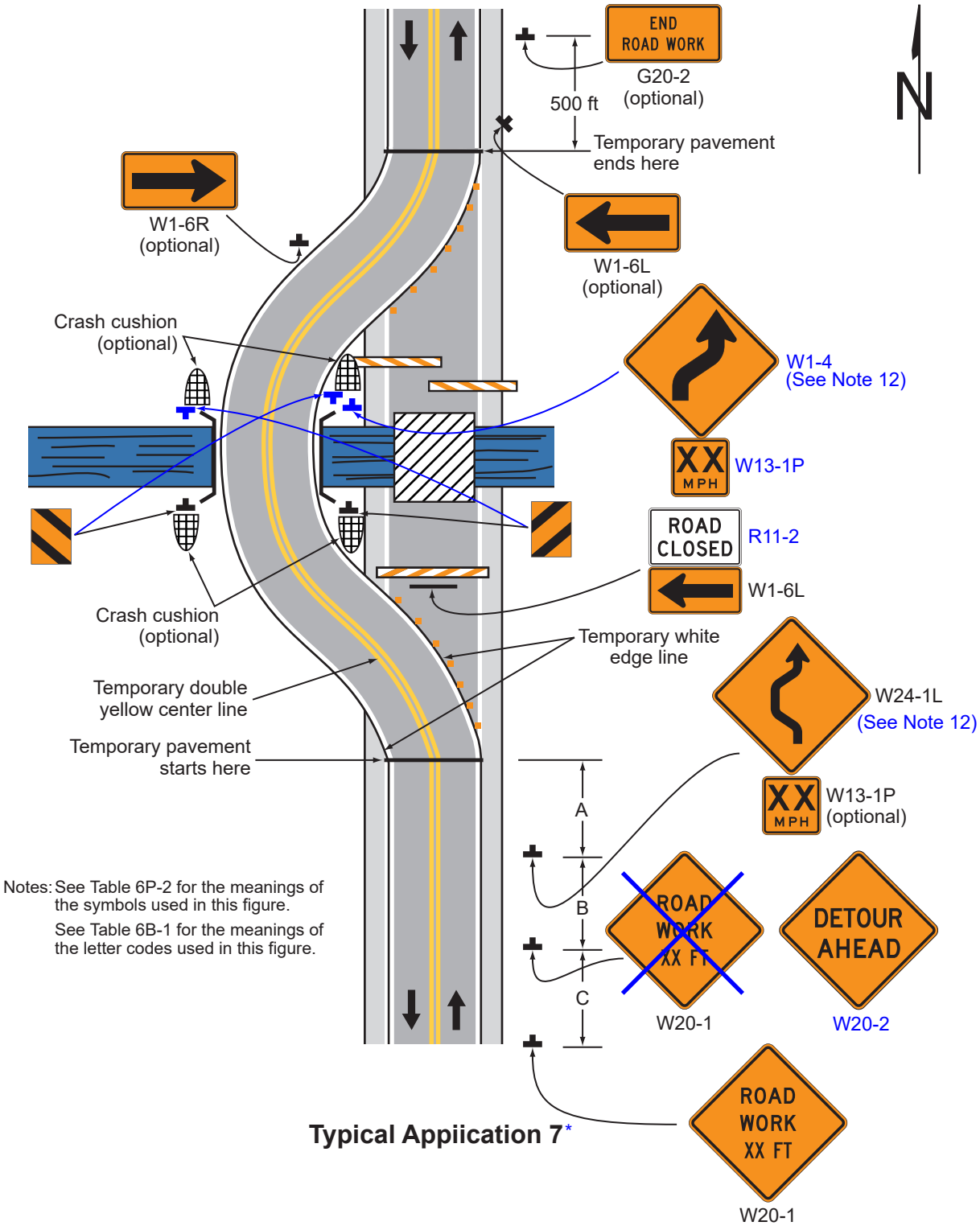
Guidance:

5. *If the tangent distance along the temporary diversion is more than 600 feet, a Reverse Curve sign, left first, should be used instead of the Double Reverse Curve sign, and a second Reverse Curve sign, right first, should be placed in advance of the second reverse curve back to the original alignment.*
6. *When the tangent section of the diversion is more than 600 feet, and the diversion has sharp curves with recommended speeds of 30 mph or less, Reverse Turn signs should be used.*
7. *Where the temporary pavement and old pavement are different colors, the temporary pavement should start on the tangent of the existing pavement and end on the tangent of the existing pavement.*
8. *Delineators or channelizing devices should be used along the diversion.*

Option:

9. Flashing warning lights and/or flags may be used to call attention to the warning signs.
10. On sharp curves, large arrow signs may be used in addition to other advance warning signs.
11. If the tangent distance along the temporary diversion is less than 600 feet, additional One-Direction Large Arrow (W1-6) and Chevron Alignment (W1-8) signs may be used.
12. When recommended speeds are the same for each curve, one Double Reverse Curve (W24-1) sign may be used, instead of two Reverse Curve (W1-4) signs, in advance of the first curve.

Figure 6P-7. Road Closure with a Diversion (TA-7)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Appiication 7*

* Refer to FHWA's List of Known Errors for error in Figure subheading. Refer to Section 1A.04 for more details.

Notes for Figure 6P-8 —Typical Application 8
Road Closure with an Off-Site Detour

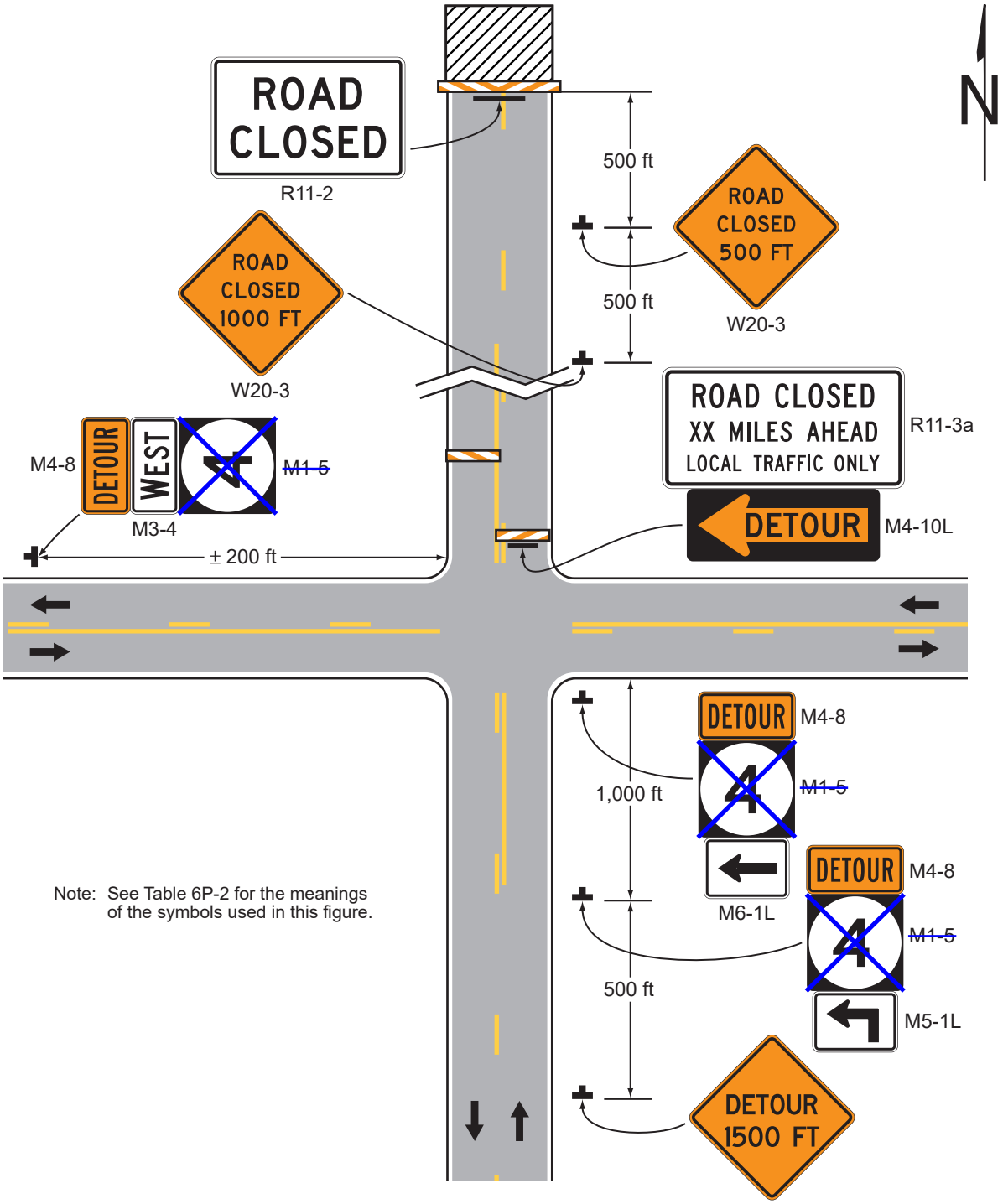
Guidance:

1. *Regulatory traffic control devices should be modified as needed for the duration of the detour.*

Option:

2. If the road is opened for some distance beyond the intersection and/or there are significant origin/destination points beyond the intersection, the ROAD CLOSED (R11-2) and DETOUR (W20-2, M4-8, M4-10) signs on Type 3 Barricades may be located at the edge of the traveled way.
3. A Route Sign Directional assembly may be placed on the far left corner of the intersection to augment or replace the one shown on the near right corner.
4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. Cardinal direction plaques may be used with route signs.

Figure 6P-8. Road Closure with an Off-Site Detour (TA-8)



Note: See Table 6P-2 for the meanings of the symbols used in this figure.

Typical Application 8

Note: Refer to Figure 2D-4 and Figure 2D-4(CA) for appropriate route shield and/or marker selection.

Notes for Figure 6P-9 —Typical Application 9 Overlapping Routes with a Detour

Support:

1. TTC devices are shown for one direction of travel only.

Standard:

2. Devices similar to those depicted shall be placed for the opposite direction of travel.

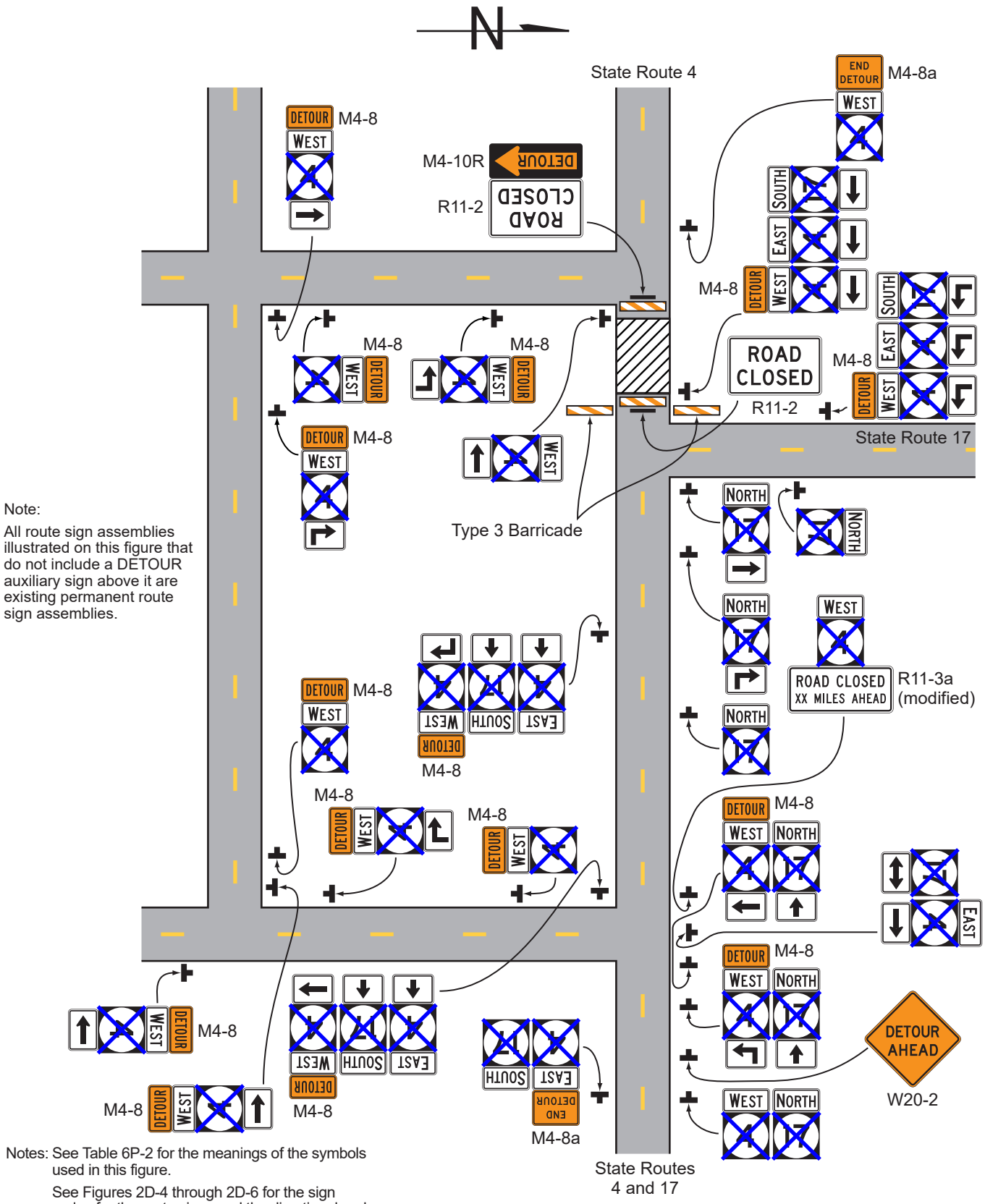
Guidance:

3. STOP (R1-1) or YIELD (R1-2) signs displayed to side roads should be installed as needed along the temporary route.

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. Flashing warning lights may be used on the Type 3 Barricades.
6. Cardinal direction plaques may be used with route signs.

Figure 6P-9. Overlapping Routes with a Detour (TA-9)



Note:

All route sign assemblies illustrated on this figure that do not include a DETOUR auxiliary sign above it are existing permanent route sign assemblies.

Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Figures 2D-4 through 2D-6 for the sign codes for the route signs and the directional and arrow auxiliary signs associated with them.

Refer to Figure 2D-4 and Figure 2D-4(CA) for appropriate route shield and/or marker selection.

Typical Application 9

Notes for Figure 6P-10 —Typical Application 10
Lane Closure on a Two-Lane Road Using Flaggers

Option:

1. Positive protection devices may be used per Section 6M.02.
2. For low-volume situations with short TTC zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6D).
3. The ROAD WORK AHEAD (W20-1) and the END ROAD WORK (G20-2) signs may be omitted for short-duration operations.
4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP (W3-4) sign may be added to the sign series.
5. Automated Flagger Assistance Devices (see Section 6L.02) may be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

Guidance:

6. *The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.*

Standard:

7. **At night, flagger stations shall be illuminated, except in emergencies.**

Guidance:

8. *When used, the BE PREPARED TO STOP (W3-4) sign should be located ~~between~~ after the Flagger sign and the ONE LANE ROAD (W20-4) sign.*
9. *When a grade crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the grade crossing, the TTC zone should be extended so that the transition area precedes the grade crossing.*
10. *When a grade crossing equipped with active warning devices exists within the activity area, provisions should be made for keeping flaggers informed as to the activation status of these warning devices.*
11. *When a grade crossing exists within the activity area, drivers operating on the left-hand side of the normal center line should be provided with comparable warning devices as for drivers operating on the right-hand side of the normal center line.*
12. *Early coordination with the railroad company or transit agency should occur before work starts.*

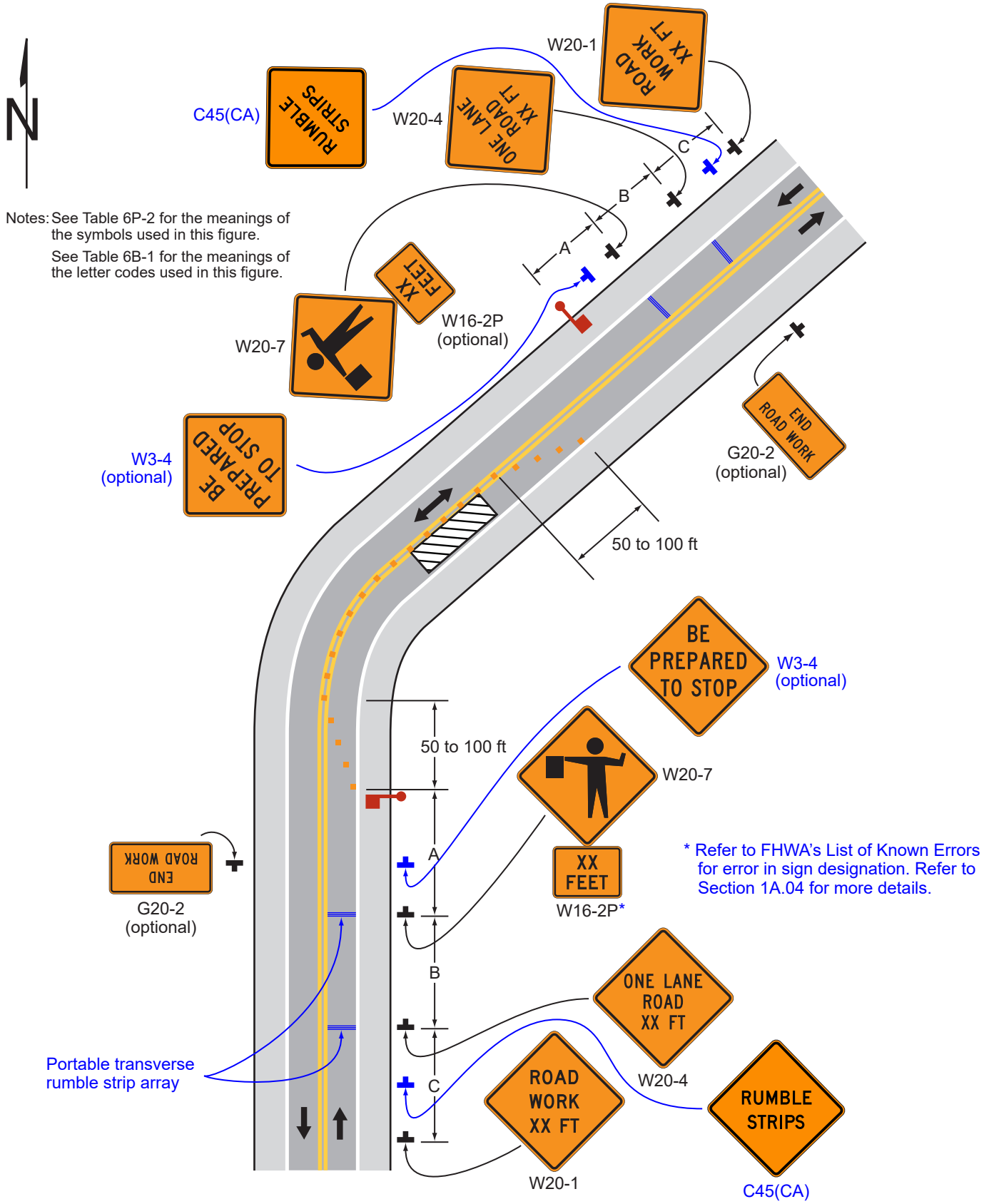
Option:

13. A flagger or a uniformed law enforcement officer may be used at the grade crossing to minimize the probability that vehicles are stopped within 15 feet of the grade crossing, measured from both sides of the outside rails.

Support:

14. For State highways, refer to Caltrans' Standard Plan T13. Refer to Section 1A.05 for information regarding this publication.
15. If portable transverse rumble strips are used for flagging operations, refer to Section 6M.06.

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



Typical Application 10

Notes for Figure 6P-11 —Typical Application 11
Lane Closure on a Two-Lane Road with Low Traffic Volumes

Option:

1. Positive protection devices may be used per Section 6M.02.
2. This TTC zone application may be used as an alternate to the TTC application shown in Figure 6P-10 (using flaggers) when the following conditions exist:
   a. Vehicular traffic volume is such that sufficient gaps exist for vehicular traffic that must yield.
   b. Road users from both directions are able to see approaching vehicular traffic through and beyond the worksite and have sufficient visibility of approaching vehicles.
3. The Type B flashing warning lights may be placed on the ROAD WORK AHEAD (W20-1) and the ONE LANE ROAD AHEAD (W20-4) signs whenever a night lane closure is necessary.

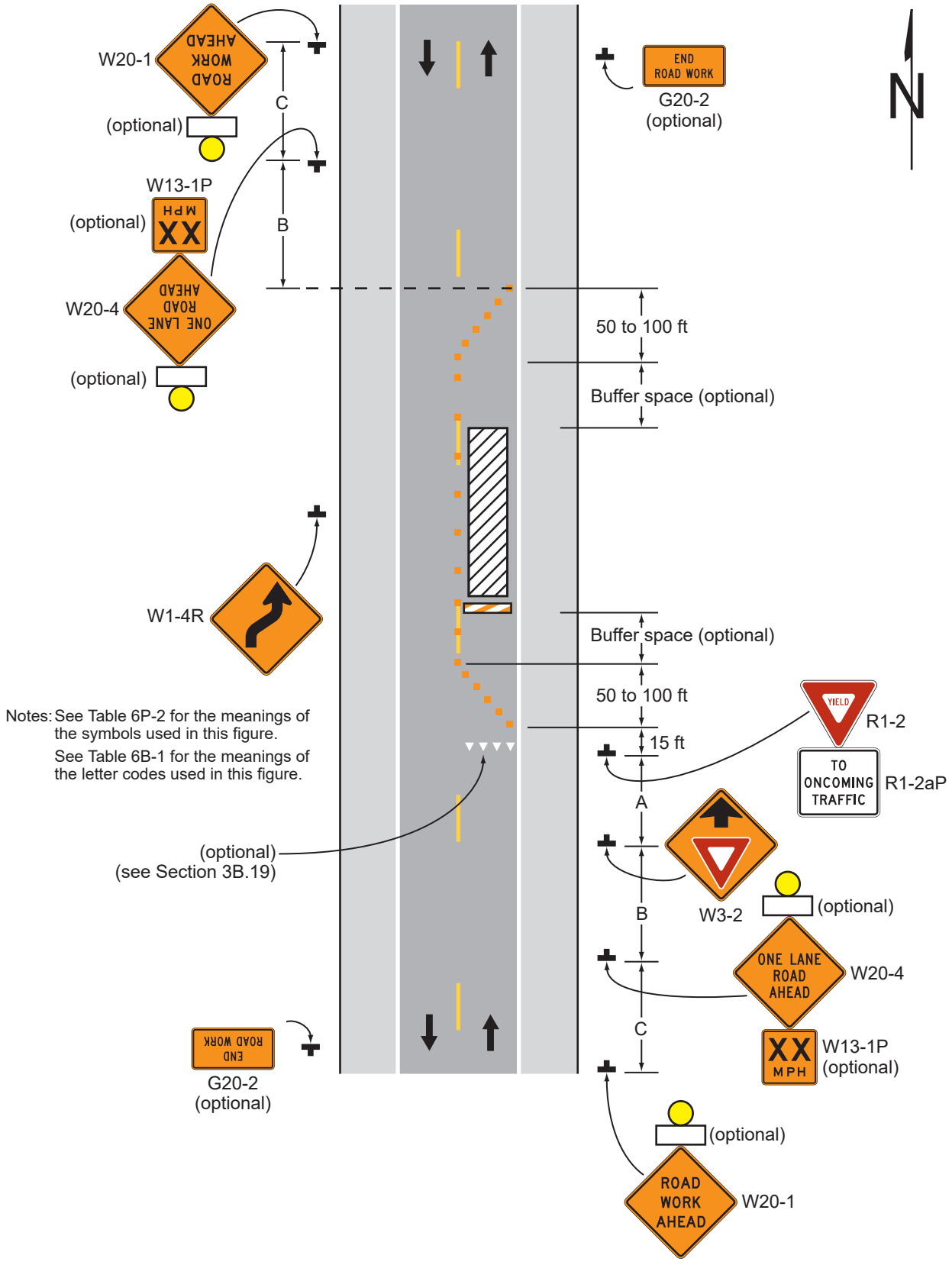
Standard:

4. The approach to the side that is not closed shall be visible (for a distance equal to the safe passing sight distance for that approach) to the road user who must yield or stop.

Support:

5. Refer to Section 3B.03 and 6E.06.

Figure 6P-11. Lane Closure on a Two-Lane Road with Low Traffic Volumes (TA-11)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 11

Notes for Figure 6P-12 —Typical Application 12
Lane Closure on a Two-Lane Road Using Temporary Traffic Control Signals

Standard:

1. **Temporary traffic control signals shall be installed and operated in accordance with the provisions of Part 4. Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic control signals.**
2. **Temporary traffic control signal timing shall be established by authorized officials. Durations of red clearance intervals shall be adequate to clear the one-lane section of conflicting vehicles.**
3. **When the temporary traffic control signal is changed to the flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.**
4. **Stop lines shall be installed with temporary traffic control signals for long-term closures. Existing conflicting pavement markings and raised pavement marker reflectors between the activity area and each stop line shall be removed. 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.**
5. **Safeguards shall be incorporated to avoid the possibility of conflicting signal indications at each end of the TTC zone.**

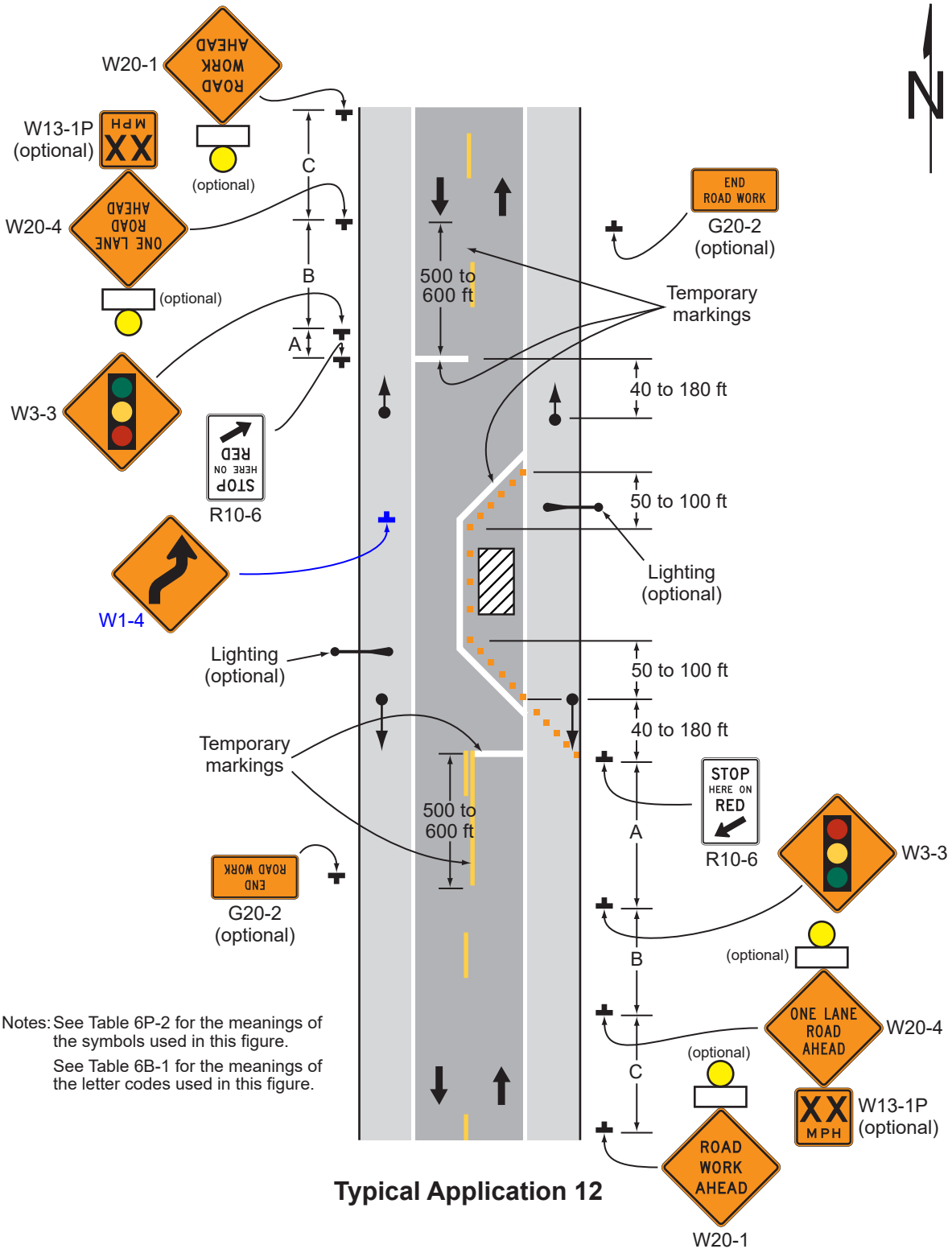
Guidance:

6. *Where no-passing lines are not already in place, they should be added.*
7. *Adjustments in the location of the advance warning signs should be made as needed to accommodate the horizontal or vertical alignment of the roadway, recognizing that the distances shown for sign spacings are minimums. Adjustments in the height of the signal heads should be made as needed to conform to the vertical alignment.*

Option:

8. Positive protection devices may be used per Section 6M.02.
9. Flashing warning lights shown on the ROAD WORK AHEAD (W20-1) and the ONE LANE ROAD AHEAD (W20-4) signs may be used.
10. Removable pavement markings may be used. Support:
11. Temporary traffic control signals are preferable to flaggers for long-term projects and other activities that would require flagging at night.
12. The maximum length of activity area for one-way operation under temporary traffic control signal control is determined by the capacity required to handle the peak demand.

Figure 6P-12. Lane Closure on a Two-Lane Road Using Temporary Traffic Control Signals (TA-12)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 12

Notes for Figure 6P-13 —Typical Application 13
Temporary Road Closure

Support:

1. Conditions represented are a planned closure not exceeding 20 minutes during the daytime.

Standard:

2. A flagger or uniformed law enforcement officer shall be used for this application. The flagger, if used for this application, shall follow the procedures provided in Sections 6D.05 and 6D.06.

Guidance:

3. The uniformed law enforcement officer, if used for this application, should follow the procedures provided in Sections 6D.05 and 6D.06.

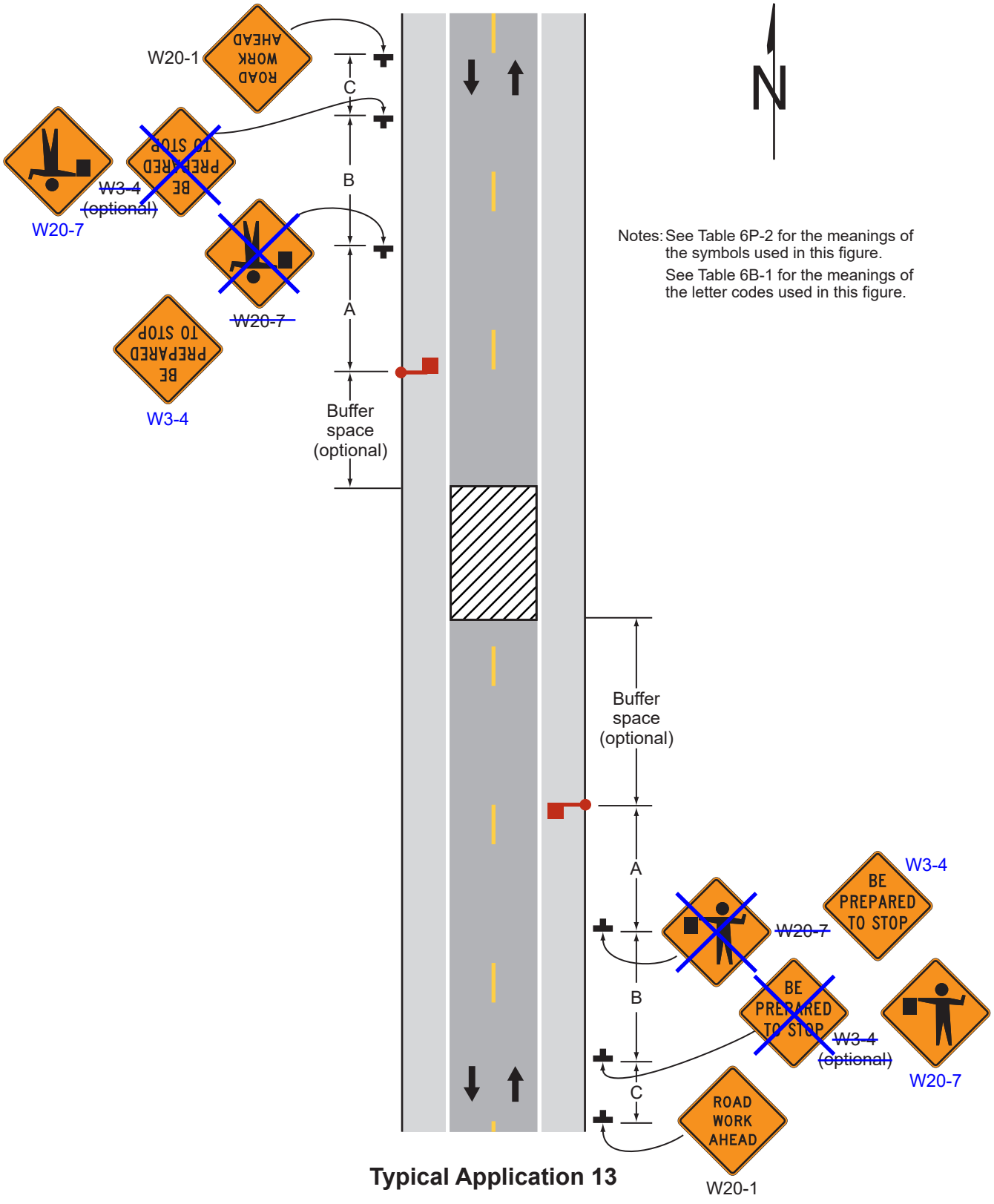
Option:

4. A BE PREPARED TO STOP sign may be added to the sign series.
5. Positive protection devices may be used per Section 6M.02.
6. Automated Flagger Assistance Devices (see Section 6L.02) may be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

Guidance:

7. When used, the BE PREPARED TO STOP (W3-4) sign should be located ~~before~~ after the Flagger symbol sign.

Figure 6P-13. Temporary Road Closure (TA-13)



Typical Application 13

Notes for Figure 6P-14 —Typical Application 14
Haul Road Crossing

Guidance:

1. *Floodlights should be used to illuminate haul road crossings where existing light is inadequate.*
2. *Where no-passing lines are not already in place, they should be added.*

Standard:

3. The traffic control method selected shall be used in both directions.

Flagging Method

4. When a road used exclusively as a haul road is not in use, the haul road shall be closed with Type 3 Barricades and the Flagger symbol signs covered.
5. The flagger shall follow the procedures provided in Sections 6D.05 and 6D.06.
6. At night, flagger stations shall be illuminated, except in emergencies.

