

CHAPTER 4B. TRAFFIC CONTROL SIGNALS — GENERAL

Section 4B.01 General

Support:

- 01 Words such as pedestrians and bicyclists are used redundantly in selected Sections of Part 4 to encourage sensitivity to these elements of “traffic.”
- 02 Standards for traffic control signals are important because traffic control signals need to attract the attention of a variety of road users, including those who are older, those with vision disabilities, as well as those who are fatigued or distracted, or who are not expecting to encounter a signal at a particular location.

Section 4B.02 Advantages and Disadvantages of Traffic Control Signals

Support:

- 01 When properly used, traffic control signals are valuable devices for safety and the control of vehicular and vulnerable road user traffic. They control the various traffic movements by alternating between directing them to stop and permitting them to proceed and thereby profoundly influence traffic flow. This accomplishes the need to safely separate road users in time in order to prevent crashes.
- 02 Traffic control signals that are properly designed, located, operated, and maintained will have one or more of the following advantages:
 - A. They reduce the frequency and severity of certain types of crashes, especially right-angle collisions and those involving vulnerable road users.
 - B. They provide for the orderly movement of traffic.
 - C. They increase the traffic-handling capacity of the intersection if:
 - 1. Proper physical layouts and control measures are used, and
 - 2. The signal operational parameters are reviewed and updated (if needed) on a regular basis (as engineering judgment determines that significant traffic flow and/or land use changes have occurred) to maximize the ability of the traffic control signal to satisfy current traffic demands.
 - D. They are coordinated to provide for continuous or nearly-continuous movement of traffic at a definite speed along a given route under favorable conditions.
 - E. They are used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.
- 03 Traffic control signals are often considered a panacea for all traffic problems at intersections. This belief has led to traffic control signals being installed at many locations where they are not needed, adversely affecting the safety and efficiency of motor vehicle, bicycle, and pedestrian traffic.
- 04 Traffic control signals, even when justified by traffic and roadway conditions, can be ill-designed, ineffectively placed, improperly operated, or poorly maintained. Improper or unjustified traffic control signals can result in one or more of the following disadvantages:
 - A. Excessive delay,
 - B. Excessive disobedience of the signal indications,
 - C. Increased use of less-adequate routes as road users attempt to avoid the traffic control signals, and
 - D. Significant increases in the frequency of collisions (especially rear-end collisions).

Section 4B.03 Alternatives to Traffic Control Signals

Guidance:

- 01 *Since road user delay and the frequency of some types of crashes are sometimes higher under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals even if one or more of the signal warrants (see Chapter 4C) has been satisfied.*
- Option:

- 02 These alternatives may include, but are not limited to, the following:
 - A. Installing signs along the major street to warn road users approaching the intersection;
 - B. Installing a roundabout to reduce fatal and serious injury crashes and vehicular conflicts that result in fatal and serious injury crashes (see Section 8A.12 if the location is in close proximity to a grade crossing);
 - C. Installing a pedestrian hybrid beacon (see Chapter 4J), rectangular rapid flashing beacons (see Chapter 4L), pedestrian-actuated Warning Beacons (see Chapter 4S), or In-Roadway Warning Lights (see Chapter 4U) if

pedestrian safety is the major concern;

- D. Relocating the stop line(s) and making other changes to improve the sight distance at the intersection;
- E. Installing measures designed to reduce speeds on the approaches;
- F. Installing a flashing beacon at the intersection to supplement STOP sign control;
- G. Installing flashing beacons on warning signs in advance of a stop-controlled intersection on the major- street and/or minor-street approaches;
- H. Adding one or more lanes on a minor-street approach to reduce the number of vehicles per lane on the approach;
- I. Revising the geometrics at the intersection to channelize vehicular movements and reduce the time required for a vehicle to complete a movement, which could also assist pedestrians;
- J. Revising the geometrics at the intersection to add pedestrian median refuge islands and/or curb extensions;
- K. Installing roadway lighting if a disproportionate number of crashes occur at night;
- L. Restricting one or more turning movements, perhaps on a time-of-day basis, if alternate routes are available;
- M. If the warrant is satisfied, installing multi-way stop control;
- N. Employing other alternatives, depending on conditions at the intersection.

Section 4B.04 Basis of Installation of Traffic Control Signals

Support:

- 01 A careful analysis of traffic operations, pedestrian and bicyclist needs, and other factors at a large number of signalized and unsignalized locations, coupled with engineering judgment, has provided a series of signal warrants, described in Chapter 4C, that define the minimum conditions under which installing traffic control signals might be justified.

Guidance:

- 02 *The design (including the phasing, operation, and timing) of new traffic control signals should be based on an engineering study of roadway, traffic, and other conditions.*

Section 4B.05 Basis of Removal of Traffic Control Signals

Guidance:

- 01 *Engineering judgment should be applied in the review of operating traffic control signals to determine whether the type of installation and the timing program meet the current requirements of all forms of traffic.*
- 02 *If changes in traffic patterns eliminate the need for a traffic control signal, consideration should be given to removing it and replacing it with appropriate alternative traffic control devices, if any are needed.*
- 03 *If the engineering study indicates that the traffic control signal is no longer justified, and a decision is made to remove the signal, the removal should be accomplished using the following steps:*
- A. *Determine the appropriate traffic control to be used after the removal of the signal.*
 - B. *Remove any sight-distance restrictions as necessary.*
 - C. *Inform the public of the removal study.*
 - D. *Flash or cover the signal heads for a minimum of 90 days, and install the appropriate STOP sign control or other traffic control devices.*
 - E. *Remove the signal if the engineering data collected during the removal study period confirms that the signal is no longer needed.*

Option:

- 04 Because Items C, D, and E in Paragraph 3 of this Section are not relevant when a temporary traffic control signal (see Section 4D.11) is removed, a temporary traffic control signal may be removed immediately after Items A and B are completed.
- 05 Instead of total removal of a traffic control signal, the poles, controller cabinet, and cables may remain in place after removal of the signal heads for continued analysis.

Standard:

- 06 **Once a traffic signal at an intersection or pedestrian crossing has been energized, it shall not be turned off unless arrangements have been made for temporary control by traffic officers, temporary stop signs or an approved temporary signal.**

Section 4B.101(CA) Modifications of Existing Signals

Support:

- 01 Where existing signals are to be modified, construction plans need to include a separate plan of the existing system as well as a plan showing the modifications.

Option:

- 02 It may also be necessary to include a tabulation on the plan showing such appurtenances as backplates and special signal faces that may be difficult to discern on a complicated plan.

Guidance:

- 03 *The design of any signal modification project should include adequate consideration for keeping the existing signals in operation while the modification work is being done.*