City of San Diego

Street Design Manual

Draft 2024 Edition

The City of SAN DIEGO

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List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ABA	Architectural Barriers Act
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CBC	California Building Code
CCT	Correlated Color Temperature
CVC	California Vehicle Code
DIB	Design Information Bulletin
FC	Foot-Candle
FHWA	Federal Highway Administration
HDM	Highway Design Manual
IES	Illuminating Engineering Society of North America
ITE	Institute of Transportation Engineers
LED	Light-Emitting Diode
LOS	Level of Service
MS4	Municipal Separate Storm Sewer Systems
MTS	Metropolitan Transit System
MUTCD	Manual on Uniform Traffic Control Devices
NACTO	National Association of City Transportation Officials
NCHRP	National Cooperative Highway Research Program
PCC	Portland Cement Concrete
PROWAG	Public Rights-of-Way Accessibility Guidelines
ROW	Right-of-Way
SANDAG	San Diego Association of Governments
SDMC	San Diego Municipal Code
TOD	Transit Oriented Development
TSP	Transit Signal Priority
TSM	Transportation Study Manual
VMT	Vehicle Miles Traveled

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1 Introduction

Streets and sidewalks are the foundation of our transportation system and play a major role in shaping cities and neighborhoods. The City of San Diego (City) is committed to a safe, well-connected, equitable, and sustainable multimodal transportation system. The City's General Plan is the primary guidance for our transportation infrastructure, as needed for existing and planned land use. Citywide goals and policies outline the need to create a framework for growth to support current and future San Diegans. It also includes a vision for improving existing streets consistent with Complete Streets planning principles and concepts that will result in dynamic, vibrant corridors that support all modes of travel.

Building on the General Plan, the City's 2022 Climate Action Plan (CAP) sets an ambitious citywide goal of net zero emissions by 2035. The CAP includes targets and strategies to encourage walking, biking, and taking transit, in addition to transitioning combustion vehicles to zero emissions vehicles. The City also committed to Vision Zero and the goal of eliminating traffic fatalities and severe injuries with the adoption of the 2020 Vision Zero Strategic Plan. At the Council level, the City adopted the Complete Streets Council Policy (R-315264) on December 22, 2023, to further the attainment of a balanced, multimodal mobility system with increased mobility options, prioritizing funding for safe, sustainable, and equitable infrastructure.

As an action in the CAP, the City has prepared a Mobility Master Plan. This plan establishes a framework for implementation of multimodal facilities that provide safety, comfort, and access to destinations for all users such as pedestrians, persons with disabilities, bicyclists, transit riders, and motorists. It identifies the areas in the City with the greatest needs where projects as well as programs should be prioritized to realize greater utilization and return on investment.

The Street Design Manual, in addition to these other Citywide plans and initiatives, will help make walking, rolling, bicycling, and using transit more convenient, efficient, and affordable.

The purpose of the Street Design Manual is to provide information and guidance for the design of the public right-of-way that recognizes the many and varied purposes that a street serves. The Street Design Manual is an appendix to the Land Development Manual and is intended to assist in the implementation of the General Plan, the Mobility Master Plan, Climate Action Plan, and the Land Development Code. In addition, it is intended to assist in the implementation of the special requirements established through community plans, specific plans, precise plans, or other City Council-adopted policy and/or regulatory documents. This manual complements compact, mixed-use development, supports walkable and bikeable neighborhoods, and substantiates the importance of site planning in the design of an effective connected, multimodal street system.

The Project Development Flowchart below shows how the City's various plans, policies, and regulations work together in implementing projects.

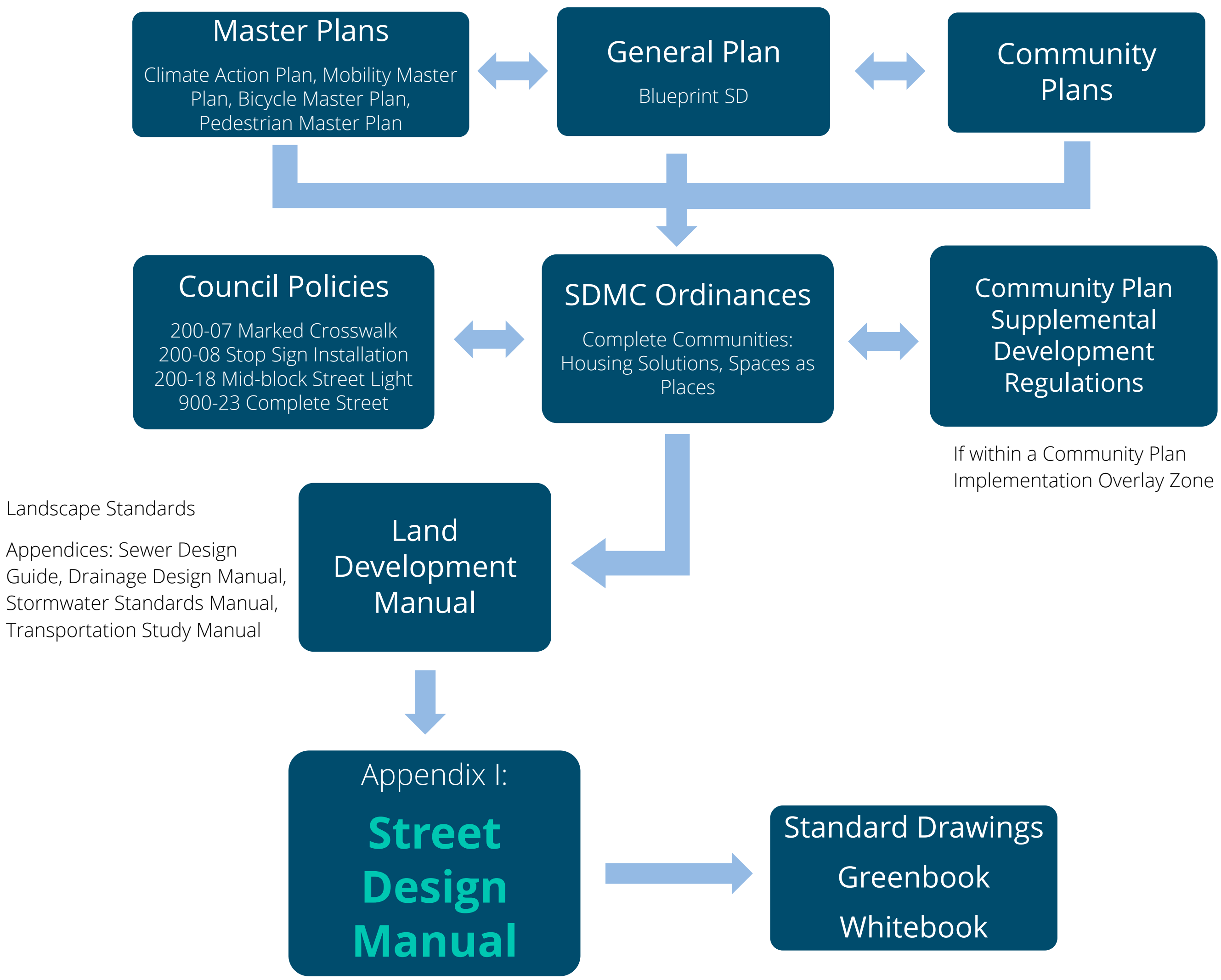

FIGURE 1-1 PROJECT DEVELOPMENT FLOWCHART

1.1. Applicability

The Street Design Manual is used by various City departments including, but not limited to: Transportation, Development Services, Engineering & Capital Projects, and by developers, regional agency partners, and members of the public; and are applicable to both new development and existing neighborhoods for design, maintenance, and repair of the transportation network. This manual establishes standards and guidelines to carry out the City's street design. It does not establish a legal standard for such functions, nor is it intended to do so. Moreover, these guidelines do not supersede requirements and policies established through land use plans, City standard drawings, or other regulatory documents; rather, they are designed to work in concert with them.

Neighborhoods with pedestrian orientated streets should be maintained and enhanced. In neighborhoods with pedestrian orientated streets, nonstandard street widths are frequently in place in many locations. Existing street designs and configurations not illustrated in this manual may be considered appropriate for continued use in such neighborhoods. The National Association of City Transportation Officials (NACTO) Urban Street Design Guide, Urban Bikeway Design Guide, Transit Street Design Guide, and additional FHWA guidelines may be referenced when designing existing streets for traffic calming, bike facilities, and for retrofitting for all modes of travel. Sound engineering judgement should be applied to protect public health, safety, and welfare, subject to approval of the City Engineer. The final decision should consider future maintenance cost, in perpetuity.

Note: All drawings included in this manual are for illustrative purposes only and should not be used as design or construction plans.

1.2. How to Use This Manual

The Street Design Manual is divided into six chapters and four appendices:

Chapter 1: Introduction
Chapter 2: Street Types
Chapter 3: The Parkway Zone
Chapter 4: Off-Street Non-Vehicular Treatments
Chapter 5: The Roadway Zone
Chapter 6: Intersection Design and Operations
Appendix A: Land Use
Appendix B: Lighting Standards and Guidelines
Appendix C: Deviations from Standards Form (DS-266)
Appendix D: High Crime Census Tract Map (2022)

The Complete Streets elements for pedestrians, bicyclists, transit users, and people of all ages and abilities should be considered. Section 1.3 establishes a Complete Streets approach to design an effective, connected, multimodal street system.

Where an inconsistency occurs between the Street Design Manual and the Community Plan Implementation Overlay Zone, the regulations set out in the Community Plan Implementation Overlay Zone apply.

1.3. Complete Streets Approach

1.3.1 What are Complete Streets?

Streets designed and operated to enable mobility for all users. Users include people of all ages and abilities, regardless of whether they are traveling as pedestrians, bicyclists, transit users, or motorists.

A "Complete Street" describes a comprehensive, integrated transportation street network with space, infrastructure, and design approach that accommodates and facilitates convenient travel and mobility for all users, including pedestrians, bicyclists, users and operators of public transit, paratransit and persons with disabilities, seniors, children, motorists, and movers of commercial goods. Complete Streets increase equitable connectivity, improve safety and public health while reducing transportation costs, and can reduce traffic collisions as well as benefit the environment. It considers the entire right-of-way, not just the area between the curbs. This design approach prioritizes vulnerable road users making it easier to cross the street, walk to daily needs, jobs, and schools, bicycle to work, and use public transportation.

FIGURE 1-2 MOBILITY LOADING PRIORITIZATION

Source: The City of San Diego's 2022 Climate Action Plan

Complete Streets changes the focus of transportation improvements from primarily serving motor vehicles to developing improvements that will serve the needs of all users. This approach centers around equity and safety and can be reflected in a loading priority model as contained in Figure 1-2. There are numerous benefits to the Complete Streets approach:

- Improves safety for all users;
- Provides access and mobility for persons with disabilities and people of all ages and abilities in all modes of travel;
- Encourages biking, walking and transit ridership for all abilities to reduce greenhouse gas emissions, improve air quality, and promote sustainable practices;
- Increases connected, comfortable, and safe pedestrian, bicycle, and transit facilities;
- Fosters a physically active and healthy community;
- Increases tree shade and opportunities for beautification and usable public space;
- Improves stormwater quality and flow management; and,
- Promotes transportation equity by providing more mobility options.

Complete Streets design requires an analysis of surrounding site conditions to determine the most appropriate and best treatments and solutions applicable for a given street. Design factors must consider the physical characteristics of the street, urban versus suburban context, surrounding land uses, collision history and safety factors, and anticipated demand.

1.3.2 Transit relating to Complete Streets

The General Plan and the Climate Action Plan require that the City promote and encourage public transit on our streets. The design of all streets that include transit stops, transit routes, or are identified for public transit in the Regional Transportation Plan, need to be coordinated with the San Diego Association of Governments and the San Diego Metropolitan Transit System to provide enhancements and improved accessibility for public transit. This may include transit lanes, curb pop-outs or bays at transit stations, median transit lanes or stations, and special designs to combine a transit street with a bikeway.

1.4. Complete Street Elements

Complete Streets Elements occur primarily in the public right-of-way (ROW). The public ROW is the area from property line to property line dedicated for public use. Complete Streets Elements may occur on dedicated easements located immediately adjacent to the public ROW. The public ROW is generally operated and maintained by the City, or through specific maintenance agreements, and provides ingress and egress to adjacent properties. The Street Design Manual establishes "zones" that organize the overall public ROW: the Parkway Zone and the Roadway Zone (Flex Zone, Vehicle Zone, and Median Zone) as depicted in Figure 1-3.

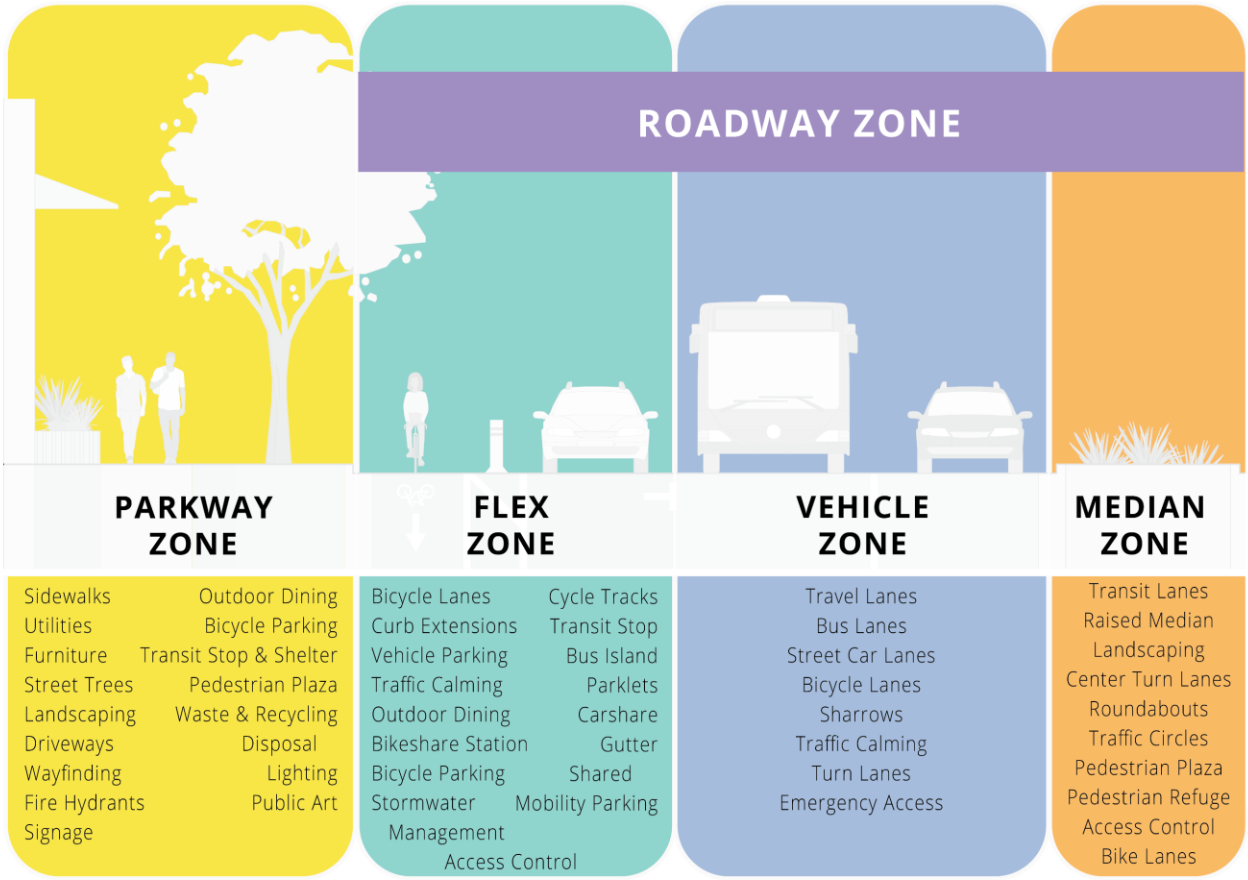

FIGURE 1-3 COMPLETE STREET ZONES

1.4.1 Establishing Zones

Complete Streets Elements are located within both the Parkway Zone and the Roadway Zone. In the Roadway Zone, such elements can include a combination of parking, bicycle facilities, transit facilities, and vehicular travel lanes. Figure 1-4 illustrates the Parkway Zone and the three components within the Roadway Zone:

- The **Flex Zone**, which can include bicycle facilities, parking, curb extensions, parklets, streetaries, and bus islands.
- The **Vehicle Zone**, which can include through lanes for automobiles, motorcycles, emergency vehicles and transit.
- The **Median Zone**, which can include a raised and/or planted median, center turn lane, roundabouts, and/or pedestrian refuge.

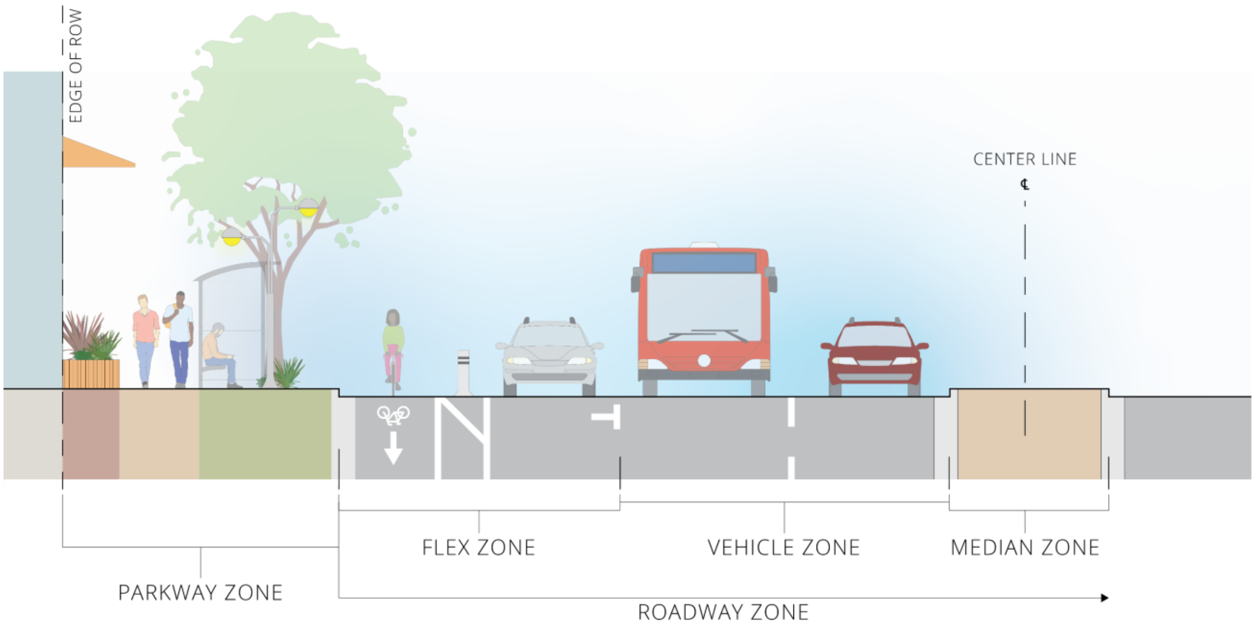

FIGURE 1-4 ILLUSTRATED COMPLETE STREET ZONES

1.5. Accessibility and Designing for All Ages and Abilities

Over 40 million individuals in the United States have a disability. Signed into law on July 26, 1990, the Americans with Disabilities Act (ADA) is a civil rights law assuring persons with disabilities have full access to a municipality's programs, services, and activities. This includes public transit, public buildings and facilities, and along public rights-of-way.

It is essential that the design of pedestrian facilities consider the abilities of all pedestrians. Mobility impairment is but one classification of disability; others are sensory deficits (the sight and hearing impaired) and cognitive impairments (those with diminished ability to process information, including language barriers).

On August 8, 2023, the Access Board published the Accessibility Guidelines for Pedestrians Facilities in the Public Right-of-Way under the American with Disabilities Act and the Architectural Barriers Act (ABA) that address access to sidewalks and streets, crosswalks, curb ramps, pedestrian signals, on-street parking, and other components of public right-of-way. These guidelines also review shared use paths, which are designed primarily for use by bicyclists and pedestrians for transportation and recreation purposes. While these guidelines have not been adopted by the Department of Transportation (DOT) and Department of Justice (DOJ), they are considered best practices to provide access and to comply with the Americans with Disabilities Act.

Pedestrian facilities (including transit access) must comply with ADA standards, Public Right-of-Way Access Guidelines (PROWAG), California Title 24, and other accessibility-related regulations and take into account the entire range of disability categories. Where there is a difference between requirements of governing standards, the requirement that provides the most restrictive (accessible) condition shall prevail. These regulations create an equitable pedestrian environment. Accessibility requirements are incorporated throughout this manual.

1.6. General Street Lighting Standards and Guidelines

Standards and Guidelines:

- All street lighting shall be broad spectrum light sources no greater than 3000K Correlated Color Temperatures (CCT). Lower CCT can be used for off-street pathways where potential lighting impacts or requirements related to sensitive habitats or biological reasons are identified.
- Street Luminaires shall be as defined in the City of San Diego Approved Materials List.
- Street Lighting Standards, arms, bases, and mounting heights shall conform to the City of San Diego Standard SDE-101 for intersection and mid-block lighting.
- Locations of additional poles to be determined by special conditions.
- Streetlighting designs for signalized intersections, roundabouts, marked crosswalks at unsignalized locations, and high pedestrian traffic areas, may require photometric analysis for minimum footcandle level, light intrusion, and glare studies, as determined by the City Engineer.
- For City streets lighting along State ROW, additional discussion can be found in Chapter 1.5 of the Caltrans Roadway Lighting Manual (2021).

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2 Street Types

2.1. Roadways

The width and configuration of the roadways indicated in this manual are designed to provide safety and accommodation for all modes of travel. Factors considered are safety, accessibility, and connectivity to promote walking, cycling, and transit use while providing reasonable conditions for the estimated future average daily traffic (ADT) and on-street parking needs, which reflects the policies in the City's General Plan.

- All dimensions for cross sections with raised medians shown in Chapter 2 of this manual assume the use of standard concrete curb per Standard Drawing SDG-154.
- Traffic calming devices can include chicanes, traffic circles, median slow points, road lumps, speed tables, raised crosswalks, intersection pop-outs, semi-diverters, or channelizations. Additional information can be found in Section 5.8, "Traffic Calming", in NACTO's Urban Street Design Guide, and the City of San Diego Traffic Calming Guidelines.
- The ADTs corresponding to the various level of services included in the City of San Diego's Transportation Study Manual are guidelines to correlate the quality of traffic service with typical sections of different street classifications. The ADT should not be used as the sole factor in determining the appropriate street classifications, since other factors play a vital role in shaping the operating conditions on a facility. Designers are encouraged to perform analysis using Highway Capacity Manual methodologies to assist in determining appropriate levels of service for their street projects.
- Senate Bill 743 (SB 743) was signed into law in September 2013, modifying the existing California Environmental Quality Act (CEQA) by removing auto delay, level of service (LOS), parking and other vehicular capacity measures as metrics of transportation system impacts for mixed-use, infill or transit oriented development projects. Vehicle miles traveled (VMT) is considered the new analysis metric used to measure transportation impacts and reflects the land use type, intensity, and location in relation to the capacity and roadway connectivity of the transportation network. It is also influenced by the availability and quality of multimodal facilities, and system operations.

2.2. Alleys

An alley is a secondary means of access usually lying along the rear of property, the front of which abuts on, and has primary access from, a street. The following design specifications for new alley design apply (see Figures 2–1 and 2–2):

- Alleys should not intersect streets of four-lane urban major or higher classification.
- Alleys are to be improved 20 feet wide within a 20-foot right-of-way. Where utility services, fire hydrants, etc. are located in the alley, the right-of-way must be widened as required. At the intersection of two alleys, a triangular area at the corner, 20 feet on each side, shall be improved and included in the right-of-way.
- Maximum grade for alleys is 15 percent. Minimum curve radius is 100 feet or as needed to accommodate commercial and emergency vehicle access and provide for 15 mph minimum sight distance.
- Curb ramps shall be installed on both sides of an alley entrance in the sidewalk path of travel.
- Alleys shall be constructed in accordance with City of San Diego Standard Drawings.
- Alley setbacks shall comply with SDMC Chapter 13, Article 1.

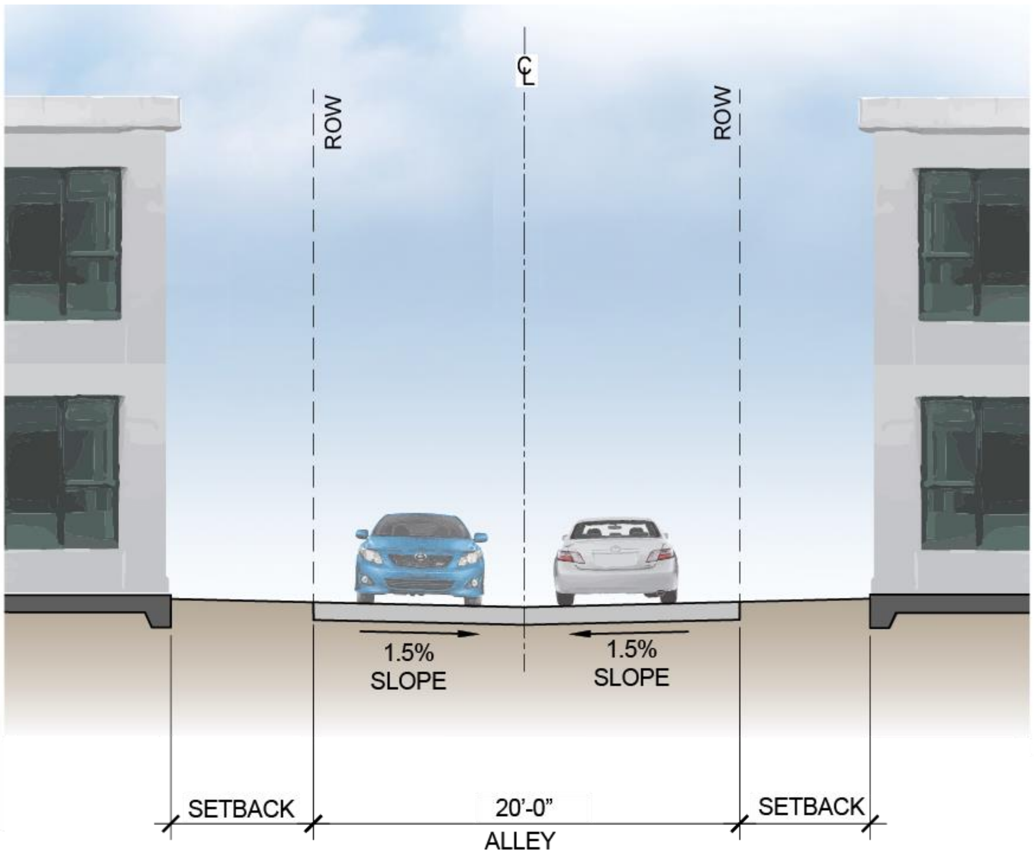

FIGURE 2-1 ALLEY SECTION VIEW

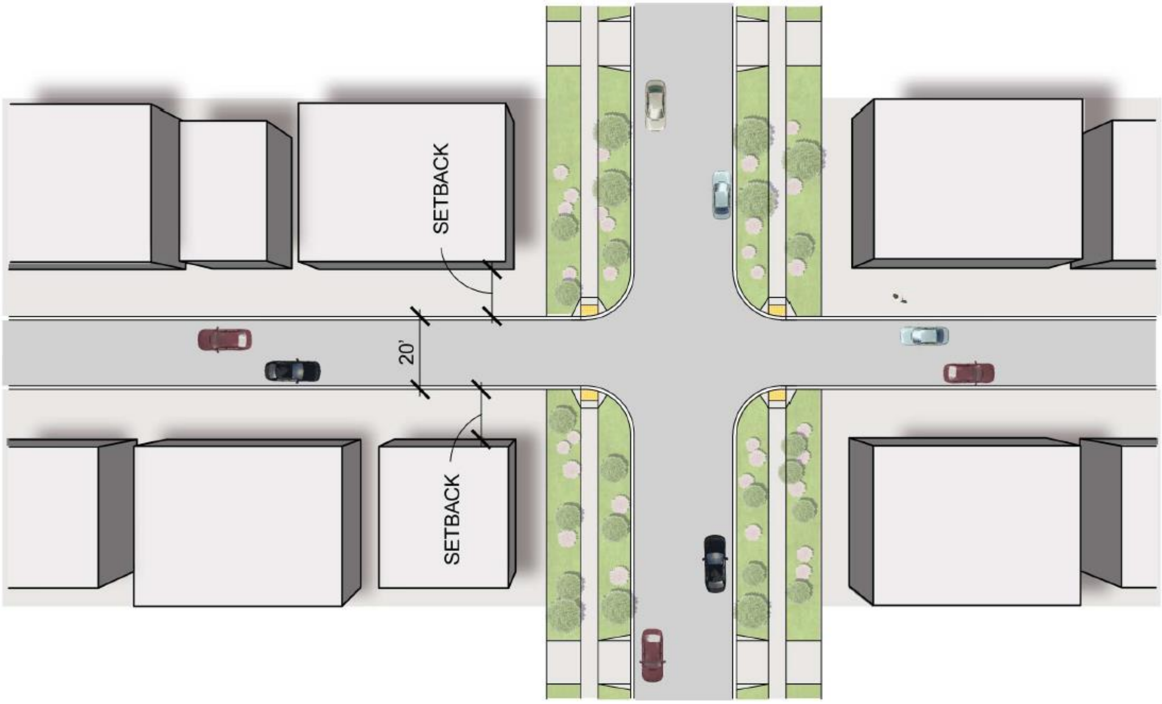

FIGURE 2-2 ALLEY PLAN VIEW

2.3. Residential Streets

Residential streets are a type of local streets that provides, primarily, direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.

All Figures are for illustrative purposes and all signing and striping are subject to the most recently adopted edition of the CA MUTCD or as deemed appropriate by the City Engineer. Figures 2-3 through 2-10 and Tables 2–1 through 2-12 illustrate the design specifications for cul-de-sacs, low-volume residential local streets, and residential local streets.

2.3.1 Cul-De-Sac

A street that primarily provides direct access to abutting property and does not have through access to an adjacent street. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It is important to maintain and increase connectivity for all modes. Cul-de-sacs can be used to minimize encroachments into steep topography or other sensitive environmental features.

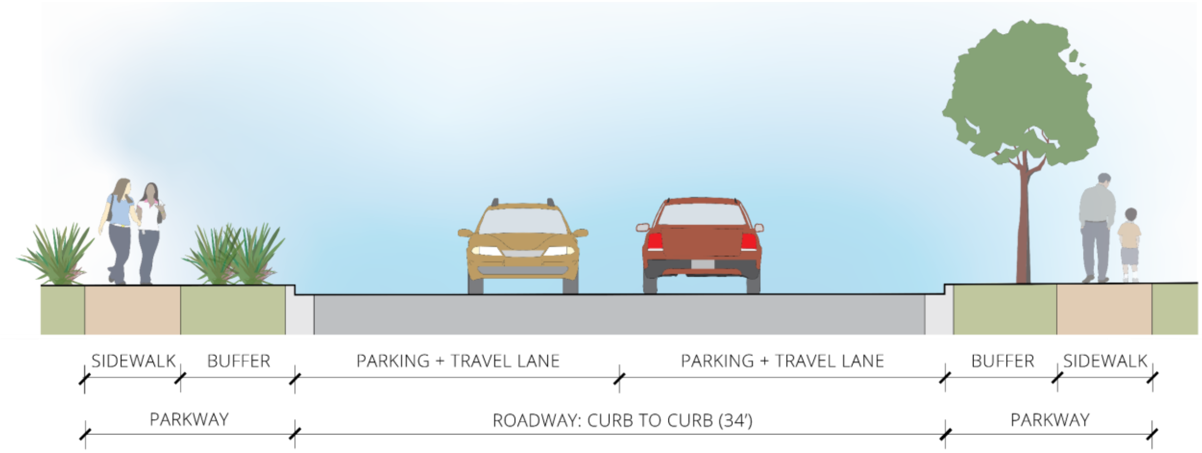

FIGURE 2-3 CUL-DE-SAC AND ENHANCED CUL-DE-SAC SECTION VIEW (OPTION C3)

FIGURE 2-4 CUL-DE-SAC AND ENHANCED CUL-DE-SAC PLAN VIEW (OPTION C3)

Notes:

1. *Not to scale. Refer to Geometric Design in the guidelines below.*
2. *On-street parking should be prohibited on refuse collection days.*

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Bike Lane	**34**	30	34	BL TL TL BL	Under 35	
C2	Parallel Parking + Bike Lane	**34**	32	34	BL TL TL PP		
C3	Parallel Parking	**34**	33	34	PP TL TL PP		
C4	Travel Lanes Only	**24**	20	34	TL TL		

TABLE 2-1 CUL-DE-SAC DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9 [1]	12	
PP	Parallel Parking	**8**	7	9	
BL	Bike Lane (Class II)	**7**	5	8	

TABLE 2-2 CUL-DE-SAC STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*
[1] Requires San Diego Fire-Rescue Department review.

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	48	64	ft
Curb-to-Curb Width	**34**	28 [1]	34	ft
Design ADT	**200**	-	-	ADT
Design Speed [2]	**-**	20	30	mph
Grade	**-**	-	15	%
Curve Radius [3]	**-**	100	-	ft

TABLE 2-3 CUL-DE-SAC STREET SPECIFICATIONS

[1] Single-loaded
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-1
Residential: *Residential Low-1 through 4*	UP-3 or UP-4
Institutional, Public, and Semi-Public Facilities	UP-2

TABLE 2-4 PARKWAYS FOR CUL-DE-SAC

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

Considerations:

- Cul-de-sacs should only be used in limited locations where providing a connection to an adjacent street is infeasible due to topographical or environmental constraints.
- When utilizing cul-de-sacs, care should be taken to design an interconnected street pattern within a residential neighborhood in order to provide, to the maximum extent feasible, direct pedestrian/bicycle routes to local destinations.

Connections/Access:

- When a cul-de-sac exceeds 150 feet in length and/or pedestrian or bicycle circulation is being or will be significantly impacted and the traffic levels on neighboring streets are being or will be degraded, additional design features should be included, but are not limited to:

    - Providing for pedestrian and bicycle connections through the cul-de-sac, or
    - Provide for pedestrian and bicycle connections through the interconnection of the bulb of the cul-de-sac with an adjacent local street. These options should be considered in order to provide access to adjacent streets or to adjacent land uses such as open space, parks, trails, or commercial areas.

- The design of pedestrian and bicycle access ways needs to address the following to provide for the safety of users:

    - Length should be kept to a minimum.
    - Adequate lighting should be provided.
    - Landscaping, fences, grade differences, or other obstructions should not hinder visibility into the access way from adjacent streets and properties.
    - Surrounding land uses should be designed to provide surveillance opportunities from those uses into the access way, such as with the placement of windows.
    - Emergency vehicle access must be provided in cases where external surveillance is inadequate.

Standards and Guidelines:

For areas with abutting properties that are designated for either commercial or industrial in a land use plan:

- Turnaround curb radius shall be 55 feet.
- Such cul-de-sacs shall be limited to 500 feet in length from the property line of the intersecting street to end of the bulb unless there are clearly defined topographic conditions requiring greater lengths. In such instances, intermediate turnarounds or secondary emergency vehicle only access may be required satisfactory to the City Engineer.

For areas with abutting properties that are designated for a residential use by a land use plan:

- Cul-de-sacs serving more than four dwelling units or over 150 feet in length require a turnaround. Cul-de-sacs of 150 feet or less shall be developed such that access can be provided without backing onto streets intersecting the cul-de-sacs.
- Turnaround curb radius shall be 50 feet.
- Based on fire apparatus capabilities, the minimum cul-de-sac radius is 40 feet.
- Residential cul-de-sacs are limited to a maximum of 200 ADT unless there are clearly defined topographic constraints that require greater volumes. Intermediate turnarounds shall have a 50-foot radius. In all cases, intermediate turnarounds and/or special design may be required to accommodate access by emergency vehicles and/or emergency evacuations.
- Coordinate with the Fire-Rescue Department for minimum dimensions based on current apparatus capabilities.

2.3.2 Green Infrastructure for Cul-De-Sacs

Typical cul-de-sacs are paved across their entire diameter. This large impervious area adds to environmental degradation by increasing runoff. Adding a landscaped area in the center of the cul-de-sac (see Figures 2-5 and 2-6) can reduce impervious land coverage by 30-40 percent, depending on configuration, while maintaining the required turning radius. Refer to Section 3.7.4 Landscaping and Stormwater Management for the standards and guidelines of street trees and landscape plantings maintenance. Green Infrastructure shall be designed in conformance with the Stormwater Manual.

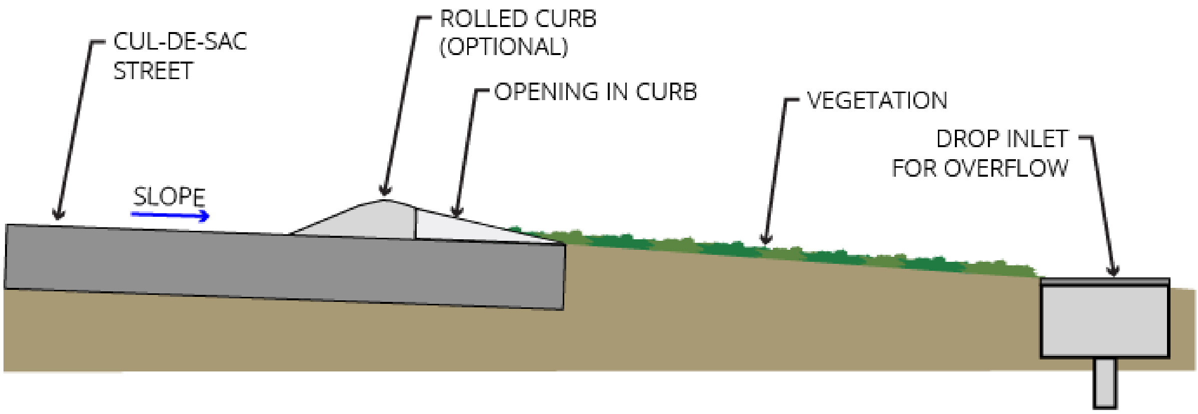

FIGURE 2-5 GREEN INFRASTRUCTURE FOR CUL-DE-SAC SECTION A-A VIEW

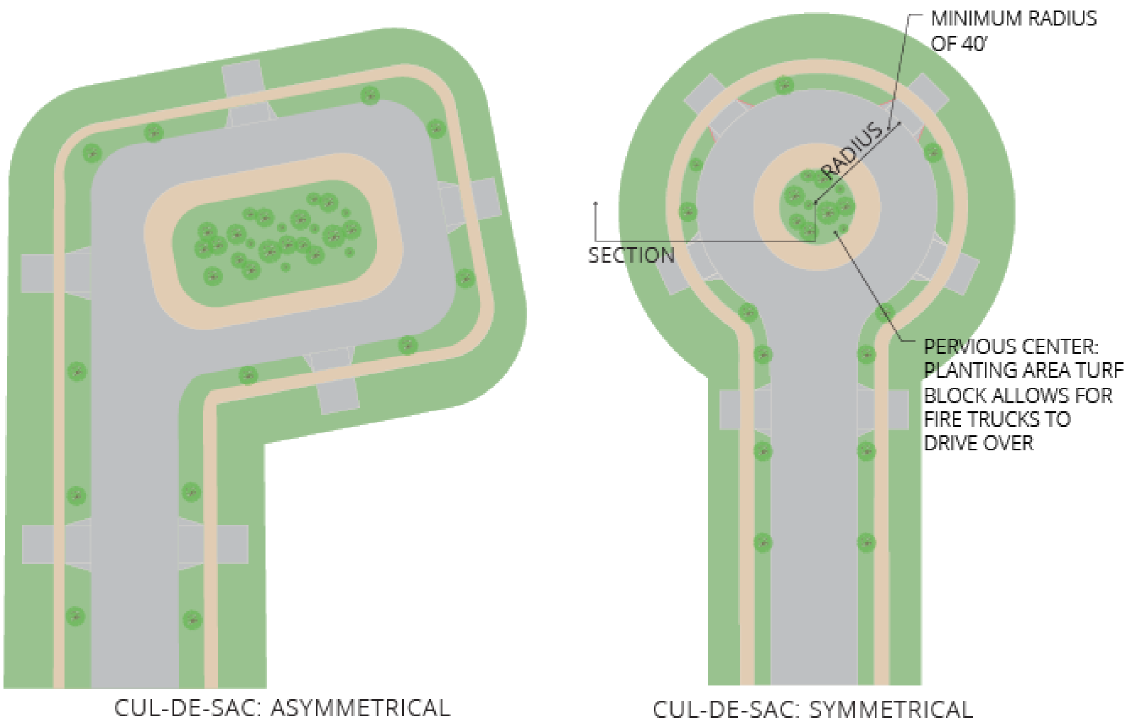

FIGURE 2-6 GREEN INFRASTRUCTURE FOR CUL-DE-SAC PLAN VIEW

Reference:

- Stormwater Standards Manual, City of San Diego, 2024

2.3.3 Low-Volume Residential Local Street

A street that primarily provides direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.

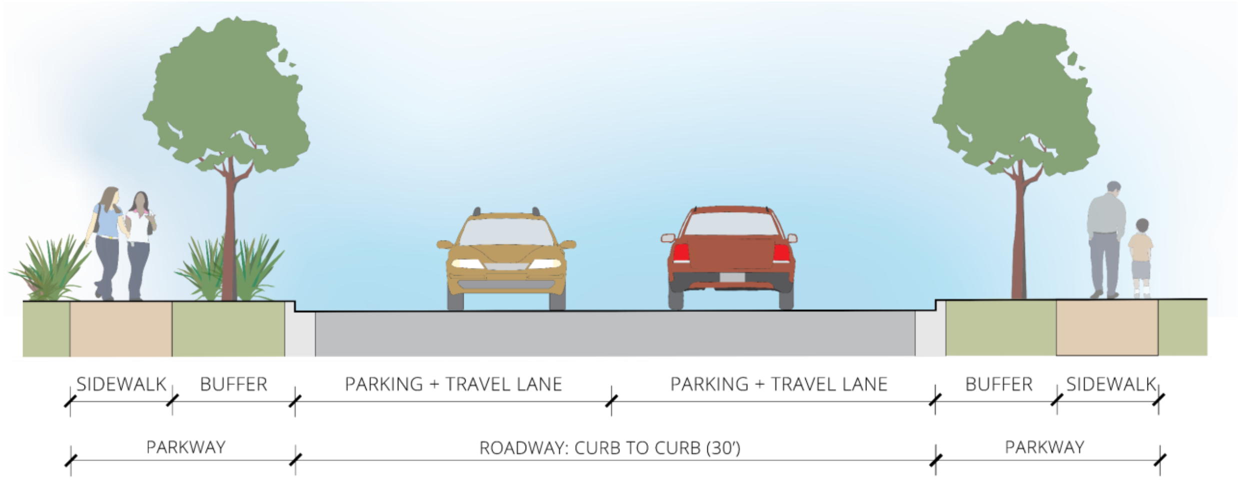

FIGURE 2-7 LOW-VOLUME RESIDENTIAL LOCAL STREET SECTION VIEW (OPTION C2)

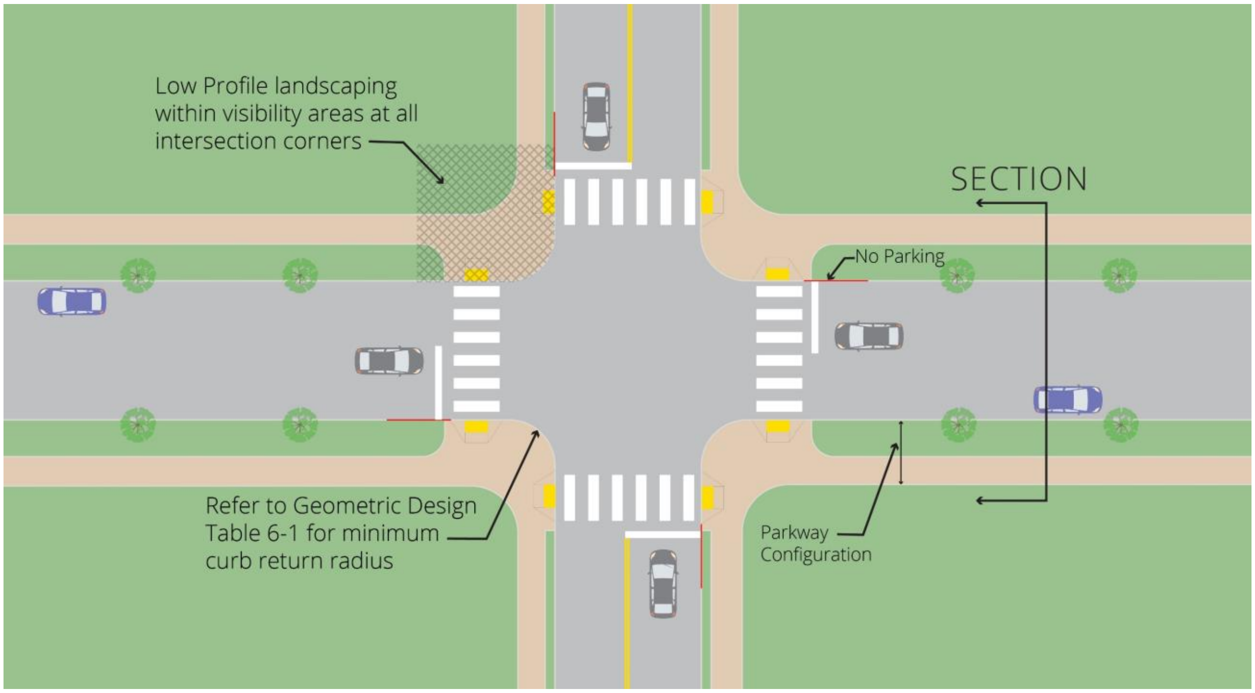

FIGURE 2-8 LOW-VOLUME RESIDENTIAL LOCAL STREET PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Bike Lane	**32**	30	32	BL TL TL BL	Under 35	
C2	Parallel Parking	**30**	28 [1]	32	PP TL TL PP		
C3	Travel Lanes Only	**24**	20	32	TL TL		

TABLE 2-5 LOW-VOLUME RESIDENTIAL LOCAL STREET DESIGN OPTIONS

Note:
[1] Single-loaded

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9 [1]	12	
PP	Parallel Parking	**8**	7	10	
BL	Bike Lane (Class II)	**7**	5	8	

TABLE 2-6 LOW-VOLUME RESIDENTIAL LOCAL STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments*
[1] Requires San Diego Fire-Rescue Department review.

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	48	62	ft
Curb-to-Curb Width	**30**	28 [1]	32	ft
Design ADT	**700**	-	-	ADT
Design Speed [2]	**-**	20	30	mph
Grade	**-**	-	15	%
Curve Radius [3]	**-**	100	-	ft

TABLE 2-7 LOW-VOLUME RESIDENTIAL LOCAL STREET SPECIFICATIONS

Note:
[1] Single-loaded
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-1
Residential: *Residential Low, Residential Medium, Residential High* Multiple Use	UP-3 or UP-4
Institutional, Public, and Semi-Public Facilities	UP-2

TABLE 2-8 PARKWAYS FOR LOW-VOLUME RESIDENTIAL LOCAL STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.3.4 Residential Local Street

A street that primarily provides direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.

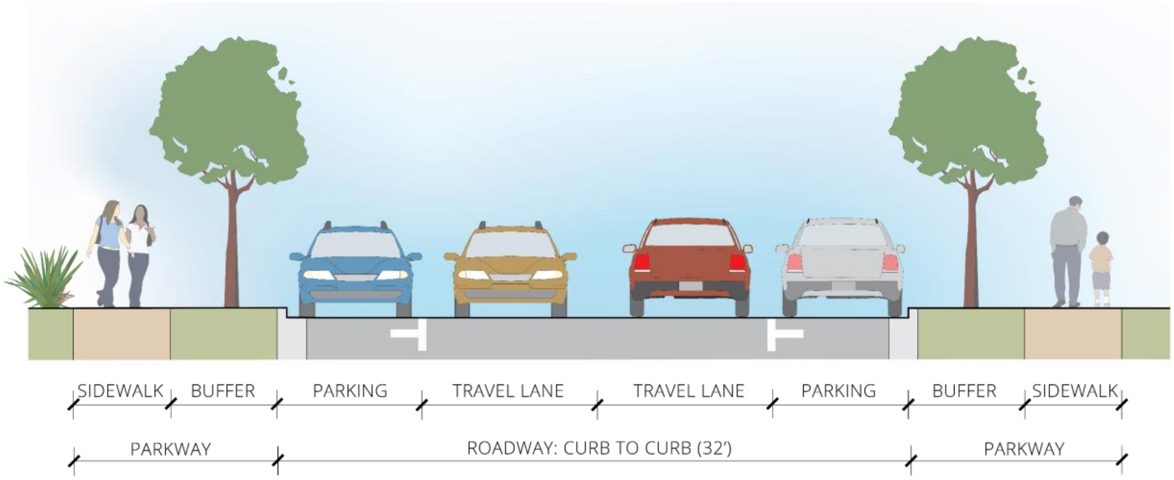

FIGURE 2-9 RESIDENTIAL LOCAL STREET SECTION VIEW (OPTION C3)

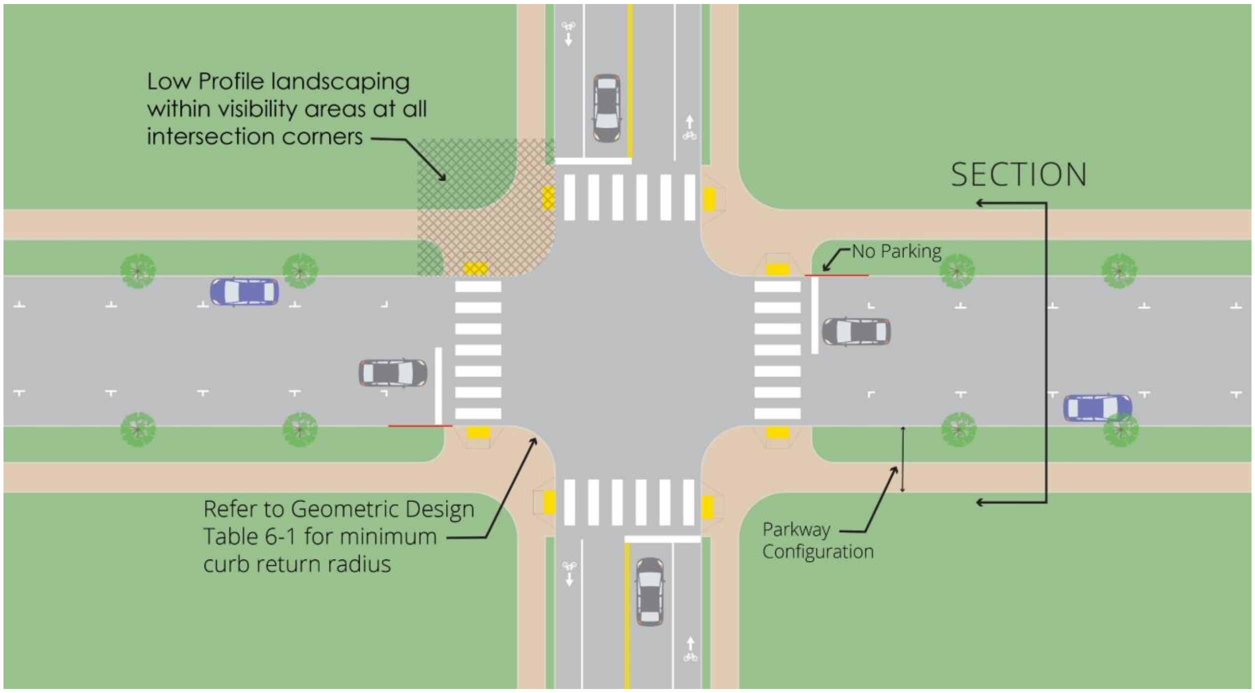

FIGURE 2-10 RESIDENTIAL LOCAL STREET PLAN VIEW (OPTION C3)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Bike Lane	**32**	30	32	BL TL TL BL	Under 35	
C2	Parallel Parking (one side)	**28**	28	32	PP TL TL		
C3	Parallel Parking	**32**	32	32	PP TL TL PP		
C4	Travel Lanes Only	**24**	20	32	TL TL		

TABLE 2-9 RESIDENTIAL LOCAL STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9 [1]	12	
PP	Parallel Parking	**8**	7	9	
BL	Bike Lane (Class II)	**7**	5	8	

TABLE 2-10 RESIDENTIAL LOCAL STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*
[1] Requires San Diego Fire-Rescue Department review.

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	48	62	ft
Curb-to-Curb Width	**32**	28 [1]	32	ft
Design ADT	**1,500**	-	-	ADT
Design Speed [2]	**-**	20	30	mph
Grade	**-**	-	15	%
Curve Radius [3]	**-**	100	-	ft

TABLE 2-11 RESIDENTIAL LOCAL STREET SPECIFICATIONS

Note:
[1] Single-loaded
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-1
Residential: *Residential Low-1 through 4*	UP-3 or UP-4
Institutional, Public, and Semi-Public Facilities	UP-2

TABLE 2-12 PARKWAYS FOR RESIDENTIAL LOCAL STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.4. Commercial Streets

Commercial Streets are a type of local streets that provides similar direct access to abutting commercial property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as deemed appropriate by the City Engineer. Figures 2-11 through 2-14 and Tables 2-13 through 2-20 below illustrate the design specifications for commercial local streets and industrial local streets.

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2.4.1 Commercial Local Street

A street that primarily provides direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.