Signalized Method

7. When a road used exclusively as a haul road is not in use, the haul road shall be closed with Type 3 Barricades. The signals shall either:
   a. Flash yellow on the main road and flash red on the haul road or be covered, and the Signal Ahead and STOP HERE ON RED (R10-6, R10-6a) signs shall be covered or hidden from view; or
   b. Display green on the main road and steady red on the haul road, but only if actuated signal operation is used such that green is always displayed to the main road except when a vehicle is detected on the haul road.
8. 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. Traffic control signal timing shall be established by authorized officials.
9. Stop lines shall be used on existing highways with temporary traffic control signals.
10. Existing conflicting pavements markings between the stop lines shall be removed. 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.

10a. A temporary traffic control signal.
   a. Each temporary signals plan shall include the equipment details.
   b. Signal faces, detectors and control equipment shall be kept in good operating condition at all times.
   c. Timing of the signals shall be determined by the agency having jurisdiction.
   d. A Signal Ahead (W3-3) sign (and flashing beacon, if required) shall be placed on each approach of the highway in advance of the signal.
   e. Haul road signals shall be operated using manual control or vehicle detectors. The operation shall provide a green indication to the haul road only if the contractor's equipment is approaching the crossing.
   f. The all-red clearance interval shall permit a vehicle to travel the length of the one-way lane before a green indication is shown to opposing traffic.
   g. Failure to comply with any of the above or other specified conditions shall be justification for revoking the permit.

Option:

10b. Temporary signals for traffic control at the intersection of a State highway and a haul road, or to provide one-way traffic control through a construction zone, may be either the fixed or portable type. Such signals are normally installed by a contractor and may require an Encroachment Permit.

Flagging Method

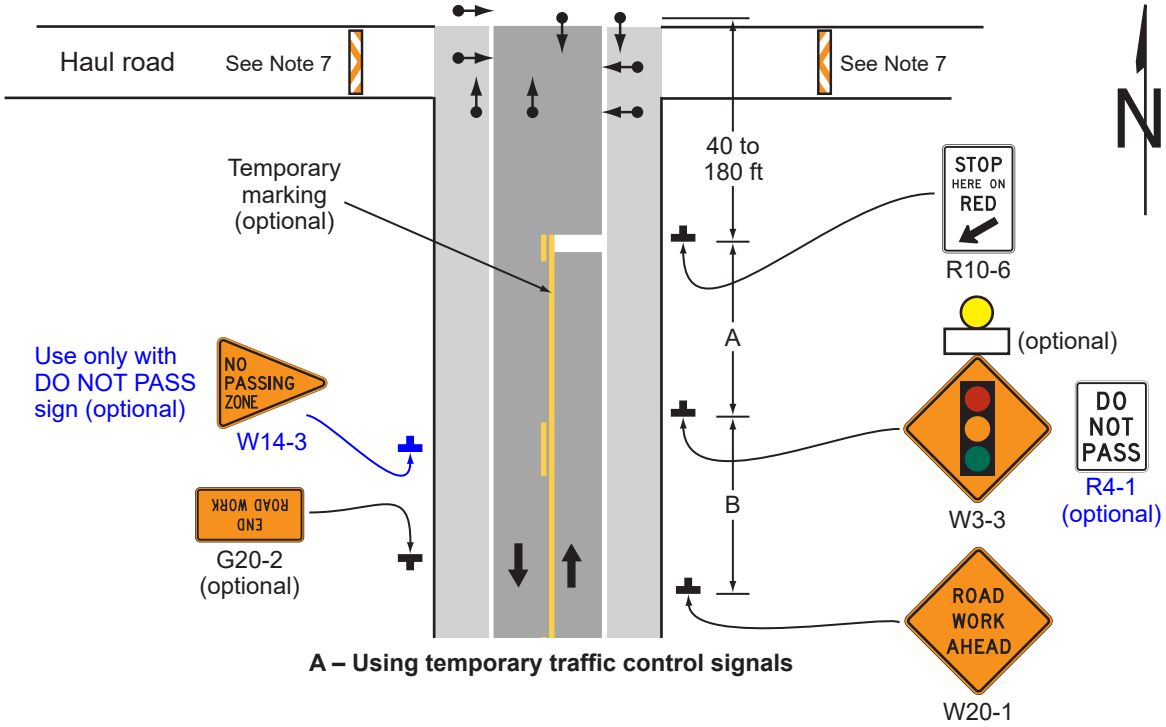
11. Automated Flagger Assistance Devices (see Section 6L.02) may be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

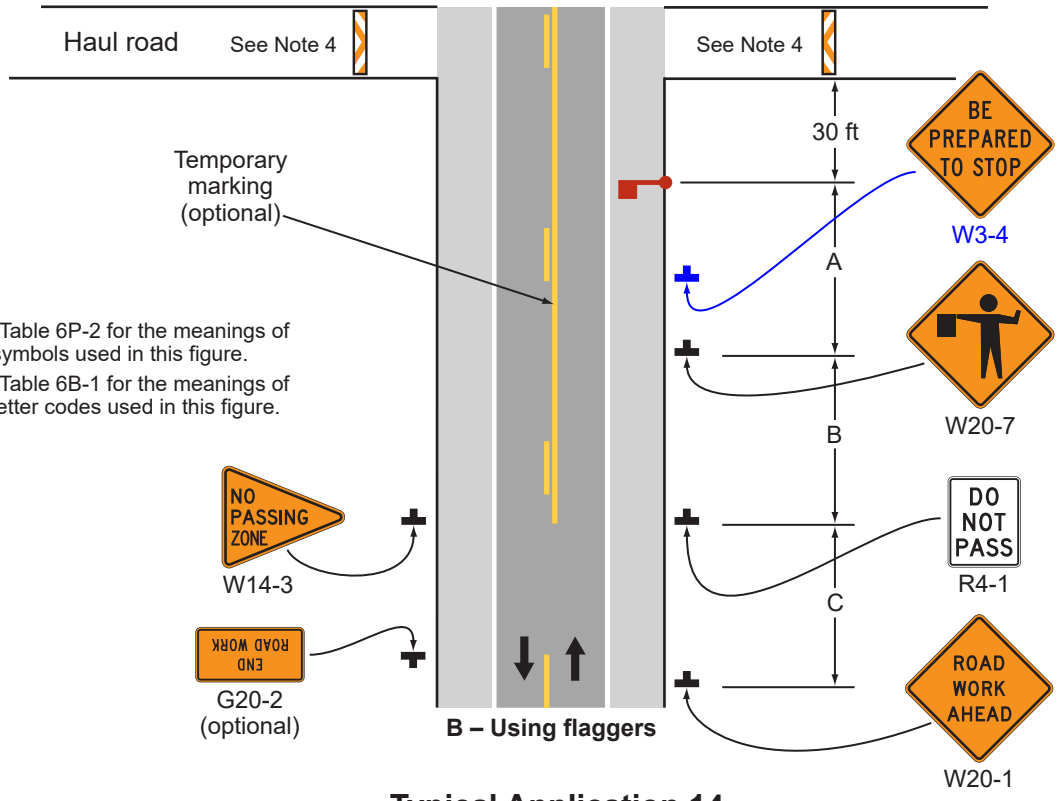
Guidance:

Signalized Method

12. *If actuated signal operation is used (see Item b in Note 7 above) and pedestrian facilities, such as sidewalks, are present in the area of the haul road crossing, then consideration should be given to providing pedestrian actuation capability at the temporary traffic control signal to accommodate any pedestrians who might be depending upon a pedestrian phase to cross the main road.*

Figure 6P-14. Haul Road Crossing (TA-14)





Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 14

Notes for Figure 6P-15 —Typical Application 15
Work in the Center of a Road with Low Traffic Volumes

Guidance:

1. *The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of the pavement or the outside edge of the paved shoulder.*

Option:

2. Positive protection devices may be used per Section 6M.02.
3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. If the closure continues overnight, warning lights may be used on the channelizing devices.
5. A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed roadways when motor vehicle traffic does not include longer and wider heavy commercial vehicles.
6. A work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used instead of the channelizing devices forming the tapers or the high-level warning devices.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

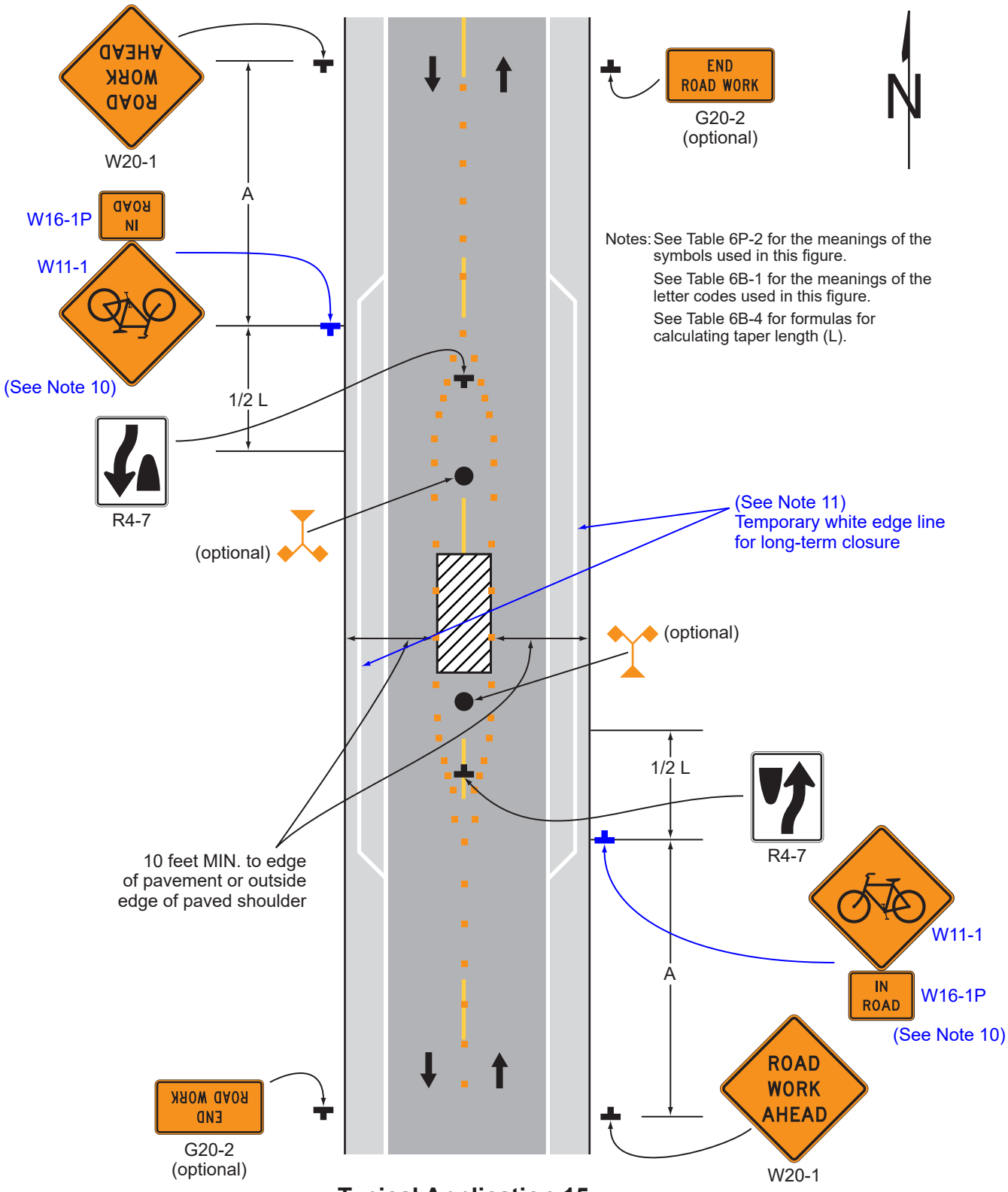
Standard:

8. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Guidance:

9. *All advance warning signs should be placed so that the path of travel for bicycles is not blocked while maintaining visibility for road users.*
10. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Crossing (W11-1) sign and the IN ROAD (W16-1P) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*
11. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01), the temporary white edge line should be used on the shoulder to indicate the use of a portion of the shoulder as a traveled way lane.*

Figure 6P-15. Work in the Center of a Road with Low Traffic Volumes (TA-15)



Typical Application 15

Notes for Figure 6P-16 —Typical Application 16
Surveying Along the Center Line of a Road with Low Traffic Volumes

Guidance:

1. *The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of the pavement or the outside edge of the paved shoulder.*
2. *Cones should be placed 6 to 12 inches on either side of the center line.*
3. *A flagger should be used to warn workers who cannot watch road users.*

Standard:

4. **For surveying on the center line of a high-volume road, one lane shall be closed using the information illustrated in Figure 6P-10.**

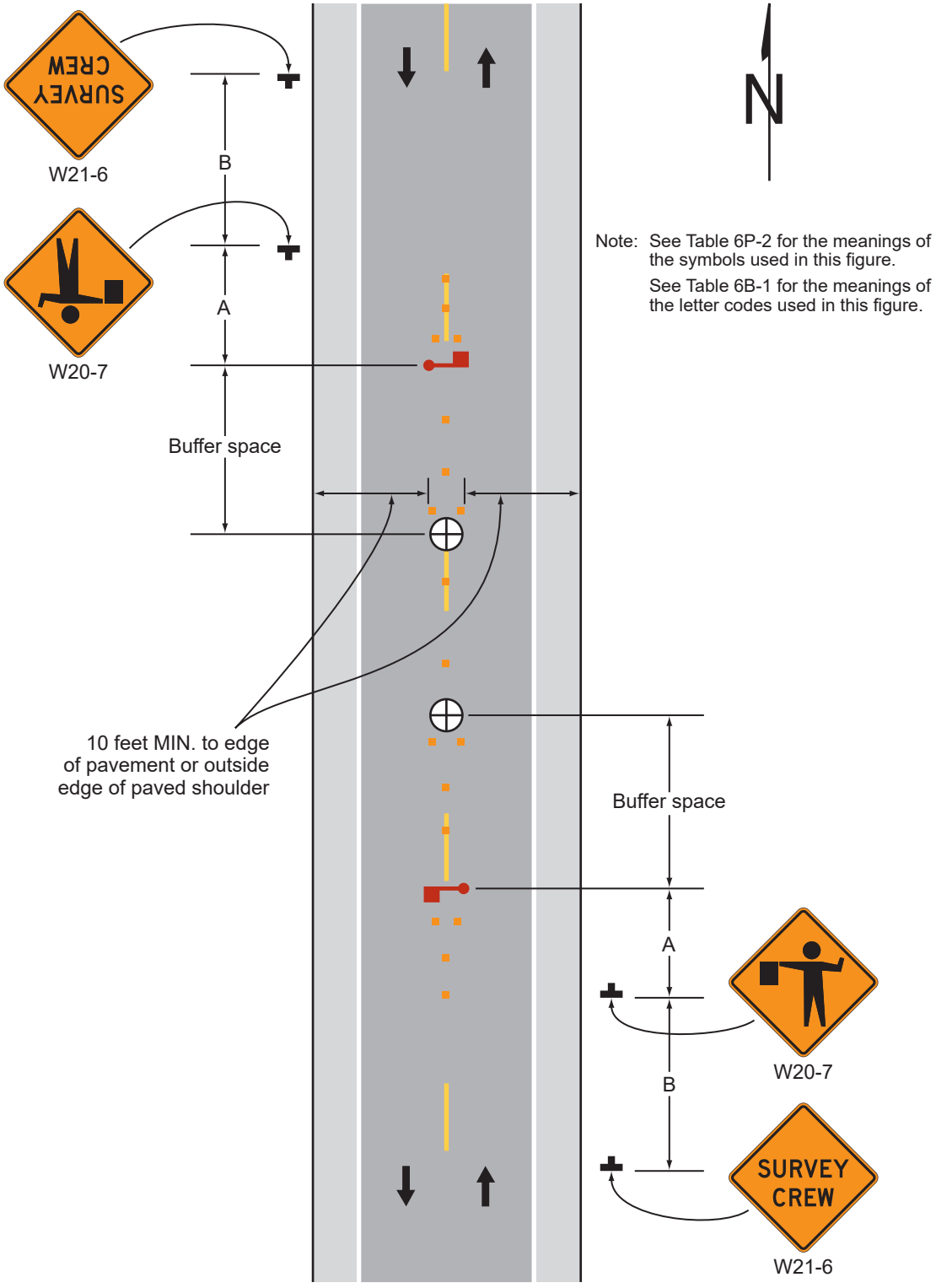
Option:

5. A high-level warning device may be used to protect a surveying device, such as a target on a tripod.
6. Cones may be omitted for a cross-section survey.
7. ROAD WORK AHEAD (W20-1) signs may be used in place of the SURVEY CREW AHEAD (W21-6) signs.
8. Flags may be used to call attention to the advance warning signs.
9. If the work is along the shoulder, the flagger may be omitted.
10. For a survey along the edge of the road or along the shoulder, cones may be placed along the edge line.
11. A BE PREPARED TO STOP (W3-4) sign may be added to the sign series.
12. Automated Flagger Assistance Devices (see Section 6L.02) may be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

Guidance:

13. *When used, the BE PREPARED TO STOP (W3-4) sign should be located ~~before~~ after the Flagger symbol (W20-7) sign.*

Figure 6P-16. Surveying Along the Center Line of a Road with Low Traffic Volumes (TA-16)



Typical Application 16

Notes for Figure 6P-17 —Typical Application 17
Mobile Operations on a Two-Lane Road

Standard:

1. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**
2. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
3. **If an arrow board is used, it shall be used in the caution mode.**

Guidance:

4. *Where practical and when needed, the work and shadow vehicles should pull over periodically to allow vehicular traffic to pass.*
5. *Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minimum distance from the work vehicle and proceed at the same speed. The shadow vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.*
6. *The shadow vehicles should also be equipped with two high-intensity flashing lights mounted on the rear, adjacent to the sign.*

Option:

7. Positive protection devices may be used per Section 6M.02.
8. The distance between the work and shadow vehicles may vary according to terrain, paint drying time, and other factors.
9. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
10. A truck-mounted attenuator may be used on the shadow vehicle or on the work vehicle.
11. If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass frequently, a DO NOT PASS (R4-1) sign may be placed on the rear of the vehicle blocking the lane.

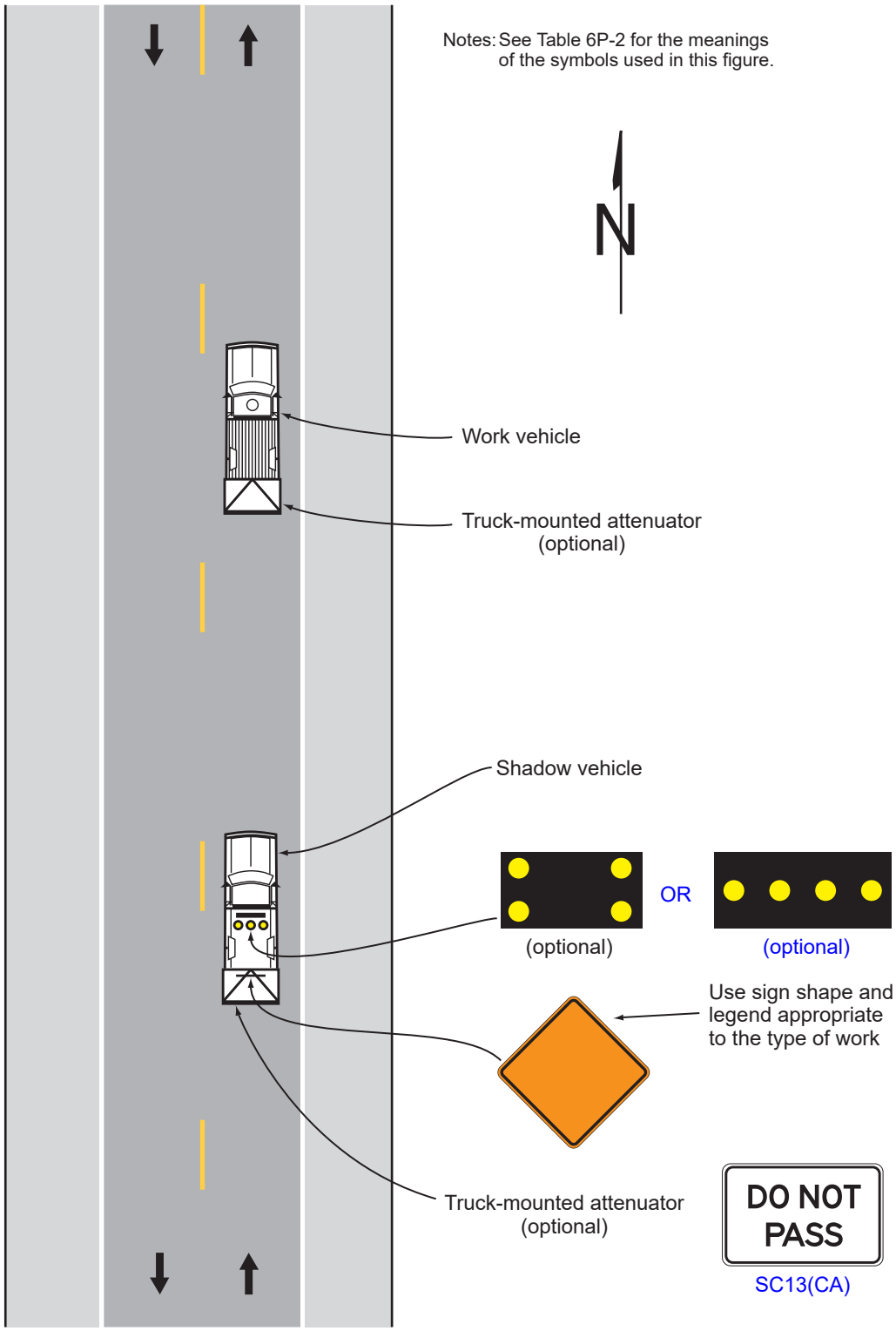
Support:

12. Shadow vehicles are used to warn motor vehicle traffic of the operation ahead.

Standard:

13. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**
14. **This typical application shall not be used on State highways, Caltrans' Standard Plan T17 for moving lane closure shall be used instead. Refer to Section 1A.05 for information regarding this publication.**

Figure 6P-17. Mobile Operations on a Two-Lane Road (TA-17)



Typical Application 17

Notes for Figure 6P-18 —Typical Application 18
Lane Closure on a Minor Street

Standard:

1. This TTC shall be used only for low-speed facilities having low traffic volumes.

Option:

2. Where the work space is short, where road users can see the roadway beyond, and where volume is low, vehicular traffic may be self-regulating.

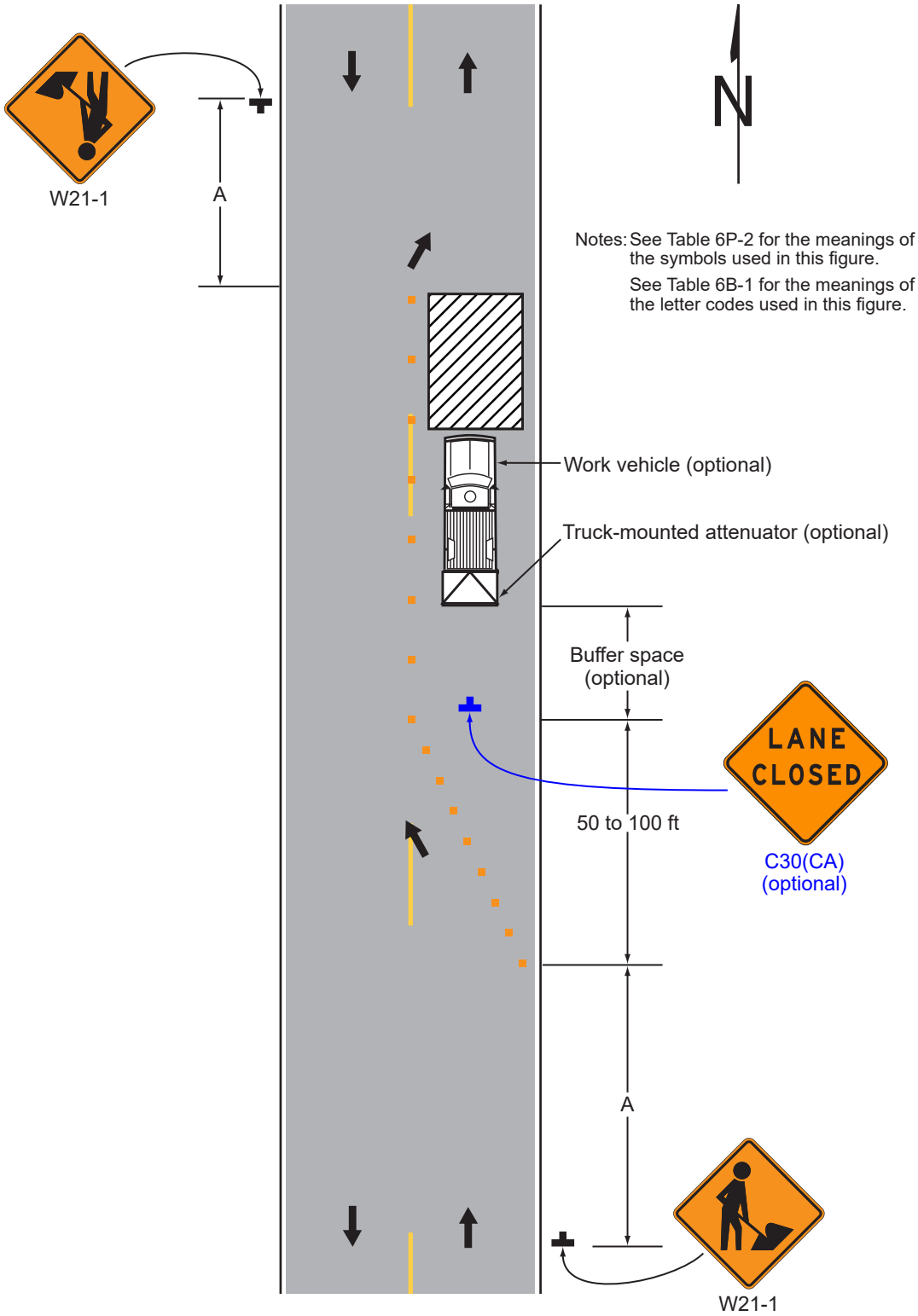
Standard:

3. Where vehicular traffic cannot effectively self-regulate, one or two flaggers shall be used as illustrated in Figure 6P-10.

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. A truck-mounted attenuator may be used on the work vehicle and the shadow vehicle.
6. Positive protection devices may be used per Section 6M.02.

Figure 6P-18. Lane Closure on a Minor Street (TA-18)



Typical Application 18

Notes for Figure 6P-19 and Figure 6P-19(CA) —Typical Application 19 Detour for One Travel Direction

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.*

Option:

3. The STREET CLOSED legend may be used in place of ROAD CLOSED.
4. Additional DO NOT ENTER signs may be used at intersections with intervening streets.
5. Warning lights may be used on Type 3 Barricades.
6. Detour signs may be located on the far side of intersections.
7. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.

Standard:

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

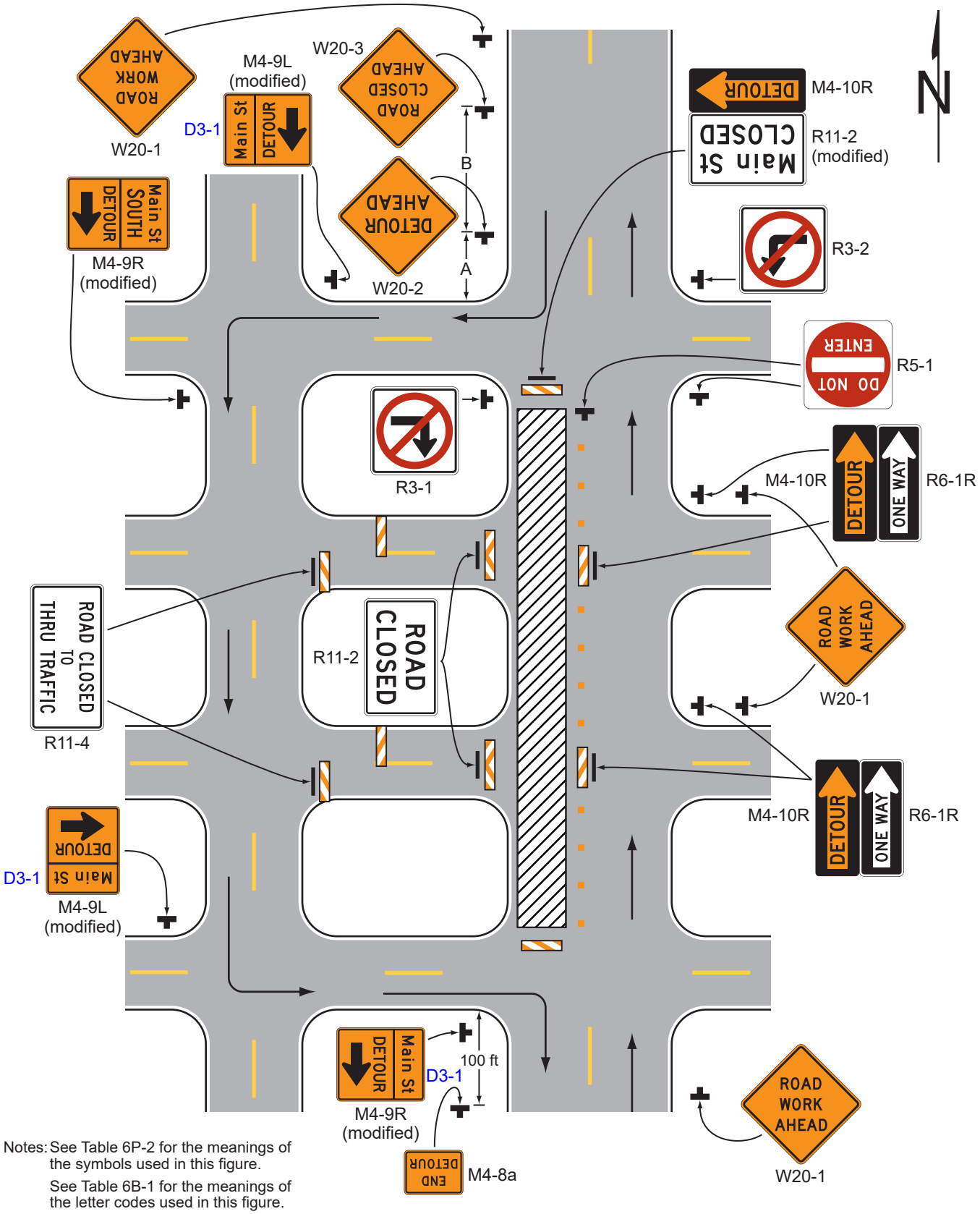
Guidance:

9. *The DETOUR (M4-8) sign should be placed on tangent sections at intervals not to exceed 1300 feet and at major intersections.*
10. *When the detour is applicable to bicyclists and not pedestrians, the Bicycle Detour (M4-9c) sign should be used instead of the Pedestrian/Bicycle Detour (M4-9a) sign.*

Option:

11. In urban areas, the M4-8 signs may be placed at every intersection.
12. For long-term duration projects (refer to Section 6N.01), the shared roadway bicycle marking may be used along detours with on-street parking and inadequate lane width.

