National Committee on
Uniform Traffic Control Devices

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National Committee on Uniform Traffic Control Devices (NCUTCD)
Recommended Changes to Proposed Text for 11th Edition of the MUTCD
Docket Number: FHWA-2020-0001

Federal Register Item Numbers: 467, 468, 469, 470
NPA MUTCD Section Number: Sections 6B.01 TO 6B.09
Legend: Base text shown in proposal is the NPA "clean" proposed text.

- NCUTCD recommendation for text to be added in final rule.
- ~~NCUTCD recommendation for text to be deleted in final rule~~.
- NCUTCD recommendation for text to be moved/relocated in final rule.
- NPA text that was not previously approved by NCUTCD but is now approved.
- Explanatory note: [Note that explains purpose of recommended change.]

The following pages present NCUTCD recommendations for changes to the MUTCD NPA proposed text, tables, and figures for Chapter 6B. Below is a short summary of the NCUTCD position for each section of this chapter. A more detailed summary is provided at the beginning of each section.

- NPA #467, Section 6B.01: Changes recommended based on Council action in spring 2021
- NPA #N/A, Section 6B.02: NCUTCD agrees with NPA content (no changes recommended)
- NPA #N/A, Section 6B.03: NCUTCD agrees with NPA content (no changes recommended)
- NPA #468, Section 6B.04: NCUTCD agrees with NPA content (no changes recommended)
- NPA #469, Section 6B.05: Changes recommended based on Council action in spring 2021
- NPA #N/A, Section 6B.06: NCUTCD agrees with NPA content (no changes recommended)
- NPA # N/A, Section 6B.07: NCUTCD agrees with NPA content (no changes recommended)
- NPA #470, Section 6B.08: NCUTCD agrees with NPA content (no changes recommended)
- NPA # N/A, Section 6B.09: Changes recommended based on Council action in spring 2021

CHAPTER 6B. TEMPORARY TRAFFIC CONTROL ELEMENTS

Section 6B.01 Comments: NCUTCD generally agrees with 6B.01, but recommends deleting the first Guidance paragraph recommending a TTC plan for "any activity". This could be interpreted as requiring a TTC plan for every possible planned or unplanned activity, which may be impractical and impact agency risk exposure.

Section 6B.01 Temporary Traffic Control Plans

Support:

Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, and cars), and road user speeds affect the needs of each zone.

The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.

A TTC plan describes TTC measures to be used for facilitating road users through a work zone or an incident area. TTC plans play a vital role in facilitating road user flow when a work zone, incident, or other event temporarily disrupts normal road user flow. Important auxiliary provisions that cannot conveniently be specified on project plans can easily be incorporated into Special Provisions within the TTC plan.

TTC plans range in scope from being very detailed to simply referencing typical drawings contained in this Manual, standard approved highway agency drawings and manuals, or specific drawings contained in the contract documents. The degree of detail in the TTC plan depends entirely on the nature and complexity of the situation.

During TTC activities, commercial vehicles might need to follow a different route from passenger vehicles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous materials might need to follow a different route from other vehicles. The Hazardous Materials and National Network signs are included in Sections 2B.72 and 2B.73, respectively.

Guidance:

~~*A TTC plan should be developed for any activity, either planned or unplanned, that will affect road users.*~~ [delete proposed Guidance]

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

TTC plans should be prepared by persons knowledgeable (for example, trained and/or certified) about the fundamental principles of TTC and work activities to be performed. The design, selection, and placement of TTC devices for a TTC plan should be based on engineering judgment.

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

Traffic control planning should be completed for all highway construction, utility work, maintenance operations, and incident management including minor maintenance and utility projects prior to occupying the TTC zone. Planning for all road users should be included in the process.

For any planned special event that will have an impact on the traffic on any street or highway, a TTC plan should be developed in conjunction with and be approved by the agency or agencies that have jurisdiction over the affected roadways.

Provisions for effective continuity of accessible circulation paths for pedestrians should be incorporated into the TTC plan.

Option:

Provisions may be incorporated into the project bid documents that enable contractors to develop an alternate TTC plan.

Modifications of TTC plans may be necessary because of changed conditions or a determination of better methods of safely and efficiently handling road users.