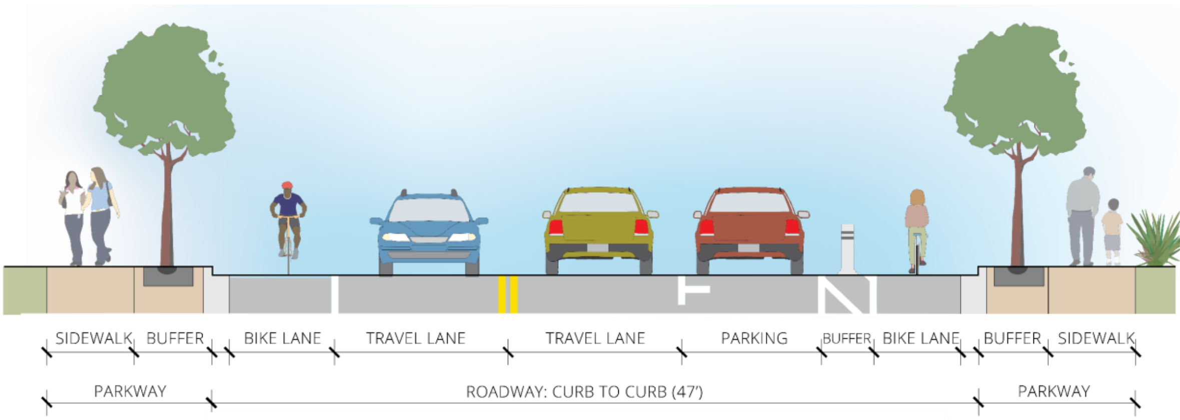

FIGURE 2-11 COMMERCIAL LOCAL STREET SECTION VIEW (OPTION C2)

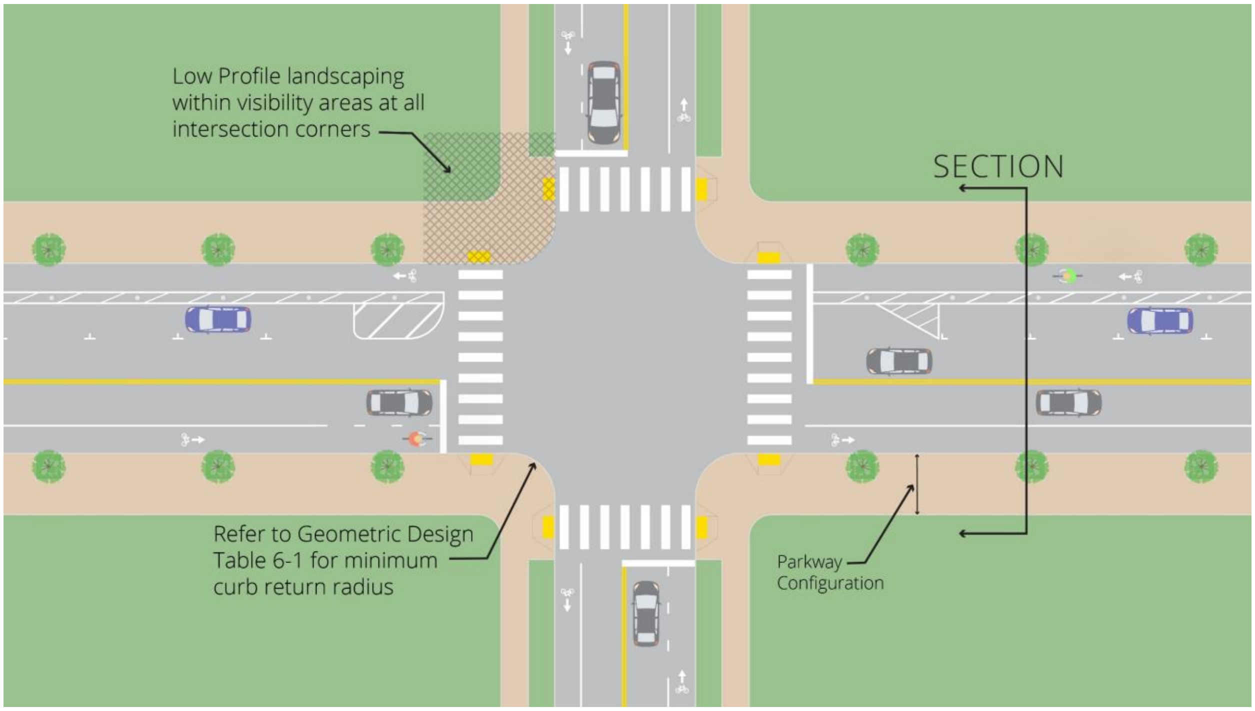

FIGURE 2-12 COMMERCIAL LOCAL STREET PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout							Speed	Modal Priority(ies)
		Pref	Min	Max									
C1	Bike Lane	**38**	30	40			BL	TL	TL	BL		Under 35	Vehicle, Bike
C2	Bike Lane + Parallel Parking	**47**	39	52	BL	BB	PP	TL	TL	BL			Vehicle, Parking, Bike
C3	Parallel Parking	**40**	34	40			PP	TL	TL	PP			Vehicle, Parking
C4	Angle Parking (Both Sides)	**52**	52	52			AP	TL	TL	AP			Vehicle, Parking
C5	Parallel Parking + Angle Parking	**46**	46	52			PP	TL	TL	AP			Vehicle, Parking
C6	Two-Way Cycle Track	**40**	35	40		BTW	BB	TL	TL				Vehicle, Bike
C7	One-Way Cycle Tracks	**40**	34	52		BT	BB	TL	TL	BB	BT	35 and Over	Vehicle, Bike
C8	Bus Only Lanes	**44**	42	48			Bus	TL	TL	Bus			Vehicle, Bus

TABLE 2-13 COMMERCIAL LOCAL STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane	**11**	10	12	Vehicle
PP	Parallel Parking	**8**	7	9	Parking
AP	Angle Parking	**16**	16	19	Parking
Bus	Bus Only Lane	**12**	11	14	Bus
BL	Bike Lane (Class II)	**7**	5	8	Bike
BT	One-way Cycle Track (Class IV)	**7**	6	8	Bike
BTW	Two-way Cycle Track (Class IV)	**12**	8	14	Bike
BB	Buffer	**3**	2	-	Bike

TABLE 2-14 COMMERCIAL LOCAL STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	60	92	ft
Curb-to-Curb Width	**40**	40	52	ft
Design ADT	**2,000**	-	-	ADT
Design Speed [2]	**-**	20	30	mph
Grade	**-**	-	8	%
Curve Radius [3]	**-**	290	-	ft

TABLE 2-15 COMMERCIAL LOCAL STREET SPECIFICATIONS

Note:
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-2
Commercial Employment, Retail, and Services - Residential Prohibited Institutional, Public, and Semi-Public Facilities Industrial Employment: *Scientific Research*	UP-6, UP-6T, UP-7, or UP-7T

TABLE 2-16 PARKWAYS FOR COMMERCIAL LOCAL STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.4.2 Industrial Local Street

A street that primarily provides direct access to abutting property. It carries low vehicular movement, low-to-heavy pedestrian movement, and low-to-moderate bicycle movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may include landscaping, pedestrian-scale lighting, and underground utilities.

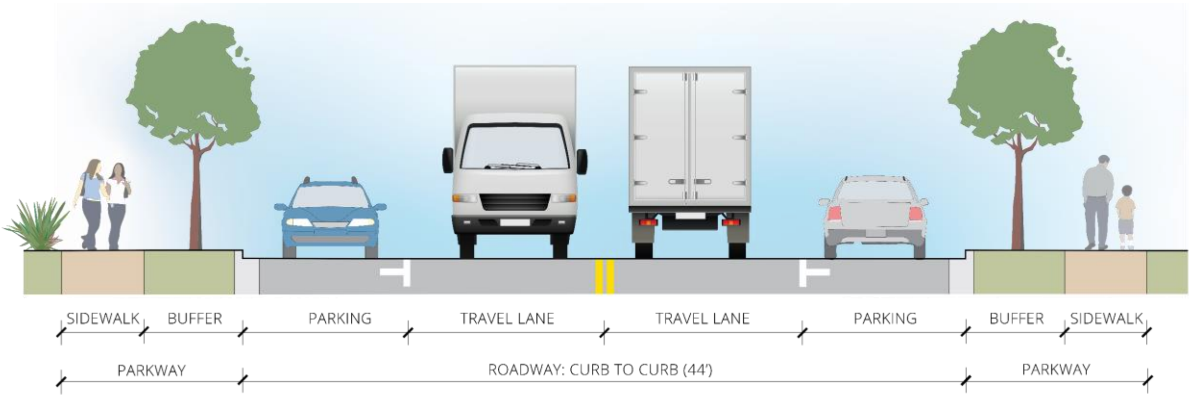

FIGURE 2-13 INDUSTRIAL LOCAL STREET SECTION VIEW (OPTION C1)

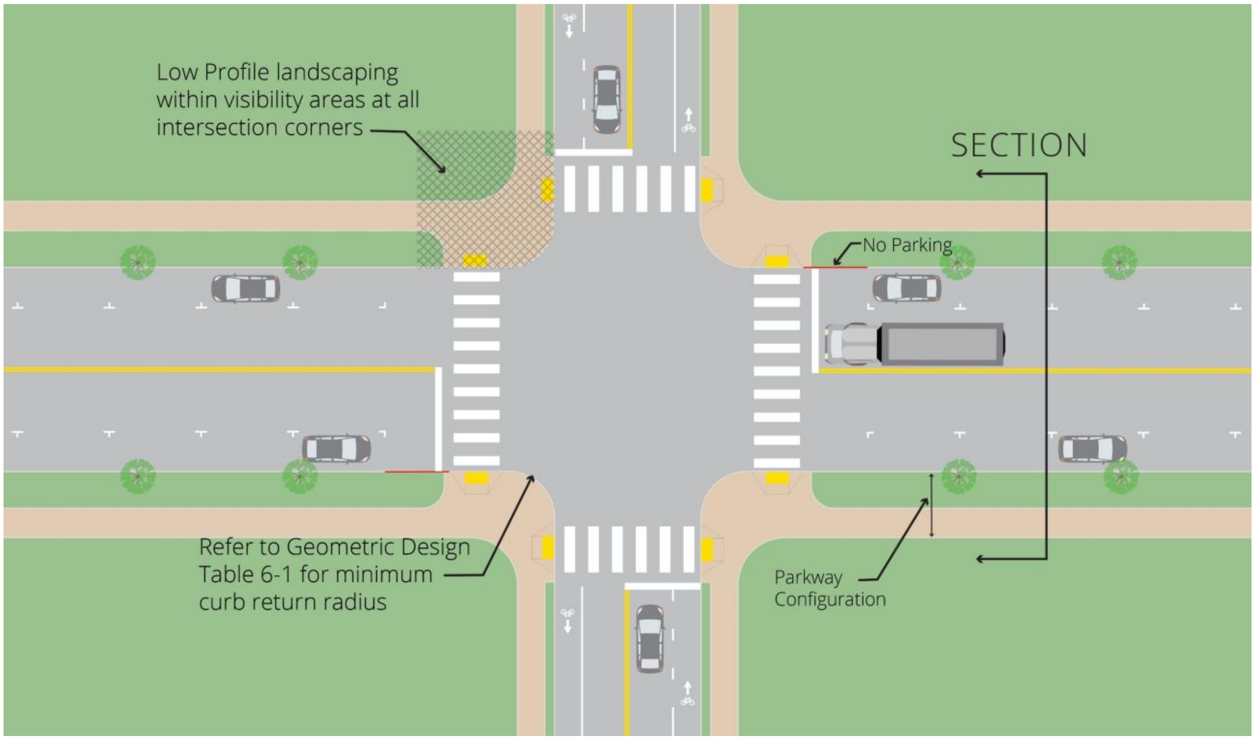

FIGURE 2-14 INDUSTRIAL LOCAL STREET PLAN VIEW (OPTION C1)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Parallel Parking	**38**	34	42	PP TL TL PP	Under 35	
C2	Travel Lanes Only	**24**	20	42	TL TL		

TABLE 2-17 INDUSTRIAL LOCAL STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9 [1]	12	
PP	Parallel Parking	**8**	7	9	

TABLE 2-18 INDUSTRIAL LOCAL STREET FACILITY DIMENSIONS

Note:
[1] Requires San Diego Fire-Rescue Department review.

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	64	74	ft
Curb-to-Curb Width	**42**	-	-	ft
Design ADT	**2,000**	-	-	ADT
Design Speed [2]	**-**	20	30	mph
Grade	**-**	-	8	%
Curve Radius [3]	**-**	290	-	ft

TABLE 2-19 INDUSTRIAL LOCAL STREET SPECIFICATIONS

Note:
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Industrial Employment	UP-2, UP-3, UP-4, or UP-4T

TABLE 2-20 PARKWAYS FOR INDUSTRIAL LOCAL STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.5. Collector Streets

Collector Streets primarily provides movement between local/collector streets and streets of higher classification and, secondarily, provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as deemed appropriate by the City Engineer. Figures 2-15 through 2-24 and Tables 2-21 through 2-40 illustrate the design specifications for two-lane sub-collector streets, two lane collector streets, two lane collector streets with two way left turn lanes, two lane industrial collector streets, and four lane urban collector streets with two way left turn lanes.

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2.5.1 Two-Lane Sub-Collector

A street that primarily provides movement between local/collector streets and streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.

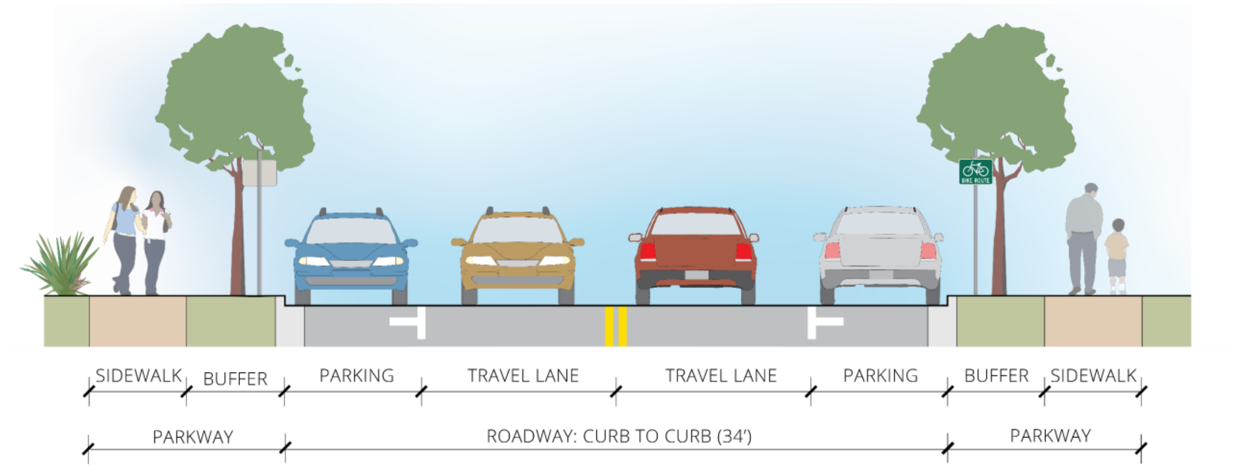

FIGURE 2-15 TWO-LANE SUB-COLLECTOR SECTION VIEW (OPTION C2)

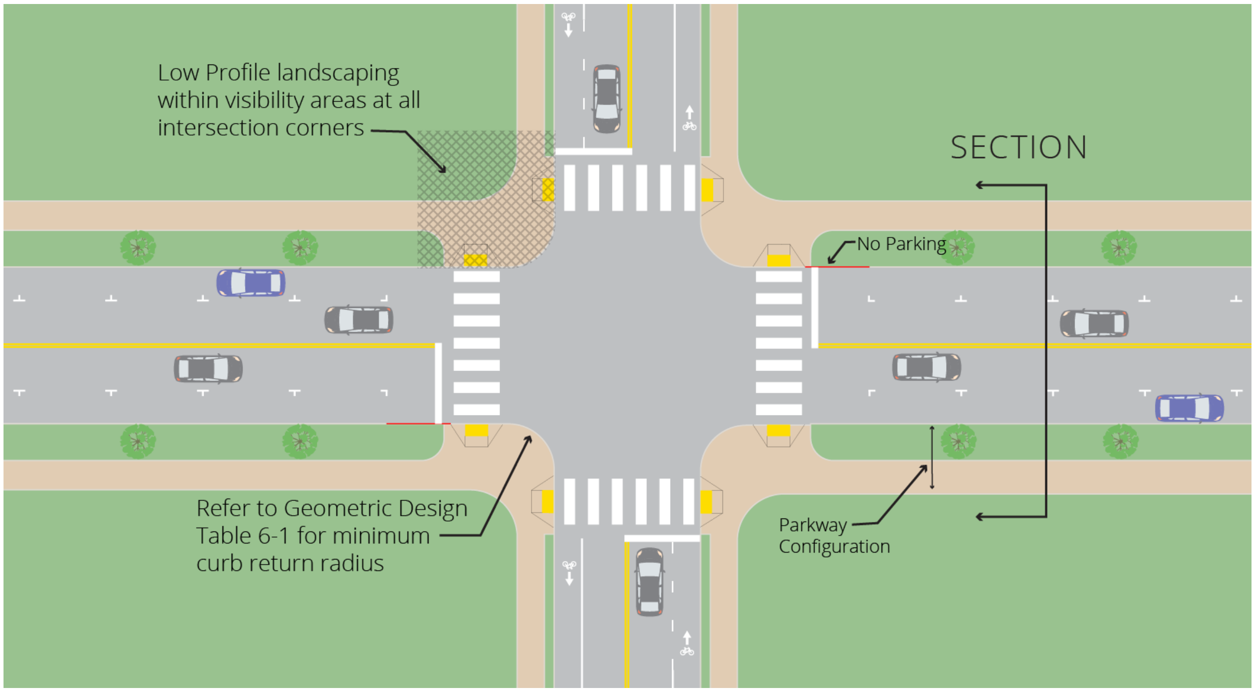

FIGURE 2-16 TWO-LANE SUB-COLLECTOR PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Bike Lane	**34**	30	34	BL TL TL BL	Under 35	
C2	Parallel Parking	**34**	34	34	PP TL TL PP		
C3	Travel Lanes Only	**34**	20	34	TL TL		

TABLE 2-21 TWO-LANE SUB-COLLECTOR STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9.5 [1]	12	
PP	Parallel Parking	**8**	7	9	
BL	Bike Lane (Class II)	**7**	5	8	

TABLE 2-22 TWO-LANE SUB-COLLECTOR STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*
[1] Requires San Diego Fire-Rescue Department review.

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	54	74	ft
Curb-to-Curb Width	**34**	-	-	ft
Design ADT [1]	**2,200**	2,200	-	ADT
Design Speed [2]	**-**	25	35	mph
Grade	**-**	8	10	%
Curve Radius [3]	**-**	450	500	ft

TABLE 2-23 TWO-LANE SUB-COLLECTOR STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-3, UP-4, or UP-4T
Residential	UP-3, UP-4, or UP-4T
Commercial Employment, Retail, and Services: *Neighborhood Commercial-Residential Prohibited, Community Commercial-Residential Prohibited* Institutional, Public, and Semi-Public Facilities	UP-2, UP-6, UP-6T, UP-7 or UP-7T

TABLE 2-24 PARKWAYS FOR TWO-LANE SUB-COLLECTOR STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.5.2 Two-Lane Collector

A street that primarily provides movement between local/collector streets and streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.

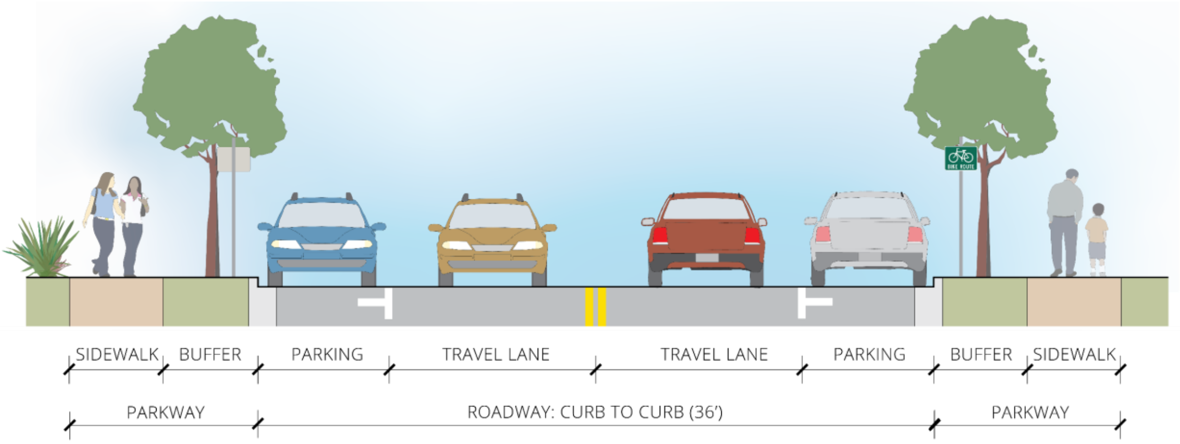

FIGURE 2-17 TWO-LANE COLLECTOR SECTION VIEW (OPTION C3)

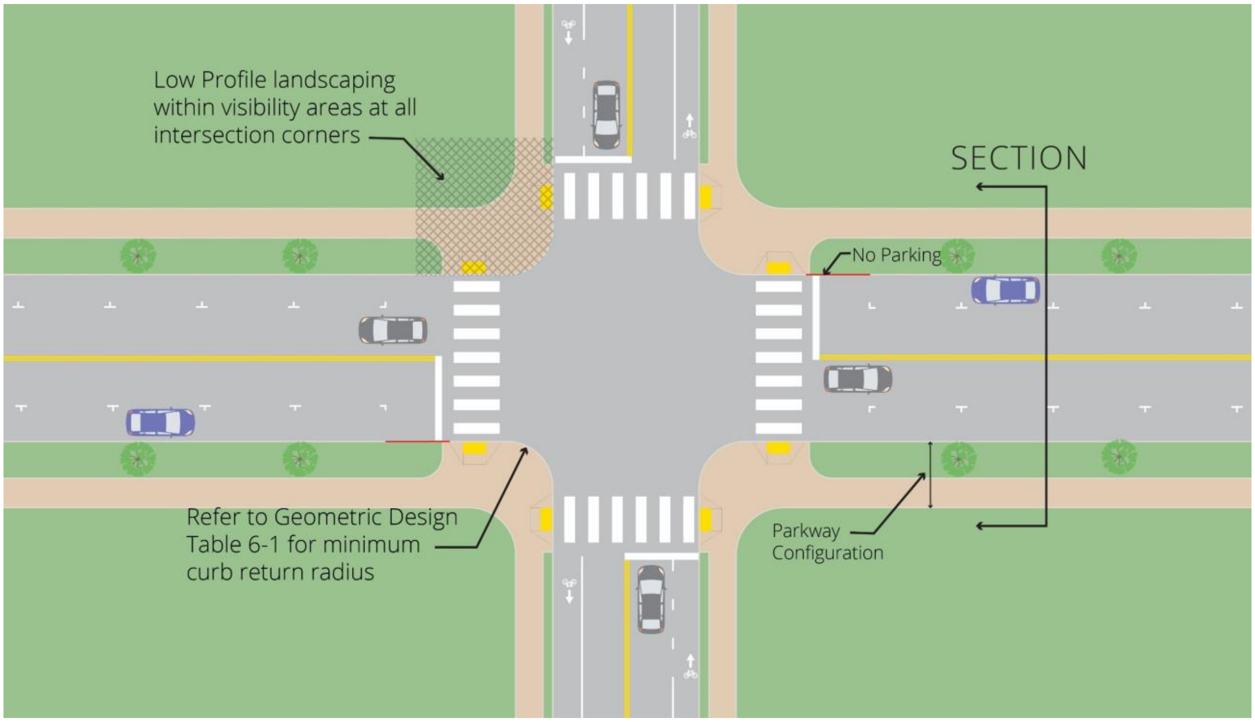

FIGURE 2-18 TWO-LANE COLLECTOR PLAN VIEW (OPTION C3)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout						Speed	Modal Priority(ies)
		Pref	Min	Max								
C1	Bike Lane	**46**	30	46	BL	BB	TL	TL	BB	BL	Under 35	
C2	Parallel Parking + Bike Lane	**46**	44	46	PP	BL	TL	TL	BL	PP	Under 35	
C3	Parallel Parking	**36**	34	36		PP	TL	TL	PP		Under 35	
C4	Two-Way Cycle Track	**40**	35	46	BTW	BB	TL	TL			35 and Over	
C5	One-Way Cycle Tracks	**46**	34	46	BT	BB	TL	TL	BB	BT	35 and Over	
C6	Parallel Parking + Two-Way Cycle Track	**48**	42	48	BTW	BB	TL	TL	PP		35 and Over	
C7	Bus Only Lanes	**46**	44	50		Bus	TL	TL	Bus		35 and Over	

TABLE 2-25 TWO-LANE COLLECTOR STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	**Through Lane**	**11**	10	12	
PP	**Parallel Parking**	**8**	7	9	
Bus	**Bus Only Lane**	**12**	11	14	
BL	**Bike Lane (Class II)**	**7**	5	8	
BT	**One-way Cycle Track (Class IV)**	**7**	6	8	
BTW	**Two-way Cycle Track (Class IV)**	**12**	8	14	
BB	**Buffer**	**3**	2	-	

TABLE 2-26 TWO-LANE COLLECTOR STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent.*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	-	60	96	ft
Curb-to-Curb Width	**36**	-	46	ft
Design ADT	-	5,000	6,500	ADT
Design Speed [2]	-	25	35	mph
Grade	-	8	10	%
Curve Radius [3]	-	450	500	ft

TABLE 2-27 TWO-LANE COLLECTOR STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-3, UP-4, or UP-4T
Residential: *Residential Low-1 through 4*	UP-3, UP-4, UP-4T
Commercial Employment, Retail, and Services - Residential Prohibited Institutional, Public, and Semi-Public Facilities	UP-6, UP-6T, UP-7, or UP-7T

TABLE 2-28 PARKWAYS FOR TWO-LANE COLLECTOR STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.5.3 Two-Lane Collector with Two-Way Left Turn Lane

A street that primarily provides movement between local/collector streets and streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.

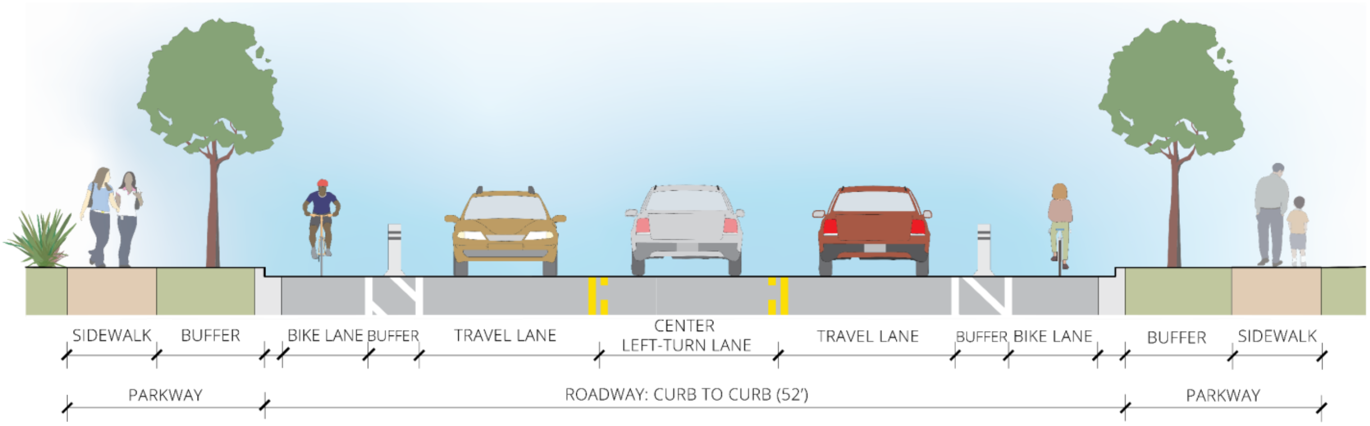

FIGURE 2-19 TWO-LANE COLLECTOR WITH TWO-WAY LEFT TURN LANE SECTION VIEW (OPTION C5)

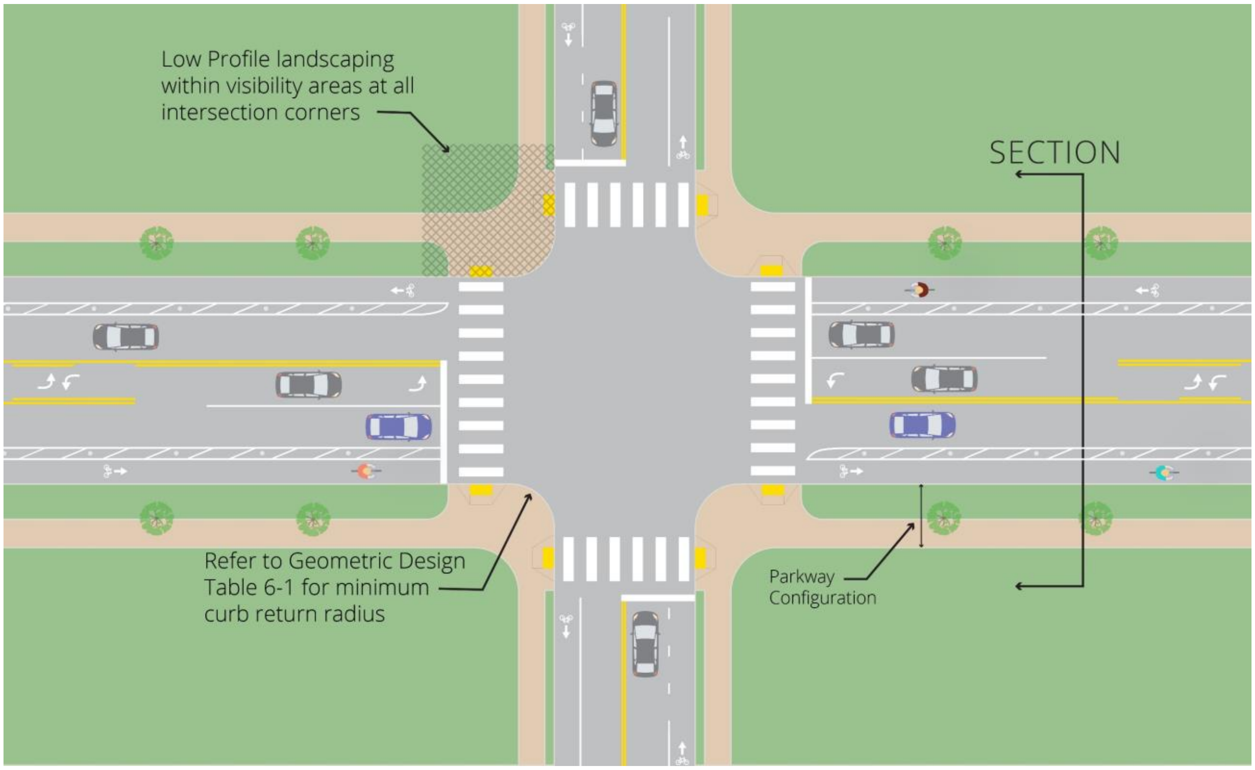

FIGURE 2-20 TWO-LANE COLLECTOR WITH TWO-WAY LEFT TURN LANE PLAN VIEW (OPTION C5)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout							Speed	Modal Priority(ies)
		Pref	Min	Max									
C1	Bike Lane	**54**	40	54	BL	BB	TL	CT	TL	BB	BL	Under 35	
C2	Parallel Parking + Bike Lane	**54**	54	54	PP	BL	TL	CT	TL	BL	PP		
C3	Parallel Parking	**50**	44	54		PP	TL	CT	TL	PP			
C4	Two-Way Cycle Track	**50**	45	54	BTW	BB	TL	CT	TL			35 and over	
C5	One-Way Cycle Tracks	**52**	44	54	BT	BB	TL	CT	TL	BB	BT		
C6	Bus Only Lanes	**54**	52	54		Bus	TL	CT	TL	Bus			

TABLE 2-29 TWO-LANE COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
PP	Parallel Parking	**8**	7	9	
Bus	Bus Only Lane	**12**	11	14	
BL	Bike Lane (Class II)	**7**	5	8	
BT	One-way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-30 TWO-LANE COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	78	94	ft
Curb-to-Curb Width	**54**	40	-	ft
Design ADT [1]	**-**	10,000	13,000	
Design Speed [2]	**-**	30	40	mph
Grade	**-**	-	8	%
Curve Radius [3]	**470**	380	610	ft

TABLE 2-31 TWO-LANE COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-3, UP-4, or UP-4T
Residential	UP-3, UP-4, or UP-4T
Commercial Employment, Retail and Services - Residential Prohibited Institutional, Public, and Semi-Public Facilities Multiple Use: *Urban Village*	UP-6, UP-6T, UP-7, or UP-7T

TABLE 2-32 PARKWAYS FOR TWO-LANE COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.5.4 Two-Lane Industrial Collector

An industrial street that primarily provides movement between local/collector streets and streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.

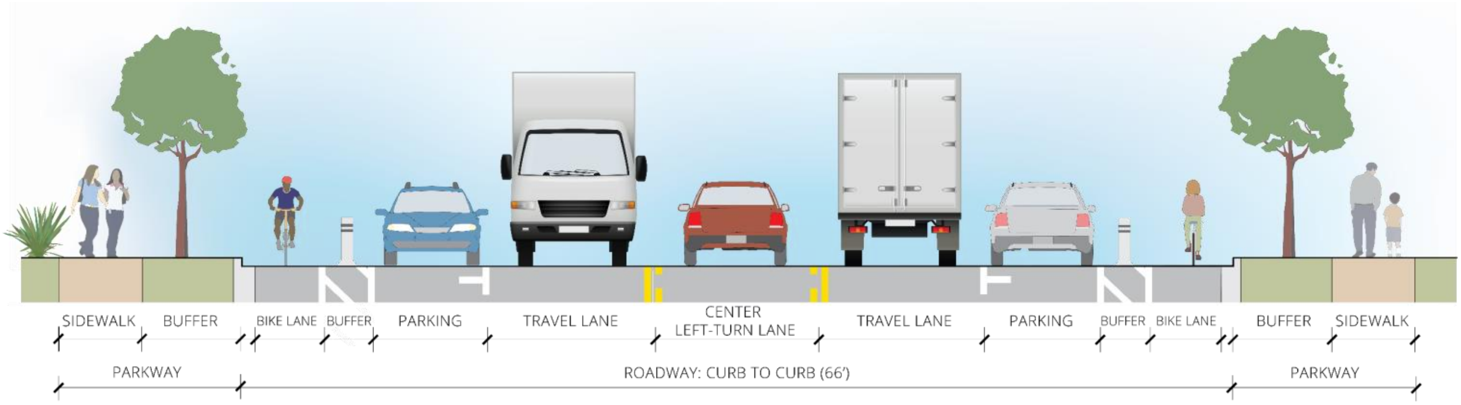

FIGURE 2-21 TWO-LANE INDUSTRIAL COLLECTOR SECTION VIEW (OPTION C5)

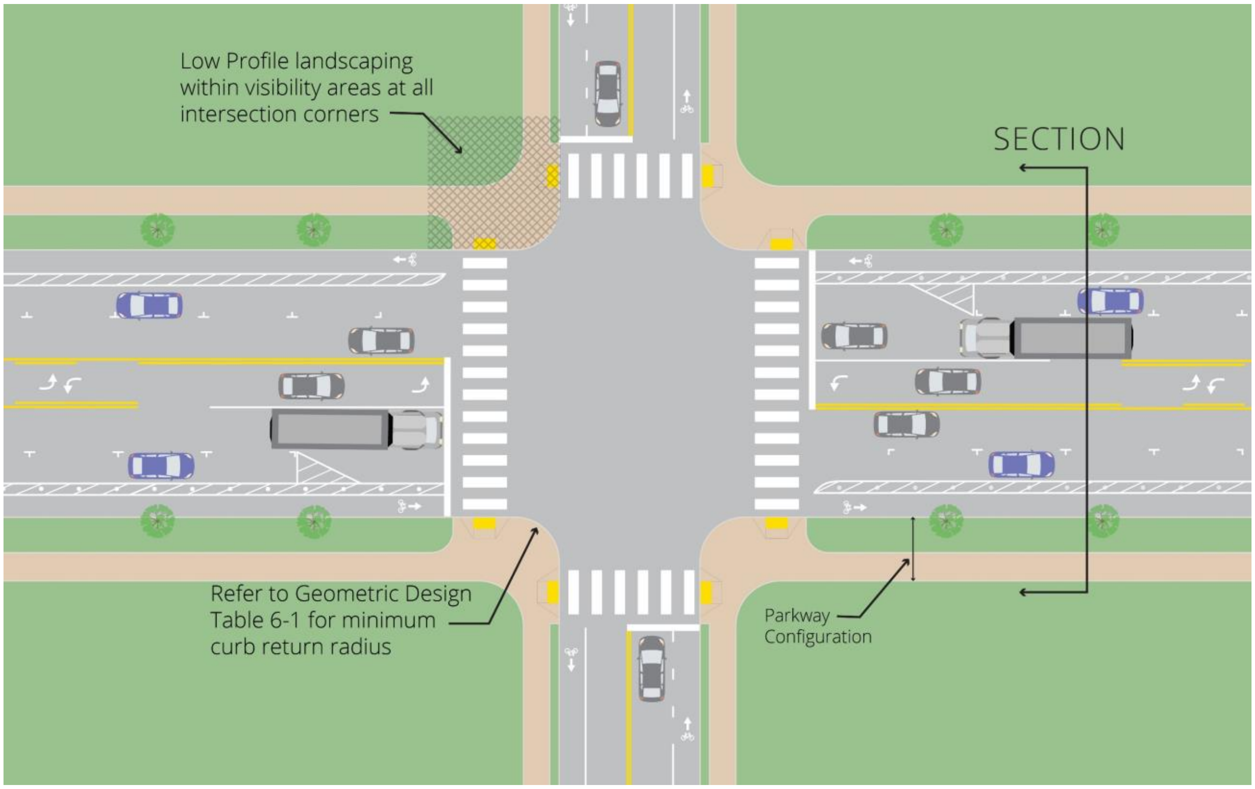

FIGURE 2-22 TWO-LANE INDUSTRIAL COLLECTOR PLAN VIEW (OPTION C5)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Bike Lane	**54**	40	54	BL BB TL CT TL BB BL	Under 35	
C2	Parallel Parking + Bike Lane	**54**	54	54	PP BL TL CT TL BL PP		P
C3	Parallel Parking	**50**	44	54	PP TL CT TL PP		P
C4	Two-Way Cycle Track	**50**	45	54	BTW BB TL CT TL	35 and Over	
C5	One-Way Cycle Tracks	**54**	44	54	BT BB TL CT TL BB BT		
C6	One-Way Cycle Tracks + Parking	**66**	60	66	BT BB PP TL CT TL PP BB BT		P
C7	Bus Only Lanes	**54**	52	54	Bus TL CT TL Bus		

TABLE 2-33 TWO-LANE INDUSTRIAL COLLECTOR STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane	**11**	10	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
PP	Parallel Parking	**8**	7	9	P
Bus	Bus Only Lane	**12**	11	14	
BL	Bike Lane (Class II)	**7**	5	8	
BT	One-way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-34 TWO-LANE INDUSTRIAL COLLECTOR STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	80	90	ft
Curb-to-Curb Width	**60**	40	66	ft
Design ADT [1]	**-**	5,000	6,500	ADT
Design Speed [2]	**-**	30	40	mph
Grade	**-**	-	8	%
Curve Radius [3]	**340**	300	430	ft

TABLE 2-35 TWO-LANE INDUSTRIAL COLLECTOR LANE STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Industrial Employment	UP-2, UP-3, UP-4 or UP-4T

TABLE 2-36 PARKWAYS FOR TWO-LANE INDUSTRIAL COLLECTOR STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.5.5 Four-Lane Urban Collector with Two-way Left Turn Lane

A street that primarily provides movement between local/collector streets and streets of higher classification; secondarily, it provides access to abutting property. It carries low-to-moderate vehicular movement, low-to-heavy pedestrian movement, moderate-to-heavy bicycle movement, and low-to-moderate transit movement. It typically has on-street parking, street trees, traffic safety street lighting, and sidewalks. It may also include landscaping, pedestrian-scale lighting, and underground utilities.

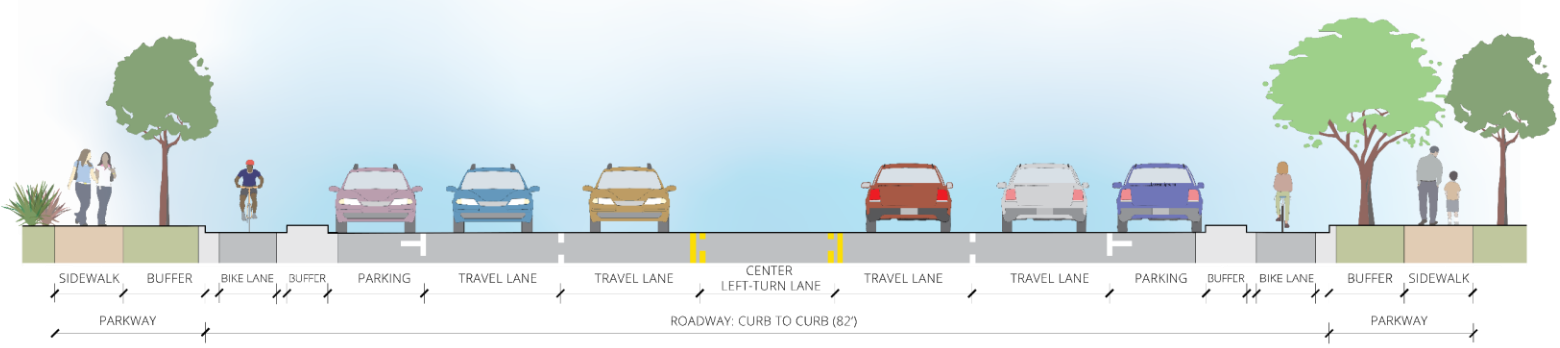

FIGURE 2-23 FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT TURN LANE SECTION VIEW (OPTION C4)

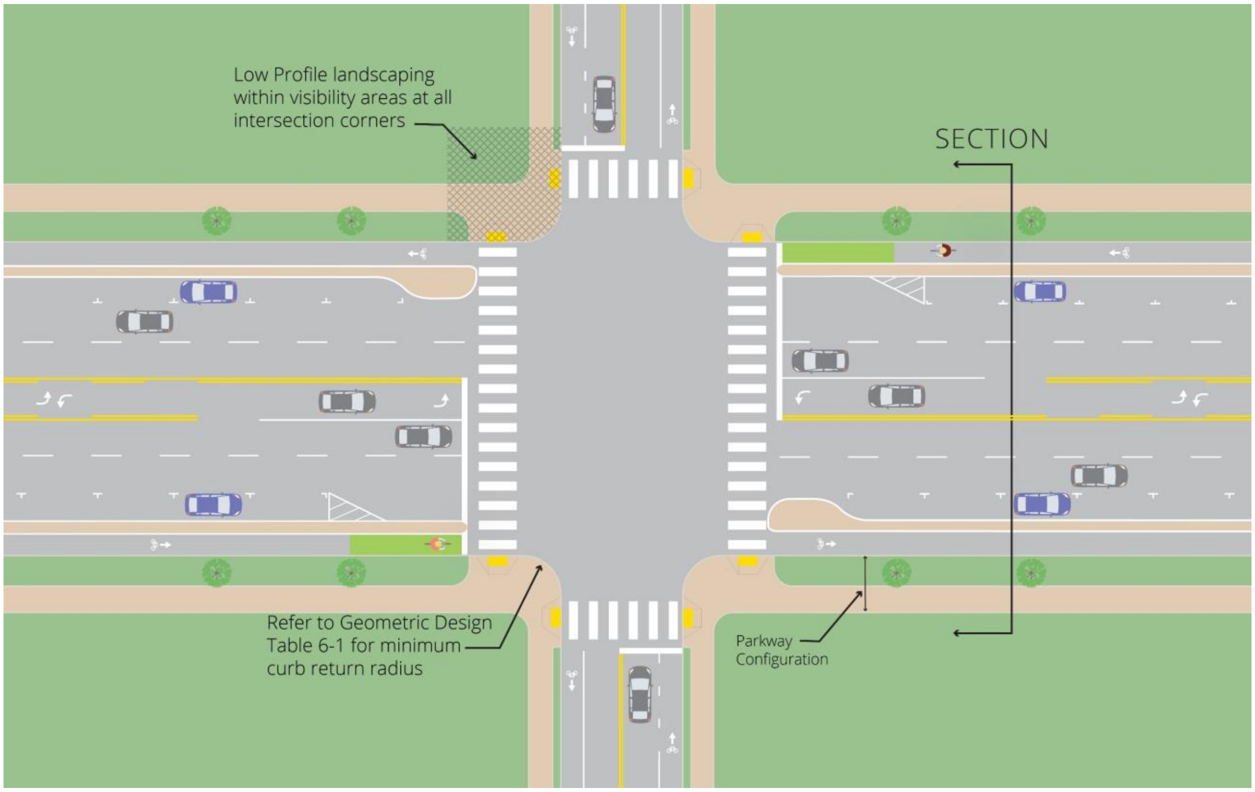

FIGURE 2-24 FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT TURN LANE PLAN VIEW (OPTION C4)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout											Speed	Modal Priority(ies)
		Pref	Min	Max													
C1	Two-Way Cycle Track	**74**	64	82		BTW	BB	TL	TL	CT	TL	TL				35 and over	
C2	One-Way Cycle Tracks	**76**	66	82		BT	BB	TL	TL	CT	TL	TL	BB	BT			
C3	Parallel Parking + Two-Way Cycle Track	**82**	78	82	BTW	BB	PP	TL	TL	CT	TL	TL	PP				
C4	Parallel Parking + One-Way Cycle Tracks	**82**	80	82	BT	BB	PP	TL	TL	CT	TL	TL	PP	BB	BT		
C5	Bus Only Lanes	**58**	52	82				Bus	TL	CT	TL	Bus					
C6	Travel Lanes Only	**58**	50	82				TL	TL	CT	TL	TL					

TABLE 2-37 FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9.5	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
PP	Parallel Parking	**8**	7	9	
Bus	Bus Only Lane	**12**	11	14	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-38 FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	110	112	ft
Curb-to-Curb Width	**82**	-	-	ft
Design ADT [1]	**-**	20,000	25,000	ADT
Design Speed [2]	**-**	30	40	mph
Grade	**-**	-	8	%
Curve Radius [3]	**470**	380	610	ft

TABLE 2-39 FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation	UP-4 or UP-4T
Residential	UP-4 or UP-4T
Commercial Employment, Retail, and Services - Residential Prohibited Institutional, Public, and Semi-Public Facilities	UP-6, UP-6T, UP-7, or UP-7T
Industrial Employment	UP-4 or UP-4T

TABLE 2-40 PARKWAYS FOR FOUR-LANE URBAN COLLECTOR WITH TWO-WAY LEFT TURN LANE STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.6. Major Streets

Major Streets are streets that primarily provides a network connecting vehicles and transit to other major streets, primary arterials, and to the freeway system; secondarily, it provides access to abutting commercial and industrial properties. It carries moderate-to-heavy vehicular movement, low-to-high pedestrian and bicycle movements, and moderate-to-high transit movement. It typically has a raised center median, street trees, traffic safety street lighting, and sidewalks, and may include landscaping, pedestrian-scale lighting, underground utilities, on-street parking, and/or bicycle facilities.

Primary Arterials are streets that primarily provides a network connecting vehicles and transit to other primary arterials and to the freeway system. It carries heavy vehicular movement while providing low pedestrian movement and moderate bicycle and transit movements. It typically has a raised center median, bicycle facilities, street trees, traffic safety street lighting, sidewalks, and no access from abutting property. It may include underground utilities.

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as deemed appropriate by the City Engineer. Figures 2-25 through 2-32 and Tables 2-41 through 2-56 below illustrate the design specifications for four-lane urban major streets, four-lane major streets, six-lane urban major streets, and six-lane primary arterial streets.

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2.6.1 Four-Lane Urban Major

A street that primarily provides a network connecting vehicles and transit to other major streets, primary arterials, and to the freeway system; secondarily, it provides access to abutting commercial and industrial properties. It carries moderate-to-heavy vehicular movement, low-to-high pedestrian and bicycle movement, and moderate-to-high transit movement. It typically has a raised center median, street trees, traffic safety street lighting, and sidewalks; it may include landscaping, pedestrian-scale lighting, underground utilities, on-street parking, and/or bicycle facilities.

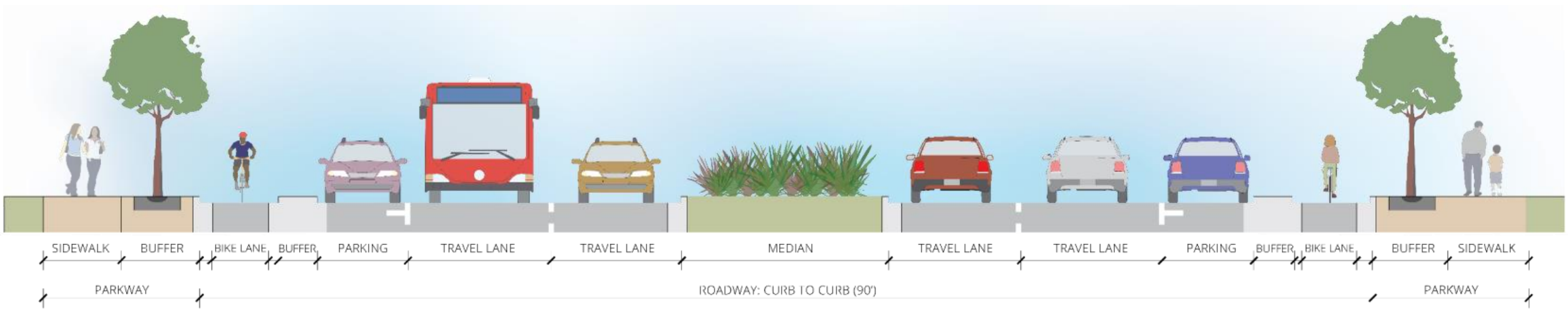

FIGURE 2-25 FOUR-LANE URBAN MAJOR SECTION VIEW (OPTION C4)

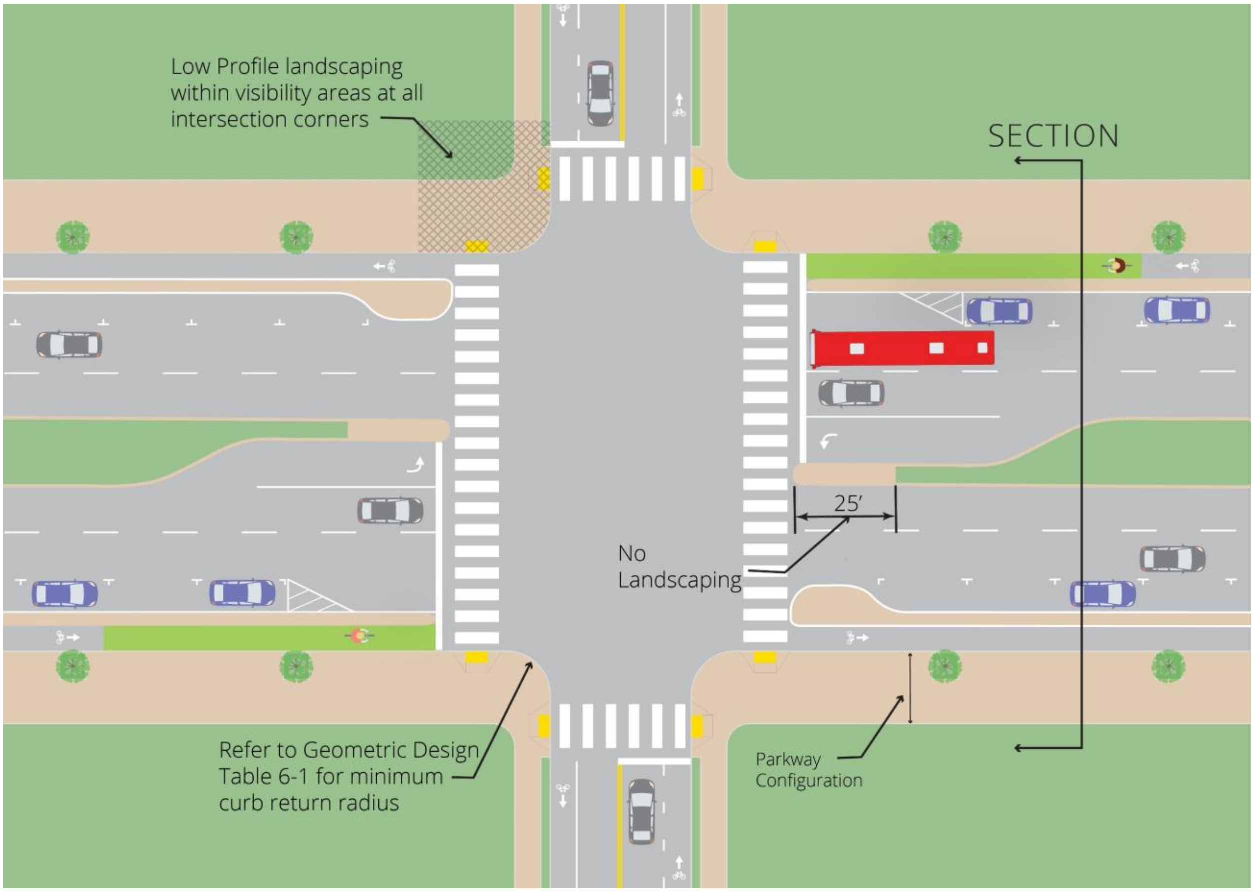

FIGURE 2-26 FOUR-LANE URBAN MAJOR SECTION VIEW (OPTION C4)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Two-Way Cycle Track	**80**	70	90	BTW BB TL TL CT TL TL	35 and Over	
C2	One-Way Cycle Tracks	**84**	74	90	BT BB TL TL CT TL TL BB BT		
C3	Parallel Parking + Two-Way Cycle Track	**90**	84	90	BTW BB PP TL TL CT TL TL PP		
C4	Parallel Parking + One-Way Cycle Tracks	**90**	88	90	BT BB PP TL TL CT TL TL PP BB BT		
C5	Bus Only Lanes	**64**	58	90	Bus TL CT TL Bus		
C6	Travel Lanes Only	**64**	56	90	TL TL CT TL TL		

TABLE 2-41 FOUR-LANE URBAN MAJOR STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9.5	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
PP	Parallel Parking	**8**	7	9	
Bus	Bus Only Lane	**12**	11	14	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-42 FOUR-LANE URBAN MAJOR STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	118	130	ft
Curb-to-Curb Width	**90**	-	-	ft
Design ADT [1]	**-**	30,000	35,000	ADT
Design Speed [2]	**-**	25	45	mph
Grade	**-**	-	7	%
Curve Radius [3]	**830**	660	1,090	ft

TABLE 2-43 FOUR-LANE URBAN MAJOR STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation Residential Commercial Employment, Retail, and Services: *Community Commercial, Regional Commercial, Commercial Office, Visitor Commercial* Institutional, Public, and Semi-Public Facilities Industrial Employment	UP-5 or UP-5T

TABLE 2-44 PARKWAYS FOR FOUR-LANE URBAN MAJOR STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.6.2 Four-Lane Major

A street that primarily provides a network connecting vehicles and transit to other major streets and primary arterials and to the freeway system; secondarily, it provides access to abutting commercial and industrial properties. It carries moderate-to-heavy vehicular movement, low-to-high pedestrian and bicycle movement, and moderate-to-high transit movement. It typically has a raised center median, street trees, traffic safety street lighting, and sidewalks; it may include landscaping, pedestrian-scale lighting, underground utilities, on-street parking, and/or bicycle facilities.