Figure 6P-19. Detour for One Travel Direction (TA-19)

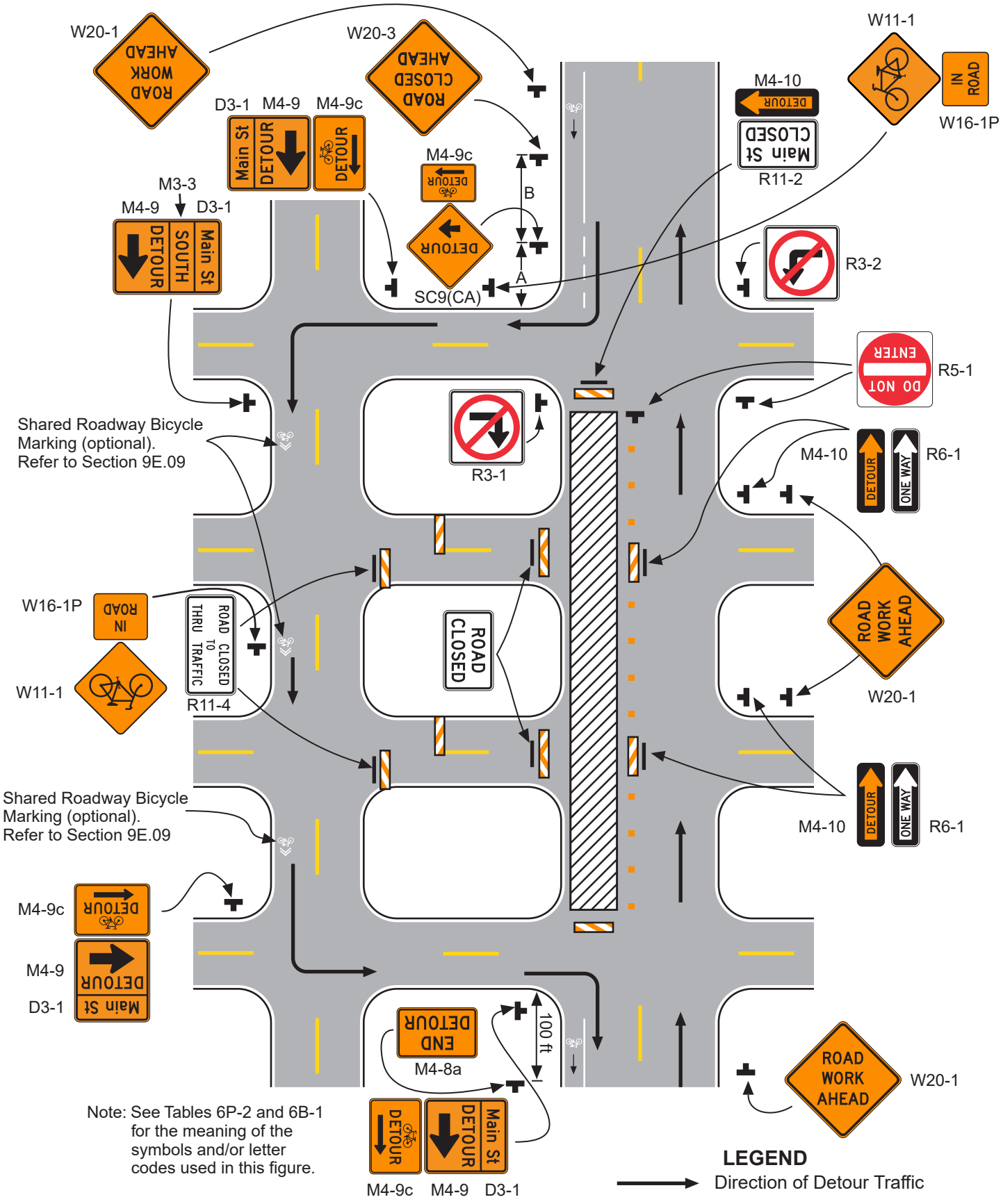


Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 19

Figure 6P-19(CA). Detour for One Travel Direction (TA-19(CA))



Typical Application 19(CA)

Notes for Figure 6P-20 —Typical Application 20
Detour for a Closed Street

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.*

Option:

3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. Flashing warning lights may be used on Type 3 Barricades.
5. 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.
6. A Street Name sign may be mounted with the Detour sign. The Street Name sign may be either white on green or black on orange.

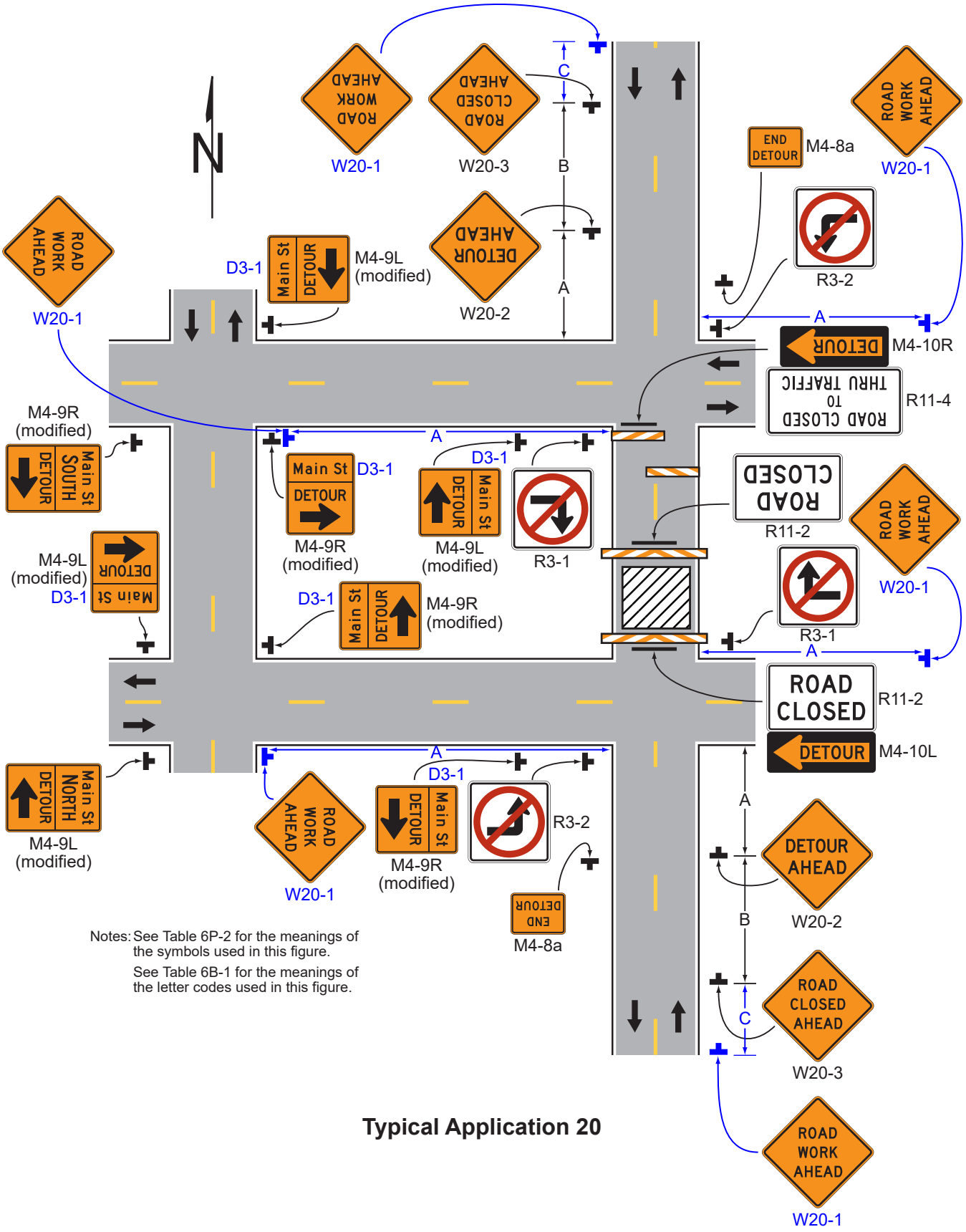
Standard:

7. When used, the Street Name sign shall be placed above the Detour sign.

Support:

8. Figure 6P-9 contains the information for detouring a numbered highway.

Figure 6P-20. Detour for a Closed Street (TA-20)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 20

Notes for Figure 6P-21 —Typical Application 21
Lane Closure on the Near Side of an Intersection

Standard:

1. **The merging taper shall direct vehicular traffic into either the right-hand or left-hand lane, but not both.**

Guidance:

2. *In this typical application, a left taper should be used so that right-turn movements will not impede through motor vehicle traffic. However, the reverse should be true for left-turn movements.*
3. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6P-29.*

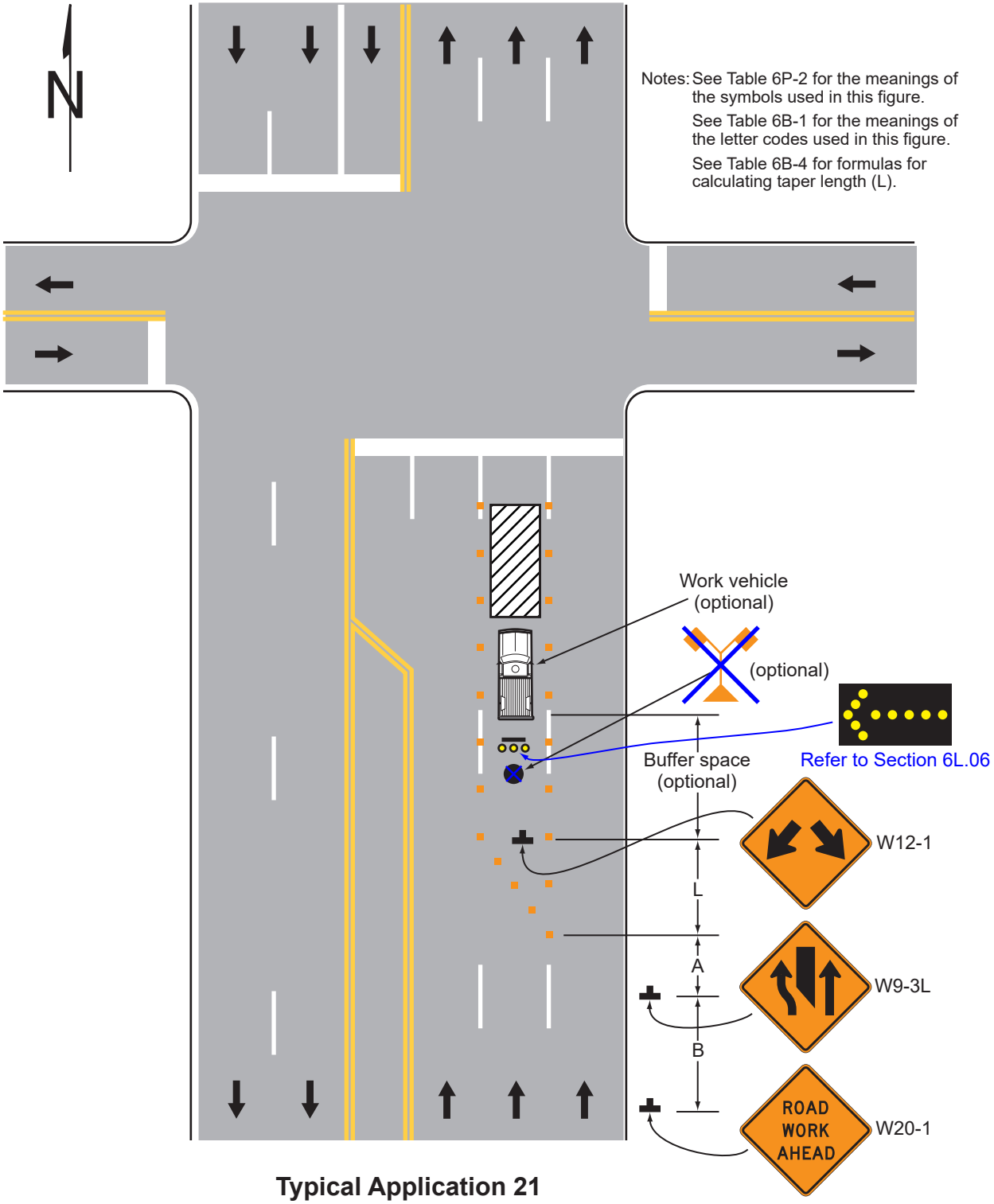
Option:

4. Positive protection devices may be used per Section 6M.02.
5. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
6. A shadow vehicle with a truck-mounted attenuator may be used.
7. A work vehicle with high-intensity rotating, flashing, oscillating, or strobe lights may be used with the ~~high-level warning device~~ arrow board.
8. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

9. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6P-21. Lane Closure on the Near Side of an Intersection (TA-21)



Typical Application 21

Notes for Figure 6P-22—Typical Application 22
Right-Hand Lane Closure on the Far Side of an Intersection

Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6P-29.*

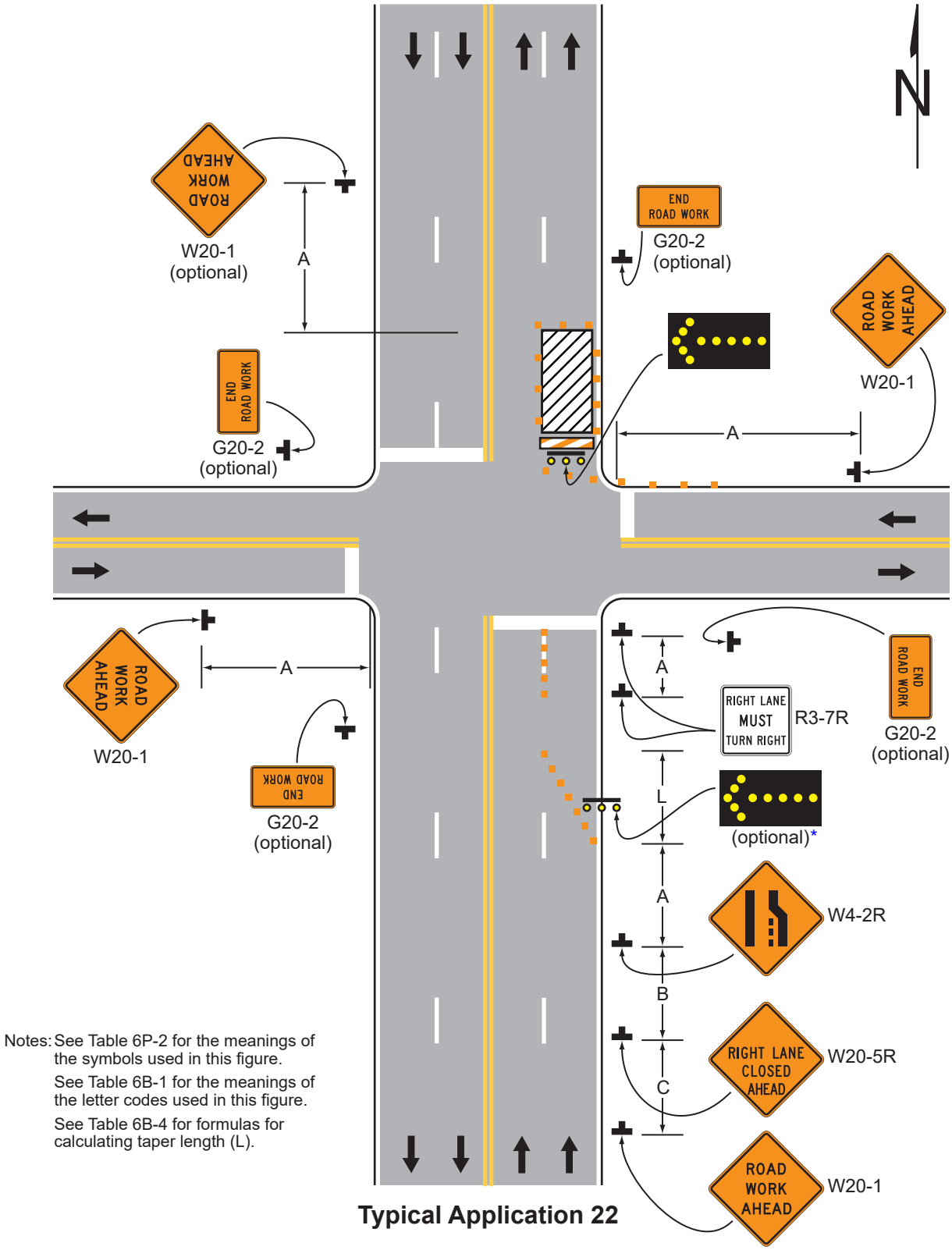
Option:

2. Positive protection devices may be used per Section 6M.02.
3. When the normal procedure of closing on the near side of the intersection any lane that is not carried through the intersection results in the closure of a right-hand lane having significant right-turn movements, then the right-hand lane may be restricted to right turns only, requiring through traffic to use the left lane.
4. For intersection approaches reduced to a single lane, left-turn movements may be prohibited to maintain capacity for through vehicular traffic.
5. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
6. Where the turning radius is large, it may be possible to create a right-turn island using channelizing devices or pavement markings.
7. If dimension "A" is not available to create a temporary right-turn lane, continuous channelizers may be installed from the end of the taper to the intersection and, as a result, the RIGHT LANE MUST TURN RIGHT (R3-7R) signs would not be installed.

Support:

8. By first closing off the right-hand lane and then reopening it as a turn bay, the capacity of the through lane is preserved by separating the right-turning vehicles from the through vehicles.
9. Refer to Figure 3B-14(CA) (Sheet 3 of 3) for lane reduction markings. Refer to Section 2C.45 for merge signs.

Figure 6P-22. Right-Hand Lane Closure on the Far Side of an Intersection (TA-22)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 22

* Refer to FHWA's List of Known Errors for error in figure text. Refer to Section 1A.04 for more details.

Notes for Figure 6P-23 —Typical Application 23
Left-Hand Lane Closure on the Far Side of an Intersection

Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6P-29.*

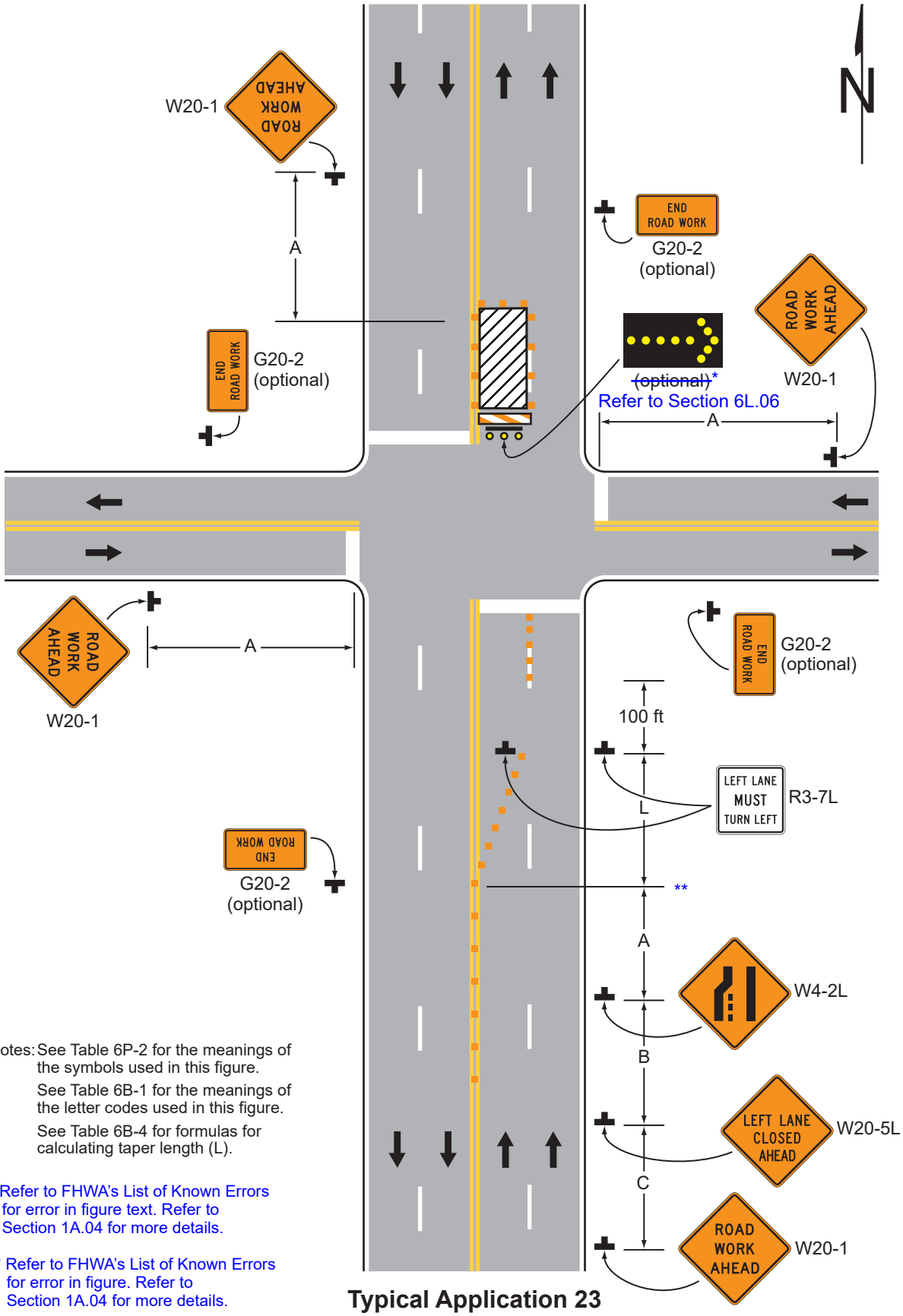
Option:

2. Positive protection devices may be used per Section 6M.02.
3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. When the normal procedure of closing on the near side of the intersection any lane that is not carried through the intersection results in the closure of a left-hand lane having significant left-turn movements, then the left-hand lane may be reopened as a turn bay for left turns only, as shown.

Support:

5. By first closing off the left-hand lane and then reopening it as a turn bay, the left-turn bay allows storage of turning vehicles so that the movement of through traffic is not impeded. A left-turn bay that is long enough to accommodate all turning vehicles during a traffic signal cycle will provide the maximum benefit for through traffic. Also, an island is created with channelizing devices that allows the LEFT LANE MUST TURN LEFT (R3-7L) sign to be repeated on the left adjacent to the lane that it controls.

Figure 6P-23. Left-Hand Lane Closure on the Far Side of an Intersection (TA-23)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

See Table 6B-4 for formulas for calculating taper length (L).

* Refer to FHWA's List of Known Errors for error in figure text. Refer to Section 1A.04 for more details.

** Refer to FHWA's List of Known Errors for error in figure. Refer to Section 1A.04 for more details.

Typical Application 23

Notes for Figure 6P-24 and Figure 6P-24(CA) —Typical Application 24 Half Road Closure on the Far Side of an Intersection

Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6P-29.*
2. *When turn prohibitions are implemented, two turn prohibition signs should be used, one on the near side and, space permitting, one on the far side of the intersection.*

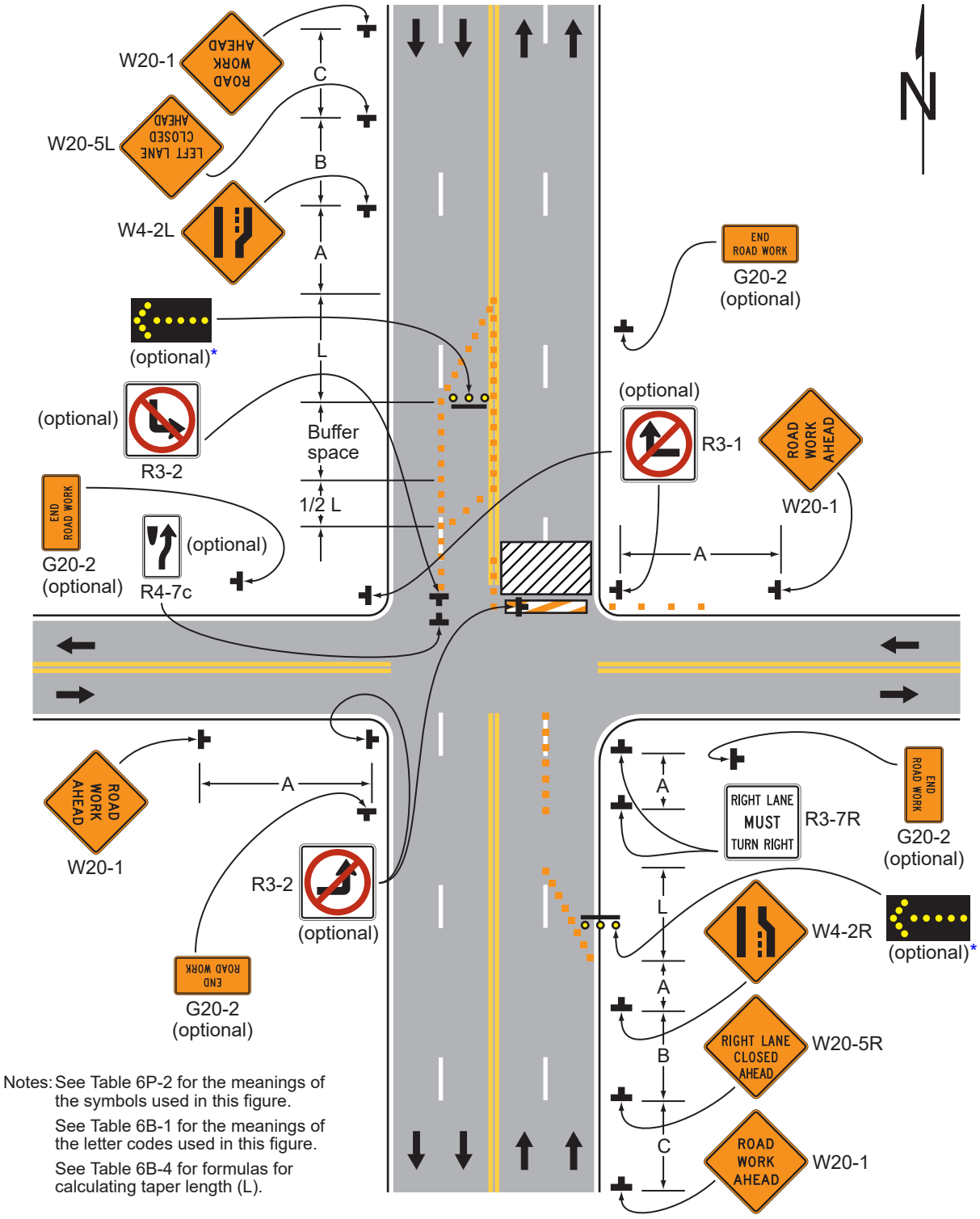
Option:

3. Positive protection devices may be used per Section 6M.02.
4. A buffer space may be used between opposing directions of vehicular traffic as shown in this application.
5. When the normal procedure of closing on the near side of the intersection any lane that is not carried through the intersection results in the closure of a right-hand lane having significant right-turn movements, then the right-hand lane may be restricted to right turns only, requiring through traffic to use the left lane.
6. Where the turning radius is large, a right-turn island using channelizing devices or pavement markings may be used.
7. If there is insufficient space to place the back-to-back Keep Right sign and No Left Turn symbol signs at the end of the row of channelizing devices separating opposing vehicular traffic flows, the No Left Turn symbol sign may be placed on the right and the Keep Right sign may be omitted.
8. For intersection approaches reduced to a single lane, left-turn movements may be prohibited to maintain capacity for through vehicular traffic.
9. Flashing warning lights and/or flags may be used to call attention to advance warning signs.
10. Temporary pavement markings may be used to delineate the travel path through the intersection.
11. If dimension "A" is not available to create a temporary right-turn lane, continuous channelizers may be installed from the end of the taper to the intersection and, as a result, the RIGHT LANE MUST TURN RIGHT (R3-7R) signs would not be installed.

Support:

12. Figure 6P-24 is appropriate for situations where the approach is stop-controlled (Stop sign and/or red flashing beacons) due to the abrupt transition through the intersection.
13. Figure 6P-24(CA) is appropriate for situations where the approach is uncontrolled or controlled by traffic signals.

Figure 6P-24. Half Road Closure on the Far Side of an Intersection (TA-24)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

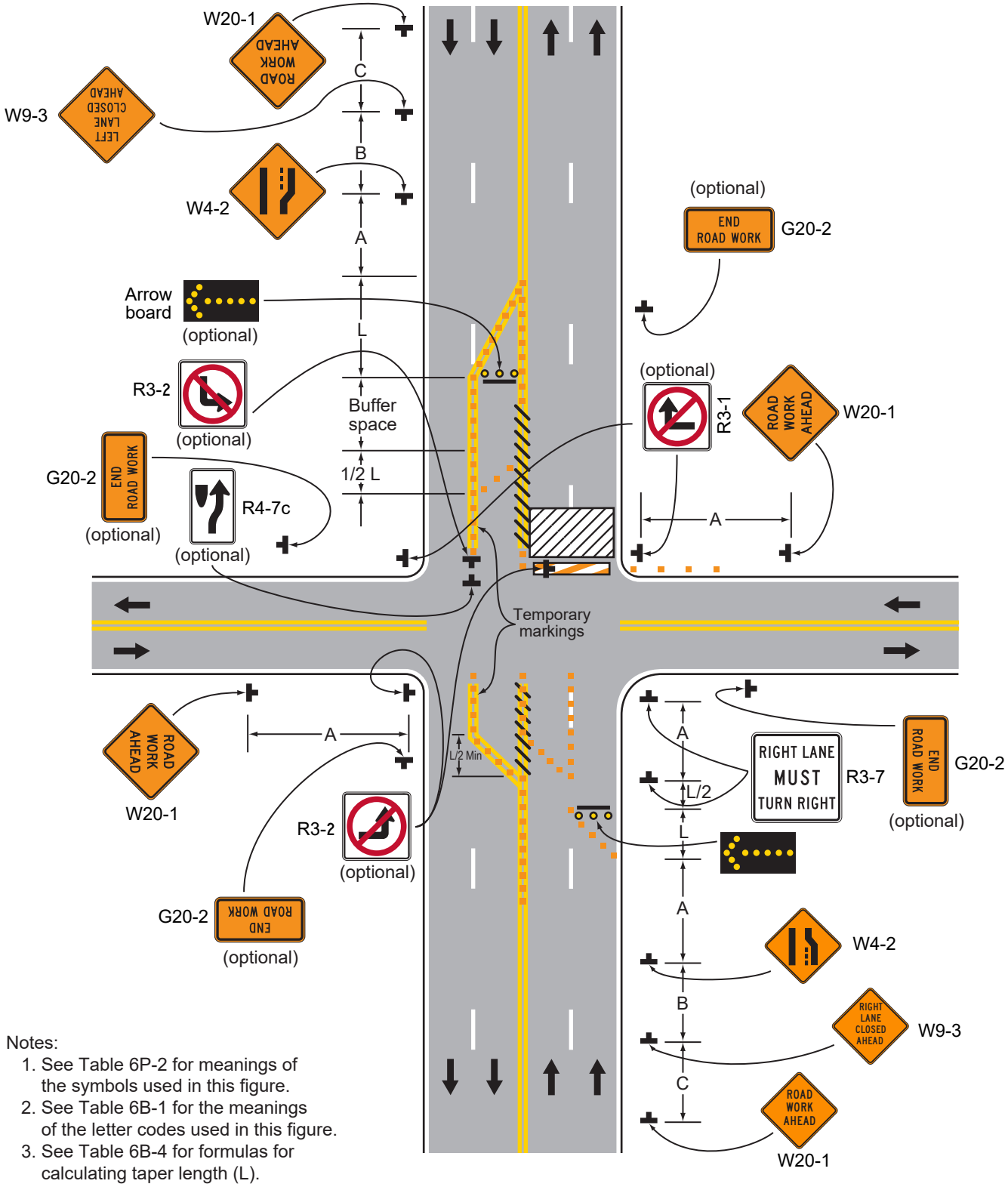
See Table 6B-1 for the meanings of the letter codes used in this figure.

See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 24

* Refer to FHWA's List of Known Errors for error in figure text. Refer to Section 1A.04 for more details.

Figure 6P-24(CA). Half Road Closure on the Far Side of an Intersection (TA-24(CA))



Notes:

1. See Table 6P-2 for meanings of the symbols used in this figure.
2. See Table 6B-1 for the meanings of the letter codes used in this figure.
3. See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 24(CA)

Notes for Figure 6P-25 —Typical Application 25
Multiple Lane Closures at an Intersection

Guidance:

1. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6P-29.*

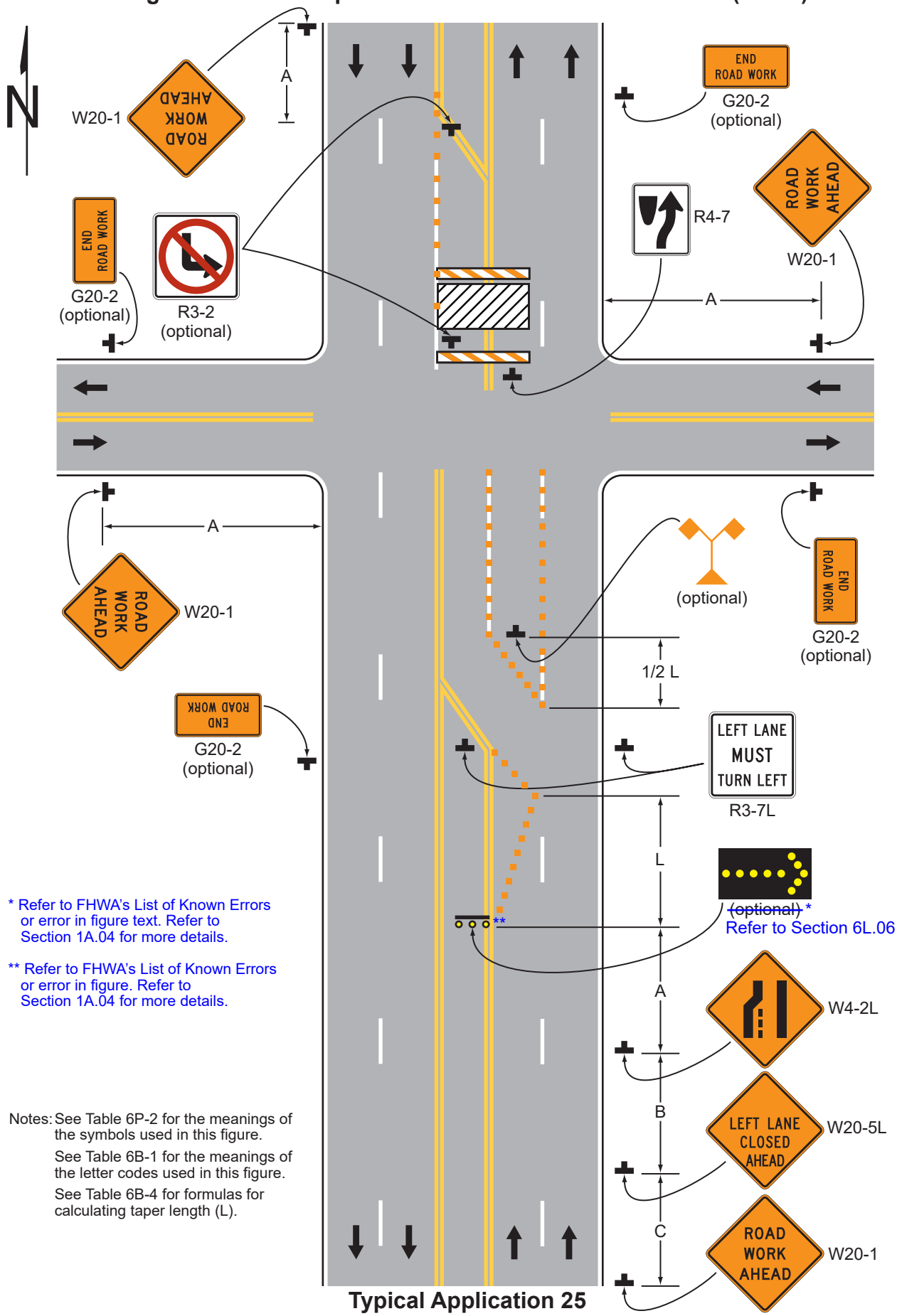
Support:

2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection, as shown.