Guidance:

This alternate or modified plan should have the approval of the responsible highway agency or owner of site roadways open to public travel prior to implementation.

Provisions for effective continuity of transit service should be incorporated into the TTC planning process because often public transit buses cannot efficiently be detoured in the same manner as other vehicles (particularly for short-term maintenance projects). Where applicable, the TTC plan should provide for features such as accessible temporary bus stops, pull-outs, and satisfactory waiting areas for transit patrons, including persons with disabilities (see Section 8A.14 for additional light rail transit issues to consider for TTC).

Provisions for effective continuity of railroad service and acceptable access to abutting property owners and businesses should also be incorporated into the TTC planning process.

Reduced speed zoning (lowering the regulatory speed limit) should be avoided as much as practical because drivers will reduce their speeds only if they clearly perceive a need to do so.

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

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

Support:

Research has demonstrated that large reductions in the speed limit, such as a 30 mph reduction, increase speed variance and the potential for crashes. Smaller reductions in the speed limit of up to 10 mph cause smaller changes in speed variance and lessen the potential for increased crashes. A reduction in the regulatory speed limit of only up to 10 mph from the normal speed limit has been shown to be more effective.

Chapter 6P contains typical applications (TAs) of TTC zones that are organized according to duration, location, type of work, and highway type. Table 6P-1 is an index of these typical applications. These typical applications include the use of various TTC methods, but do not include a layout for every conceivable work situation.

Decisions regarding the selection of the most appropriate typical application to use as a guide for a specific TTC zone require an understanding of each situation. Although there are many ways of categorizing TTC zone applications, work duration, work location, work type, and highway type are used to characterize the typical applications illustrated in Chapter 6P.

Guidance:

Typical applications should be altered, when necessary, to fit the conditions of a particular TTC zone.

Option:

Other devices may be added to supplement the devices shown in the typical applications, while others may be deleted. The sign spacings and taper lengths may be increased to provide additional time or space for driver response.

Support:

Formulating specific plans for TTC at traffic incidents is difficult because of the variety of situations that can arise.

Well-designed TTC plans for planned special events will likely be developed from a combination of treatments from several of the typical applications.

Section 6B.02 Comments: NCUTCD agrees with 6B.02 as presented in the NPA.

Section 6B.02 Temporary Traffic Control Zones

Support:

A TTC zone is an area of a highway where road user conditions are changed because of a work zone, an incident zone, or a planned special event through the use of TTC devices, uniformed law enforcement officers, or other authorized personnel.

A work zone is an area of a highway with construction, maintenance, or utility work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles. It extends from the first warning sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to the END ROAD WORK sign or the last TTC device.

An incident zone is an area of a highway where temporary traffic controls are imposed by authorized officials in response to a traffic incident (see Section 6O.01). It extends from the first warning device (such as a sign, light, or cone) to the last TTC device or to a point where road users return to the original lane alignment and are clear of the incident.

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

Section 6B.03 Comments: NCUTCD agrees with 6B.03 as presented in the NPA.