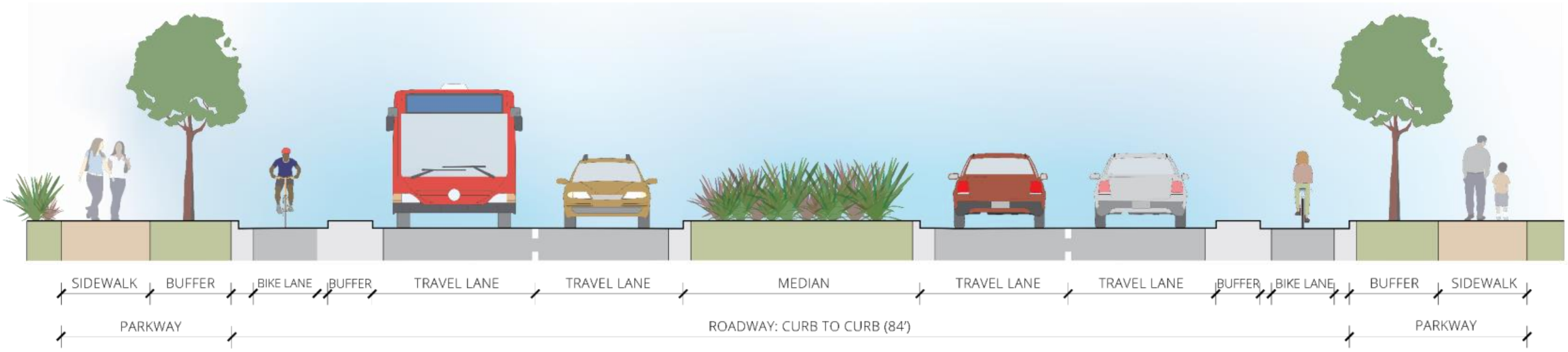

FIGURE 2-27 FOUR-LANE MAJOR SECTION VIEW (OPTION C2)

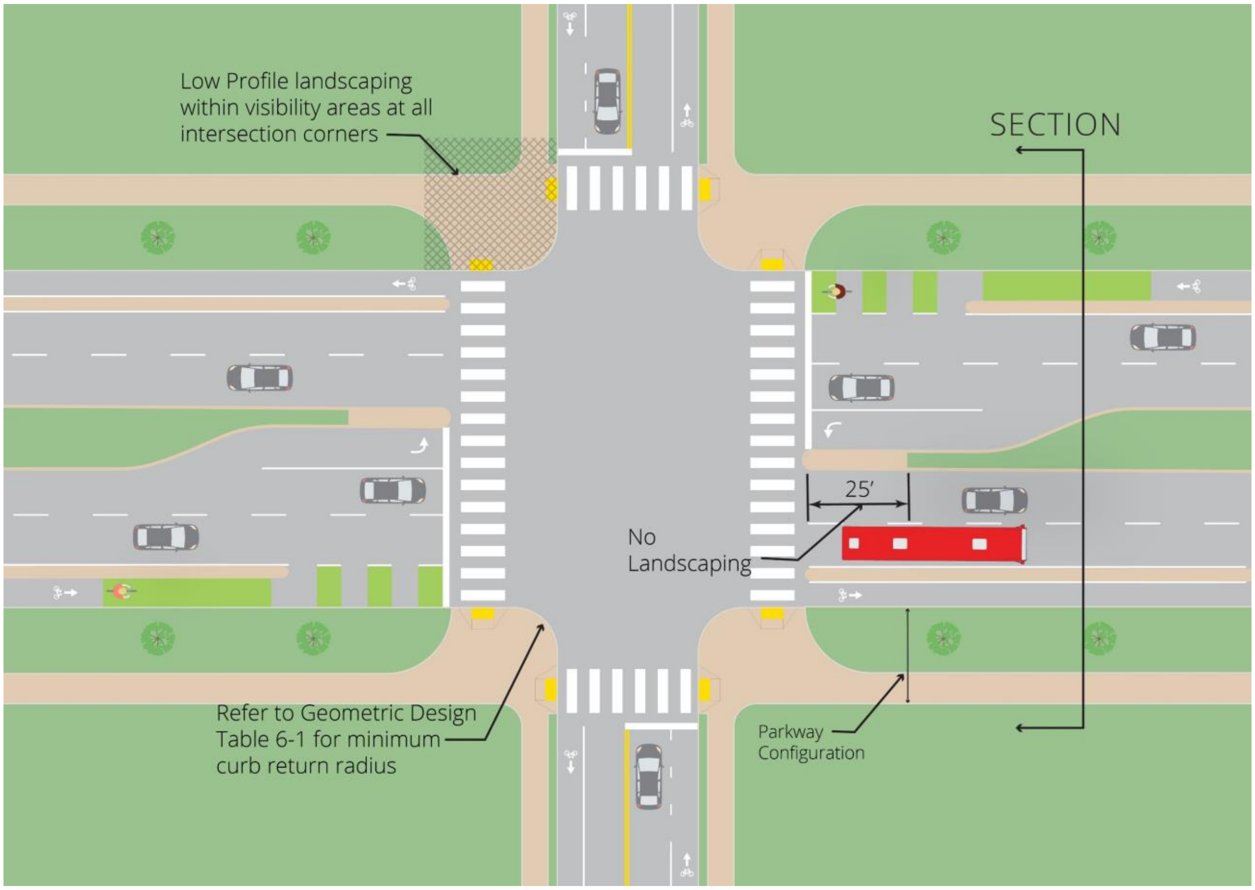

FIGURE 2-28 FOUR-LANE MAJOR PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Two-Way Cycle Track	**69**	60	78	BTW BB TL TL CT TL TL	35 and Over	
C2	One-Way Cycle Tracks	**74**	74	82	BT BB TL TL CT TL TL BB BT		
C3	Bus Only Lanes	**56**	52	76	Bus TL CT TL Bus		
C4	Travel Lanes Only	**54**	50	76	TL TL CT TL TL		

TABLE 2-45 FOUR-LANE MAJOR STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9.5	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
Bus	Bus Only Lane	**12**	11	14	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-46 FOUR-LANE MAJOR STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**120**	-	-	ft
Curb-to-Curb Width	**76**	-	-	ft
Design ADT [1]	**-**	30,000	35,000	ADT
Design Speed [2]	**-**	30	55	mph
Grade	**-**	-	7	%
Curve Radius [3]	**1,350**	880	1,850	ft

TABLE 2-47 FOUR-LANE MAJOR STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation Residential Commercial Employment, Retail, and Services: *Community Commercial, Regional Commercial, Commercial Office, Visitor Commercial* Institutional, Public, and Semi-Public Facilities Industrial Employment	UP-5 or UP-5T

TABLE 2-48 PARKWAYS FOR FOUR-LANE MAJOR STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.6.3 Six-Lane Urban Major

A street that primarily provides a network connecting vehicles and transit to other major streets and primary arterials and to the freeway system; secondarily, it provides access to abutting commercial and industrial properties. It carries moderate-to-heavy vehicular movement, low-to-high pedestrian and bicycle movement, and moderate-to-high transit movement. It typically has a raised center median, street trees, traffic safety street lighting, and sidewalks; it may include landscaping, pedestrian-scale lighting, underground utilities, on-street parking, and/or bicycle facilities.

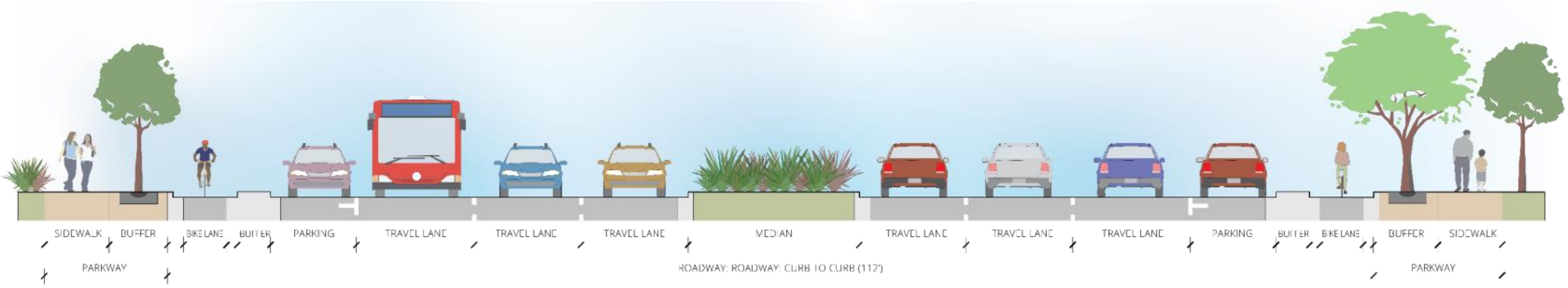

FIGURE 2-29 SIX-LANE URBAN MAJOR SECTION VIEW (OPTION C4)

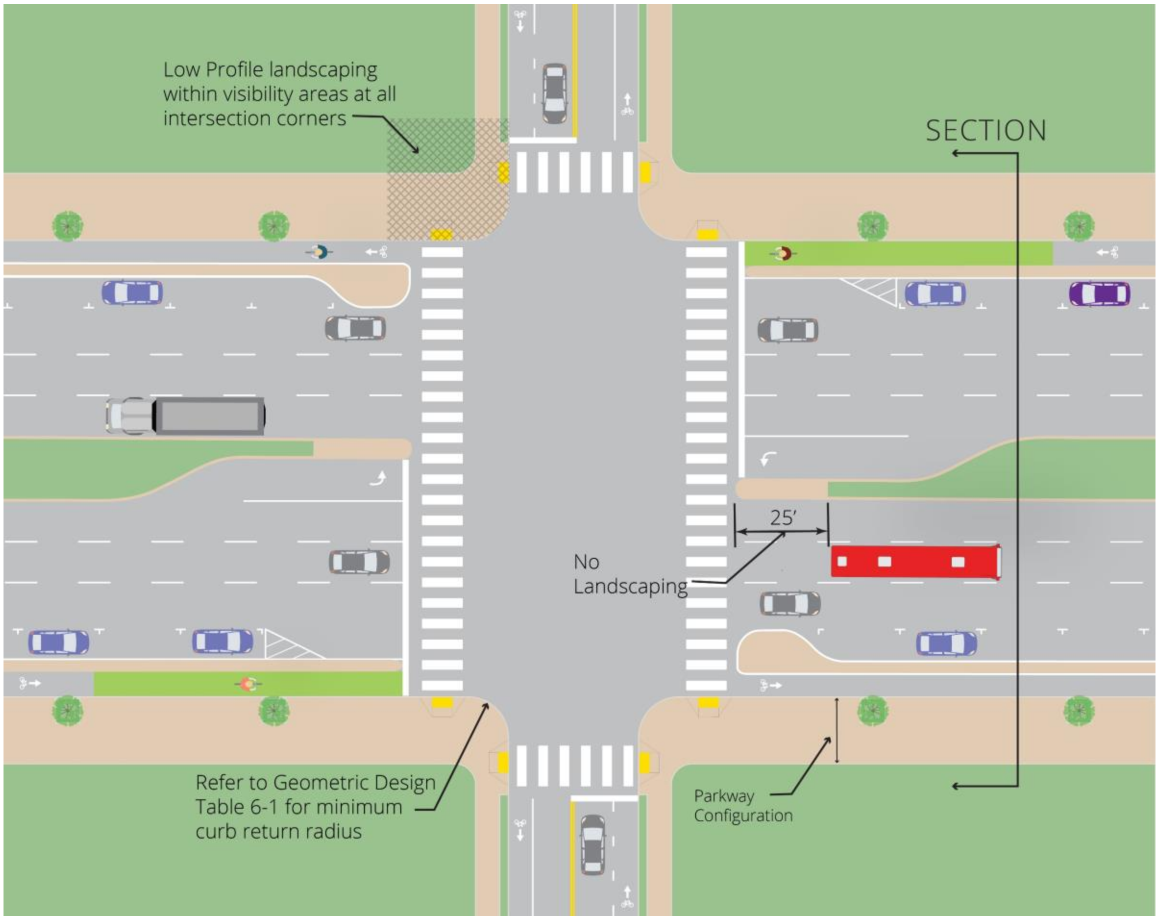

FIGURE 2-30 SIX-LANE URBAN MAJOR PLAN VIEW (OPTION C4)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Two-Way Cycle Track	**104**	90	112	BTW BB TL TL TL CT TL TL TL	35 and Over	
C2	One-Way Cycle Tracks	**108**	92	112	BT BB TL TL TL CT TL TL TL BB BT		
C3	Parallel Parking + Two-Way Cycle Track	**112**	104	112	BTW BB PP TL TL TL CT TL TL TL PP		P
C4	Parallel Parking + One-Way Cycle Tracks	**112**	106	112	BT BB PP TL TL TL CT TL TL TL PP BB BT		P
C5	Bus Only Lanes	**88**	78	112	Bus TL TL CT TL TL Bus		
C6	Travel Lanes Only	**88**	76	112	TL TL TL CT TL TL TL		

TABLE 2-49 SIX-LANE URBAN MAJOR STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9.5	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
PP	Parallel Parking	**8**	7	9	P
Bus	Bus Only Lane	**12**	11	14	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-50 SIX-LANE URBAN MAJOR STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	140	152	ft
Curb-to-Curb Width	**112**	-	-	ft
Design ADT [1]	**-**	40,000	45,000	
Design Speed [2]	**-**	25	45	mph
Grade	**-**	-	7	%
Curve Radius [3]	**830**	660	1,090	ft

TABLE 2-51 SIX-LANE URBAN MAJOR STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation Residential Commercial Employment, Retail, and Services: *Community Commercial, Regional Commercial, Commercial Office, Visitor Commercial* Institutional, Public, and Semi-Public Facilities Multiple Use: *Urban Village* Industrial Employment	UP-4, UP-4T, UP-6, UP-6T, UP-7, or UP-7T

TABLE 2-52 PARKWAYS FOR SIX-LANE URBAN MAJOR STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.6.4 Six-Lane Primary Arterial

A street that primarily provides a network connecting vehicles and transit to other primary arterials and to the freeway system. It carries heavy vehicular movement while providing low pedestrian movement and moderate bicycle and transit movements. It typically has a raised center median, bicycle facilities, street trees, traffic safety street lighting, sidewalks, and no access from abutting property. It may include underground utilities.

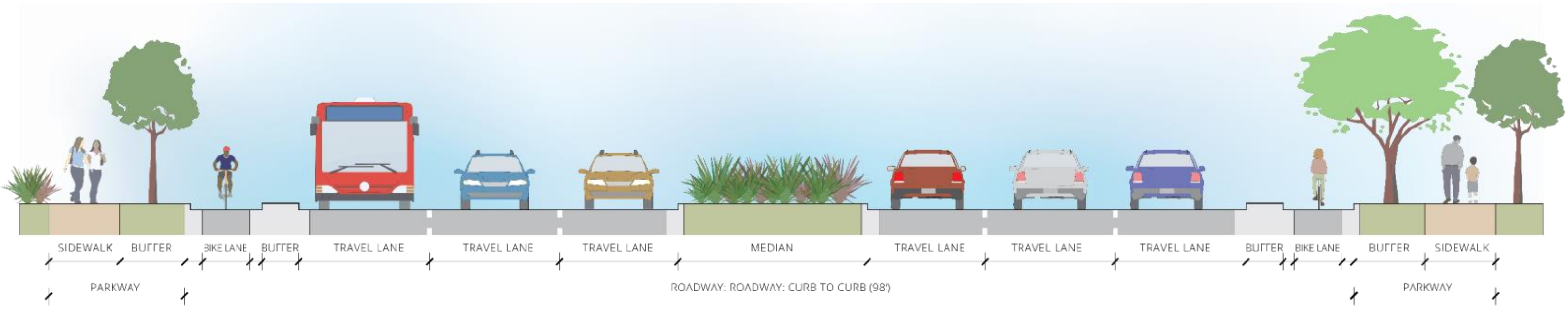

FIGURE 2-31 SIX-LANE PRIMARY ARTERIAL SECTION VIEW (OPTION C2)

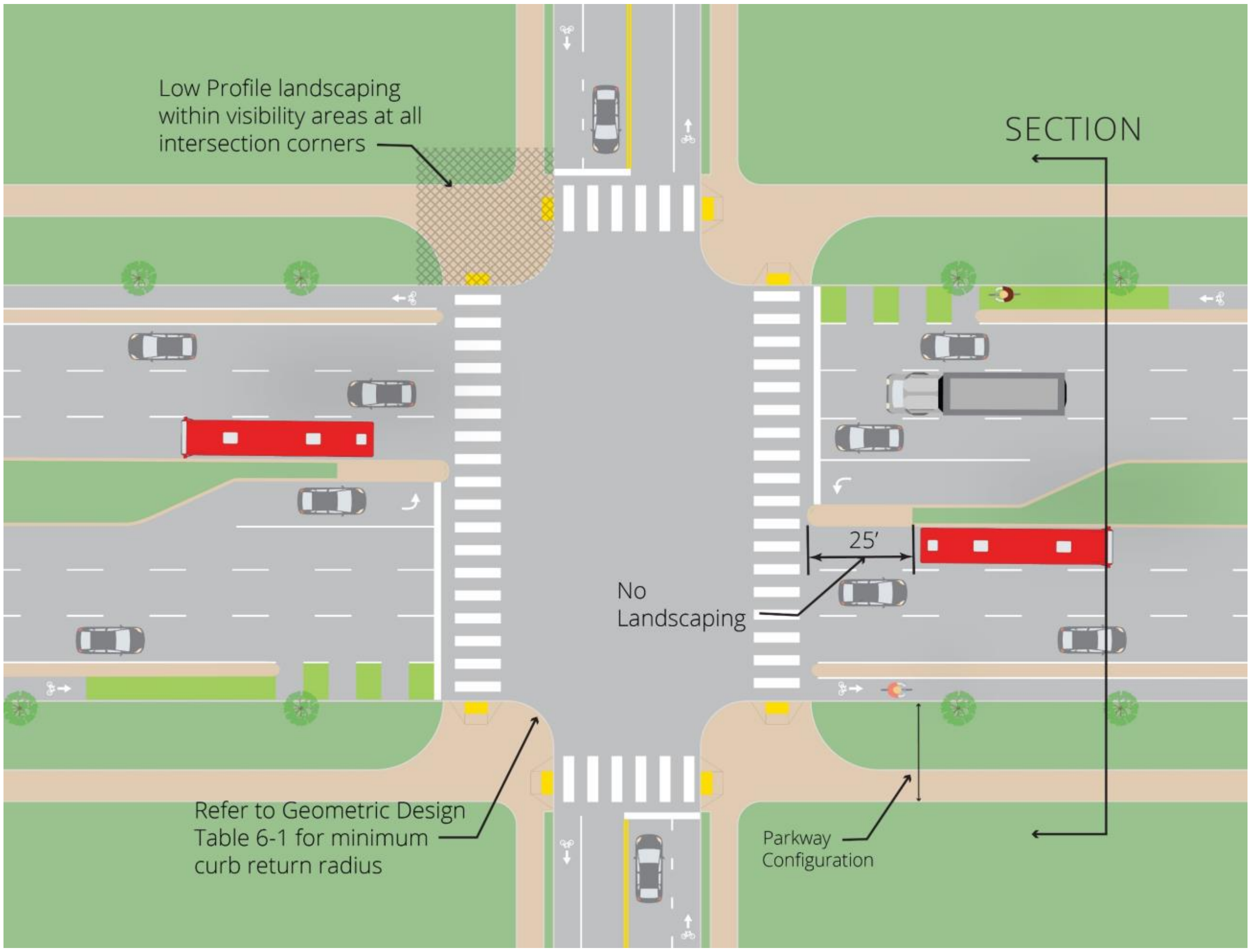

FIGURE 2-32 SIX-LANE PRIMARY ARTERIAL PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout											Speed	Modal Priority(ies)
		Pref	Min	Max													
C1	Two-Way Cycle Track	**98**	90	98	BTW	BB	TL	TL	TL	CT	TL	TL	TL			35 and Over	
C2	One-Way Cycle Tracks	**98**	92	98	BT	BB	TL	TL	TL	CT	TL	TL	TL	BB	BT		
C3	Bus Only Lanes	**88**	78	98			Bus	TL	TL	CT	TL	TL	Bus				
C4	Travel Lanes Only	**88**	76	98			TL	TL	TL	CT	TL	TL	TL				

TABLE 2-53 SIX-LANE PRIMARY ARTERIAL STREET DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane (Adjacent to Curb)	**11**	10	12	
	Through Lane (All other)	**10**	9.5	12	
CT	Center Turn Lane	**10**	10	12	
	Raised Median	**14**	6	-	-
Bus	Bus Only Lane	**12**	11	14	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-54 SIX-LANE PRIMARY ARTERIAL STREET FACILITY DIMENSIONS

Note:
** Bicycle Facility should exclude gutter pan width, if adjacent*
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**142**	-	-	ft
Curb-to-Curb Width	**98**	-	-	ft
Design ADT [1]	**-**	50,000	55,000	ADT
Design Speed [2]	**-**	50	60	mph
Grade	**-**	-	6	%
Curve Radius [3]	**1,350**	880	1,850	ft

TABLE 2-55 SIX-LANE PRIMARY ARTERIAL STREET SPECIFICATIONS

Note:
[1] Minimum and maximums for Design ADTs refer to LOS C and LOS D
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation Residential Commercial Employment, Retail, and Services: *Community Commercial, Regional Commercial, Commercial Office, Visitor Commercial* Institutional, Public, and Semi-Public Facilities Industrial Employment	UP-5 or UP-5T

TABLE 2-56 PARKWAYS FOR SIX-LANE PRIMARY ARTERIAL STREET

Note: See Appendix A for land use definitions and see Section 3.5.1 Urban Parkway Configurations for parkways

2.7. Rural Roads

Rurals roads are typically in agricultural, natural open space, and large lot (greater than 2.5 acres) residential areas that primarily provides direct access to abutting property or provides movement between local, collector, or streets of higher classification. It carries low-to-moderate vehicular movement, low pedestrian movement, low-to-moderate bicycle movement, and low transit movement. It may include traffic safety street lighting and underground utilities. It typically does not have sidewalks or landscaping.

All Figures are for illustrative purposes and all signing and striping are subject to the most recent adopted edition of the CA MUTCD or as appropriate by reviewer. Figures 2-33 through 2-36 and Tables 2-57 and 2-64 below illustrate the design specifications for rural local roads and rural collector roads.

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2.7.1 Rural Local Road

A road in agricultural, natural open space, and large lot (greater than 2.5 acres) residential areas that primarily provides direct access to abutting properties. It carries low vehicular movement, low pedestrian movement, and low bicycle movement. It may include traffic safety street lighting and underground utilities. It typically does not have sidewalks or landscaping.

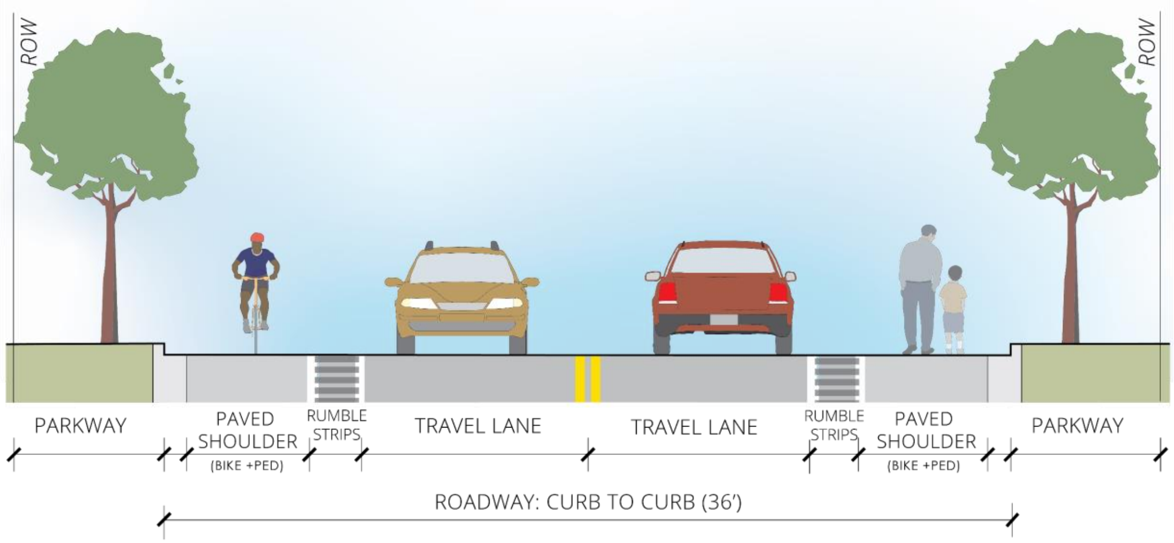

FIGURE 2-33 RURAL LOCAL ROAD SECTION VIEW (OPTION C2)

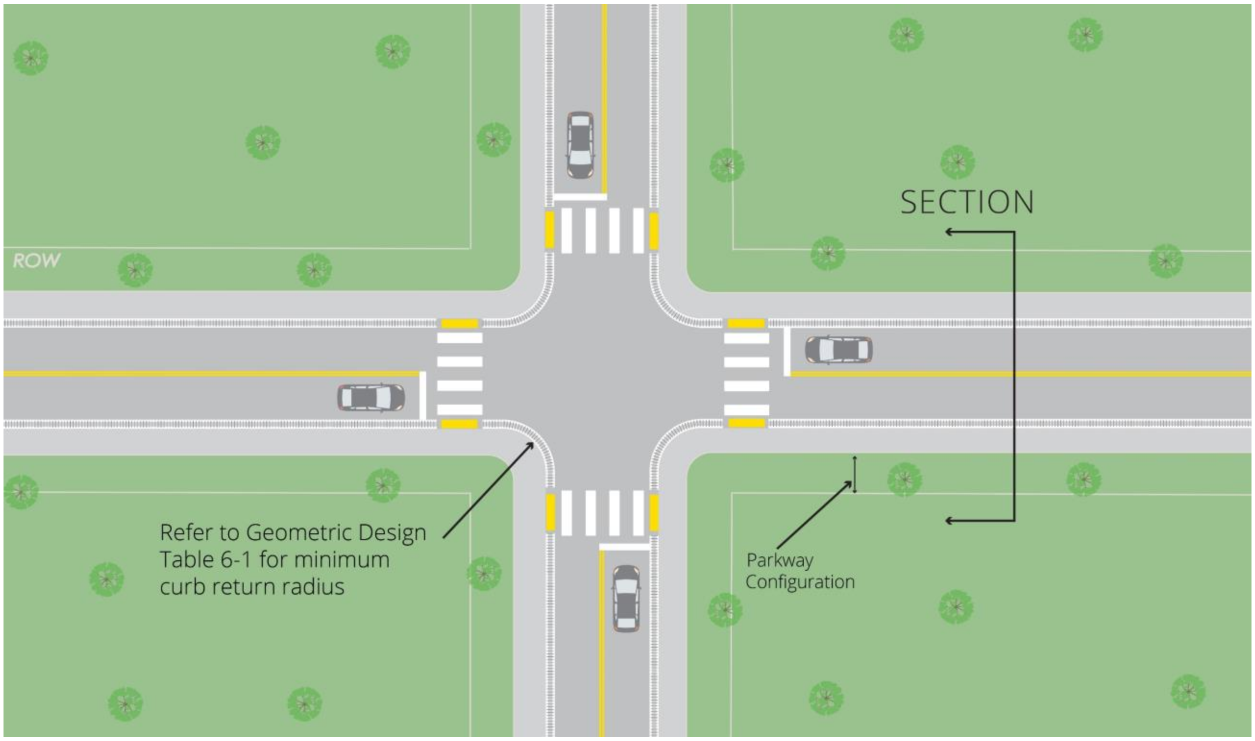

FIGURE 2-34 RURAL LOCAL ROAD PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Travel Lanes Only	**24**	24	24	TL TL	Under 35	
C2	Travel Lanes + Shoulder	**36**	24	36	SD TL TL SD		

TABLE 2-57 RURAL LOCAL ROAD DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane	**11**	10	12	
SD	Paved Shoulder	**-**	-	-	-
BL	Bike Lane (Class II)	**7**	5	8	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-58 RURAL LOCAL ROAD FACILITY DIMENSIONS

Note:
** See Section 6.5 for bicycle intersection treatments.*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**60**	-	-	ft
Paved Width	**36**	-	-	ft
Design ADT	**1,500**	-	-	ADT
Design Speed [2]	**-**	20	50	mph
Grade	**-**	-	15	%
Curve Radius [3]	**340**	300	430	ft

TABLE 2-59 RURAL LOCAL ROAD SPECIFICATIONS

Note:
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation Residential: *Residential Low-1 through 3* Agriculture	RP-1, RP-2, or RP-3

TABLE 2-60 PARKWAYS FOR RURAL LOCAL ROAD

Note: See Appendix A for land use definitions and Section 3.5.2 Rural Parkway Configurations for parkways

2.7.2 Rural Collector Road

A road in agricultural, natural open space, and large lot (greater than 2.5 acres) residential areas that primarily provides direct access to abutting properties. It carries low vehicular movement, low pedestrian movement, and low bicycle movement. It may include traffic safety street lighting and underground utilities. It typically does not have sidewalks or landscaping.

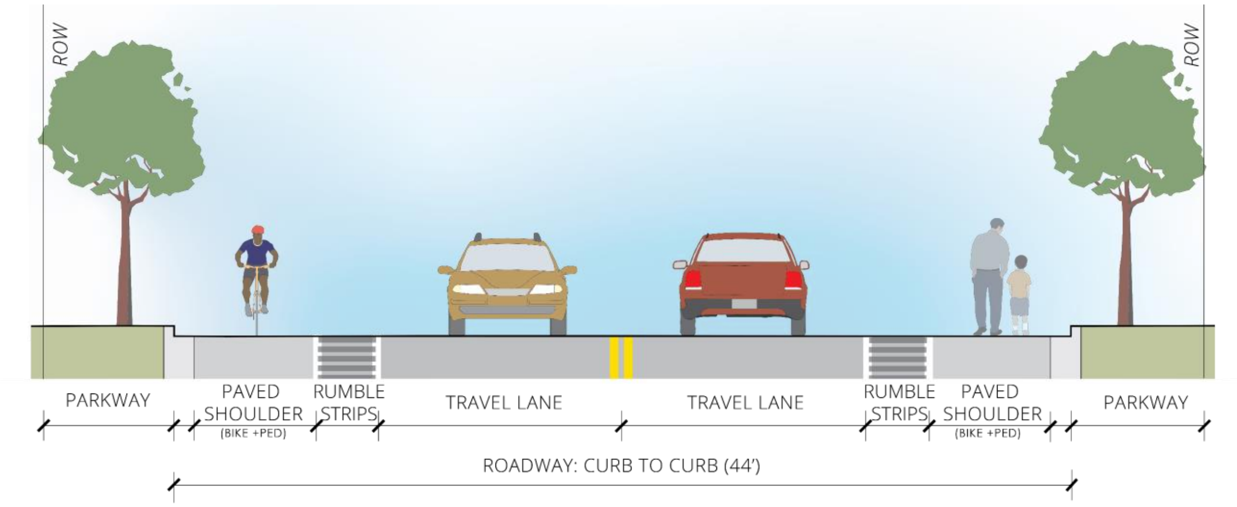

FIGURE 2-35 RURAL COLLECTOR ROAD SECTION VIEW (OPTION C2)

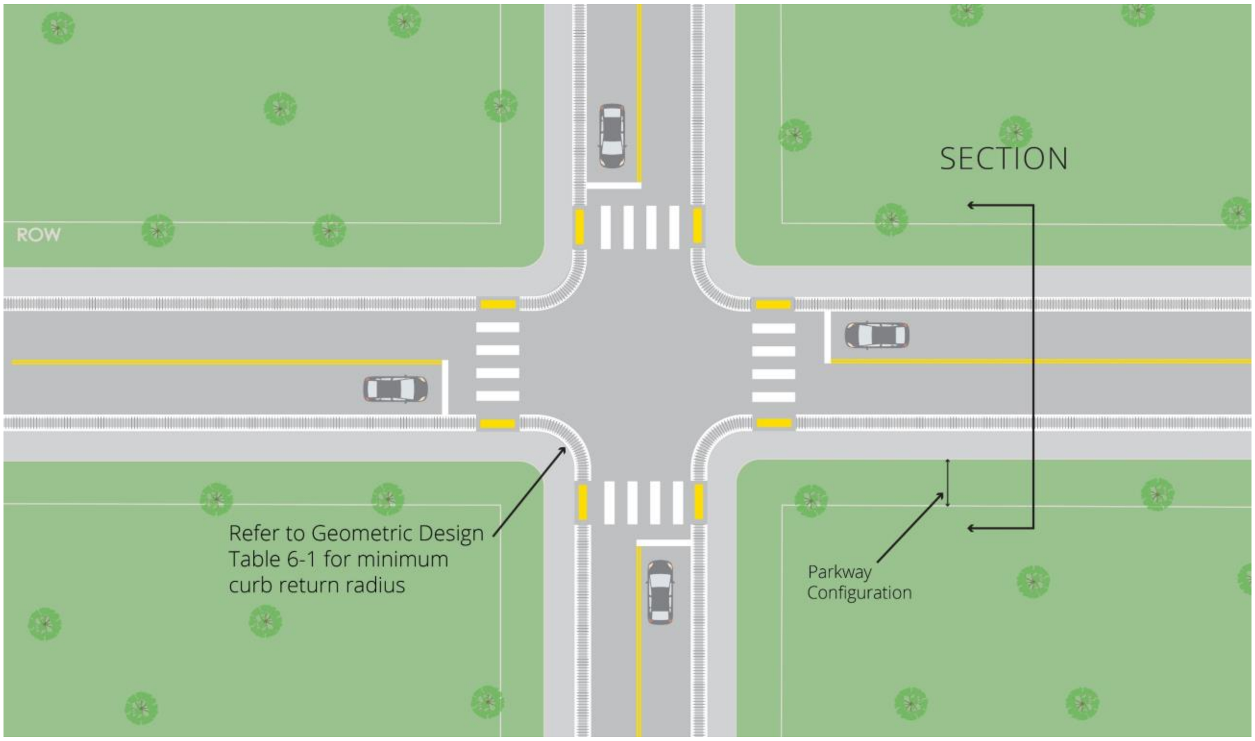

FIGURE 2-36 RURAL COLLECTOR ROAD PLAN VIEW (OPTION C2)

Opt #	Description	Curb-to-Curb Width (ft)			Sample Layout	Speed	Modal Priority(ies)
		Pref	Min	Max			
C1	Travel Lanes Only	**22**	20	24	TL TL	Over 35	
C2	One-way Cycle Tracks	**44**	40	44	BL BB TL TL BB BL		

TABLE 2-61 RURAL COLLECTOR ROAD DESIGN OPTIONS

Key	Description	Dimensions (ft)			Mode
		Pref	Min	Max	
TL	Through Lane	**11**	10	12	
BL	Bike Lane (Class II)	**7**	5	8	
BT	One-Way Cycle Track (Class IV)	**7**	6	8	
BTW	Two-Way Cycle Track (Class IV)	**12**	8	14	
BB	Buffer	**3**	2	-	

TABLE 2-62 RURAL COLLECTOR ROAD FACILITY DIMENSIONS

Note:
** See Section 6.5 for bicycle intersection treatments*

Description	Specifications			Units
	Pref	Min	Max	
Right of Way Width	**-**	80	96	ft
Paved Width	**44**	-	-	ft
Design ADT	**7,500**			ADT
Design Speed [2]	**-**	20	60	mph
Grade	**5**	4	7	%
Curve Radius [3]	**1,350**	970	1,850	ft

TABLE 2-63 RURAL COLLECTOR ROAD SPECIFICATIONS

Note:
[2] Minimum and maximums refer to AASHTO 2018 Greenbook Design Speeds
[3] Curve radii are derived from Caltrans' HDM Maximum Comfortable Speed on Horizontal Curves chart.

Land Use	Parkway Configurations
Parks, Open Space, and Recreation Residential: *Residential Low-1 through 3* Agriculture	RP-4

TABLE 2-64 PARKWAYS FOR RURAL COLLECTOR ROAD

Note: See Appendix A for land use definitions and Section 3.5.2 Rural Parkway Configurations for parkways

2.7.3 Green Infrastructure for Rural Roads

Rural swale systems are a combination of street design elements that allow for surface drainage while simultaneously protecting the roadway edge, organizing parking, and allowing for driveway access (see BASMAA, 1999). A section of a typical rural swale system is illustrated in Figure 2-37. As shown in the figure, curb and gutter are not required. The street is crowned to direct runoff to shoulders where it is collected into a vegetated swale or gravel shoulder. The rural swale system is appropriate for Private Street, Rural Local Road, and Rural Collector Road classifications.

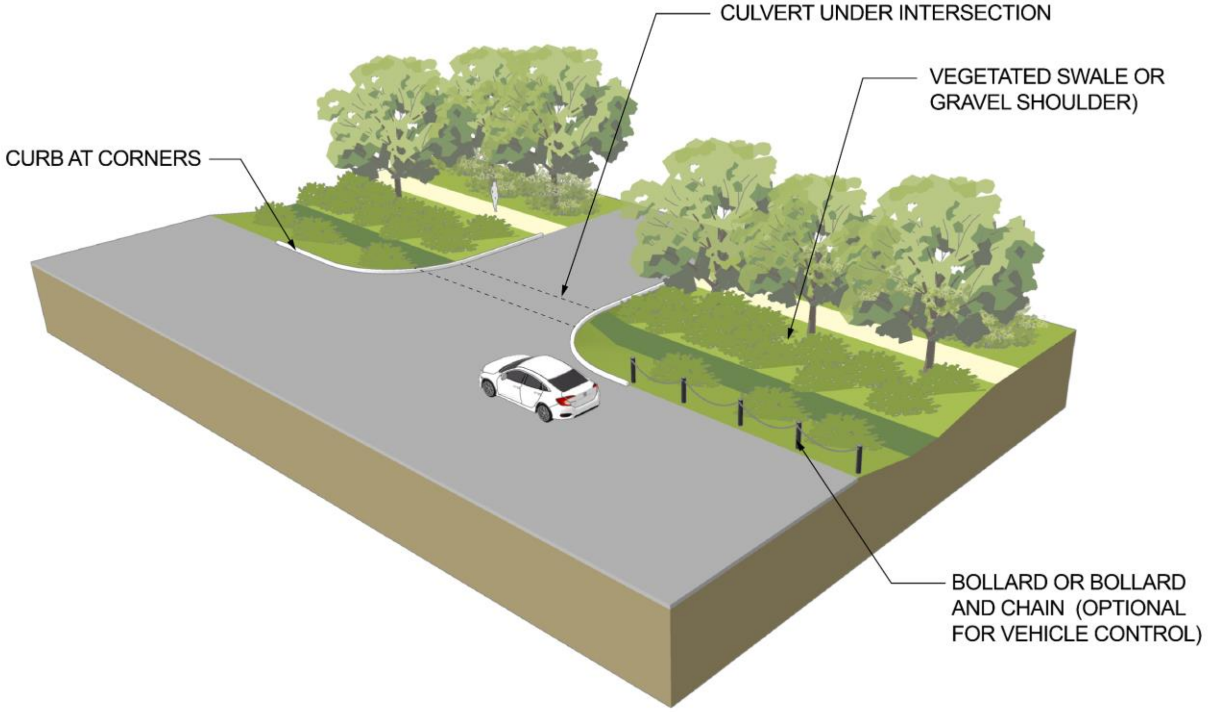

FIGURE 2-37 RURAL SWALE SYSTEM DIAGRAM

References:

- Start at the Source: Design Guidance Manual for Stormwater Quality Protection, BASMAA, 1999

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3 The Parkway Zone

The Parkway Zone (also referred to as a parkway) typically encompasses the region of the right of way (ROW) between the property line and the curb. Its primary function is to provide a safe, accessible, and enjoyable means of travel for pedestrians, a public space between buildings and land uses; and separation from the Flex Zone where people park, bike, or embark/disembark from transit. The Parkway Zone can include a vibrant space with street furniture, street trees, wayfinding signage, and outdoor dining.

FIGURE 3-1 THE PARKWAY ZONE IN RELATION TO OTHER ROW ZONES

Who Are Pedestrians?

Pedestrian is used throughout these guidelines to include people who walk, push strollers or carts, stand or sit, access transit, or those who use a mobility assistive device or other mobility assisting device—be they children, teens, adults, elderly, persons with disabilities. Pedestrian-oriented design is accessible design for all people.

The principal issue in the design of a pedestrian-supportive street is how to allocate space. This can be how much space is required to satisfy the existing and future needs of pedestrians; how much space is required to create active public space or room for deliveries; or how much space is required to provide for street furniture, tree growth, and tree canopy.

The sections that follow discuss the pedestrian experience at street level, including:

- Creating a Parkway Zone
- New Development versus Retrofit
- Parkway Zone Guidelines and Standards

3.1. Creating a Parkway Zone

Land use and street design that benefit pedestrians also help promote use of alternatives to automobile travel and contribute to the overall quality, health, and community. Furthermore, policies designed to support walking and pedestrians also benefit overall accessibility. This approach to neighborhood design directly aligns with the City's General Plan and Climate Action Plan.

The Pedestrian Master Plan includes a comprehensive analysis of communities' existing pedestrian conditions and needs. The Plan identifies pedestrian routes to activity centers and infrastructure improvement projects along these routes. The plan is a key resource when considering pedestrian projects that promote pedestrian safety, walkability, mobility, and neighborhood quality.

The Parkway Zone is not merely a sidewalk or walking and rolling area for pedestrians. It is also an important social space where people interact and walk together, catch a bus, or dine at a café. Sidewalks within the Parkway Zone must be wide enough to accommodate movement in addition to amenities (such as seating and bike racks) making it more comfortable and appealing and encourage greater use.

Safe and direct sidewalk connections are of key importance to creating a pedestrian-friendly environment. Sidewalks should support activities that will occur in the area and provide a comfortable place for pedestrians to take part in various activities. However, creating a high-quality Parkway Zone that supports and encourages walking takes much more than simply providing sidewalks. The design of the sidewalk and buffer area, and the location of buildings are just some of the additional considerations of creating a pedestrian-supportive environment.

3.1.1 Design Considerations

The following are general design considerations when developing the Parkway Zone:

- Wider sidewalks and/or public gathering places should be provided when additional ROW is available.

- Wider sidewalks, bicycle facilities, or on-street parking can buffer uses and buildings from vehicular traffic.
- In pedestrian-oriented areas street design should prioritize pedestrians and incorporate lower speeds and narrower roadways to facilitate crossing and access.
- Sidewalk widths should be provided greater in areas with higher usage for both existing and future needs.
- Materials should be selected with consideration for maintenance and long-term appearance.
- Obstructions and conflict points should be minimized.
- Persons with disabilities must have equal access to all public facilities—primarily to public transit, public buildings and facilities, and along public rights-of-way.
- The space between buildings and traffic (including building setbacks) should encourage multimodal connectivity.
- Frequent driveways along a street create more conflict points between automobiles and pedestrians and impede the flow of traffic.

3.1.2 Relation to Transit

- The "footprint" of and access to transit facilities such as bus shelters must be considered in the design of sidewalks.
- Sidewalks must connect transit facilities with the adjacent uses and must be accessible for persons with disabilities.
- Incorporate MTS publication, "Designing for Transit" as well as these guidelines in relation to pedestrian access to transit facilities.
- All streets that are directly served by transit should also be designed or retrofitted to serve pedestrians to promote access to transit.
- Streets, sites, and buildings within an area that is walkable to transit stops should be designed or retrofitted to serve pedestrians.
- Transit stops must be served with curb ramps at both sides of the bus stops at the adjacent intersections as required by the ADA and California Title 24 regulations.

3.2. New Development versus Retrofit

These standards and guidelines outline the minimum improvements for the public ROW associated with new development. However, because the City is largely built out, and development is primarily infill, in many cases, tradeoffs between different needs and users may be necessary when retrofitting existing streets and developments.

The following considerations should be made for new or retrofitted ROW:

- Improvements to accessibility must be considered for both sides of the street.
- Neighborhoods evolve over time and the public ROW configuration influences future development and circulation.

The following considerations should be made for retrofitted ROW:

- As redevelopment occurs, dimensions of an existing parkway can be increased either through the acquisition of additional ROW, public easements to create additional pedestrian space, or through a reduction in curb-to-curb street width. Repurposing of existing on-street parking, or parking orientation, and lane reconfiguration to reduce speeding, can also create opportunities for an improved pedestrian environment.
- Utilities (e.g., lighting, electrical, and storm drains) should be identified and either incorporated into the design or relocated prior to improvements to existing streets.

The following considerations should be made for new ROW:

- New streets must consider the needs of all users in determining ROW width.
- For new road design, all rules, regulations, standards, and City policies apply.

3.3. Navigating the Parkway Zone

The Parkway Zone is typically located within the street ROW between the curb face and building face and/or property line. The Parkway Zone is composed of four distinct zones (see Figure 3-2 for illustration):

- Frontage Zone
- Throughway Zone
- Furnishings Zone
- Edge Zone

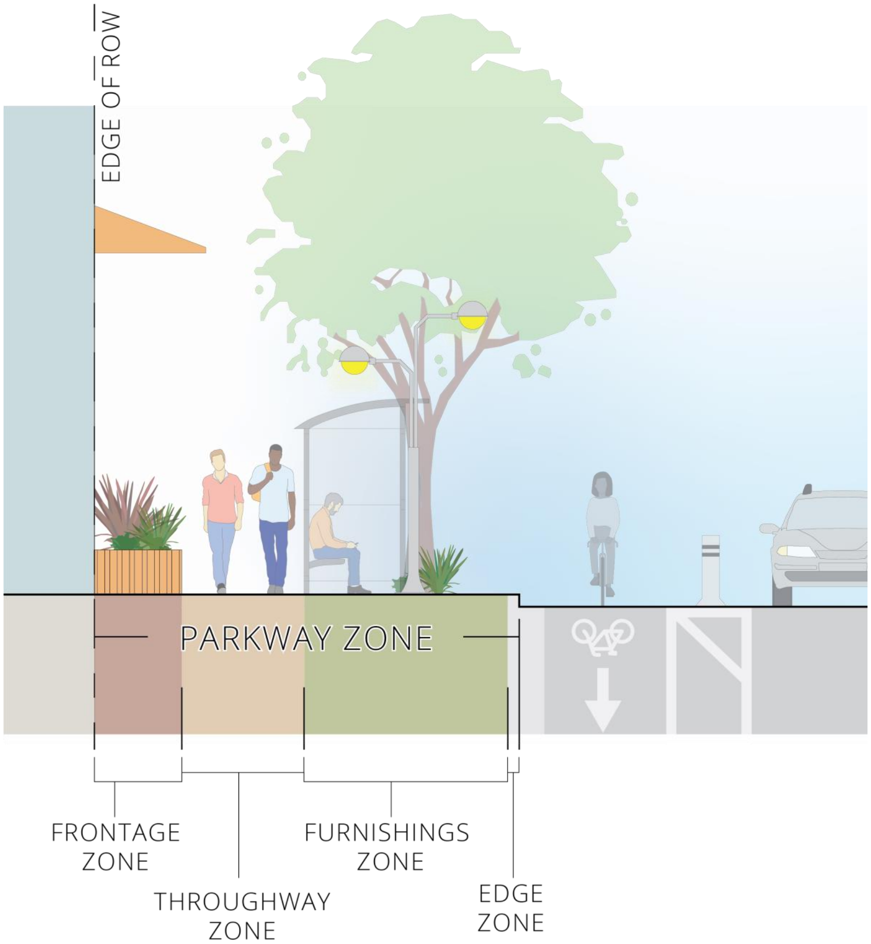

FIGURE 3-2 PARKWAY ZONES

3.4. Parkway Zone Standards and Guidelines

3.4.1 Frontage Zone

The Frontage Zone is the area adjacent to the property line that may be defined by a building façade, surface material change, landscaping, or a fence. The minimum Frontage Zone should be 1 foot 6 inches in these situations. Commercial land uses may use this zone for outdoor displays, plantings, seating, dining, or other activities as permitted by City regulations. Architectural elements that encroach into the street (e.g., awnings, stairs, front stoops, artistic elements, planters, marquees, etc.) may also occupy this zone. Where no Furnishings Zone exists, elements that would normally be sited there (e.g., benches, light poles, signals, trash receptacles, etc.) may occupy the Frontage Zone to keep the Throughway Zone clear and maintain minimum ADA requirements. It is the property owners' responsibility to ensure that there is adequate space to accommodate these uses without impeding access.

The usage of the Frontage Zone for entrance enhancements should occur most commonly in pedestrian-oriented land uses where building frontages adjoin the sidewalk, especially with high pedestrian orientation commercial and mixed-use land uses. Property entry points (e.g. entry paths, gates, portals, or columns) can also be enhanced for land uses with lower densities where building are generally set back from the Parkway Zone.

Standards and Guidelines:

- A fully accessible route from the Throughway Zone to the building point of entry must be provided.
- Elements including landscaping planters and lighting must not encroach upon the minimum pedestrian access route (PAR).
- Planters must be visible, so they do not become hazards within the pedestrian circulation path.
- The minimum width should be 3 feet when directly fronting at grade off-street parking spaces and should include either landscaping, low wall or fencing to maintain the pedestrian environment and prevent vehicle encroaching into the Throughway Zone.
- Awnings may extend from buildings over the Throughway Zone; canopies with structural supports can be allowed when the supports are located outside of the Throughway Zone within the Frontage or Furnishings Zone and as long as the required vertical clearance of 7' min is required. Maintenance shall be assured by either an Encroachment Maintenance and Removal Agreement or by inclusion in a maintenance assessment district.
- Light fixtures should be oriented and directed to provide light only within the entrance area, keeping skyward and horizontal light pollution to a minimum.
- Pavement textures and/or materials within the ROW should meet ADA standards for accessible surfaces such as smooth, firm and slip resistance.
- Setbacks, facades, and projected elements (such as awnings) must conform to any applicable regulations in the Land Development Code and/or land use plan policies and guidelines.

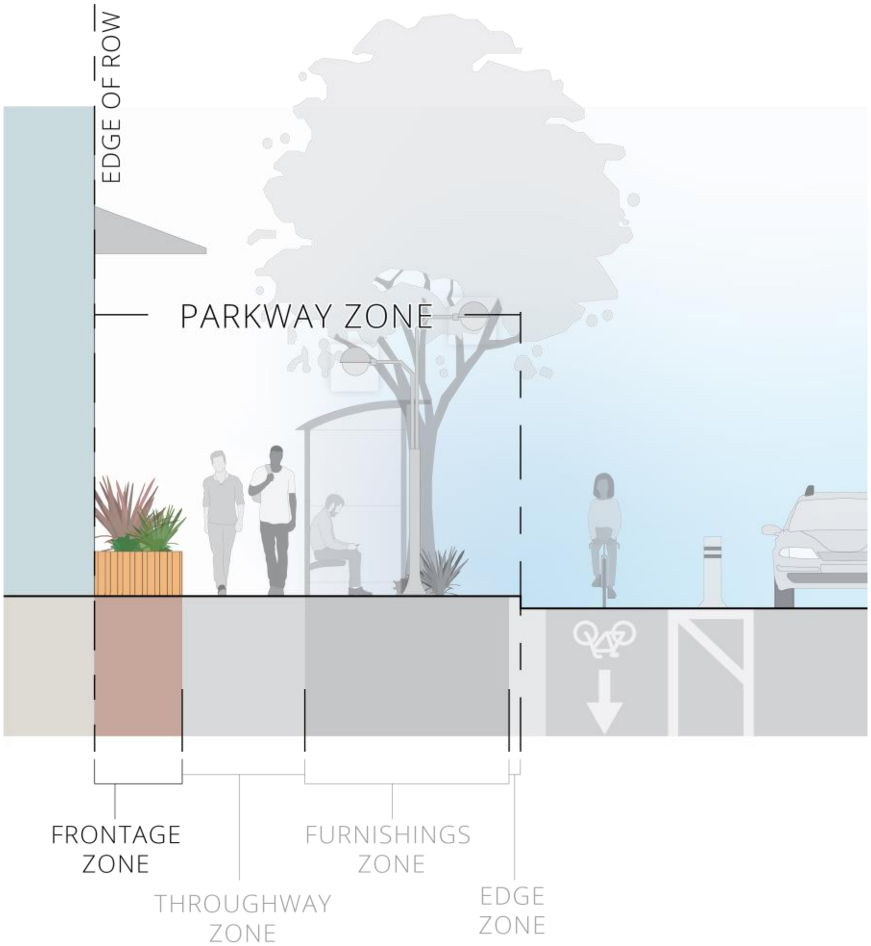

FIGURE 3-3 FRONTAGE ZONE

3.4.2 Throughway Zone

The Throughway Zone is intended for pedestrian travel only and should be entirely clear of obstacles, including driveway aprons. This zone must be at least 5 feet wide unless an exception is approved by the City Engineer. For high pedestrian volume areas, additional width should be provided. “Overhanging” elements such as awnings, store signage, bay windows, etc. may occupy this zone as long as there is a clear distance under them of at least 8 feet.

The Throughway Zone is a space where people interact and walk together which include accessing transit, shopping and outdoor dining. People traveling from transit or a vehicle or bike parked on the street rely on the Throughway Zone to get from their origin to their destination.

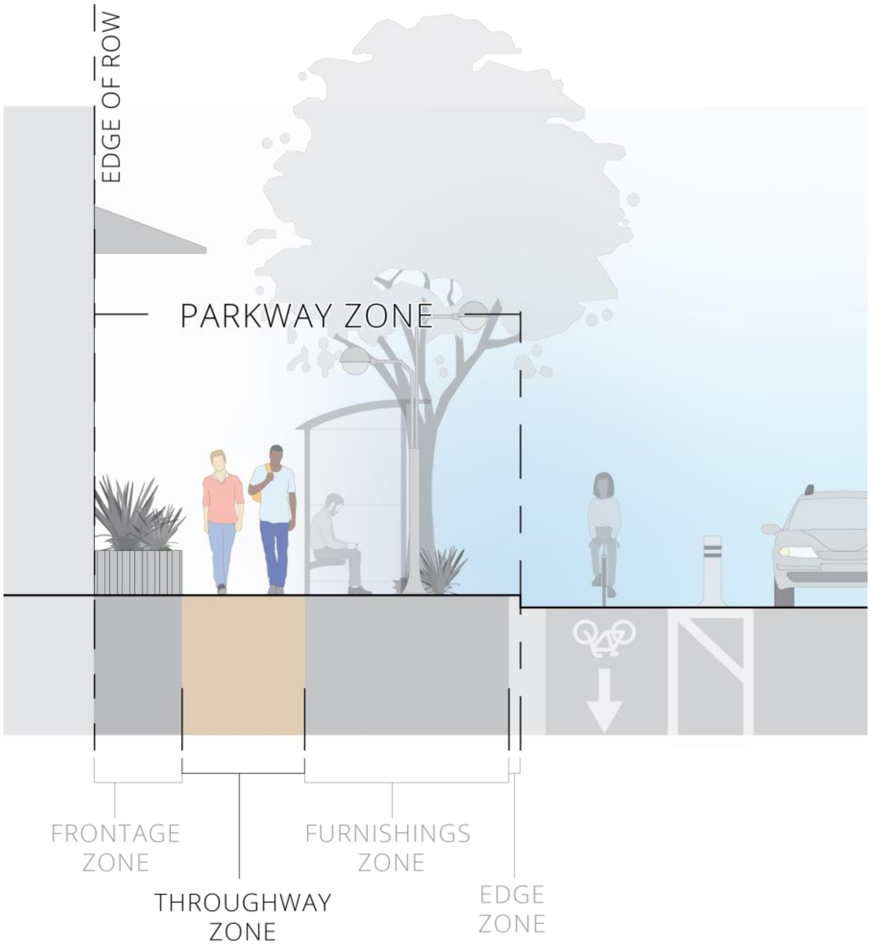

FIGURE 3-4 THROUGHWAY ZONE

3.4.2.1 Widths

For retrofitting or improving existing ROWs, sidewalks should be constructed. Where the existing ROW is too narrow to accommodate standard sidewalk construction, additional ROW or alternate public access must be provided.

The following design standards must be considered for sidewalk widths:

- Minimum widths are set forth in this chapter, Section 3.5 “Parkway Configurations,” for various street classifications and the City’s Standard Drawings.
- The width of a contiguous sidewalk is measured from the back of the curb.
- The Throughway Zone is intended to be continuous clear widths. Where fire hydrants, street furniture, or other above-ground appurtenances reduce such width, additional area for a Throughway Zone should be constructed around the obstacles.

3.4.2.2 Grade

The following considerations are to be made for grades:

- There should be enough sidewalk cross slope for adequate drainage. See the City's Standard Drawings.
- Along sidewalks, pedestrianways, and shared pedestrian/bikeway facilities, long, steep grades should have level areas every 400 feet for the pedestrian to stop and rest. See Section 3.4.2.3 "Accessibility" below for additional details.
- The portion of the right-of-way beyond curbs shall slope downwards towards the street at 1.5 percent grade.

3.4.2.3 Accessibility

The following sidewalk guidelines must be adhered to:

- Circulation paths contiguous to vehicular traffic shall be physically separated from vehicular traffic. Vehicular traffic includes travel through parking facilities, into and out of parking spaces, into and out of electric vehicle charging spaces, and along roadways, driveways and drive aisles. Physical separation shall be provided with circulation paths raised 4 inches (102 mm) minimum above the area where vehicular traffic occurs. See CA Building Code 11B-250 for more information.

Exceptions:

- o Curb ramps and blended transitions with detectable warning surfaces complying with CBC and PROWAG may be used to connect raised circulation paths and pedestrian crossings within areas of vehicular traffic. Blended transitions and cut-through medians with detectable warning surfaces complying with CBC and PROWAG may be used to connect circulation paths and pedestrian crossings at similar elevations within areas of vehicular traffic.
- o Where driveways are controlled with yield or stop control devices or traffic signals, detectable warning surfaces shall be provided on the pedestrian circulation path where the pedestrian circulation path meets the driveway.
- o At locations where circulation paths cross driveways or drive aisles, circulation paths shall not be required to comply with this section and detectable warning surfaces shall not be permitted. Beyond the crossing where continuation of the circulation path within a parking facility leads immediately to and does not continue beyond only parking spaces complying with CBC and PROWAG and passenger drop-off and loading zones complying with CBC and PROWAG, the circulation path shall not be required to be raised.

- The minimum unobstructed sidewalk width shall be 5 feet excluding 6-inch top of curb. Limited exceptions may be made by the City Engineer to reduce the sidewalk to a minimum of 3.5-feet because of right-of-way (ROW) restrictions, natural barriers, or other existing conditions on a case-by-case basis. The minimum width should be expanded when there is either a vertical barrier fronting the sidewalk or a vehicle travel lane.

- If the clear width of the sidewalk is less than 4 feet, passing spaces shall be provided at intervals of 200 feet maximum. Passing spaces shall be either:

    - A space 60 inches minimum x 60 inches minimum, or
    - An intersection of two walking surfaces providing a T-shaped* space, where the base and arms of the T-shaped space extend 48 inches minimum beyond the intersection. See Figure 3–5 for illustration of T-shaped space.

        - The turning space shall be a T-shaped space within a 60 inch square minimum with arms and base 36 inches wide minimum. Each arm of the T shall be clear of obstructions 12 inches minimum in each direction and the base shall be clear of obstructions 24 inches minimum. The space shall be permitted to include knee and toe clearance complying with accessibility regulations only at the end of either the base or one arm.

