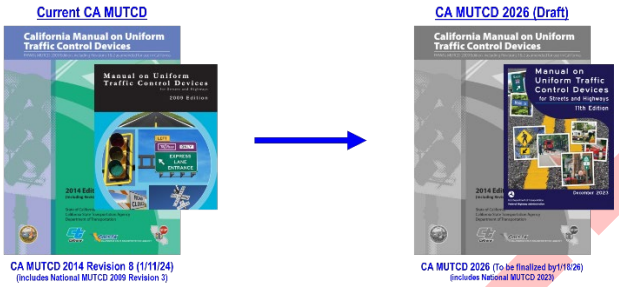
California MUTCD 2026 (Draft)

(FHWA's National MUTCD 2023 - As Amended for use in California)



The National MUTCD 2023 is published by Federal Highway Administration's (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. On December 19, 2023, a Final Rule adopting the National MUTCD 2023 was published in the Federal Register with an effective date of January 18, 2024. States must adopt the National MUTCD as their legal State standard for traffic control devices within two years from the effective date.

Caltrans began the process to review National MUTCD 2023 for adoption in California by soliciting CA MUTCD practitioners statewide to form Subject Matter Expert (SME) Workgroups based on the individual Parts of the MUTCD.

This document has been prepared by Caltrans as an initial draft to revise current California MUTCD to be in substantial conformance with FHWA's National MUTCD 2023 (11th Edition). This document was developed pursuant to SME Workgroup members review of their respective MUTCD part in the weekly/bi-weekly meetings, when comparing the new National MUTCD 2023 with California revised contents of the National MUTCD 2009 (10th Edition) in the current CA MUTCD 2014 Revision 8. The SME Workgroup meeting reviews and discussions focused on assessing potential impacts of adopting these National MUTCD 2023 changes in California and provided comments and recommendations to Caltrans, which were used by Caltrans to finalize this draft document.

This draft document is now being shared with the traffic control device practitioners in California for review and open to the public to provide comments. All comments received will be discussed with the respective SME Workgroup members for resolution and response, as appropriate, and will be used to prepare the final draft. The final draft will then be prepared as an agenda item for the California Traffic Control Devices Committee (CTCDC) meeting (public hearing) and made open to public for review and comment, using CTCDC established process and in compliance with California Vehicle Code (CVC) 21400 provisions.

This document combines the National MUTCD 2023 and current California MUTCD 2014 Revision 8 (effective January 11, 2024). Though every effort has been made by Caltrans to ensure accuracy of this document, the inherent variances between National MUTCD and California MUTCD, along with moving of contents and reorganization undertaken by FHWA in the National MUTCD 2023, there may be unintentional errors or omissions in this document or some contents may have been overlooked.

The official versions of the National MUTCD 2023 and California MUTCD 2014 Revision 8 are available on the following websites:

- National MUTCD 2023 - https://mutcd.fhwa.dot.gov/
- California MUTCD 2014 Revision 8 - https://dot.ca.gov/programs/safety-programs/camutcd

This document uses the current California MUTCD format, which is similar to the National MUTCD format. It incorporates National MUTCD in its entirety and explicitly shows which portions thereof are applicable or not applicable in California as follows:

- **Unedited black text** - The unedited National MUTCD text is shown in "Times New Roman" font and black color
- ~~**Strikethrough black text**~~ - Text portions of the National MUTCD content that are not applicable in California are shown with a strikethrough of the black text and a blue margin line on the right side.
- **Blue text** - The California text additions, including new paragraphs, and enhancements are incorporated into the combined document at appropriate locations and shown in "Arial Narrow" font and blue color with a blue margin line on the right side.
- **California topics with no corresponding National MUTCD section** – Sections are given a number that begins with number 101 and increases in sequence, followed with a "(CA)" to indicate that this is a California created section.