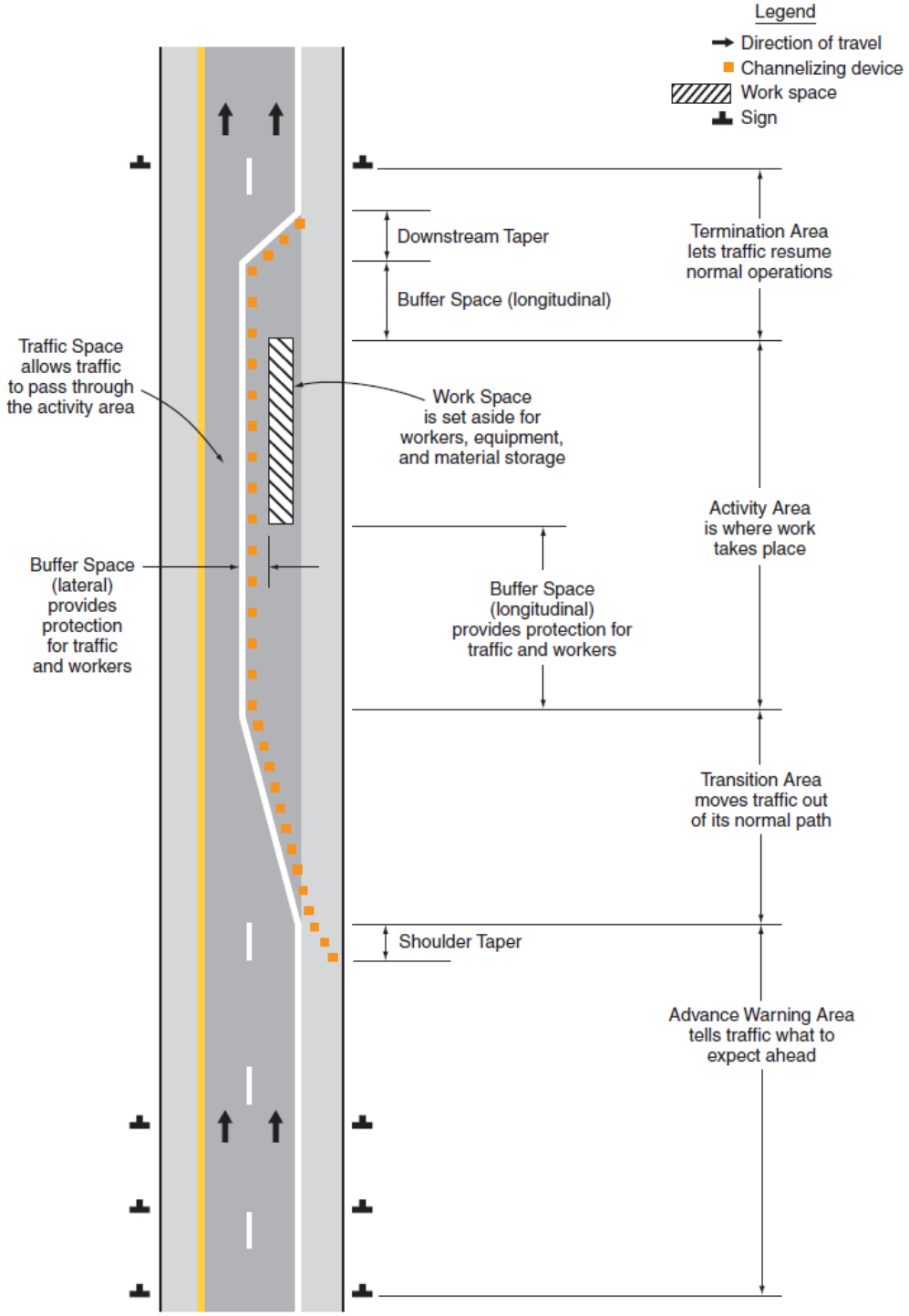
Section 6B.03 Components of Temporary Traffic Control Zones

Support:

A TTC zone is often divided into four areas as needed, based on engineering judgment: the advance warning area, the transition area, the activity area, and the termination area. Figure 6B-1 illustrates the four areas typically included in a TTC zone. These four areas are described in Sections 6B.04 through 6B.07.

Figure 6B-1 Comments: NCUTCD agrees with Figure 6B-1 as presented in the NPA.

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



Section 6B.04 Comments: NCUTCD agrees with 6B.04 as presented in the NPA.

Section 6B.04 Advance Warning Area

Support:

The advance warning area is the section of highway where road users are informed about the upcoming transition and activity areas or incident area.

Option:

The advance warning area may vary from a single sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to a series of signs in advance of the TTC zone activity area.

Guidance:

Typical distances for placement of advance warning signs on freeways and expressways should be longer because drivers are conditioned to uninterrupted flow. Therefore, the advance warning sign placement should extend on these facilities as far as 1/2 mile or more.

On urban streets, the effective placement of the nearest warning sign to the TTC zone, in feet, should range from 4 to 8 times the speed limit in mph, with the high end of the range being used when speeds are relatively high. When two or more advance warning signs are used on higher-speed streets, such as major arterials, the advance warning area should extend a greater distance (see Table 6B-1).

Option:

When a single advance warning sign is used (in cases such as low-speed residential streets), the advance warning area may be as short as 100 feet.