Option:

3. Positive protection devices may be used per Section 6M.02.
4. If the left-turn movement that normally uses the closed turn bay is small and/or the gaps in opposing vehicular traffic are frequent, left turns may be permitted on that approach.
5. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

Figure 6P-25. Multiple Lane Closures at an Intersection (TA-25)



* Refer to FHWA's List of Known Errors or error in figure text. Refer to Section 1A.04 for more details.

** Refer to FHWA's List of Known Errors or error in figure. Refer to Section 1A.04 for more details.

Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 25

Notes for Figure 6P-26 —Typical Application 26
Closure in the Center of an Intersection

Guidance:

1. *All lanes should be a minimum of 10 feet in width as measured to the near face of the channelizing devices.*

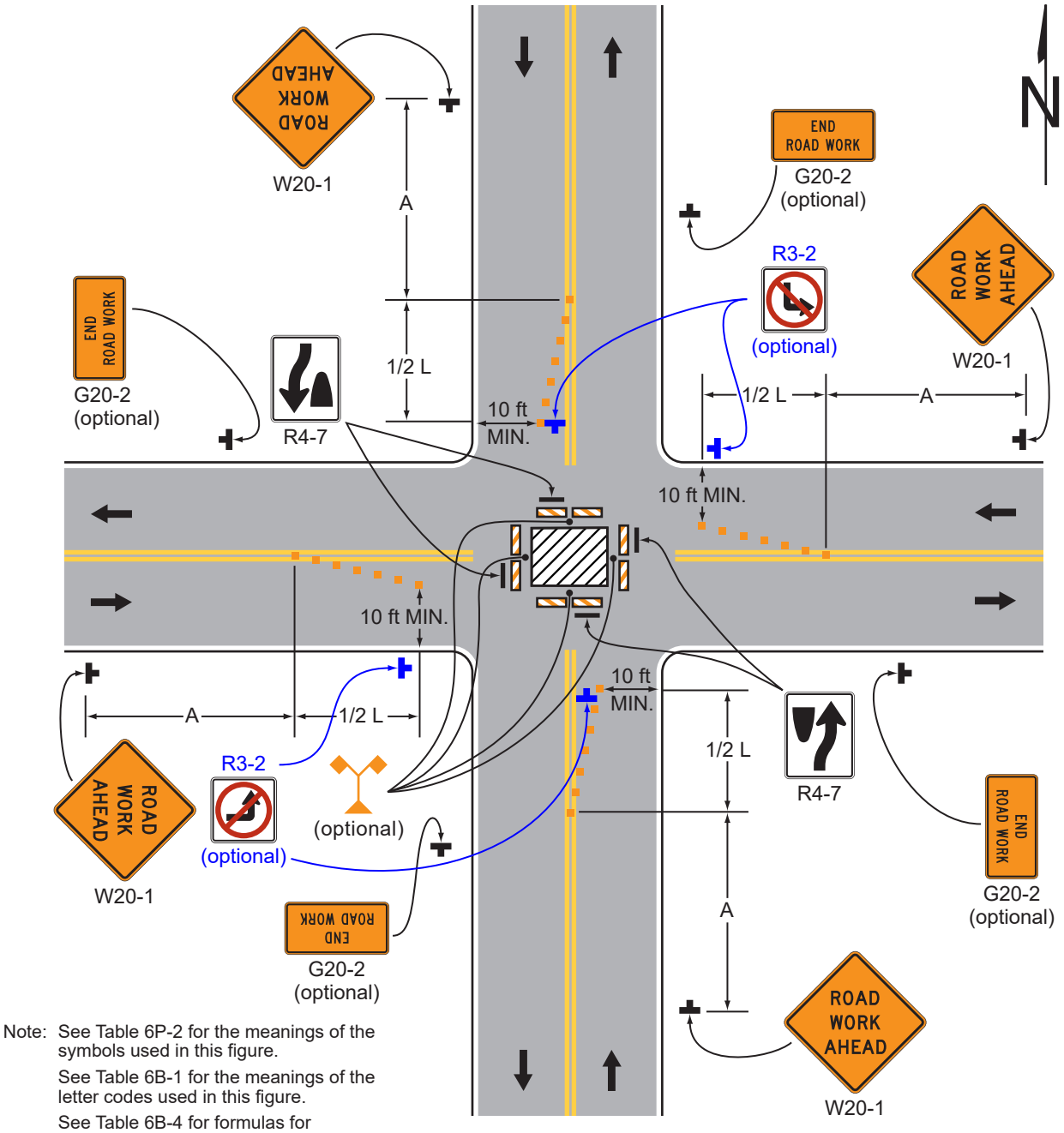
Option:

2. A high-level warning device may be placed in the work space, if there is sufficient room.
3. For short-term use on low-volume, low-speed roadways with vehicular traffic that does not include longer and wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.
4. Flashing warning lights and/or flags may be used to call attention to advance warning signs.
5. Left turns may be prohibited as required by geometric conditions, such as where the streets are so narrow that it might be physically impossible to turn left, especially for large vehicles.
6. For short-duration work operations, the channelizing devices may be eliminated if a vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work space.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

8. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6P-26. Closure in the Center of an Intersection (TA-26)



Note: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 26

Notes for Figure 6P-27 —Typical Application 27
Closure at the Side of an Intersection

Guidance:

1. *The situation depicted can be simplified by closing one or more of the intersection approaches. If this cannot be done, and/or when capacity is a problem, through vehicular traffic should be directed to other roads or streets.*
2. *Depending on road user conditions, flagger(s) or uniformed law enforcement officer(s) should be used to direct road users within the intersection.*

Standard:

3. **At night, flagger stations shall be illuminated, except in emergencies.**

Option:

4. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
5. For short-duration work operations, the channelizing devices may be eliminated if a vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights is positioned in the work space.
6. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

7. *When used, the BE PREPARED TO STOP (W3-4) sign should be located ~~before~~ after the Flagger symbol sign.*
8. *ONE LANE ROAD AHEAD (W20-4) signs should also be used to provide adequate advance warning.*

~~Support:~~

Option:

9. Turns may be prohibited as required by vehicular traffic conditions, such as where the streets are so narrow that it might be physically impossible to make certain turns, especially for large vehicles.

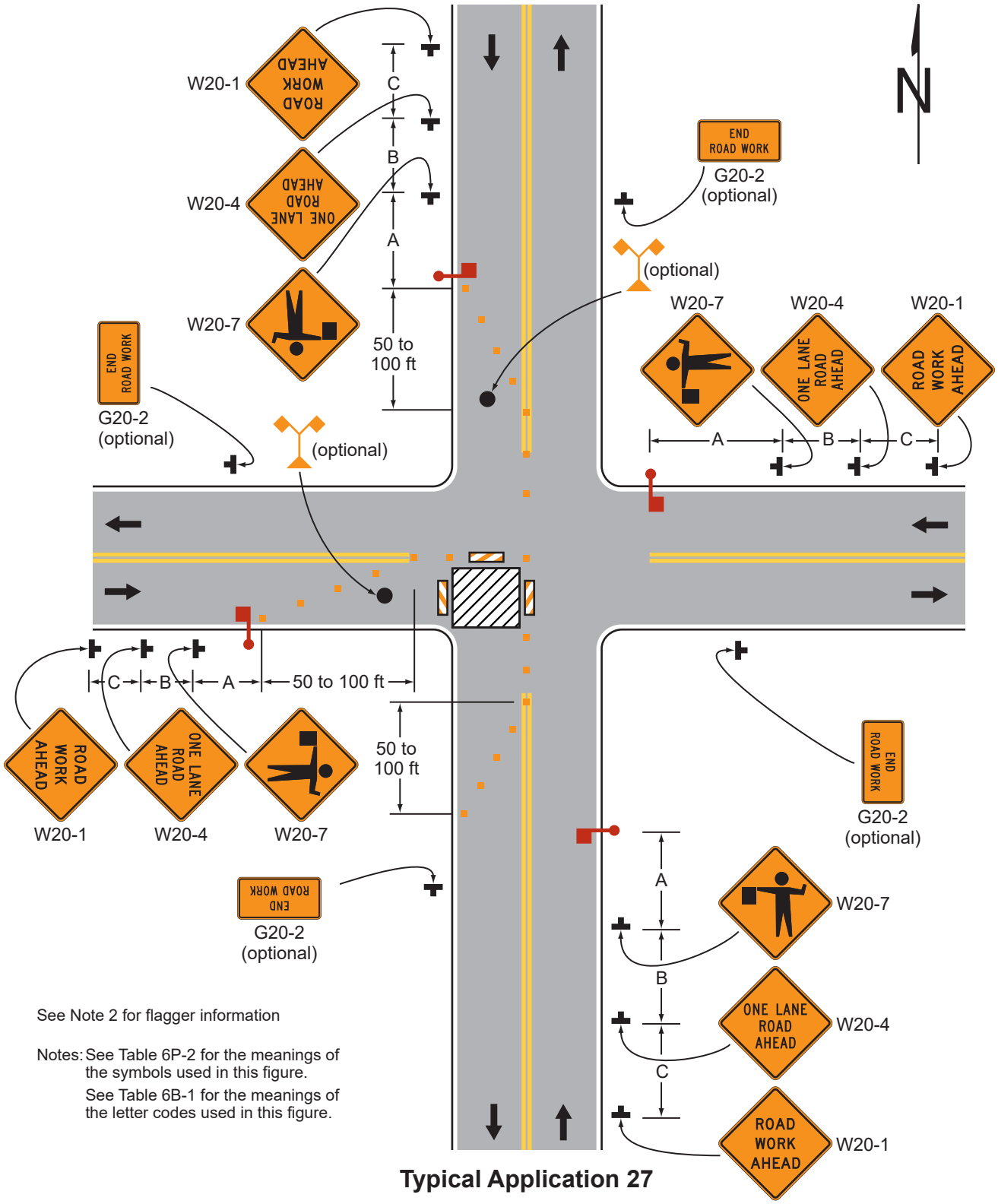
Option:

10. Positive protection devices may be used per Section 6M.02.
11. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

12. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6P-27. Closure at the Side of an Intersection (TA-27)



See Note 2 for flagger information

Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 27

Notes for Figure 6P-28 —Typical Application 28
Sidewalk Detour or Diversion

Standard:

1. **When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. A pedestrian channelizing device (see Figure 6K-2) that is detectable by a person with a vision disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.**
2. **When used, temporary ramps shall provide a 12:1 (8.33%) or flatter slope, with a slip-resistant surface. The ramp landing area shall provide a 48-inch x 48-inch minimum area with a 2% or flatter cross-slope.**
3. **When used, Longitudinal Channelizing Devices used for temporary pedestrian routes shall comply with Section 6K.02.**
4. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6M.02.**
5. **SIDEWALK CLOSED CROSS HERE signs shall include audible information devices to provide adequate communication to pedestrians with vision disabilities.**
6. **Audible information devices shall be provided where midblock sidewalk closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians with vision disabilities.**

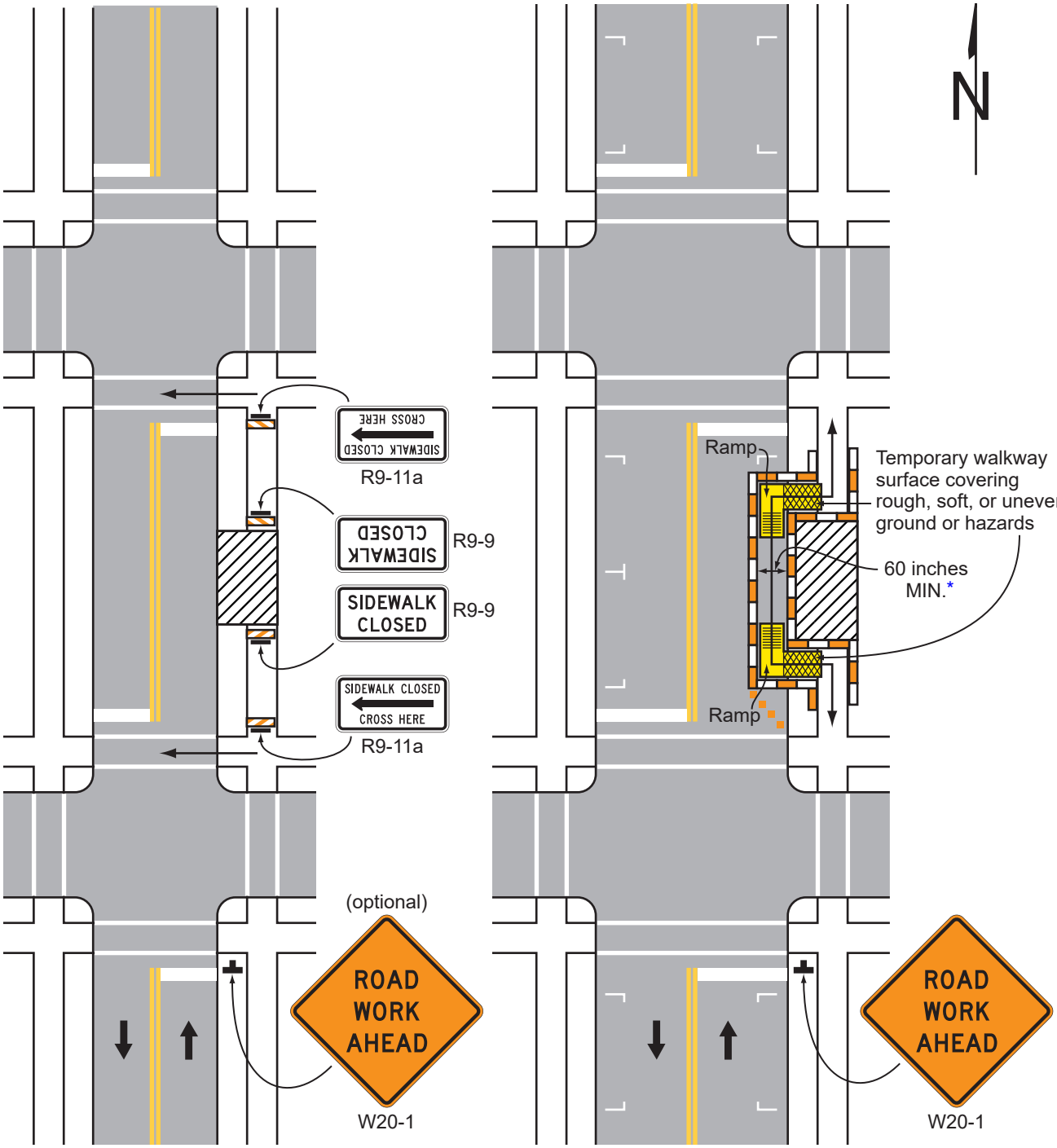
Guidance:

7. *The surface of an alternate pathway should meet the requirements of the U.S. Department of Justice 2010 ADA Standards for Accessible Design, September 15, 2010, 28 CFR 35 and 36, Americans with Disabilities Act of 1990.*
8. *The protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers and their use in this situation should be based on engineering judgment.*

Option:

9. Street lighting may be considered.
10. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS (W5-1) signs, may be used to control vehicular traffic.
11. For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.
12. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the temporary sidewalks from vehicular traffic flow.
13. Signs, such as KEEP RIGHT (LEFT) (R4-7a, R4-8a), may be placed along a temporary sidewalk to guide or direct pedestrians.
14. The width of the alternate pedestrian route may be 48 inches with a passing area of 60 inches every 200 feet.

Figure 6P-28. Sidewalk Detour or Diversion (TA-28)



Typical Application 28

Note: SeeTable 6P-2 for the meanings of the symbols used in this figure.

* Refer to FHWA's List of Known Errors for error in figure text. Refer to Section 1A.04 for more details.

Notes for Figure 6P-29 —Typical Application 29
Crosswalk Closures and Pedestrian Detours

Standard:

1. **When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**
2. **Curb parking shall be prohibited for at least 50 feet in advance of the midblock crosswalk.**
3. **SIDEWALK CLOSED CROSS HERE (R9-11a) signs shall include audible information devices to provide adequate communication to pedestrians with vision disabilities.**
4. **Audible information devices shall be provided where midblock sidewalk closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians with vision disabilities.**

Guidance:

5. *Pedestrian traffic signal displays controlling closed crosswalks should be covered or deactivated.*

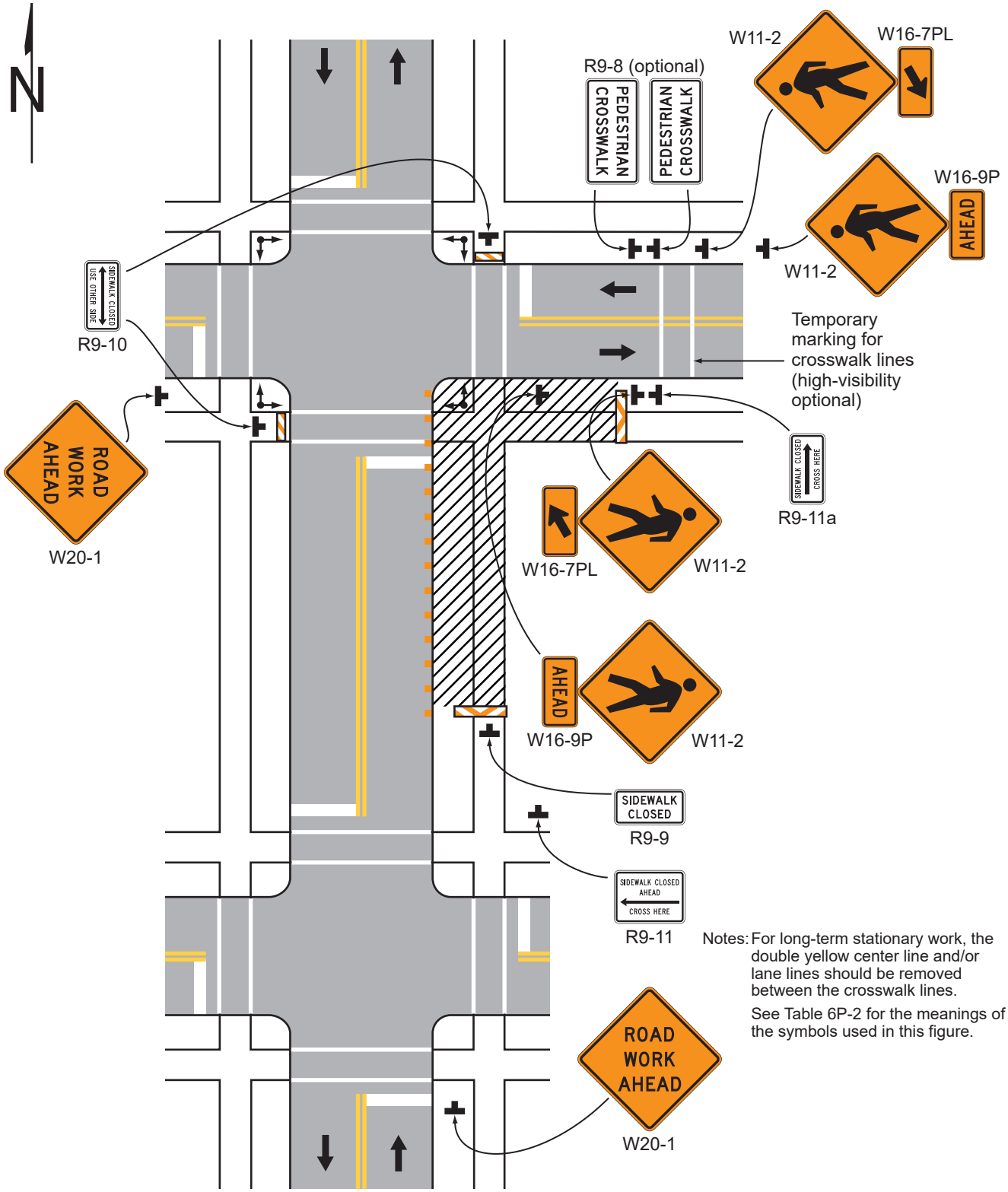
Option:

6. Street lighting may be considered.
7. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS (W5-1) signs, may be used to control vehicular traffic.
8. For nighttime closures, Type A Flashing warning lights may be used on barricades supporting signs and closing sidewalks.
9. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the work space from vehicular traffic.
10. In order to maintain the systematic use of the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in TTC zones.
11. Positive protection devices may be used per Section 6M.02.

Support:

12. Refer to CVC § 22500 for mid-block crosswalks.

Figure 6P-29. Crosswalk Closures and Pedestrian Detours (TA-29)



Typical Application 29

Notes for Figure 6P-30 —Typical Application 30 Interior Lane Closure on a Multi-Lane Street

Guidance:

1. *This information applies to low-speed, low-volume urban streets. Where speed or volume is higher, additional signing such as LEFT LANE CLOSED XX FT (W20-5L) should be used between the signs shown.*

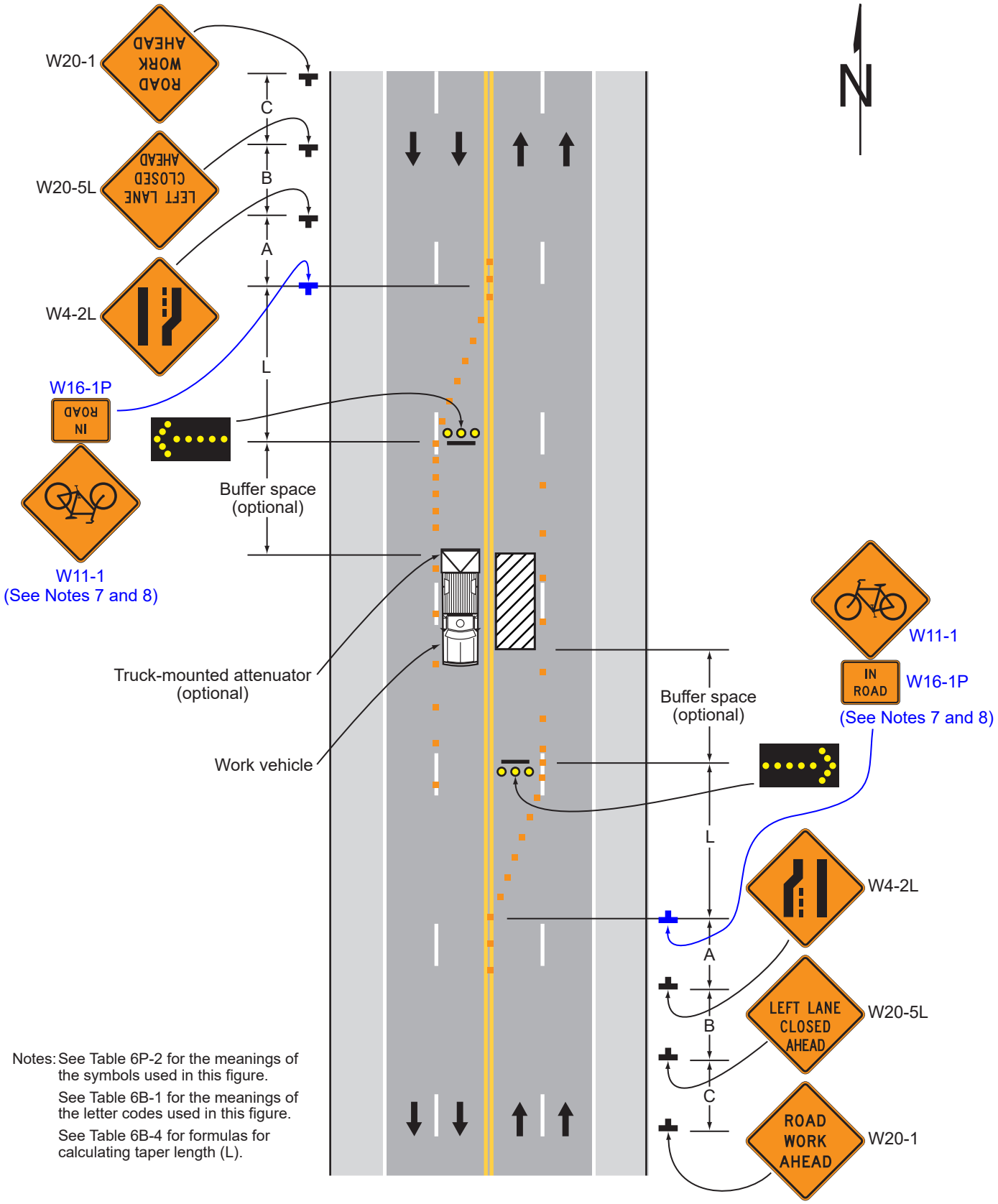
Option:

2. Positive protection devices may be used per Section 6M.02.
3. Shadow vehicles with a truck-mounted attenuator may be used. Support:
4. The closure of the adjacent interior lane in the opposing direction might not be necessary, depending upon the activity being performed and the work space needed for the operation.
5. The RIGHT (LEFT) LANE(S) CLOSED (W20-5 or C20(CA)) sign may be used instead of the Lane Reduction (W4-2) sign.

Guidance:

6. *All advance warning signs should be placed so that the path of travel for bicycles is not blocked, while maintaining visibility for road users.*
7. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Crossing (W11-1) sign and the IN ROAD (W16-1P) plaque or the IN STREET (W16-1aP) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*
8. *If bicyclists are able to use the shoulder throughout the TTC zone, the Bicycle Crossing (W11-1) sign and the IN ROAD (W16-1P) plaque or the IN STREET (W16-1aP) plaque should be omitted.*

Figure 6P-30. Interior Lane Closure on a Multi-Lane Street (TA-30)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 30

Notes for Figure 6P-31 —Typical Application 31
Lane Closure on a Street with Uneven Directional Volumes

Standard:

1. **The illustrated information shall be used only when the vehicular traffic volume indicates that two lanes of vehicular traffic shall be maintained in the direction of travel for which one lane is closed.**

Option:

2. The procedure may be used during a peak period of vehicular traffic and then changed to provide two lanes in the other direction for the other peak.

Guidance:

3. *For high speeds, a LEFT LANE CLOSED XX FT (W20-5L) sign should be added for vehicular traffic approaching the lane closure, as shown in Figure 6P-32.*
4. *Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is impracticable, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of ½ S feet where S is the speed in mph. Temporary markings should be installed where needed. The spacing of channelizing devices should not exceed the maximum distances shown in Table 6K-101(CA). Refer to Section 6K.01 for spacing of channelizing devices.*
5. *If the lane shift has curves with recommended speeds of 30 mph or less, Reverse Turn signs should be used.*
6. *Where the shifted section is long, a Reverse Curve sign should be used to show the initial shift and a second sign should be used to show the return to the normal alignment.*
7. *If the tangent distance along the temporary diversion is less than 600 feet, the Double Reverse Curve sign should be used at the location of the first Two Lane Reverse Curve sign. The second Two Lane Reverse Curve sign should be omitted. Use the Reverse Curve (W1-4) signs for both locations instead of the Double Reverse Curve or Two Lane Reverse Curve signs.*

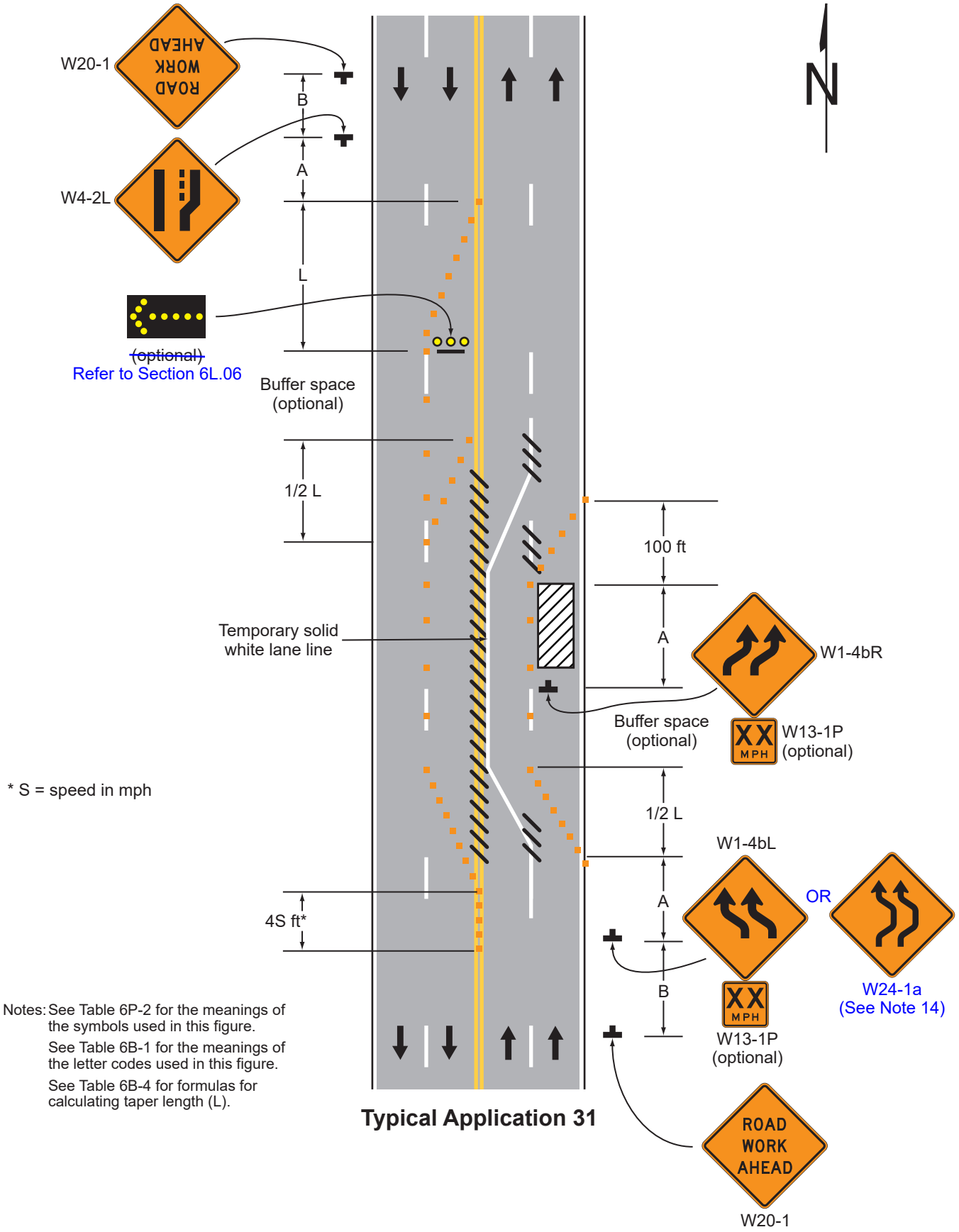
Standard:

8. **Except as provided in Note 11 below, the number of lanes illustrated on the Reverse Curve or Double Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.**

Option:

9. Positive protection devices may be used per Section 6M.02.
10. A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.
11. Where two or more lanes are being shifted, a Reverse Curve (or Reverse Turn) sign with an ALL LANES plaque (see Figure 6H-1) may be used instead of a sign that illustrates the number of lanes.
12. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.
13. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.
14. When recommended speeds are the same for each curve, one Double Reverse Curve (W24-1) sign may be used, instead of two Reverse Curve (W1-4) signs, in advance of the first curve.

Figure 6P-31. Lane Closure on a Street with Uneven Directional Volumes (TA-31)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 31

Notes for Figure 6P-32 —Typical Application 32
Half Road Closure on a Multi-Lane, High-Speed Highway

Standard:

1. **Pavement markings no longer applicable shall be removed or obliterated as soon as practical. Except for intermediate-term and short-term situations, temporary markings shall be provided to clearly delineate the temporary travel path. For short-term and intermediate-term situations where it is not feasible to remove and restore pavement markings, channelization shall be made dominant by using a very close device spacing.**

Guidance:

2. *When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.*
3. *Where channelizing devices are used instead of pavement markings, the maximum spacing should be ½ S feet where S is the speed in mph. The spacing of channelizing devices should not exceed the maximum distances shown in Table 6K-101(CA). Refer to Section 6K.01 for spacing of channelizing devices.*
4. *If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should be omitted.*

Option:

5. Positive protection devices may be used per Section 6M.02.
6. Warning lights may be used to supplement channelizing devices at night.
7. A truck-mounted attenuator may be used on the work vehicle and/or the shadow vehicle.

