

Improved Temporary Traffic Delineation

In accordance with the 2014 CA Manual of Uniform Traffic Control Devices (MUTCD) for the implementation of improved temporary traffic delineation for use in construction work zones.

Enclosed is the description of the proposal that further details the use of the traffic delineation approach. Additionally, we have included a copy of Section 6 from the CA MUTCD amended with the proposed improvements and typical applications. We feel that these improve the current temporary traffic control standards and are consistent with the fundamental principles for normal highway conditions.

a traffic control system to improve the safe movement of travel in work zones. The current temporary traffic control devices lack in awareness and consistency from normal highway situations.

As specified in the CA MUTCD Section 6B.01, paragraph 7.1A

"The basic safety principles governing the design of permanent roadways and roadsides should also govern the design of TTC zones. The goal should be to route road users thru such zones using roadway geometrics, roadside features, and TTC devices as nearly as possible comparable to those of normal highway situations."

With our many years in traffic engineering and traffic control implementation, we have encountered real world situations where a need to improve the current standards has been warranted. We have attached Exhibit 1 which reflects the proposed improvements to a few of the current typical applications from the CA MUTCD. We have also attached Attachment "A" which covers all the typical applications and our proposed modifications for reference.

Exhibit 1

Modified Typical Application – TA-105(CA)

The attached typical application in Exhibit one has been modified to include the color-coding modifications that represent a system of temporary traffic control devices that is comparable to normal highway conditions. For example, cones, channelizing devices, or typical barricades originating from an existing left shoulder or double yellow line shall have yellow reflective banding/chevrons (day or night). Similarly, cones, channelizing devices, or typical barricades originating from a right shoulder or lane line shall have white reflective banding/chevrons (day or night). Lastly, cones, channelizing devices, or typical barricades within a road/lane closure shall have red reflecting banding/chevrons (day or night). It is our assessment through the interpretation of the CA MUTCD that temporary traffic control devices should reflect normal highway conditions as much as possible. Therefore, utilizing the proper color coding with temporary traffic control cones, channelizing devices, or typical barricades will more accurately depict the roadway conditions and improve the safe movement of travel through the work zones. See next page for Exhibit 1.

Recommendation

Additionally, it is our assessment that these modifications are more in line with the normal roadway conditions and therefore feel that they can be adopted with a standard change to the CA MUTCD without an experiment.

We appreciate the opportunity to express our concerns and recommendations. We look forward to hearing from the team on a proposed path forward.

Sincerely,


Terry Utz

Aaron Calderon



Morteza Delpasand, P.E, T.E.



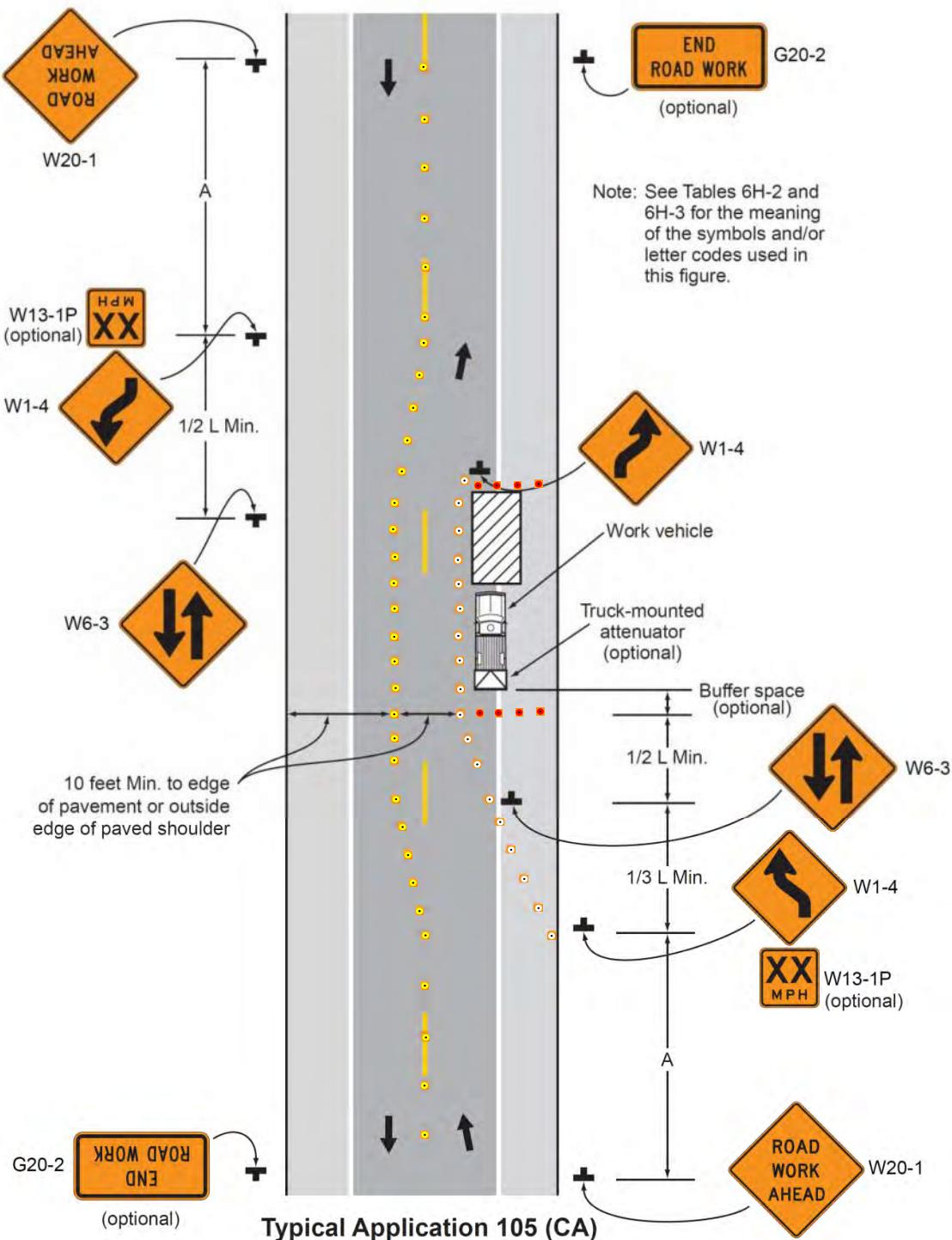
Example, Modified Typical Application

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Figure 6H-105 (CA). Lane Shift on Road With Low Traffic Volumes (TA-105 (CA))



CHANNELIZING DEVICES



LEFT SHOULDER/TRAVELWAY



RIGHT SHOULDER/TRAVELWAY



TRAVELWAY CLOSED

Attachment A

TYPICAL APPLICATION FOR TTC (TEMPORARY TRAFFIC CONTROL)

WHEN IN USE TRAFFIC CONES AND CHANNELIZING DEVICES SHALL HAVE RETROREFLECTIVE BANDS OR SLEEVES AND SHALL CONFORM TO THAT OF THE PAVEMENT MARKINGS IT SUPPLEMENTS IN THE DIRECTION OF TRAVEL.

