



COLORADO
Department of Transportation

COLORADO DEPARTMENT OF TRANSPORTATION



Bus Rapid Transit Signing and Markings Design Guide

2025

ACKNOWLEDGEMENTS

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Bus Rapid Transit Design Guide

Introduction

The State of Colorado's growth has increased the need to meet mobility, environmental, and energy demands on public transit systems. Bus Rapid Transit (BRT) systems provide Coloradans with more reliable, convenient, and faster travel times than traditional bus service. This guide supplements CDOT Standard and Specifications.

Purpose

The Bus Rapid Transit Design Guide is a collection of recommendations based on the latest research from varied sources to meet Colorado's specific needs. The goal is to standardize design variances with the implementation of BRT systems across the state.

BRT Warrant

An engineering study shall be performed, including an environmental review and a preliminary design phase, to implement a BRT system on state highways.

ADA/PROWAG Requirements

The [Accessibility Guidelines for Pedestrian Facilities in the Public Right of Way](#) (PROWAG) shall be the minimum enforceable guidelines for pedestrian access routes associated with Bus Rapid Transit. Newly constructed facilities, added facilities, and altered facilities are subject to full compliance with PROWAG. Altered facilities are defined as a change to or an addition of a pedestrian facility in an existing developed public right-of-way that affects or could affect pedestrian access, circulation, or usability. This means that any altered portion of a pedestrian facility is expected to comply with all technical requirements to the maximum extent feasible. In some cases, the combination of several maintenance treatments occurring at or near the same time may qualify as an alteration, as defined in PD 605.1 "ADA Accessibility Requirements in CDOT Transportation Projects".

Signing

Typical sign installation shall comply with the 11th edition MUTCD, CDOT Standards and Specifications, and DS-627-3 "BRT Pavement Markings". Refer to Table 1 for Standard Colorado Sign Codes and Sizes.

- Bus lane signage shall conform to the 11th edition MUTCD Chapter 2G.
- Signage shall be clearly visible and vegetation should be managed.
- Signage for bus queue jump and shared right turn lanes shall follow DS-627-3 typical applications.
- Bus Lane Ahead (R3-12f) and Bus Lane Ends (R3-12g) shall be placed at the start and end of each busway. Preferential lane operation (R3-11) series signage should be installed after each major intersection. Additional preferential lane operation signs, post mounted (R3-11) or overhead (R3-14), should be provided

along the length of the preferential lane. The placement of additional signs is determined by posted speed limits, existing traffic control devices, and engineering judgement.

- The HOV diamond symbol shall not be used on the bus or bicycle Preferential Lane Signs and is reserved exclusively to indicate particular occupancy requirements only.
- To avoid wrong way entry and roadway user error crashes, each busway intersection shall be signed to inform road users of proper lane use. The minimum signage required for each intersection is based on engineering judgement.
- All Sign Design Variance shall be approved by Region Traffic.

Table 1. BRT Sign Codes and Sizes

Sign or Plaque	Sign Code	Conventional Road		Expressway
		Single Lane	Multi-Lane	
Right Lane Must Turn Right	R3-7R	30 x 30	36 x 36	48 x 48
Except Buses	R3-7aP	24 x 12	24 x 12	-
Buses and Right Turns Only	R3-11(q)(r)_CO	30 x 36	30 x 36	36 x 48
Begin Right Turn Lane	R3-20R	24 x 36	24 x 36	-
No Turn On Red	R10-11	24 x 30	24 x 30	-
No Left Turns	R3-2	24 x 24	36 x 36	36 x 36
Do Not Enter	R5-1	30 x 30	36 x 36	36 x 36
Buses Only Arrow Overhead	R3-11(o)_CO	30 x 36	30 x 36	-
Three Lane Control	R3-8a	Varies x 30	Varies x 30	-
Two Lane Control	R3-8	Varies x 30	Varies x 30	-
Emergency Snow Street	R7-203	18 x 24	18 x 24	-
Truck No U-Turns	R3-4	24x24	36 x 36	36 x 36
Keep Right	R4-7	24 x 30	24 x 30	36 x 48

Pavement Markings

Materials used shall be selected from Colorado's approved products list and should follow the respective Region's pavement markings selection guide. Typical BRT pavement markings shall comply with DS-627-3 "BRT Pavement Markings", S-627-1, 11th edition MUTCD Chapter 3E, and related specifications.

Red-Colored Pavement Markings

- Full length red-colored pavement shall not be installed on state highways.
- Any red-colored pavement markings shall be a durable material and installed as specified by the Engineer.
- Broken red-colored pavement markings shall only be installed within a designated bus transit lane and at high conflict locations between transit and other modes of travel, as determined by the Engineer.