PART 5

TRAFFIC CONTROL DEVICE CONSIDERATIONS FOR AUTOMATED VEHICLES

CHAPTER 5A. GENERAL

Section 5A.01 Scope and Purpose

Support:

01 The ~~scope of the~~ provisions in this Part are intended for consideration of traffic control devices ~~that are~~ specifically being designed to accommodate automated vehicles capable of performing partial or full real-time operational functions in general traffic on a sustained basis. ~~This Part does not require agencies to use these provisions in their accommodation of automated vehicles on their roadways. Rather, the~~ The purpose of these provisions is to provide agencies with general considerations and guidance for traffic control devices that can be more helpful in the accommodation of such vehicles, while at the same time being more beneficial to road users.

02 It is important for early implementers of automated vehicles to understand the ramifications of traffic control devices in a mixed fleet environment and to consider the needs of both human and machine-led road users. Partial automation technologies are already commercially available in the vehicle fleet and are operating under current infrastructure conditions. The overall effectiveness of the automation is ~~impacted~~ affected by the uniformity and consistent application of the highway infrastructure, including traffic control devices.

03 This Chapter ~~provides an overview of~~ summarizes foundational driving automation system (see definition in Section 5A.03) technology terminology, key principles, considerations for traffic control device selection, and topics for agencies to consider. The MUTCD does ~~not address~~ not deal with standardization of digital infrastructure, geometric road design, traffic control device maintenance levels, minimum pavement conditions, or other items that might be important for safe and effective operation of driving automation system technologies.

Section 5A.02 Overview of Automated Vehicles and Connected Vehicles

Support:

01 Driving automation system technology automates some or all aspects of the driving tasks to assist or replace the human driver and can include driver assistance technology generally known as advanced driver assistance systems (ADAS). Automated vehicles (AVs) are vehicles in which at least one element of vehicle control (such as steering, speed control, or braking) occurs without direct human driver input. AVs function by gathering information from a suite of sensors that can include, but are not limited to:

A. Cameras,
B. Radar,
C. Light detection and ranging (LiDAR),
D. Ultrasonic, and
E. Infrared.

02 AVs can combine sensor data with other inputs including detailed map data and information from other connected vehicles or infrastructure. AVs might ~~be able to~~ detect and classify objects in their surroundings and might predict how they are likely to behave.

03 Connected vehicle technology enables cars, buses, trucks, trains, roads, and roadside infrastructure, as well as other devices such as cellular telephones, to communicate with one another. Connected vehicle technology enabling vehicles to communicate with each other is known as vehicle-to-vehicle (V2V). Connected vehicle technology enabling vehicles to communicate with infrastructure is known as vehicle-to-infrastructure (V2I). Connected vehicle technology enables equipped vehicles on the road to be aware of the location and status of other nearby equipped vehicles or devices. Road users could receive notifications and alerts of dangerous situations, such as a vehicle ~~that is~~ about to run a red traffic signal as it nears an intersection, or an oncoming car, that is out of sight beyond a curve swerving into the opposing lane to avoid an object on the road.

Section 5A.03 Definitions and Terms

Support:

01 The definitions and terms ~~shown~~ in Items A through G below, which are found in the Society of Automotive Engineers standard SAE J3016 and other sources, are used extensively in automated vehicle technology. Their definitions, which are summarized below for reference and for use with ~~the provisions of~~ this Manual, are as follows:

A. Advanced Driver Assistance Systems (ADAS) – Electronic systems that aid a vehicle driver with one or more driving tasks while driving. They are intended to increase the safe operation of a vehicle and include applications such as automatic braking, lane keeping assistance, adaptive cruise control, and others.
B. Automated Driving System (ADS) – The hardware and software ~~that are~~ collectively capable of performing the entire Dynamic Driving Task (DDT) on a sustained basis, ~~regardless of whether~~ even if it is limited to a specific Operational Design Domain (ODD); this term is used specifically to describe a Level 3, 4, or 5 driving automation system.
C. Automation Levels – The levels of automation ~~that are~~ described in Table 5A-1.
D. Cooperative Automation – Technology that enables communication with other vehicles and the infrastructure to coordinate automated vehicle operation.
E. Driving Automation System – The hardware and software ~~that are~~ collectively capable of performing part or all of the DDT on a sustained basis; this term is used generically to describe any system capable of Levels 1 through 5 driving automation.
F. Dynamic Driving Task (DDT) – ~~All of the~~ The real-time operational and tactical functions required to operate a vehicle in on-road traffic, excluding the strategic functions such as trip scheduling and selection of destinations and waypoints.
G. Operational Design Domain (ODD) – Operating conditions under which a ~~given~~ driving automation system or feature ~~thereof~~ of it is specifically designed to function, including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway ~~characteristics~~ features.