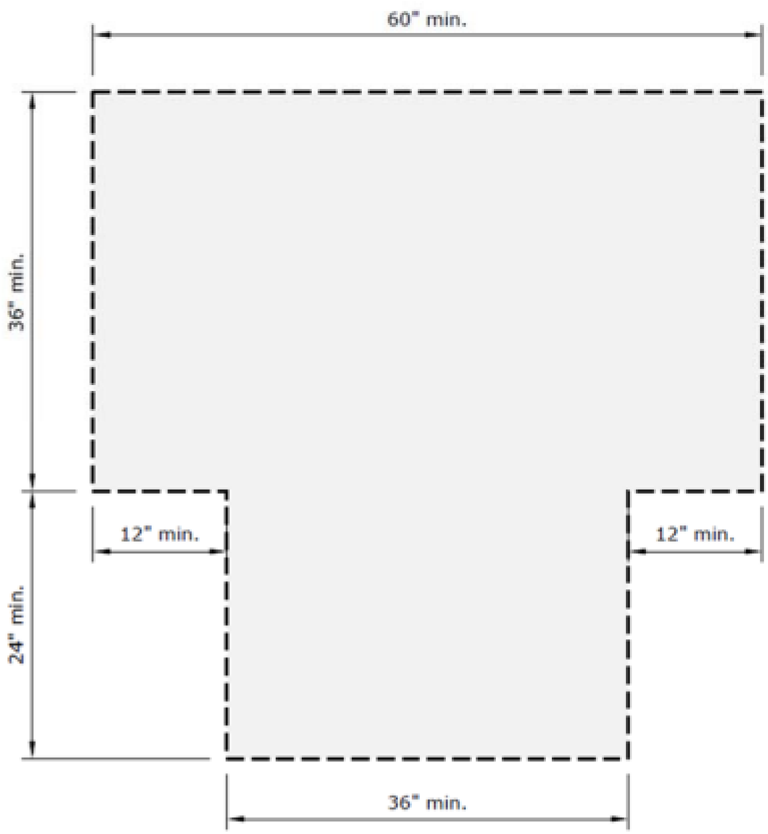

FIGURE 3-5 T-SHAPE TURN SPACE

- Warning Curbs: A 6-inch-high warning or concrete curb shall be provided along the sidewalk monolithic curb edge where there is an abrupt change in elevation exceeding 4 inches in a vertical dimension along adjacent surfaces. A warning curb is not required between a sidewalk and an adjacent street or driveway or when a guardrail or handrail is provided with a guiderail centered 2 inches minimum and 4 inches maximum above the surface of the sidewalk.

- Curb ramps will be discussed on Chapter 6, “Intersection Design and Operations”, Section 6.4.2, “Curb Ramps”.

References:

- California Building Code, International Code Council, 2022
- PROWAG, US Access Board, 2023
- 2010 ADA Standards for Accessible Design, Department of Justice, 2010

3.4.2.4 Innovative Sidewalks

Innovative sidewalks may be considered for area enhancement and to accommodate existing features such as mature trees. They may be approved on an individual basis provided they are located within the street ROW and maintenance of the area between the sidewalk and curb is provided by special assessment district or other agreement with the City of San Diego. All other requirements shown in the City’s Standard Drawings, including compliance with 1.5 percent grading. Sidewalks and the pedestrian path shall be parallel to the curb to the greatest extent possible.

3.4.2.5 Surfaces

The following standards and guidelines apply for surfaces:

- All surfaces shall be stable, firm, and slip resistant with a minimum static coefficient of friction of 0.5.
- Surfaces along accessible routes shall be free of gratings whenever possible, including tree grates. Horizontal openings in gratings and joints shall not be more than 0.5 inch and elongated openings in gratings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.
- Vertical surface discontinuities shall be 0.5 inch maximum. Vertical surface discontinuities between 0.25 inch and 0.5 inch shall be beveled with a slope not steeper than 50 percent. The bevel shall be applied across the entire vertical surface discontinuity.
- Where feasible, porous pavement should be considered. Porous pavement must adhere to Chapter 12 “Green Infrastructure” of the City of San Diego’s Drainage Design Manual.

3.4.2.6 Construction

The following design standards apply for sidewalk construction:

- Sidewalks shall be constructed in accordance with the City’s Standard Drawings.
- Utility access panels within sidewalks shall be slip resistant and flush mounted, and they must not include holes greater than 0.25 inches.

- Throughout the city, contractors stamp the work with their names and the date of construction on the sidewalk. In addition to the contractors' stamp, the name of the street is often imprinted into the curb. In many of the city's older neighborhoods these street names may not be the current names of the streets. However, these markers are an indicator of the age of a particular neighborhood and provide a sense of continuity and history for the residents. When existing sidewalks are being repaired or replaced, existing sidewalk stamps and imprints shall be retained in place or placed into the new sidewalk work.

3.4.3 Furnishings Zone

The Furnishings Zone accommodates street trees and landscaping. It is the zone that provides the buffer between the active pedestrian walking area, the Throughway Zone, and street traffic. Street trees, tree grates, street furniture, utility poles, electrical transformers, utility pedestals, storm water green infrastructure, parking meters, fire hydrants, bicycle racks, and the like are consolidated in this zone to keep them from being obstacles in the Throughway Zone.

Planting in this zone must comply with the standards and guidelines in this manual and the landscape regulations in the Municipal Code, Landscape Standards, and the San Diego Tree Selection Guide, particularly in the case of street tree planting areas. The placement of the aforementioned elements must comply with the Land Development Code, San Diego Municipal Code, ADA, PROWAG, CBC regulations, and applicable Council policies. Generally, any landscaping installed within the right-of-way is to be maintained by the adjacent property owner or a Maintenance Assessment District.

Installing pedestrian pop-outs is an effective way to increase sidewalk space. The dimensions of the Furnishings Zone must consider the speed of traffic and whether street parking is provided.

Street furnishings add character and interest to the Parkway Zone. Transit stops with shelters can also be found in the Furnishing Zone. These are typically located on the curb side of the Parkway Zone and can include seating, lighting, street trees, signage and wayfinding, artwork, transit shelters or benches, and bicycle parking.

Considerations:

- Refer to the Land Development Manual Appendix T: Mobility Choices Regulations: Implementation Guidelines for additional information on how these elements can apply as VMT reduction measures.
- Partnerships between City agencies and business or neighborhood groups are a powerful tool for installing and maintaining abundant and varied furnishings throughout the City's diverse land uses and neighborhoods. Other creative financing opportunities include bench sponsorship programs and incentives to business owners for the installation and maintenance of public amenities outside their businesses. These methods can support broader streetscape improvements such as seating, trees, landscaping, wayfinding signage, and lighting.

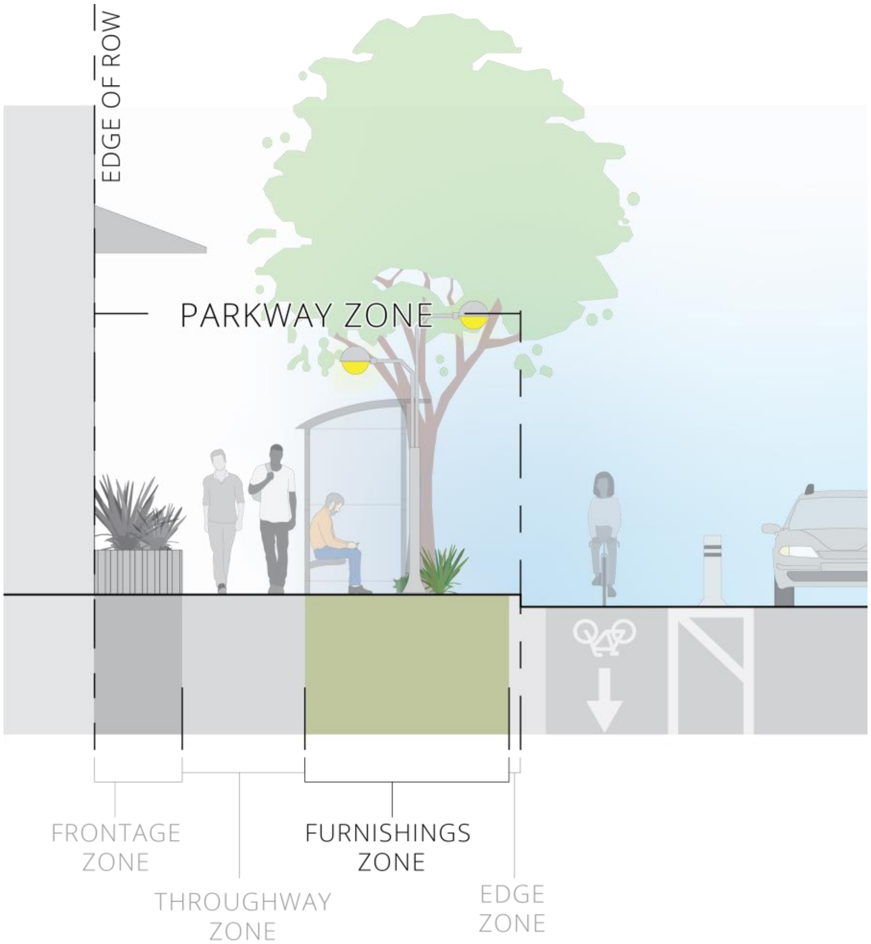

FIGURE 3-6 FURNISHINGS ZONE

Standards and Guidelines:

- Street furniture and above-ground appurtenances placed in the public ROW shall conform to the requirements set forth in the ADA, California Title 24 regulations, PROWAG, the San Diego Municipal Code and applicable policies, regulations, and standards.
- The selection of street furniture products, including seating, planters, bollards, and trash receptacles, must be durable, decorative and able to withstand inclement weather. Sustainable or recyclable materials are preferred.
- Maintenance shall be assured by either an Encroachment Maintenance and Removal Agreement or by inclusion in a maintenance assessment district.
- Street furniture and above-ground appurtenances shall be located in a fashion that preserves the safety, integrity, and layout of the pedestrian passageway and assures that public use of the sidewalk is not unreasonably restricted.
- Permanently affixed streetscape amenities must minimize impacts on water runoff.
- Where tree grates are located along sidewalks, they shall either:

  - be covered by tree grates per current City Standards, or
  - the finish grade of the tree well shall not be lower than 4" as measured from the sidewalk surface otherwise, a 6" warning curb or planter wall shall be provided around the tree well.

- Streetscape design elements, including street furniture and artwork, should be selected to provide a cohesive environment and identifiable character. Color and material selection that enhances a unified street furniture “look” is encouraged.
- Transit-related standards and guidelines will be discussed in Section 3.7.2.

3.4.3.1 Public Seating

Public seating contributes to an active pedestrian environment by enhancing the role of the sidewalk as an enjoyable public space. Seating serves short-term needs to rest or wait, and it also fosters socialization and enjoyment of the urban environment. Examples of public seating include fixed benches, sitting rounds, seats built into other amenities like landscape planters, and even movable chairs and tables.

Benefits:

- Activates and enlivens the sidewalk environment.
- Forms active social spaces, especially when grouped in areas of higher pedestrian activity.
- Provides valuable places for pedestrians, especially those with limited mobility or caring for children, to rest along the path of travel.
- Contributes to economic vitality by creating a pedestrian-oriented environment that is attractive for shopping.

Considerations:

- Providing well-distributed seating furniture is especially important in areas with high concentrations of pedestrian activity and on streets with pedestrian-oriented destinations.
- Seating design should consider the characteristics of the surrounding neighborhood and contribute to a sense of place and neighborhood character.
- Seating is especially valuable in shaded areas, preferably under trees.
- Benches that provide full back support and armrests to assist in sitting and standing are more usable by persons with disabilities.

Standards and Guidelines:

- Seating must not impede ADA clear widths. This determination must account for the seated persons’ utilization of space beyond the boundaries of the seating element such as stretching out legs or setting down shopping bags.
- Seating must not conflict with access to building entries, door maneuvering clearance, loading zones, parked vehicles, driveways, and fire hydrants.

- At least 50 percent, but no less than one, of benches at each location shall be accessible and provide clear space. The clear space shall be located either at one end of the bench or shall not overlap the area within 1.5 ft from the front edge of the bench. Benches at tables are not required to comply.
- Poorly located seating is often under-utilized seating; proper locational placement must be ensured so that seating fixtures are situated in areas where people would like to-or need to-be seated.
- Seating may be located anywhere within the Parkway Zone as long as the minimum ADA clear width is maintained. Benches and other seating areas are most commonly located in the Furnishings Zone; are a primary component of many curb extensions in the Flex Zone; and can also be located in the Frontage Zone, where users benefit from an added buffer from the roadway.
- Business and building owners, Business Improvement Districts, and neighborhood groups are encouraged to install and maintain public seating fixtures as a public benefit.
- Benches to accommodate transit users should be provided at all transit stops.

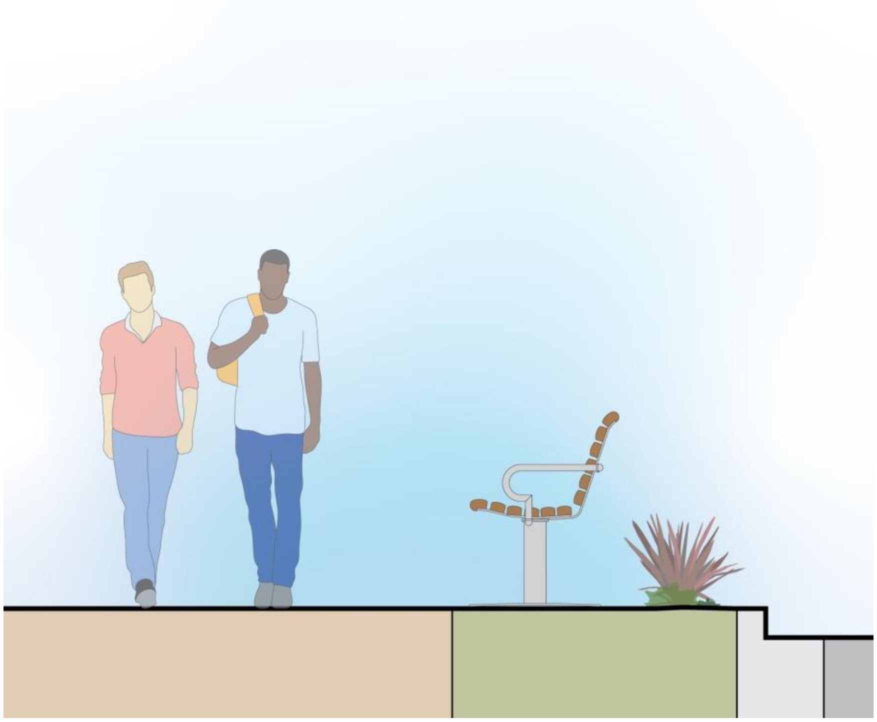

FIGURE 3-7 PUBLIC SEATING

3.4.3.2 Sidewalk Cafes

The City of San Diego Spaces as Places Design Manual defines outdoor dining within the Parkway Zone as Sidewalk Cafes. Sidewalk Cafes are outdoor dining spaces located within the Parkway area of the public right-of-way that are associated with adjacent eating and drinking establishments. Outdoor eating and drinking establishment areas located on private property are not subject to the Sidewalk Café regulations.

Refer to the *Spaces as Places Design Manual* and SDMC §141.0621 for location, design, accessibility, and fire code standards.

3.4.3.3 Recreation Areas

Exercise and recreation equipment may be incorporated into the Furnishings Zone. This provides an opportunity for people to engage in healthy outdoor activities within their communities.

Standards and Guidelines:

- Equipment must be installed such that while in use it is not impeding pedestrian flow or extending within two feet of the Edge Zone.
- Equipment should be accessible to as many people as possible and take into consideration a variety of abilities including those in wheelchairs or with limited mobility.

Refer to the ADA Standards and Section 2.13 of the *Consultant's Guide to Park Design and Development* for more information.

3.4.3.4 Signage/Wayfinding

Wayfinding is a tool that helps people navigate from place to place. In the context of a mobility hub, these places might include transit stations, civic and community buildings, parks, and more. Static and interactive signs can provide maps and directions to points of interest, transit schedules and routes, and other information on available mobility services and facilities. This mobility hub feature can exist throughout the five-minute walk, bike, and drive distance and be customized based on user type and travel mode. Additional discussion for interactive signage and wayfinding will be included in Section 3.4.3.5 "Parking Signage and Information".

Signage comes in various forms. Depending on the given circumstances, these signs may make drivers aware of their surroundings. Upon leaving a major arterial, many people do not recognize when they enter a residential (lower speed) neighborhood. Installing speed limit signs can notify drivers that they have entered a residential neighborhood.

Standards and Guidelines:

- Traffic signs must be coordinated with the Transportation Department and adhere to California Manual on Uniform Traffic Control Devices (CA MUTCD) standards.
- Break-away signposts must conform to standards in Standard Drawing SDM-104.
- The signage and wayfinding lettering and symbols must be scaled for the intended user and accessible for all users.
- Signage shall comply with the ADA, PROWAG and CBC Title 24 Standards.

- "School Zone" signs are installed at appropriate locations to remind drivers that there is a school and there are children in the vicinity. See Chapter 7B of the CA MUTCD for additional school signage discussion and requirements.
- Place wayfinding in visible and predictable locations, such as overhead or at eye-level. Placement should consider the growth of nearby trees when determining line of sight.
- Maps, routes, and other wayfinding should be prominent at transit stations and stops, especially high-volume, high-activity, or transfer stops.
- Wayfinding should either:
    - Utilize standard City signage per CA MUTCD Section 2D.50, or
    - Reflect the character of the community in which it is installed, to the satisfaction of the City Engineer.

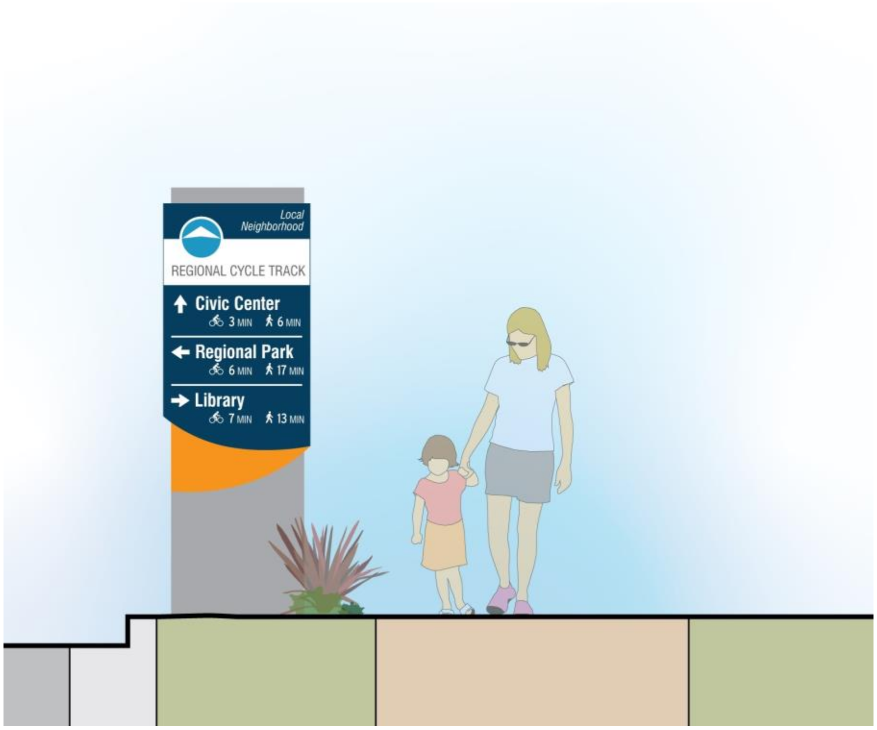

FIGURE 3-8 WAYFINDING SIGNAGE

<u>**References:**</u>

- 2010 ADA Standards for Accessible Design, Department of Justice, 2010
- CA MUTCD Rev. 8, Caltrans, 2018
- Mobility Hub Features Catalog, SANDAG, 2017
- PROWAG, US Access Board, 2023
- Standard Drawings for Public Works Construction, City of San Diego, 2021
- The "Whitebook", City of San Diego, 2021
- Title 24, International Code Council, 2022
- Traffic Calming Guidelines, City of San Diego, 2010

3.4.3.5 Parking Signage and Information

Parking signage and wayfinding provides information on parking availability, location, and price.

Benefits:

- Providing information on parking availability, location, and price can help manage the parking supply by helping people understand their parking options.

Considerations:

- Digital signage can provide real-time updates on parking availability, particularly for off-street parking. This helps to manage parking supply and reduce VMT for people circling looking for parking.
- Variable metered parking information can be displayed on signage or coordinated with phone applications.

FIGURE 3-9 DIGITAL PARKING SIGNAGE

Location: City of Santa Monica
Source: Selbert Perkins Design

3.4.3.6 On-Street Electric Vehicle Charging Stations (EVCS)

An electric vehicle charging station (EVCS) gives people the opportunity to charge plug-in electric vehicles (EVs) while parking near their home or destination. Battery-powered electric vehicles, plug-in hybrid electric vehicles, and electric vehicle conversions of hybrid or internal combustion engine vehicles are examples of EVs. Passenger cars, microtransit vehicles, shuttles, and large transit buses can all be EVs. They are critical to California's zero emission vehicle (ZEV) planning.

Benefits:

- On-street EVCS provide a convenient way to charge EVs while on the go.
- Reduces the need for individuals to install home ECVS thereby reducing some of the up-front costs which can be a deterrent to individual investment

Considerations:

- There are three levels of car chargers based on voltage. Level 1 chargers (120V) are the slowest and least expensive and provide 2-5 miles of charge per hour of charging time. Level 2 chargers (240V) add about 20 miles of range per hour of charging time. Level 3 chargers also referred to as DC Fast chargers (480V) are the fastest charging currently available and add 50 to 70 miles of range in approximately 30 minutes. It is recommended that for on-street EVCS, Level 2 or 3 chargers are installed unless long dwell times are anticipated.
- Minimizing the distance of the EV chargers from the point of power connection can keep the cost of installation low.
- Placing EV charging where employees/residents/guests are most likely to use it (e.g., near the building they work or live in) is preferable, particularly if the location also is close to the point of power connection.
- Running power to EV chargers in surface mounted conduit (often acceptable in parking garages) or through landscape areas, as opposed to asphalt and concrete, can keep the cost lower.
- All Level 2 EV charging equipment must be ENERGY STAR® certified to be eligible for CALeVIP rebates. All DC fast charger equipment must be Open Charge Point Protocol (OCPP) certified to be eligible for CALeVIP rebates.
- Cellular, Wi-Fi, or ethernet communication availability must be considered to enable any 'smart' features of electric vehicle charging stations, such as load management and station reporting.
- Driver confidence and vehicle utility relate directly to the ability to charge when needed. Jurisdictions can help ensure charging spaces are used for charging through signage and enforcement by installing tow-away signs at charging spaces along with clearly striping and marking the associated pavement.
- Consider implementing variable pricing based on time of day or other factors.
- Depending on locations, EVCS spaces may be provided with canopy solar panels. Refer to City policies, PROWAG, and CBC for requirements and guidelines.

Total Number of EVCS at a Facility[1]	Minimum Number (by type of EVCS Required to Comply with CBC, Title 24, and PROWAG)		
	Van Accessible	Standard Accessible	Ambulatory
1 to 4	1	0	0
5 to 25	1	1	0
26 to 50	1	1	1
51 to 75	1	2	2
76 to 100	1	3	3
101 and over	1 plus 1 each 300 or fraction thereof, over 100	3 plus 1 each 60 or fraction thereof, over 100	3 plus 1 each 50 or fraction thereof, over 100

TABLE 3-1 REQUIRED NUMBER AND TYPE OF ACCESSIBLE EVCS SPACES

1. Where an EV charger can simultaneously charge more than one vehicle, the number of EVCS provided shall be considered equivalent to the number of electric vehicle that can be simultaneously charged.

Source: 2019 California Building Code

Standards and Guidelines:

- Sites for installation locations should consider whether it will provide a safe customer experience, be easily accessible for drivers, contain sufficient space for charging stalls and supporting equipment, and whether it will be proximate to commute routes, amenities, and utility lines.
- Electric vehicle charging is a service provided by the facility owner or public entity, and therefore must be accessible to persons with disabilities.
- Refer to the accessibility provisions for the accessible route requirements serving accessible EVCS spaces. Check the PROWAG and CBC.
- An electric vehicle may not need to charge every time it is parked, so public and common use charging stations are charging spaces, not parking spaces.
- While an electric vehicle needs to be parked to charge, charging (not parking) is the primary purpose of a charging station.
- Accessible chargers must be installed according to any applicable PROWAG and CBC. In addition, at minimum, accessible routes require 30”x48” floor clearance adjacent to the charger face. The height of operable parts on accessible chargers shall not exceed 48”. The horizontal reach depth to operable parts shall not exceed 10”.
- EVCSs on a public street should be designated for the exclusive use of charging and parking a vehicle that is connected for electric charging. Signage should indicate which spaces are designated for EV charging only.
- Accessible spaces should be designated by appropriate signage. “Use last” signs may indicate that accessible charging spaces may be used by any driver but should be used last by non-disabled drivers. The U.S. Access Board has designed the examples below, which would not require the accessible charging spaces to be reserved exclusively for persons with disabilities with a parking placard or license plate.
- Installation of EVCSs should be coordinated with San Diego Gas & Electric (SDGE) and comply with the SDGE Electric Vehicle Supply Equipment Standards where applicable.

FIGURE 3-10 ELECTRIC VEHICLE CHARGING SIGN

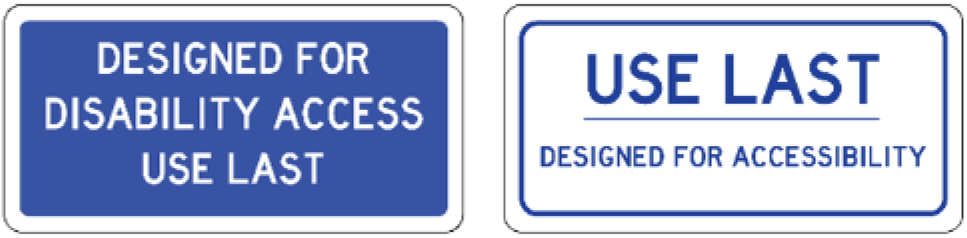

FIGURE 3-11 ELECTRIC VEHICLE ACCESSIBILITY CHARGING SIGN

Source: U.S. Access Board

References:

- California Building Code, International Code Council, 2022
- California Electric Vehicle Infrastructure Project (CALeVIP), California Energy Commission
- Electric Vehicle Charging Station Permitting Guidebook 2nd Ed, Office of Business and Economic Development, 2023
- PROWAG, US Access Board, 2023
- Vehicle Supply Equipment Standards, San Diego Gas & Electric (SDGE), 2023

3.4.3.7 Artwork in the ROW

Art in the right-of-way involves integrating artwork and other creative elements and cultural events and experiences within public spaces such as sidewalks, streets, and plazas. These activations aim to promote a sense of place within a community, foster engagement and connectivity, and promote cultural expression and animate the public realm. Artworks can be integrated into right-of-way infrastructure in a variety of forms such as street furnishings, lighting, performance, temporary installations, wayfinding, and paving materials and surfaces. The City's Public Art Program enables the design and implementation of public art in eligible active transportation infrastructure to create visible and community-centered spaces for users. Additional interdepartmental coordination and planning and inter-agency collaboration with SANDAG, MTS and CALTRANS can ensure the implementation of the City's Public Art Master Plan and future citywide cultural plan to expand art activations, linkages with cultural amenities and creative placemaking within transportation and mobility projects.

Standards and Guidelines:

- Design, installation, maintenance, and removal must be coordinated with sponsoring agencies or groups.
- The artwork's placement must not compromise the clear Throughway Zone.
- Artwork should be considered during the planning and design phase of development in order to be more closely integrated with other streetscape elements.
- Artwork should be accessible to persons with disabilities.
- The siting of artwork should maintain all clearances and applicable ADA requirements on protruding objects and clearances per PROWAG.
- Artwork can be incorporated into utilitarian street elements (e.g., landscaping, light standards, benches, trash receptacles, bicycle parking facilities, and utility boxes). This is especially beneficial in areas with high pedestrian volumes such as commercial, civic, and cultural land uses.
- Artwork can also be interactive, encouraging play and recreation. The best art provides these benefits for people of all ages and abilities. Artwork can be situated in a variety of areas and locations, especially on streets and public spaces with high concentrations of pedestrians.
- Art can be located anywhere in the Parkway Zone (except the accessible path of travel) and on exterior building walls that are adjacent to or nearby the sidewalk area as long as it does not protrude into the ROW.
- Art that is publicly accessible or viewable is encouraged on private property.
- Non-commercial murals are encouraged for blank exterior walls that are visible from the roadway.
- Large-scale artwork (e.g., murals or "supergraphics") can be oriented toward roadway users as long as it does not pose a distraction hazard, satisfactory to the City Engineer.
- Artwork including murals proposed for City property or ROW require review and approval by the City prior to their permitting and installation through the approval process from the City of San Diego's Temporary Exhibit of Artwork Toolkit or Mural Toolkit.

References:

- Installation of Murals in Public Right-of-Way (ROW) Pavements and Sidewalks Memorandum, City of San Diego, 2018
- Information Bulletin 568: Placemaking, City of San Diego Development Services Dept, 2018
- Mural Toolkit, Department of Cultural Affairs
- Temporary Exhibit Toolkit, Department of Cultural Affairs

3.4.3.8 Waste and Recycling Receptacles

Well-designed and strategically located receptacles are an essential component of a clean, enjoyable pedestrian environment. Their effectiveness in keeping litter off the streets is largely dependent on their placement, functional design, and volume capacities.

Guidelines:

- Waste and recycling receptacles shall be accessible to persons with disabilities.
- The covers of Waste and recycling receptacles shall be designed to minimize contact of stormwater to the trash in order to prevent leaching pollutants, especially where composting is implemented.
- Waste receptacles, like all street furniture, should be considered a street design element. Their design should complement the design of surrounding street furnishings (including benches, streetlights, bike racks, etc.)
- Waste receptacles should be located near high activity generators such as major civic and commercial destinations, at transit stops, and near street corners.
- At least one waste/recycling receptacle should be located at all transit stops. At stops with higher usage, multiple receptacles may be necessary to ensure that trash is accommodated; these can be either adjoining or separated, depending on stop layout and function.
- Along streets in retail commercial land uses, there should be a maximum of one trash receptacle every 200 feet. Receptacles should be placed outside of corner areas to prevent encroachment into clear spaces and accessible routes required for traffic signals around curb ramps and along the area adjacent to accessible parking spaces. Additional trash receptacles should be provided only if a private sponsor provides continued maintenance.
- Receptacles should generally be located in the Furnishings Zone between the curb and the pedestrian throughway. Receptacles may also be located in the Frontage Zone as long as they do not impede the pedestrian movement. This can work well for businesses who agree to provide continued trash removal.
- Waste and recycling receptacles should be located near street corners but should not inhibit corner visibility. Organics receptacles should be considered in areas with food retail.
- Receptacles should be immovable and bolted to the pavement to ensure that their proper placement is maintained.
- Receptacles should be opaque not mesh or wire baskets and have a top. Attention must be paid to the receptacle's functional design so that there is a large opening to ensure usability while also effectively screening the trash. Trash receptacles should open from the side to allow easy access for removal/replacement of garbage bags.
- Durable, graffiti-resistant materials such as galvanized or stainless steel should be used.
- Solar receptacles (compactors) should be considered for use in high-volume locations. This means that fewer receptacles are necessary in high volume locations, lessening their negative aesthetic effects on the street environment.
- In some locations, trash receptacles are serviced by waste removal companies that do not practice mixed-waste processing (a process in which recyclables are sorted out). In these locations, waste receptacles should be paired with recycling receptacles, and they should be easily distinguishable from one another. Ideally, a single fixture that incorporates two receptacles – one for trash and one for recycling –should be used.
- In areas with high rates of food waste, composting receptacles must be considered.
- Where trash receptacles are provided along with recycling and/or composting receptacles, educational signage should be provided.

3.4.4 Edge Zone

The Edge Zone (commonly referred to as the "Curb") is the interface between the roadway and the sidewalk. At a minimum, this zone includes the 6-inch-wide curb. In more active, mixed-use areas with on-street parking, this zone should be a minimum of 1 foot 6 inches to accommodate the door swing of a parked car to prevent conflict with elements within the Furnishings Zone. Water and sewer facilities require a minimum of 5 feet horizontal separation between outer diameter to face of curb to allow for trenching and a working area near the trench.

Curb utilization options and opportunities will be discussed in Section 5.3 Flex Zone.

3.5. Parkway Configurations

This section contains the illustrations for the urban (UP) and rural (RP) parkway configurations listed in Chapter 2 Street Types tables: Tables 2-4, 2-8, 2-12, 2-16, 2-20, 2-24, 2-28, 2-32, 2-36, 2-40, 2-44, 2-48, 2-52, 2-56, 2-60, 2-64.

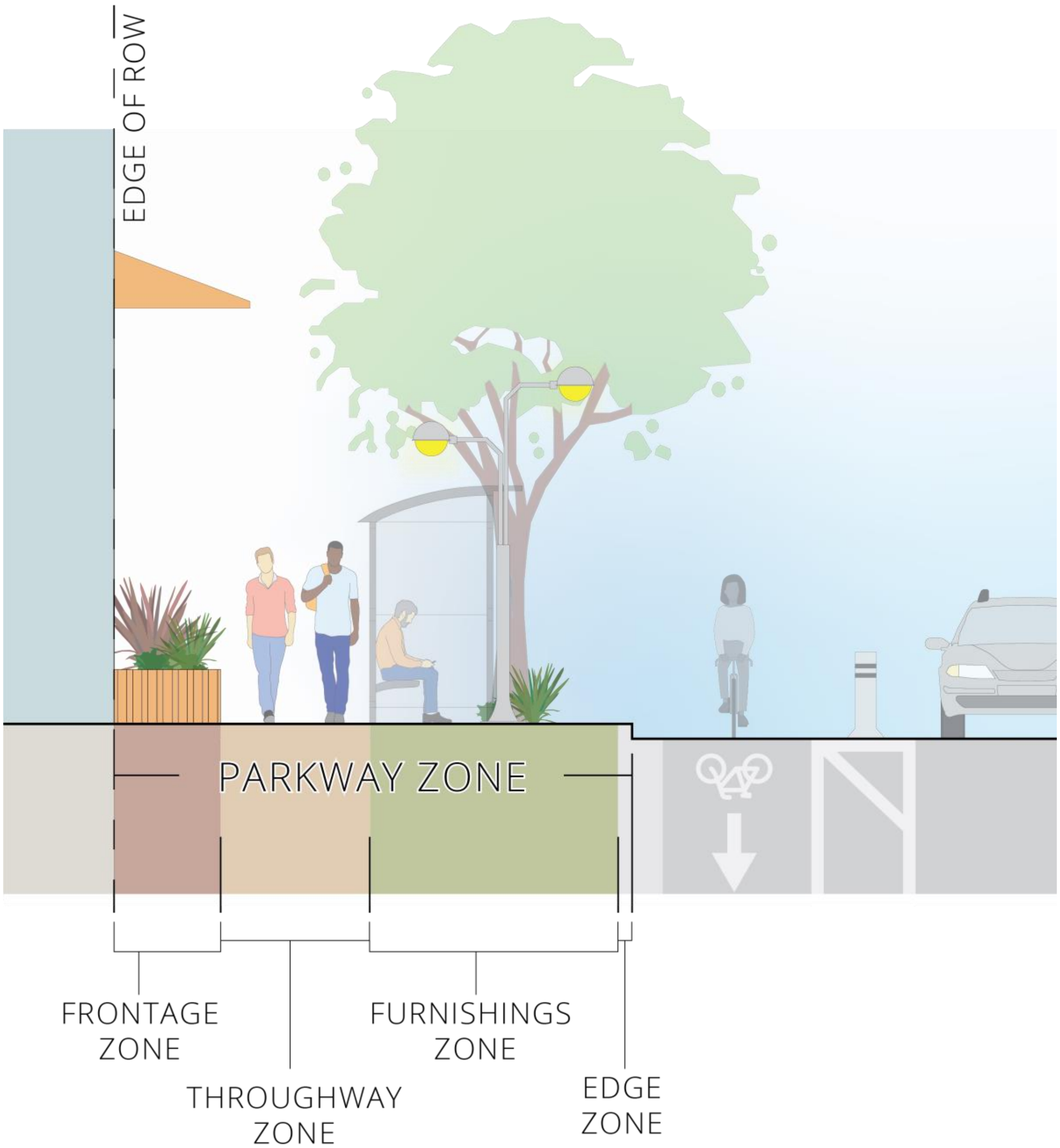

FIGURE 3-12 THE PARKWAY ZONES

3.5.1 Urban Parkway Configurations

Figures 3–13 through 3–23 illustrate relevant urban parkway configurations.

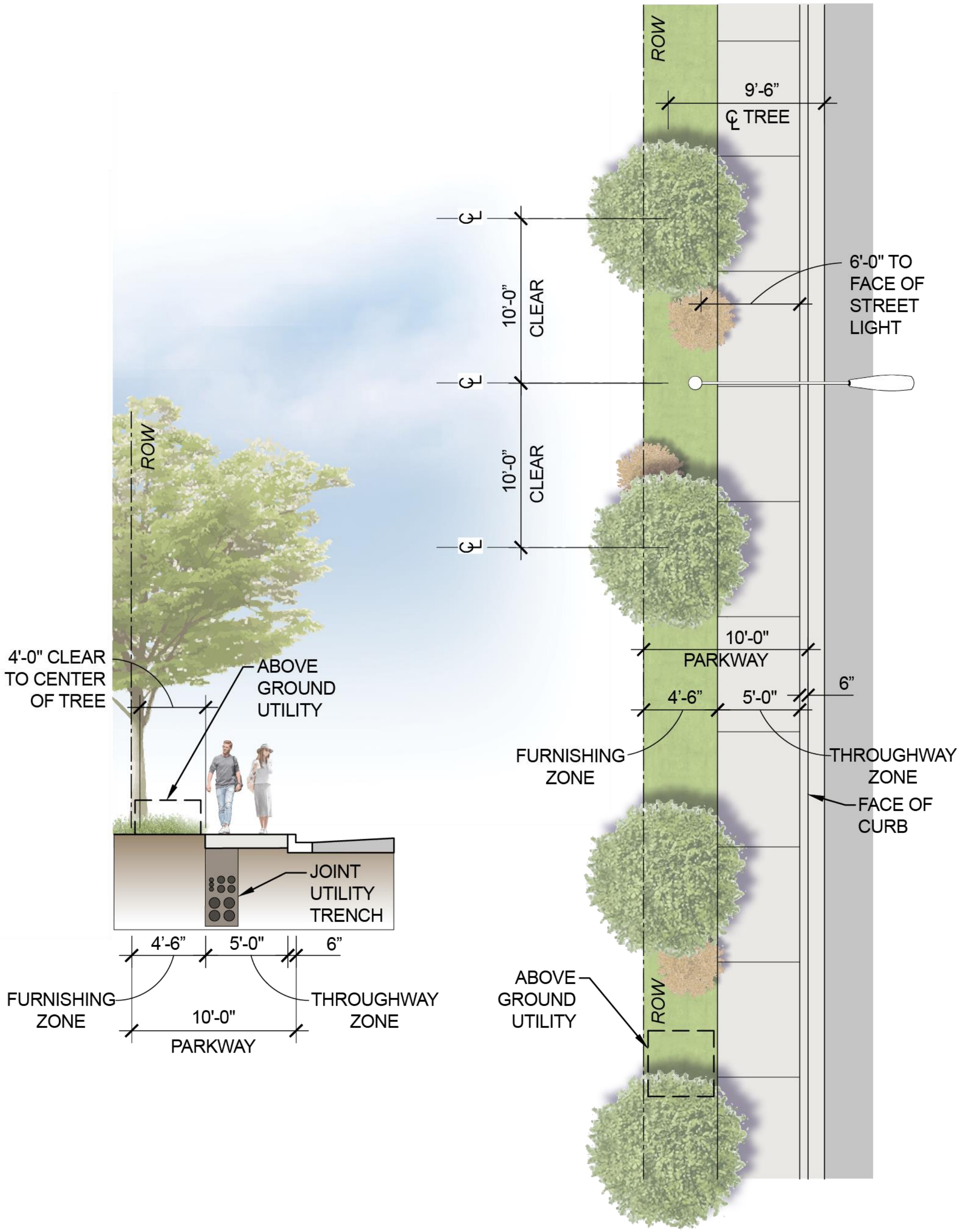

FIGURE 3-13 UP-1: 10' PARKWAY – CONTIGUOUS SIDEWALK

Note:

1. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*
2. *Canopy trees must be a minimum distance of 4' away from the building per SDMC 142.0403 (b) (5)*

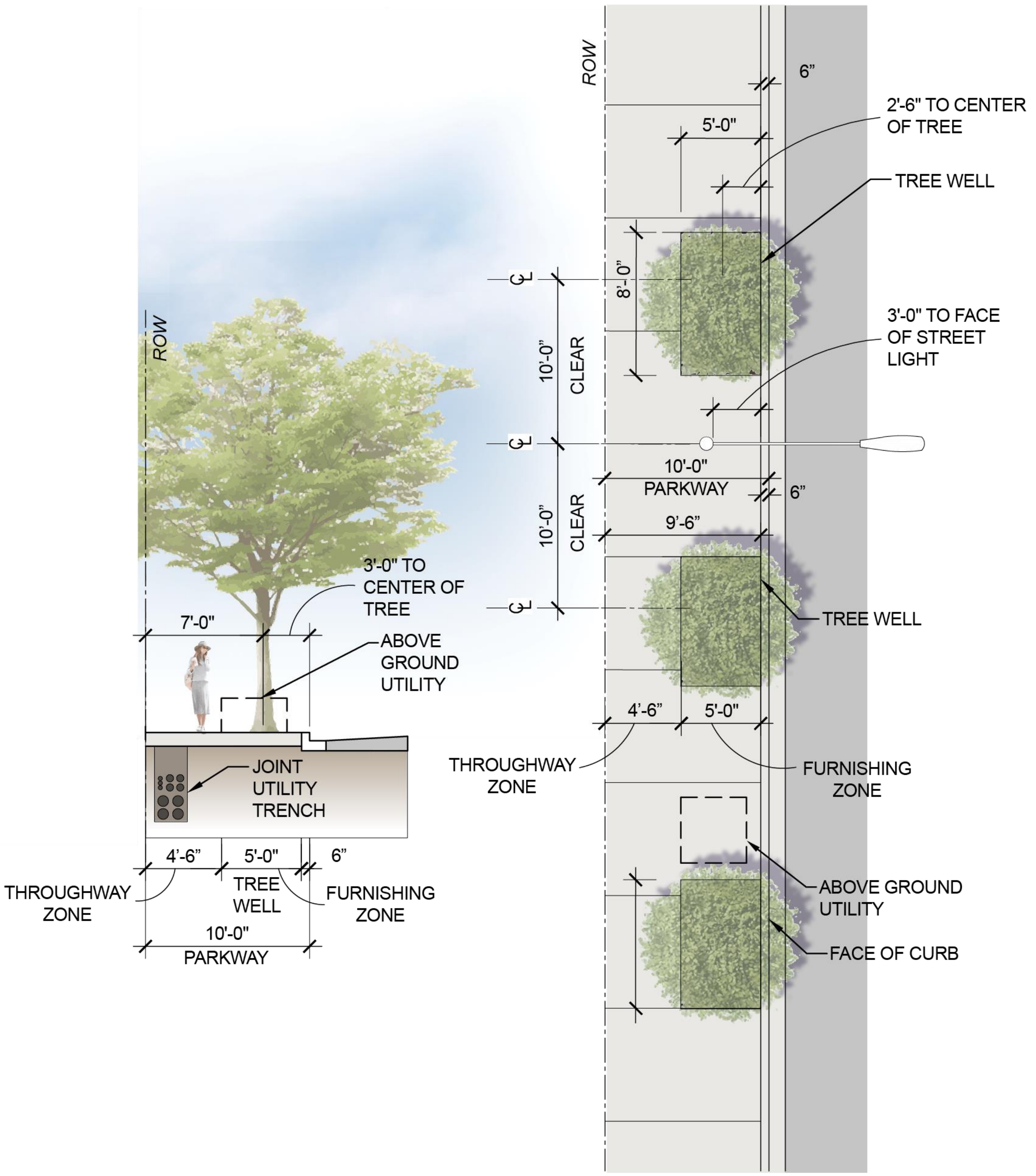

FIGURE 3-14 UP-2: 10' PARKWAY WITH TREE WELLS

Note:

1. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

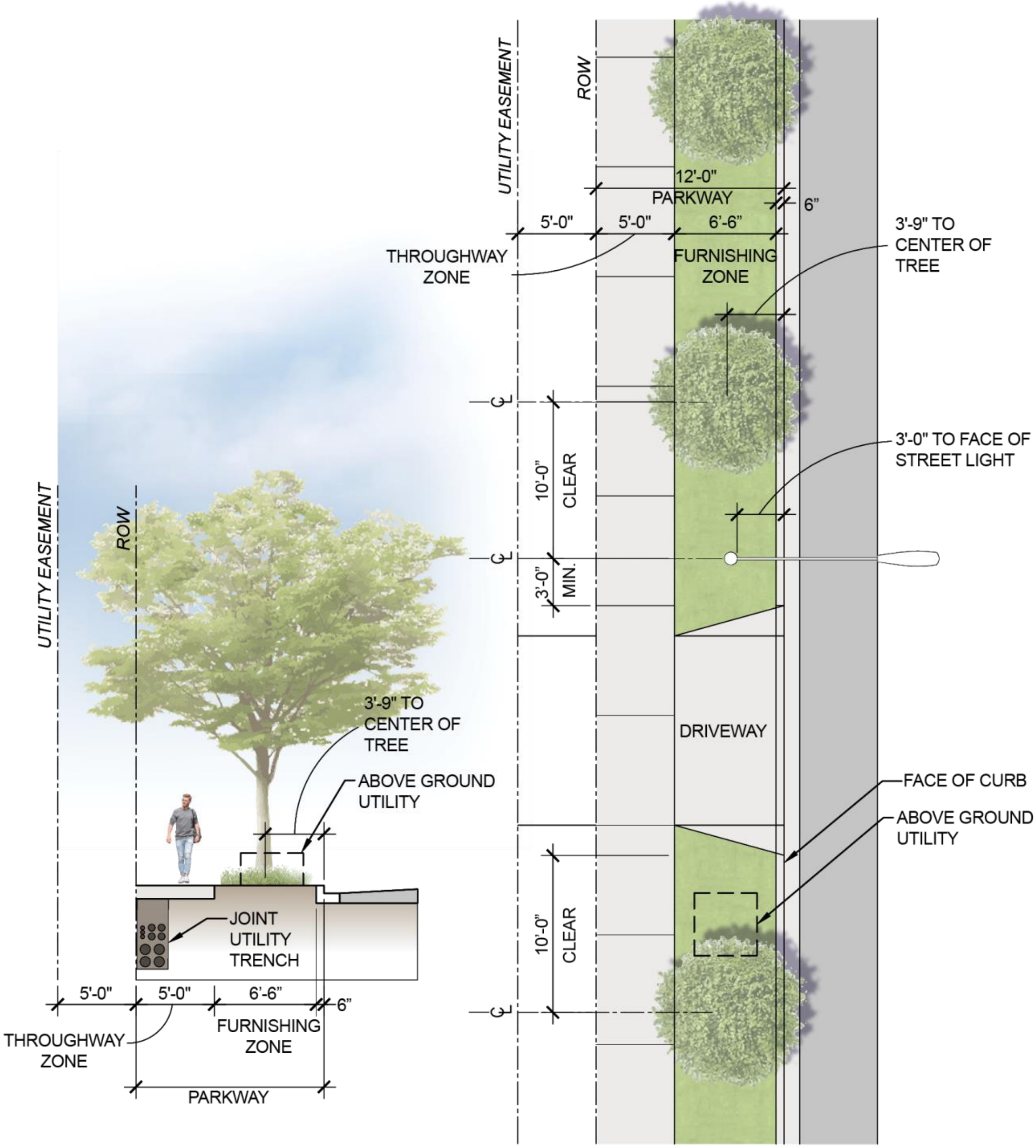

FIGURE 3-15 UP-3: 12' PARKWAY NON-CONTIGUOUS SIDEWALK

Note:

1. *Reference SDG-164 for required clearance for obstructions near driveways.*
2. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

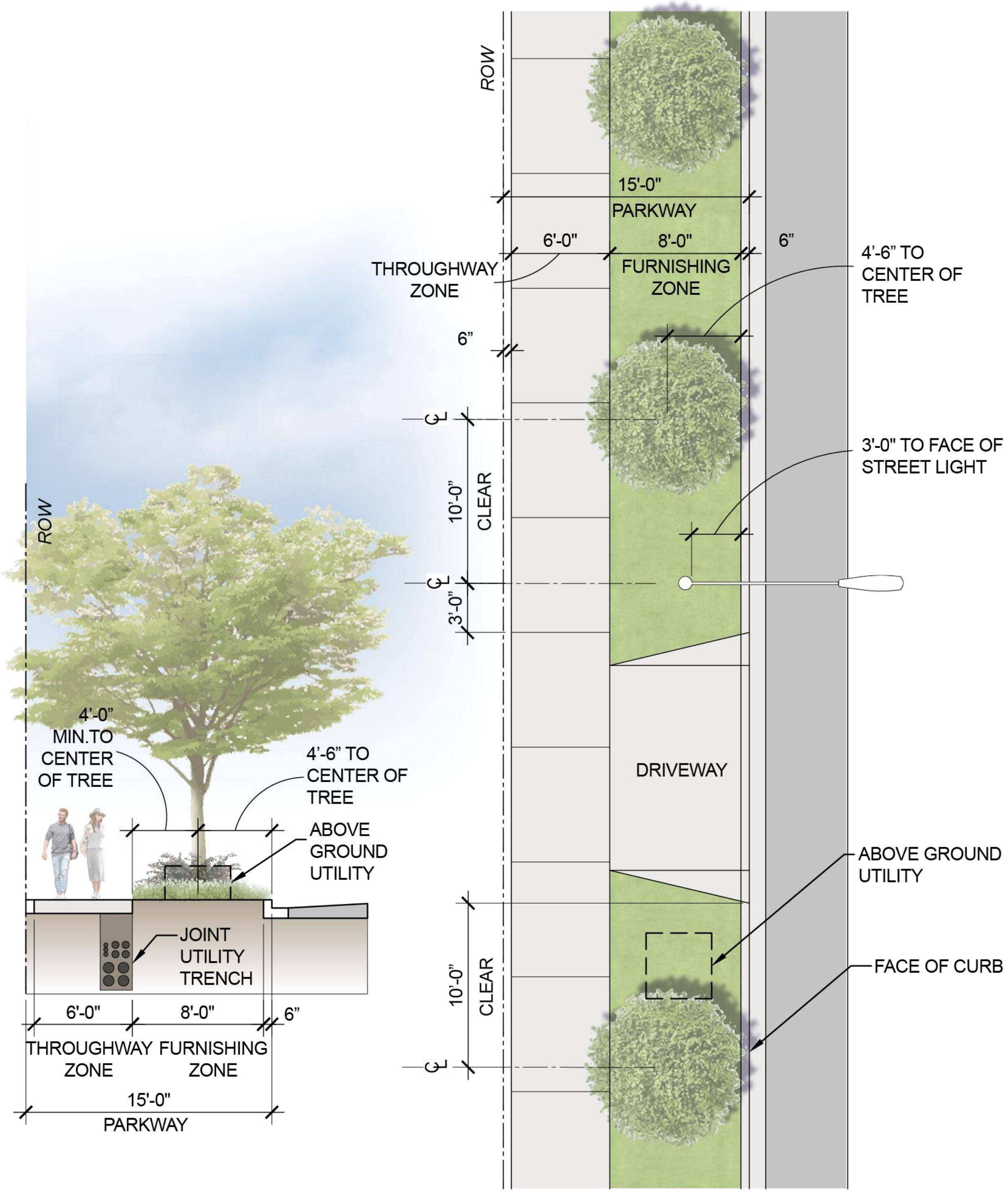

FIGURE 3-16 UP-4: 15' PARKWAY NON-CONTIGUOUS SIDEWALK

Note:

1. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

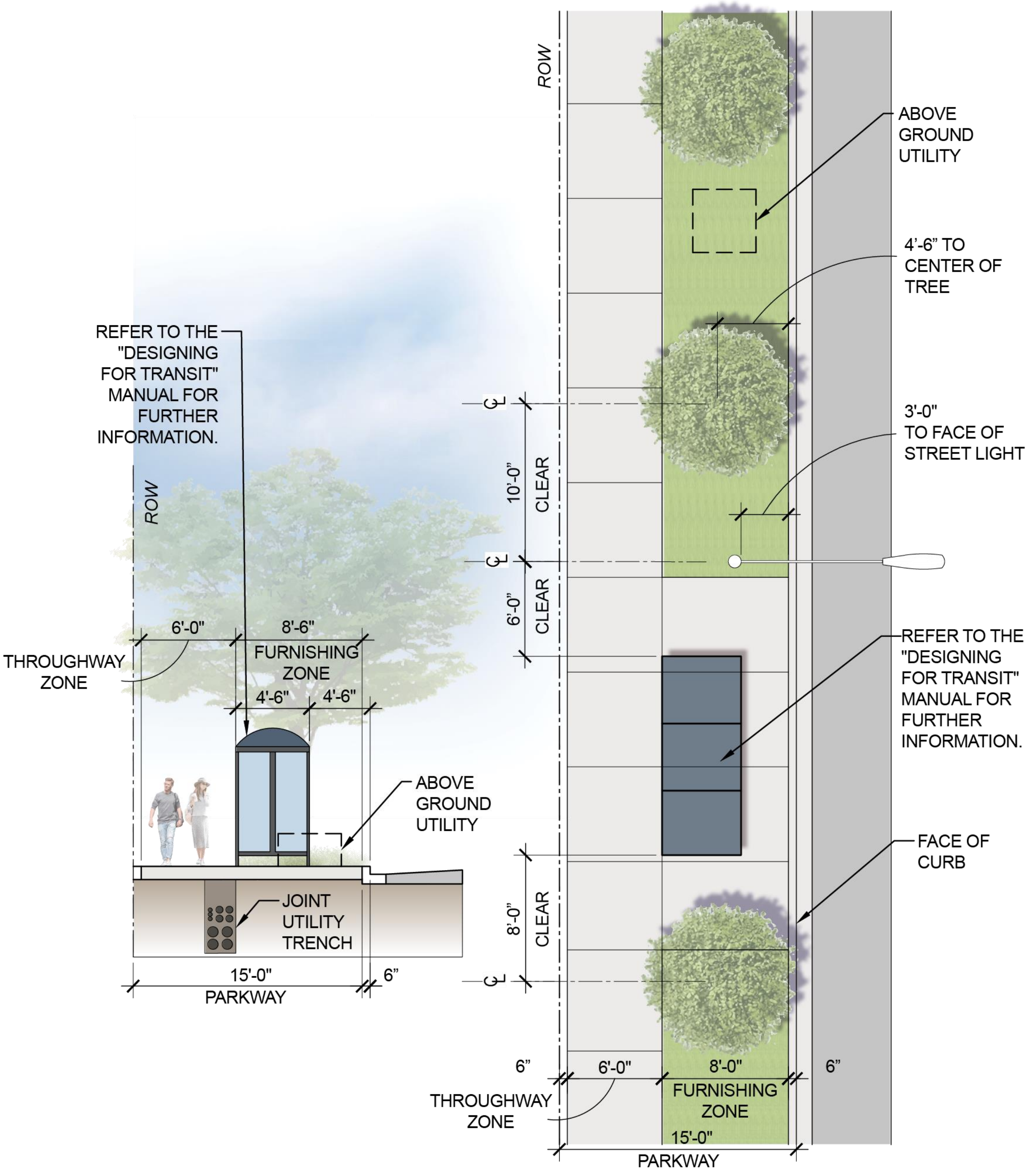

FIGURE 3-17 UP-4T: 15' PARKWAY NON-CONTIGUOUS SIDEWALK WITH TRANSIT AREA

Note:

1. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

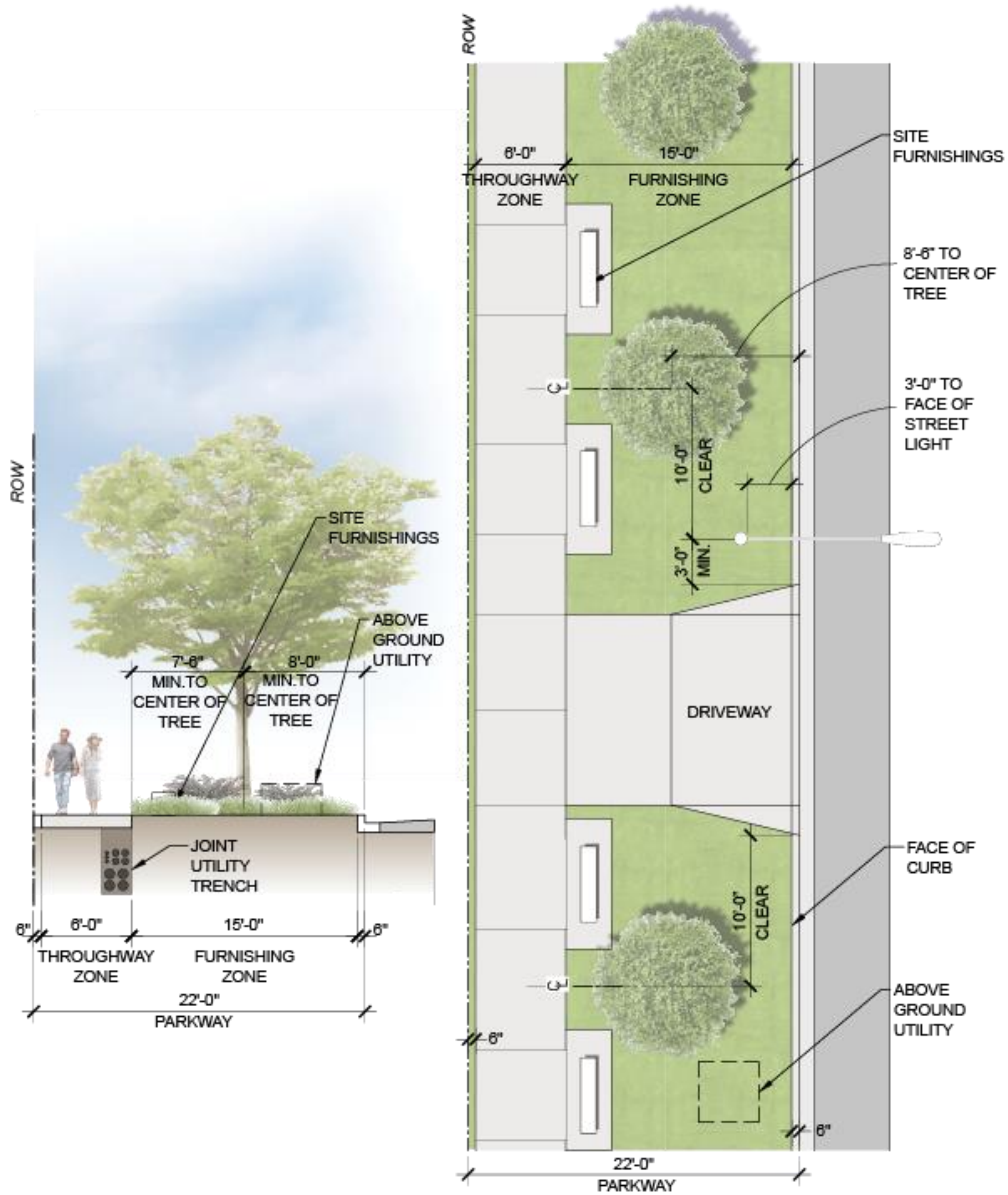

FIGURE 3-18 UP-5: 22’ PARKWAY NON-CONTIGUOUS SIDEWALK

Note:

1. *Alternative configuration of sidewalk and landscape strip may be installed subject to approval of City Engineer.*
2. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

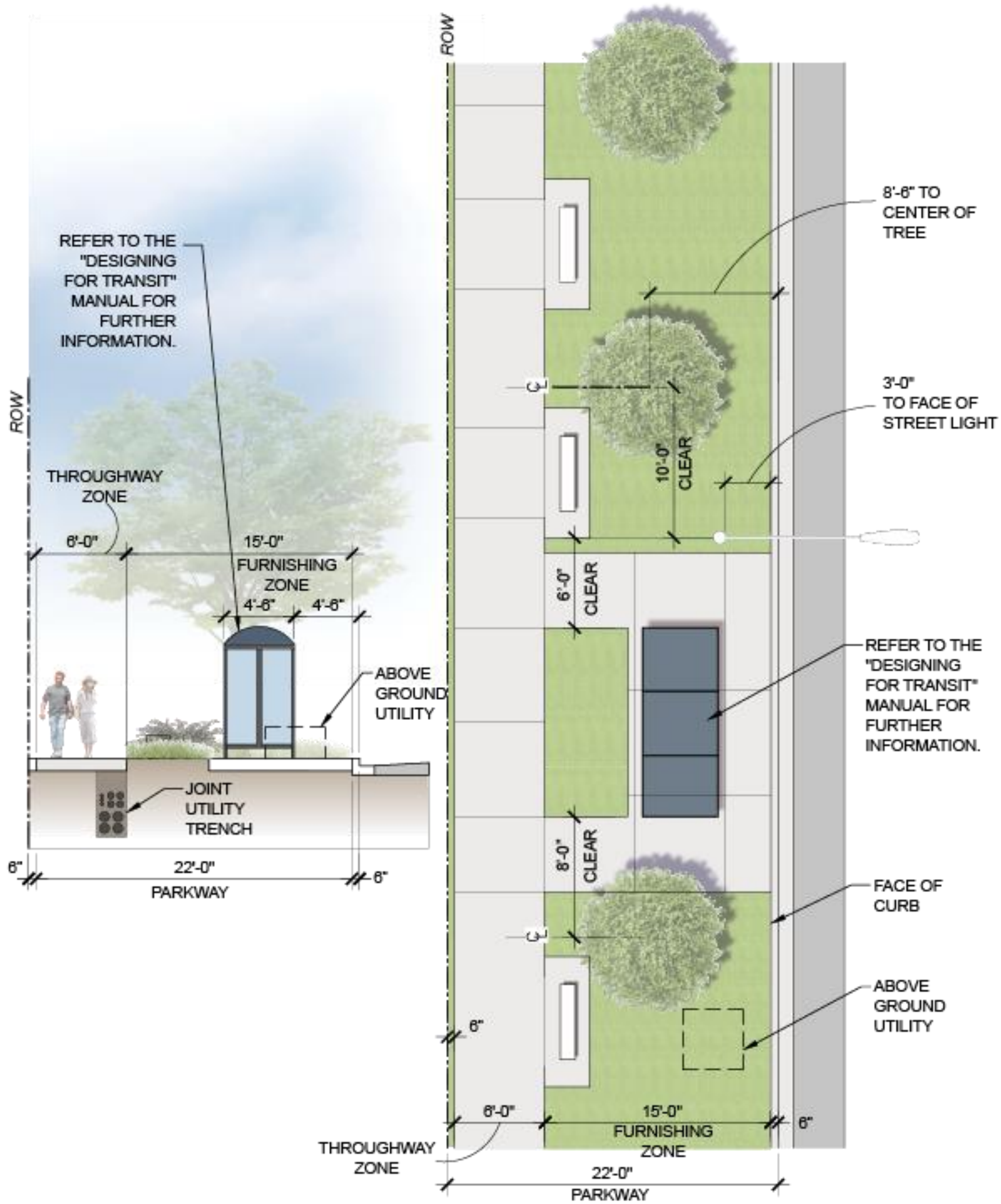

FIGURE 3-19 UP-5T: 22' PARKWAY NON-CONTIGUOUS SIDEWALK WITH TRANSIT AREA

Note:

1. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

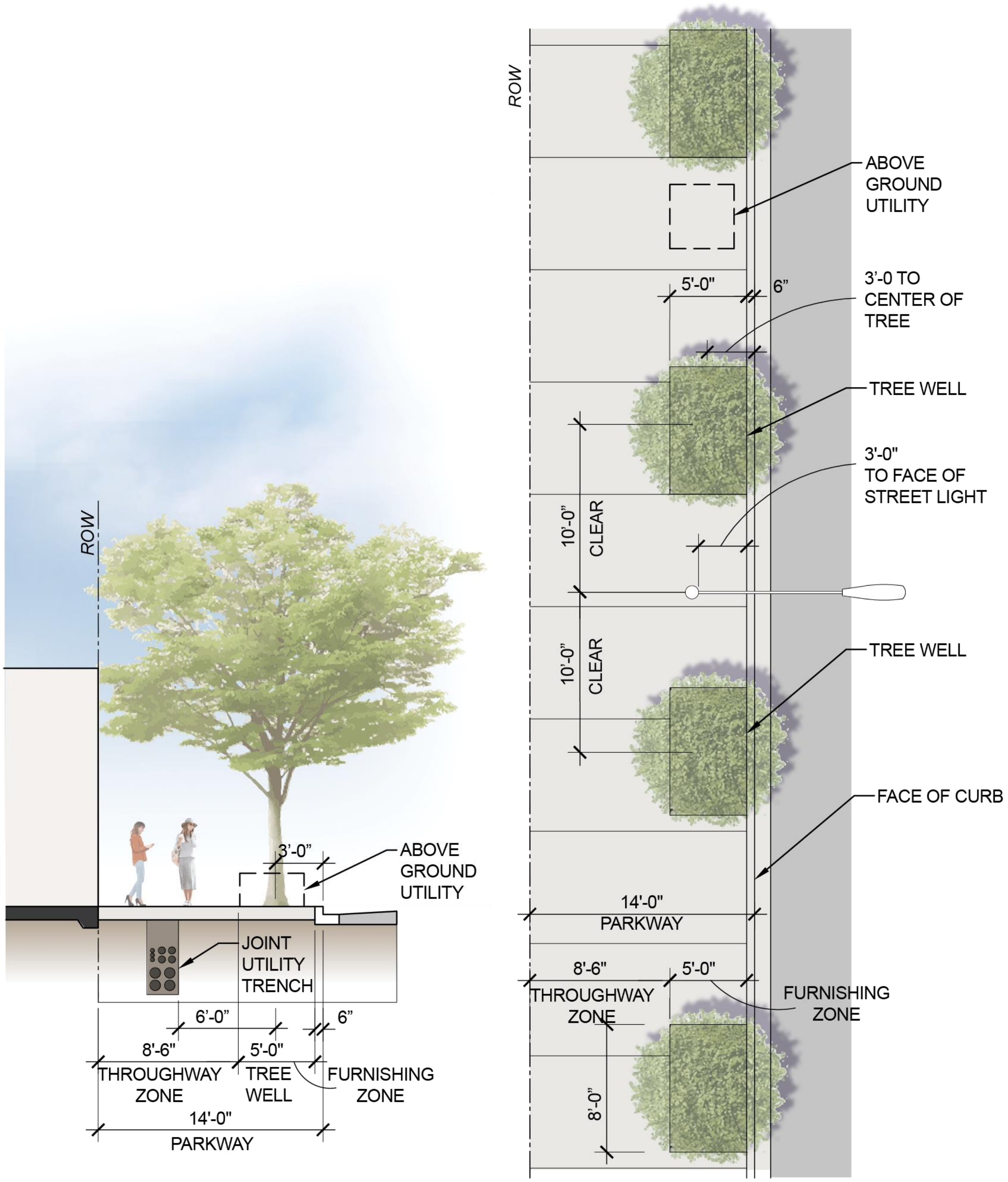

FIGURE 3-20 UP-6: 14' PARKWAY WITH TREE WELLS

Note:

1. *Where storefront furniture is provided, the clear pedestrian path shall not be less than 5'-0"*
2. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

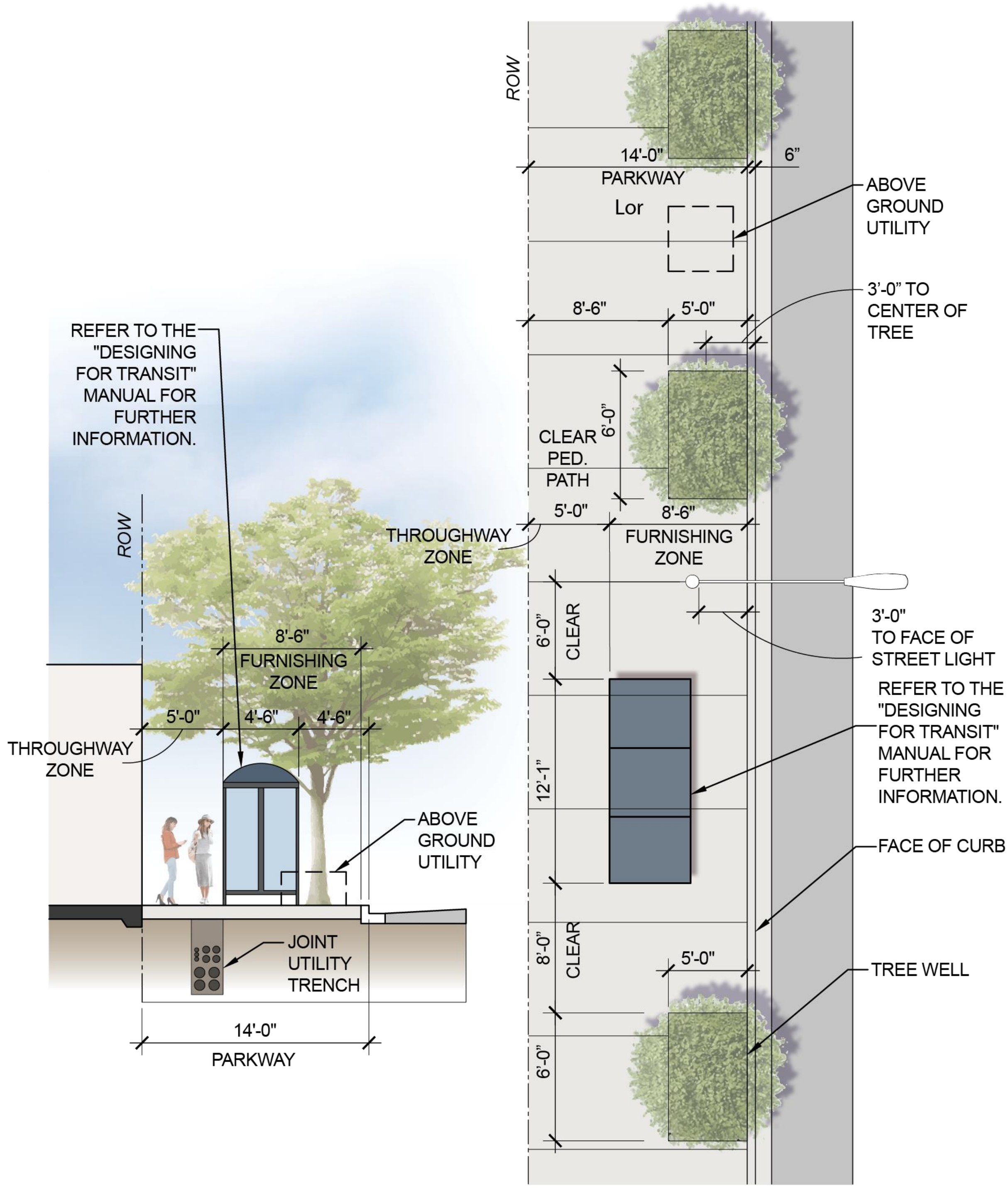

FIGURE 3-21 UP-6T: 14' PARKWAY WITH TREE WELLS AND TRANSIT AREA

Note:

1. *Where storefront furniture is provided, the clear pedestrian path shall not be less than 5'-0"*
2. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

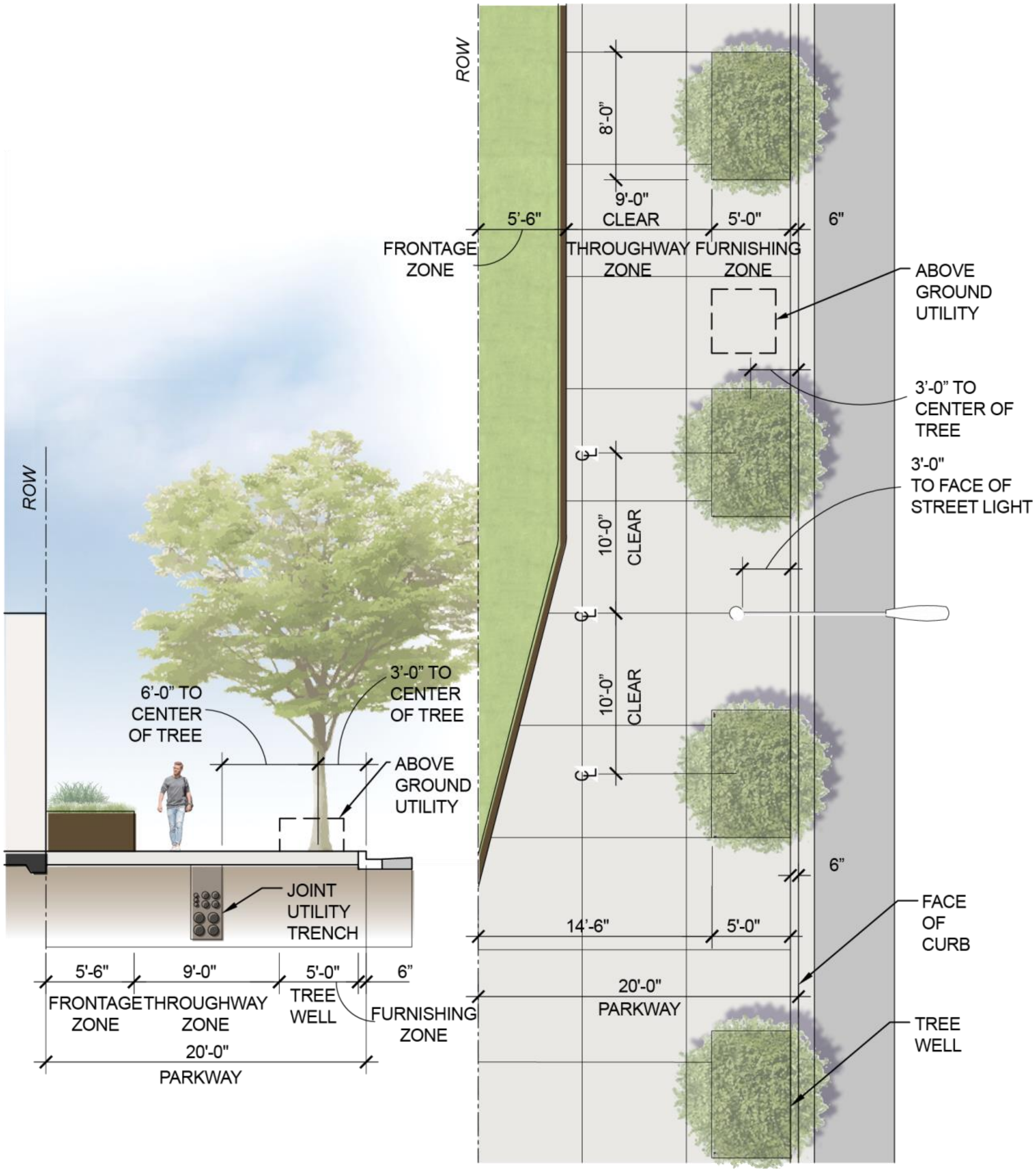

FIGURE 3-22 UP-7: 20' PARKWAY WITH TREE WELLS

Note:

1. *Where storefront furniture is provided, the clear pedestrian path shall not be less than 5'-0"*
2. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

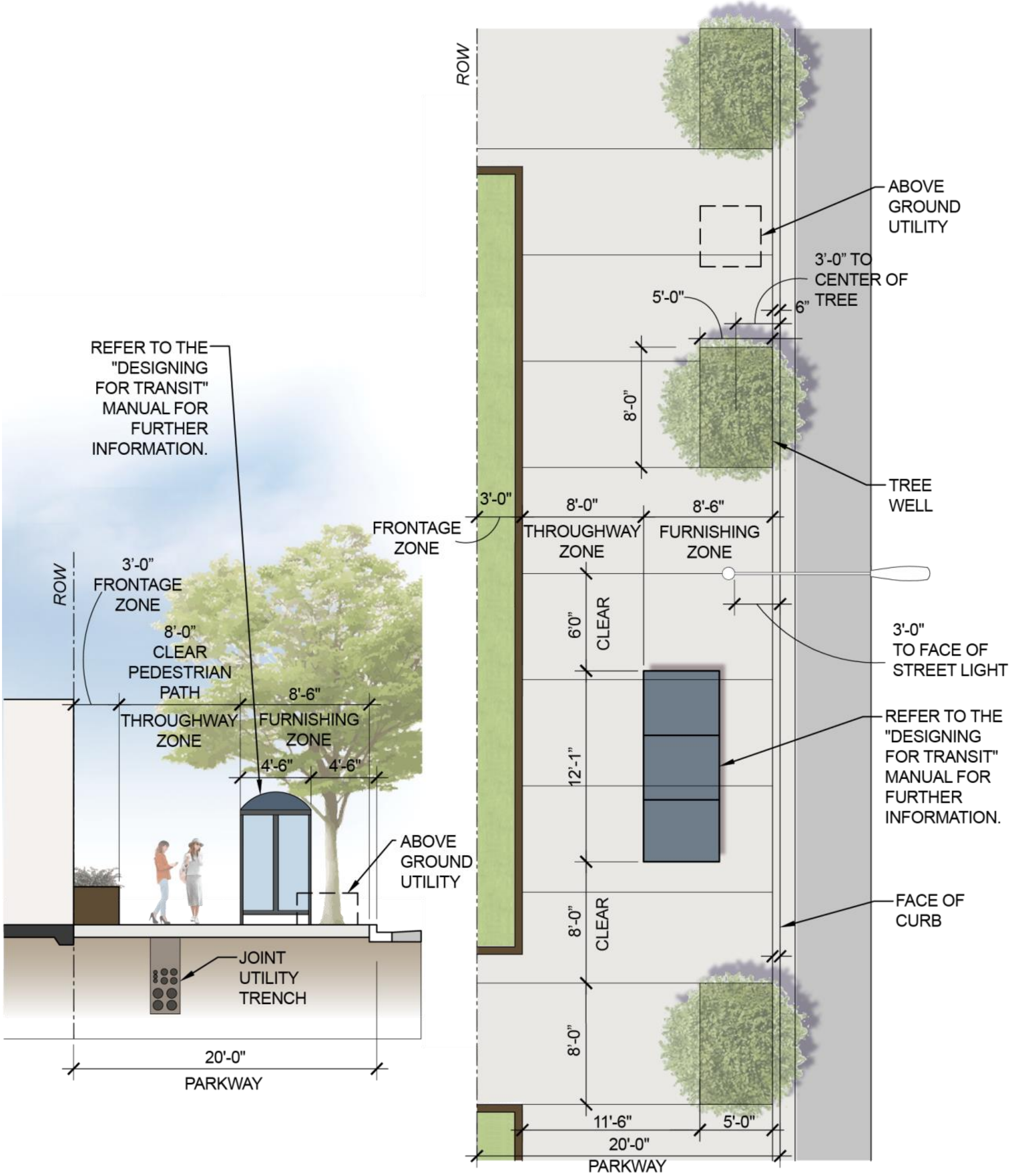

FIGURE 3-23 UP-7T: 20' PARKWAY WITH TREE WELLS AND TRANSIT AREA

Note:

1. *Where storefront furniture is provided, the clear pedestrian path shall not be less than 5'-0"*
2. *All street trees shall conform to SDMC Chapter 14, Article 2, Division 4.*

3.5.2 Rural Parkway Configurations

Figures 3–24 through 3–27 illustrate relevant rural parkway configurations.

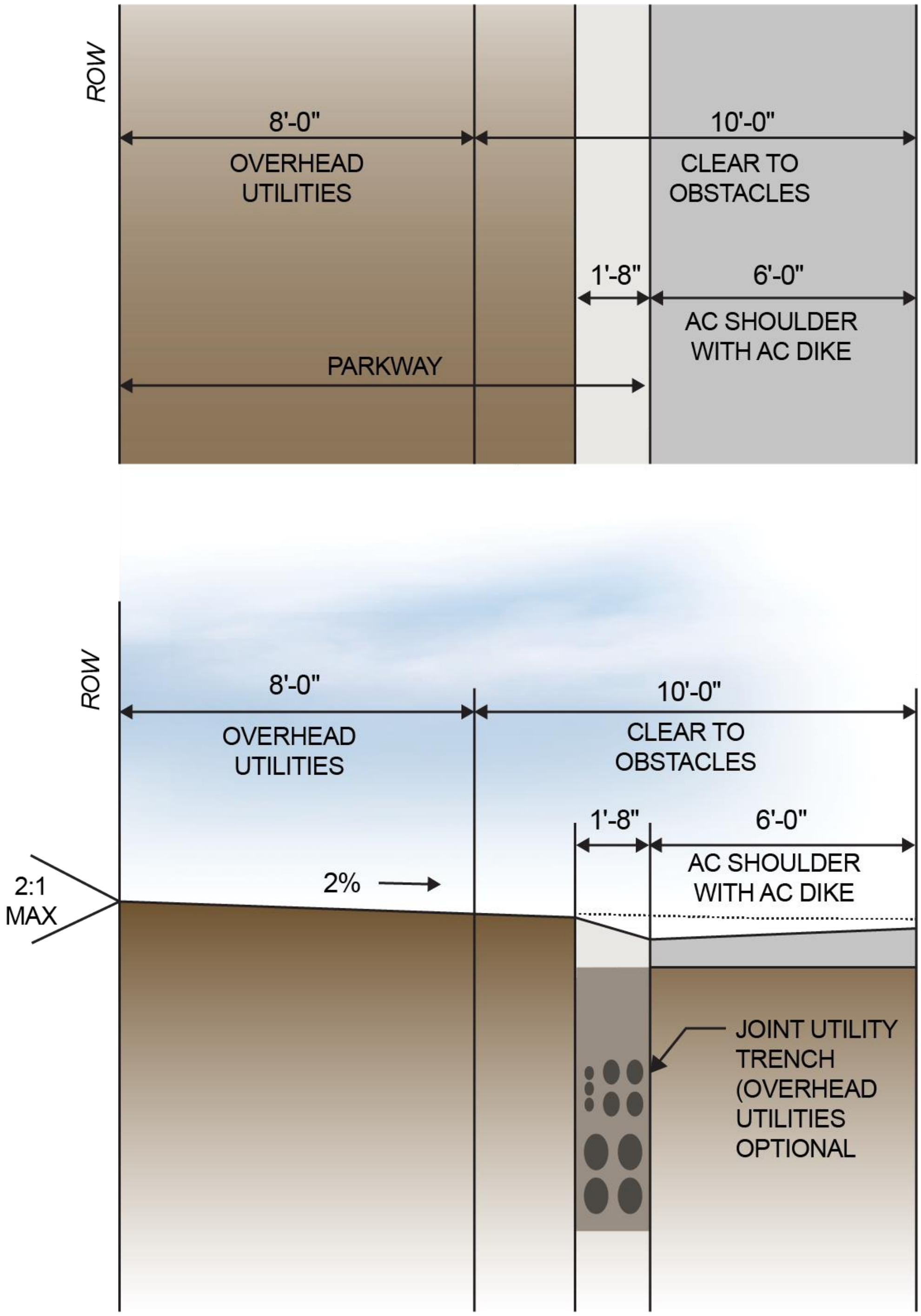

FIGURE 3-24 RP-1: 12' RURAL PARKWAY

Note: Street trees are typically required at a rate of 1 tree for every 30 feet of frontage along the road.

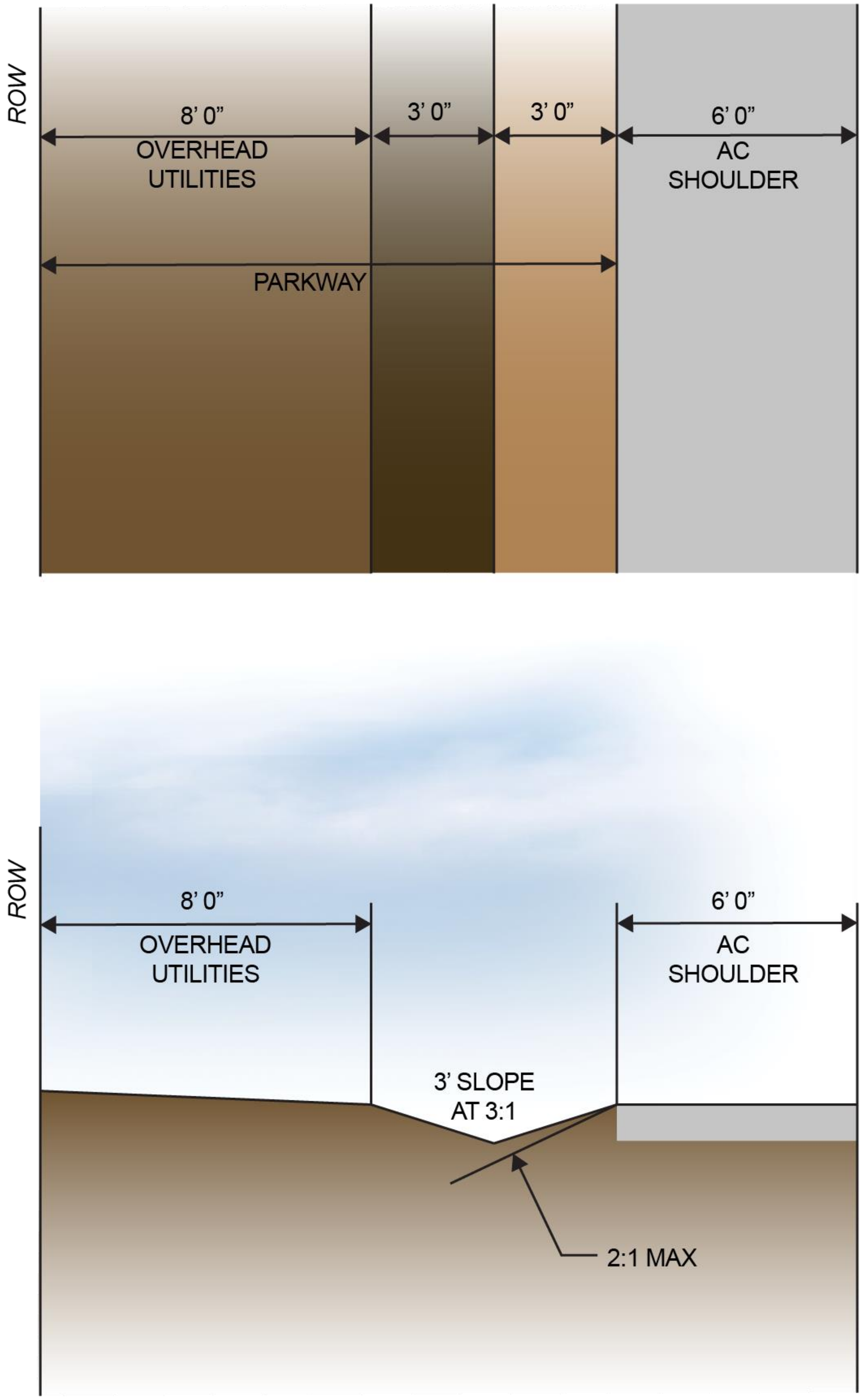

FIGURE 3-25 RP-2: 14' RURAL PARKWAY

Note: Street trees are typically required at a rate of 1 tree for every 30 feet of frontage along the road.

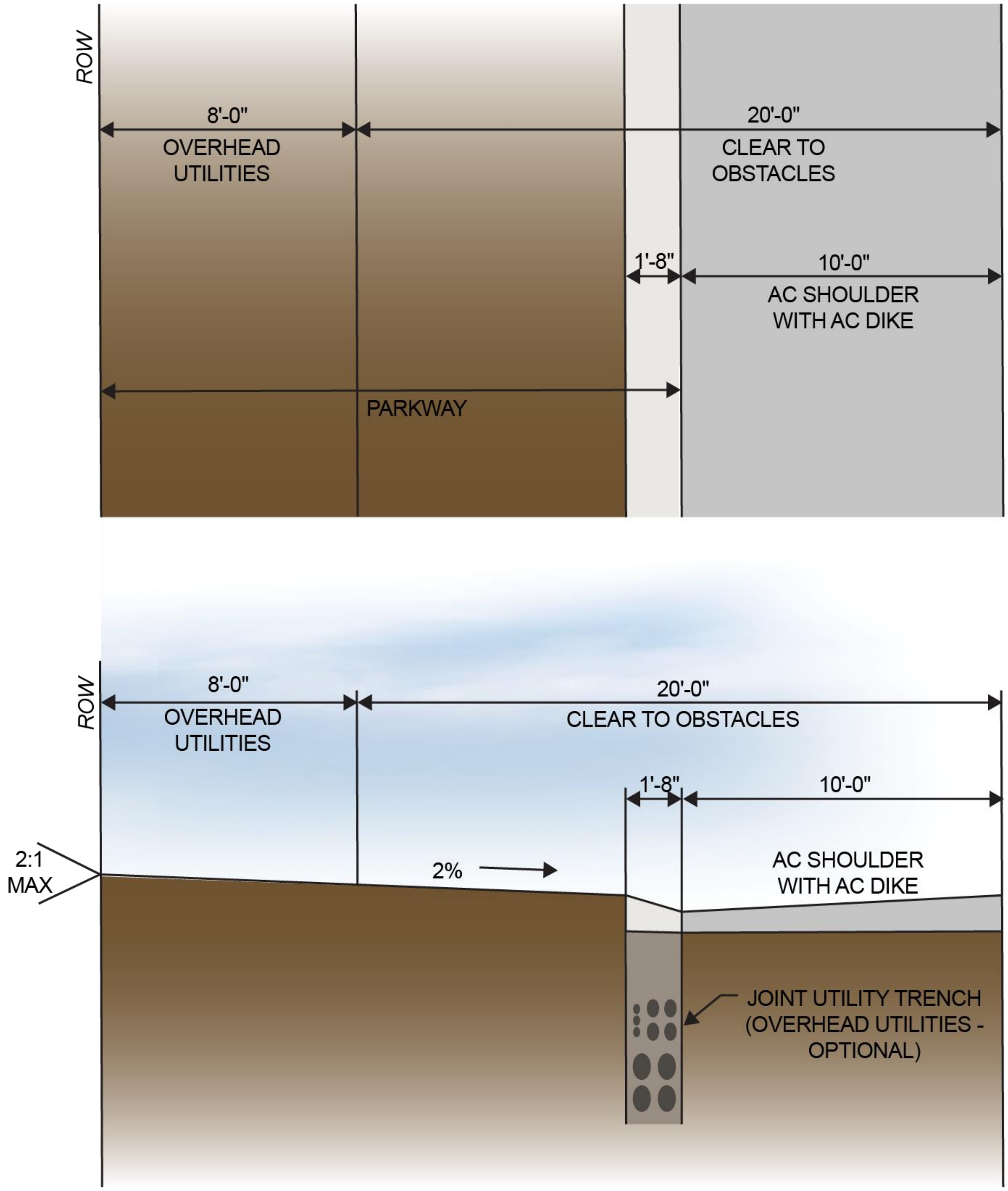

FIGURE 3-26 RP-3: 18’ RURAL PARKWAY

Note: Street trees are typically required at a rate of 1 tree for every 30 feet of frontage along the road.

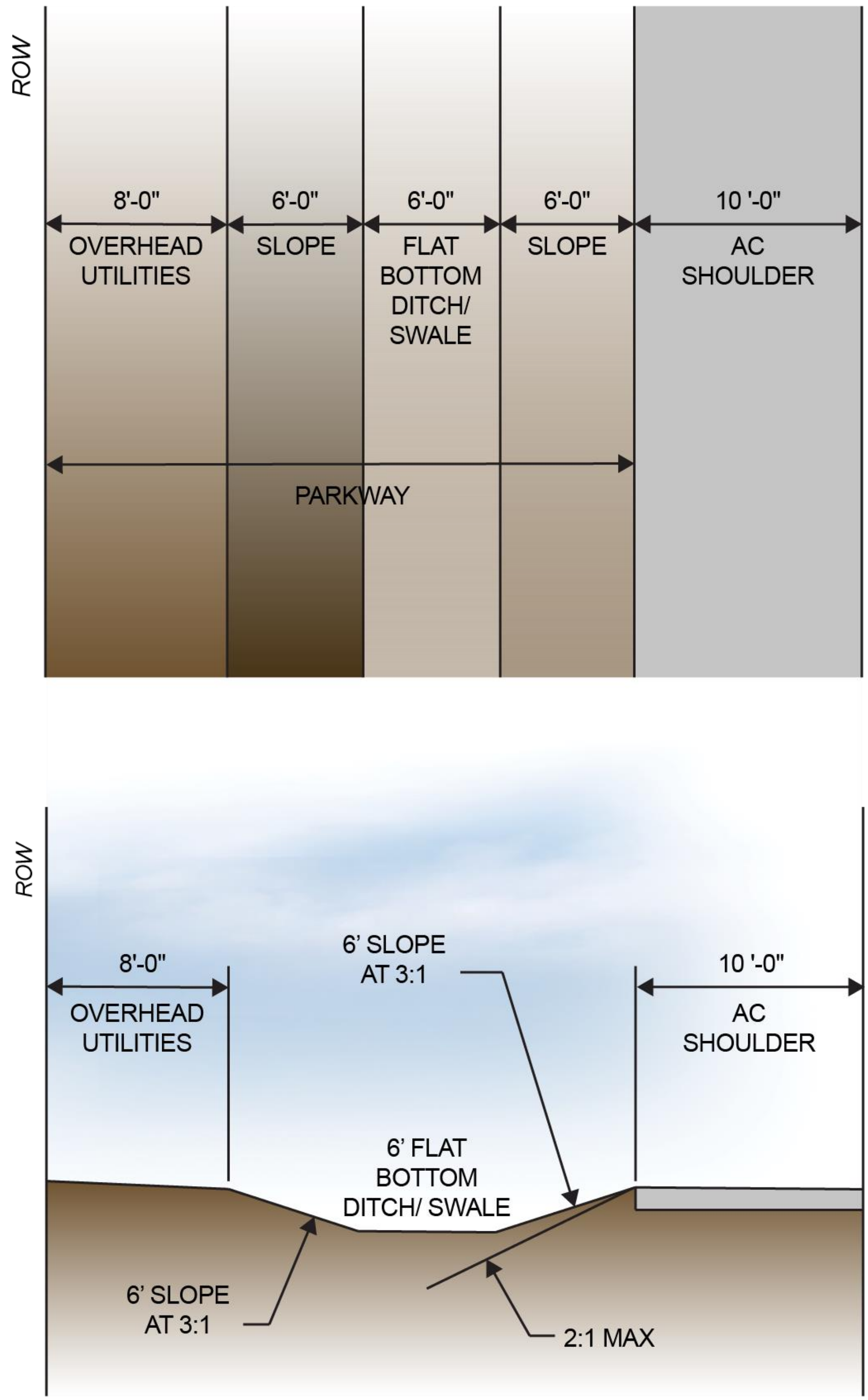

FIGURE 3-27 RP-4: 26' RURAL PARKWAY

Note: Street trees are typically required at a rate of 1 tree for every 30 feet of frontage along the road.

3.6. Parkway Lighting Standards and Guidelines

3.6.1 Mid-Block Street Lighting

Mid-block street lighting shall be installed as discussed in Council Policy 200-18 and as per the funding priorities below:

First Priority Locations:

- Intersection of public streets, highway-rail grade crossings
- Marked midblock crosswalks
- Tunnels, underpasses, and pedestrian bridges
- Crests or sharp curves in the roadway alignment
- Cul-de-sacs or dead ends more than 150 feet in length within 1320 feet of a transit stop or in a high-crime census tract, or more than 200 feet in length
- Midblock transit stops, school entrances, and entrances to high-pedestrian public facilities

Second Priority Locations – high-crime census tracts:

- Midblock locations in residential and commercial areas in high-crime census tracts within 1320 feet of a transit stop
- Midblock locations in residential and commercial areas in high-crime census tracts more than 1320 feet from a transit stop

Third Priority Locations – residential areas in non-high-crime-census tracts:

- Midblock locations in residential areas in non-high-crime census tracts within 1320 feet of a transit stop
- Midblock locations in residential areas in non-high-crime census tracts more than 1320 feet from a transit stop

Fourth Priority Locations – commercial areas in non-high-crime census tracts:

- Midblock locations in commercial areas in non-high-crime census tracts within 1320 feet of a transit stop
- Midblock locations in commercial areas in non-high-crime census tracts more than 1320 feet from a transit stop

Fifth Priority Locations – agricultural and open space:

- Midblock locations in agricultural-zoned and natural open space

Note: High-crime census tracts have 50% higher rate than the citywide average rate for violent crime.

Additional conditions:

- One light on each side of the street at a-grade railroad crossings to illuminate the side of the train facing the motorist.

- Immediately adjacent to areas of high pedestrian activity, including schools, parks, transit centers, access to transit, and commercial and recreational facilities that draw large numbers of pedestrians.
- At other locations, such as at abrupt changes in horizontal or vertical alignment, as determined by the City Engineer.

3.6.1.1 Exempt Areas

Agriculture-zoned or natural open space land may be exempted from midblock street lighting provisions, at the direction of the City Engineer.

3.6.1.2 Luminaires

Mid-block street lighting shall use fully shielded (Type U0) luminaires and shall conform to the following:

- Type X, for alleys.
- Type Y-MID, for local residential streets (any width) and streets classified as collector or higher with curb-to-curb width up to and including 40 feet.
- Type Z-MID, for streets classified as collector or higher with curb-to-curb width greater than 40 feet.
- At the end of a cul-de-sac, use a Type Y-INT luminaire to minimize impact to houses adjacent to luminaire.

3.6.2 Pedestrian-Scale Lighting

Pedestrian-scale lighting serves to increase visibility for pedestrians in dark and twilight conditions creating a safer environment for those in the parkway zone whether traversing the sidewalk or approaching an intersection.

Lighting should be designed with consideration of day and nighttime activities in the area. Lighting must create a nighttime ambiance that complements the adjacent buildings and public realm and promotes a sense of safety. Where pedestrian-scale lighting is installed, sidewalk or walkway lighting shall be provided at regular intervals to prevent the creation of light and dark pockets, shall provide adequate lighting for pedestrians of all abilities, and shall conform to the following:

- Post top luminaires and poles have been standardized for use in the City. Refer to the City's Standard Drawings Section SDE, The "Whitebook" Section 700, and Approved Materials List. Pole shall match luminaire color.
- All new and replacement luminaires shall be LED. The latest technical and operational energy conservation concepts must be considered in lighting designs.
- In commercial areas, the average maintained horizontal illuminance (FC) on the sidewalk or walkway shall be as shown in the current version of IES-RP-8 for High Pedestrian Conflict areas (Pedestrian Only).

- In mixed-use areas, the average maintained horizontal illuminance on the sidewalk or walkway shall be as shown in the current version of IES-RP-8 for Medium Pedestrian Conflict areas.
- In residential areas, the average maintained horizontal illuminance on the sidewalk or walkway shall be as shown in the current version of IES-RP-8 for Low Pedestrian Conflict areas.
- In commercial areas, contributions from other nearby storefront lighting, private lighting, sign lighting, and/or reflections from structures on the private property should not be considered a reason for reducing the sidewalk or walkway illuminance levels indicated above. Sidewalk or walkway lights shall have shielded fixtures that keep light pollution, trespass, and glare to drivers to a minimum, as approved by the City Engineer. Manufacturer models for sidewalk and walkway lighting shall be approved by the City Engineer.
- Agriculture-zoned land or open space may be exempt, at the discretion of the City Engineer, from pedestrian scale lighting provisions.
- Further design guidelines can be found in the current version of RP-8 publication of the Illuminating Engineering Society of North America, “America National Standard Practice for Roadway Lighting.”
- Energy code regulations for exterior lighting are in the current version of California’s Title 24 regulations.
- All street lighting shall have shielding to cutoff illumination above an angle 90 degrees above the nadir.

3.6.2.1 Post Top Luminaires

Post top luminaires and poles have been standardized for use in the City. Refer to the City’s Standard Drawings, The “Whitebook” Section 700, and Approved Materials List.

Poles shall match luminaire color. All new and replacement luminaires shall be LED.

3.6.2.2 Centre City Street Light Application Guidelines

Pedestrian street lights should be located approximately seventy-five (75) to ninety-five (95) feet apart; with three lights located on each 200-foot block frontage and four lights located on each 300-foot block frontage. Street lights should be staggered on opposite sides of the street (Figure 3-28). When installed near street trees using four (4) foot by six (6) foot tree grates, the street lights are to be installed two (2) feet from the back of curb, measured from the back of curb to center of the pole base. When installed near street trees using five (5) foot by five (5) foot tree grates, the street lights are to be installed two and a half (2½) feet from the back of curb, measured from the back of curb to center of the pole base.

3.6.2.3 Street Light Conformance

- Design of street lighting systems shall conform to Section 209 Electrical Components of the “Greenbook” Standard Specifications for Public Works Construction, National Electric Code, Standard Special Provisions for Street Lighting and Traffic Signal Systems for the City of San Diego, Caltrans Standard Plans, applicable amendments, and this Manual.
- All luminaires shall be LED.

- All luminaire designs shall minimize upward light were possible and shall conform to the 'U' ratings above.

3.6.2.4 Centre City Luminaires and Poles

The street lighting program for downtown includes Type C - Standard, Type CE - Enhanced Standard, Type A - Gateway, Type G - Gaslamp, Type AP - Asian Pacific, and Type T - Tear-Drop Lights. These light standards are designed primarily for mid-block lighting. All signalized intersections shall utilize cobra head style luminaires on Type 15 standards per City requirements.

3.6.2.5 Street Light Classifications

District	Street Light
Ballpark District, Columbia, Core, Cortez, East Village, Marina	TYPE C Standard Light (SDE-108)
Gaslamp Quarter	TYPE G Gaslamp Light (SDE-110)
Horton Plaza	TYPE A Gateway Light (SDE-105)
Little Italy	TYPE CL Little Italy Light (SDE-109)

TABLE 3-2 DISTRICT STREET LIGHTS

District	Street Light
4th Ave. (Broadway to C St.), 5th Ave. (Broadway to C St.), 6th Ave. (Broadway to C St.), Kettner Blvd. (Ash St. to Laurel St.)	TYPE CE Enhanced Standard Light (SDE-109)
3rd Ave. (Market St. to J St.), Island Ave. (2nd Ave. to 6th Ave.)	TYPE AP Asian Pacific Light (SDE-107)
C St. (west of Park Blvd.)	Special per MTS (Induction Shoebox Lights)
J St. (6th Ave. to 14th St.)	TYPE A Gateway Light (SDE-105)

TABLE 3-3 SPECIAL STREET LIGHTS

District	Street Light
1st Ave., 10th Ave. (south of Ash St.), 11th Ave., A St., Ash St., F St. (east of 6th Ave.), Front St., G St. (west of 4th Ave. and east of 6th Ave.), Grape St., Hawthorn St., Laurel St., Pacific Highway	TYPE A Gateway Light (SDE-105)

TABLE 3-4 GATEWAY STREET LIGHTS

District	Street Light
Broadway, Cedar St. (west of 1st Ave.), Imperial Ave., Market St. (west of 4th Ave. and east of 6th Ave.)	TYPE A Gateway Light (SDE-105)
Harbor Dr.	Under Port of San Diego jurisdiction
Park Blvd.	TYPE T Tear-Drop Light (SDE-111)