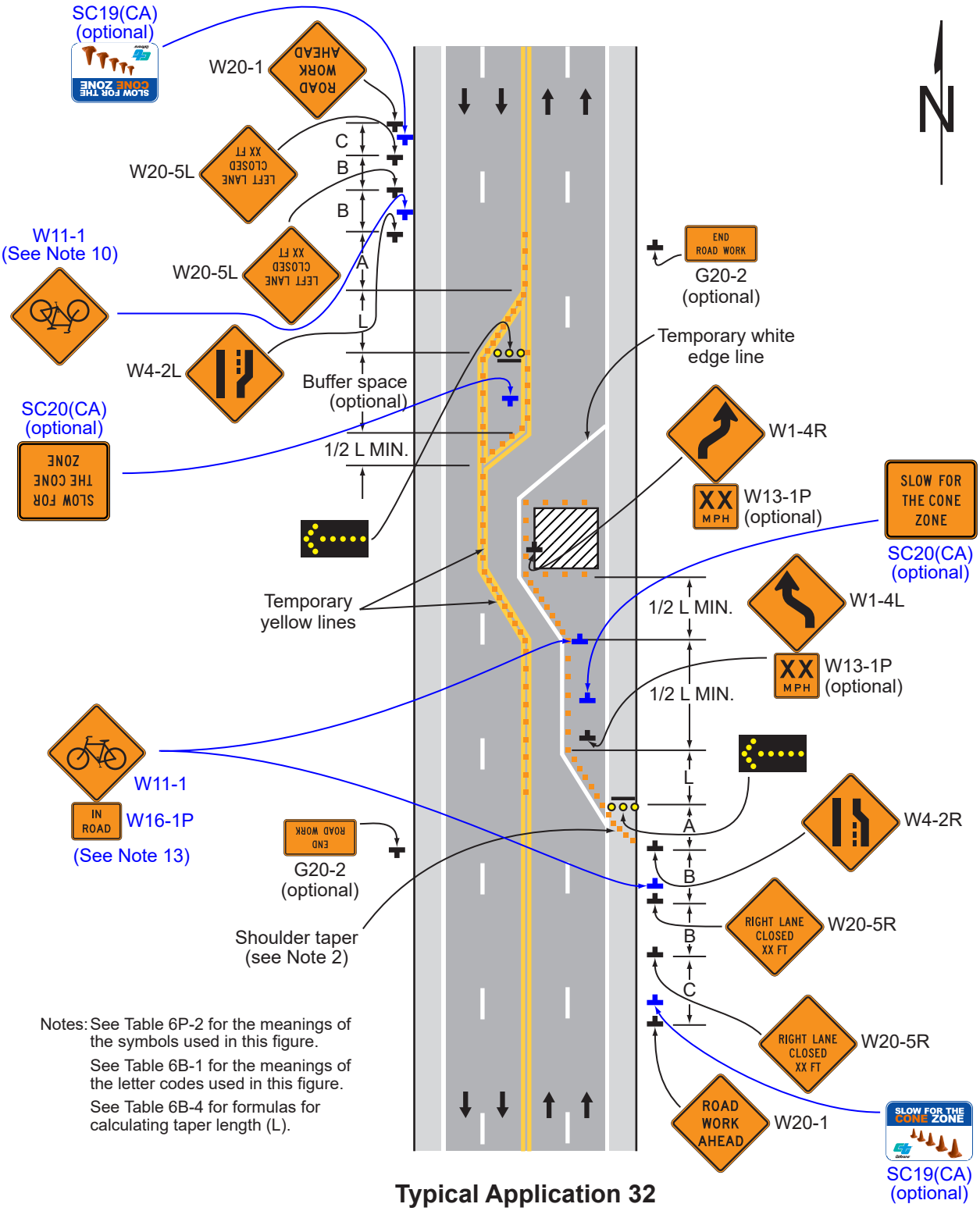
Support:

8. Refer to Section 6F.102(CA) for use of the Slow For The Cone Zone (SC19(CA) and SC20(CA)) Signs.

Guidance:

9. *All advance warning signs should be placed so that the path of travel for bicycles is not blocked, while maintaining visibility for road users.*
10. *If bicyclists are able to use the shoulder throughout the TTC zone, the Bicycle Crossing (W11-1) sign should be used and the IN ROAD (W16-1P) plaque or the IN STREET (W16-1aP) plaque should be omitted.*
11. *The speeds used for the shoulder taper calculations should be of bicyclists in the project vicinity or if a special event such as a bike race, the expected speed of bicyclists approaching the TTC zone.*
12. *If bicyclists are sharing the traveled way lanes with motorists, speed reduction countermeasures should be used to reduce traffic speeds in the TTC zone. Refer to Sections 6B.01 and 6C.04.*
13. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Crossing (W11-1) sign and the IN ROAD (W16-1P) plaque or the IN STREET (W16-1aP) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*

Figure 6P-32. Half Road Closure on a Multi-Lane, High-Speed Highway (TA-32)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 32

Notes for Figure 6P-33 —Typical Application 33
Stationary Lane Closure on a Divided Highway

Standard:

1. **This information also shall be used when work is being performed in the lane adjacent to the median on a divided highway. In this case, the LEFT LANE CLOSED signs and the corresponding Lane Ends signs shall be substituted.**
2. **When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed as needed.**

Guidance:

3. *When paved shoulders having a width of 8 feet or more are closed, channelizing devices should be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.*

Option:

4. A truck-mounted attenuator may be used on the work vehicle and/or shadow vehicle.
5. Positive protection devices may be used per Section 6M.02. Support:
6. Where conditions permit, restricting all vehicles, equipment, workers, and their activities to one side of the roadway might be advantageous.

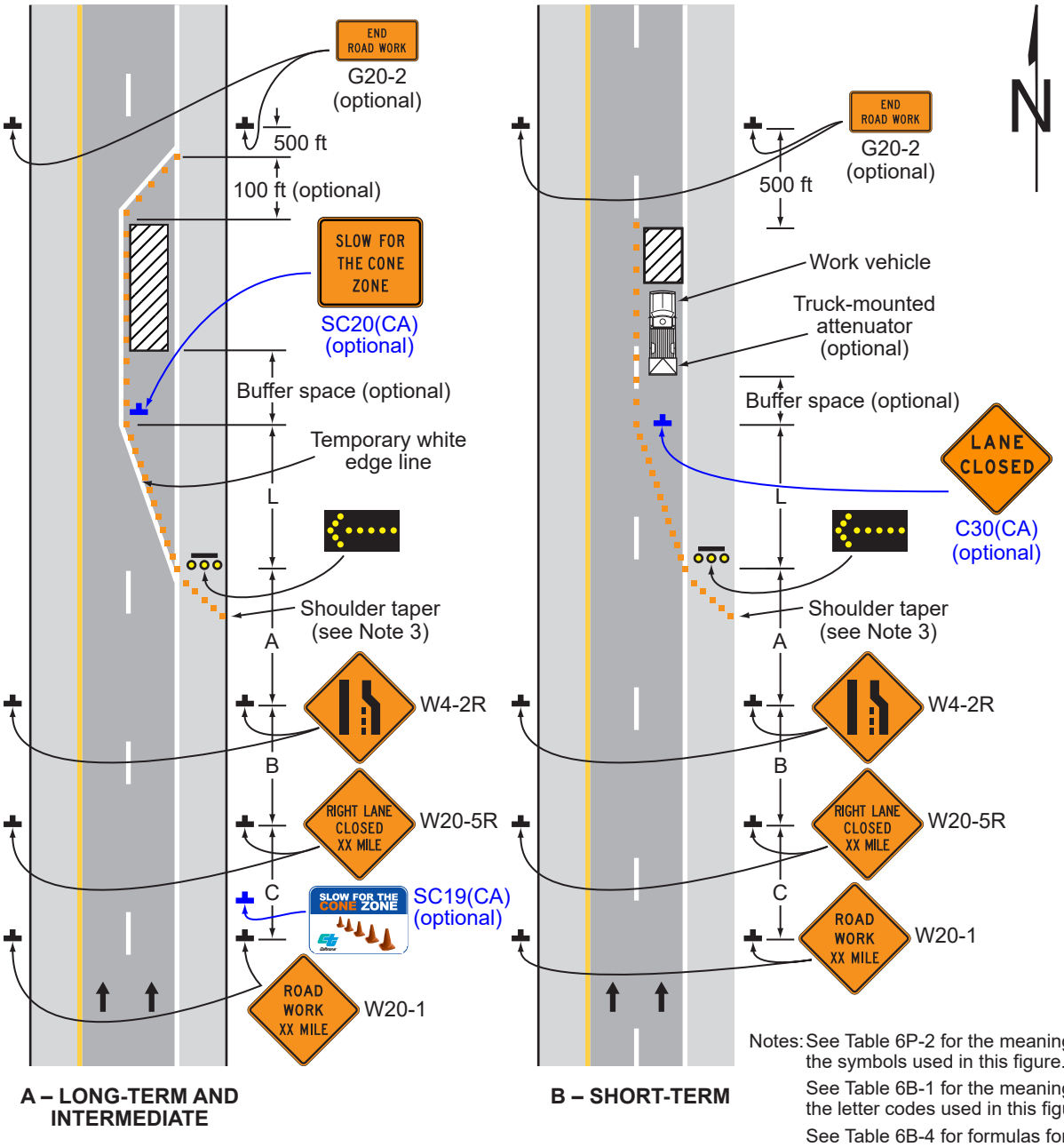
Standard:

7. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Support:

8. Refer to Section 6F.102(CA) for use of the Slow For The Cone Zone (SC19(CA) and SC20(CA)) Signs.

Figure 6P-33. Stationary Lane Closure on a Divided Highway (TA-33)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 33

Notes for Figure 6P-34 —Typical Application 34
Lane Closure with a Temporary Traffic Barrier

Standard:

1. **This information also shall be used when work is being performed in the lane adjacent to the median on a divided highway. In this case, the LEFT LANE CLOSED (W20-5L) signs and the corresponding Lane Ends signs shall be substituted.**

Guidance:

2. *For long-term lane closures on facilities with permanent edge lines, a temporary edge line should be installed from the upstream end of the merging taper to the downstream end of the downstream taper, and conflicting pavement markings should be removed.*
3. *The use of a barrier should be based on engineering judgment.*

Standard:

4. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6M.02.**
5. **The barrier shall not be placed along the merging taper. The lane shall first be closed using channelizing devices and pavement markings.**

Option:

6. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to the edge of pavement for nighttime lane closures.
7. The barrier shown in this typical application is an example of one method that may be used to close a lane for a long-term project. If the work activity permits, a movable barrier may be used and relocated to the shoulder during non-work periods or peak-period vehicular traffic conditions, as appropriate.

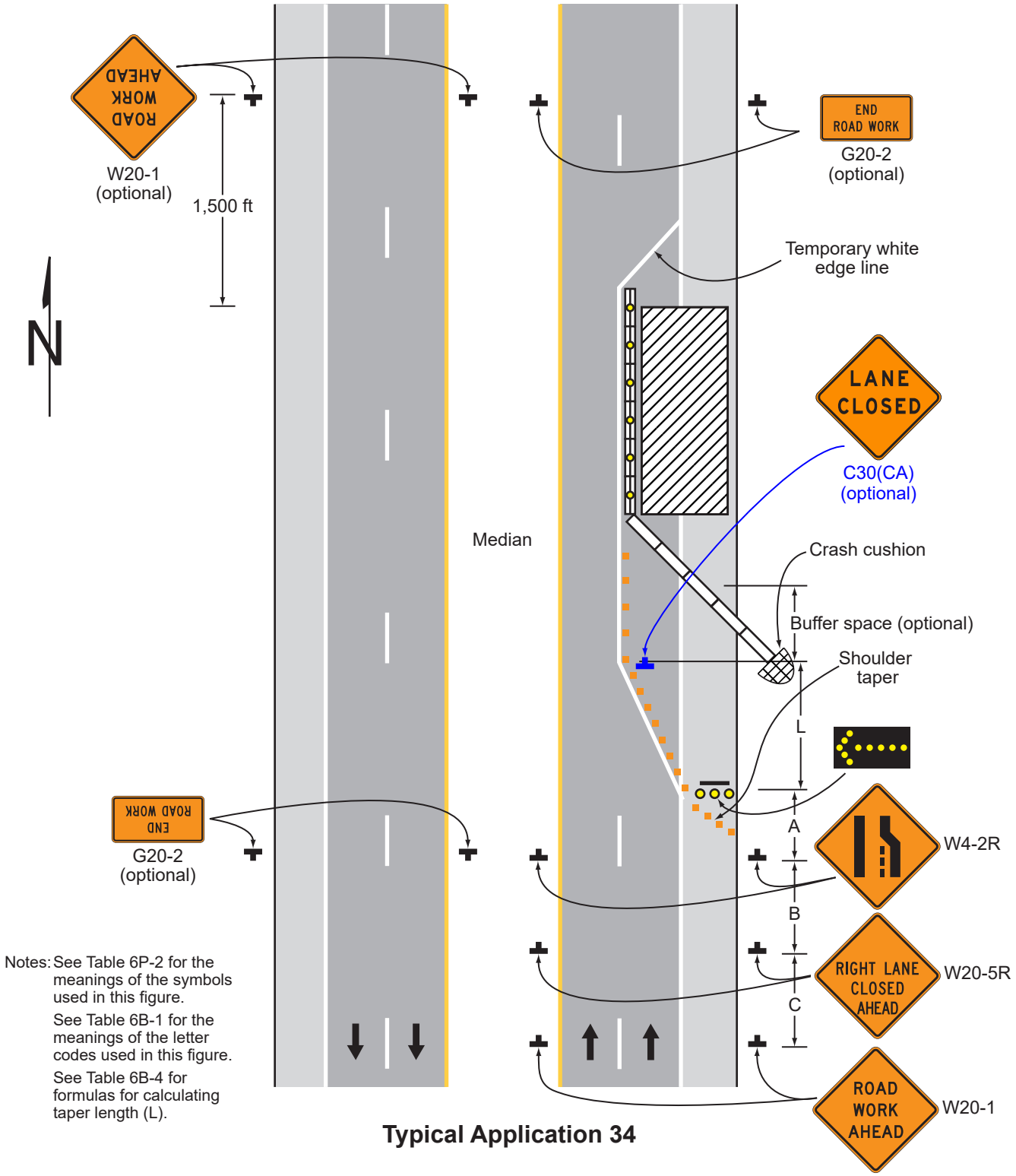
Standard:

8. **If a movable barrier is used, the temporary white edge line shown in the typical application shall not be used. During the period when the right-hand lane is opened, the sign legends and the channelization shall be changed to indicate that only the shoulder is closed, as illustrated in Figure 6P-5. The arrow board, if used, shall be placed at the downstream end of the shoulder taper and shall display the caution mode.**

Guidance:

9. *If a movable barrier is used, the shift should be performed in the following manner. When closing the lane, the lane should be initially closed with channelizing devices placed along a merging taper using the same information employed for a stationary lane closure. The lane closure should then be extended with the movable-barrier transfer vehicle moving with vehicular traffic. When opening the lane, the movable-barrier transfer vehicle should travel against vehicular traffic from the termination area to the transition area. The merging taper should then be removed using the same information employed for a stationary lane closure.*

Figure 6P-34. Lane Closure with a Temporary Traffic Barrier (TA-34)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 34

Notes for Figure 6P-35 —Typical Application 35
Mobile Operation on a Multi-Lane Road

Standard:

1. **Arrow boards shall, as a minimum, be Type B, with a size of 60 x 30 inches.** For State highways, the arrow boards shall, as a minimum, be type II, with a size of 72 x 36 inch. Refer to Caltrans' Standard Specifications Section 12-3.30 for minimum size and type of arrow panels cited above. Refer to Section 1A.05 for information regarding this publication.
2. **Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.**
3. **Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.**
4. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

5. *Vehicles used for these operations should be made highly visible with appropriate equipment, such as flags, signs, or arrow boards.*
6. *Shadow Vehicle 1 should be equipped with an arrow board and truck-mounted attenuator.*
7. *Shadow Vehicle 2 should be equipped with an arrow board. An appropriate lane closure sign should be placed on Shadow Vehicle 2 so as not to obscure the arrow board.*
8. *Shadow Vehicle 2 should travel at a varying distance from the work operation so as to provide adequate sight distance for vehicular traffic approaching from the rear.*
9. *The spacing between the work vehicles and the shadow vehicles, and between each shadow vehicle, should be minimized to deter road users from driving in between.*
10. *Work should normally be accomplished during off-peak hours.*
11. *When the work vehicle occupies an interior lane (a lane other than the far right or far left) of a directional roadway having a right-hand shoulder 10 feet or more in width, Shadow Vehicle 2 should drive on the right-hand shoulder with a sign indicating that work is taking place in the interior lane.*

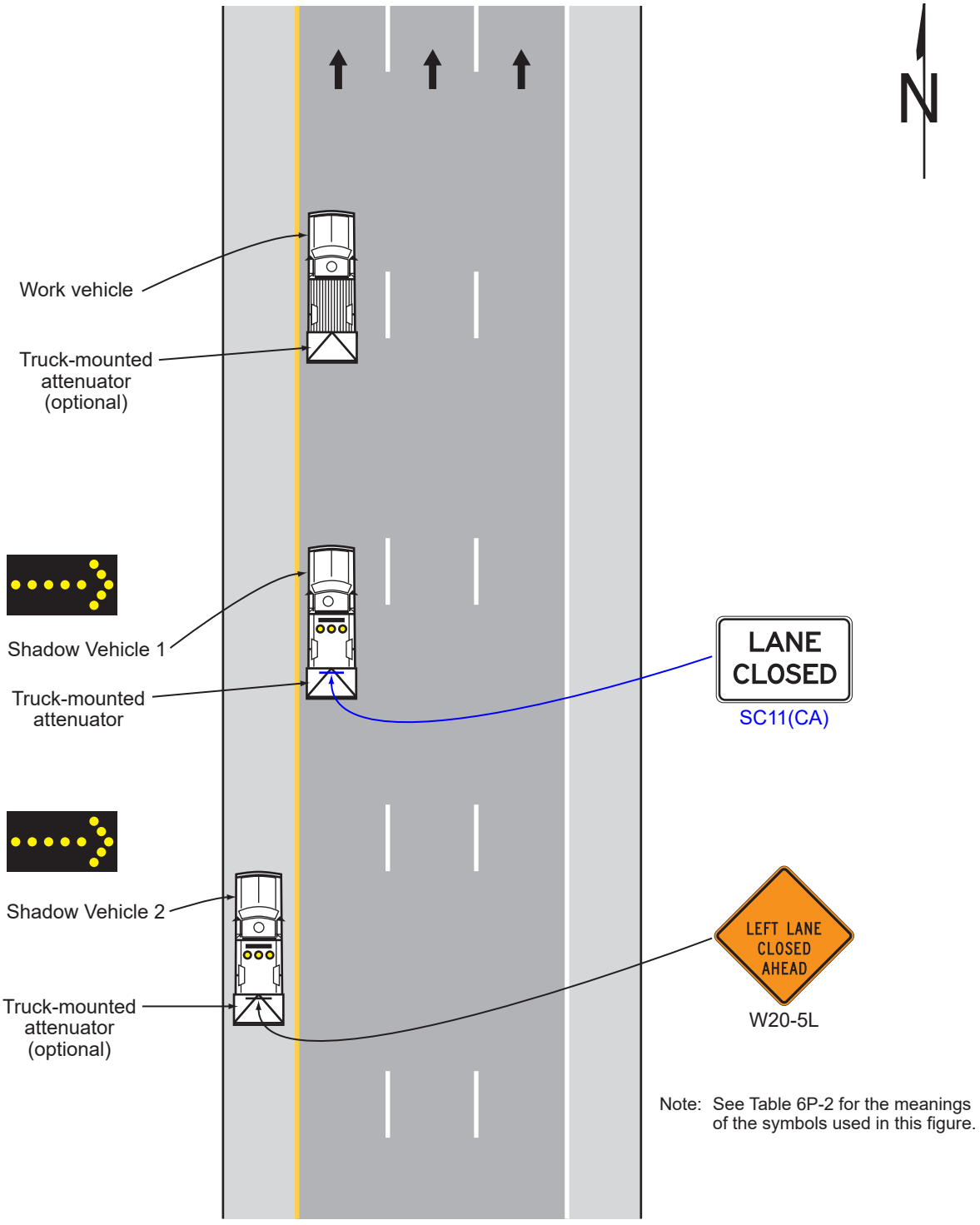
Option:

12. A truck-mounted attenuator may be used on Shadow Vehicle 2.
13. Positive protection devices may be used per Section 6M.02.
14. On high-speed roadways, a third shadow vehicle (not shown) may be used with Shadow Vehicle 1 in the closed lane, Shadow Vehicle 2 straddling the edge line, and Shadow Vehicle 3 on the shoulder.
15. Where adequate shoulder width is not available, Shadow Vehicle 3 may also straddle the edge line.

Support:

16. For State highways, refer to Caltrans' Standard Plan T15 and T16. Refer to Section 1A.05 for information regarding this publication.

Figure 6P-35. Mobile Operation on a Multi-Lane Road (TA-35)



Typical Application 35

Notes for Figure 6P-36 Typical Application 36
Lane Shift on a Freeway

Guidance:

1. *The lane shift should be used when the work space extends into either the right-hand or left-hand lane of a divided highway and it is impracticable, for capacity reasons, to reduce the number of available lanes.*

Support:

2. When a lane shift is accomplished by using (1) geometry that meets the design speed at which the permanent highway was designed, (2) full normal cross-section (full lane width and full shoulders), and (3) complete pavement markings, then only the initial general work-zone warning sign is required.

Guidance:

3. *When the conditions in Note 2 above are not met, the information shown in the typical application should be employed and the provisions in Notes 4 through 17 below are applicable.*

Standard:

4. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6M.02.**
5. **The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.**

Guidance:

6. *A warning sign should be used to show the changed alignment.*

Standard:

7. **Except as provided in Note 8 below, the number of lanes illustrated on the Reverse Curve signs shall be the same as the number of through lanes available to road users, and the direction of the reverse curves shall be appropriately illustrated.**

Option:

8. Where two or more lanes are being shifted, a W1-4 (or W1-3) sign with an ALL LANES (W24-1cP) plaque (see Figure 6H-1) may be used instead of a sign that illustrates the number of lanes.
9. Where more than three lanes are being shifted, the Reverse Curve (or Turn) sign may be rectangular.

Guidance:

10. *Where the shifted section is longer than 600 feet, one set of Reverse Curve signs should be used to show the initial shift and a second set should be used to show the return to the normal alignment. If the tangent distance along the temporary diversion is less than 600 feet, a Double Reverse Curve sign should be used instead of the first Reverse Curve sign, and the second Reverse Curve sign should be omitted.*
11. *If a STAY IN LANE (R4-9) sign is used, then solid white lane lines should be used.*

Standard:

12. **The minimum width of the shoulder lane shall be 10 feet.**
13. **For long-term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.**

Option:

14. For short-term stationary work, lanes may be delineated by channelizing devices or removable pavement markings instead of temporary markings.

Guidance:

15. *If the shoulder cannot adequately accommodate trucks, trucks should be directed to use the travel lanes.*
16. *The use of a barrier should be based on engineering judgment.*

Option:

17. Type C Steady-Burn warning lights may be placed on channelizing devices and the barrier parallel to the edge of the pavement for nighttime lane closures.
18. Detail 11 (refer to Figure 3A-102(CA)) may be used instead of the temporary solid white lane line, which is shown in Figure 6P-36.

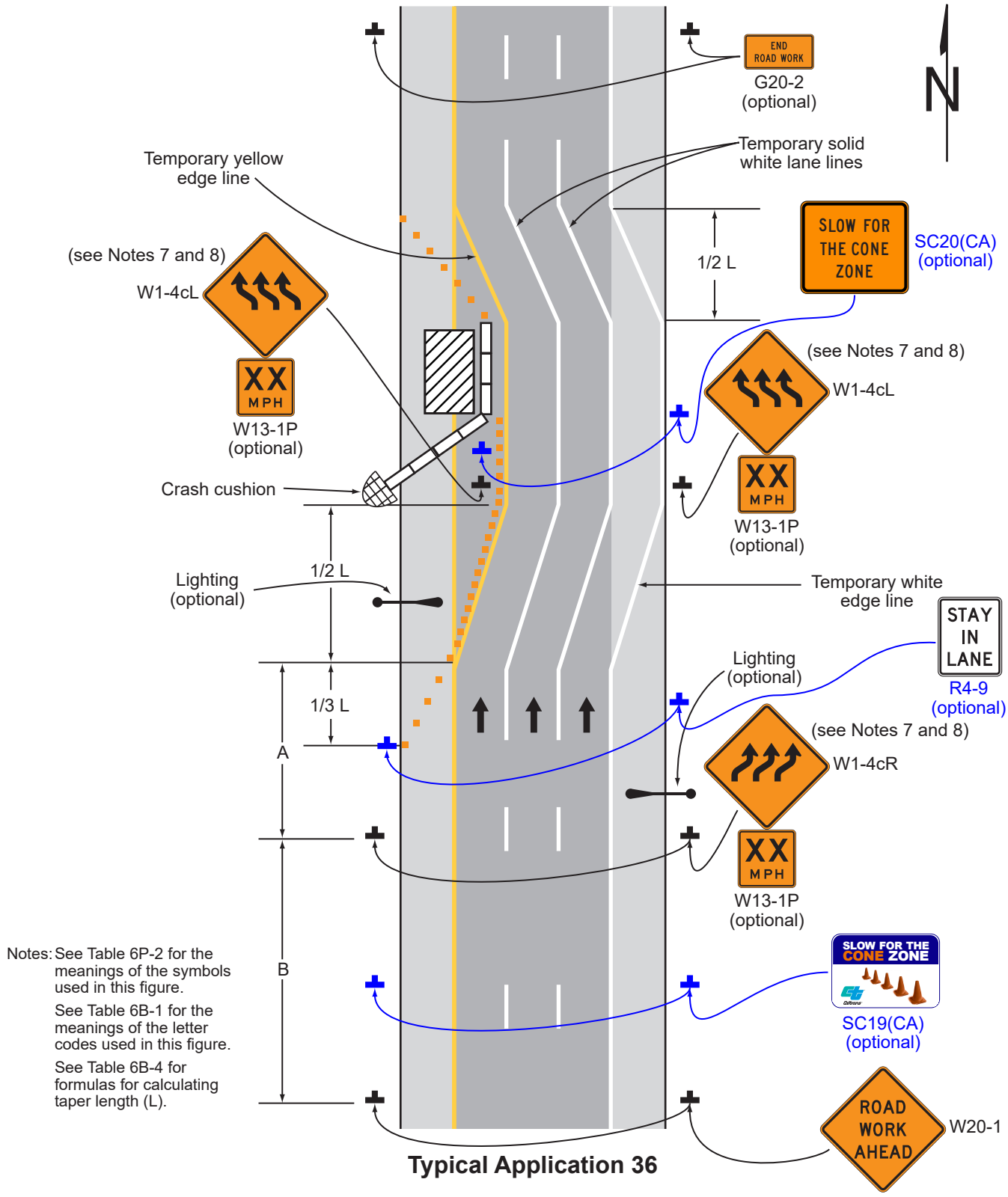
Support:

19. Refer to Section 6F.102(CA) for use of the Slow For The Cone Zone (SC19(CA) and SC20(CA)) Signs.

Guidance:

20. *All advance warning signs should be placed so that the path of travel for bicycles is not blocked, while maintaining visibility for road users.*
21. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, the Bicycle Crossing (W11-1) sign and the IN ROAD (W16-1P) plaque or the IN STREET (W16-1aP) plaque should be used to advise motorists of the presence of bicyclists in the travel way lanes.*
22. *Except for short durations and mobile operations, when a highway shoulder is occupied and bicyclists would be sharing a lane with vehicular traffic, as a result of the TTC zone, speed reduction countermeasures should be used to reduce traffic speeds in the TTC zone. Refer to Sections 6B.01 and 6C.04.*
23. *Except for short durations and mobile operations, when a highway shoulder is occupied and bicyclists would be sharing a lane with vehicular traffic, as a result of the TTC zone, before narrowing the outside lane other measures such as widening the outside shoulder to allow bicyclists and motor vehicles to travel side by side through the TTC zone should be considered.*
24. *If traffic volumes make it feasible, the two left lanes should be merged into one lane to avoid using the shoulder as a traveled way lane and allowing continued use for emergency purposes and bicycle travel.*
25. *When existing accommodations for bicycle travel are disrupted or closed in a long-term duration project (refer to Section 6N.01) and the roadway width is inadequate for allowing bicyclists and motor vehicles to travel side by side, a separate path should be considered for bicyclists.*

Figure 6P-36. Lane Shift on a Freeway (TA-36)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 36

Notes for Figure 6P-37 —Typical Application 37
Double Lane Closure on a Freeway

Standard:

1. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

2. *Ordinarily, the preferred position for the second arrow board is in the closed exterior lane at the upstream end of the second merging taper. However, the second arrow board should be placed in the closed interior lane at the downstream end of the second merging taper in the following situations:*
   a. *When a shadow vehicle is used in the interior closed lane, and the second arrow board is mounted on the shadow vehicle;*
   b. *If alignment or other conditions create any confusion as to which lane is closed by the second arrow board; and*
   c. *When the first arrow board is placed in the closed exterior lane at the downstream end of the first merging taper (the alternative position when the shoulder is narrow).*

Standard:

2a. All advance warning signs mounted on portable supports shall be equipped with at least two flags or a flashing warning beacon. Each flag shall be at least 16 x 16 inches in size and shall be orange or red in color. Flashing warning beacons (Section 6L.07) shall be used to call attention to the initial warning signs during hours of darkness. Flashing warning beacons is optional during daytime operations.

Option:

3. Flashing warning lights and/or flags may be used to call attention to the initial warning signs.
4. A truck-mounted attenuator may be used on the shadow vehicle.
5. Positive protection devices may be used per Section 6M.02.
6. If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left- hand and adjacent interior lanes may be closed and vehicular traffic carried around the work space on the right-hand lane and a right-hand shoulder.

Guidance:

7. *When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.*

Standard:

8. 3 cones or 2 Type II barricades shall be placed transversely across each closed lane at end of each merging taper and every 2000 feet throughout the lane closure.

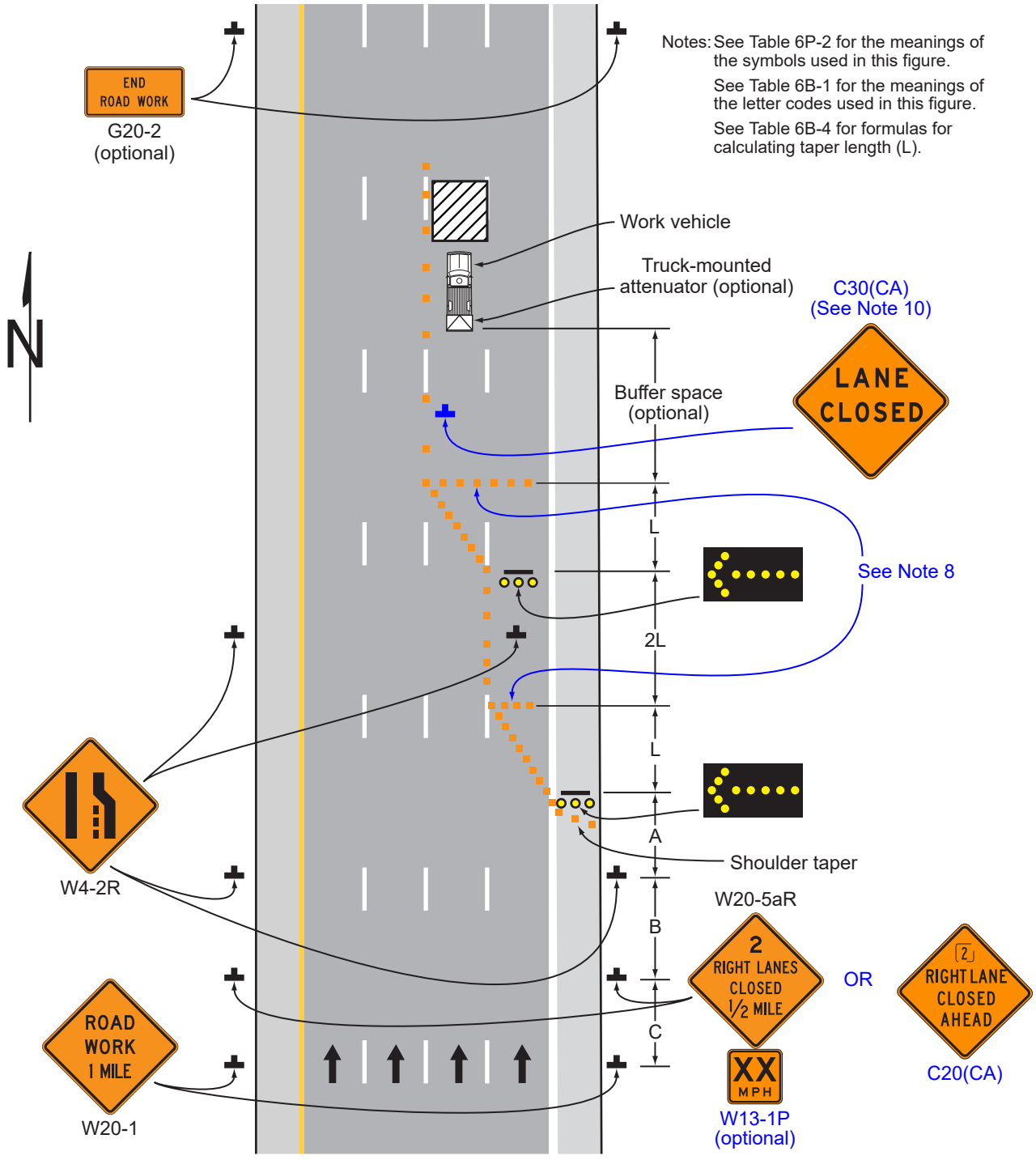
9. On freeways, maximum spacing of channelizing devices shall be 50 feet in advance warning and transition areas, 100 feet in activity and termination areas (refer to Figure 6B-1).

10. LANE CLOSED C30(CA) sign shall be placed every 2000 feet throughout the lane closure adjacent to the open lane within the closed lane.

Support:

11. For State highways, refer to the Caltrans' Standard Plan T10. Refer to Section 1A.05 for information regarding this publication.