Section 5A.04 Traffic Control Device Design and Use Considerations

Support:

01 The interaction of traffic control devices with driving automation systems can create many challenges for agencies in determining traffic control device selection and application. The lack of tolerance of driving automation systems for non-uniformity in traffic control device design and application is a limiting factor of current driving automation system sophistication. This is because driving automation systems have a limited ability to interpolate across gaps in traffic control device cues to the vehicle in ~~the following~~ these types of situations:

A. The driving automation system technology's ability to adapt to existing traffic control device design and typical quality, such as the refresh rates of electronic changeable message sign displays or the overall quality of a device that has ~~been in service~~ operated on the roadway for many years;
B. The color perception of signs;
C. The electronically perceptible conspicuity and contrast of markings in different environments and lighting conditions;
D. The driving automation system camera technology and device photometric characteristics in interpreting various types of traffic signals
E. The ability to discern and comprehend temporary traffic control devices and their varying applications, such as active electronic display devices or flaggers; and
F. The ability to decipher traffic control at highway-rail or highway-LRT grade crossings, especially at passive grade crossings.

02 These and other challenges might limit the functionality of driving automation systems, thus making them less effective or functional, with potential implications for safety and traffic operations. The uniform design and consistent application of standardized traffic control devices supports the functionality of driving automation system technology in many situations. Similarly, ~~good~~ proper traffic control device maintenance practices and programs will help improve the potential for driving automation systems to operate properly in many roadway environments.

Guidance:

03 *Agencies should adopt traffic control device maintenance policies and or practices with consideration to both the human driver and driving automation system technology needs (see Sections 1D.10, 2A.19, 3A.05 and 4A.10).*

04 *Engineering judgment (see Section 1D.03) used to determine traffic control device selection and placement should consider uniformity in application and location needed to support both the human driver and driving automation system technology.*

Support:

05 A systematic approach to traffic control device selection, application, and maintenance ~~taking into consideration~~ considering certain fundamental principles, will help agencies considering the inclusion of Avs on their roadways. Generally, improvements to traffic control device uniformity and improved maintenance policies and practices that keep traffic control devices in good working order with high levels of conspicuity that are beneficial to the human driver will be beneficial to AVs as well.

Guidance:

06 *When feasible, ~~Agencies~~ agencies should apply the following fundamental principles and considerations as they evaluate traffic control devices and other maintenance practices to support driving automation system technologies during maintenance and infrastructure improvements:*

- *A. Apply~~ing~~ uniform and consistent traffic control devices on each type of roadway, and applying a similar approach to traffic control at similar locations in similar situations.*
- *B. Establish~~ing~~ maintenance policies that incorporate effective practices to identify and then fix or replace in a ~~timely~~ reasonably prompt manner any traffic control device ~~that is~~ reaching the end of its useful life, or that is damaged or otherwise no longer serviceable.*
- *C. Based on engineering judgment, determine ~~Making sure~~ that temporary and/or emergency traffic control, ~~to the extent practicable~~, devices are ~~is~~ planned in advance ~~using devices~~ that comply with the provisions of this Manual and that follow policies designed to provide uniformity throughout the site and across jurisdictions.*
- *D. Consider removing ~~Removing~~ extraneous devices that are no longer necessary or that provide limited benefit to vehicle operation or navigation.*