Guidance:

Since rural highways are normally characterized by higher speeds, the effective placement of the first warning sign in feet should be substantially longer—from 8 to 12 times the speed limit in mph. Since two or more advance warning signs are normally used for these conditions, the advance warning area should extend 1,500 feet or more for open highway conditions (see Table 6B-1).

The distances contained in Table 6B-1 are approximate, are intended for guidance purposes only, and should be applied with engineering judgment. These distances should be adjusted for field conditions, if necessary, by increasing or decreasing the recommended distances.

Support:

The need to provide additional reaction time for a condition is one example of justification for increasing the sign spacing. Conversely, decreasing the sign spacing might be justified in order to place a sign immediately downstream of an intersection or major driveway such that traffic turning onto the roadway in the direction of the TTC zone will be warned of the upcoming condition.

Option:

Advance warning may be eliminated when the activity area is sufficiently removed from the road users' path so that it does not interfere with the normal flow.

Table 6B-1 Comments: NCUTCD agrees with Table 6B-1 as presented in the NPA.

Table 6B-1. Recommended Advance Warning Sign Minimum Spacing

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

* Speed category to be determined by the highway agency or owner of site roadways open to public travel.

** The column headings A, B, and C are the dimensions shown in Figures 6P-1 through 6P-54. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Section 6B.05 Comments: NCUTCD generally agrees with 6B.05, but recommends editing the Standard for clarity. The reference to "short-term" is inappropriate in this section as the Option statement provides an exception for mobile operations. In addition, the traffic control devices listed in the Standard do not include all the devices that may be used to direct road users out of their normal path.

Section 6B.05 Transition Area

Support:

The transition area is that section of highway where road users are redirected out of their normal path.

Transition areas usually involve strategic use of tapers, which because of their importance are discussed separately in detail.

Standard:

When redirection of the road users' normal path is required, they shall be directed from the normal path to a new path with appropriate traffic control devices and/or methods. ~~**signs, arrow boards, and/or channelizing devices, except for short-term or mobile operations.**~~ [edit for clarity]

Option:

Because it is impractical in mobile operations to redirect the road users' normal path with stationary channelization, more dominant vehicle-mounted traffic control devices, such as arrow boards, portable changeable message signs, and high-intensity rotating, flashing, oscillating, or strobe lights, may be used instead of channelizing devices to establish a transition area.

Section 6B.06 Comments: NCUTCD agrees with 6B.06 as presented in the NPA.

Section 6B.06 Activity Area

Support:

The activity area is the section of the highway where the work activity takes place. It is comprised of the work space, the traffic space, and the buffer space.

The work space is that portion of the highway closed to road users and set aside for workers, equipment, and material, and a shadow vehicle if one is used upstream. Work spaces are usually delineated for road users by channelizing devices or, to exclude vehicles and pedestrians, by temporary barriers.

Option:

The work space may be stationary or may move as work progresses.

Guidance:

Since there might be several work spaces (some even separated by several miles) within the project limits, each work space should be adequately signed to inform road users and reduce confusion.

Support:

The traffic space is the portion of the highway in which road users are routed through the activity area.

The buffer space is a lateral and/or longitudinal area that separates road user flow from the work space or an unsafe area, and might provide some recovery space for an errant vehicle.

Guidance:

Neither work activity nor storage of equipment, vehicles, or material should occur within a buffer space.

Option:

Buffer spaces may be positioned either longitudinally or laterally with respect to the direction of road user flow. The activity area may contain one or more lateral or longitudinal buffer spaces.

A longitudinal buffer space may be placed in advance of a work space.

The longitudinal buffer space may also be used to separate opposing road user flows that use portions of the same traffic lane, as shown in Figure 6B-2.

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

Support:

Typically, the buffer space is formed as a traffic island and defined by channelizing devices.

When a shadow vehicle, arrow board, or changeable message sign is placed in a closed lane in advance of a work space, only the area upstream of the vehicle, arrow board, or changeable message sign constitutes the buffer space.

Option:

The lateral buffer space may be used to separate the traffic space from the work space, as shown in Figures 6B-1 and 6B-2, or such areas as excavations or pavement-edge drop-offs. A lateral buffer space also may be used between two travel lanes, especially those carrying opposing flows.

Guidance:

The width of a lateral buffer space should be determined by engineering judgment.