TABLE 3-5 CEREMONIAL STREET LIGHTS

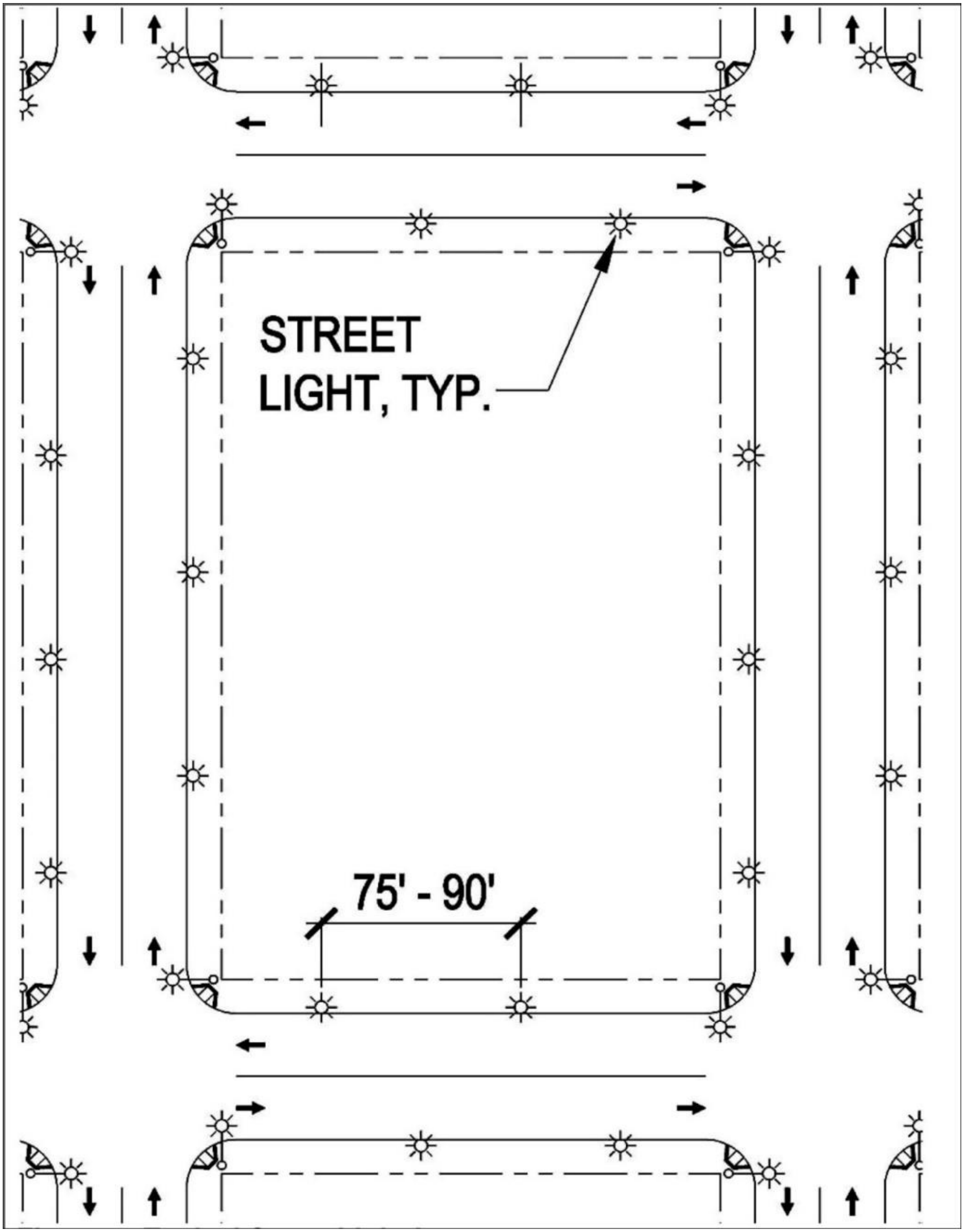

FIGURE 3-28 TYPICAL CENTER CITY STREET LIGHT LAYOUT

Source: Centre City Streetscape Manual

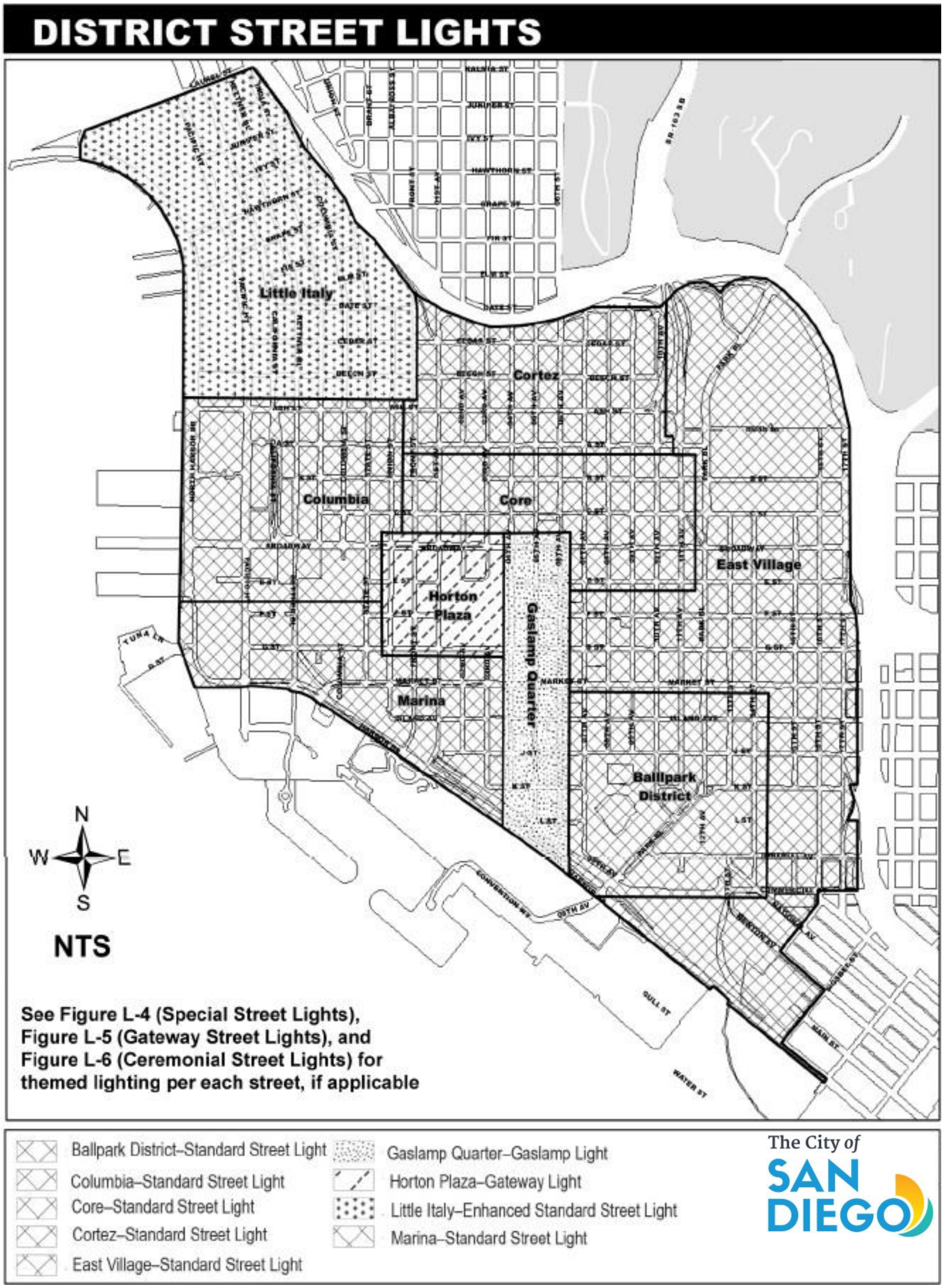

FIGURE 3-29 DISTRICT STREET LIGHTS

Source: Centre City Streetscape Manual

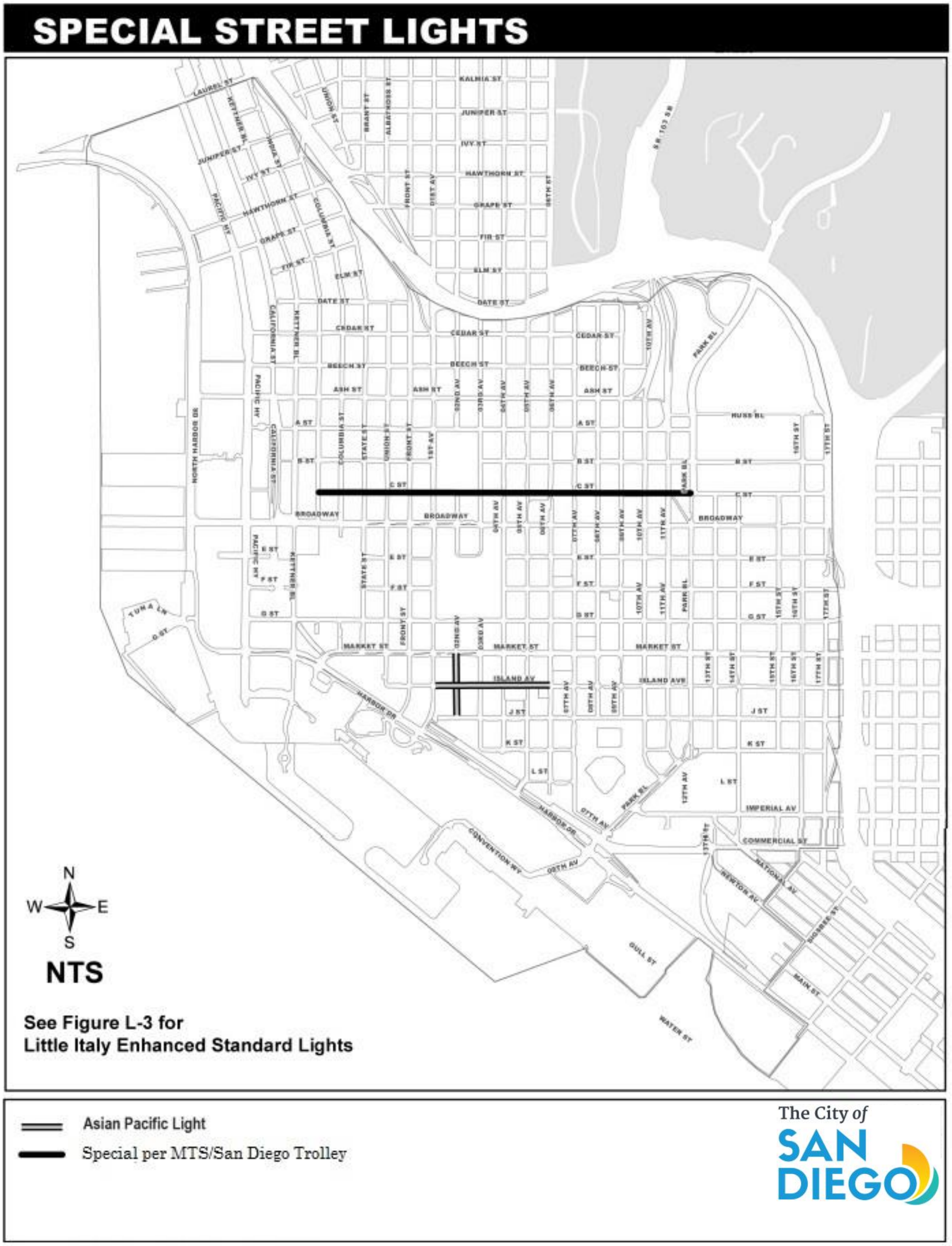

FIGURE 3-30 SPECIAL STREET LIGHTS

Source: Centre City Streetscape Manual

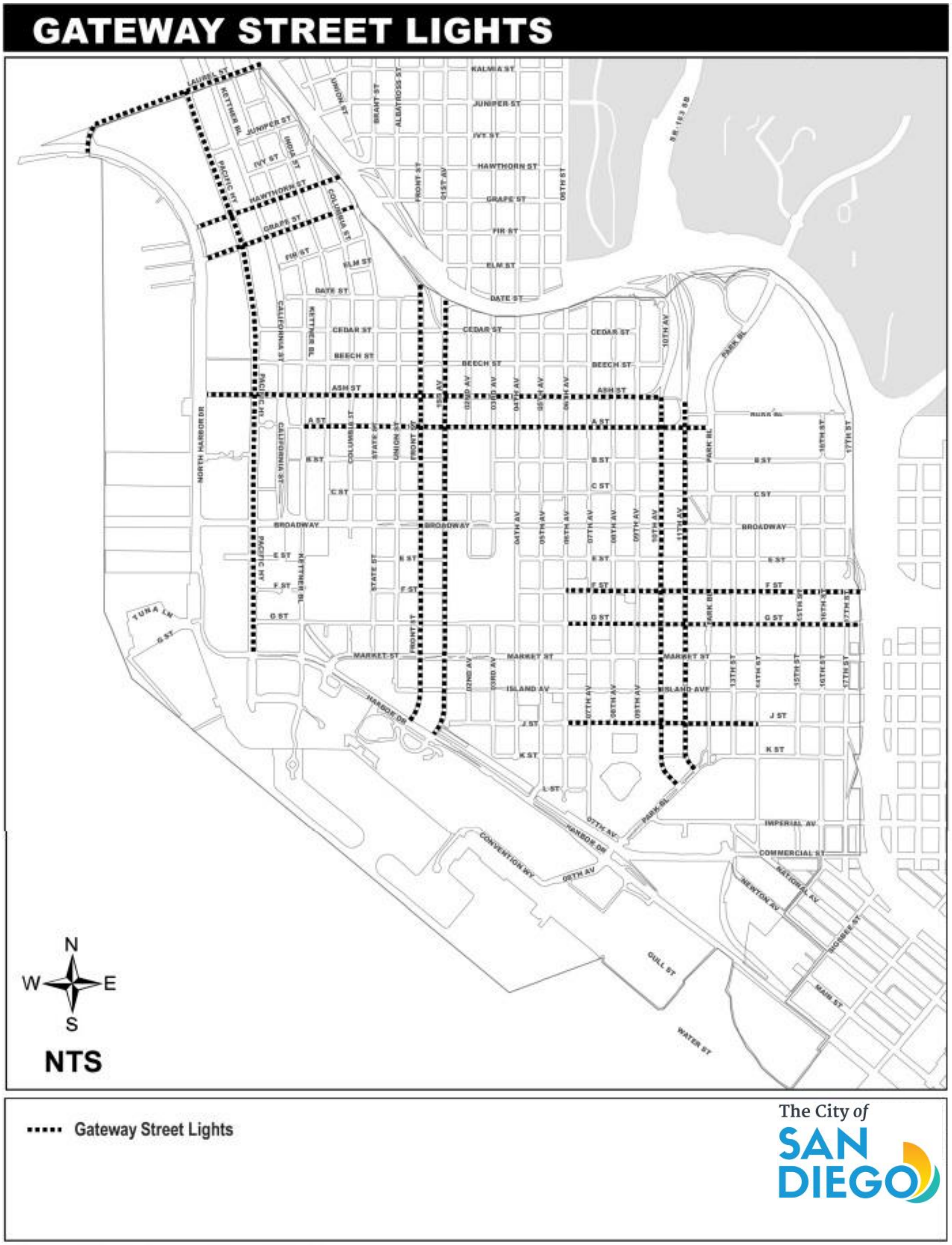

FIGURE 3-31 GATEWAY STREET LIGHTS

Source: Centre City Streetscape Manual

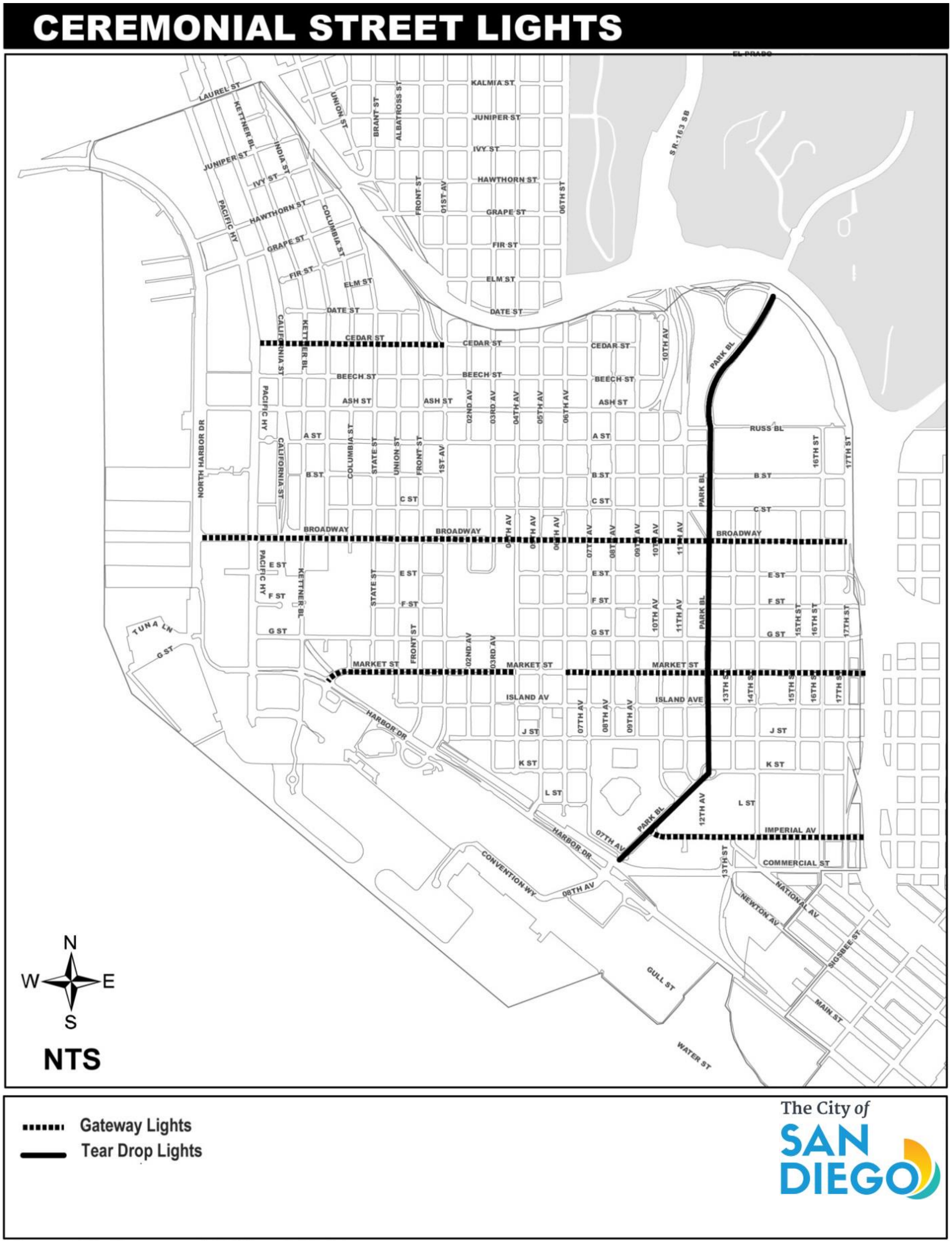

FIGURE 3-32 CEREMONIAL STREET LIGHTS

Source: Centre City Streetscape Manual

3.7. Other Parkway Features

3.7.1 Vehicular Features

3.7.1.1 Driveways

Driveways provide vehicular access to off-street destinations. This can create a potential conflict for pedestrians and bicyclists when drivers cross the sidewalk or enter the roadway. Too many driveways can disrupt pedestrian flows and degrade the pedestrian environment.

__Standards and Guidelines:__

- Driveways shall be designed per the City's Standard Drawings and San Diego Municipal Code.
- Clear lines of sight, which may be disrupted by parked vehicles or vegetation, must be considered when siting driveways and surrounding infrastructure.
- Access to private property from public and private streets shall be by standard concrete driveways. Curb returns with curb ramps are required at signalized driveways. Driveway width shall be consistent with the Land Development Code. Driveways shall be designed such that access can be provided without backing onto streets that are classified as collector or higher classification. Driveways shall be designed and constructed per the City's Standard Drawings and San Diego Municipal Code.
- Access Control Plans should be developed for new and existing streets that consolidate access points to adjacent properties, either through local access lanes, shared easements, or establishment of access via less-busy cross streets.
- Where applicable, multiple types of driveway users should be considered including personal vehicles, freight, buses, bikes, and maintenance/construction vehicles.
- Driveways with entry gates should ensure that the gate is appropriately placed (at least 20' from property line) so that vehicles do not obstruct the path of travel for pedestrians on the sidewalk.
- Driveway access is not typically permitted onto a primary arterial. Should a lot have frontage only on a primary arterial, driveway access limited only to right turns in and out will be permitted at locations and under conditions specified by the City Engineer and may require a dedicated lane.
- Where applicable, site access should be designed from the alley. See Land Development Code requirements.
- Median breaks for driveway access to major streets will not typically be permitted unless all of the following conditions exist:
    - Driveway access must comply with ADA access requirements, California's Title 24, and City Standards.
    - The property to be served is a major traffic generator and has a continuous frontage of 1,200 feet or more along the major street and is situated between streets that intersect the major street from the side occupied by the property.
    - The median opening is not less than 600 feet from an intersection with a major or collector street.

  - The median opening is not less than 400 feet from an intersection with a local street. The need for left-turn storage may require a greater distance.
  - The median opening is greater than 600 feet from any other existing or proposed mid-block median opening.
  - All costs (e.g., base material, surfacing, traffic safety street lighting, traffic signals, reconstruction or utility relocation) required by a mid-block opening will be borne by the requesting party.

3.7.2 Transit Features

3.7.2.1 Bus Stops & Bus Shelters

Waiting areas provide a safe and comfortable place for passengers to wait for their transit. Area enhancements may include seating, landscaping, lighting, shade and rain cover, trash receptacles, complimentary WiFi, real-time transit arrival alerts, and daily schedule information. These amenities support a passenger's overall transit riding experience, encouraging new riders to try transit, and increasing a passenger's sense of security.

Considerations:

- In constrained conditions, transit shelters are available with partially open sides, allowing the Furnishings Zone to be reduced.
- Providing a pop-out for the entire length of the transit stop is also an effective way to increase Furnishings Zone width.

Standards and Guidelines:

- Bus boarding and alighting areas shall provide a clear length of 96 inches, measured perpendicular to the curb or vehicle roadway edge, and a clear width of 60 inches, measured parallel to the vehicle roadway.
- Where feasible, the location of transit stops and shelters in the Furnishings Zone shall be a minimum of 10 feet where shelters are existing and proposed. Where there is no bus shelter, other bus stop locations shall provide a minimum of 8 feet. The Furnishings Zone width for bus shelters shall extend for 25 feet parallel to the curb measured from the bus stop sign. This will provide adequate clearance to accommodate bus lifts for persons with disabilities. Refer to MTS Designing for Transit and Urban Parkway Configurations in this Chapter for additional information.
- Bus stops and shelters must be compliant with ADA access requirements, California's Title 24, and City accessibility standards.
- Bus route identification signs shall comply with California's Title 24.
- Stops shall not be designed or constructed to require persons with disabilities to board or alight from a bus at a location other than one used by the general public.

- Bus stop boarding and alighting areas shall have a firm, stable surface.
- The Furnishings Zone should be a minimum of 8 feet 6 inches to provide wheelchair access to the shelter.
- Bus stops should not obstruct driveways or pedestrian paths wherever possible. For the location of bus shelters and clear widths, refer Section 3.5.1, "Urban Parkway Configurations."
- The design of bus stations and bus stops should be conducted in consultation with Metropolitan Transit System (MTS).
- Where feasible, bus stop bulbs can be installed at bus stop locations to help improve on-time performance while also improving the waiting area for passengers. The shelter or stop may be located on a bus bulb; refer to Section 5.3.4.2, "Bus Bulb Outs."
- Bus stops and shelters should be connected by an accessible route to the boarding and alighting area and adjacent sidewalks.
- Seating design should take into consideration passenger age, expected duration of wait times, and volume of boardings at the location.
- Hardscaping should be designed such that water drains away from waiting and boarding/alighting areas.
- Real-time wayfinding signs and prominent bus stop signs are essential elements for passengers and should be included at all new stops. Signage should provide relevant information on the transportation network and surrounding area. Audible push to talk real time signage should be included at high use stops.

References:

- 2010 ADA Standards for Accessible Design, Department of Justice, 2010
- California Building Code, (Chapter 11B-810), International Code Council, 2022
- Designing for Transit, MTS, 2018
- Mobility Hub Features Catalog, SANDAG, 2018
- Transit Street Design Guide, NACTO, 2016

3.7.3 Bicycle and Micromobility Infrastructure

Bicycle and micromobility infrastructure for parking, access, and repair often occurs within the parkway zone or the adjacent Flex Zone.

3.7.3.1 Bike Parking and Corral

Bike parking and end-of-trip facilities are essential components of a bicycle system. Facilities such as bike parking racks improve safety and convenience for bicyclists. Bicyclists need secure, well-located bicycle parking to support utilitarian and recreational bicycle trips. Lack of parking can be a major obstacle to using a bicycle. A robust bicycle parking program can improve the bicycling environment and increase the visibility of bicycling in a relatively short time.

<u>**Standards and Guidelines:**</u>

- Bicycle parking may be implemented by the City of San Diego within the street right of way.
- Bicycle parking includes the City's standard inverted-U bike racks, lockers, and high-capacity bike parking such as corrals with approved process as detailed https://www.sandiego.gov/bicycling/racks-and-lockers.
- Bicycle racks, where placed in the public ROW, should be sited in a well-lit area as close to building entrances and regular foot traffic as possible without restricting or encroaching onto pedestrian-accessible routes. The rack must be positioned to provide 2 feet by 6 feet of space per bicycle.
- Bicycle rack requests and bike corrals must be evaluated and supported by the abutting property owner/business owner.
- Bicycle racks must support the bicycle frame (not the wheel) at two points of contact and permit the use of a U-shaped lock to secure the frame and one wheel.
- Bicycle lockers should be provided in a secure, weather-protected manner and location.
- Bicycle Corrals (also known as "in-street" bicycle parking) consist of bicycle racks grouped together in a common area within the public right-of-way traditionally used for automobile parking. Bicycle Corrals are reserved exclusively for bicycle parking and other micromobility devices and provide a relatively inexpensive solution to providing high-volume bicycle parking. Bicycle Corrals can be implemented by converting one or two on-street motor vehicle parking spaces into on-street bicycle parking.
- Bicycle Corrals do not block sightlines (as large motor vehicles would do), therefore, it may be possible to locate bicycle parking in 'no-parking' zones near intersections and crosswalks. The Bicycle Corral location and design specifications are subject to the City of San Diego Transportation Department approval.
- If a Business Improvement District (BID) requests the installation of bicycle parking, the BID shall purchase the racks or corrals and is responsible for maintenance and cleaning.

3.7.3.2 Micromobility Parking

Micromobility devices, inclusive of scooters, operate and park within public right-of-way. Designating parking locations provide more control over the start and end location of vehicles, increases predictability for users and non-users alike, and reduces encroachment in the public right-of-way. Standards and guidelines are discussed in Section 5.3.3.9 under the Flex Zone.

3.7.3.3 Bikeshare Stations

Bikeshare stations are the most visible components of a bike share system. As a result, station placement is one of the most public and challenging aspects of the bike share planning process. Good station placement can attract riders, serve as a permanent promotion for the system itself, create value for sponsors, contribute to larger road safety designs, and add activity to the parkway zone.

Standards and Guidelines:

- Refer to the latest City of San Diego Municipal Code for Shared Mobility Devices on the standards and guidelines.
- Placing stations in the roadbed, at the same level as vehicle traffic, is a common siting choice. On-street stations are most frequently used where sidewalks are narrow or pedestrian space is at a premium. Much like linear “parklets” or bike parking corrals, bike share stations can be placed in standard (8’ or 9’) parking lanes, in offset/floating parking lanes, and in painted and concrete medians.
- An on-street bike share station can generally be placed anywhere where parked cars would go. The typical bike share station—with bikes at a 90 degree angle—is narrower than a parked car; riders pull bikes out into the “door zone” just as a driver would open a car door.
- Sidewalk stations should not impede pedestrian flow. Keeping stations in the same line as street furniture and other sidewalk features may help to maintain a pedestrian clear path.
- The payment kiosk should be oriented so that users can access the kiosk while standing on the sidewalk.

References:

- NACTO Bike Share Station Siting, 2019
- Mobility Hub Features Catalog, SANDAG, 2018
- Municipal Code Chapter 8, Article 3, Division 3, City of San Diego, n.d.

3.7.3.4 Bike Repair Stations

Bicycle Repair Stations create a helpful environment for people on bikes, enhancing a neighborhood’s accessibility and convenience. Making these available to the public is an effort by the City to encourage knowledge of bicycle repair and to make it a little easier for people on bicycles to get around and stay on the road.

Bicycle Repair Stations provide a basic bicycle repair resource in business land uses and corridors that have high bicycle traffic or to support more bicycle activity. Repair Stations feature a stand to mount a bicycle and contain the basic tools needed to perform do-it-yourself bicycle repair including screwdrivers, wrenches, and hex tools. Repair stations should feature a heavy-duty bicycle pump with a pump head for both schrader and presta valves.

3.7.3.5 Bicycle Access Ramps or Channels

Bicycle access ramps and channels, also known as bicycle runnels, provide a raised or recessed surface to roll bikes going up or downstairs.

FIGURE 3-33 BICYCLE ACCESS CHANNEL

Location: UCLA Portola Plaza
Source: ITE

Standards and Guidelines:

- Bicycle access ramps must not obstruct the path of travel.
- Bicycle access ramps or channels must be sited such that handrails remain accessible. If handrails are only installed on one side, the bicycle access ramp should be placed on the opposite side of the stairs.
- Ramp assemblies must be adequately anchored to existing and new stairs.
- A spacing of 6” from the edge of the adjacent wall is recommended.
- Educational signage at the top and bottom of stairs is recommended.
- Signage on the ramp or channel is recommended.

References:

- Quick Bites: Bike Runnels – Improving Access for Cyclists and All Users at Stairways, ITE, 2023

3.7.4 Landscaping and Stormwater Management

Street trees are urban infrastructure whose value is recognized in many of the City's land use policy documents. These documents call for street tree plantings to achieve various goals, including:

- Establishing and preserving neighborhood character.
- Encouraging commercial revitalization.
- Creating a comfortable pedestrian environment to improve mental health and wellbeing.
- Reducing the urban heat island effect.
- Capturing and reducing storm water runoff.
- Sequestering carbon and reducing pollution.

Considerations:

- To ensure the preservation and protection of existing mature trees within the Parkway Zone, protective measures such as protective barriers, mulching, permeable materials, etc., should be considered.
- Tree removals are typically not allowed. The City of San Diego may approve of permitted tree removal under rare and unavoidable circumstances with a required tree replacement plan.

Standards and Guidelines:

- For requirements for street trees and other landscaping in the ROW, refer to the citywide Landscape Regulations (San Diego Municipal Code Section 142, Chapter 14, Article 2, Division 4) and the associated Land Development Manual-Landscape Standards.
- The citywide Landscape Regulations address requirements such as the quantity, distribution, size, selection, and approval of plant material, including street trees. The Landscape Standards establish standards, guidelines, and criteria for all landscaping in the public ROW such as locational criteria (distance of trees from the face of curb for certain street classifications and speeds, and from traffic signals, signs, and underground facilities), plant selection, maintenance, median landscaping, irrigation, and electrical services.
    - Per Sewer Design Guide and Water Facility Design Guide, no trees shall be allowed within 10 feet of sewer or water mains and services
- For all street trees and landscape plantings in roadway islands, watering and maintenance will be assured through an agreement with the City, such as a street tree permit, encroachment removal and maintenance agreement, or maintenance assessment district.
- Tree grates must be a minimum size of 40 square feet per SDMC 142.0403 (b) (6). Knockouts must be provided to enlarge the inside diameter for supporting a larger tree trunk as the tree grows. Entire tree grate removal may be necessary to allow for future, undamaged tree growth or to address lifted grates that may affect pedestrian safety. Alternations to the tree roots or root flare are prohibited to accommodate tree grates. Tree grates must adhere to standards in the City's

Standard Drawings SDL-104. If tree grates occur within pedestrian access routes, they shall comply with the ADA, CBC and PROWAG standards. Landscaping and irrigation, including maintenance and trimming, must adhere to the City standards in the "Whitebook".

  - Tree grates are maintained through EMRAs, MADS, HOAs and other private property owners.

- Palm trees, which provide limited shade and need increased levels of periodic maintenance for health and safety of the tree, are prohibited from being planted in the right of way without special permission from the City to do so.
- MS4 Permit requires all development projects to implement source control and site design practices that will minimize the generation of pollutants.
  - Development projects are defined by the MS4 Permit as "construction, rehabilitation, redevelopment, or reconstruction of any public or private projects".
  - Refer to the City of San Diego Stormwater Standards Manual.
- For drainage standards, refer to the City of San Diego Drainage Design Manual.
- For landscape standards, refer to the City of San Diego Land Development Code, Landscape Standards.

References:

- Drainage Design Manual, City of San Diego Stormwater Dept, 2017
- Municipal Code, Chapter 14, City of San Diego, n.d.
- Sewer Design Guide, City of San Diego Public Utilities Dept, 2015
- Standard Drawings for Public Works Construction, City of San Diego, 2021
- Stormwater Standards Manual, City of San Diego Stormwater Dept, 2024
- The "Whitebook", City of San Diego Engineering and Capital Dept, 2021
- Water Facility Design Guide, City of San Diego Public Utilities Dept, 2021

3.7.4.2 Infiltration Planters and Bioswales

Sidewalk planters are structural landscaped reservoirs that capture, manage, and treat roadway runoff. Typically, stormwater is collected and temporarily stored to allow for even rates of filtration and infiltration through the facility. Pollutants are filtered out as water percolates through the vegetation, soil media, and gravel layer. Sidewalk planters can allow for infiltration into surrounding subsoils, or they can simply allow water to flow through the facility to be discharged elsewhere (typically the storm drain system).

A bioswale is similar in function to infiltration planters in that it captures stormwater runoff from nearby streets, sidewalks, and driveways. Bioswales can be installed as an alternative to planters in the parkway area, especially when sidewalk widths are inadequate or when curb extensions for traffic calming are desired. Bioswales should not be installed over water and sewer facilities.

Considerations:

- Consider soil volume minimums achieved through employment of suspended pavement systems or structural soil.

Standards and Guidelines:

- Both planters and bioswales must be designed to accommodate and grow street trees as trees and their root systems help capture stormwater runoff. They are typically located adjacent to the curb either in the Furnishings Zone or in a curb extension.
- Bioswales and other stormwater treatment facilities placed alongside pedestrian circulation paths and on street parking spaces shall comply with the provisions of the access law.
- Roadway runoff enters a facility directly from the street through curb cuts. Where there is curbside parking, a paved convenience strip of at least 24” must allow access to parked vehicles.
- Treating street runoff requires multiple installations in a row; this ensures their effectiveness at managing the sometimes heavy amounts of runoff by dispersing it over many facilities. Street design should consider the holistic system of multiple installations.
- Infiltration planters are placed where site conditions are appropriate for allowing water to infiltrate surrounding native soils. Infiltration planters have impermeable sides to keep water from saturating nearby top soil, while the bottom is open to allow for water to percolate the surrounding subsoil.
- Infiltration planters may have negative effects on existing and new utility installation. Utility boxes may require waterproofing or watertight installation. Many utility boxes have opened undersides (no bottom slab) and water can get in from below. Designers should ensure that utility boxes or vaults are protected from water coming into the vault.
- Infiltration planters should generally not be constructed closer than 10 feet to building footprints.
- The feasibility of infiltration planters requires geotechnical investigation and soil feasibility studies. Infiltration planters are not suitable where the seasonal high groundwater table is within 10 feet of the bottom of the facility.
- Design criteria can be found in the Stormwater Standards Manual.

References:

- Stormwater Standards Manual, City of San Diego Stormwater Dept, 2024

3.7.5 Public Utilities and Utility Features

3.7.5.1 Utilities and Other Infrastructure

Effective management of utility placement on, above, and below the parkway area ensures a safer and more enjoyable street environment. The placement of other amenities can potentially reduce maintenance access to utilities, highlighting the need for interdepartmental coordination.

Standards and Guidelines:

- Above ground utilities or infrastructure, such as parking meters and pay stations, fire hydrants, drinking fountains, signal boxes, and water meters must be placed in such a way that minimum clear sidewalk widths are maintained.
- Future Utilities Undergrounding Program projects must find space in the parkway for transformers, switch boxes, pedestals, vaults and handholes to accommodate the conversion of overhead lines to underground.
- Horizontal or flush utility access covers must not create a tripping hazard.

References:

- Standard Drawings for Public Works Construction, City of San Diego, 2021
- The "Whitebook", City of San Diego Engineering and Capital Dept, 2021

3.7.5.2 Guy Braces/Wire

Guy braces, also known as guy wires, is a tensioned cable used to stabilize utility poles within the Furnishings Zone.

Considerations:

- There are 3 situations that a guy wire are typically installed:
    - Parallel to the Throughway Zone
    - Perpendicular to the Throughway Zone, or
    - Diagonally crossing the Throughway Zone.

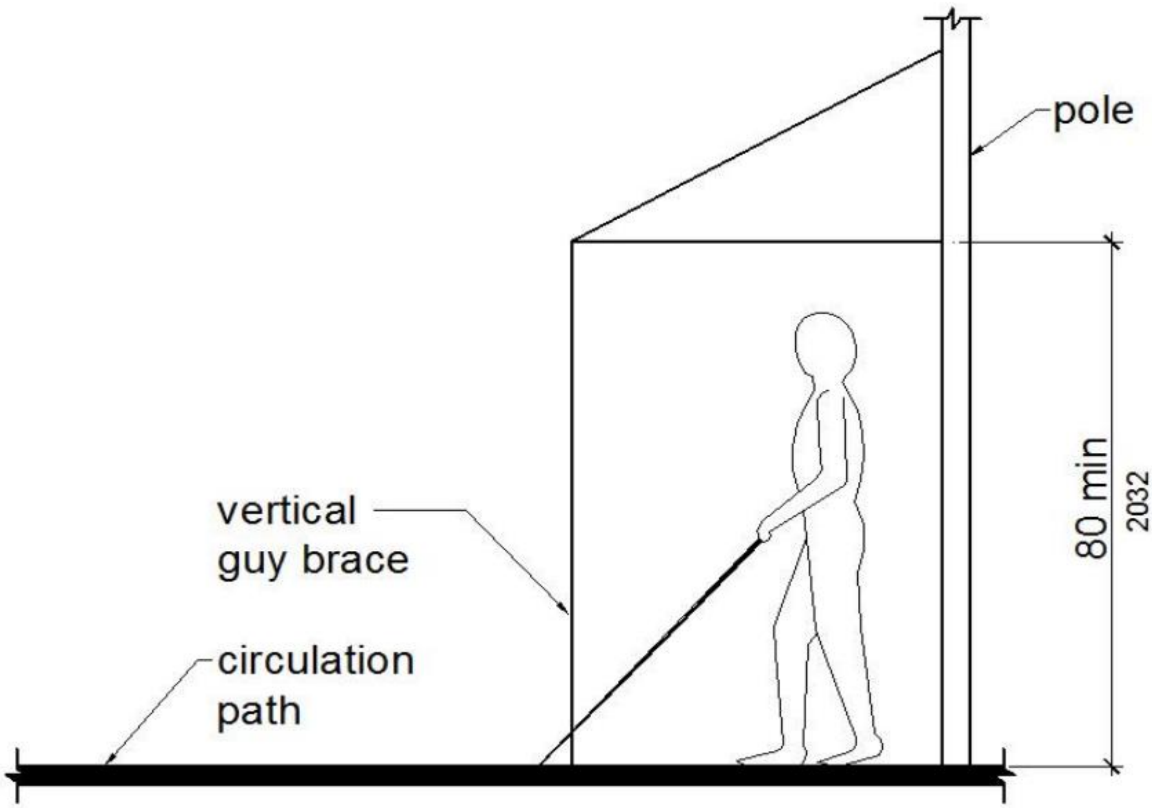

FIGURE 3-34 GUY BRACES

Source: 2022 California Building Code, Chapter 11B

Standards and Guidelines:

- Minimum vertical clearances shall be 80 inches.
- Minimum clearance from the vertical guy wire to the circulation path shall be 2 feet.
- Minimum distance of the anchor location to the face of the curb shall be 1.5 feet.
- Vertical and horizontal elements should be taped with yellow reflector covers to the guy wire.

References:

- California Building Code (Chapter 11B-307.4), International Code Council, 2022

3.8. Mobility Hubs

Mobility hubs provide a focal point in the transportation network that seamlessly integrates different modes of transportation, multimodal supportive infrastructure, and placemaking strategies to create activity centers that maximize first–mile last mile connectivity.

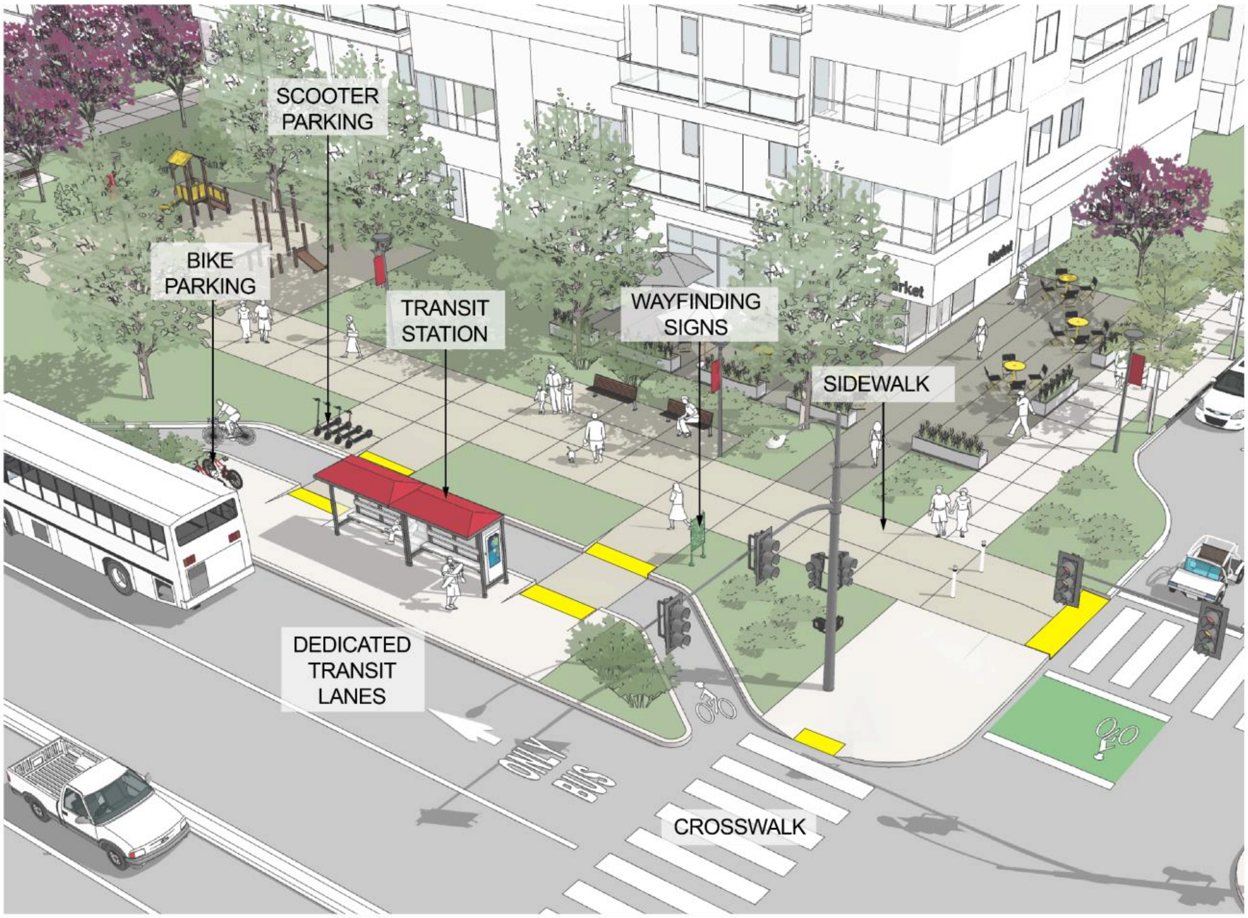

FIGURE 3-35 MOBILITY HUB

Benefits:

- Supports first–last mile solutions by providing multimodal transportation services and activities around transit stations to maximize connectivity and access for transit riders.
- Flexibility for change serves to accommodate possible future growth, expansion, and changes as new technologies evolve.

Considerations:

- Invest in mobility hub demonstration projects and supportive policies that improve access for all, ensure equity, and promote safety across modes. Encourage and prioritize projects (e.g., transportation system management and demand management, pedestrian, bicycle, and smart growth efforts) that support mobility hub implementation to promote integration with public transit and seamlessly connect people between shared modes.

- It is important to ensure that the hub is sited in the correct location rather than simply installing it in the most convenient space available.

Guidelines:

- Each mobility hub can be designed specifically for the surrounding community it serves, ultimately making it easier for residents, employees, and visitors to use transit to travel from home to work and a wide variety of destinations in between.
- A mobility hub area includes not just the transit station itself but all those services and destinations that are accessible within a 5-min walk, bike, or drive to/from high-frequency transit.
- SANDAG Mobility Hub Features Catalog identifies the following types of services and amenities that may be found within the access zones. Some features may be concentrated within a short walk to transit, while others may serve people better who have to bike or use a motorized service to reach a transit stop:
- Transit Amenities: These are features located in the immediate transit station area to help riders plan their trips and make connections while offering them a safe and comfortable place to wait for their ride.
- Pedestrian Amenities: These features are located within a five-minute walk to transit and include safe and convenient walkways and crossings.
- Bike Amenities: These features are located within a five-minute bike ride to transit and include a connected network of bikeways, secure options for parking a bike, and conveniently located options for bikeshare.
- Motorized Services Amenities: These features are located within a five-minute drive to transit and may include on-demand, motorized shared services and infrastructure improvements that support their efficient operation.
- Support Services & Amenities: These features may exist within all mobility hub access zones and can include wayfinding, mobile retail services, and integrated trip planning and payment options.

References:

- Designing for Transit, MTS, 2018
- Mobility Hub Features Catalog, SANDAG, 2018

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4 Off-Street Non-Vehicular Treatments

Off-street non-vehicular treatments are those that occur within the Parkway Zone, or in the public ROW not described in this typology. Importantly, these treatments diverge from the typical roadway configurations, and may or may not be adjacent to a vehicle zone. They accomplish a variety of purposes, from providing recreation and leisure opportunities to improving the function of roadway systems. All Off-Street Non-Vehicular Treatments for pedestrians, temporary and permanent, shall be designed to be accessible for all ages and abilities as required by ADA, PROWAG and Title 24. Typical off-street non-vehicular treatments that are located within the Flex Zone such as pedestrian plazas, parklets, and streetaries can be found in Chapter 5.

4.1. Placemaking

Placemaking is the temporary use of public right-of-way and private property that activates streetscapes by enhancing the pedestrian experience and providing neighborhood-serving activities, experiences, or spaces and includes temporary, small-scale development specifically designed to support that temporary use. Projects that may qualify as Placemaking uses include, but are not limited to, those that provide areas for pedestrians to briefly rest (e.g., plazas, shade structures, and benches), promote the use of underutilized space (e.g., landscaping and decorative lighting), and improve and promote pedestrian activity and other uses of the public right-of-way (e.g., bicycle racks and refuse containers). (SDMC §113.0103; SDMC §129.070)

Placemaking projects are privately funded, typically have broad community support and are often planned in concert with community-oriented organizations, such as a Business Improvement District, Civic Association, Community Parking District, Community Planning Group, Maintenance Assessment District, Property Business Improvement District, Town Council or other similar non-profit organizations. Consult Ordinance O-20928 and Information Bulletin IB-568 (Oct. 2018) for more information on Placemaking in the City of San Diego.

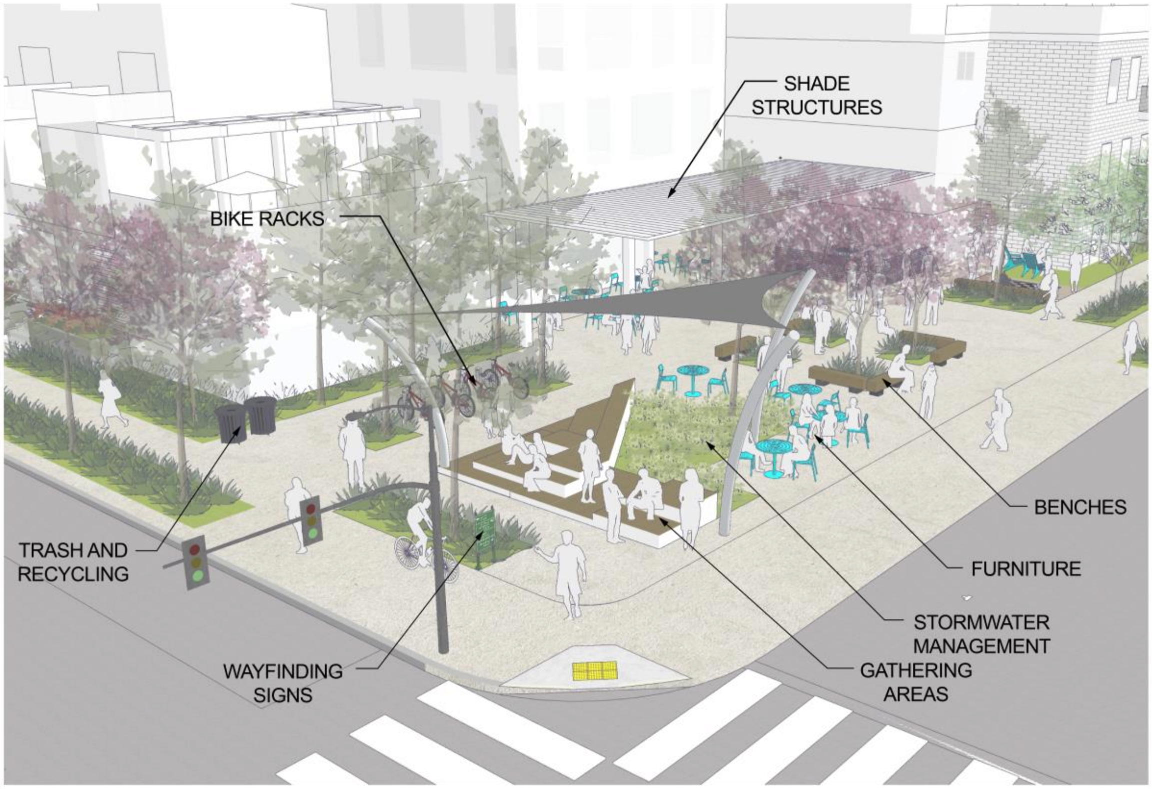

FIGURE 4-1 PLACEMAKING

4.1.1 Temporary Treatments

The City of San Diego allows for various temporary treatments to enhance placemaking efforts. Placemaking projects can be permitted for up to five years. After five years the Placemaking project must be removed, and the area returned to its original condition unless a new permit for Placemaking is obtained. Depending on the treatment, projects may be subject to fees and permitting and/or licensing requirements. Placemaking projects on private property are subject to the regulations contained in SDMC §141.0421.

4.2. Active Transportation Treatments

An activated space refers to an area within the public ROW that is designed to engage and attract people and enhance the vibrancy and functionality of the off-street environment. These carefully curated spaces also foster pedestrian and bicyclist safety, as well as boost the local economy by drawing visitors and supporting local businesses.

These types of treatments can be considered as types of Class I multi-use paths or shared-use paths. Treatments that are used by bikes and pedestrians are considered as Shared Use Paths per PROWAG, therefore shall meet all the provisions of the regulations. Curb ramps serving Shared Use Paths shall be the same width as the Shared Use Path (minus flares).

4.2.1 Class I Multi-use Paths/Shared-use Facilities

Multi-use paths are paved, off-road facilities designed for travel by a variety of nonmotorized users, including bicyclists, pedestrians, skaters, joggers, and others. Most multi-use paths in the United States are constructed to provide recreational opportunities. Some are also intended to serve commuters. Multi-use paths are also very common on university campuses because motor vehicle traffic and parking are often heavily restricted. Shared Pedestrian/Bikeway Facilities are a type of multi-use paths.

Benefits:

- Multi-use paths can provide a desirable facility, particularly for cyclists, pedestrians, and other road users who prefer separation from traffic.
- They can provide users with a shortcut through a residential neighborhood (e.g., a connection between two cul-de-sac streets). Located in a park, they can provide an enjoyable recreational opportunity.
- Multiuse paths can be located along rivers, ocean fronts, canals, abandoned or active railroad and utility rights-of-way, limited access freeways, within college campuses or within and between parks.

Considerations:

- Conflicts between different user types are especially likely to occur on regional recreational paths that attract a broad diversity of users.

Standards and Guidelines:

- Since nearly all multi-use paths are used by pedestrians, they fall under ADA requirements. These facilities are most commonly designed for two-way travel.
- In general, paths expected to receive heavy use should be a minimum of 14 feet wide, paths expected to experience moderate use should be at least 12 feet wide and low volume paths or pedestrianways can be 10 feet wide. In very rare circumstances, a reduced width of 8 ft may be used (see AASHTO for conditions in which 8 ft is appropriate).
- On pathways with heavy peak hour and/or seasonal volumes, or other operational challenges such as sight distance constraints, the use of a centerline stripe on the path can help clarify the direction of travel and organize pathway traffic. A solid yellow centerline stripe may be used to separate two directions of travel where passing is not permitted, and a broken yellow line may be used where passing is permitted. The centerline can either be continuous along the entire length of the path, or may be used only in locations where operational challenges exist. Per the MUTCD, all markings used on bikeways shall be retroreflective.
- In areas with extremely heavy pathway volumes, segregation of pedestrians from wheeled users may be appropriate; however, care should be taken that the method of segregation is simple and straightforward. Pedestrians are typically provided with a bi-directional walking lane on one side of the pathway, while bicyclists are provided with directional lanes of travel. This solution should

only be used when a minimum path width of 15 ft is provided, with at least 10 ft for two-way wheeled traffic, and at least 5 ft for pedestrians.

- Under most conditions, there is no need to segregate pedestrians and bicyclists on a multi-use path, even in areas with high user volumes—they can typically coexist. Path users customarily keep right except to pass. Signs may be used to remind bicyclists to pass on the left and to give an audible warning prior to passing other slower users. Part 9 of the CA MUTCD provides a variety of regulatory signs that can be used for this purpose.
- Joint use of paths by cyclists and equestrians can pose problems due to the ease with which horses can be startled. Also, the preferred surface treatments for cycling and equestrian paths differ. Therefore, where either equestrian or cycling activity is expected to be high, separate trails are recommended.
- Ideally, a graded shoulder area at least 3 to 5 ft wide with a maximum cross-slope of 1V:6H, which should be recoverable in all weather conditions, should be maintained on each side of the pathway. At a minimum, a 2 ft graded area with a maximum 1V:6H slope should be provided for clearance from lateral obstructions such as bushes, large rocks, bridge piers, abutments, and poles.
- Figures 4–8 and 4-9 and Table 4-2 illustrate the minimum design specifications for shared pedestrian/bikeway facilities.

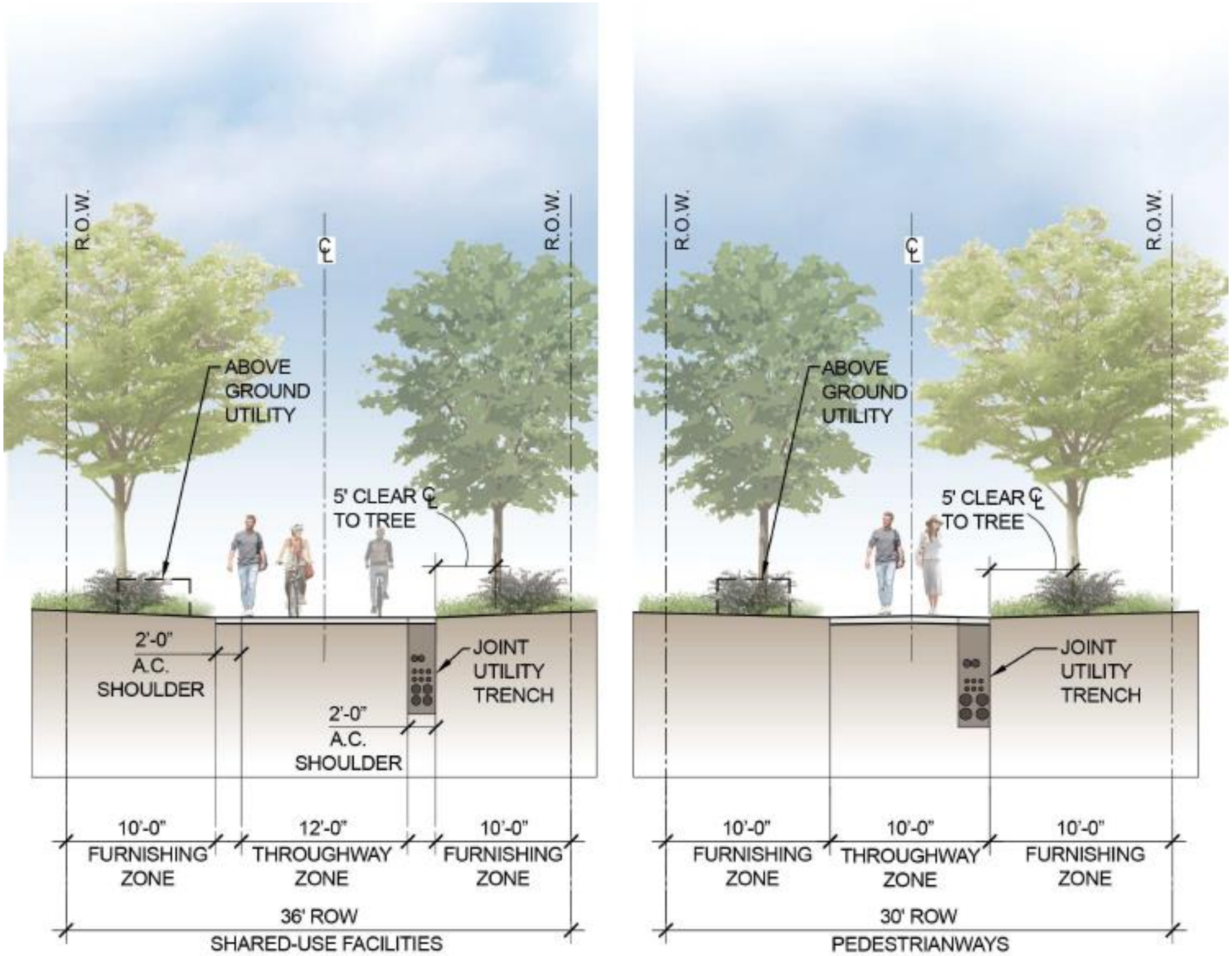

FIGURE 4-2 PEDSTRIANWAYS AND SHARED-USE FACILITIES SECTION VIEW

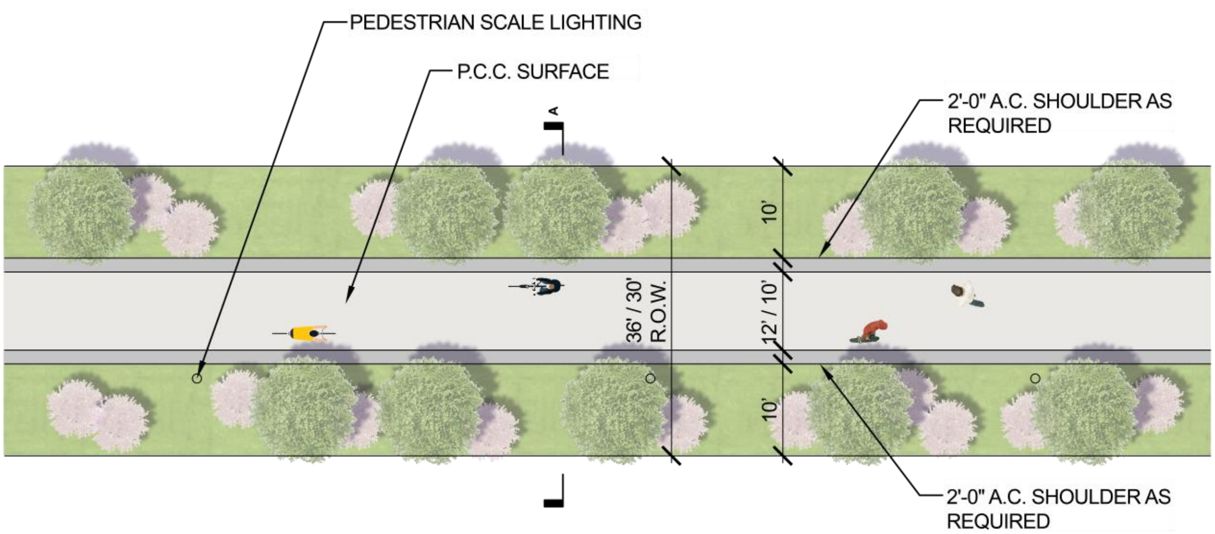

FIGURE 4-3 PEDESTRIANWAY/SHARED-USE FACILITIES PLAN VIEW

Facility	Multi-Use Path	Shoulder
Preferred	12'	2' (+10' Furnishing Zone)

TABLE 4-1 MULTI-USE PATH DIMENSIONS

Description	Specifications		Units
Width, Right-of-Way[1,2]	36		ft
Width of Traveled Way[3]	12		ft
Width of Shoulder[4]	2		ft
Maximum Grade	5		%
Street Trees	Permitted		-
Street Lights	Pedestrian Scale		-
Utilities	One side		-

TABLE 4-2 SHARED PEDESTRIAN/BIKEWAY SPECIFICATIONS

Notes:

1. *ROW of 30 ft is required for pedestrianways only.*
2. *Where ROW is constrained, Furnishings Zone width may be reduced to 6 ft.*
3. *Width of traveled way of 10 ft. is required for pedestrianways.*
4. *Shoulders are not required for pedestrianways only.*

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Guide for the Development of Bicycle Facilities, AASHTO, 2012
- Highway Design Manual, 7th ed., Caltrans, 2020
- PROWAG, US Access Board, 2023

4.2.1.1 **Class I Bike Path within the Parkway**

A bike path (Class I) is a bicycle facility on a paved right-of-way, completely separated from the roadway. A bike path allows a variety of uses in additional to bicyclists. It permits walkers, joggers, wheelchair users, and non-motorized scooter users among many others.

Benefits:

- Offers opportunities not provided by the road system.
- Provides recreational opportunities.
- Provides low-stress experience for multiple users: bicyclists, pedestrians, joggers, skaters, wheelchair users, and others.

Considerations:

- Right-of-way constraints.
- Can be parallel to higher-speed thoroughfares.

Guidelines:

- Provides a completely separated right-of-way for the exclusive use of bicycles separated from pedestrians with cross flows minimized.
- Preferred bike path width is 10 feet (12 feet City standard), with a minimum of 8 feet width in constrained locations. The preferred buffer between the roadway and multi-use path is 2 feet (plus an additional 10 feet furnishing zone, with a minimum of 6 feet furnishing zone in constrained locations).
- Provides a dedicated pedestrian path that is accessible to persons any abilities.