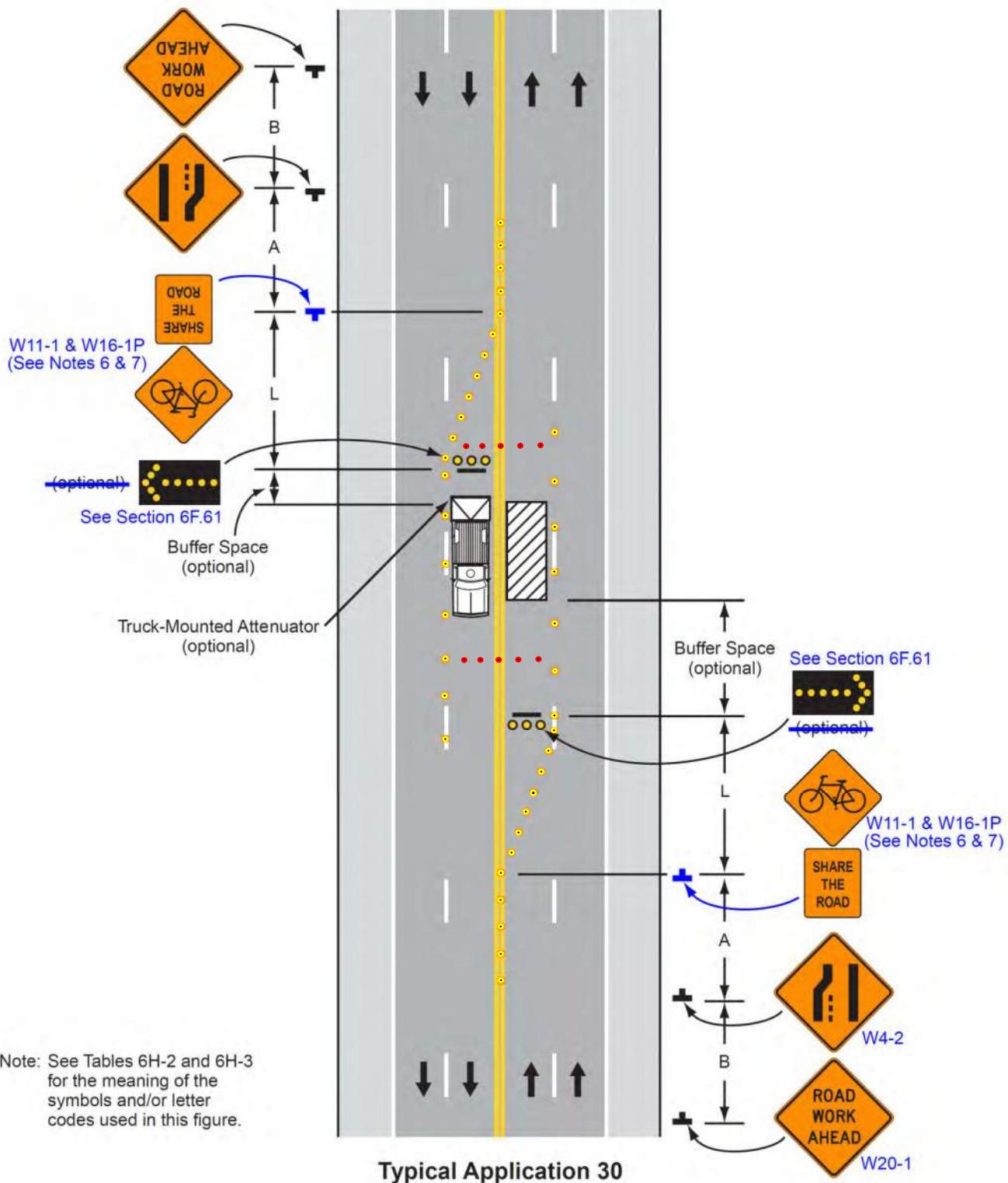
REFERENCE MODIFIED

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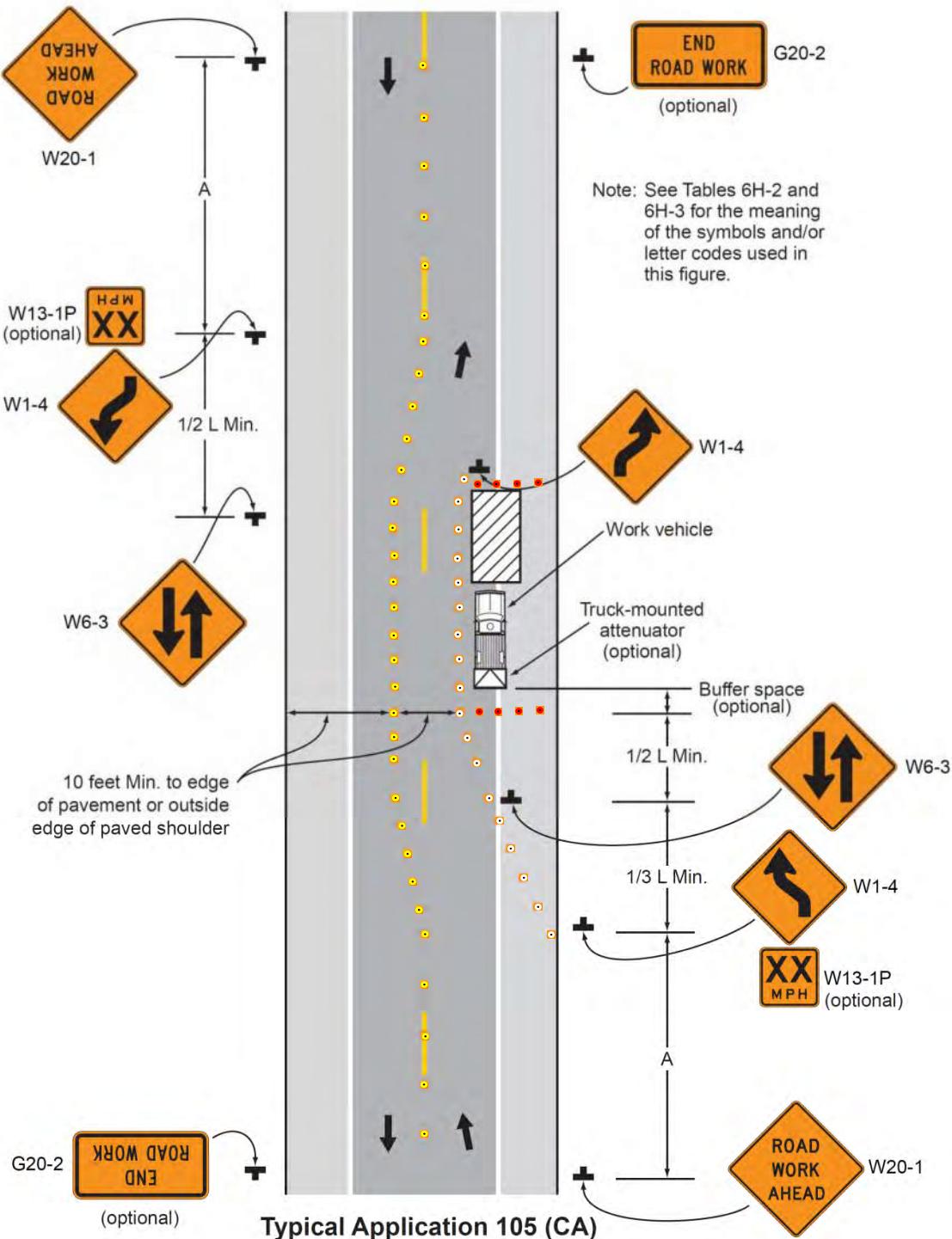
Page 1205

Figure 6H-30. Interior Lane Closure on Multi-lane Street (TA-30)



CHANNELIZING DEVICES



Figure 6H-105 (CA). Lane Shift on Road With Low Traffic Volumes (TA-105 (CA))**CHANNELIZING DEVICES**