Figure 6P-37. Double Lane Closure on a Freeway (TA-37)



Typical Application 37

~~Notes for Figure 6P-38 — Typical Application 38~~
~~Interior Lane Closure on a Freeway~~

~~**Standard:**~~

~~**1. An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**~~

~~**2. If temporary traffic barriers are installed, they shall comply with the provisions and requirements in Section 6M.02.**~~

~~**3. The barrier shall not be placed along the shifting taper. The lane shall first be shifted using channelizing devices and pavement markings.**~~

~~**4. For long-term stationary work, existing conflicting pavement markings shall be removed and temporary markings shall be installed before traffic patterns are changed.**~~

~~*Guidance:*~~

~~*5. For a long-term closure, a barrier should be used to provide additional safety to the operation in the closed interior lane. A buffer space should be used at the upstream end of the closed interior lane.*~~

~~*6. An arrow board displaying an arrow pointing to the right should be placed on the left-hand shoulder at the beginning of the taper.*~~

~~*7. For long-term use, the broken lane lines should be made solid white in the two-lane section.*~~

~~Option:~~

~~8. As an alternative to initially closing the left-hand lane, as shown in the typical application, the right- hand lane may be closed in advance of the interior lane closure with appropriate channelization and signs. The Interior Lane Shift Ahead symbol sign may be mirrored to indicate a right lane shift.~~

~~9. A short, single row of channelizing devices in advance of the vehicular traffic split to restrict vehicular traffic to their respective lanes may be added.~~

~~10. DO NOT PASS signs may be used.~~

~~11. If a paved shoulder having a minimum width of 10 feet and sufficient strength is available, the left- hand and center lanes may be closed and motor vehicle traffic carried around the work space on the right-hand lane and a right-hand shoulder.~~

~~12. A work vehicle with a truck-mounted attenuator may be used within the closed interior lane between the buffer space and the work area.~~

~~13. Positive protection devices may be used per Section 6M.02.~~

~~*Guidance:*~~

~~*14. When a shoulder lane is used that cannot adequately accommodate trucks, trucks should be directed to use the normal travel lanes.*~~

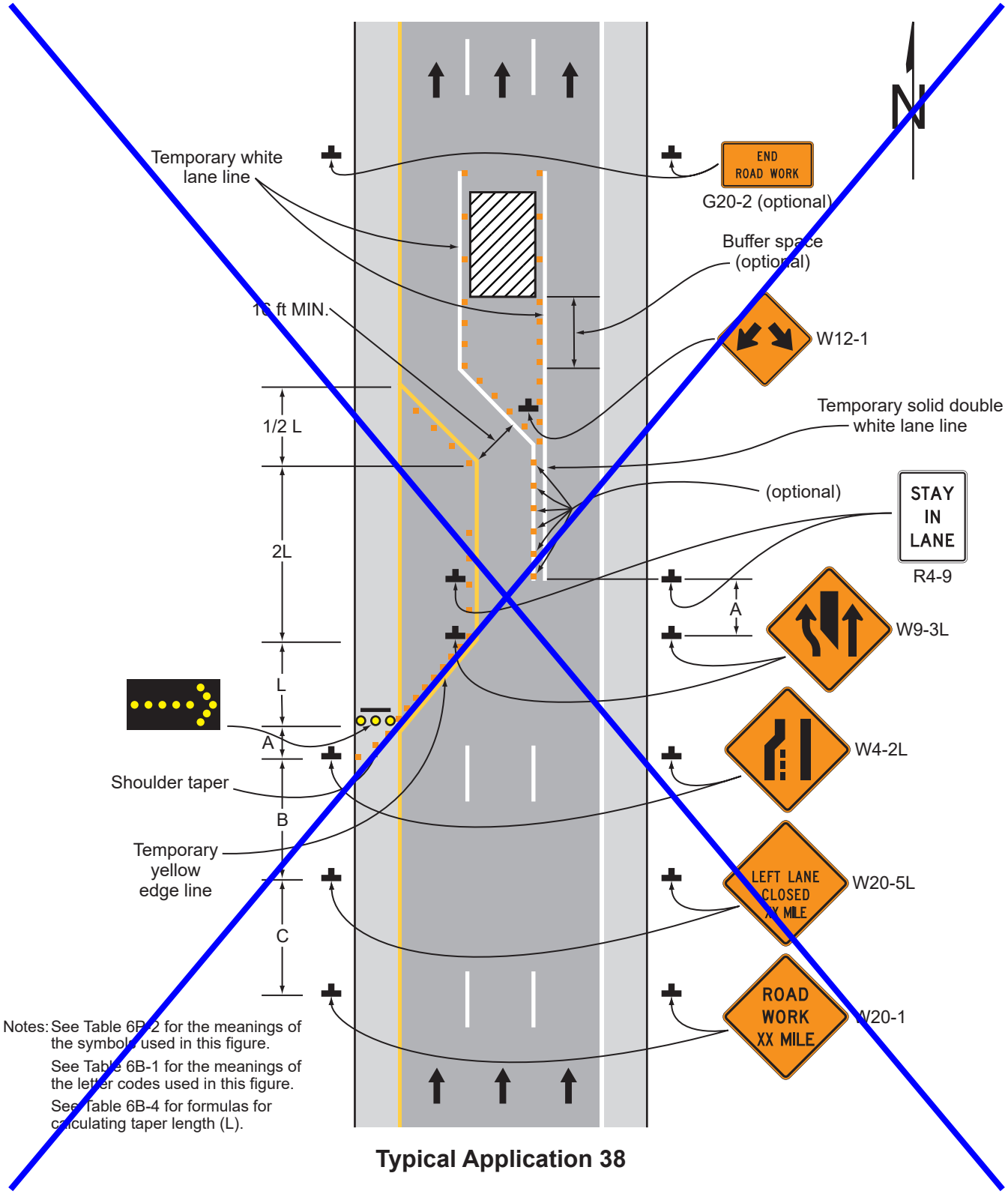
Standard:

15. This typical application is deleted for application and shall not be used on freeways in California. Whenever an interior lane needs to be closed on freeways, all adjacent lane(s) to one side of this lane shall be closed as illustrated in Figure 6P-37.

Support:

16. For State highways, refer to Caltrans' Standard Plan T10, T10A, and T14. For interior lane closure on Freeways using mobile operation, refer to Caltrans' Standard Plan T16. Refer to Section 1A.05 for information regarding this publication.

Figure 6P-38. Interior Lane Closure on a Freeway (TA-38)



Typical Application 38

Notes for Figure 6P-39 —Typical Application 39
Median Crossover on a Freeway

Standard:

1. **Channelizing devices or temporary traffic barriers shall be used to separate opposing vehicular traffic.**
2. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Guidance:

3. *For long-term work on high-speed, high-volume highways, consideration should be given to using a temporary traffic barrier to separate opposing vehicular traffic.*

Option:

4. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic (W6-3), DO NOT PASS (R4-1), KEEP RIGHT (R4-7), and DO NOT ENTER (R5-1) signs may be eliminated.
5. The alignment of the crossover may be designed as a reverse curve.

Guidance:

6. *When the crossover follows a curved alignment, the design criteria contained in the "AASHTO Green Book – A Policy On Geometric Design of Highways and Streets," 7th Edition, 2018 AASHTO should be used.*
7. *When channelizing devices have the potential of leading vehicular traffic out of the intended traffic space, the channelizing devices should be extended a distance in feet of 2 times the speed limit in mph beyond the downstream end of the transition area as depicted.*
8. *Where channelizing devices are used, the Two-Way Traffic signs should be repeated every 1 mile.*

Option:

9. NEXT XX MILES (W7-3aP) Supplemental Distance plaques may be used with the Two-Way Traffic (W6-3) signs, where XX is the distance to the downstream end of the two-way section.

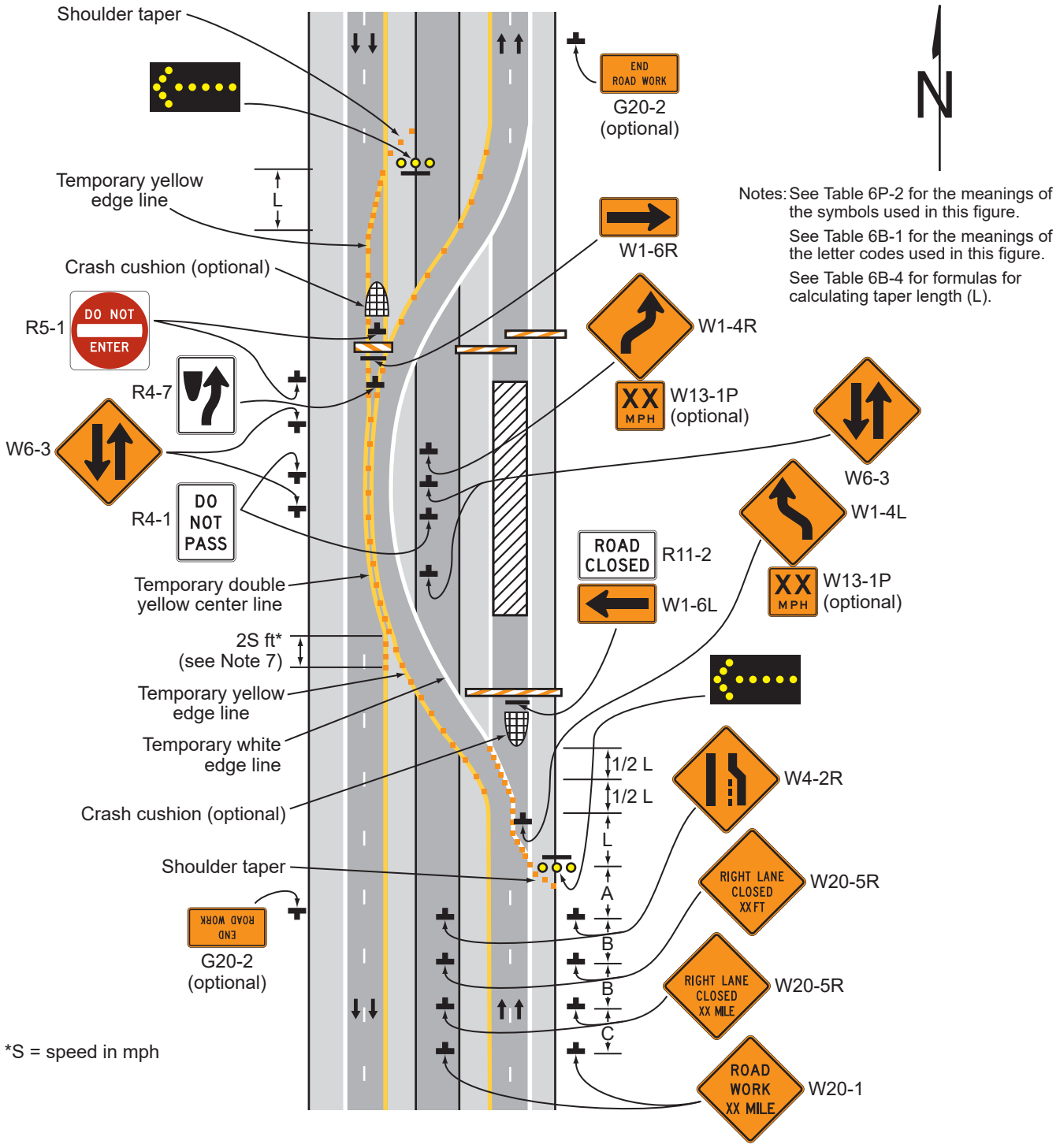
Support:

10. When the distance is sufficiently short that road users entering the section can see the downstream end of the section, they are less likely to forget that there is opposing vehicular traffic.
11. The sign legends for the four pairs of signs approaching the lane closure for the non-crossover direction of travel are not shown. They are similar to the series shown for the crossover direction, except that the left-hand lane is closed.

Option:

12. Positive protection devices may be used per Section 6M.02.

Figure 6P-39. Median Crossover on a Freeway (TA-39)



Typical Application 39

Notes for Figure 6P-40 —Typical Application 40
Median Crossover for an Entrance Ramp

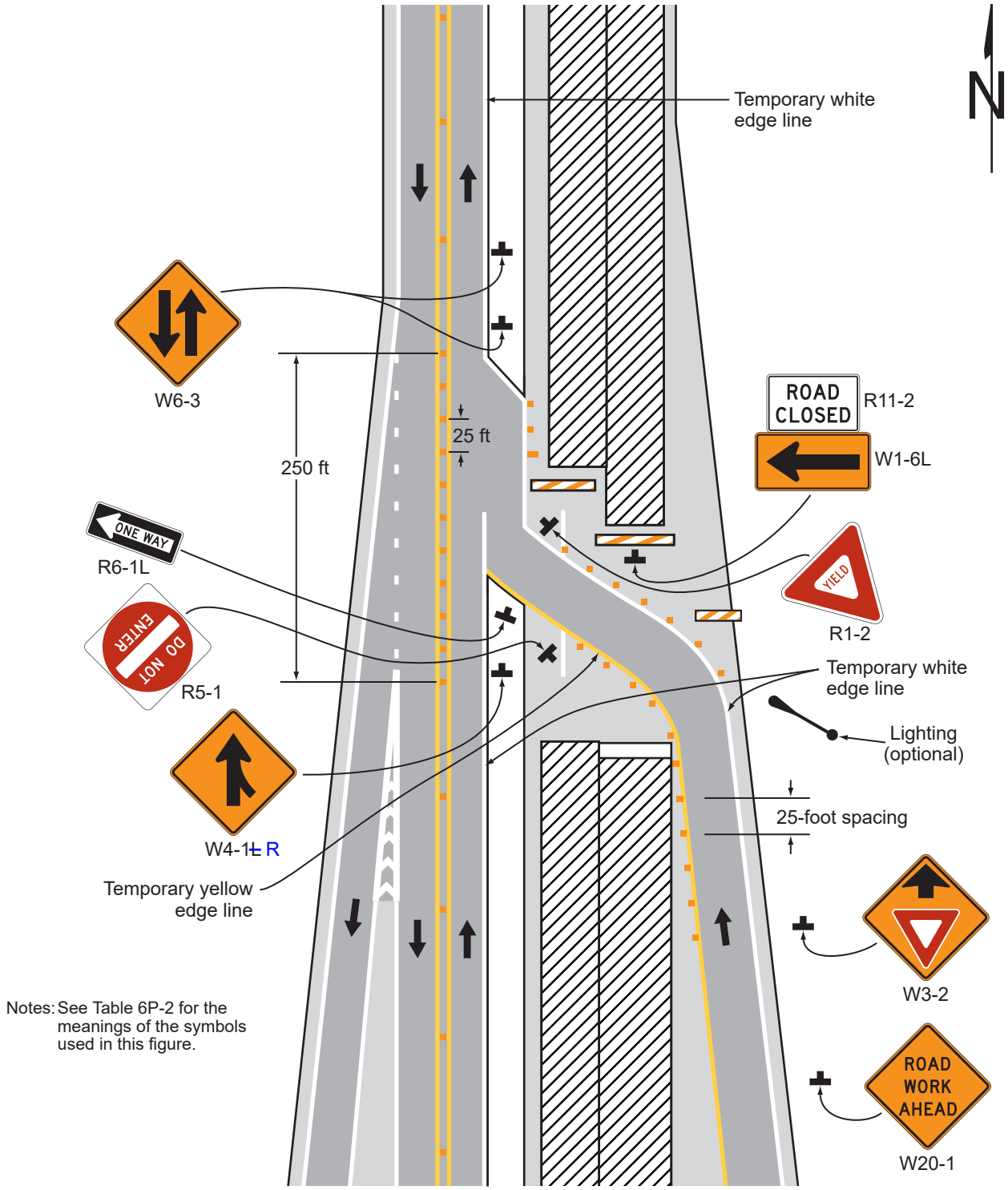
Guidance:

1. *The typical application illustrated should be used for carrying an entrance ramp across a closed directional roadway of a divided highway.*
2. *A temporary acceleration lane should be used to facilitate merging.*
3. *When used, the YIELD (R1-2) or STOP (R1-1) sign should be located far enough forward to provide adequate sight distance of oncoming mainline vehicular traffic to select an acceptable gap, but should not be located so far forward that motorists will be encouraged to stop in the path of the mainline traffic. If needed, yield or stop lines should be installed across the ramp to indicate the point at which road users should yield or stop. Also, a longer acceleration lane should be provided beyond the sign to reduce the gap size needed.*

Option:

4. Positive protection devices may be used per Section 6M.02.
5. If vehicular traffic conditions allow, the ramp may be closed.
6. A broken edge line may be carried across the temporary entrance ramp to assist in defining the through vehicular traffic lane.
7. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic (W6-3) signs and the DO NOT ENTER (R5-1) signs may be eliminated.

Figure 6P-40. Median Crossover for an Entrance Ramp (TA-40)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

Typical Application 40

Notes for Figure 6P-41 —Typical Application 41
Median Crossover for an Exit Ramp

Guidance:

1. *This typical application should be used for carrying an exit ramp across a closed directional roadway of a divided highway. The design criteria contained in the "AASHTO Green Book – A Policy On Geometric Design of Highways and Streets," 7th Edition, 2018, AASHTO should be used for determining the curved alignment.*
2. *The guide signs should indicate that the ramp is open, and where the temporary ramp is located. Conversely, if the ramp is closed, guide signs should indicate that the ramp is closed.*
3. *When the exit is closed, a black-on-orange EXIT CLOSED (E5-2a) sign panel should be placed diagonally across the interchange/intersection guide signs and channelizing devices should be placed to physically close the ramp.*
4. *In the situation (not shown) where channelizing devices are placed along the mainline roadway, the devices' spacing should be reduced in the vicinity of the off ramp to emphasize the opening at the ramp itself. Channelizing devices and/or temporary pavement markings should be placed on both sides of the temporary ramp where it crosses the median and the closed roadway.*
5. *Advance guide signs providing information related to the temporary exit should be relocated or duplicated adjacent to the temporary roadway.*

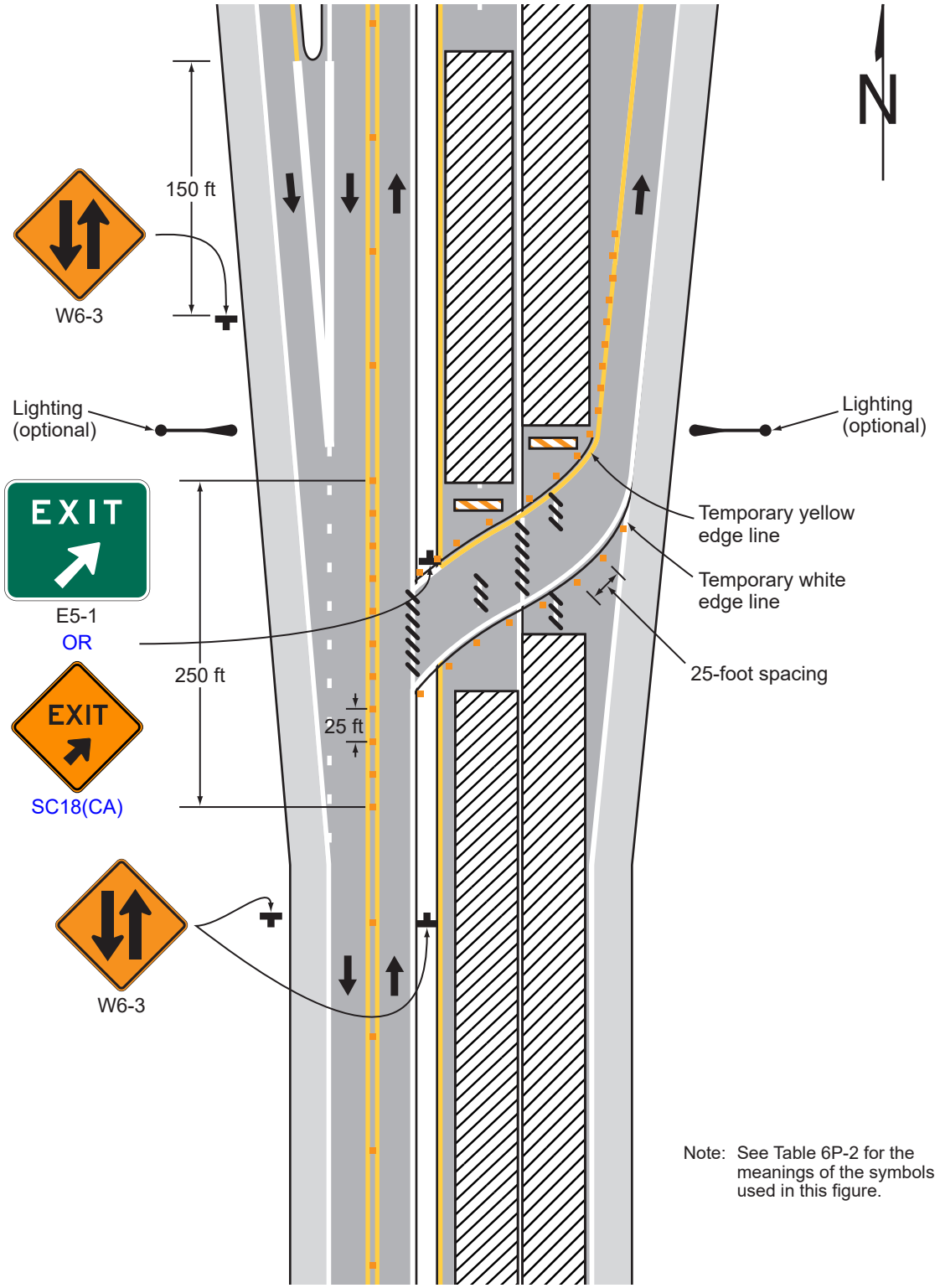
Standard:

6. **A temporary EXIT (E5-1) sign shall be located in the temporary gore. For better visibility, it shall be mounted a minimum of 7 feet from the pavement surface to the bottom of the sign.**

Option:

7. Positive protection devices may be used per Section 6M.02.
8. Guide signs referring to the exit may need to be relocated to the median.
9. The temporary EXIT (E5-1) sign placed in the temporary gore may be either black on orange or white on green.
10. In some instances, a temporary deceleration lane may be useful in facilitating the exiting maneuver.
11. When a temporary traffic barrier is used to separate opposing vehicular traffic, the Two-Way Traffic (W6-3) signs may be omitted.

Figure 6P-41. Median Crossover for an Exit Ramp (TA-41)



Note: See Table 6P-2 for the meanings of the symbols used in this figure.

Typical Application 41

Notes for Figure 6P-42 —Typical Application 42
Work in the Vicinity of an Exit Ramp

Guidance:

1. *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.*
2. *When the exit ramp is closed, a black-on-orange EXIT CLOSED sign panel should be placed diagonally across the interchange/intersection guide signs.*
3. *The design criteria contained in the "AASHTO Green Book – A Policy On Geometric Design of Highways and Streets," 7th Edition, 2018, AASHTO should be used for determining the alignment.*

Standard:

4. **A temporary EXIT sign shall be located in the temporary gore. For better visibility, it shall be mounted a minimum of 7 feet from the pavement surface to the bottom of the sign.**

Option:

5. Positive protection devices may be used per Section 6M.02.
6. The temporary EXIT (E5-1) sign placed in the temporary gore may be either black on orange or white on green.
7. An alternative procedure that may be used is to channelize exiting vehicular traffic onto the right-hand shoulder and close the lane as necessary.

Standard:

8. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

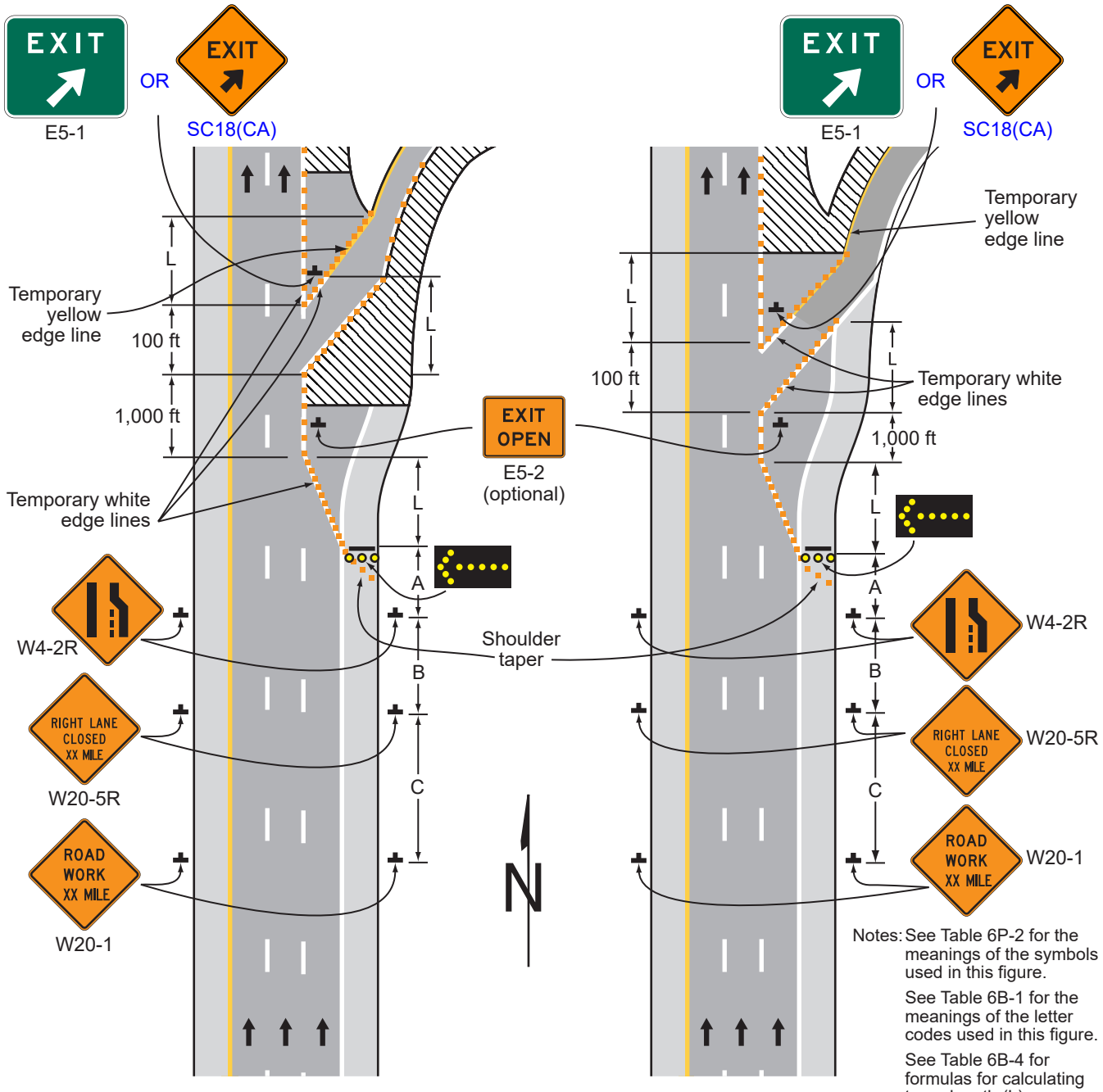
Option:

9. The Caltrans' Standard Plan T10, T10A, and T14 may be used instead of this typical application.

Support:

10. Refer to Section 1A.05 for information regarding this publication.

Figure 6P-42. Work in the Vicinity of an Exit Ramp (TA-42)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.

See Table 6B-1 for the meanings of the letter codes used in this figure.

See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 42

Notes for Figure 6P-43 —Typical Application 43
Partial Exit Ramp Closure

Guidance:

1. *Truck off-tracking should be considered when determining whether the minimum lane width of 10 feet is adequate (see Section 6N.07).*

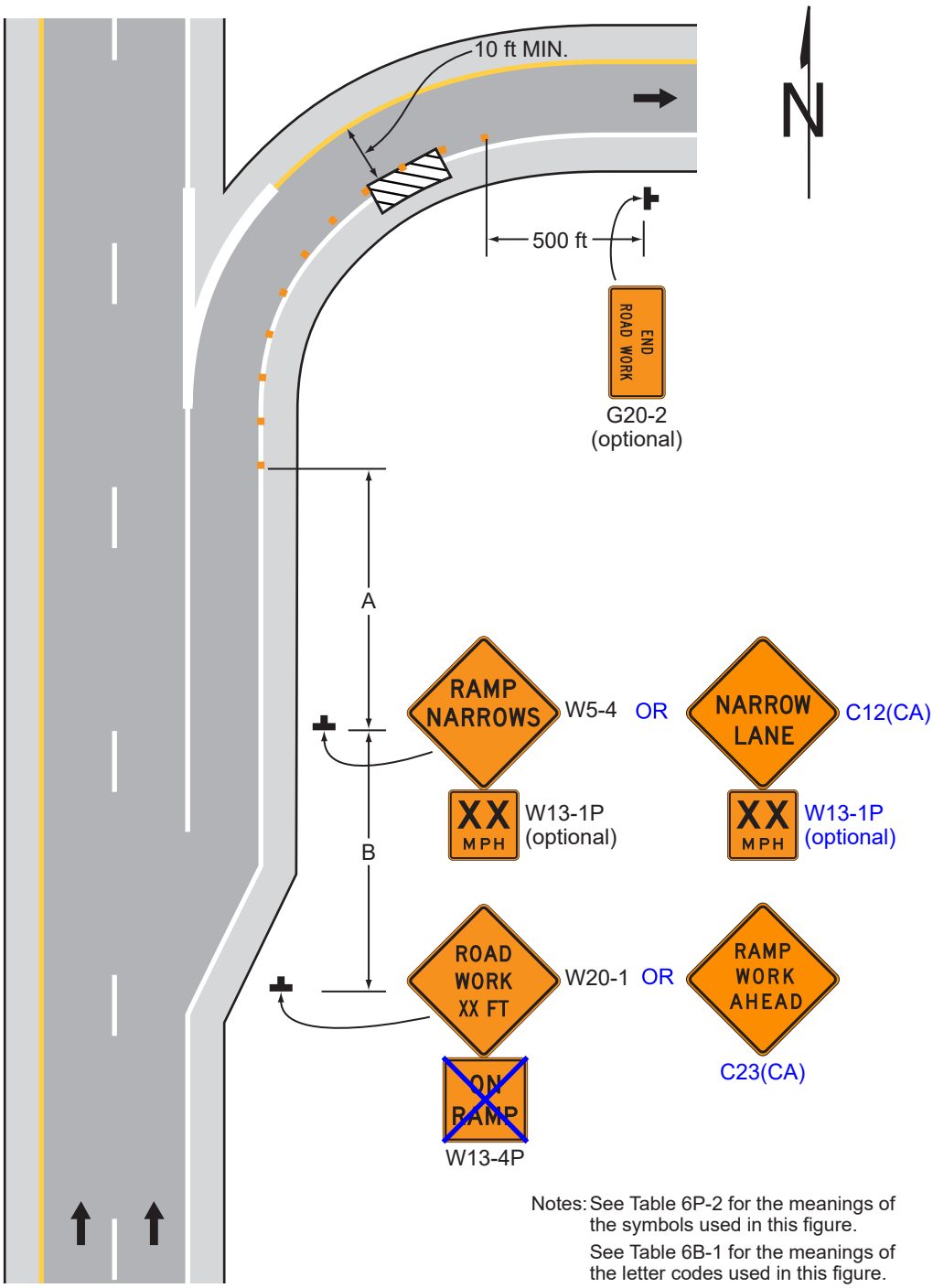
Option:

2. Positive protection devices may be used per Section 6M.02.
3. The ROAD NARROWS (W5-1) sign or NARROW LANE(S) (C12(CA)) sign may be used instead The RAMP NARROWS (W5-4) sign. Refer to Sections 2C.17 and 6H.102(CA).

Guidance:

4. *For planned partial ramp closure, consideration should be given to closing the entire exit ramp. Refer to the Caltrans' Standard Plan T14. Refer to Section 1A.05 for information regarding this publication.*

Figure 6P-43. Partial Exit Ramp Closure (TA-43)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 43

Notes for Figure 6P-44 —Typical Application 44
Work in the Vicinity of an Entrance Ramp

Guidance:

1. *An acceleration lane of sufficient length should be provided whenever possible as shown on the diagram on the left.*

Standard:

2. **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 (R1-1) signs (one on each side of the approach).**

Guidance:

3. *When used, the YIELD (R1-2) or STOP (R1-1) 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 sufficient gaps are not available, consideration should be given to closing the ramp.*
4. *Where a STOP (R1-1) sign is used, a temporary stop line should be placed across the ramp at the desired stop location.*
5. *The mainline merging taper with the arrow board at its starting point should be located sufficiently in advance so that the arrow board is not confusing to 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.*
6. *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:

7. Positive protection devices may be used per Section 6M.02.
8. A Stop Beacon (see Section 4S.05) or a Type B high-intensity warning flasher with a red lens may be placed above the STOP (R1-1) sign.
9. Where the acceleration distance is significantly reduced, a supplemental plaque may be placed below the Yield Ahead sign reading NO MERGE AREA (W4-5aP).