Option:

When work occurs on a high-volume, highly congested facility, a vehicle storage or staging space may be provided for incident response and emergency vehicles (for example, tow trucks and fire apparatus) so that these vehicles can respond quickly to road user incidents.

Table 6B-2 Comments: NCUTCD agrees with Table 6B-2 as presented in the NPA.

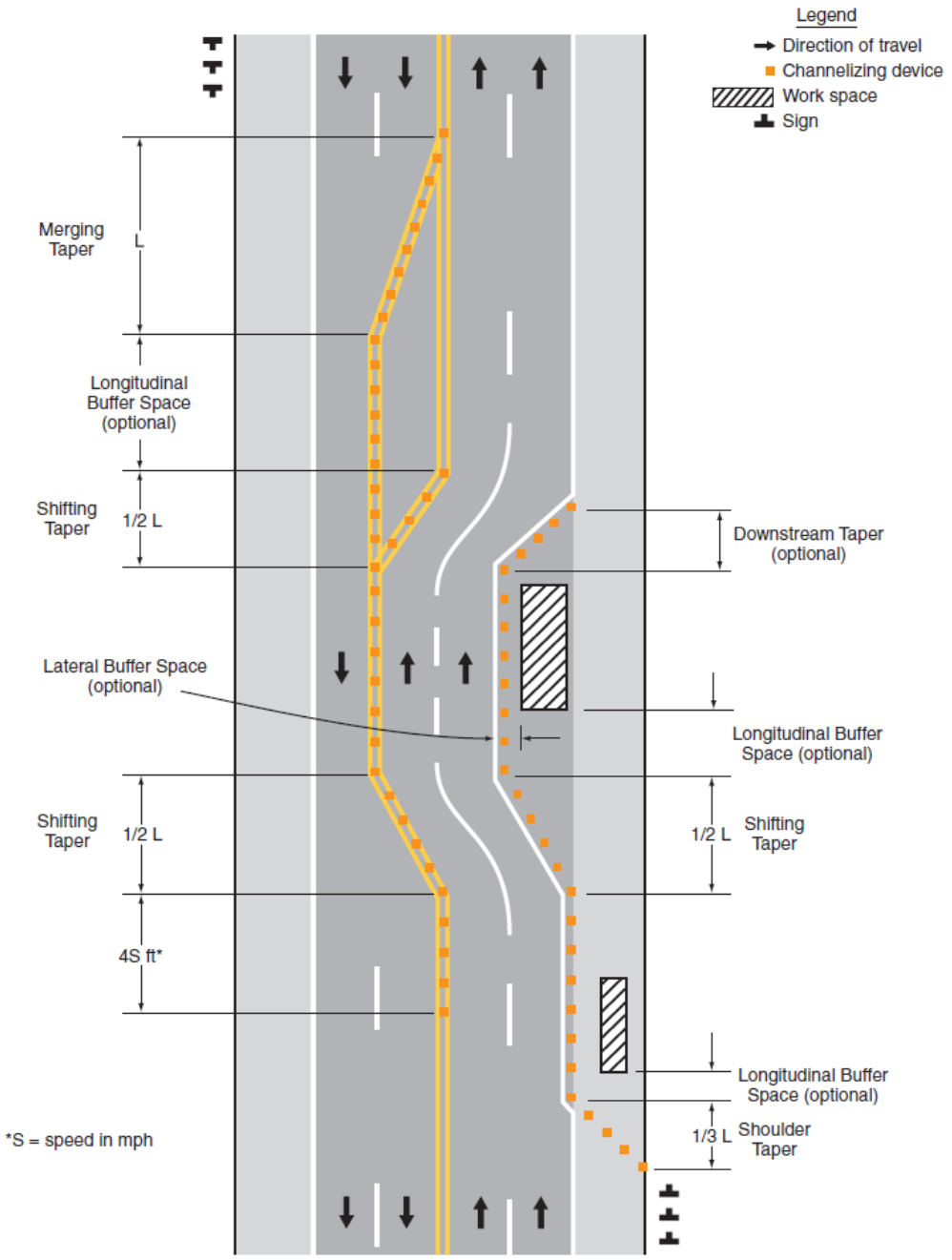
Table 6B-2. Stopping Sight Distance as a Function of Speed

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

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

Figure 6B-2 Comments: NCUTCD agrees with Figure 6B-2 as presented in the NPA.