LEFT SHOULDER/TRAVELWAY

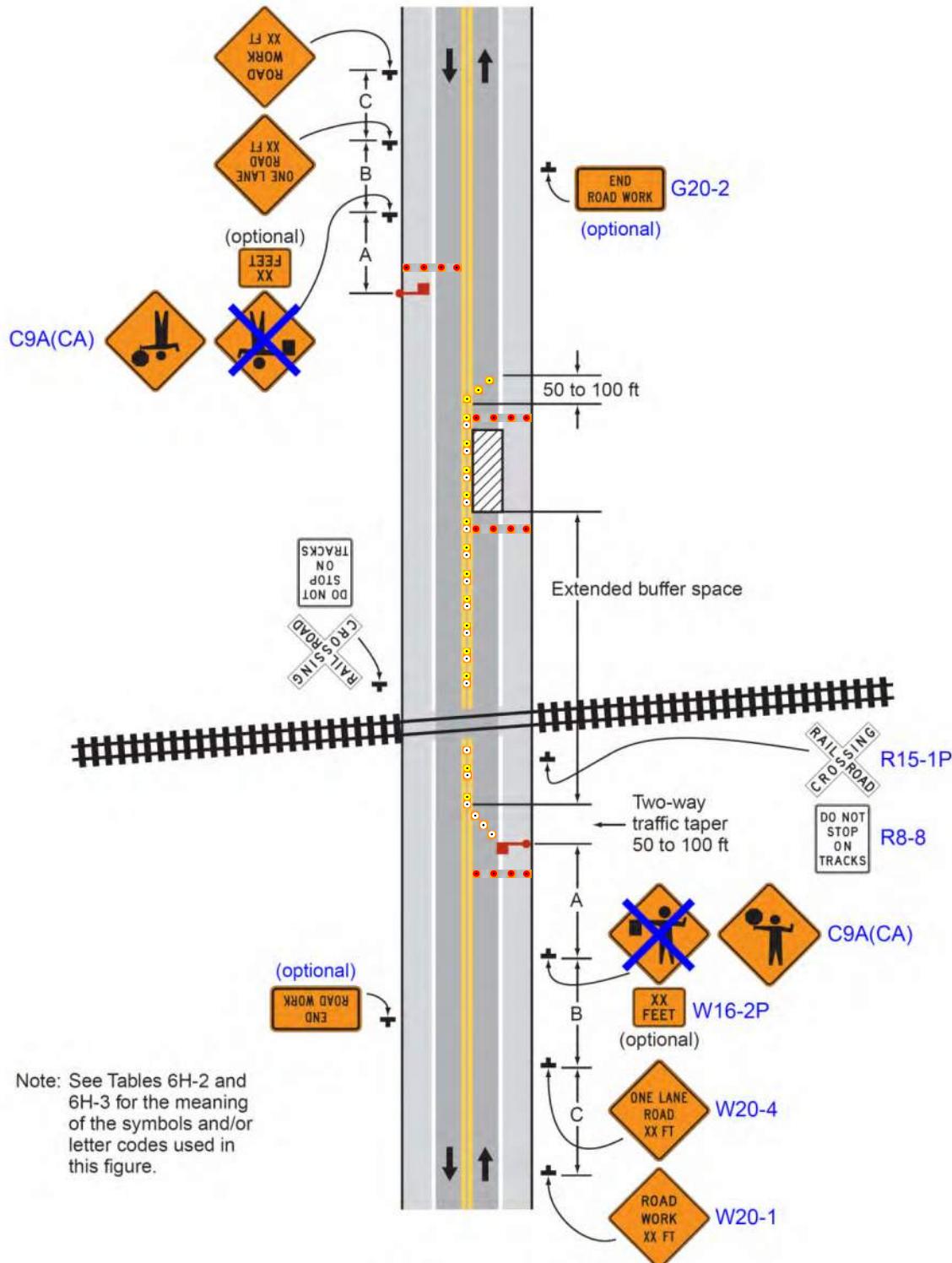


RIGHT SHOULDER/TRAVELWAY



TRAVELWAY CLOSED

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



Typical Application 46

CHANNELIZING DEVICES



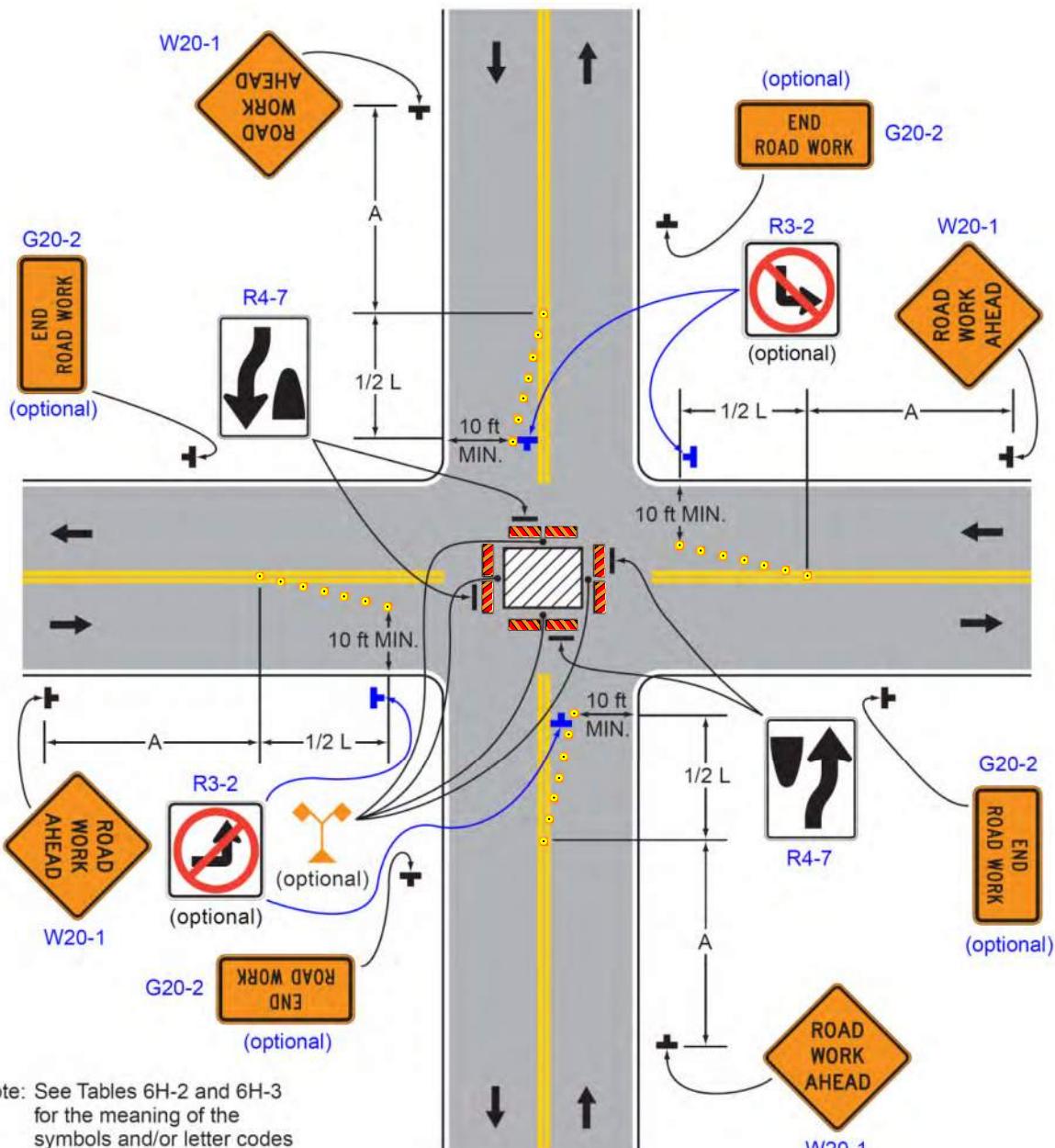
LEFT SHOULDER / TRAVEL WAY



RIGHT-SHOULDER (TRAVELWAY)