Standard:

10. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

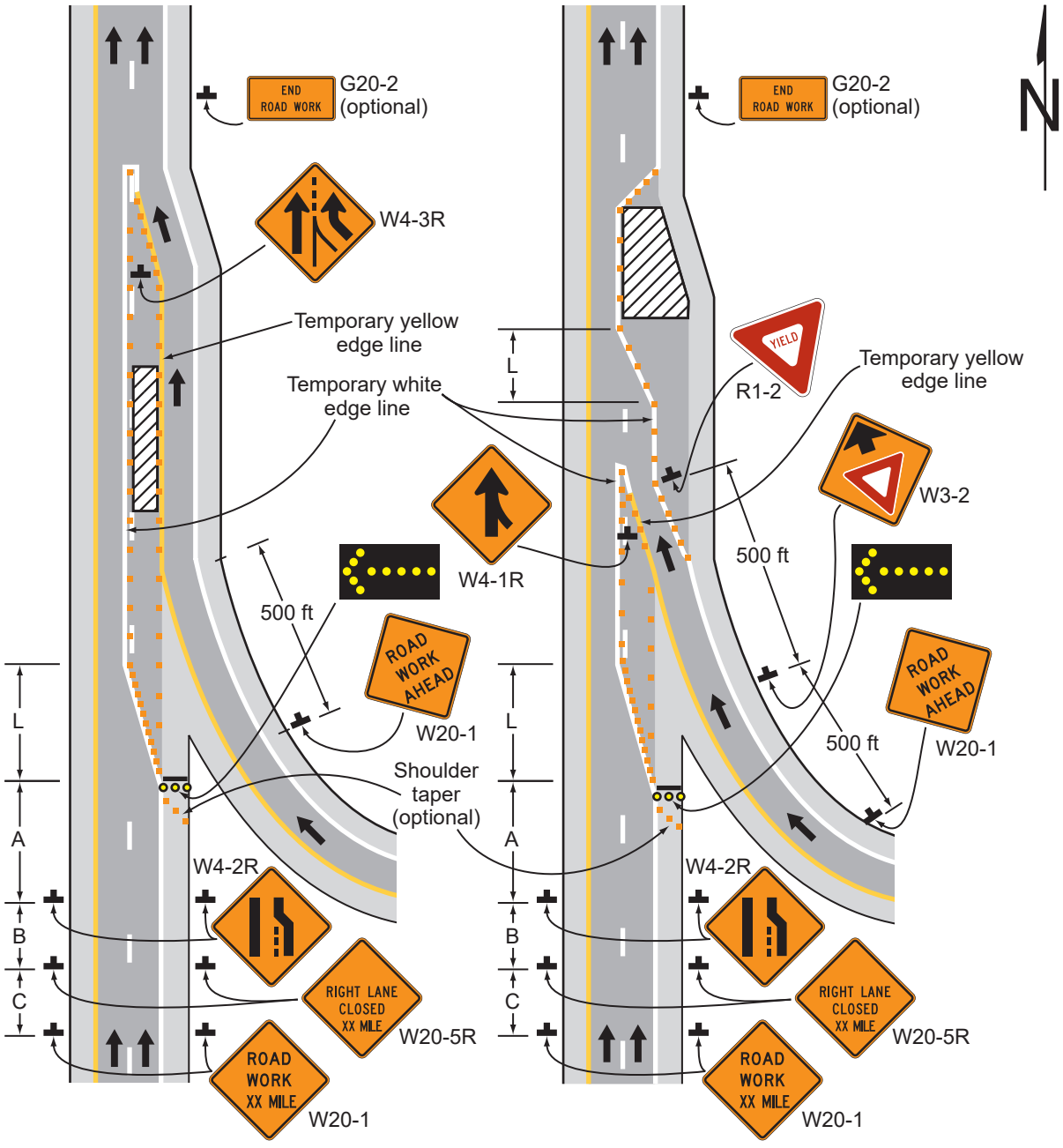
Option:

11. The Caltrans' Standard Plan T10, T10A, and T14 may be used instead of this typical application.

Support:

12. Refer to Section 1A.05 for information regarding this publication.

Figure 6P-44. Work in the Vicinity of an Entrance Ramp (TA-44)



A – Added lane **B – Merge required**

Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 44

Notes for Figure 6P-45 —Typical Application 45
Temporary Reversible Lane Using Movable Barriers

Support:

1. This application addresses one of several uses for movable barriers (see Section 6M.02) in highway TTC zones. In this example, one side of a 6-lane divided highway is closed to perform the work operation, and vehicular traffic is carried in both directions on the remaining 3-lane roadway by means of a median crossover.
   To accommodate unbalanced peak-period vehicular traffic volumes, the direction of travel in the center lane is switched to the direction having the greater volume, with the transfer typically being made twice daily. Thus, there are four vehicular traffic phases described as follows:
   a. Phase A—two travel lanes northbound and one lane southbound;
   b. Transition A to B—one travel lane in each direction;
   c. Phase B—one travel lane northbound and two lanes southbound; and
   d. Transition B to A—one travel lane in each direction.
   The typical application on the left illustrates the placement of devices during Phase A. The typical application on the right shows conditions during the transition (Transition A to B) from Phase A to Phase B.

Guidance:

2. *For the reversible lane situation depicted, the ends of the movable barrier should terminate in a protected area or a crash cushion should be provided. During Phase A, the transfer vehicle should be parked behind the downstream end of the movable barrier for southbound traffic as shown in the typical application on the left. During Phase B, the transfer vehicle should be parked between the downstream ends of the movable barriers at the north end of the TTC zone as shown in the typical application on the right.*
   The transition shift from Phase A to B should be as follows:
   a. Change the signs in the northbound advance warning area and transition area from a LEFT LANE CLOSED AHEAD (W20-5L) to a 2 LEFT LANES CLOSED AHEAD (W20-5aL). Change the mode of the second northbound arrow board from Caution to Right Arrow.
   b. Place channelizing devices to close the northbound center lane.
   c. Move the transfer vehicle from south to north to shift the movable barrier from the west side to the east side of the reversible lane.
   d. Remove the channelizing devices closing the southbound center lane.
   e. Change the signs in the southbound transition area and advance warning area from a 2 LEFT LANES CLOSED AHEAD (W20-5aL) to a LEFT LANE CLOSED AHEAD (W20-5L). Change the mode of the second southbound arrow board from Right Arrow to Caution.
3. *Where the lane to be opened and closed is an exterior lane (adjacent to the edge of the traveled way or the work space), the lane closure should begin by closing the lane with channelizing devices placed along a merging taper using the same information employed for a stationary lane closure. The lane closure should then be extended with the movable-barrier transfer vehicle moving with vehicular traffic. When opening the lane, the transfer vehicle should travel against vehicular traffic. The merging taper should be removed in a method similar to a stationary lane closure.*

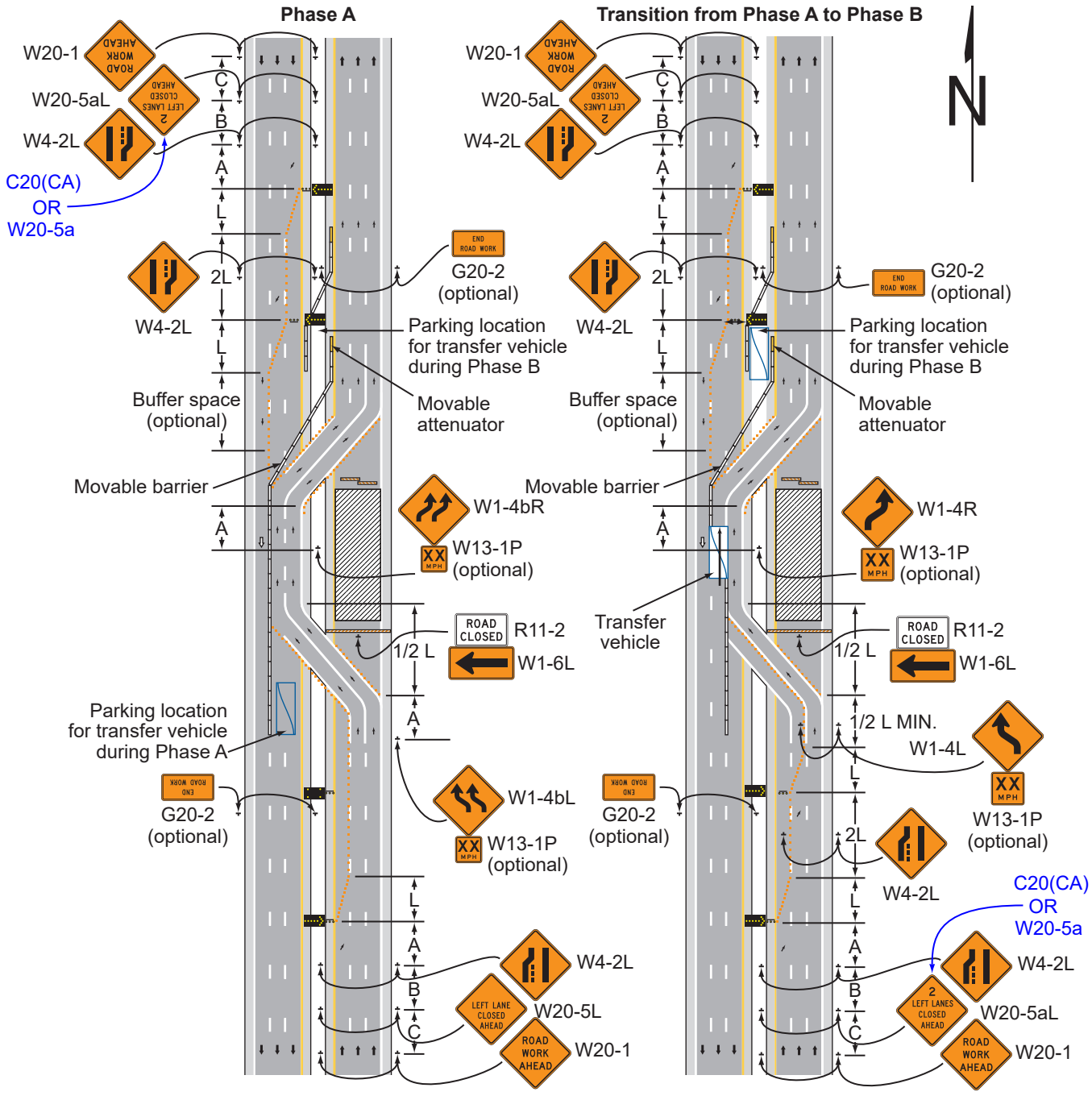
Option:

4. The procedure may be used during a peak period of vehicular traffic and then changed to provide two lanes in the other direction for the other peak.
5. A longitudinal buffer space may be used in the activity area to separate opposing vehicular traffic.
6. A work vehicle or a shadow vehicle may be equipped with a truck-mounted attenuator.

Standard:

7. **An arrow board shall be used when a freeway lane is closed. When more than one freeway lane is closed, a separate arrow board shall be used for each closed lane.**

Figure 6P-45. Temporary Reversible Lane Using Movable Barriers (TA-45)



Typical Application 45

Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Notes for Figure 6P-46 —Typical Application 46
Work in the Vicinity of a Grade Crossing

Guidance:

1. *When grade crossings exist either within or in the vicinity of roadway work activities, extra care should be taken to minimize the probability of conditions being created, by lane restrictions, flagging, or other operations, where vehicles might be stopped within the grade crossing, considered as being 15 feet on either side of the closest and farthest rail. This should include roadway work activities on a street parallel to a highway-rail grade crossing where right-hand turns or left-hand turns could be impacted.*

Standard:

2. **If the queuing of vehicles across active rail tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the grade crossing to prevent through or turning vehicles from stopping within the grade crossing (as described in Note 1 above), even if automatic warning devices are in place.**

Guidance:

3. *Early coordination with the railroad company or transit agency should occur before work starts.*
4. *In the example depicted, the buffer space of the activity area should be extended upstream of the grade crossing (as shown) so that a queue created by the flagging operation will not extend across the grade crossing.*
5. *The DO NOT STOP ON TRACKS (R8-8) sign should be used on all approaches to a grade crossing within the limits of a TTC zone.*

Option:

6. Positive protection devices may be used per Section 6M.02.
7. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
8. A BE PREPARED TO STOP (W3-4) sign may be added to the sign series.
9. Automated Flagger Assistance Devices (see Section 6L.02) may be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

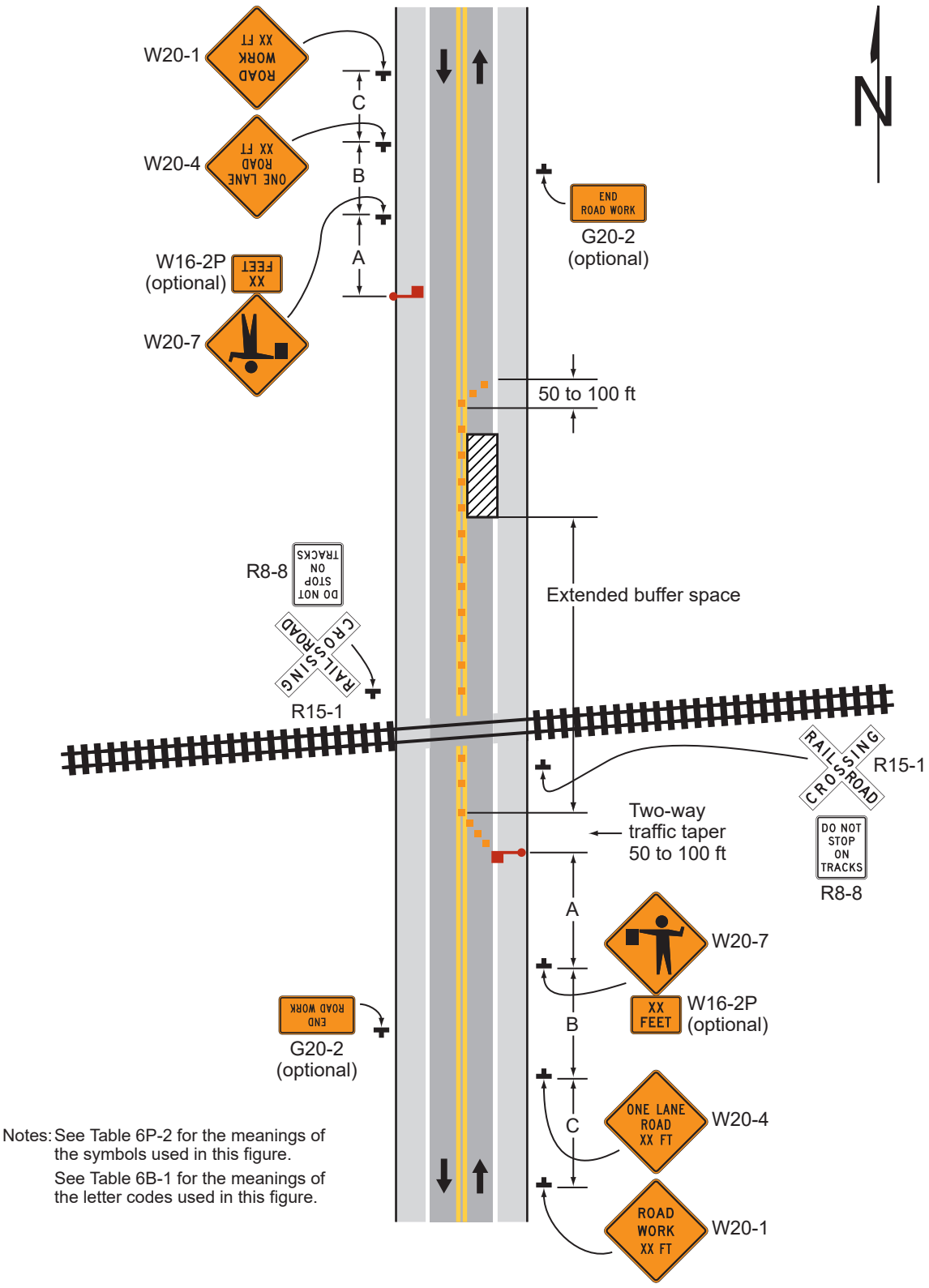
Guidance:

10. *When used, the BE PREPARED TO STOP (W3-4) sign should be located ~~before~~ after the Flagger symbol sign.*

Standard:

11. **At night, flagger stations shall be illuminated, except in emergencies.**

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



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 46

Notes for Figure 6P-47 – Typical Application 47
Bicycle Lane Closure without a Detour

Guidance:

1. *If a bicycle lane on a roadway having a speed limit of 35 mph or higher is closed and conditions are not appropriate to direct bicyclists into a shared lane, a separate bicycle facility or detour route should be considered (see Figures 6P-48 and 6P-51).*

1a. *SHOULDER CLOSED (W21-5a) signs should be used on limited-access roadways where there is no opportunity for disabled vehicles to pull off the roadway*

1b. *If road users 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.*

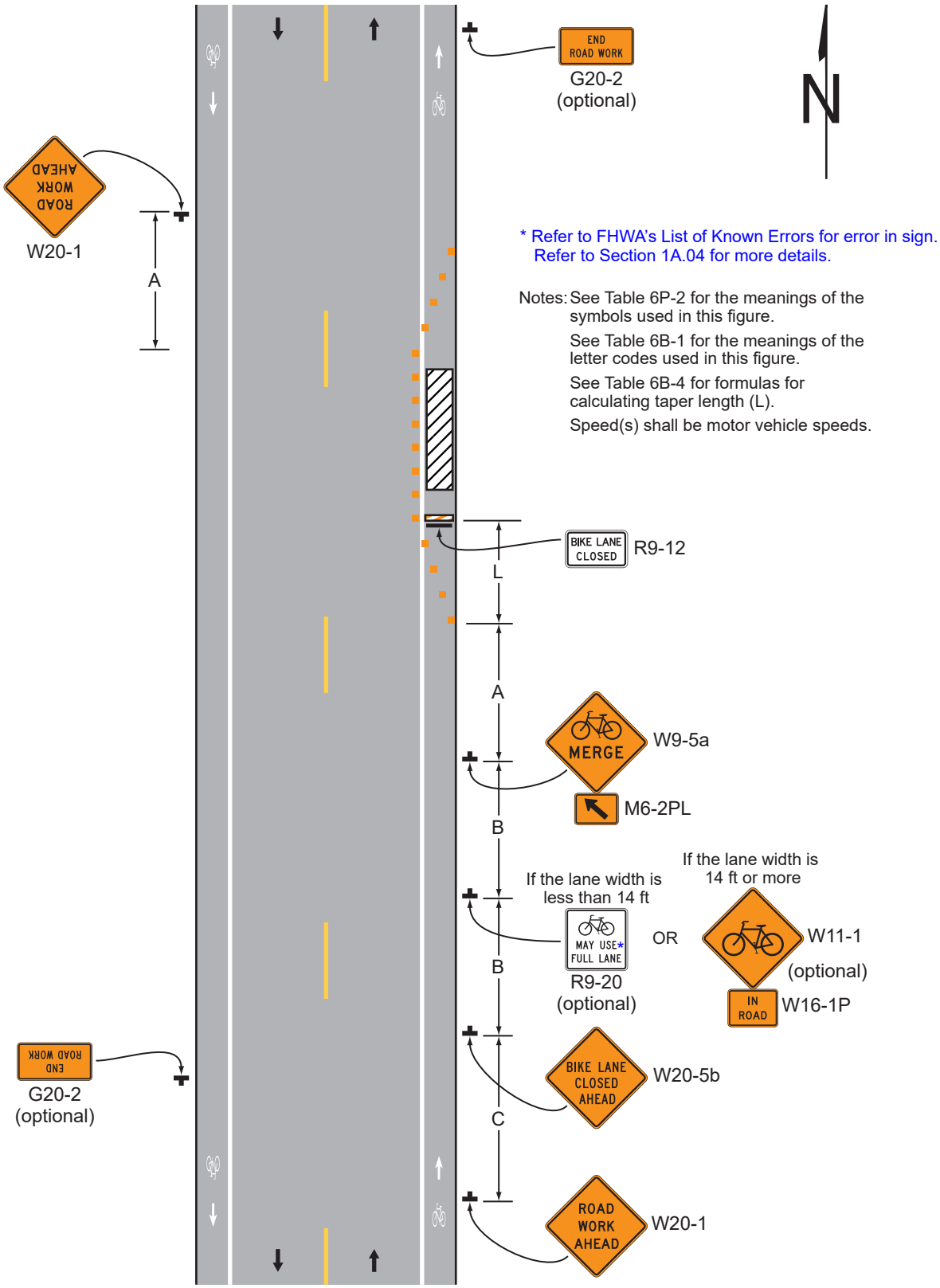
Option:

2. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel lane is less than 14 feet wide, then BICYCLES ALLOWED USE OF FULL LANE (R9-20) signs may be used.
3. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel lane is at least 14 feet wide throughout the TTC zone, then Bicycle Warning signs in association with IN STREET (W16-1aP) or IN ROADWAY (W16-1P) plaques may be used.
4. Positive protection devices may be used per Section 6M.02.
5. This typical application (TA-47) may be used for roadways without a bike lane or bicycle symbol markings.

Guidance:

6. *Where feasible, an* adequate *lane width should be provided to allow bicyclists and motor vehicles to travel side by side throughout the TTC zone. If lane width conditions are not met, use the IN ROAD (W16-1P) or Bicycles Allowed Use of Full Lane (R9-20) sign.*
7. *The speeds used for the shoulder taper calculations should be motor vehicle speeds.*

Figure 6P-47. Bicycle Lane Closure without a Detour (TA-47)



Typical Application 47

Notes for Figure 6P-48 – Typical Application 48
Bicycle Lane Closure with an On-Road Detour

Guidance:

1. *A detour route for bicyclists where a section of bicycle lane is closed should use the most direct route practical on roadways or shoulders where conditions are appropriate for bicycling.*
2. *Bicycle related regulatory and/or warning signs should be considered along the bicycle detour based on engineering judgment and traffic conditions.*
3. *A Street Name sign or Bike Route Name sign should be mounted with the Bike Detour sign.*

Option:

4. The Street Name sign or Bike Route Name sign may be either white on green or black on orange.

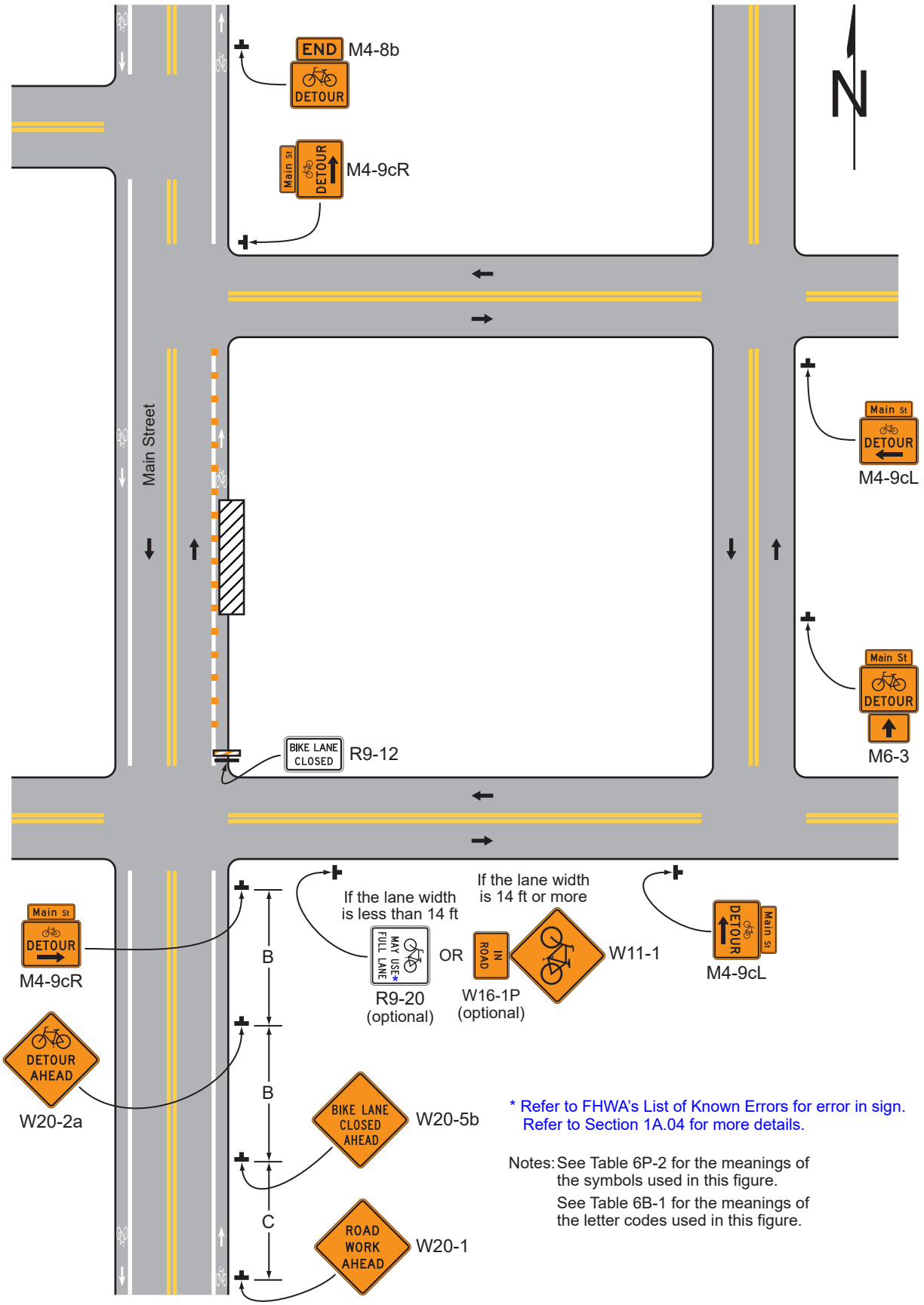
Standard:

5. **Where used, the Street Name sign or Bike Route Name sign shall be placed above the Bike Detour sign.**

Option:

6. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel lane is less than 14 feet wide, then BICYCLES ALLOWED USE OF FULL LANE (R9-20) signs may be used.
7. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel lane is at least 14 feet wide throughout the TTC zone, then Bicycle Warning signs in association with IN STREET (W16-1aP) or IN ROADWAY (W16-1P) plaques may be used.

Figure 6P-48. Bicycle Lane Closure with an On-Road Detour (TA-48)



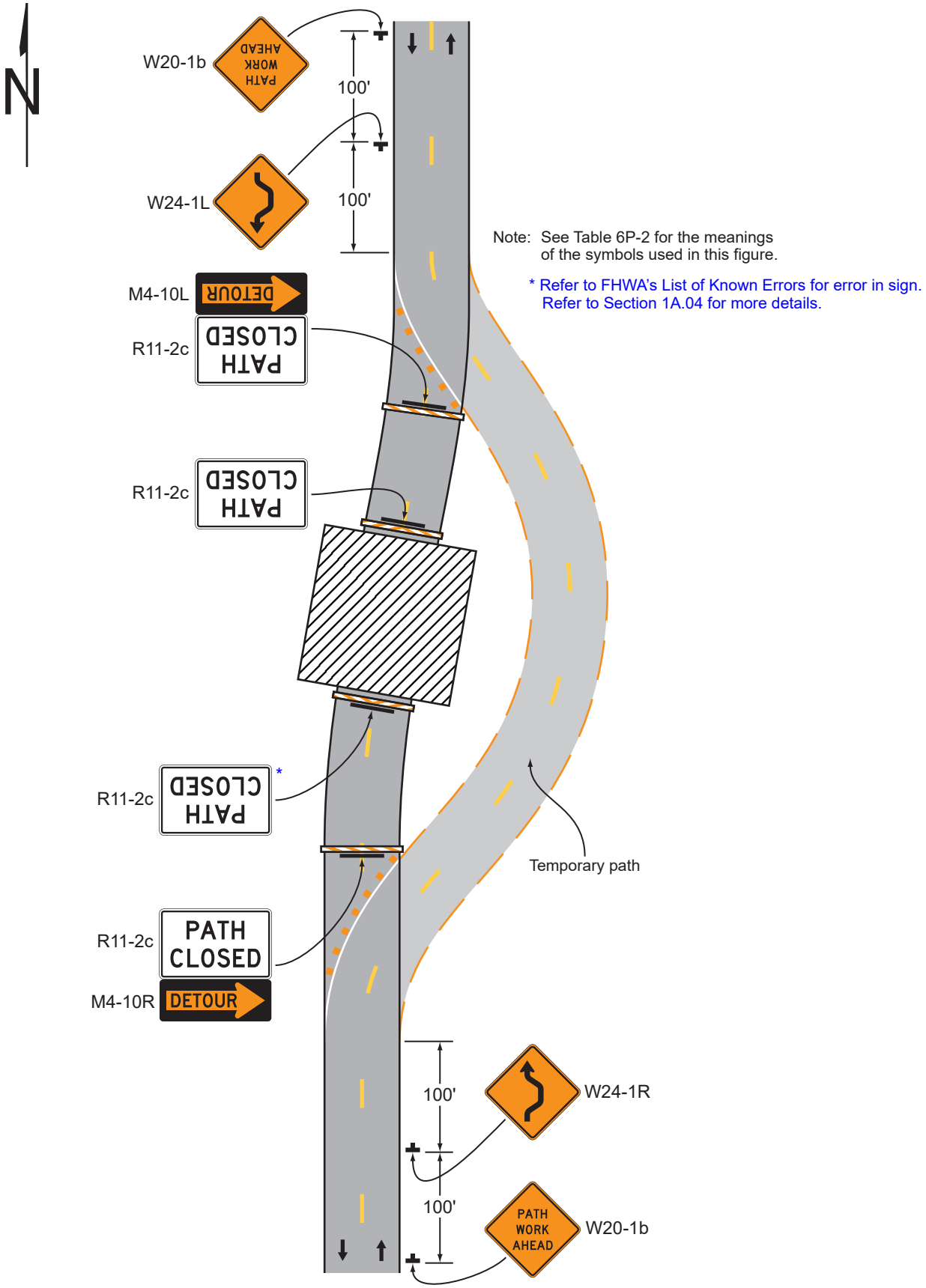
Typical Application 48

Notes for Figure 6P-49 – Typical Application 49
Shared-Use Path Closure with a Diversion

Guidance:

1. *The temporary paved shared-use path should be at least as wide as the shared-use path that was temporarily closed.*

Figure 6P-49. Shared-Use Path Closure with a Diversion (TA-49)



Typical Application 49

Notes for Figure 6P-50 – Typical Application 50
On-Road Detour for a Shared-Use Path

Guidance:

1. *The on-road detour route for bicyclists should use the most direct route practical on roadways or shoulders where conditions are appropriate for bicycling.*
2. *Bicycle related regulatory and/or warning signs should be considered along the bicycle detour based on engineering judgment and traffic conditions.*
3. *A Street Name sign or Bike Route Name sign should be mounted with the Bike Detour sign.*

Option:

4. The Street Name sign or Bike Route Name sign may be either white on green or black on orange.

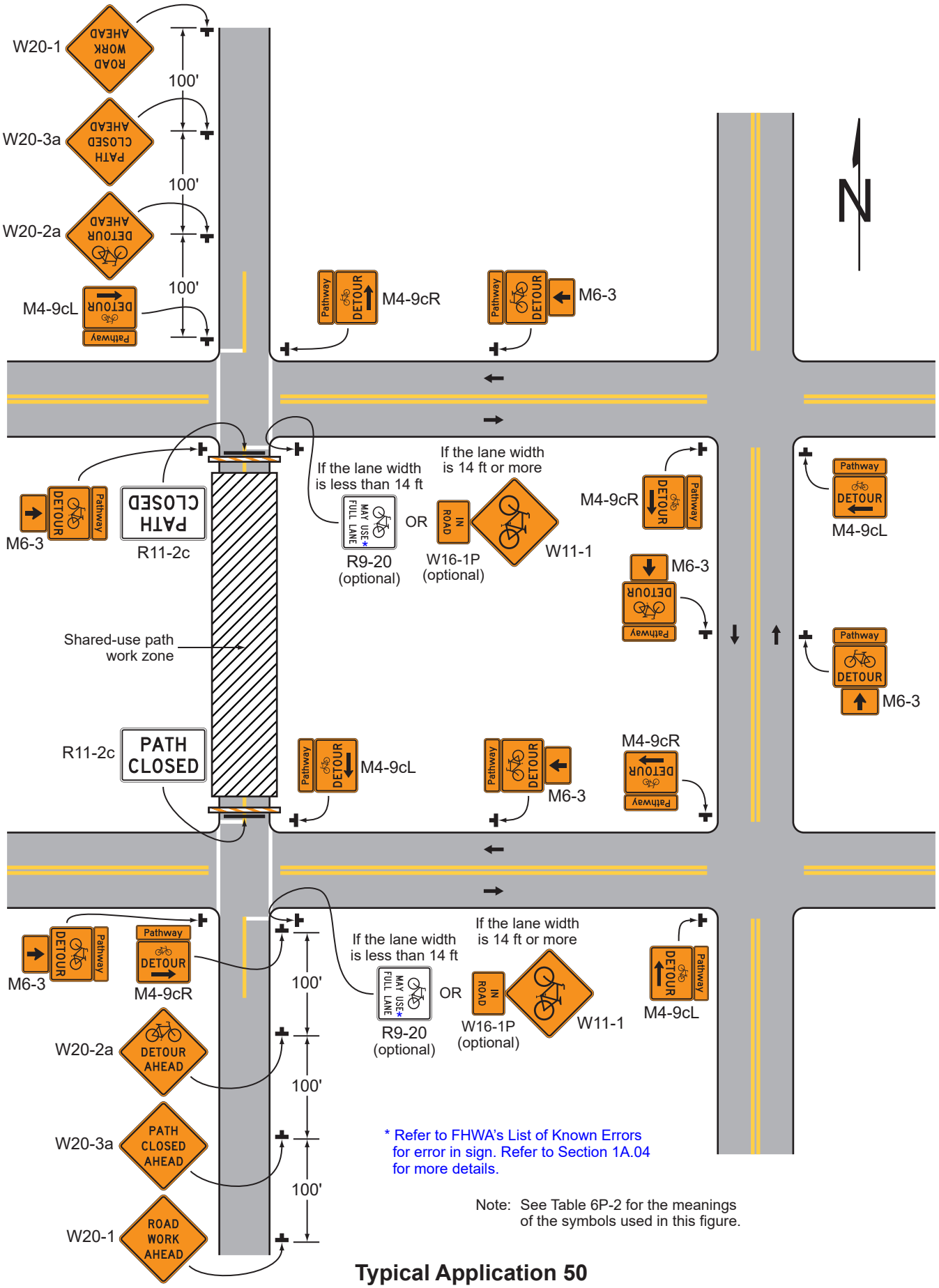
Standard:

5. **Where used the Street Name sign or Bike Route Name sign shall be placed above the Bike Detour sign.**

Option:

6. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel lane is less than 14 feet wide, then BICYCLES ALLOWED USE OF FULL LANE (R9-20) signs may be used.
7. If a bicycle lane on a roadway having a speed limit of 30 mph or less is closed, and the adjacent travel lane is at least 14 feet wide throughout the TTC zone, then Bicycle Warning signs in association with IN STREET (W16-1aP) or IN ROADWAY (W16-1P) plaques may be used.

Figure 6P-50. On-Road Detour for a Shared-Use Path (TA-50)



* Refer to FHWA's List of Known Errors for error in sign. Refer to Section 1A.04 for more details.

Note: See Table 6P-2 for the meanings of the symbols used in this figure.