References:

- Evaluation of Safety, Design, and Operation of Shared-Use Paths, FHWA, 2006
- Highway Design Manual, 7th ed., Caltrans, 2020
- PROWAG (Shared Use Path Accessibility Guidelines), US Access Board, 2023

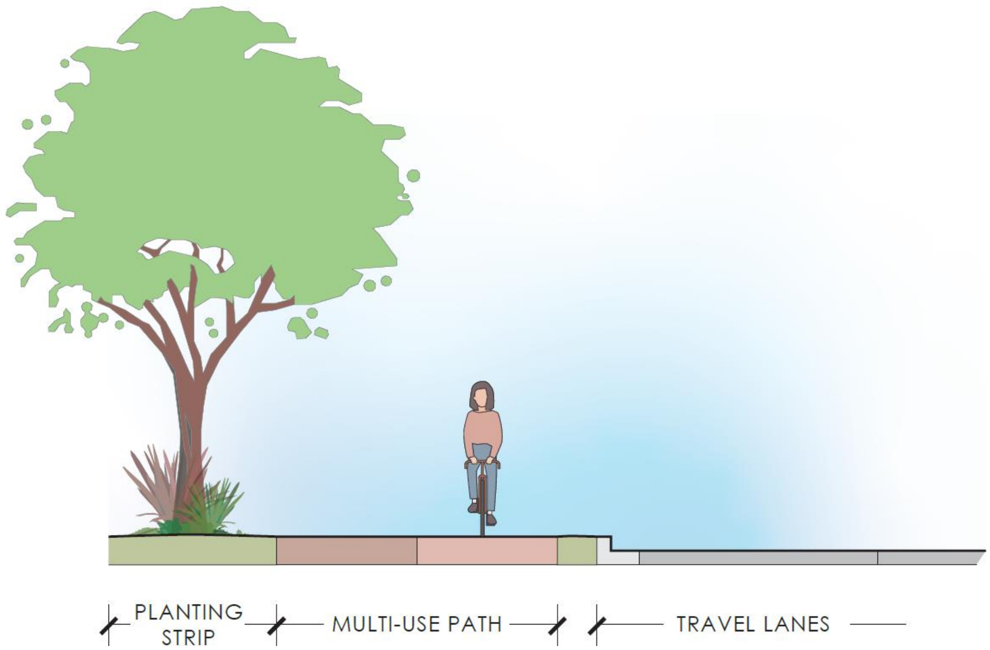

FIGURE 4-4 CLASS I BIKE PATH SECTION VIEW

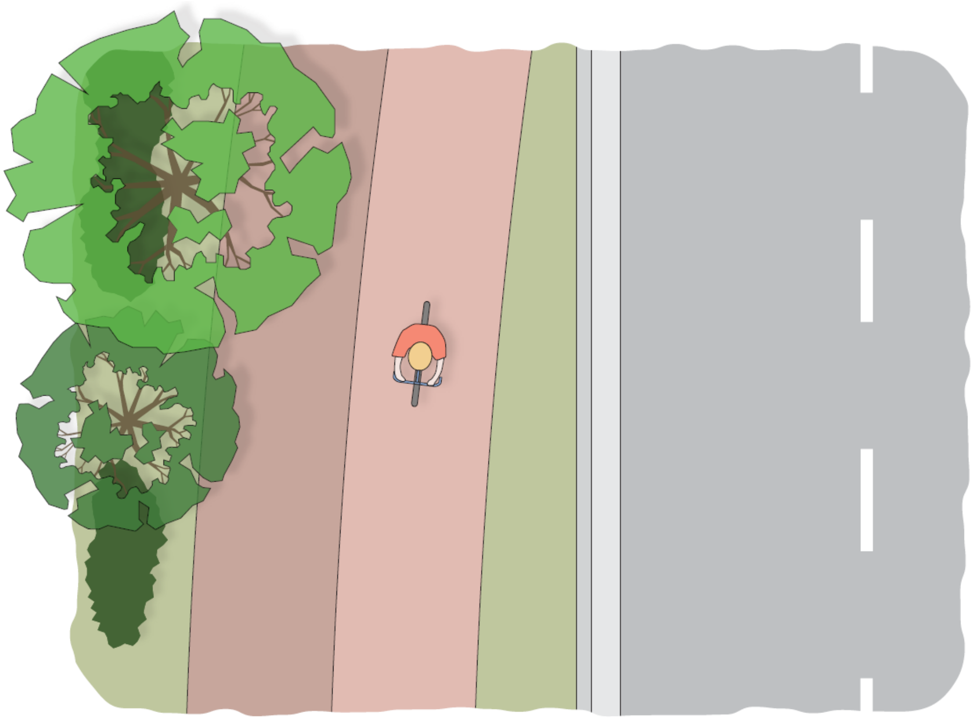
FIGURE 4-5 CLASS I BIKE PATH PLAN VIEW

Facility	Bike Path	Buffer
Preferred	10′-12′	2′ (+10′ parkway)
Minimum	8′	2′ (+6′ parkway)

TABLE 4-3 CLASS I BIKE PATH DIMENSIONS

4.2.1.2 Promenade

Public Promenades involve partial or complete street closures to vehicular traffic to facilitate active transportation uses such as walking and biking free from vehicular conflicts. Recreational amenities, outdoor dining and other enjoyable public interactions can facilitate and contribute to the enjoyment of the active transportation experience. It is envisioned that promenades will create places that are sociable, have a variety of uses and activities, are well connected to their surroundings and are comfortable and welcoming to people with all abilities. Compared to more temporary treatments, promenades are intended to produce longer-term or permanent facilities for pedestrians.

Benefits:

- Promenades are designed along streets within the City of San Diego to facilitate active transportation and enhance pedestrian experience.
- Promenades encourage non-motorized transportation.
- Promenades foster safe pedestrian interaction and outdoor activities.
- Promenades can help create quality places that give an identity and image to communities, and help attract new residents, businesses, and investments.
- Promenades are envisioned to be community-driven places that are functional and inviting to all.
- Promenades present the opportunity for incremental interventions within a neighborhood.

Considerations:

- Promenades can be full street closures, partial street closures, or done as a dedication or easement as part of a development project.
- Promenade development is described in three phases within the Spaces as Places Design Manual, ranging from more temporary interventions to more permanent interventions:
    - In Phase 1, the community comes together to propose partial or complete street closure to traffic to encourage pedestrian activity and open up street space for children in the community to play and gather.
    - In Phase 2, the community adds recreational amenities to enhance the pedestrian experience and program activities that the community can enjoy.
    - In Phase 3, the Promenade becomes central to the community and additional investments are made to add lighting, paving, seating areas, trees and other amenities, thus making it a truly community-driven project.

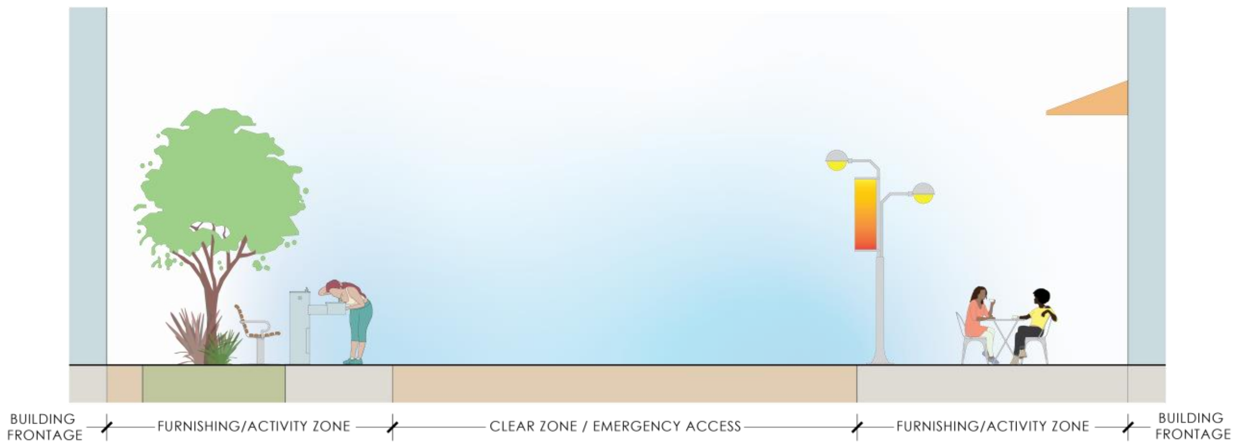

FIGURE 4-6 PROMENADE

Standards and Guidelines:

- ADA accessible curb ramps with truncated domes or City-approved detectable warning surfaces shall be provided for access to the Promenade.
- Promenades shall be designed to maintain drainage of stormwater from the gutter and not cause ponding.
- Proper location and relocation of catch basins, and utilization of design treatments to channel water through and along the Promenade, shall be required per City standards.
- When trench drains are installed, the Maintenance Assessment District, Business Improvement District, or private property owner shall be responsible for cleaning and maintaining the trench drains at all times.
- The design shall be in accordance with current City of San Diego stormwater standards and any changes to the road grade or curb line are to be reviewed and approved by the City Engineer.
- Design and placement of street furniture, trees, and plantings shall not impede pedestrian accessibility.
- Crosswalks shall be redesigned or added to ensure a safe, walkable urban environment, per the City Engineer.
- No vehicle access and no parking allowed when full street closure hours are in effect.
- Maintain an emergency access vehicle lane that is at minimum 20 to 26 feet wide (as determined by the City Engineer), provides a minimum of 13 feet and six inches of vertical clearance, and is clear at all times - any planters or furniture within this zone must be easily movable.
- See the Spaces as Places Design Manual for design guidelines specific to Phases 1 & 2 described above.

References:

- Municipal Code §141.0629, City of San Diego, n.d.
- Spaces as Places Design Manual, City of San Diego City Planning Dept, 2023

4.2.1.3 Esplanade

An esplanade integrates an off-street bicycle path (typically two-way), a pedestrian walkway, trees, and landscaping into a travel corridor alongside a vehicular roadway. An esplanade creates an inviting pathway that is safe and enjoyable for a wide range of users.

Benefits:

- Encourages bicycling and walking as an alternative to motorized travel.
- Increases comfort and safety by separating pedestrians and bicyclists from the roadway.
- May provide additional safety and comfort by providing a parkway strip separating the pedestrian walkway from the bicycle path.
- Provides key pedestrian and bicycle linkages.

FIGURE 4-7 ESPLANADE

Location: North Harbor Drive

Considerations:

- An esplanade generally requires greater width than that of a typical sidewalk area, so its development will likely necessitate the relocation of the curb to increase sidewalk width. This will likely require the relocation of utility infrastructure (e.g., drainage infrastructure, streetlights, utility poles, underground wiring, and utility boxes).

- An esplanade should have dedicated signalization at intersections with vehicular roadways. This is desired for several reasons:
    - Pedestrians and bicyclists are less visible to turning traffic because the pathways are set back further from the street,
    - At roadway crossings with two-way bicycle paths, motorists may not expect oncoming bicycle traffic, and
    - Dedicated signalization adds convenience and comfort to users.

Guidelines:

- An esplanade is typically 25-35’ wide, accommodating a minimum 7’-wide pedestrian walkway, minimum 12’ two-way bicycle path, and a parkway with landscaping, trees, and/or streetlights.
- Ideally there should be two parkway strips – one between the roadway and bicycle path, and another between the bicycle path and pedestrian walkway. Trees with broad canopies should be chosen to help create an attractive environment and protect users from the sun.
- Methods for stormwater treatment and management should be integrated into the landscaping plan.
- Permeable pavement should be considered for pathway surfaces.
- Esplanades could qualify for Priority Development Project Category 1 Exemption if the design follows the criteria outlined in Section 1.4.3 and Appendix J.1 of the Stormwater Standards Manual.

4.2.1.4 **Coastal Trails**

Coastal trails are applied along stretches of recreational beach sites. Boardwalks can be a type of coastal trail. Coastal trails attract many types of pathway users and conveyances, including bicyclists, pedestrians, rollerbladers, and pedicabs.

Benefits:

- Provides a pleasant recreational facility for many types of users to enjoy.
- Provides a safe way to enjoy scenic rides and walks.

Considerations:

- The bicycle path should not be placed adjacent to large numbers of destinations to avoid conflicts with pedestrians and vehicles.

Guidelines:

- To provide an adequate and pleasant facility, adequate widths and separation are needed to maintain an enjoyable pathway environment.

- Path Width:
  - Bicycle Path: 12’ minimum
  - 17’ with parallel 5’ pedestrian path
  - 1’ clearance for signage
- Pavement Markings: Standard pavement markings should be used per the CA MUTCD. In order to reinforce the need for separation of bicyclists and pedestrians, graphic markings may be used.
- Surfacing: Paved surface thickness 4”, adequate to support maintenance vehicles.
- The bicycle path should be located on whichever side of the path will result in the fewest number of anticipated pedestrian crossings. Site analysis of each project is required to determine expected pedestrian behavior.
- Offsetting of the pedestrian path should be provided if possible. Otherwise, separation should be provided in the form of striping or landscaping.

FIGURE 4-8 COASTAL TRAIL

Location: Bayshore Bikeway, Coronado, CA

<u>**References:**</u>

- CA MUTCD Rev. 8, Caltrans, 2024
- Guide for the Development of Bicycle Facilities, AASHTO, 2012
- Highway Design Manual, 7th ed., Caltrans, 2020

4.2.1.5 Equestrian Trails

Equestrian trails allow individuals to enjoy a unique form of recreation and travel within the City of San Diego. An integrated network of trails promotes horseback riding and provides a safe means for recreational riders to experience scenic parts of the City.

Benefits:

- Provides access to scenic open spaces across parts of the City.
- Ensures the safety and viability of horseback riding in the City with proper design and facilities.
- Provides a means to incorporate more landscaping and native vegetation throughout the City.

Considerations:

- Equestrians include youth, elders, leisure riders, professional riders, organized groups, novices, persons with disabilities, and working ranchers. Riders recreate singly or in groups, and for many reasons—including pleasure, exercise, or challenge. Well-designed horse trails consider the setting of the trail system, the needs of all user groups, and the specific needs of stock and their riders.
- AASHTO generally finds it undesirable to mix horses and bicyclists on paved shared-use trails.

FIGURE 4-9 EQUESTRIAN TRAIL

Source: Visit California

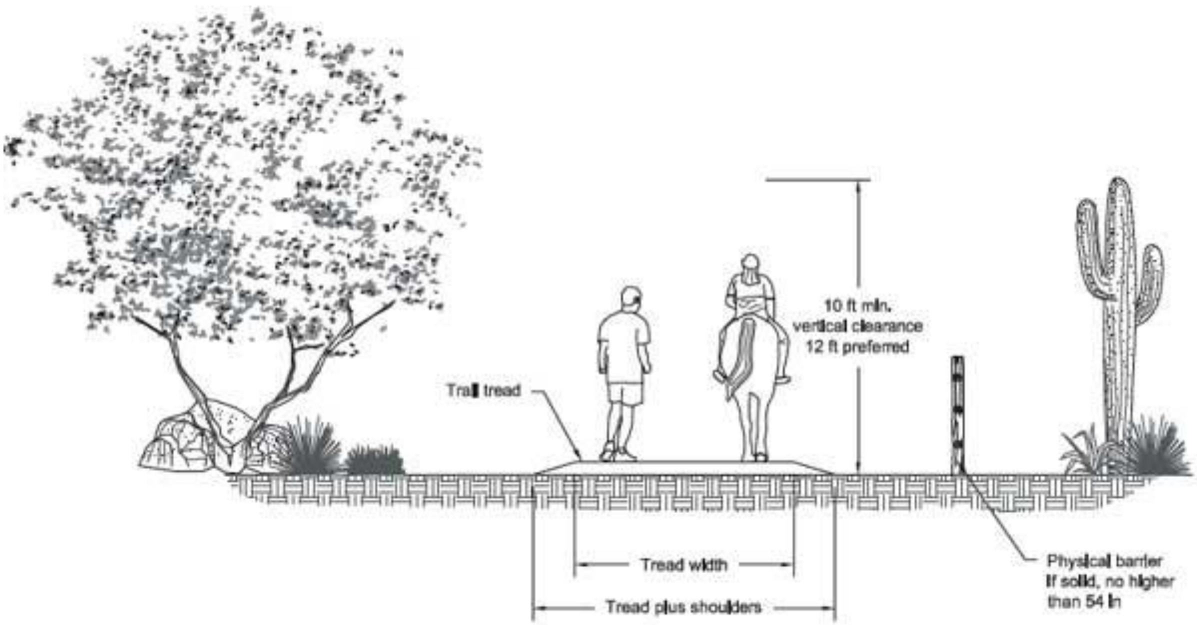

FIGURE 4-10 EQUESTRIAN TRAIL SECTION VIEW

Source: United States Department of Agriculture

Guidelines:

- Design trails adjacent to streets to be between 10 and 12 feet in width to accommodate a double-track. Trail widths may be reduced in cases where topography or space is prohibitive. No trail width should be less than 6 feet.
- Maintain a vertical clearance of 10 feet from the ground and any physical barrier such as bridges, underpasses, and maintain vegetation free of protruding branches.
- A minimum height of 4 feet is recommended for all fences and barriers along trails. A greater height may be permitted for trails adjacent to high-speed roads where traffic may startle horses. Height should be tapered down as trail approaches intersections or end, to maximize horse/rider view.
- Low walls or fences with railings added for more height are acceptable. Bollards or barrier posts can help separate equestrian from other uses. Barrier posts should be an odd number to prevent confusion, and placed 5 feet apart to allow equestrians to pass through.
- Preferred fence materials include “woodcrete” or other sturdy material that gives the appearance of wood-like finish.
- A second signal actuator push button (equine crossing signal) should be installed 5 to 6 feet above the ground where the equestrian trail crosses a street at a signalized intersection. The post should be placed 6.5 feet from the road edge so that the animal’s head does not encroach into the roadway.
- Use of native plants for landscaping is encouraged. Low walls or fences can include vegetation facing the trail to improve appearance, especially along trails with pipe railing. Vegetation should

be trimmed to less than 4 feet high for crime prevention purposes, and trimmed to avoid injury to equines.

- Urban trails should be designed in accordance with traffic engineering standards.

4.2.2 Linear Parks/Greenways

Linear parks/greenways are passive or active recreation uses in urban areas, arranged parallel to the public right-of-way or a geographical feature; can be continuous or a sequence of recreational spaces, linked by a pedestrian and/or multi-use path.

Benefits:

- Can serve as a link in a city's plans to boost active transportation.
- Encourage movement and relaxation.
- Excellent way to add green space to urban areas.
- Good candidates for underutilized spaces.
- Can help create nature-based solutions for flooding, run-off pollution, and other environmental issues urban areas face.
- Allow parks to be accessible to more people.

FIGURE 4-11 LINEAR PARK

Considerations:

- The design, materials and features of a linear park impact its specific maintenance needs, but given their similarity to trails and pocket parks, maintenance needs are likely to resemble elements of both pocket park maintenance and trail maintenance.
- Greenways can include both passive and active recreational amenities to attract pedestrian activity.
- Where feasible consider the removal of a parking lane or vehicular travel lane to accommodate a Greenway.

Guidelines:

- Refer to the City of San Diego Parks Master Plan for guiding principles, goals and standards, and policies for parks in San Diego.
- Refer to PROWAG and Guide to the ABA Accessibility Standards for accessibility requirements for linear parks/greenways.
- Refer to The Consultant's Guide to Park Design and Development for Park Design Standards for park design standards in the City of San Diego.

References:

- Consultant's Guide to Park Design and Development, City of San Diego, 2019
- Guide to the ABA Accessibility Standards, US Access Board, 2015
- Parks Master Plan, City of San Diego City Planning Dept, 2021
- PROWAG, US Access Board, 2023

4.3. Sidewalks for Overpasses and Underpasses

Access on an overpass across a highway is often along a narrow sidewalk where the pedestrian is against a wall or guardrail and is highly exposed and vulnerable to speeding traffic. The unappealing environment of underpasses is often exacerbated by poor lighting and obscured sightlines.

The overpass discussion is applicable to all bridges with pedestrian access, and both overpass and underpass discussions are also applicable to grade-separated railroad crossings.

Benefits:

- Potentially providing complete separation of pedestrians from motor vehicle traffic.
- Providing crossings where no other pedestrian facility is available.
- Connecting off-road trails and paths across major barriers.
- Improving bicycle safety while reducing delay for all users.

FIGURE 4-12 OVERPASS

Location: La Jolla Village Drive

FIGURE 4-13 PEDESTRIAN UNDERPASS

Location: Santa Fe Drive Pedestrian Underpass, Encinitas
Source: TYLin

Considerations:

- Overpasses and underpasses are required to be accessible for persons with disabilities. Pedestrian ramps or elevators may be incorporated as part of the access elements. Pedestrian ramps may require a considerable amount of land for installation and elevators may have potential security and maintenance issues.
- Lighting, drainage, graffiti removal, and security are major concerns with underpasses.
- Overpasses and underpasses are costly, visually intrusive, and poorly utilized when a more direct at-grade crossing is possible.
- Use sparingly and as a measure of last resort. Most appropriate over high-volume, high-speed highways, railroad tracks, or natural barriers.
- If the crossing is not convenient or does not serve a direct connection, it may not be well utilized.

Guidelines

- Underpasses should have a daytime illuminance minimum of 10 footcandles achievable through artificial and/or natural light provided through an open gap to sky between the two sets of highway lanes and a nighttime level of 4 footcandles.
- Consider acoustics measures within underpasses to reduce noise impacts to pedestrians and bicyclists.
- Seek opportunities to widen sidewalks when retrofits occur.
- The AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities recommends that pedestrian overpasses be at least 8 feet wide. The width should be increased if the sidewalk leading up to the overpass is wider. If the overpass also accommodates bicyclists, the width should be at least 14 ft. Depending on the length of the overpass, it might be necessary to increase its width to counteract any visual perceptions of narrowness.
- Similar guidelines apply to underpasses. Minimum widths should be between 14 and 16 ft, but underpass width should be increased if the underpass is longer than 60 ft.
- Grade Requirements: As with other path sections, grade should not exceed 5%.

References:

- Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO, 2021
- Highway Design Manual, 7th ed., Caltrans, 2020
- Pedestrian Safety Guide and Countermeasure Selection System, FHWA, 2013
- PROWAG, US Access Board, 2023

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5 The Roadway Zone

5.1. Creating the Roadway Zone

The Roadway Zone is the portion of the ROW between the curbs that may contain elements from the Flex Zone, Vehicle Zone, and Median Zone. Its primary function is to promote a safe and enjoyable environment for a variety of users to travel or park. Roadway users primarily entail those driving or riding in personal or shared vehicles, transit riders, micromobility riders, and people on bikes.

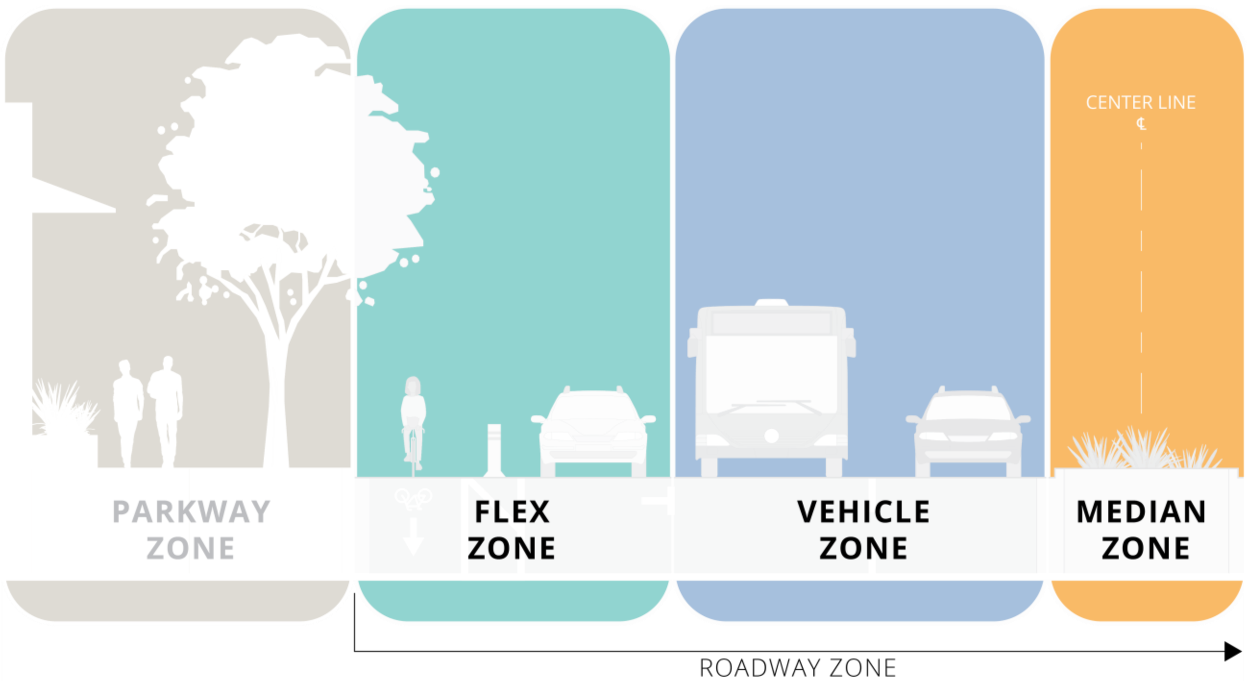

FIGURE 5-1 ROADWAY ZONE

5.2. Roadway Zone Standards and Guidelines

- Streets shall be paved with asphalt concrete over cement-treated base, concrete, or full-depth asphalt concrete in accordance with the City's Standard Drawings or with a comparable structural section approved by the City Engineer or designee.
- The same pavement section is required in shoulders as well as driving lanes, except for rural road classifications.
- PCC pavement is required for streets with grades greater than 12 percent.
- Rolled curbs are not permitted on publicly dedicated streets, except that rolled or mountable curbs may be permitted in situations such as centers of roundabouts. Rolled curb may be used on private drives where the grade does not exceed 5 percent.
- Emergency vehicle access routes and requirements must be adhered to as shown in Figures 5-2, 5-3, and 5-4. Fire apparatus access roadways shall not have less than 20 feet of unobstructed width, shall have an adequate roadway turning radius of 40 feet, and shall have a minimum vertical clearance of 13 feet 6 inches per the Development Services approval process. When adjacent to a fire hydrant or if an adjacent building exceeds 30 feet in height, fire apparatus access roadways shall not have less than 26 feet of unobstructed width. Access should be coordinated with property access routes. See City of San Diego FPB Policy A-14-1 for additional guidance, standards, and exceptions.
- The required width of emergency vehicle access roadways shall not be obstructed in any manner, including the parking of vehicles. Where no space is provided for parking along access roadways, they shall be kept clear by the posting of signs or the painting of curbs. See City of San Diego FPB Policy A-14-1 for additional guidance, standards, and exceptions.
- Most design details, location requirements, pavement structural section computations, and construction methods are included in the latest edition of the City's Standard Drawings, "Greenbook", and "Whitebook".
- Curb-to-curb width is the distance from face-of-curb to face-of-curb, as shown in the San Diego Regional Standard Drawings, and the City's Standard Drawings.
- Drainage Improvements may be required for streets with unique roadway alignments or pre-existing drainage problems. Street drainage is covered in detail in the Drainage Design Manual and Stormwater Standards.
- Engineers are cautioned that use of stamped concrete for pavement surfaces in residential areas may cause adverse community reaction due to noise where the roadway is immediately adjacent to dwelling units.

5.2.1 New Development versus Retrofit

In addition to the guidelines outlined above, these guidelines and standards describe the opportunities for roadway improvements for new and retrofit streets.

The following considerations apply to new or retrofitted ROW:

- Parallel routes serving all forms of traffic should be considered when resulting curb-to-curb width may not accommodate all forms of traffic (e.g., a dedicated bicycle or transit lane, a parking lane, or a travel lane).
- Neighborhoods evolve over time and the public ROW configuration has an influence as to what type of development occurs.
- All impacts to surface drainage should be evaluated and managed accordingly.

The following considerations apply to retrofitted ROW:

- The dimensions of existing roadways can be increased either through the acquisition of additional ROW or increasing setback requirements for new development. If the curb-to-curb width is increased, the existing level of pedestrian accommodation must be maintained or enhanced.
- The dimensions of existing curb-to-curb roadway width can be reduced to create additional pedestrian space, by decreasing the width of travel lanes or other street features, such as medians, where applicable. An alternative to reducing lane width could be to revise the parking from parallel to diagonal or removing a travel lane, which slows speeds and creates opportunities for an improved pedestrian environment.
- Prior to improvements to an existing street, utilities (e.g., lighting, electrical, and storm drains) should be identified and either incorporated into the design or relocated to provide access as required by the ADA and California Title 24 regulations.

The following considerations should be made for new ROW:

- For new road design, all current rules, regulations, standards, and City policies apply.
- New streets must consider the needs of all users in determining ROW width.
- Locate and design new streets to respect the natural environment, scenic character, and community character of the area traversed; and meet safety standards.
- A new street should be a safe system with vulnerable road users separated from high-speed vehicles.

5.2.2 Emergency Vehicles and Access

In the state of California, drivers must yield the right-of-way to any emergency vehicle using a siren and red lights and shall immediately drive to the right-hand edge or curb of the highway, clear of any intersection, and thereupon shall stop and remain stopped until the authorized emergency vehicle has passed. Roadways, in turn, must be equipped to contend with the challenges inherent in emergency situations, such as the need to accommodate emergency vehicles with large turning radii. To complicate this, well-rounded street design often involves interventions that make it more difficult to make space for emergency vehicles to pass. Therefore, special guidelines must be considered when designing roadways that accommodate emergency vehicles while balancing the daily needs of all road users.

Considerations

- Lane reduction projects with center turn lanes, median bus lanes, and offset bus lanes all provide a lane for emergency vehicles to use in congested conditions.
- The impact of raised crosswalks, raised intersections, corner bulb outs, speed humps, speed tables and raised medians on the operational needs of transit buses and emergency vehicles should be considered.
- Trucks and buses are wider and have longer wheelbases and greater minimum turning radii. These are the principal characteristic dimensions affecting horizontal roadway design.
- Consider emergency vehicle response routes when planning roadway upgrades.
- Large emergency vehicles may be able to traverse higher curbs, medians and truck aprons. Designers should consider traversable heights of standard emergency vehicles when designing safe intersections.
- Road lumps have been developed specifically to accommodate fire vehicles. It should be considered in qualified locations where mobility of fire vehicles is a high priority.

Standards and Guidelines:

- Emergency vehicle access routes, fire access setback distances, and their requirements must be adhered to as shown in Figures 5-2, 5-3, 5-4 and the following:
    - Fire apparatus access roadways shall not have less than 20 feet of unobstructed width, shall have an adequate roadway turning radius, and shall have a minimum vertical clearance of 13 feet 6 inches per the Development Services approval process.
    - When adjacent to a fire hydrant or if an adjacent building exceeds 30 feet in height, fire apparatus access roadways shall not have less than 26 feet of unobstructed width.
    - The fire access setback distance shall be no less than 15 feet and no greater than 30 feet from the building to ensure the ability to position an aerial ladder to one entire side of the building. The setback distance can include the entire Parkway Zone and Flex Zone (if emergency cannot access the Flex Zone). See City of San Diego FPB Policy A-14-1 for additional guidance, standards, and exceptions.
- The required width of emergency vehicle access roadways shall not be obstructed in any manner, including the parking of vehicles. Where no space is provided for parking along access roadways, they shall be kept clear by the posting of signs or the painting of curbs.
- Promenades must accommodate access for emergency vehicles, usually by using street furniture that can be moved to make way for emergency vehicles.
- Design of landscaped medians must account for impacts on emergency vehicle movement and access.
- Diverters may affect access for emergency vehicles; designs that allow emergency vehicle access are required and should be coordinated with emergency responders. Diverters should be designed flexibly with mountable curbs to allow emergency vehicles to traverse them.

- Multi-purpose paths should be designed with sufficient surfacing structural depth for the subgrade soil type to support maintenance and emergency vehicles. Where the path must be constructed over a very poor subgrade (wet and/or poor material), treatment of the subgrade with lime, cement or geotextile fabric should be used.

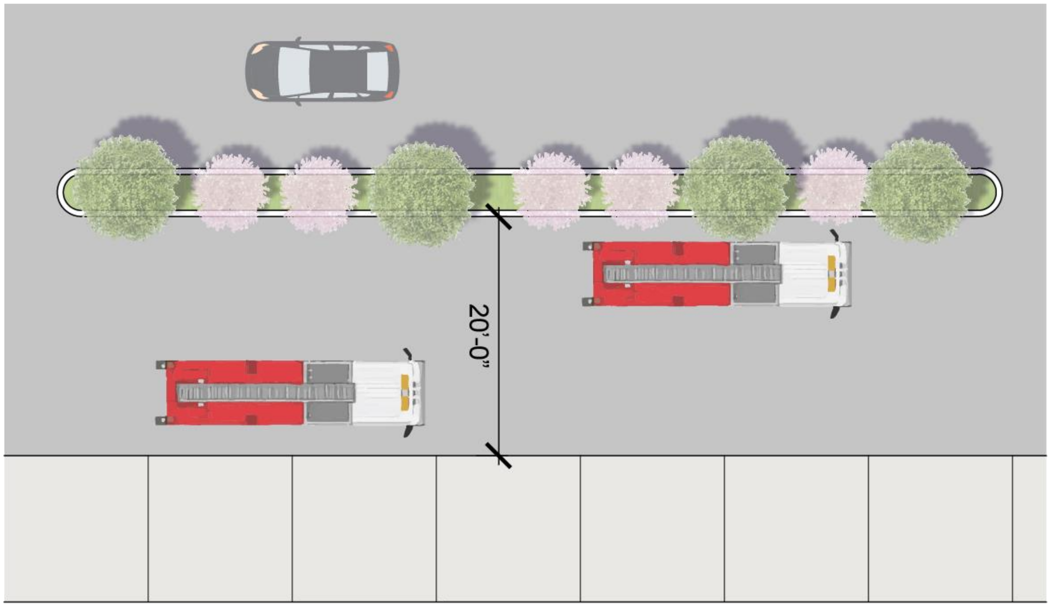

FIGURE 5-2 FIRE ACCESS UNOBSTRUCTED WIDTH OF 20 FT

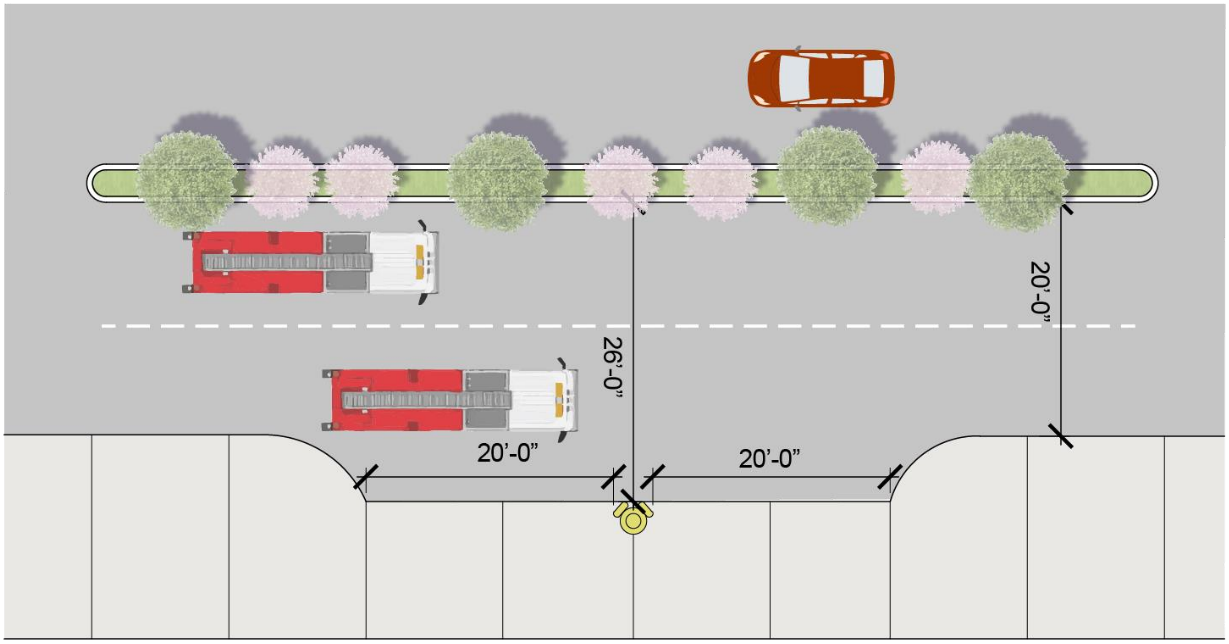

FIGURE 5-3 FIRE ACCESS UNOBSTRUCTED WIDTH OF 26 FT ADJACENT TO FIRE HYDRANT

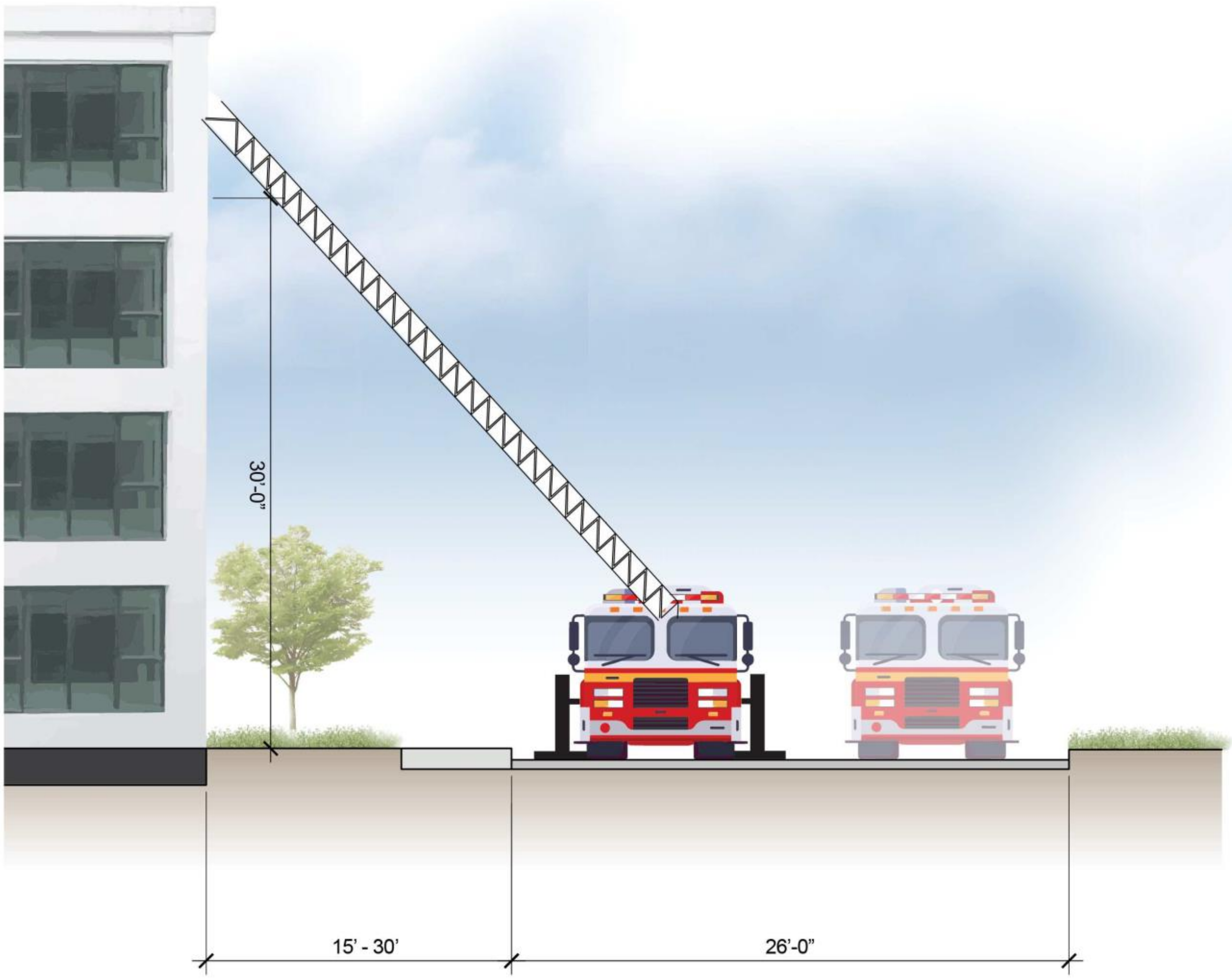

FIGURE 5-4 FIRE ACCESS SETBACK DISTANCE

Note: The area within the Fire Access Setback distance can include various treatments such as cycle tracks and parking.

Standards and Guidelines:

- Emergency vehicle access routes, fire access setback distances, and their requirements must be adhered to as shown in Figures 5-2, 5-3, 5-4 and the following:
    - Fire apparatus access roadways shall not have less than 20 feet of unobstructed width, shall have an adequate roadway turning radius, and shall have a minimum vertical clearance of 13 feet 6 inches per the Development Services approval process.
    - When adjacent to a fire hydrant or if an adjacent building exceeds 30 feet in height, fire apparatus access roadways shall not have less than 26 feet of unobstructed width.
    - The fire access setback distance shall be no less than 15 feet and no greater than 30 feet from the building to ensure the ability to position an aerial ladder to one entire side of the building. The setback distance can include the entire Parkway Zone and Flex Zone (if emergency cannot access the Flex Zone). See City of San Diego FPB Policy A-14-1 for additional guidance, standards, and exceptions.

- The required width of emergency vehicle access roadways shall not be obstructed in any manner, including the parking of vehicles. Where no space is provided for parking along access roadways, they shall be kept clear by the posting of signs or the painting of curbs.
- Promenades must accommodate access for emergency vehicles, usually by using street furniture that can be moved to make way for emergency vehicles.
- Design of landscaped medians must account for impacts on emergency vehicle movement and access.
- Diverters may affect access for emergency vehicles; designs that allow emergency vehicle access are required and should be coordinated with emergency responders. Diverters should be designed flexibly with mountable curbs to allow emergency vehicles to traverse them.
- Multi-purpose paths should be designed with sufficient surfacing structural depth for the subgrade soil type to support maintenance and emergency vehicles. Where the path must be constructed over a very poor subgrade (wet and/or poor material), treatment of the subgrade with lime, cement or geotextile fabric should be used.

References:

- FPB Policy A-14-1 "Fire Access Roadways", City of San Diego Fire-Rescue Dept, 2015
- Traffic Calming ePrimer, Module 5: Effects of Traffic Calming Measures on Non-Personal Passenger Vehicles, FHWA, n.d.

5.3. Flex Zone

The Flex Zone encompasses the region of the right of way (ROW) between the Parkway Zone and the Vehicle Zone. Various features can be placed in the Flex Zone depending on community needs, surrounding land uses, and the roadway classification. These features include parklets, bicycle facilities, transit facilities, on-street parking, passenger and loading zones, and accommodation for emergency vehicles.

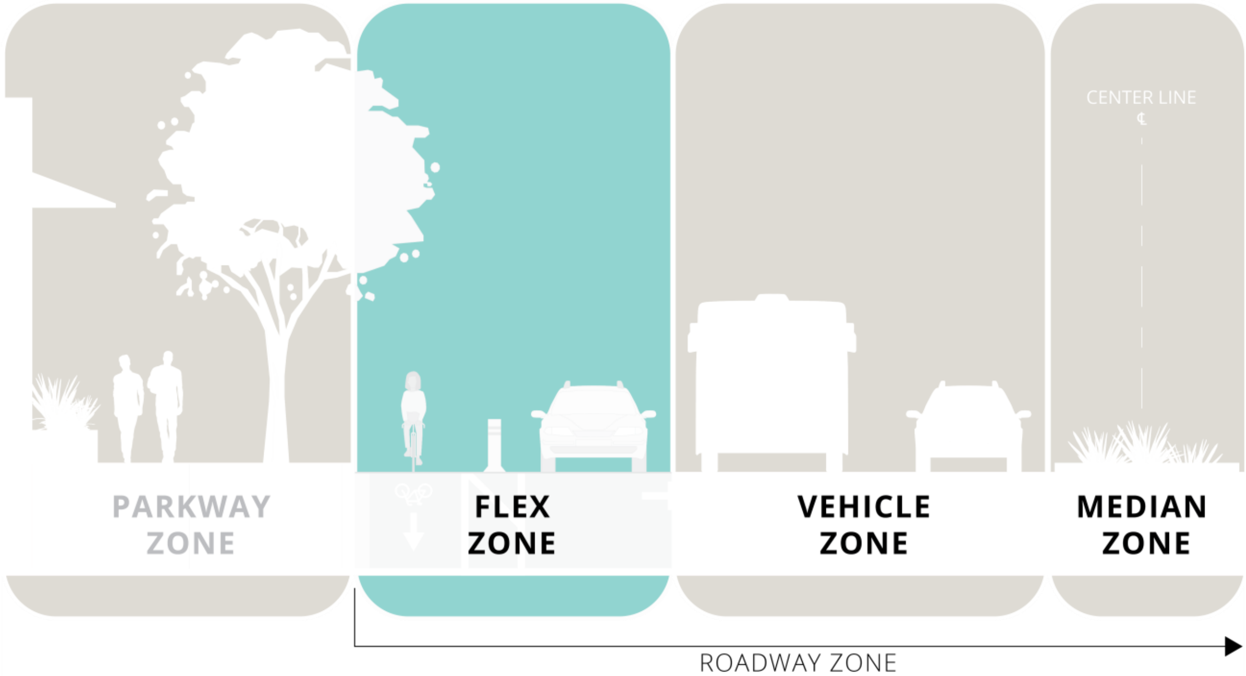

FIGURE 5-5 FLEX ZONE

5.3.1 Pedestrian Plazas, Parklets, and Streetaries

Streetaries are outdoor spaces created in street space formerly dedicated to parking spaces that serve as an extension of a restaurant or other establishment that sells food and drink.

Similarly, Pedestrian Plazas (also known as "parklets") transform one or two curbside parking spaces into an active, vibrant, and accessible public space. They typically incorporate benches, tables, landscaping, and/or bicycle parking on a platform that is flush with the sidewalk. Parklets are sponsored, installed, and maintained by a community partner such as a neighborhood or business group. See the Spaces as Places Manual for additional information.

Benefits:

- Pedestrian Plazas are publicly accessible to all and are intended to provide a space for enjoyable public interaction.
- Pedestrian Plazas foster a more walkable, pedestrian-friendly environment, and offer additional seating areas for pedestrians and patrons of the surrounding businesses.

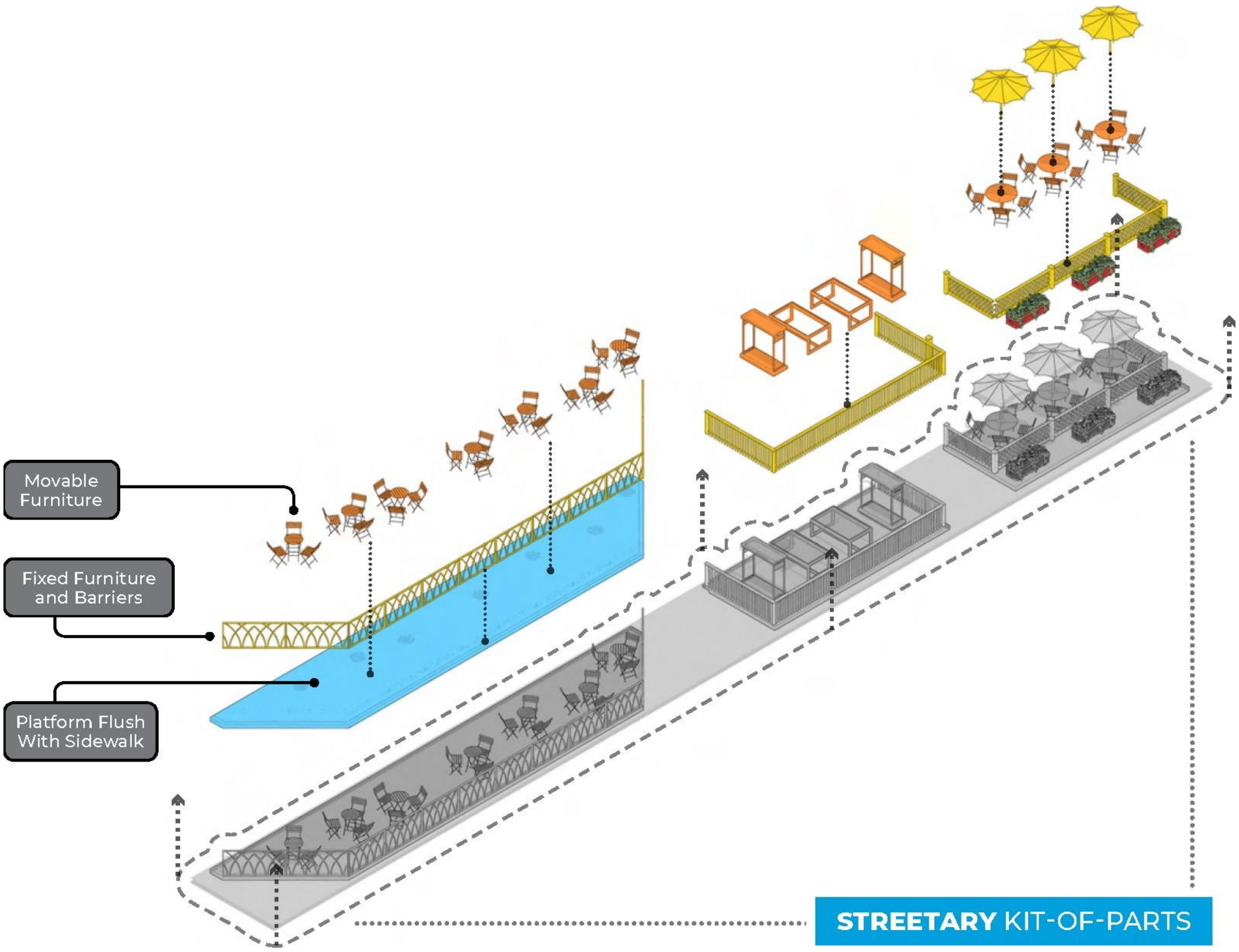

FIGURE 5-6 STREETARY

Source: Spaces as Places Design Manual

Considerations:

- Pedestrian Plazas should not be located on streets where the grade along the street exceeds a maximum running slope of 5% or a maximum cross slope of 2%.
- If a Pedestrian Plaza will be placed where an existing parking meter is located, the applicant will be required to pay the costs for the City to remove the parking meter. When the pedestrian plaza is removed, the applicant will then be required to pay for the reinstallation of the parking meter.
- The City Engineer may require removal of a Pedestrian Plaza if a Pedestrian Plaza is not used or maintained as intended, if it is determined to be a public safety hazard or public nuisance, or if use of the space is needed for another purpose.
- Pedestrian Plazas shall not interfere with the use of designated blue zone parking spaces; curb ramps; Metropolitan Transit System (MTS) stops or other access features of the public right-of-way.
- Pedestrian Plazas, Parklets, and Streetaries shall be designed and constructed to be accessible to all individuals therefore, shall comply with all applicable provisions of the access law for entry, dining, seating, etc.

- Street trees must be considered, including vacant sites where street trees have previously existed. Trees must be protected in place and no new installations shall be closer than 6 feet from the base of existing street trees. Installations must avoid tree damage, including tree root systems. Vacant sites must be replanted with trees and may not be covered or paved in.
- Standards for streetaries, including location, design, accessibility, stormwater, and fire code requirements can be found in the Spaces as Places Design Manual and in Chapter 14, Article 1, Division 6, Section 141.0612 of the City of San Diego Municipal Code.

References:

- Information Bulletin 565: Pedestrian Plaza, City of San Diego Development Services Dept, 2020
- Municipal Code §141.0612, City of San Diego, n.d.
- Spaces as Places Design Manual, City of San Diego City Planning Dept, 2023

5.3.2 Bikeways

Bikeways are to be provided in accordance with adopted community plans and the City's Bicycle Master Plan and should be continuous, leading to all major activity centers. Bikeway design will reference the Caltrans Highway Design Manual, CA MUTCD, AASHTO Guide for the Development of Bicycle Facilities, NACTO Urban Bikeway Design Guide, and the City of San Diego Bicycle Facility Design Guidelines in order to promote safer and more attractive bikeway facilities.

5.3.3 Bicycle Facilities

Bicycle facilities are typically provided within the Flex Zone and provide space for cyclists and other micromobility users to travel safely separated from pedestrians and motor vehicles. Bicycle facilities do not contribute to minimum parkway widths even if at the same grade as the parkway.

Multi-use or off-street paths, typically designated as Class I facilities can be found in Chapter 4, "Off-street Non-vehicular Treatments".

Incorporating appropriate bicycle facilities is a crucial element in creating a complete street that supports all modes of travel. The selection of the bicycle facility ensures that cyclists are safely and efficiently integrated into the street environment. Prioritizing bike facility selection fosters a more inclusive and sustainable transportation system, which aligns with the goals of a Complete Street.

Caltrans Design Information Bulletin 94 Complete Streets: Contextual Design Guidance (DIB-94) recommends the following bicycle facilities based on the posted speed limit and average daily traffic.

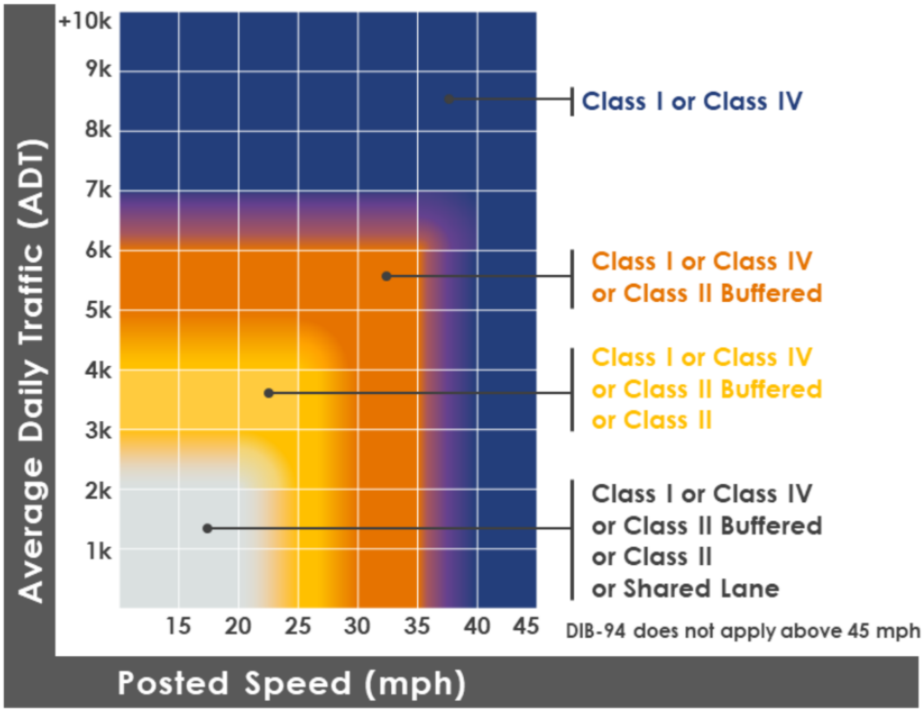

FIGURE 5-7 RECOMMENDED BICYCLE FACILITIES

Source: Caltrans' Design Information Bulletin 94 – Complete Streets

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5.3.3.1 Class II Bike Lane

Bike lanes are defined by pavement striping and signage used to allocate a portion of a roadway for exclusive or preferential bicycle travel. Bike lanes are one-way facilities on either side of a roadway. Whenever possible, Bike Lanes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues, such as additional warning or wayfinding signage.

Benefits:

- Provides bicyclists with a safe, dedicated space on the roadway.
- Facilitates predictable behavior and movements between motorists and bicyclists.
- Allows bicyclists to travel at speeds appropriate to bicyclists rather than moving traffic.

Considerations:

- On streets with heavy bicycle traffic, wider bike lanes should be considered in order to allow faster moving bicyclists to pass slow moving bicyclists.
- Left-side bike lanes should be considered on one-way arterial streets if significant transit service is present on the right-most travel lane. Contraflow bike lanes can be considered on the left side of one-way streets.

Standards and Guidelines:

- White line separating vehicle lane from bike lane must be 6”; White line separating bike lane from parking lane must be 4”.
- 5 feet shall be the minimum width of bike lane where parking stalls are marked.
- On streets with on-street parking, if parking volume is substantial or turnover high, an additional one to two feet of width is desirable.
- Wider bike lanes are desirable in certain circumstances such as on higher speed arterials (45 mph+) where a wider bike lane can increase separation between passing vehicles, parked vehicles and bicyclists.