TRANSPORTS

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

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

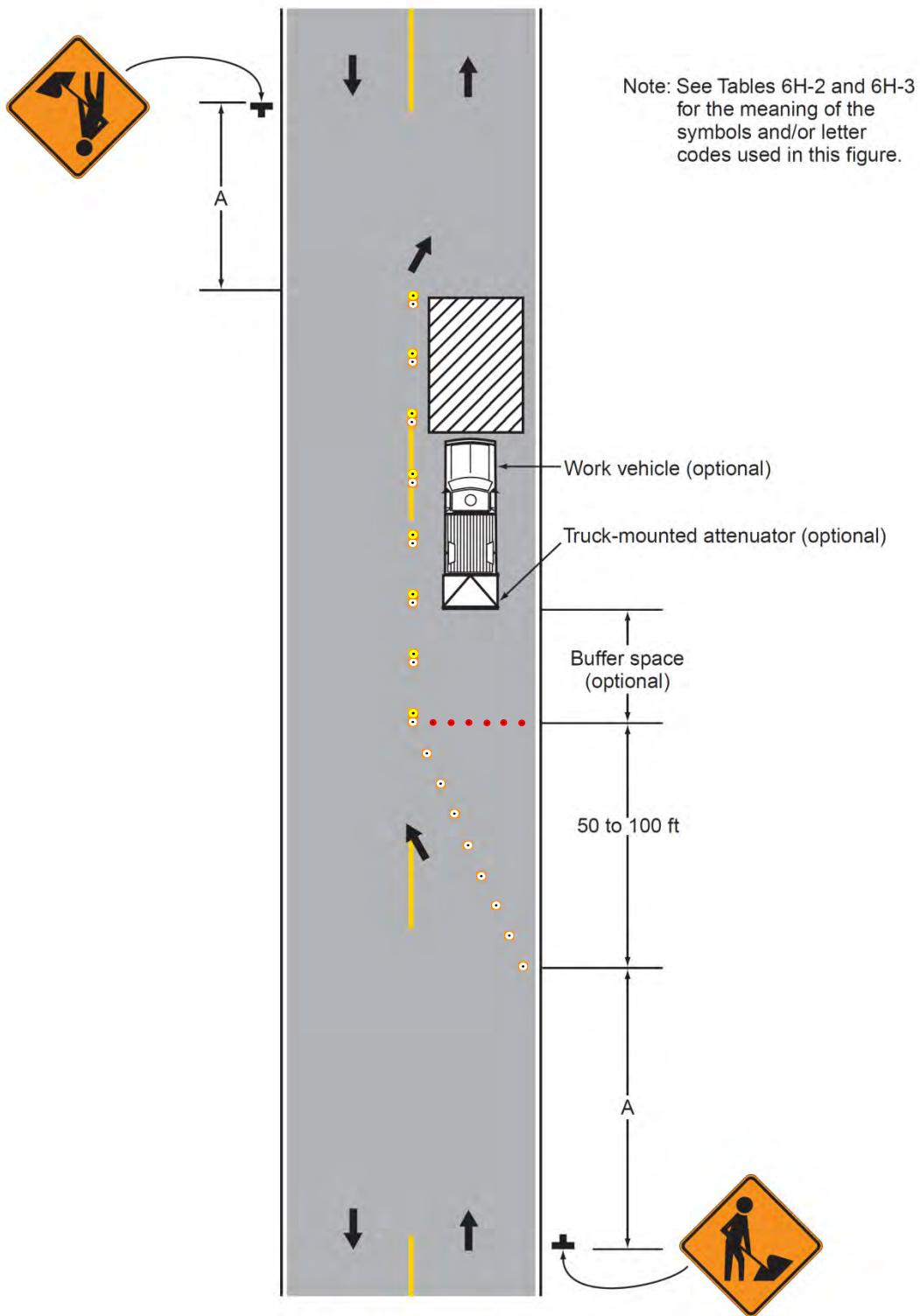
Typical Application 26

CHANNELIZING DEVICES

LEFT SHOULDER/TRAVELWAY

TRAVELWAY CLOSED

TYPE-I TRAVELWAY

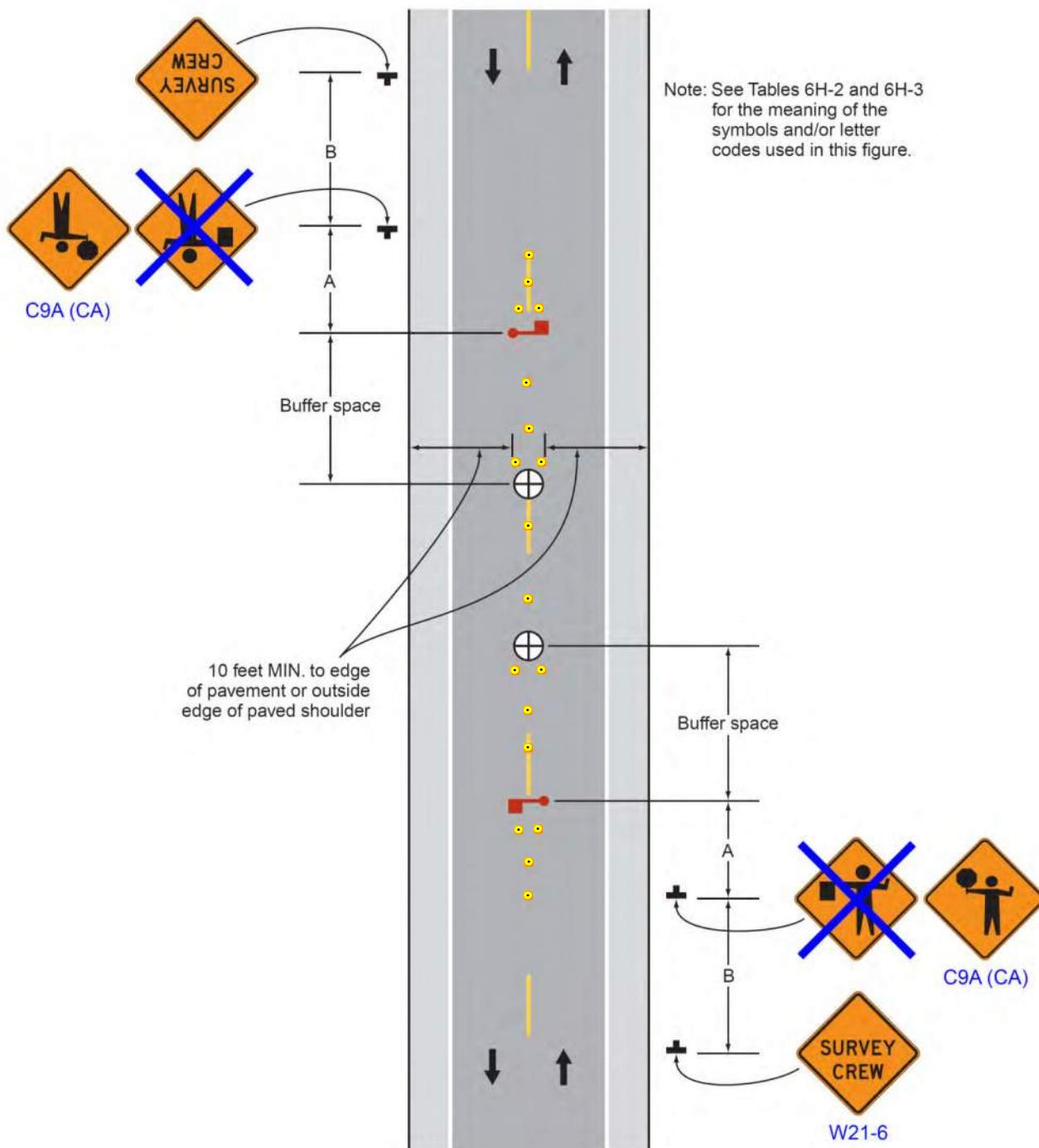
Figure 6H-18. Lane Closure on a Minor Street (TA-18)