Typical Application 50

Notes for Figure 6P-51 and Figure 6P-51(CA) – Typical Application 51
Paved Shoulder Closure with a Bicycle Diversion onto a Temporary Path

Option:

1. This plan may be used where a paved shoulder is closed and a temporary paved path is provided for bicyclists.

Guidance:

2. *This plan should be used where a paved shoulder is closed on a roadway having a speed limit greater than or equal to 45 mph that is part of a bikeway system (local, county or state) and a temporary paved path is provided for bicyclists.*
3. *The A, B, and C dimensions should be based on anticipated bicycle speeds.*
4. *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.*
5. *If road users 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.*

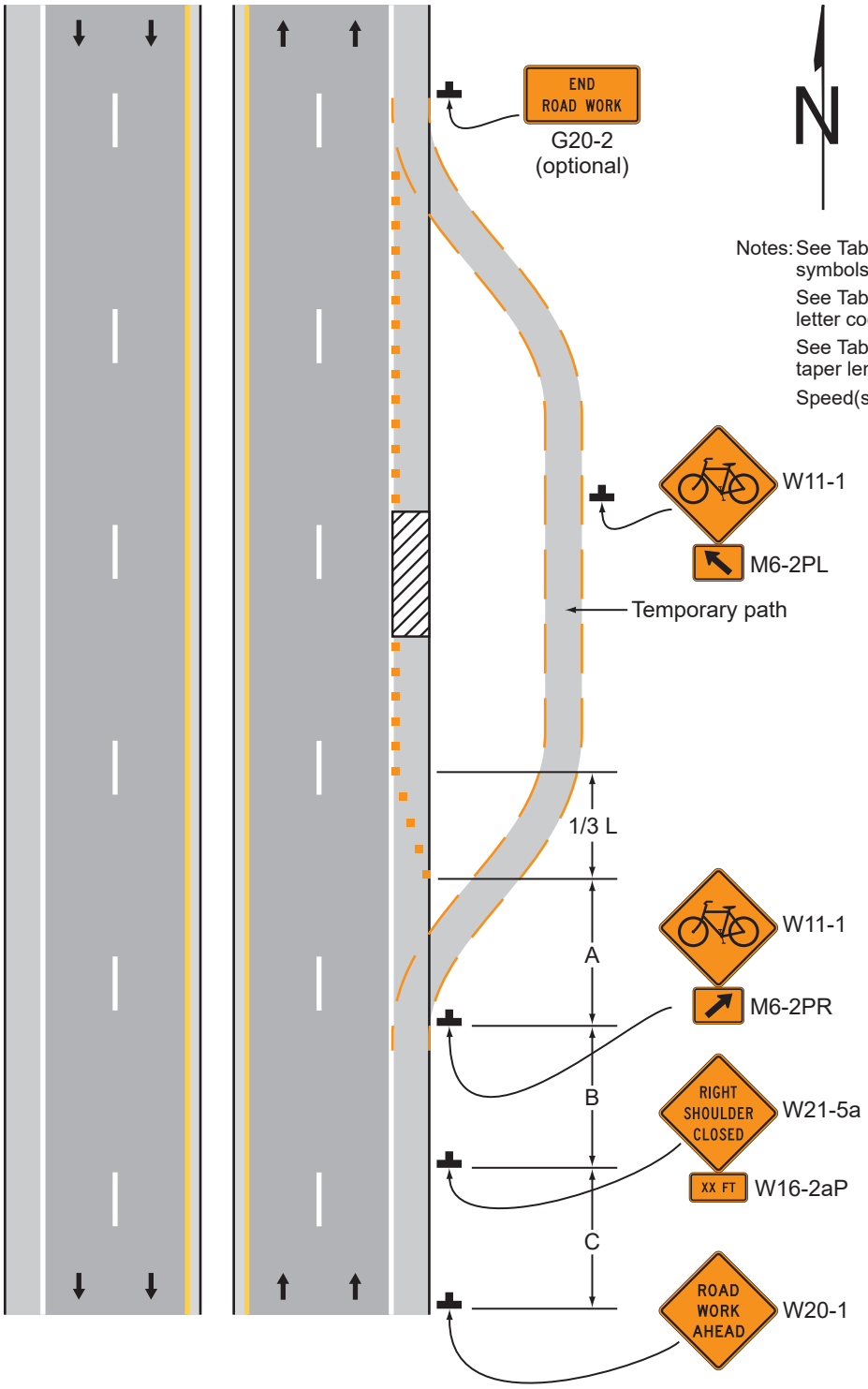
Option:

6. Positive protection devices may be used per Section 6M.02.

Guidance:

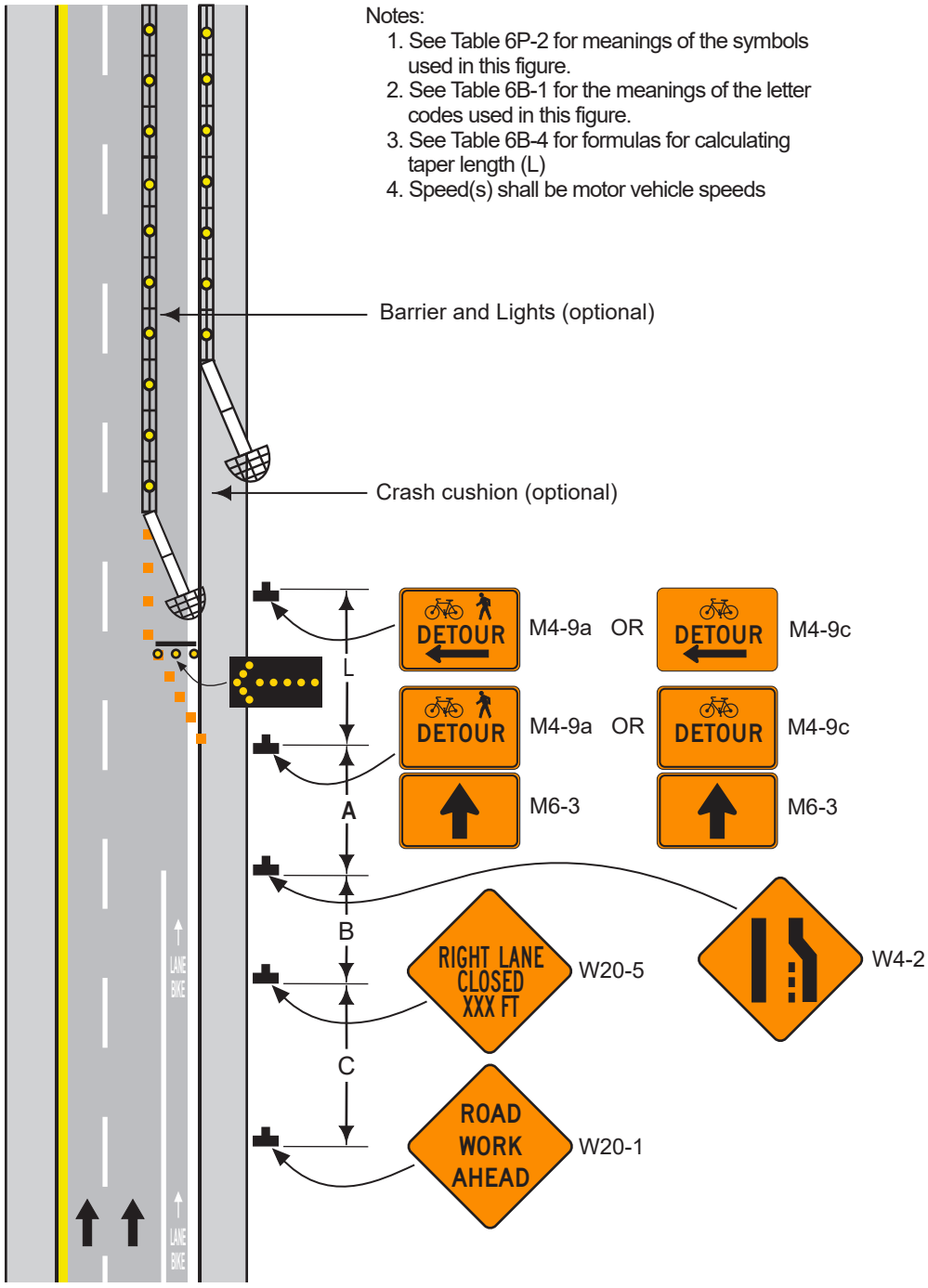
7. *The width of the* existing *pedestrian facility should be provided for the temporary facility, if practical. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60 inch passing space should be provided at least every 200 feet to allow individuals in wheelchairs to pass.*

Figure 6P-51. Paved Shoulder Closure with a Bicycle Diversion onto a Temporary Path (TA-51)



Typical Application 51

Figure 6P-51(CA). Paved Shoulder Closure with Bicycle Diversion onto a Temporary Path (TA-51(CA))



Typical Application 51(CA)

Notes for Figure 6P-52 – Typical Application 52
Short-Term or Short-Duration Work in a Circular Intersection

Option:

1. Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP (W3-4) sign may be added to the sign series.
2. If closure continues overnight, warning lights may be used on the channelizing devices.

Standard:

3. **Where a quadrant of the circular intersection is closed, only one direction of approach traffic shall be released at a time.**
4. **At night, flagger stations shall be illuminated, except in emergencies.**
5. **WRONG WAY (R5-1a) signs shall be covered.**

Guidance:

6. *When used, the BE PREPARED TO STOP (W3-4) sign should be located between the Flagger sign and the ~~ONE LANE ROAD sign~~ Flagger symbol (W20-7).*
7. *YIELD (R1-2), ONE WAY (R6-1and R6-2), and Directional arrow (R6-4, R6-4a, and R6-4b) signs should be covered or removed.*
8. *Confusing or misleading guide or lane-use control signs should be covered.*

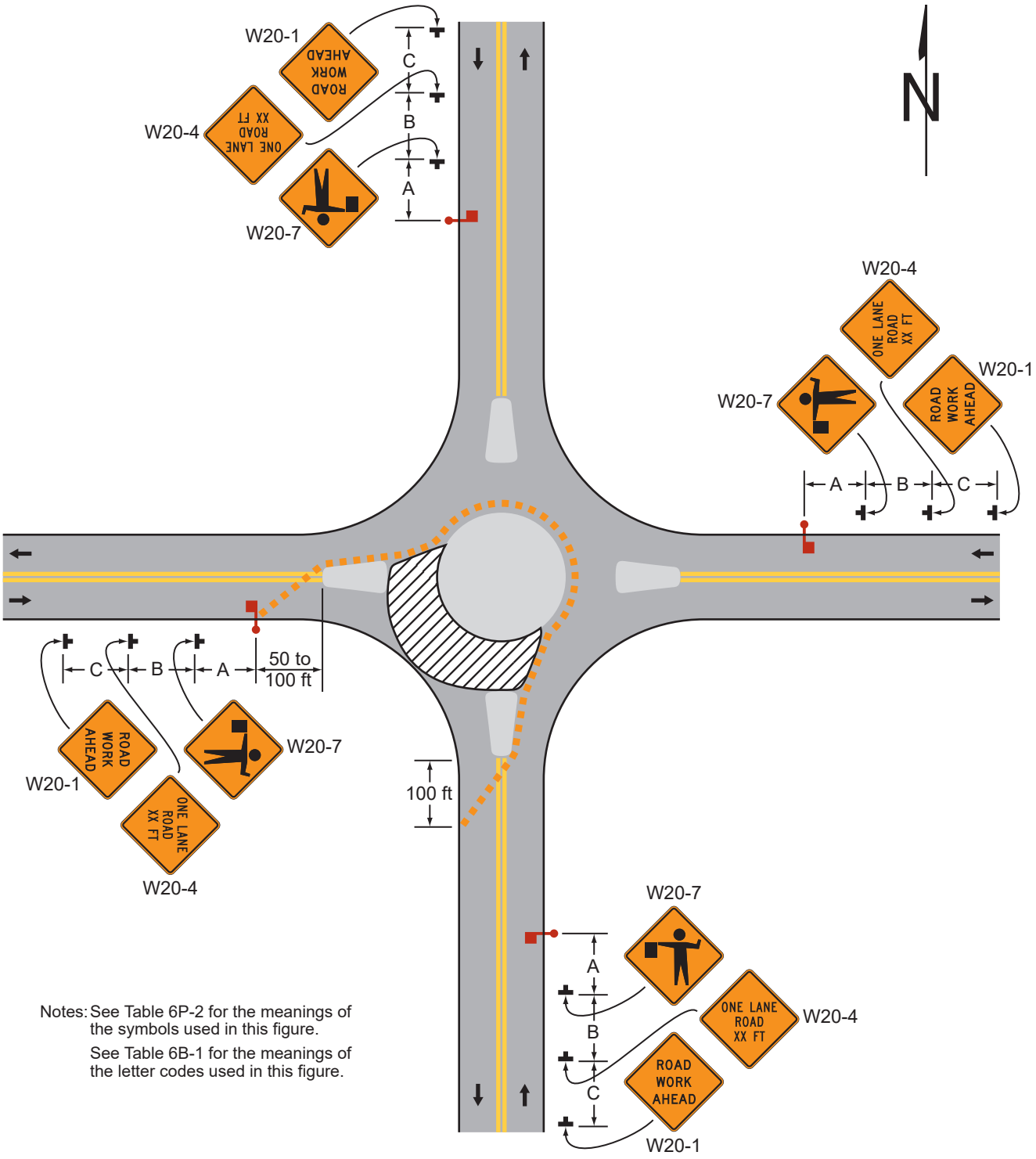
Option:

9. Crosswalks may be closed.
10. As an alternative to closing crosswalks, warning signs may be added informing pedestrians that there is traffic coming from the left.

Guidance:

11. *Since the geometrics of the circular intersection will be temporarily altered, consideration should be given to establishing a truck detour for the duration of the project.*
12. *For intermediate or long-term work, the circular intersection should be closed and traffic detoured, with appropriate detour signing (see Figure 6P-8) provided.*

Figure 6P-52. Short-Term or Short-Duration Work in a Circular Intersection (TA-52)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 52

Notes for Figure 6P-53 – Typical Application 53
Flagging Operation on a Single-Lane Circular Intersection

Standard:

1. **Flaggers shall follow the procedures provided in Sections 6D.05 and 6D.06.**
2. **When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities (see Figure 6P-29) shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**
3. **At night, flagger stations shall be illuminated, except in emergencies.**

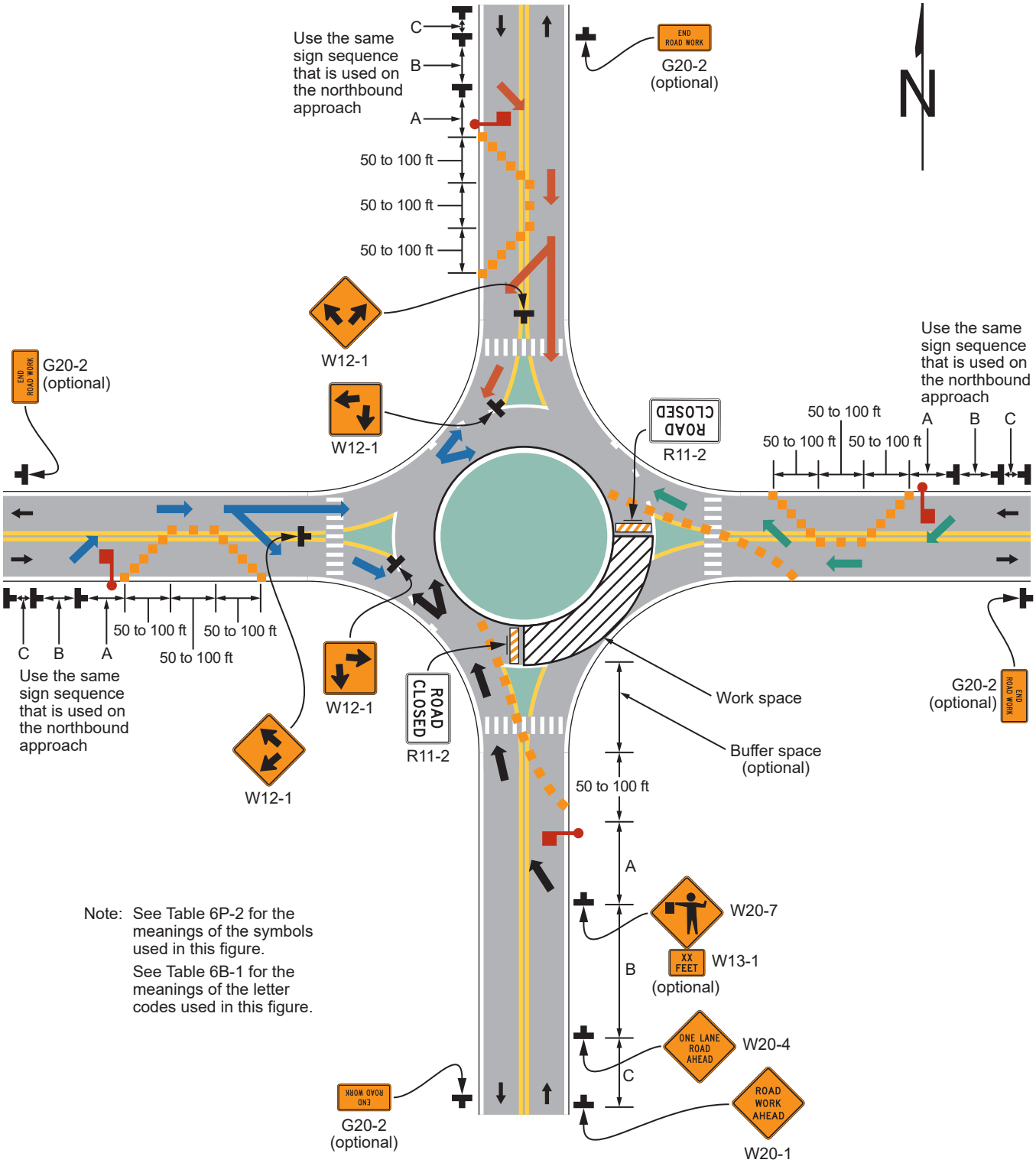
Guidance:

4. *Flaggers on each approach to the intersection should coordinate with each other so that traffic proceeds through the circular intersection from only one entry point at any one time.*
5. *When designing the TTC and installing the channelizing devices for work activities at circular intersections, accommodations for the turning radius of wider heavy commercial vehicles should be considered.*
6. *Since the geometrics of the circular intersection will temporarily be altered, consideration should be given to establishing a truck detour for the duration of the project.*
7. *For intermediate or long-term work, the circular intersection should be closed if traffic cannot be accommodated, and traffic detoured with appropriate detour signing (see Figure 6P-8) provided.*
8. *Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is impracticable, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of ½ S feet where S is the speed in mph. Temporary markings should be installed where needed.*
9. *When used, the BE PREPARED TO STOP (W3-4) sign should be located between the Flagger sign and the ONE LANE ROAD (W20-4) sign.*
10. *The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.*
11. *Care should be exercised when establishing the limits of the TTC zone to ensure adequate sight distance in advance of the transition.*

Option:

12. Periodic adjustments to the channelizing devices may be allowed in an active TTC zone to accommodate the turning movements of tractor trailer vehicles and other large vehicles.
13. On the approaches where traffic flow will be split, two pilot vehicles may be used to guide traffic through the circular intersection.

Figure 6P-53. Flagging Operation on a Single-Lane Circular Intersection (TA-53)



Note: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 53

Notes for Figure 6P-54 – Typical Application 54
Inside Lane Closure on a Multi-Lane Circular Intersection

Standard:

1. **When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities (see Figure 6P-29) shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.**

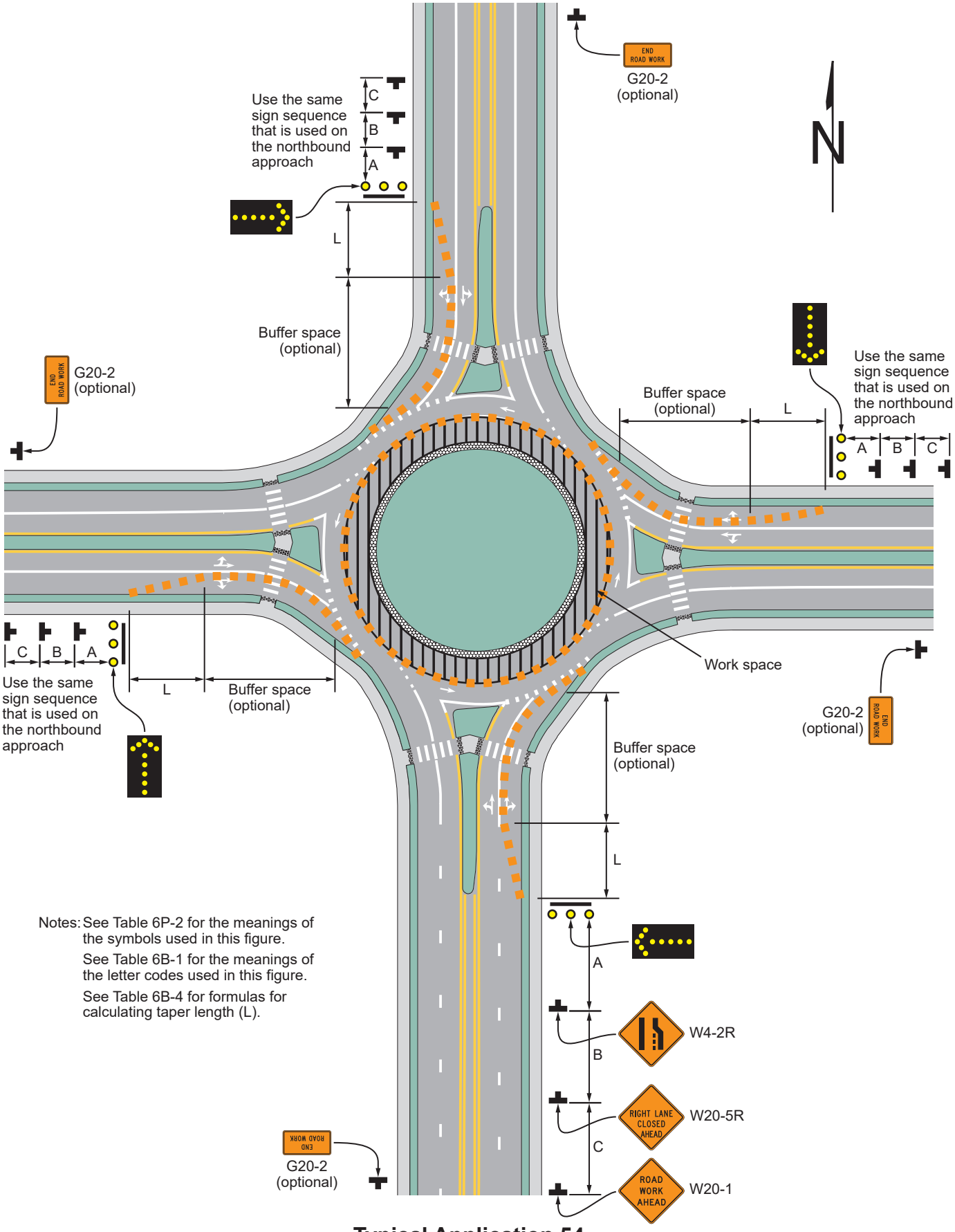
Guidance:

2. *Care should be exercised when establishing the limits of the TTC zone to ensure adequate sight distance in advance of the transition.*
3. *When designing the TTC and installing the channelizing devices for work activities at circular intersections, accommodations for the turning radius of wider heavy commercial vehicles should be considered.*
4. *Since the geometrics of the circular intersection will temporarily be altered, consideration should be given to establishing a truck detour for the duration of the project.*
5. *For intermediate or long-term work, the circular intersection should be closed if traffic cannot be accommodated, and traffic detoured with appropriate detour signing provided (see Figure 6P-8).*
6. *Conflicting pavement markings should be removed for long-term projects. For short-term and intermediate-term projects where this is impracticable, the channelizing devices in the area where the pavement markings conflict should be placed at a maximum spacing of ½ S feet where S is the speed in mph. Temporary markings should be installed where needed.*

Option:

7. A portable changeable message sign may be used as part of the TTC plan to provide clear guidance to motorists on all approaches to the circular intersection.
8. On a multi-lane approach, a lane (or lanes) on either the left-hand side or the right-hand side may be closed.

Figure 6P-54. Inside Lane Closure on a Multi-Lane Circular Intersection (TA-54)



Notes: See Table 6P-2 for the meanings of the symbols used in this figure.
See Table 6B-1 for the meanings of the letter codes used in this figure.
See Table 6B-4 for formulas for calculating taper length (L).

Typical Application 54

Notes for Figure 6P-101(CA) — Typical Application 101(CA)
Right Lane and Bike Lane Closure on Far Side of Intersection

Guidance:

1. *When existing accommodations for bicycle travel are disrupted or closed, information and devices contained in Figures 6P-47 through 6P-51(CA), as appropriate per situation encountered, should be used to consider the needs and control of bicyclists through a TTC zone.*
2. *If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure 6P-29.*

Option:

3. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right lane having significant right turning movements, then the right lane may be restricted to right turns only, as shown. This procedure increases the through capacity by eliminating right turns from the open through lane.
4. For intersection approaches reduced to a single lane, left-turning movements may be prohibited to maintain capacity for through vehicular traffic.
5. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
6. Where the turning radius is large, it may be possible to create a right-turn island using channelizing devices or pavement markings.

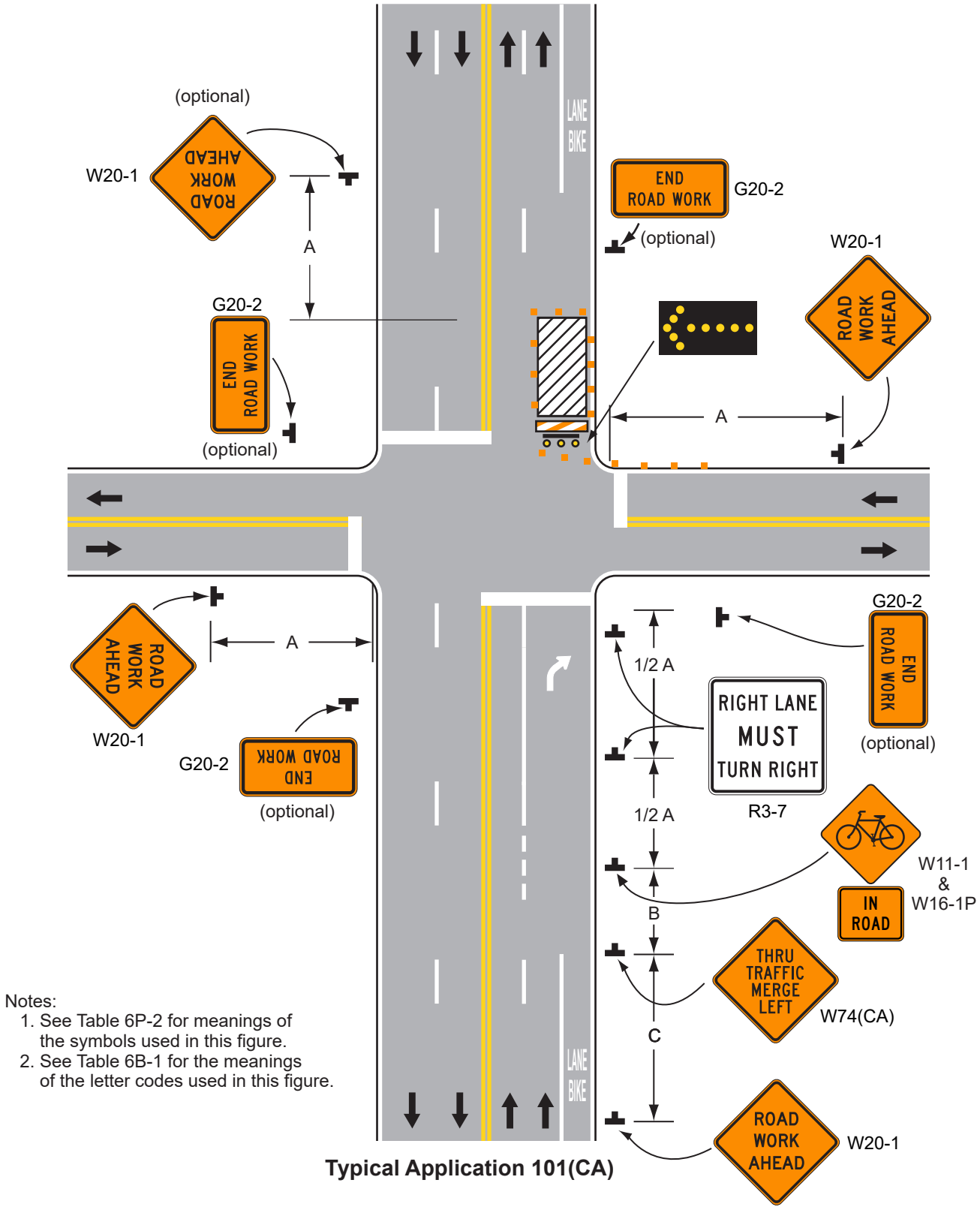
Guidance:

8. *For long-term duration projects (refer to Section 6N.01), consideration should be given to installing signs in an overhead location.*

Option:

9. A high-level warning device (flag tree) may supplement the advance warning signs. Refer to Section 6L.08.

Figure 6P-101(CA). Right Lane and Bike Lane Closure on Far Side of Intersection (TA-101(CA))



Notes:
1. See Table 6P-2 for meanings of the symbols used in this figure.
2. See Table 6B-1 for the meanings of the letter codes used in this figure.

Typical Application 101(CA)

Notes for Figure 6P-102(CA) — Typical Application 102(CA)
Lane Shift on Road with Low Traffic Volumes

Guidance:

1. *The lanes on either side of the center work space should have a minimum width of 10 feet as measured from the near edge of the channelizing devices to the edge of pavement or the outside edge of paved shoulder.*

Standard:

2. **Workers in the roadway shall wear high-visibility safety apparel as described in Section 6C.04.**

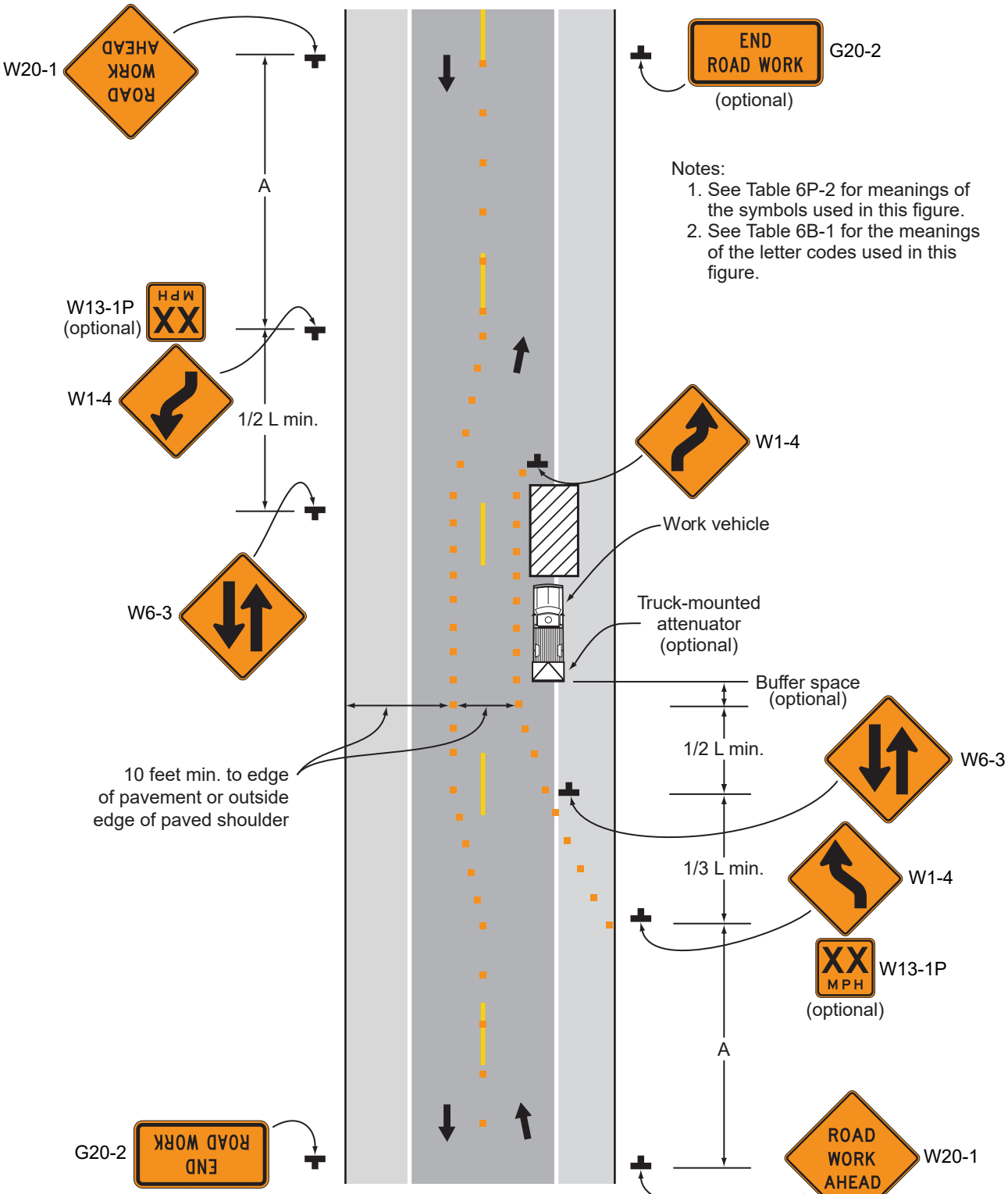
Option:

3. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.
4. If the closure continues overnight, warning lights may be used on the channelizing devices.
5. A lane width of 9 feet may be used for short-term stationary work on low-volume, low-speed roadways when motor vehicle traffic does not include longer and wider heavy commercial vehicles.
6. A work vehicle displaying high-intensity rotating, flashing, oscillating, or strobe lights may be used instead of the channelizing devices forming the tapers or the high-level warning devices.
7. Vehicle hazard warning signals may be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights.

Standard:

8. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.**

Figure 6P-102(CA). Lane Shift on Road With Low Traffic Volumes (TA-102(CA))



Typical Application 102(CA)