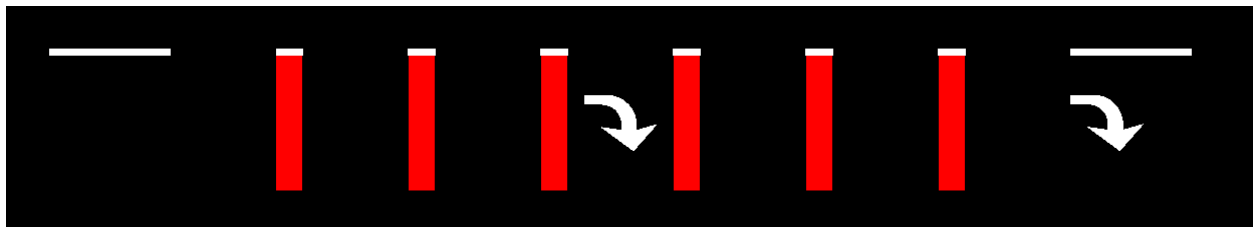


Figure 1: Broken Red-Colored Pavement Markings

Longitudinal Pavement Markings

- Line types, dimensions, and spacings shall follow standard plans DS-627-3 and S-627-1.
- Solid Channelizing Lane Lines for turn only lanes may be double solid to prohibit vehicles turning in front of buses stopped on the near-side of the intersection.
- Buffer spaces should be considered where practicable to increase lateral visibility.
- Intersection Extension Markings may be installed as shown on the plans.

Symbol and Word Pavement Markings

- Arrow markings placement shall follow S-627-1. The first arrow marking distance from the intersection may be reduced from the typical 50 feet to 25 feet for speeds less than 35 mph.
- Thru Arrows should be placed at intersections with 3 or more lane control movements to discourage wrong-way entry and side-swipe crashes.
- "BUS ONLY" word messages should be placed at the beginning of shared transit/right turn only lanes and after each intersection as shown in DS-627-3.

Safety Considerations

BRT systems are one of the fastest growing transit modes in the United States. These systems implemented across the nation have produced system evaluation reports, and some of which provide crash data and lessons learned. The following traffic safety findings from other states' reports should be considered when installing BRT systems on Colorado roadways.

- There was a greater likelihood (seven times) of crashes at busway intersections that were independent from other intersections ([South Miami-Dade BRT](#), 2003).
 - When using advanced loop detectors for bus signal priority, it is recommended to design for 15 mph approach speeds. Crashes were seven times more likely when loop detectors were activated and buses continued through intersections at speeds of 45 mph compared to loop detectors not activated at all.
- It was found that crash rates decreased overall after the installation of centerlane BRT infrastructure ([Albuquerque, New Mexico BRT](#), 2025). However, pedestrian crashes and pedestrian fatalities/serious injuries increased with the implementation of the BRT system.
 - Future BRT implementation should integrate [pedestrian safety treatments](#) throughout the design. Pedestrian crossing treatments such as pedestrian hybrid beacons or rectangular rapid flashing beacons are recommended at regular intervals to assist pedestrians using the BRT system or attempting to cross the BRT system. This is the most common safety recommendation throughout BRT systems in the US.
 - BRT pedestrian safety messaging and pedestrian signage should be considered throughout the design to reduce “pedestrian error” and “alcohol/drug involved” related crashes. “Vehicles going straight” is the most common crash type for “pedestrian error” and “alcohol/drug involved” related crashes.
 - Raised medians should be integrated throughout the design as findings show significant decreases in left-turn collisions both overall and for pedestrians.

GENERAL NOTES

- 1. BUS LANE MARKINGS AND SIGNING SHALL CONFORM TO MUTCD 2009 CHAPTERS 2G AND 3D.
- 2. RED-COLORED PAVEMENT MARKINGS SHALL BE A DURABLE MATERIAL AND INSTALLED AS SPECIFIED BY THE ENGINEER.
- 3. THE INSTALLATION LOCATIONS OF WORD MESSAGES SHALL BE MINIMUM 25 FEET DOWNSTREAM FROM THE INTERSECTION, SPACED LONGITUDINALLY 20 FEET, AND Laterally PLACED IN THE CENTER OF THE PREFERENTIAL LANE.
- 4. REFER TO S-627-1 FOR ARROW PLACEMENTS AT INTERSECTIONS.
- 5. BROKEN RED-COLORED PAVEMENT MARKINGS SHALL ONLY BE INSTALLED WITHIN A DESIGNATED BUS TRANSIT LANE AND AT HIGH CONFLICT LOCATIONS BETWEEN TRANSIT AND OTHER MODES OF TRAVEL, AS DETERMINED BY THE ENGINEER.
- 6. R3-11 SERIES SIGNAGE SHOULD BE INSTALLED AFTER EACH MAJOR INTERSECTION.
- 7. DOTTED LANE LINES SHOULD BEGIN A DISTANCE IN ADVANCE OF THE INTERSECTION SUITABLE TO ENABLE DRIVERS TO MAKE THE NECESSARY LANE CHANGE BEFORE REACHING THE QUEUE OF VEHICLES WAITING TO MAKE THE RIGHT TURN. WHERE:

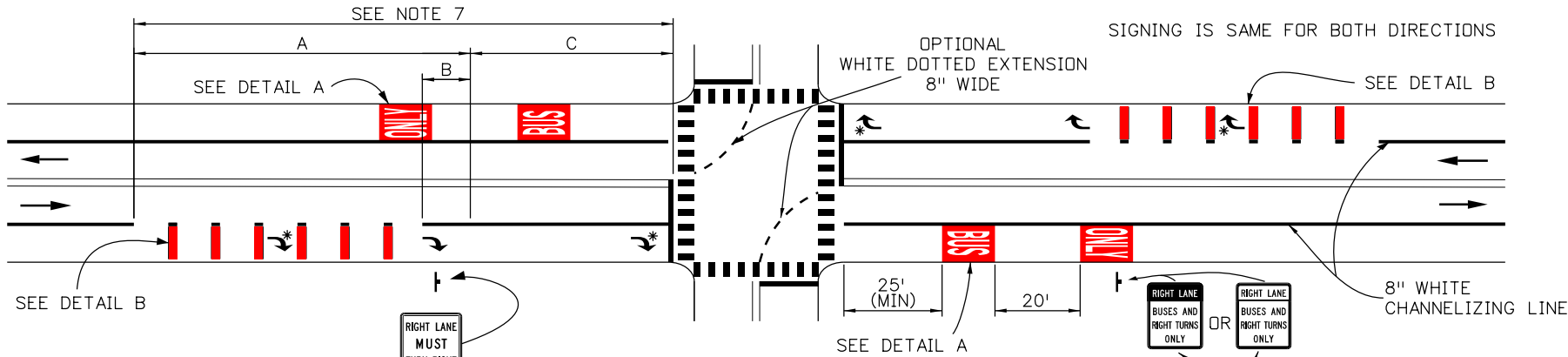
A = FULL DECELERATION DISTANCE + PERCEIVED REACTION DISTANCE
B = AVERAGE VEHICLE LENGTH
C = STORAGE LENGTH

A - B = DESIRABLE LENGTH OF DOTTED LANE LINES
C + B = DESIRABLE LENGTH OF CHANNELIZING LANE LINE
A + C = TOTAL ADVANCE DISTANCE

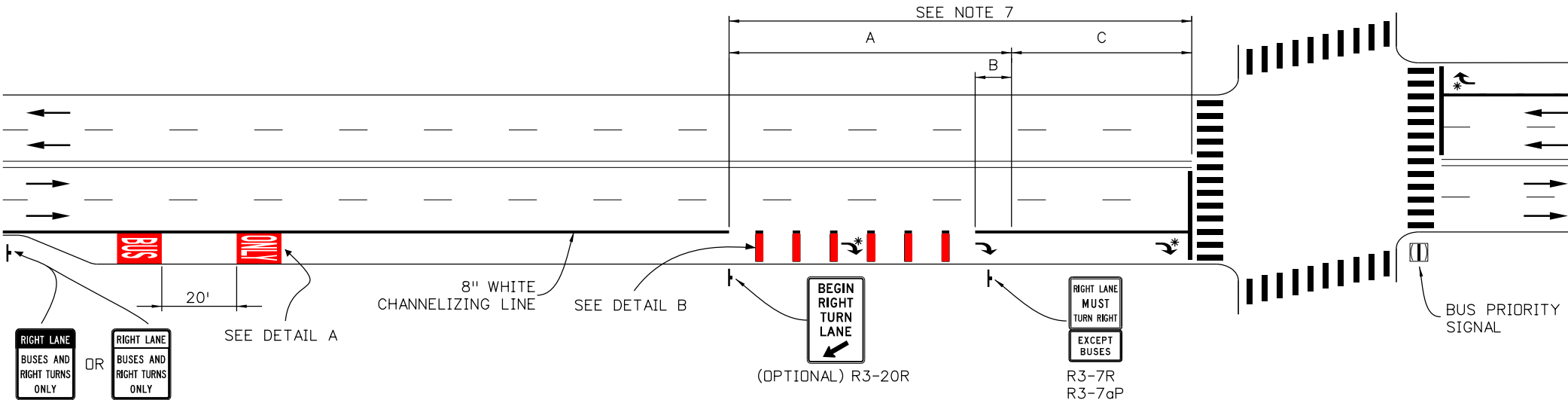
SEE CDOT ROADWAY DESIGN GUIDE CHAPTER 8.