Typical Application 18
CHANNELIZING DEVICES

W21-1

- LEFT SHOULDER/TRAVELWAY
- RIGHT SHOULDER/TRAVELWAY
- TRAVELWAY CLOSED

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

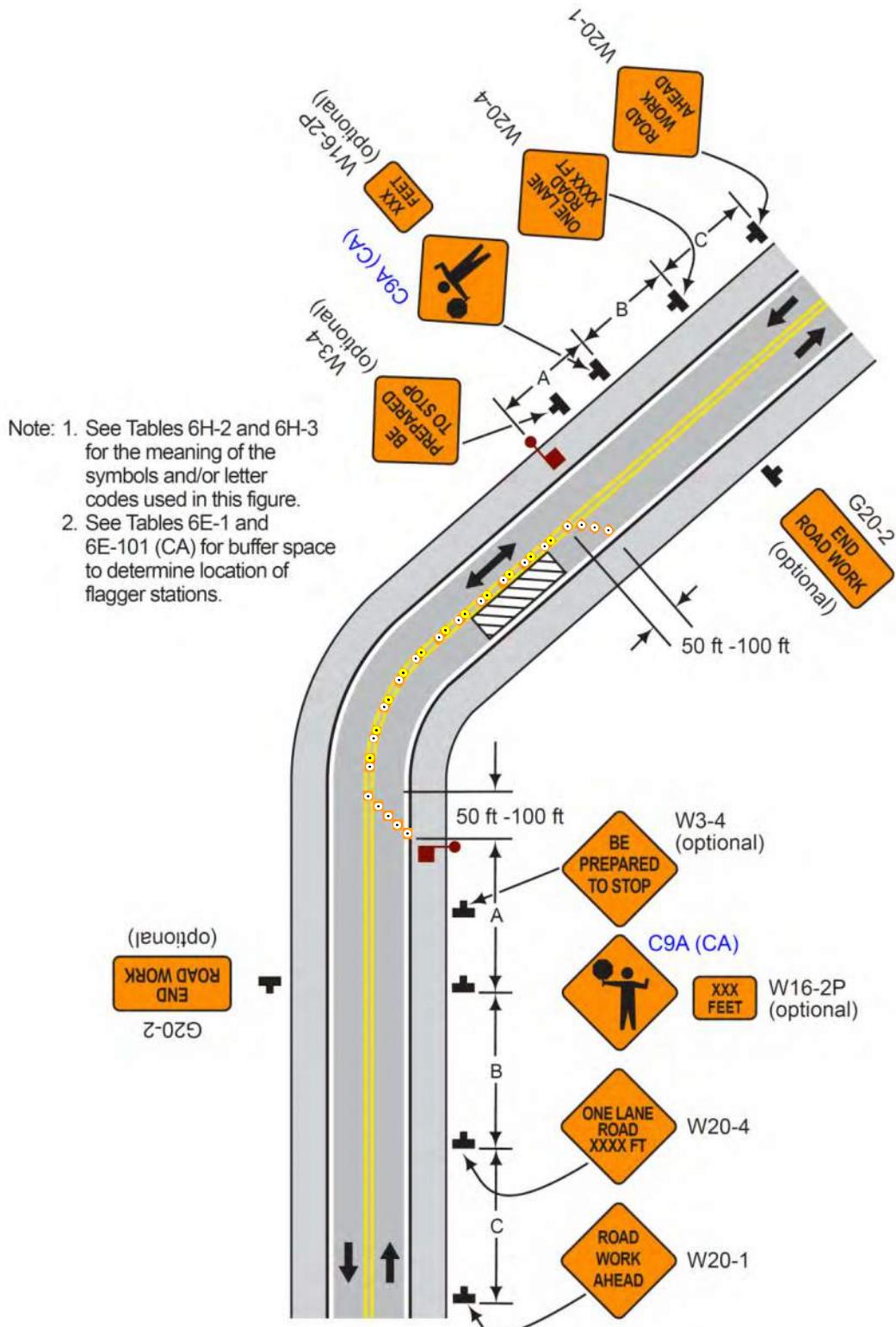


Typical Application 16

CHANNELIZING DEVICES



LEFT SHOULDER/TRAVELWAY

Figure 6H-10 (CA). Lane Closure on Two-Lane Road Using Flaggers (TA-10)**Typical Application 10****CHANNELIZING DEVICES**

- LEFT SHOULDER/TRAVELWAY
- RIGHT SHOULDER/TRAVELWAY
- TRAVELWAY CLOSED

Revised Standards to include color code retroreflective material on Cone but applies to all temporary traffic control devices.

CONES –

Section 6F.64 Cones Standard:

01 Cones (see Figure 6F-7) shall be predominantly orange and shall be made of a material that can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways, cones shall be not less than 18 inches in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a minimum of 28 inches in height.

02 For nighttime ~~when in~~ use, cones shall be retro reflectorized or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 28 to 36 inches in height shall be provided by a 6-inch wide white, **Yellow, and Red** band located 3 to 4 inches from the top of the cone and an additional 4-inch wide white, **Yellow, and Red** band located approximately 2 inches below the 6-inch band. **03** Retroreflectorization of cones that are more than 36 inches in height shall be provided by horizontal, circumferential, alternating orange and white, **Yellow, and Red** retroreflective stripes that are 4 to 6 inches wide. Each cone shall have a minimum of two orange and two white, **Yellow, and Red** stripes with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 3 inches in width.

Support: 03a The 36 inch and 42 inch high cones provide additional conspicuity in visually complex environments and for older road users.

Option: 04 Traffic cones may be used to channelize road users, divide opposing vehicular traffic lanes, divide lanes when two or more lanes are kept open in the same direction, and delineate short duration maintenance and utility work.

Guidance: 05 Steps should be taken to minimize the possibility of cones being blown over or displaced by wind or moving vehicular traffic.

Option: 06 Cones may be doubled up to increase their weight.

Support: 07 Some cones are constructed with bases that can be filled with ballast. Others have specially weighted bases, or weight such as sandbag rings that can be dropped over the cones and onto the base to provide added stability.

Guidance: 08 Ballast should be kept to the minimum amount needed.

Option: 09 Retroreflectorization of 28 inch in height or higher cones may be provided by a 13 inch band (sleeve).

Traffic Drums –

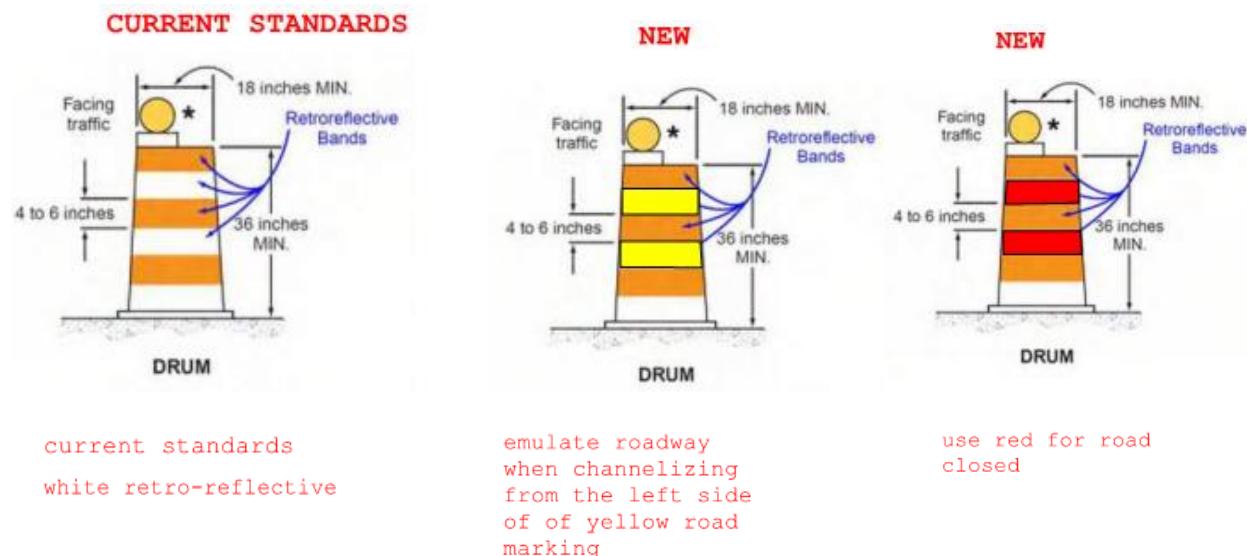
Section 6F.67 Drums Standard:

01 Drums (see Figure 6F-7) used for road user warning or channelization shall be constructed of lightweight, deformable materials. They shall be a minimum of 36 inches in height and have at least an 18inch minimum width regardless of orientation. Metal drums shall not be used. The markings on drums shall be horizontal, circumferential, alternating orange and white, **Yellow, and Red** retroreflective stripes 4 to 6 inches wide. Each drum shall have a minimum of two orange and two white, **Yellow, and Red** stripes with the top stripe being orange. Any non-retroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3 inches wide. Drums shall have closed tops that will not allow collection of construction debris or other debris.

Support: 02 Drums are highly visible, have good target value, give the appearance of being formidable obstacles and, therefore, command the respect of road users. They are portable enough to be shifted from place to place within a TTC zone in order to accommodate changing conditions, but are generally used in situations where they will remain in place for a prolonged period of time.

Option: 03 Although drums are most commonly used to channelize or delineate road user flow, they may also be used alone or in groups to mark specific locations.

Guidance: 04 Drums should not be weighted with sand, water, or any material to the extent that would make them hazardous to road users or workers when struck. Drums used in regions susceptible to freezing should have drain holes in the bottom so that water will not accumulate and freeze causing a hazard if struck by a road user.



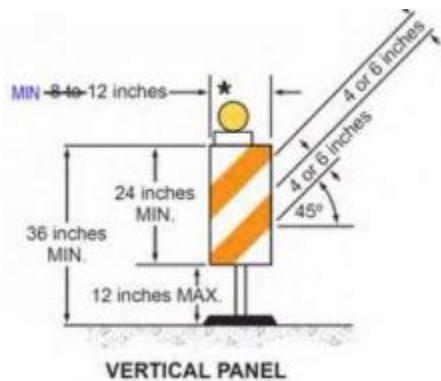
Vertical Panel –

Section 6F.66 Vertical Panels Standard:

01 Vertical panels (see Figure 6F-7) shall have retroreflective striped material that is 8 to 12 inches in width and at least 24 inches in height. They shall have alternating diagonal orange and white, **Yellow, and Red** retroreflective stripes sloping downward at an angle of 45 degrees in the direction vehicular traffic is to pass. 02 Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.

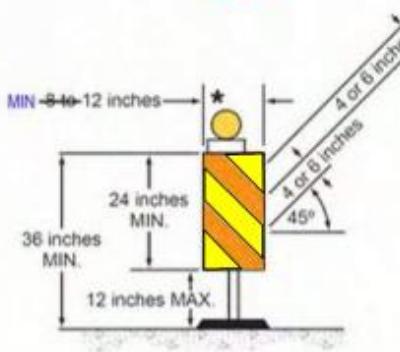
Guidance: 02a Vertical panels should be a minimum of 12 inch in width. Option: 03 Where the height of the retroreflective material on the vertical panel is less than 36 inches, a stripe width of 4 inches may be used.

CURRENT STANDARDS



current standards
white retro-reflective

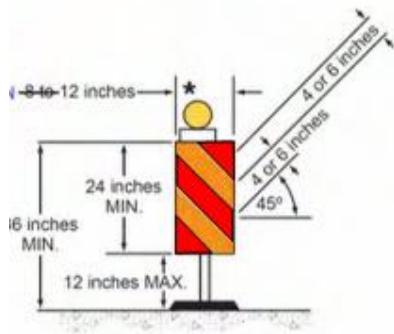
NEW



VERTICAL PANEL

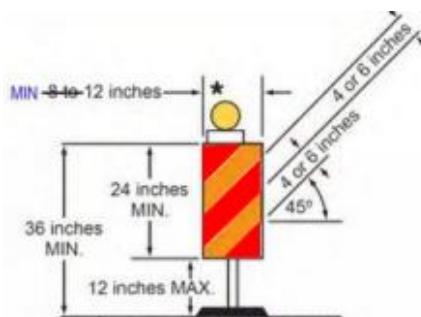
emulate roadway
when channelizing
from the left side
of yellow road
marking

NEW



VERTICAL PANEL

use red for road
closed



VERTICAL PANEL

use red for road
closed

RIGHT

LEFT

Type-I –

Type-II –

Type-III –

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

Support: 01 A barricade is a portable or fixed device having from one to three rails with appropriate markings and is used to control road users by closing, restricting, or delineating all or a portion of the right-of-way.

02 As shown in Figure 6F-7, barricades are classified as Type 1, Type 2, or Type 3.

Standard: 03 Stripes on barricade rails shall be alternating orange and white, **Yellow, and Red** retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Except as provided in Paragraph 4, the stripes shall be 6 inches wide.

Option: 04 When rail lengths are less than 36 inches, 4-inch wide stripes may be used.

Standard: 05 The minimum length for Type 1 and Type 2 Barricades shall be 24 inches, and the minimum length for Type 3 Barricades shall be 48 inches. Each barricade rail shall be 8 to 12 inches wide.

Barricades used on freeways, expressways, and other high-speed roadways shall have a minimum of 270 square inches of retroreflective area facing road users.

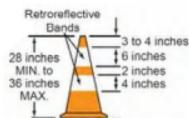
Section 6F.71 Longitudinal Channelizing Devices

Standard: 02 If used singly as Type 1, 2, or 3 barricades, longitudinal channelizing devices shall comply with the general size, color, stripe pattern, retroreflectivity, and placement characteristics established for the devices described in this Chapter

CHANNELIZING DEVICES INCLUDE CONES, TUBULAR MARKERS, CHANNELIZERS, PORTABLE DELINEATORS, VERTICAL PANELS, DRUMS, TYPE-I, TYPE-II, TYPE-III BARRICADES, AND LONGITUDINAL CHANNELIZING DEVICES.

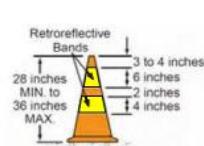
WHEN IN USE TEMPORARY TRAFFIC CONTROL AND CHANNELIZING DEVICES SHALL HAVE RETROREFLECTIVE BANDS, SLEEVES, OR CHEVERONS AND SHALL CONFORM TO THAT OF THE PAVEMENT MARKINGS IT SUPPLEMENTS IN ITS DIRECTION OF TRAFFIC FLOW .