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



Section 6B.07 Comments: NCUTCD agrees with 6B.07 as presented in the NPA.

Section 6B.07 Termination Area

Support:

The termination area is the section of the highway where road users are returned to their normal driving path. The termination area extends from the downstream end of the work area to the last TTC device such as END ROAD WORK signs, if posted.

Option:

An END ROAD WORK sign, a Speed Limit sign, or other signs may be used to inform road users that they can resume normal operations.

A longitudinal buffer space may be used between the work space and the beginning of the downstream taper.

Section 6B.08 Comments: NCUTCD agrees with 6B.08 as presented in the NPA.

Section 6B.08 Tapers

Option:

Tapers may be used in both the transition and termination areas. Whenever tapers are to be used in close proximity to an interchange ramp, crossroads, curves, or other influencing factors, the length of the tapers may be adjusted.

Support:

Tapers are created by using a series of channelizing devices and/or pavement markings to move traffic out of or into the normal path. Types of tapers are shown in Figure 6B-2.

Longer tapers are not necessarily better than shorter tapers (particularly in urban areas with characteristics such as short block lengths or driveways) because extended tapers tend to encourage sluggish operation and to encourage drivers to delay lane changes unnecessarily. The test concerning adequate lengths of tapers involves observation of driver performance after TTC plans are put into effect.

Guidance:

The appropriate taper length (L) should be determined using the criteria shown in Tables 6B-3 and 6B-4.

Support:

A merging taper requires the longest distance because drivers are required to merge into common road space.

Guidance:

A merging taper should be long enough to enable merging drivers to have adequate advance warning and sufficient length to adjust their speeds and merge into an adjacent lane before the downstream end of the transition.

Support:

A shifting taper is used when a lateral shift is needed. When more space is available, a longer than minimum taper distance can be beneficial. Changes in alignment can also be accomplished by using horizontal curves designed for normal highway speeds.

Guidance:

A shifting taper should have a length of approximately ½ L (see Tables 6B-3 and 6B-4).

Support:

A shoulder taper might be beneficial on a high-speed roadway where shoulders are part of the activity area and are closed, or when improved shoulders might be mistaken as a driving lane. In these instances, the same type, but abbreviated, closure procedures used on a normal portion of the roadway can be used.

Guidance:

If used, shoulder tapers should have a length of approximately 1/3 L (see Tables 6B-3 and 6B-4). If a shoulder is used as a travel lane, either through practice or during a TTC activity, a normal merging or shifting taper should be used.

Support:

A downstream taper might be useful in termination areas to provide a visual cue to the driver that access is available back into the original lane or path that was closed.

Guidance:

If used, a downstream taper should have a minimum length of 50 feet and a maximum length of 100 feet with devices placed at a spacing of approximately 20 feet.

Support:

The one-lane, two-way taper is used in advance of an activity area that occupies part of a two-way roadway in such a way that a portion of the road is used alternately by traffic in each direction.

Guidance:

A taper having a minimum length of 50 feet and a maximum length of 100 feet with channelizing devices at approximately 20-foot spacing should be used to guide traffic into the one-lane section, and a downstream taper should be used to guide traffic back into their original lane.

Support:

An example of a one-lane, two-way traffic taper is shown in Figure 6B-3.

Figure 6B-3 Comments: NCUTCD agrees with Figure 6B-3 as presented in the NPA.