LEGEND

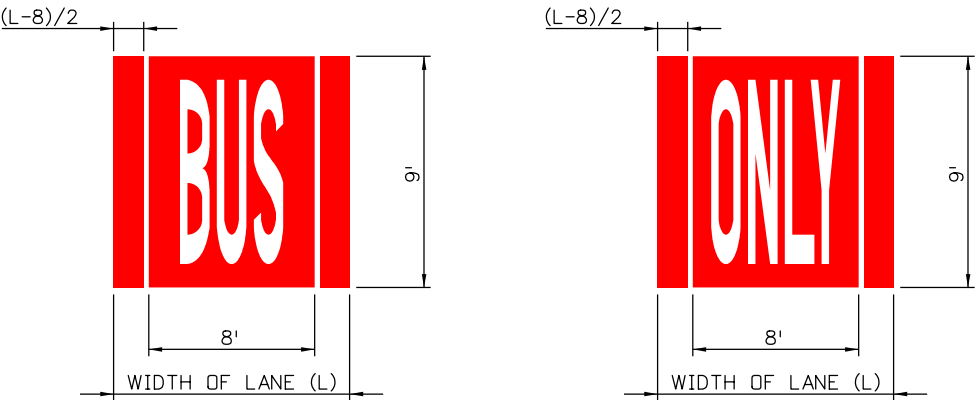
- DIRECTION OF TRAVEL
- * OPTIONAL LANE USE ARROW SEE NOTE 4



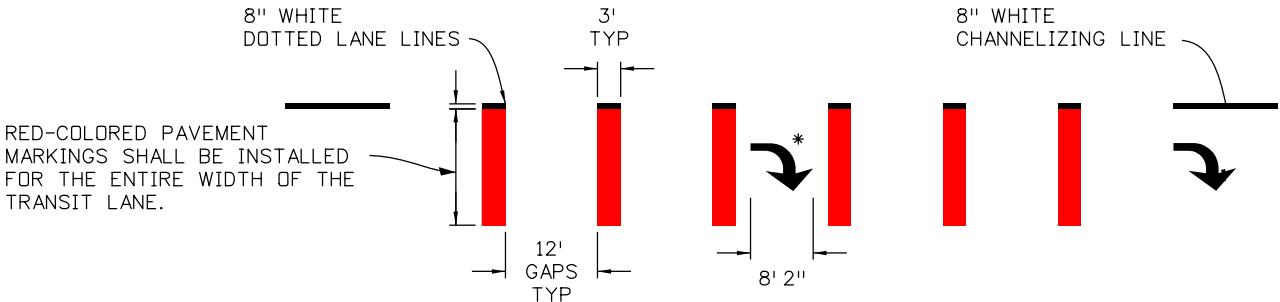
SHARED TRANSIT/RIGHT TURN ONLY LANE



BUS QUEUE JUMP/RIGHT TURN ONLY LANE



DETAIL A



DETAIL B

BUS RAPID TRANSIT (BRT) PAVEMENT MARKINGS

Computer File Information				Sheet Revisions		Colorado Department of Transportation 2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9654 FAX: 303-757-9219 Traffic Safety & Engineering EB	PAVEMENT MARKINGS	STANDARD PLAN NO.	
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Last Modified By:									
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English									Project Sheet Number:

References

1. 11th Edition MUTCD
2. S-627-1 Pavement Markings
3. DS-627-3 BRT Pavement Markings
4. CDOT Roadway Design Guide 2023
5. NACTO Transit Street Design Guide
6. Transit Capacity and Quality of Service Manual, Third Edition
7. [TCRP Report 118](#)
8. A Policy on Geometric Design of Highways and Streets by AASHTO
9. Chapter 16 “Auxiliary Lanes” of Access Management Manual
10. [TCRP Synthesis](#) 169 “Pedestrian and Bicycle Safety in Bus Rapid Transit and High-Priority Bus Corridors: A Synthesis of Transit Practice (2023)
11. [South Miami-Dade Busway System Summary](#)
12. [Changes in crash types and contributing factors after bus rapid transit \(BRT\) infrastructure installation in Albuquerque, New Mexico](#)
13. [Designing Bus Rapid Transit Running Ways](#)
14. [Understanding and Using New Pedestrian and Bicycle Facilities](#)

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