CURRENT STANDARDS



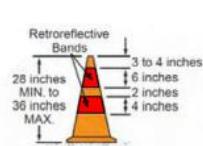
current standards when using 28" traffic cones at night must have 6" white retro-reflective collar and a 4" collar

NEW

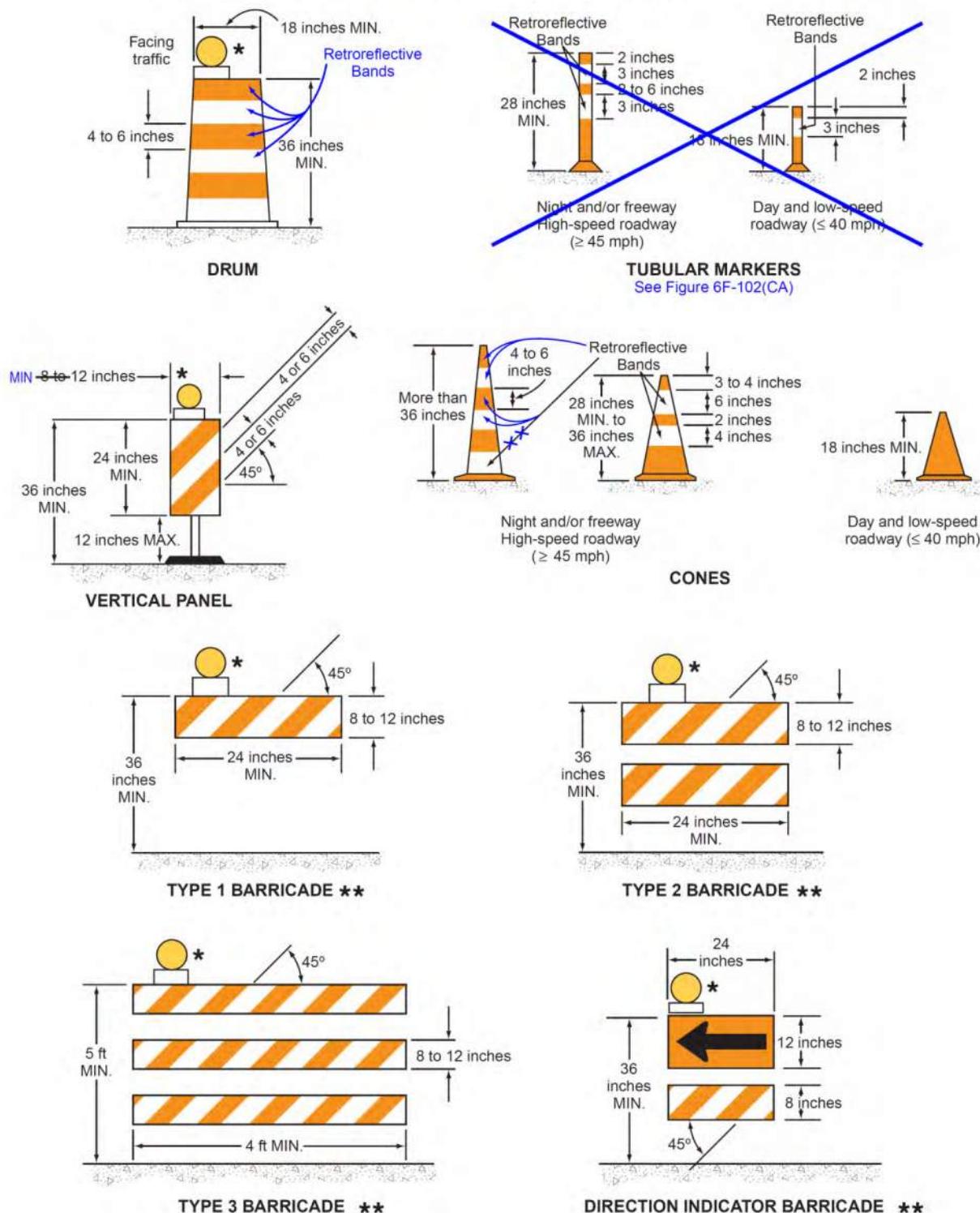


emulate roadway when channelizing from the left side of yellow road marking

NEW



use red for road closed
and/or lane

Figure 6F-7. Channelizing Devices

* Warning lights (optional)

** Rail stripe widths shall be 6 inches, except that 4-inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.

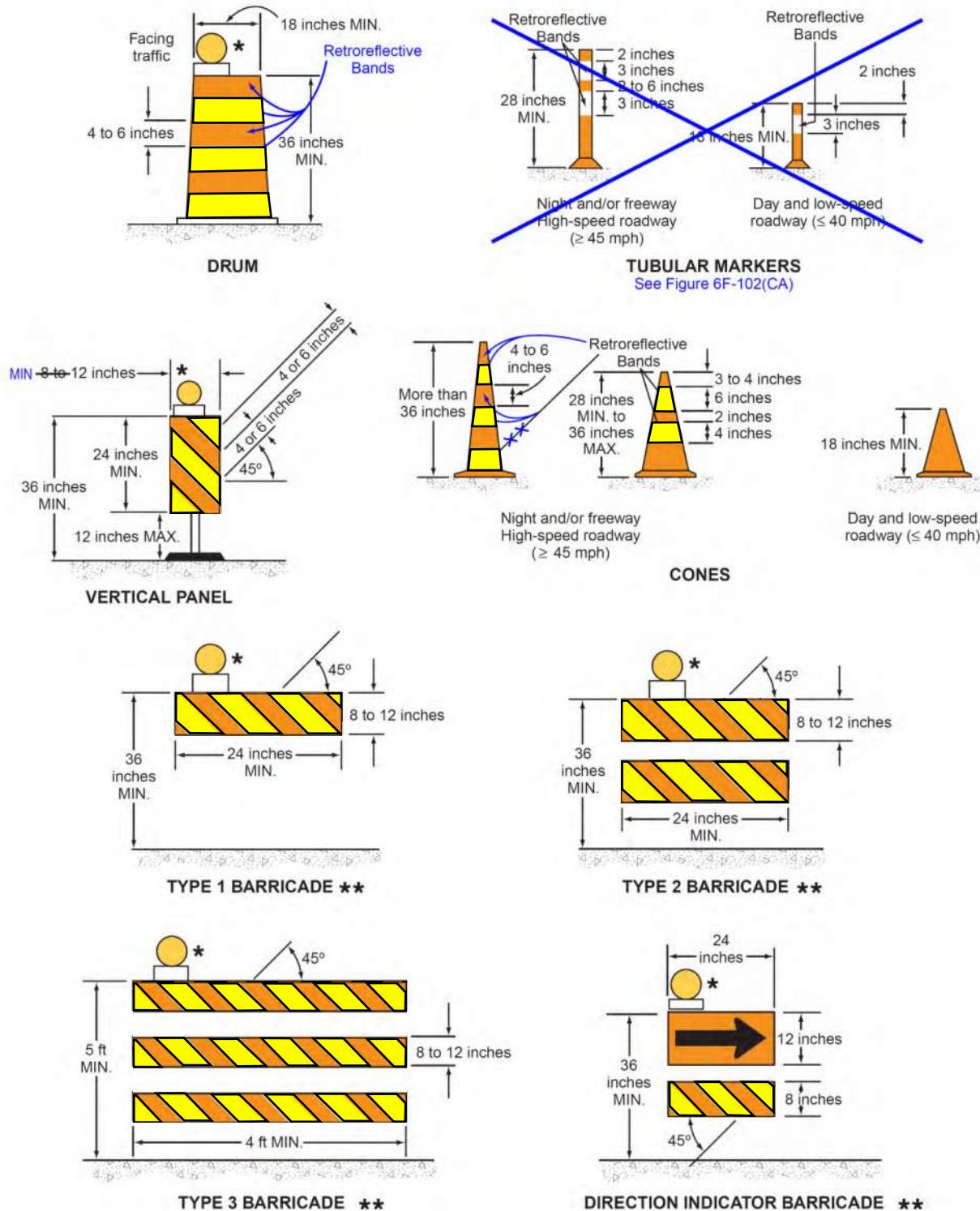
YELLOW FOR RIGHT BANDS/CHEVRON CHANILIZATION

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Figure 6F-7. Channelizing Devices



* Warning lights (optional)