Figure 6B-3. Example of a One-Lane, Two-Way Traffic Taper

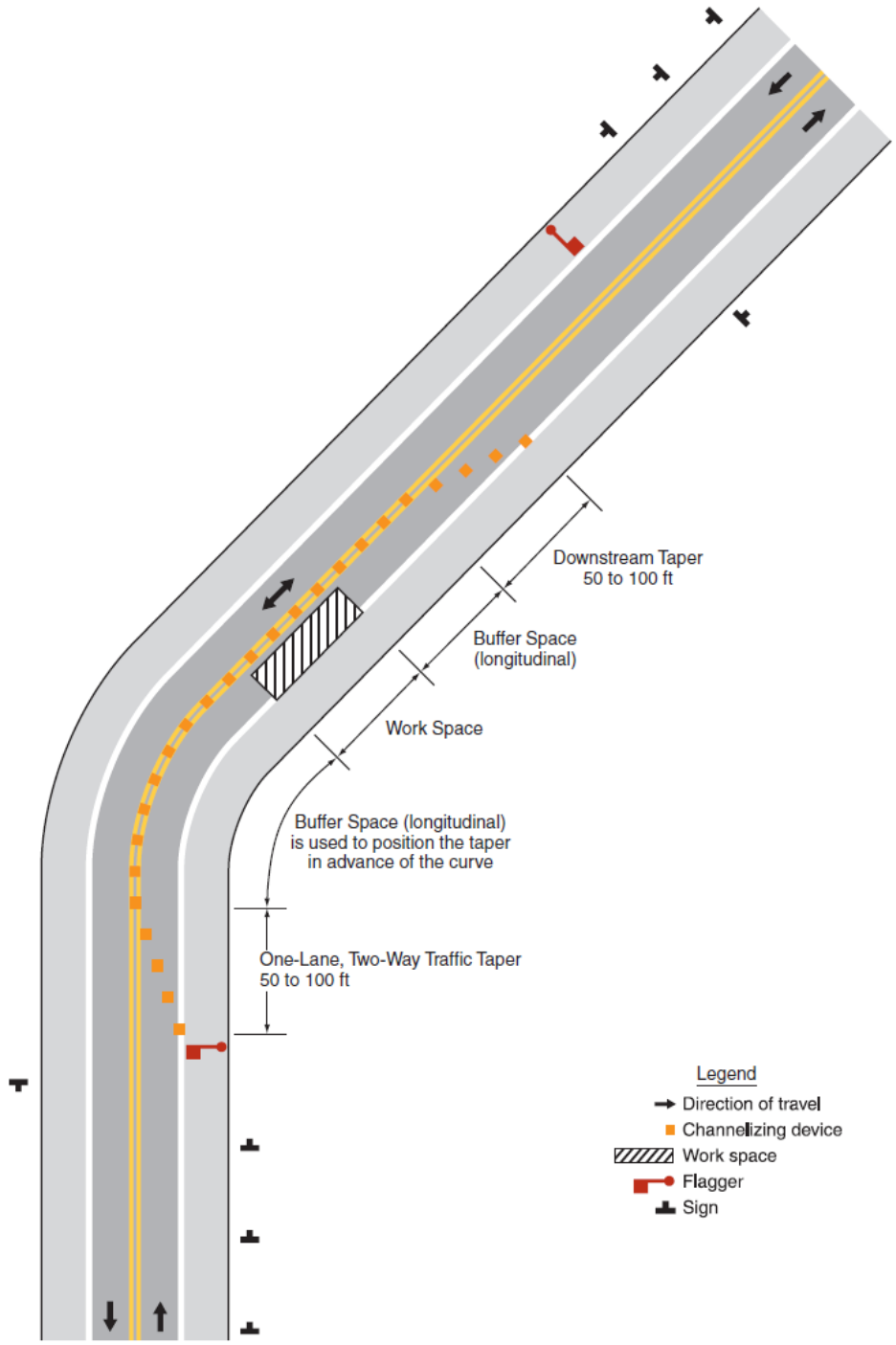


Table 6B-3 Comments: NCUTCD agrees with Table 6B-3 as presented in the NPA.

Table 6B-3. Taper Length Criteria for Temporary Traffic Control Zones

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

Note: Use Table 6B-4 to calculate L

Table 6B-4 Comments: NCUTCD agrees with Table 6B-4 as presented in the NPA.

Table 6B-4. Formulas for Determining Taper Length

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

Where: L = taper length in feet
W = width of offset in feet
S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

Section 6B.09 Comments: NCUTCD agrees with 6B.09 as presented in the NPA; however, the two Support statements seem to be definitions, and if so should be relocated appropriately and reassigned to Standard status.

Section 6B.09 Detours and Diversions

Support:

A detour is a temporary rerouting of road users onto an existing highway in order to avoid a TTC zone.

Guidance:

Detours should be clearly signed over their entire length so that road users can easily use existing highways to return to the original highway.

Support:

A diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area.