** Rail stripe widths shall be 6 inches, except that 4-inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.

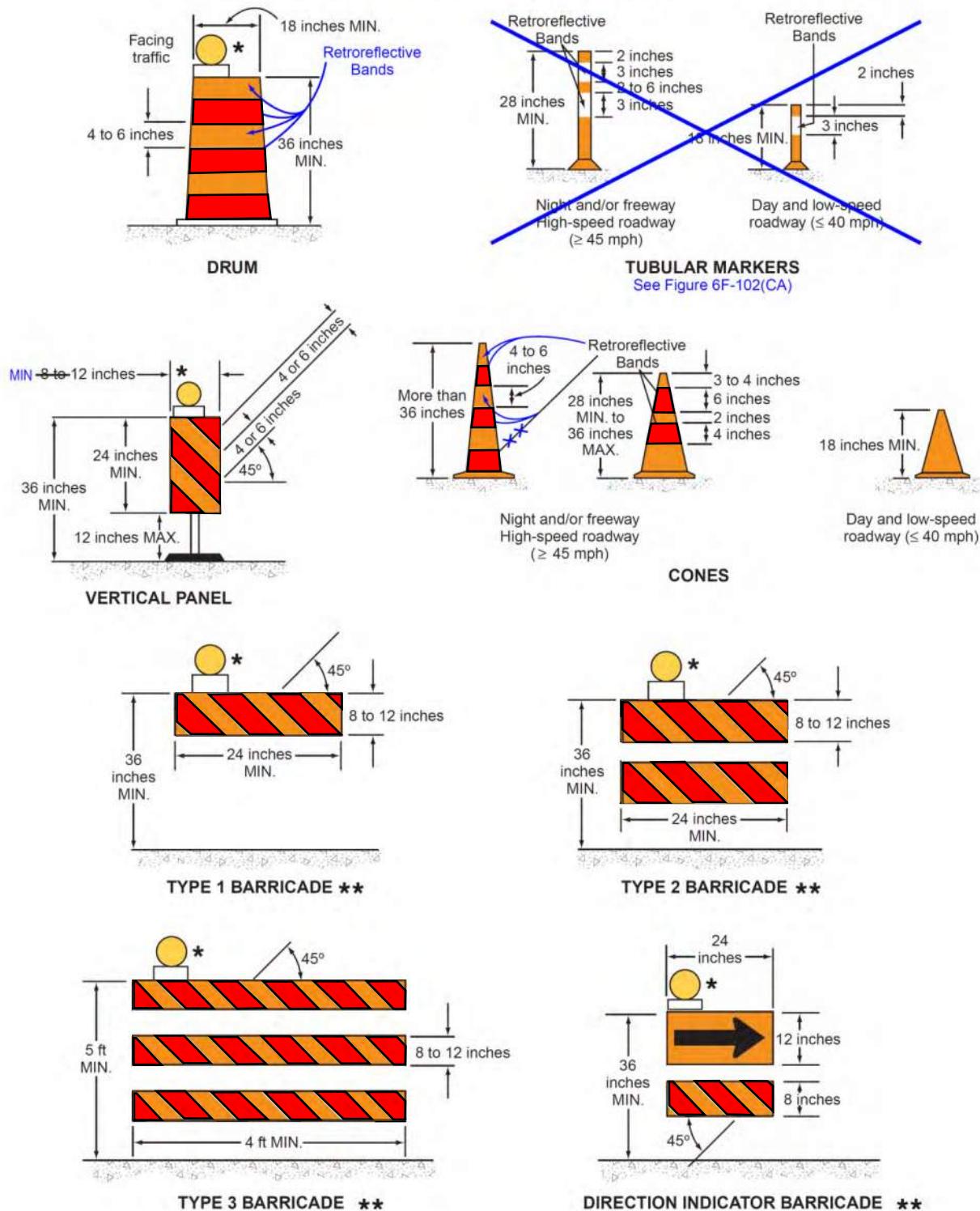
RED FOR RIGHT BANDS/CHEVERON ROAD/LANE CLOSED

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Figure 6F-7. Channelizing Devices



* Warning lights (optional)

** Rail stripe widths shall be 6 inches, except that 4-inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.

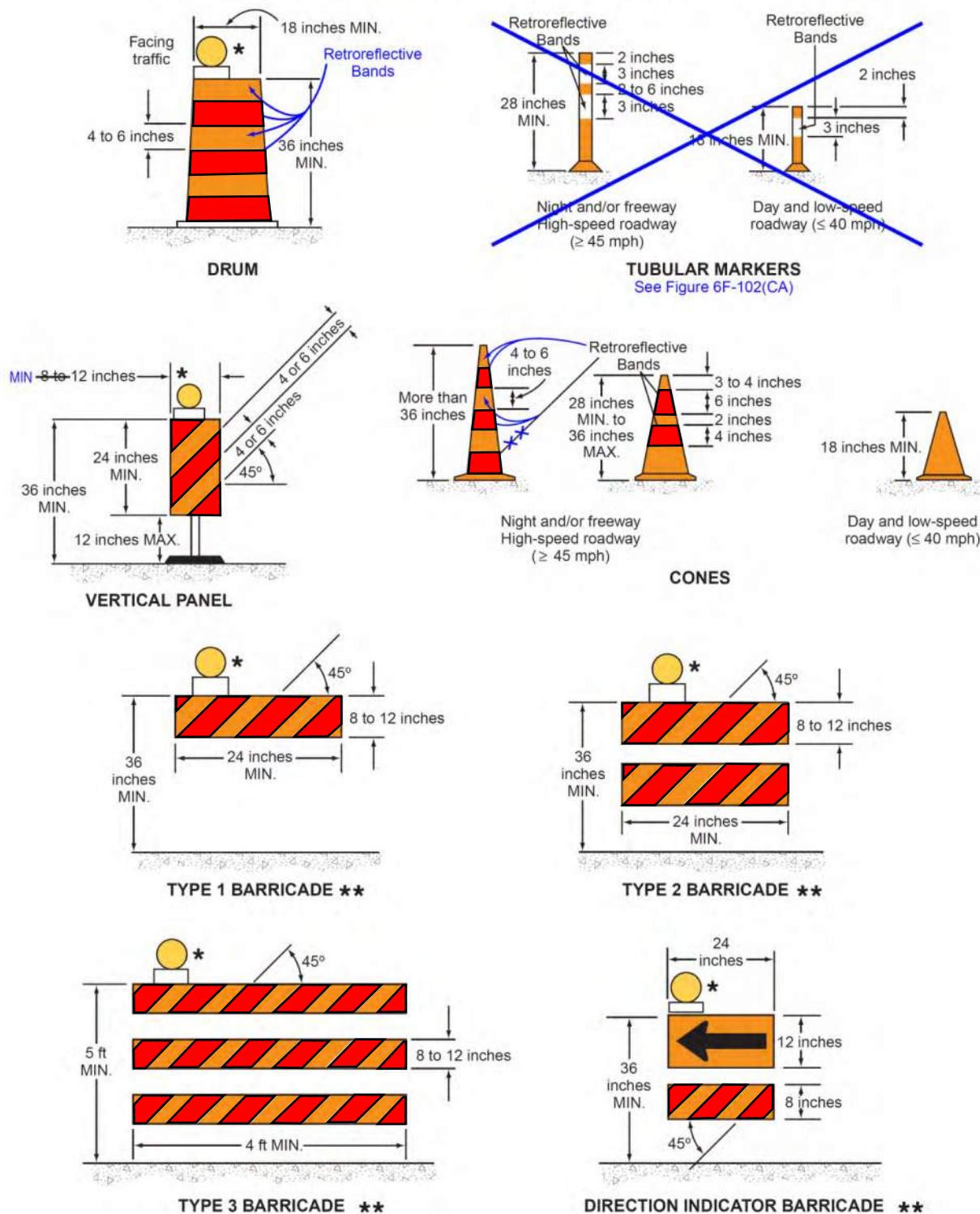
RED FOR LEFT BANDS/CHEVERON ROAD/LANE CLOSED

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Figure 6F-7. Channelizing Devices



* Warning lights (optional)

** Rail stripe widths shall be 6 inches, except that 4-inch wide stripes may be used if rail lengths are less than 36 inches. The sides of barricades facing traffic shall have retroreflective rail faces.