References:

- Bicycle Master Plan, City of San Diego, 2013
- Highway Design Manual, 7th ed., Caltrans, 2020

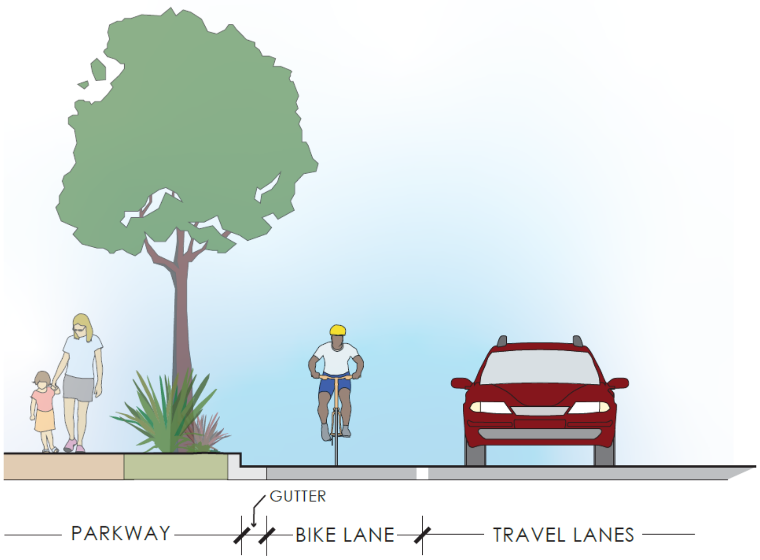

FIGURE 5-8 CLASS II BIKE LANE SECTION VIEW

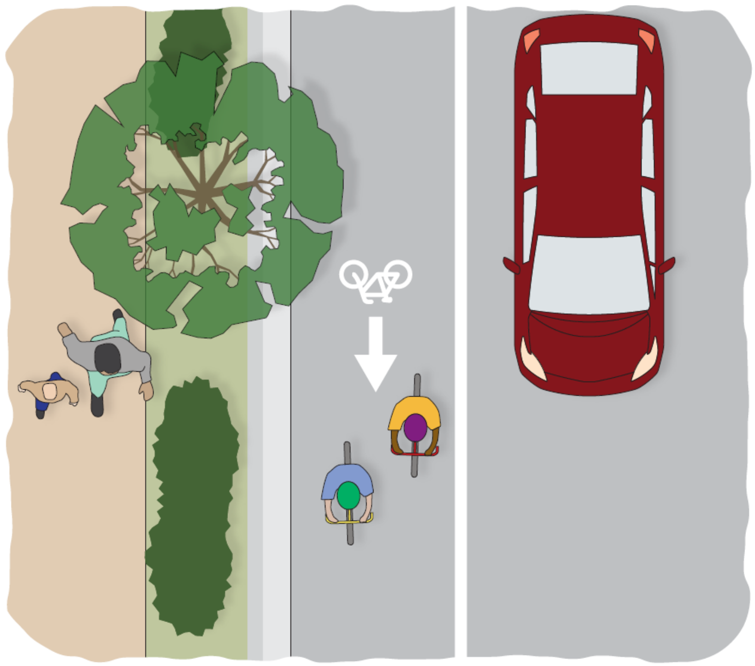

FIGURE 5-9 CLASS II BIKE LANE PLAN VIEW

Facility	Bike Lane [1]
Preferred	7′
Minimum	5′
Maximum	8′

TABLE 5-1 CLASS II BIKE LANE DIMENSIONS

Note:

1. *Bike Lane width should exclude the width of the gutter pan, if adjacent.*

5.3.3.2 Class II Buffered Bike Lane

Buffered bike lanes are conventional bike lanes paired with a designated buffer space separating the bike lane from the adjacent motor vehicle travel lane and/or parking lane. A buffered bike lane is allowed as per CA MUTCD guidelines for buffered preferential lanes (Section 3D-01).

Benefits:

- Provides greater shy distance between motor vehicles and bicyclists.
- Provides space for bicyclists to pass another bicyclist without encroaching into the adjacent motor vehicle travel lane.
- Encourages bicyclists to ride outside of the door zone when buffer is between parked cars and bike lane.
- Appeals to a wider cross-section of bicycle users.

Considerations:

- Buffer striping may require additional maintenance when compared to a conventional bike lane.
- If trenching is to be done in the bike lane, the entire bike lane should be repaved so that there is not an uneven surface or longitudinal joints.

Standards and Guidelines

- Minimum buffer width is 2 feet and should be tapered at the beginning of the bike lane.
- The buffer area should have diagonal markings or chevron markings if 4 feet or wider. The chevron or diagonal markings may be omitted from bicycle lane buffer areas less than 4 feet wide.
- Bike lane word and/or symbol and arrow markings (CA MUTCD Figure 9C-3) shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists.
- The combined width of the buffer(s) and bike lane should be considered “bike lane width” with respect to guidance given in other documents that don’t recognize the existence of buffers.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Urban Bikeway Design Guide, NACTO, 2014

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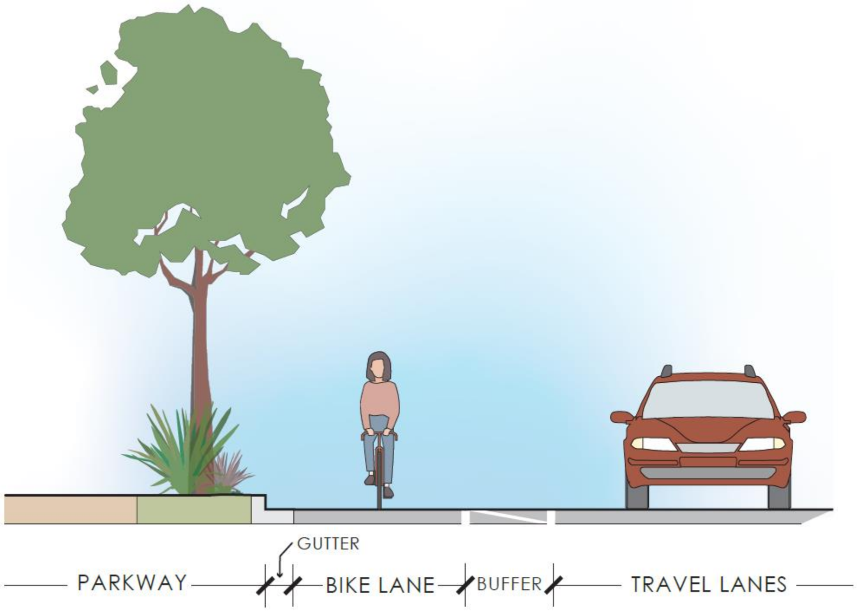

FIGURE 5-10 CLASS II BICYCLE BUFFERED BIKE LANE SECTION VIEW

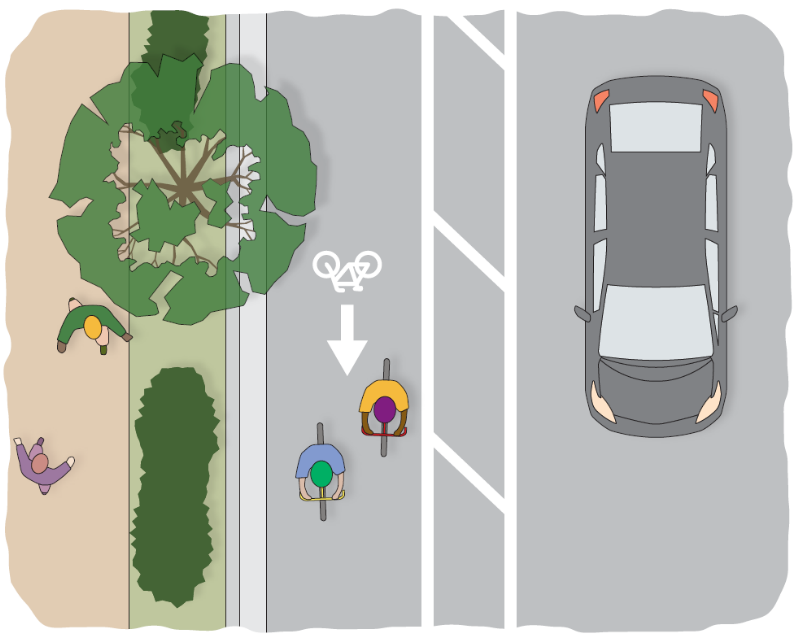

FIGURE 5-11 CLASS II BUFFERED BIKE LANE PLAN VIEW

Facility	Bike Lane [1]	Buffer
Preferred	7′	3′
Minimum	5′	2′
Maximum	8′	4′

TABLE 5-2 CLASS II BUFFERED BIKE LANE DIMENSIONS

Notes:

1. *Bike Lane width should exclude the width of the gutter pan, if adjacent.*

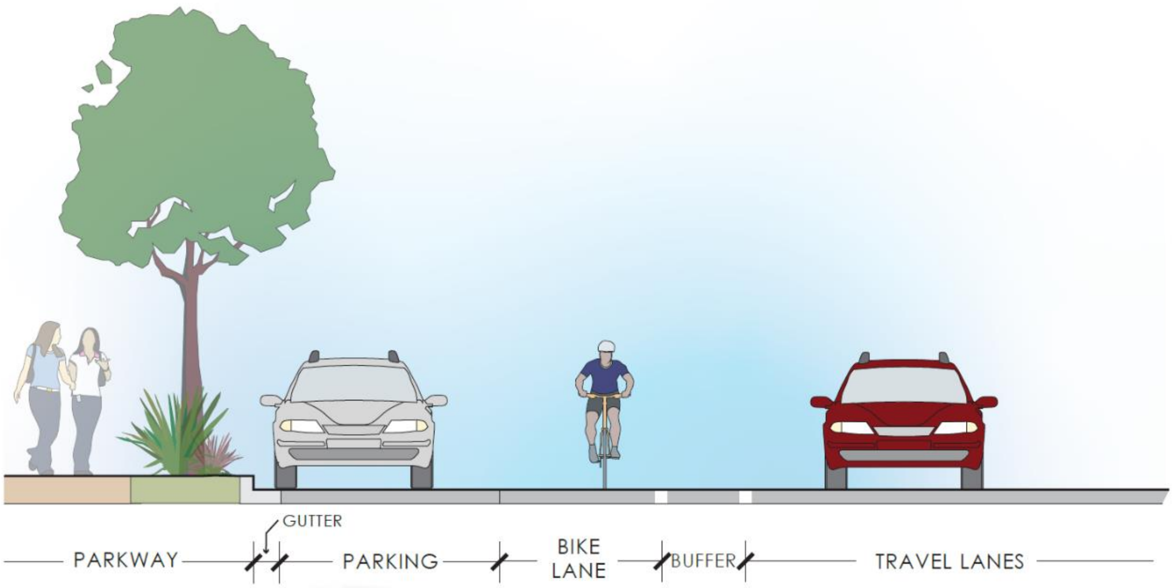

FIGURE 5-12 CLASS II BUFFERED BIKE LANE ADJACENT TO PARKING SECTION VIEW

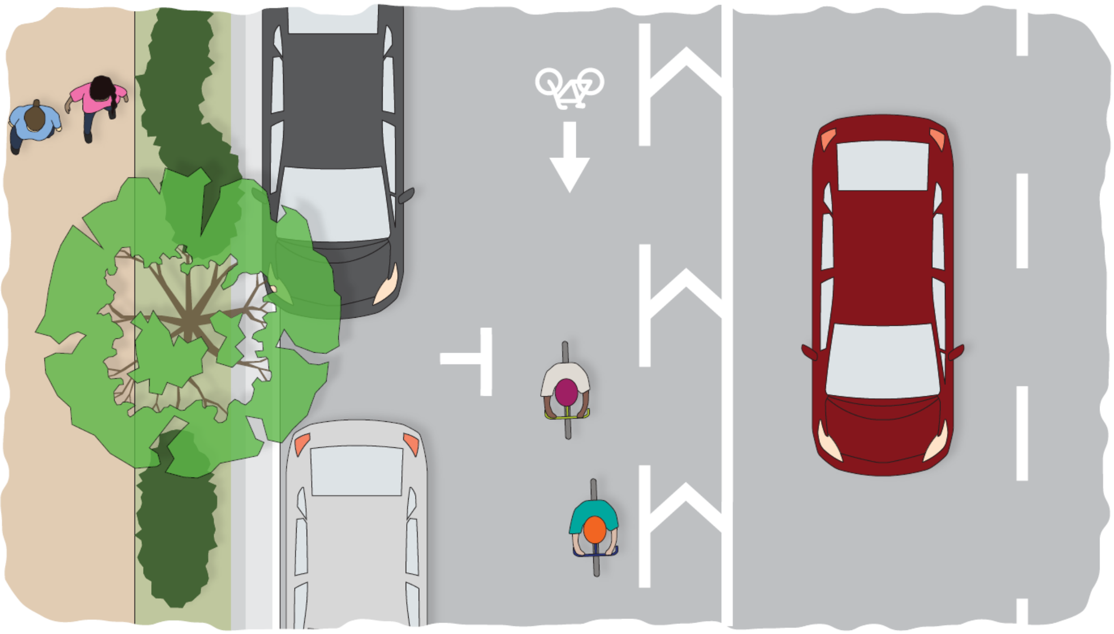

FIGURE 5-13 CLASS II BUFFERED BIKE LANE ADJACENT TO PARKING PLAN VIEW

Facility	Buffer [1]	Bike Lane	Buffer
Preferred	3′	7′	3′
Minimum	-	5′	2′
Maximum	-	8′	4′

TABLE 5-3 CLASS II BUFFERED BIKE LANE ADJACENT TO PARKING DIMENSIONS

Notes:

1. *Optional buffer. If adjacent to angle parking, preferred buffer width between the bike lane and travel lane is 4 ft.*

5.3.3.3 Class III Bike Routes

Class III Bike Routes are shared facilities within travel lanes which either provide continuity to other bicycle facilities or designate networks on low volume/low speed connecting streets.

Benefits:

- May help to raise the visibility of bicyclists on streets.
- May help to encourage bicyclists to use the full lane, which could help prevent injuries that occur when bicyclists collide with open car doors in adjacent on-street parking facilities.

Considerations:

- Sharrows should not be installed on high-speed or high-volume streets.
- Routes should be signed only if any of the following apply:
  - They provide for through and direct travel in bicycle-demand corridors.
  - Connect discontinuous segments of bike lanes.
  - They provide traffic actuated signals for bicycle and appropriate assignment of right of way at intersections to give greater priority to bicyclists, as compared with alternative streets.
  - Street parking has been removed or restricted in areas of critical width to provide improved safety.
  - Surface imperfections or irregularities have been corrected (e.g., utility covers adjusted to grade, potholes filled, etc.).

Guidelines:

- Senate Bill 1216 (2024) prohibits the use of new sharrows on a roadway that has a posted speed limit greater than 30 mph where bicycle travel is permitted.
- Existing sharrows shall not be replaced on repaved roadways with a posted speed limit greater than 30 mph.
- For application and placement of shared roadway markings and bike route signs, see the CA MUTCD Sections 9B and 9C.
- Minimum widths for Class III bikeways are represented in the minimum standards for highway lanes and shoulder in the California MUTCD.
- Bike routes should be installed in concert with traffic calming mechanisms to increase safety. See Chapter 5.8, "Traffic Calming" for more information.

References:

- CA MUTCD Rev. 8, Caltrans, 2024

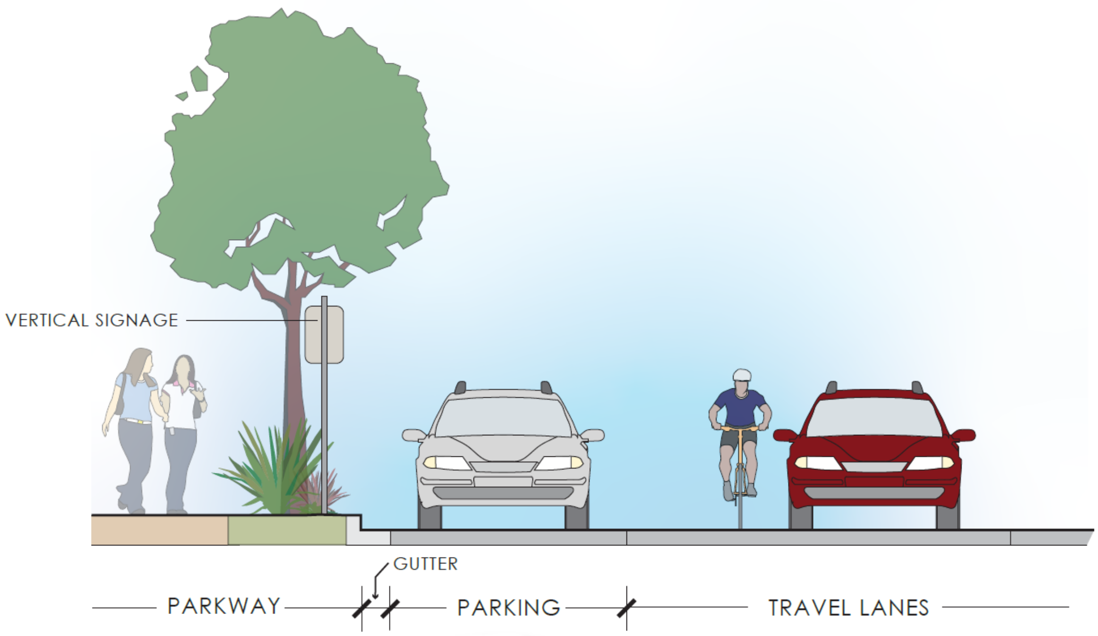

FIGURE 5-14 CLASS III BIKE ROUTE SECTION VIEW

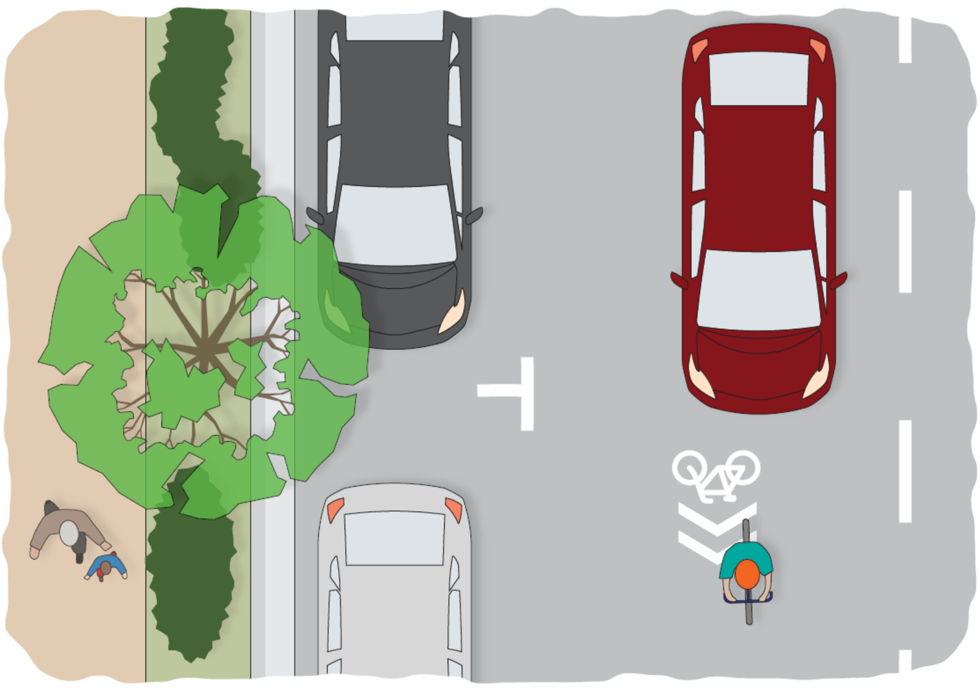

FIGURE 5-15 CLASS BIKE ROUTE PLAN VIEW

5.3.3.4 Bicycle Boulevard

Bicycle Boulevards are bike routes on low volume, low speed local streets that prioritize bicycle movement. Traffic calming is typically used to discourage drivers from using the street as a circulation route. Bike boulevards provide continuous comfortable bicycle routes through the local street network. Directional markings and wayfinding signage provide riders with intuitive, coherent routing.

Benefits:

- Can benefit residents from reduced vehicle speeds and through traffic due to traffic calming measures.
- Provides comfortable route for bicyclists to utilize the full lane.

Considerations:

- With the presence of traffic calming measures, emergency vehicle access should be considered. Refer to Section 5.2.2 “Emergency Vehicles and Access” for more information.

Guidelines:

- Less than 3,000 ADT and an 85th percentile speed of no more than 25 mph, 20 mph preferred.
- Bicycle wayfielding signs and pavement marking shall be included to distinguish a bike boulevard from a bike route.
    - For application and placement of shared roadway markings and bike route signs, see the California MUTCD Sections 9B and 9C.
- Any centerline striping shall be removed, except at controlled intersection approaches.
- Bike routes should be installed in concert with traffic calming mechanisms to increase safety. See Chapter 6.8, “Traffic Calming” for more information.
- Like Class III Bike Routes, minimum widths for bike boulevards are represented in the minimum standards for highway lanes and shoulder in the California MUTCD.

References:

- Bikeway Selection Guide, FHWA, 2019
- Urban Bikeway Design Guide, NACTO, 2014

5.3.3.5 Class IV Separated Bikeways General Notes

Separation for bicycle facilities can take many forms varying in cost, ease of installation, durability, and aesthetics.

Benefits:

- Provides physical separation for people on bikes.
- Provides increased confidence in personal safety for cyclists, which increases the range of potential users for the bicycle facilities.

Considerations:

- All physical barriers have the potential to impact drainage and emergency vehicle access and should be evaluated accordingly.
- Flexible delineator posts are one of the most popular types of separation elements due to their low cost, visibility, and ease of installation. However, their durability and aesthetic quality can present challenges and agencies may consider converting these types of buffers to a more permanent style when design and budgets allow. Delineators can be placed in the middle of the buffer area or to one side or the other as site conditions dictate (such as street sweeper width or vehicle door opening).
  - Separated bikeways using fixed barriers can make it difficult to provide adequate fire access setbacks distance (15-30') for buildings exceeding 30' in height. Flexible pylons can be driven over in an emergency and allow more flexibility for emergency access as opposed to parking or other immovable barriers.
- Raised median concrete curbs can either be cast in place or precast. This type of buffer element is more expensive to construct and install but provides a continuous raised buffer that is attractive with little long-term maintenance required. Mountable curbs are an option where emergency vehicle access may be required.
- Concrete barriers provide the highest level of crash protection among these separation types. They are less expensive than many of the other treatments and require little maintenance. However, this barrier type may be less attractive and may require additional drainage and service vehicle solutions. A crash cushion must be installed where the barrier end is exposed.
- Bollards are a rigid barrier solution that provides a strong vertical element to the buffer space. Depending on how closely the bollards are placed apart, this form of separation may result in an increased cost compared to others and may not be as appropriate on higher speed streets.
- Planters provide an aesthetic element to the streetscape, a suitable vertical barrier, and are quick to install. However, depending on the placement, this treatment is more expensive than other solutions, requires maintenance of the landscaping, and may not be as appropriate on higher speed streets.
- Parking stops, miniature speed humps, and similar low linear barriers are inexpensive buffer solutions that offer several benefits. These barriers have a high level of durability, can provide

near continuous separation, and are a good solution when minimal buffer width is available. However, using the minimum width will not provide the same level of comfort and protection due to their low height and bicyclists' proximity to traffic. These can be combined with flexible delineator posts to create an enhanced barrier.

- While not a barrier type on its own, parked cars can provide an additional level of protection and comfort for bicyclists. Additional guidance and standards can be found in Section 5.3.5.5, "Floating Parking."
- Separation types can be used in combination to realize the full benefits of several treatments at a lower overall cost. For example, delineator posts can be alternated with parking stops or other low, linear barriers to provide both horizontal and vertical elements. Planters or rigid barriers and bollards may be used at the start of a block to more clearly identify the separated bike lane and provide an aesthetic treatment, with more inexpensive treatments used midblock.
- Raised cycle tracks may be at the level of the adjacent sidewalk or set at a level between the roadway and sidewalk to separate the cycle track from the sidewalk. A raised cycle track may be combined with a parking lane or other barrier between the cycle track and the vehicle travel lane. Refer to DIB 89-02 for more information.

Guidelines:

- Asphalt concrete berms should be included when there is parking allowed on grades where vehicles are required to turn the wheels towards the curb.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- DIB 89-02 "Class IV Bikeway Guidance", Caltrans, 2022

5.3.3.6 Class IV One-Way Cycle Track

A Cycle Track is a hybrid type bicycle facility that combines the experience of a separated path with the on-street infrastructure of a conventional Bike Lane.

Cycle tracks are bikeways located in roadway right-of-way but separated from vehicle lanes by physical barriers or buffers. One-way cycle tracks provide for one-way bicycle travel in each direction adjacent to vehicular travel lanes and are exclusively for bicycle use.

Benefits:

- Decreases injuries and fatalities while providing a safer, more comfortable bicycling experience.
- Encourages bicyclists to travel in a protected bike lane on the roadway, as opposed to on the sidewalk.
- Mitigates conflicts between bicyclists and motorists by providing greater clarity about roadway behavior.
- Increases bicycle ridership.

Considerations:

- May create design challenges at intersections for right-turning vehicles.
- May require creating entry and exit points for driveways and parking lots along the Cycle Track route.
- May require bicyclist-only signal phasing to allow for left turns along the route by installing two-stage left-turn boxes.
- May require the removal of on-street parking.
- Cycle tracks can have channelizers and posts on downhill grades greater than 3% when the BL is equal to or greater than 7’ and the buffer is equal to or greater than 3’.

Standards and Guidelines:

- One-way cycle tracks can be separated by a device or barrier (pavement markings or coloring), bollards, curbs/medians and on-street parking or a combination of these elements from the travel lane or by on-street parking with additional striping provided between the travel lane and the cycle track.
- Bike lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed at the beginning of a cycle track and at periodic intervals along the facility based on engineering judgment.
- The minimum width for a cycle track shall be 5 feet per DIB 89-02. The minimum width should be 6 feet to accommodate street sweeping. In areas with high bicyclist volumes or uphill sections, the minimum width should be 7 feet to allow for bicyclists passing each other.
- In the absence of a raised median or curb, the minimum desired width of the painted buffer is 3 ft. The buffer space should be used to locate bollards, planters, signs or other forms of physical protection.

- Colored pavement may be used to further define the bicycle space.

References:

- DIB 89-02 "Class IV Bikeway Guidance", Caltrans, 2022

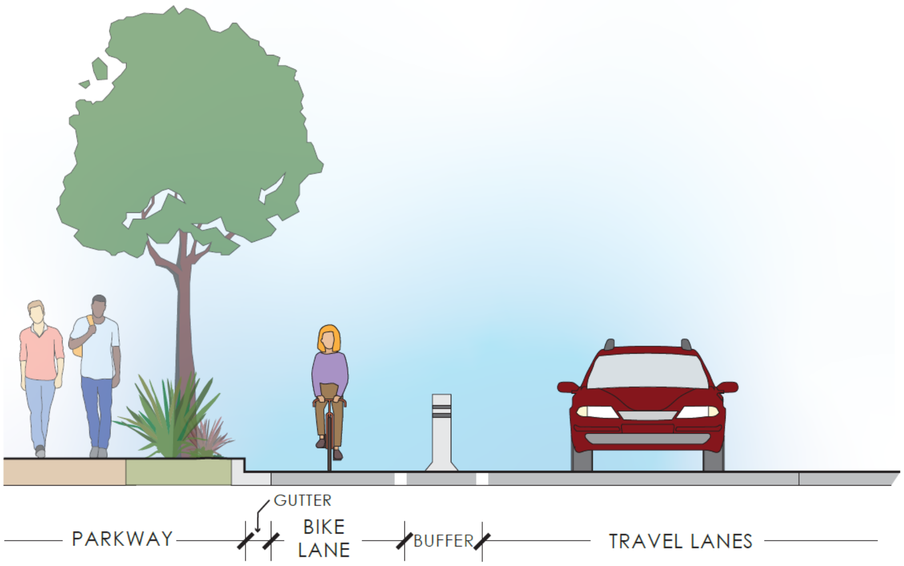

FIGURE 5-16 ONE-WAY CYCLE TRACK SECTION VIEW

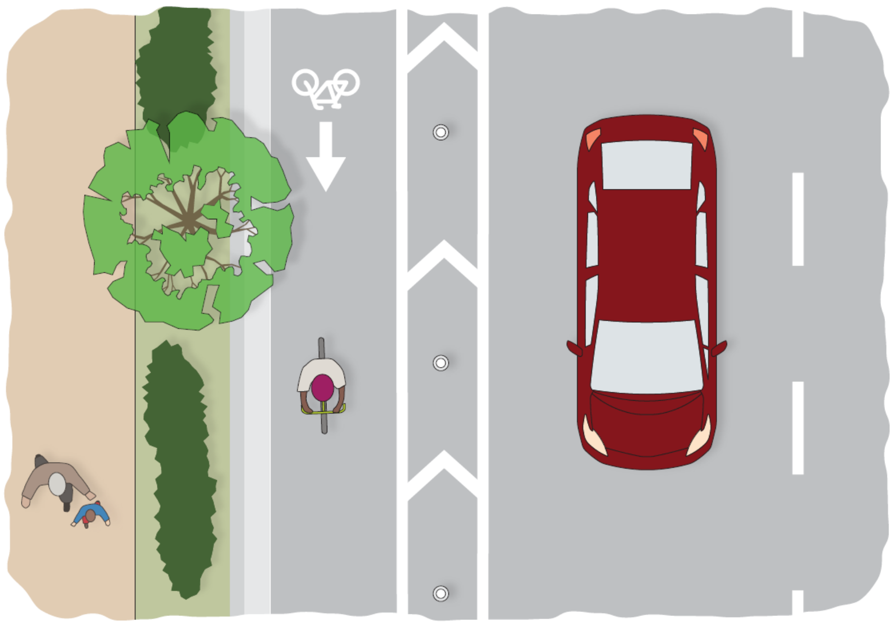

FIGURE 5-17 ONE-WAY CYCLE TRACK PLAN VIEW

Facility	Bike Lane [3]	Buffer with post
Preferred	7′	3′
Minimum	6′ [1,2]	2′ [2]
Maximum	8′	-

TABLE 5-4 ONE-WAY CYCLE TRACK DIMENSIONS

Notes:

1. *Cycle tracks can be narrower than standard minimum if there are agreements or other arrangements for maintenance.*
2. *Standard minimum does not apply on downhill grades steeper than 3%.*
3. *Cycle track lane width should exclude the width of the gutter pan, if adjacent.*

5.3.3.7 Class IV Two-Way Cycle Tracks

Two-way cycle tracks are physically separated bicycle facilities that allow bicycle movement in both directions on one side of the road. Two-cycle tracks share some of the same design elements as one-way cycle tracks, but require additional considerations at driveways.

At street level, two-way cycle tracks can be protected by parking or other physical barrier. A raised cycle track can provide vertical separation from the adjacent vehicle travel lane.

Benefits:

- Decreases injuries and fatalities.
- Encourages cyclists to travel in a protected bikeway as opposed to on the sidewalk.
- More attractive to a wide range of bicyclists at all levels and ages.
- Increases bicycle ridership.

Considerations:

- Trash pickup, transit use, and emergency vehicle access should be accounted for in the planning and design process.
- A yellow flex post or removable bollard with obstruction pavement markings should be considered at the entrance to a two-way cycle track to prevent vehicles from entering, while still allowing for emergency vehicle access and bike lane street sweeping.
- May create design challenges at intersections.
- May require creating entry and exit points for driveways and parking lots.
- May require bicyclist-only signal phasing at intersections.

Guidelines:

- Two-way cycle tracks can be separated by a device or barrier (pavement markings or coloring), bollards, curbs/medians and on-street parking or a combination of these elements from the travel lane or by on-street parking with additional striping provided between the travel lane and the cycle track.
- Preferred two-way cycle track width is 12 feet, with a minimum of 8 feet width in constrained locations for minimum lengths.
- Raised cycle tracks may be at the level of the adjacent sidewalk or set at a level between the roadway and sidewalk to separate the cycle track from the sidewalk. A raised cycle track may be combined with a parking lane or other barrier between the cycle track and the vehicle travel lane.

References:

- DIB 89-02 "Class IV Bikeway Guidance", Caltrans, 2022

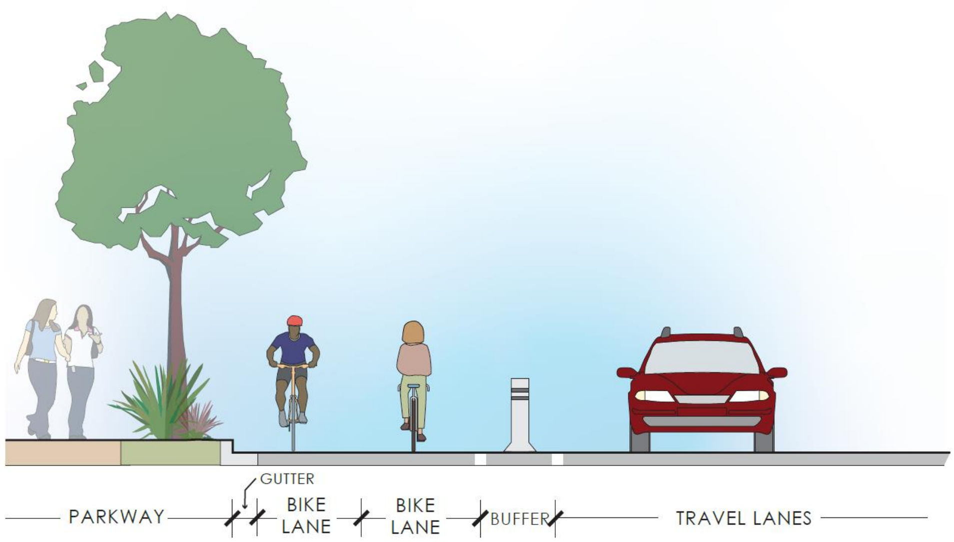

FIGURE 5-18 TWO-WAY CYCLE TRACK SECTION VIEW

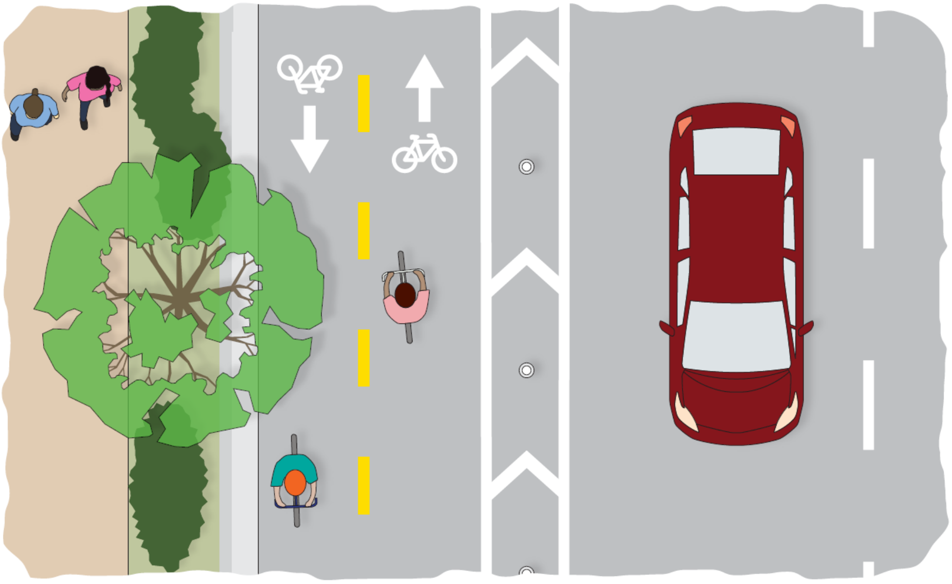

FIGURE 5-19 TWO-WAY CYCLE TRACK PLAN VIEW

Facility	Two-Way Cycle Track [3]	Buffer
Preferred	12′	4′
Minimum	8′ [1,2]	2′ (3′ parking adjacent) [2]
Maximum	14′	-

TABLE 5-5 TWO-WAY CYCLE TRACK DIMENSIONS

Notes:

1. *Cycle tracks can be narrower than standard minimum if there are agreements or other arrangements for maintenance.*
2. *Standard minimum does not apply on downhill grades steeper than 3%.*
3. *Cycle track lane width should exclude the width of the gutter pan, if adjacent.*

5.3.3.8 Bicycle Facilities at Driveways

Where driveways exist, different bicycle infrastructure requires different treatments.

Benefits:

- Installing green conflict paint near driveways may raise the driver's and bicyclist's awareness of these potential conflict areas.

Considerations:

- Alternating from Class IV to Class II infrastructure may be appropriate on roadways with many driveways or turning movements.

FIGURE 5-20 BICYCLE FACILITIES AT DRIVEWAYS

Location: Park Blvd.

Standards and Guidelines:

- At unpaved roadway or driveway crossings, including bike paths or pedestrian walkways, the crossing roadway or driveway shall be paved a minimum of 15 feet to minimize or eliminate gravel intrusion on the path. The pavement structure at the crossing should be adequate to sustain the expected loading at that location.

- Future driveway construction should avoid construction of a vertical lip from the driveway to the gutter, as the lip may create a problem for bicyclists when entering from the edge of the roadway at a flat angle. If a lip is deemed necessary, the height should be limited to ½ inch.
- See Section 3H.06 of the FHWA MUTCD for standards and guidelines for the optional use of green colored pavement for in marked bike lanes and extensions of bike lanes through intersections and other traffic conflict areas.
- CA MUTCD 4D.105 (CA) to require bicyclists to be detected at all traffic-actuated signals on public and private roads and driveways.
- Separated bikeways at alleys and driveways should remain as a separated bikeway facility. However, the physical separation feature, such as flexible posts, planters, etc. will be discontinued at alley or driveway locations. The separation markings may continue at these locations. Note the importance of including traffic control devices for the benefit of sight distance.

5.3.3.9 Micromobility Parking

Micromobility devices, inclusive of scooters, operate and park within public right-of-way. Designating parking locations provides more control over the start and end location of vehicles, increases predictability for users and non-users alike, and reduces encroachment in the public right-of-way.

Standards and Guidelines:

- Refer to the latest City of San Diego Municipal Code for Shared Mobility Devices on the standards and guidelines.
- A minimum 6’ clear pedestrian path should be provided required for all sidewalk corral locations.
- Corrals or shared micromobility parking areas should be located outside of the pedestrian path of travel, typically within the Flex Zone.
- Corrals should be marked with neutral, non-branded, or universal-branded signage to best inform customers of where devices should be parked.

References:

- Guidelines for Regulating Shared Micromobility, NACTO, 2019
- Municipal Code Chapter 8, Article 3, Division 3, City of San Diego, n.d.

5.3.4 Transit Facilities

5.3.4.1 Floating Bus Stops

Floating bus stops, like bus islands, are dedicated waiting and boarding areas for passengers that streamline transit service and improve accessibility by enabling in-lane stops.

Floating bus stops are separated from the sidewalk by a bicycle channel, eliminating conflicts between transit vehicles and bicycle at stops. For both streetcars and buses, boarding islands allow the creation of accessible in-lane stops with near-level or level boarding.

Benefits:

- Reduces transit vehicle dwell times; on busy streets, in-lane stops may reduce stop delay between 5 and 20 seconds per location.
- Eliminates bus-bike “leapfrogging” conflict at stops, in which buses merge across the bicycle travel path at stops, causing bicycles to merge into general traffic to pass the stopped bus, only to be passed again as the bus accelerates.
- Provides more space for transit passengers and amenities while maintaining a clear pedestrian path on the sidewalk.

Considerations:

- Floating bus stops usually require less complex drainage modifications than bus bulb outs.
- At high-volume stops, it may be necessary to require bicyclists to yield to people accessing the floating bus stop directly from the sidewalk.
- Bicycle signals can enhance the clarity of intersection movements.
- Consider using bike signals with far-side boarding islands to provide a dedicated bike and pedestrian through phase.
- Refer to Section 5.2.2 “Emergency Vehicles and Access” for minimum clear widths for emergency vehicle access and fire access setback distances.

Standards and Guidelines:

- Boarding islands must be designed to permit accessible boarding.
- An accessible boarding area, typically 8 feet wide by 5 feet long, must be provided to permit boarding maneuvers by a person using a wheelchair (ADA Std. 810.2.2)
- Where the bike lane or cycle track requires bicyclists to yield at a crosswalk from the sidewalk onto the floating bus stop, the BIKES YIELD TO PEDESTRIANS sign (MUTCD R9-6) and yield triangle markings must be installed.
- Detectable warning surfaces must be placed on both sides of every crossing over the bike lane.
- Platform access ramp may have a maximum slope of 1:12 at a crosswalk or other crossing point, at the sidewalk and onto the platform (ADA Std. 405.2)
- Use reflective signage or other visible raised element on the leading (back left) corner of the island.

- KEEP LEFT or KEEP RIGHT (MUTCD R4-8) or object marker (OM-3) signs may be used.
- An accessible ramp should be placed at the intersection end of the floating bus stop entering the crosswalk.
- Floating bus stops should include shelters, seating, wayfinding, and passenger information when feasible.
- Shelters should be located at least 10 feet from crosswalks over the bike lane to allow visibility between bicyclists and people exiting the bus stops.
- Install leaning rails along the edge of the island along the bike channel on portions of the floating bus stop without a shelter or accessible boarding area.
- A YIELD stencil marking may be marked in the bike channel prior to the crosswalk to reinforce the requirement to yield.
- Higher (14-inch) platforms typically require that all doors be configured for level boarding, and may be incompatible with some buses
- For low-floor vehicles using bridge plates, near-level boarding can usually be achieved with a 9.5- to 12-inch platform.

References:

- Transit Street Design Guide, NACTO, 2016

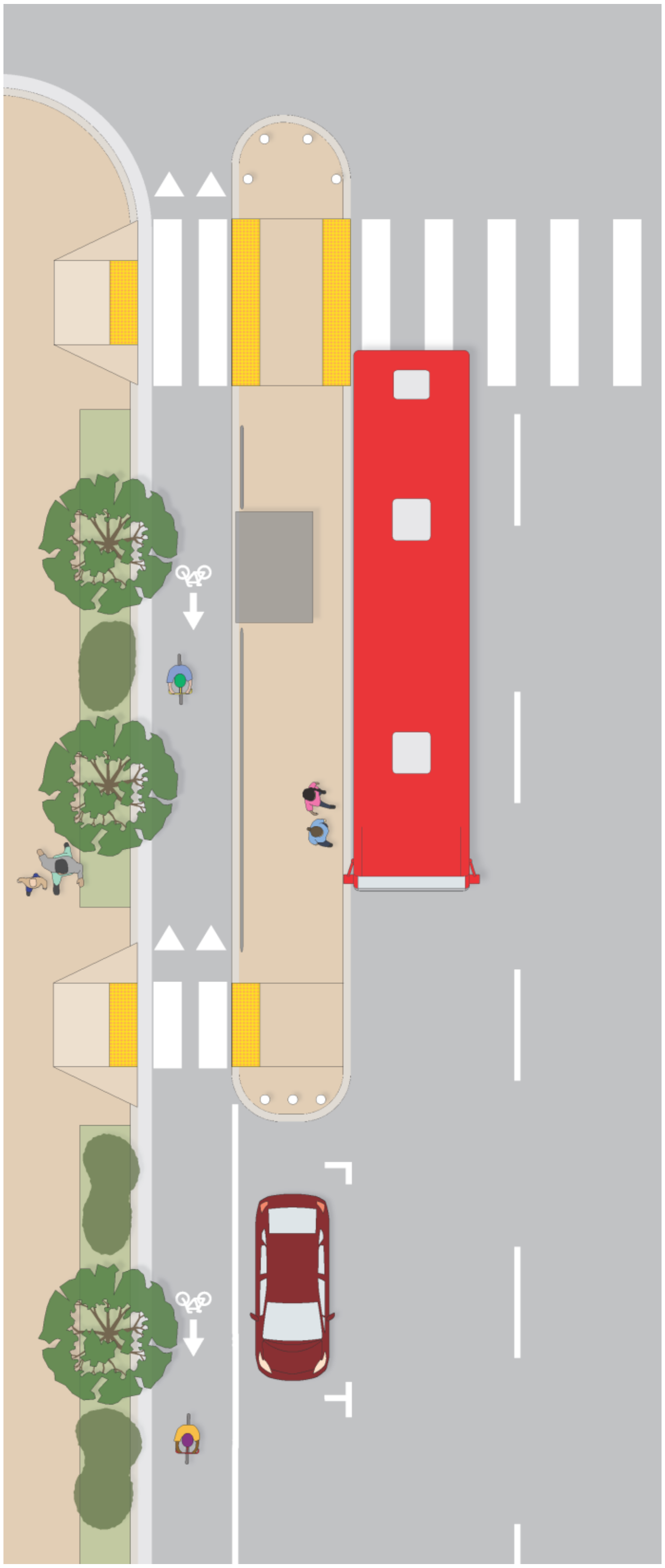

FIGURE 5-21 FLOATING BUS STOPS PLAN VIEW

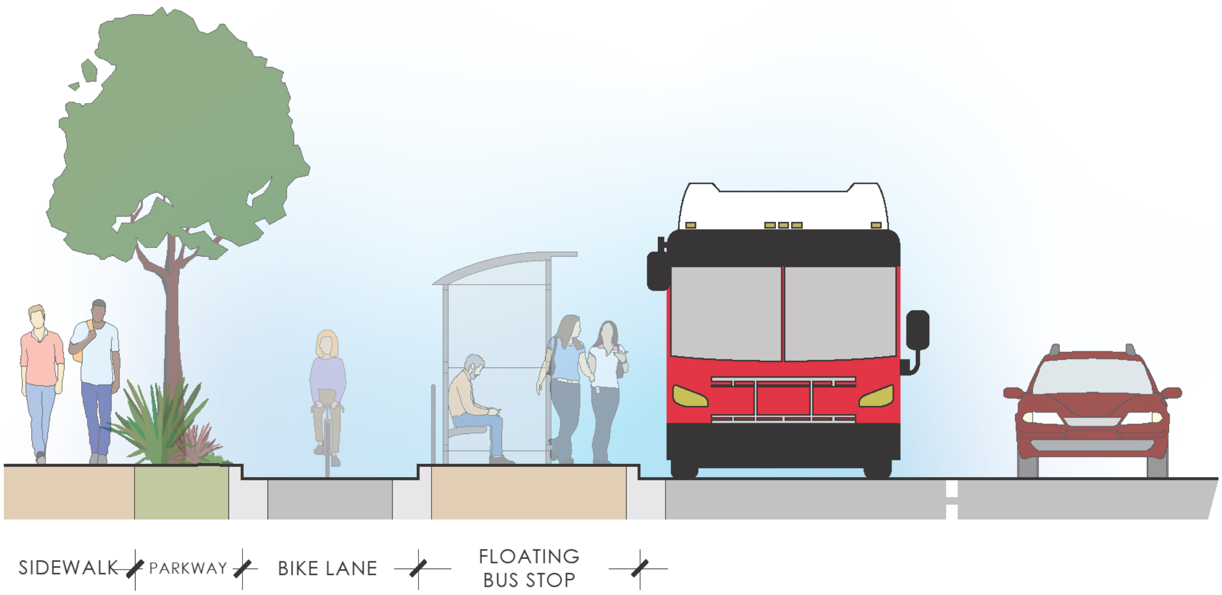

FIGURE 5-22 FLOATING BUS STOPS THROUGH THE LOCATION SECTION VIEW

Facility	Bike Lane	Floating Bus Stop[1,2]
Preferred	7′	10′
Minimum	6′	9′
Maximum	8′	12′

TABLE 5-6 FLOATING BUS STOPS DIMENSIONS

Notes:

1. *Dimensions excludes any rail and curb.*
2. *10 ft minimum with a bus shelter.*

5.3.4.2 Bus Bulb Outs

Bus bulb outs are curb extensions that align the bus stop with the parking lane, allowing buses to stop and board passengers without ever leaving the travel lane.

Bus bulb outs help buses move faster and more reliably by decreasing the amount of time lost when merging in and out of traffic.

Benefits:

- Helps buses move faster and more reliably by decreasing the amount of time lost when merging in and out of traffic.

Considerations:

- Bus bulb outs may be combined with amenities such as wayfinding, landscaping, and trees to enhance the overall transit user experience.
- Refer to Section 5.2.2 "Emergency Vehicles and Access" for minimum clear widths for emergency vehicle access and fire access setback distances.

Standards and Guidelines:

- San Diego should work with MTS to determine the clear width necessary to deploy a wheelchair accessible lift onto the bus bulb.
- A bus bulb out should be roughly equal to the width of the parking lane with a return angle of 45 degrees. To accommodate street sweeping, all curves shall have a min 22' radius.
- Use cut-throughs for curbside bicycle facilities (i.e. bike lane or cycle track) at intersections and midblock bus bulb outs.
- Curbside bike lanes should not be dropped on the approach to an intersection with a curb extension.
- Where a rear side bus bulb out is combined with a turn restriction, design the curb to self-enforce the turn restriction and monitor closely to ensure that transit vehicles are not suffering from delays.
- Bus bulb outs should be equipped with transit shelters whenever possible.
- Bus bulb outs may require right turn on red restrictions where motorists are likely to queue in the right-hand lane.
- See Section 3H.07 of the FHWA MUTCD for standards and guidelines for the optional use of red colored pavement for transit lanes.

References:

- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Transit Street Design Guide, NACTO, 2016

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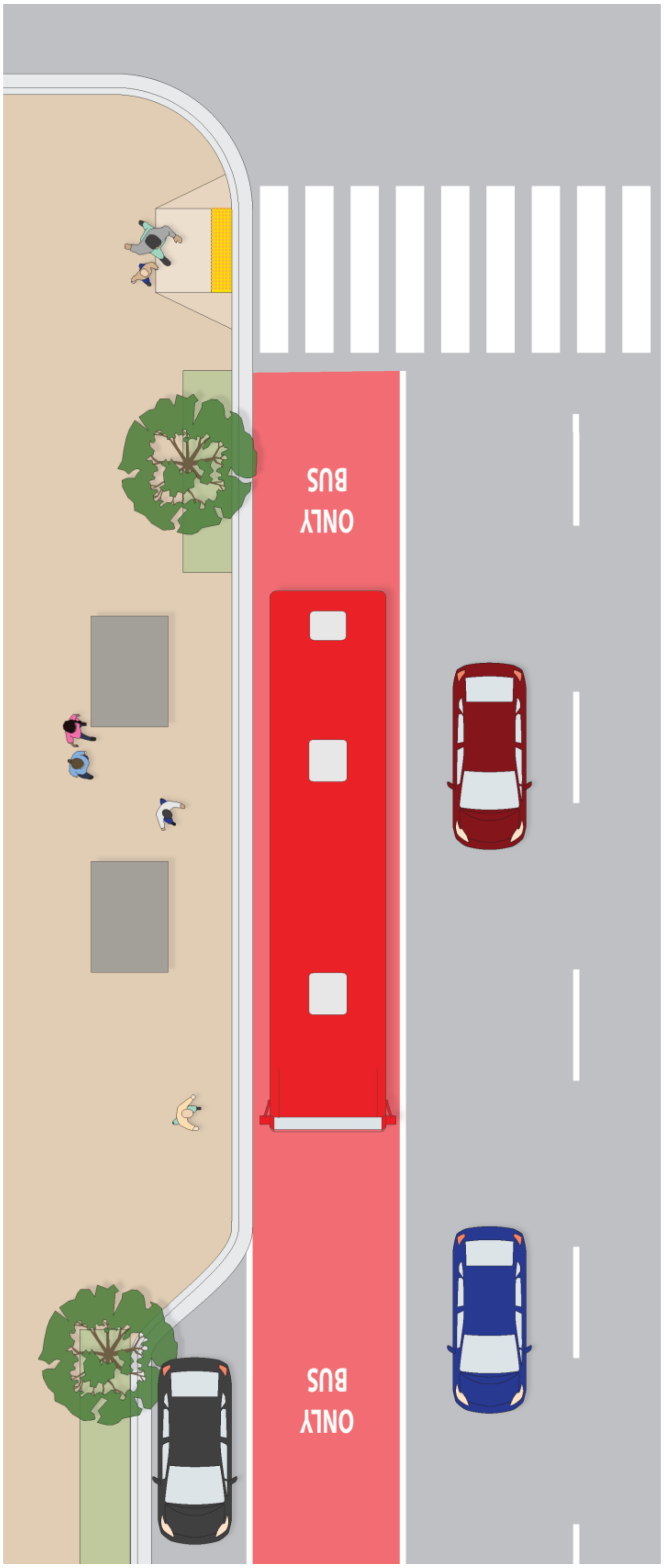

FIGURE 5-23 BUS BULB OUTS PLAN VIEW

Note: Red transit lane paint is optional.

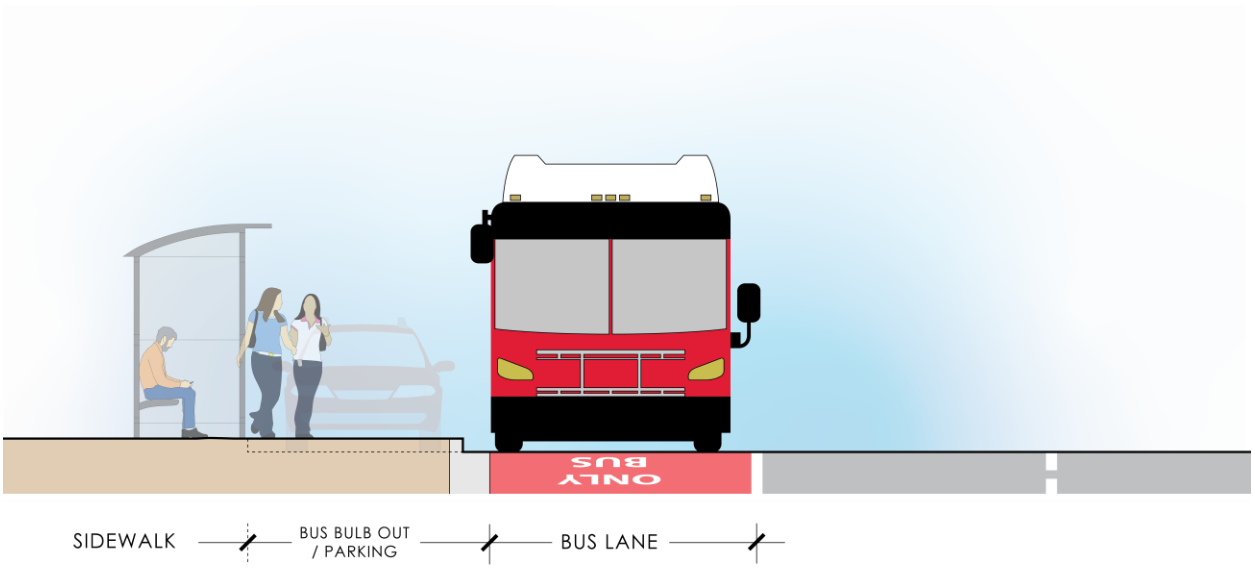

FIGURE 5-24 BUS BULB OUTS THROUGH THE LOCATION SECTION VIEW

Facility	Bus Bulb Outs Length (feet)	Bus Bulb Outs Width (feet)
Preferred	-	8′ - 10′
Minimum	One 40′ Bus	6′
Maximum	Two 60′ Buses	-

TABLE 5-7 BUS BULB OUT DIMENSIONS

5.3.4.3 Bus Pad

Bus pads are highly durable areas of the roadway surface at bus stops, usually constructed in concrete, addressing the common issue of asphalt distortion at bus stops.

Conventional asphalt pavement is flexible and can be moved by the force and heat generated by braking buses and trucks, leading to wave-shaped hills or hummocks along the length of a bus stop. This issue is pronounced at high-volume stops where dwelling buses further heat the roadway surface, as well as near-side stops in mixed-traffic lanes where trucks may be adding to wear.

Benefits:

- Addresses the common issue of asphalt distortion at bus stops.

Considerations:

- Bus pads should be at least 12 feet wide to accommodate both wheels of a bus, but should be wider at locations without precision loading, to provide a consistent surface when the bus does not pull fully to the curb.
- The ideal length of a comparable pull-out stop can be used to determine the length of the bus pad.
- Coordinate with MTS on placement and determining the bus pad length. At in-lane stops, bus pad length should be determined based on the length of the full bus zone.

Standards and Guidelines:

- Pavement at bus stops must be kept smooth at crosswalks to maintain accessibility.
- Along bus stops with through bicycle traffic, such as in-lane stops, smooth pavement must be provided.
- At in-lane stops, the bus pad should extend across the full width of the lane, and end on the lane line.
- At pull-out stops where the bus crosses a bike lane, the concrete bus pad should end at either the right edge of the bike lane or the left edge of the bike lane (including its full width), to prevent the creation of a longitudinal seam within the bike lane.
- Where bicyclists pass stopped buses, as on shared bus-bike lanes, bus pads should be provided across the full width of the lane to provide a level surface to both buses and bikes.
- At curbside pull-out stops, bus pads should be provided for the full length of the clear curb zone, ending before reaching the crosswalk.
- Bus pads should end before the crosswalk to prevent lateral or longitudinal pavement seams in the crosswalk.
- If a bus pad has to extend into the crosswalk, it should extend across the full width of the crosswalk to prevent wheelchairs from encountering seams between concrete and asphalt.

- Concrete bus pads are required for all bus stops along transit corridors and shall consist of 9 inches of PCC pavement. Refer to the Metropolitan Transit Development Board "Designing for Transit" Guidelines and the City of San Diego Standard Drawing.

References:

- Designing for Transit, MTS, 2018
- Standard Drawings for Public Works Construction (SDG-102), City of San Diego Engineering and Capital Projects Dept, 2021
- Transit Street Design Guide, NACTO, 2016

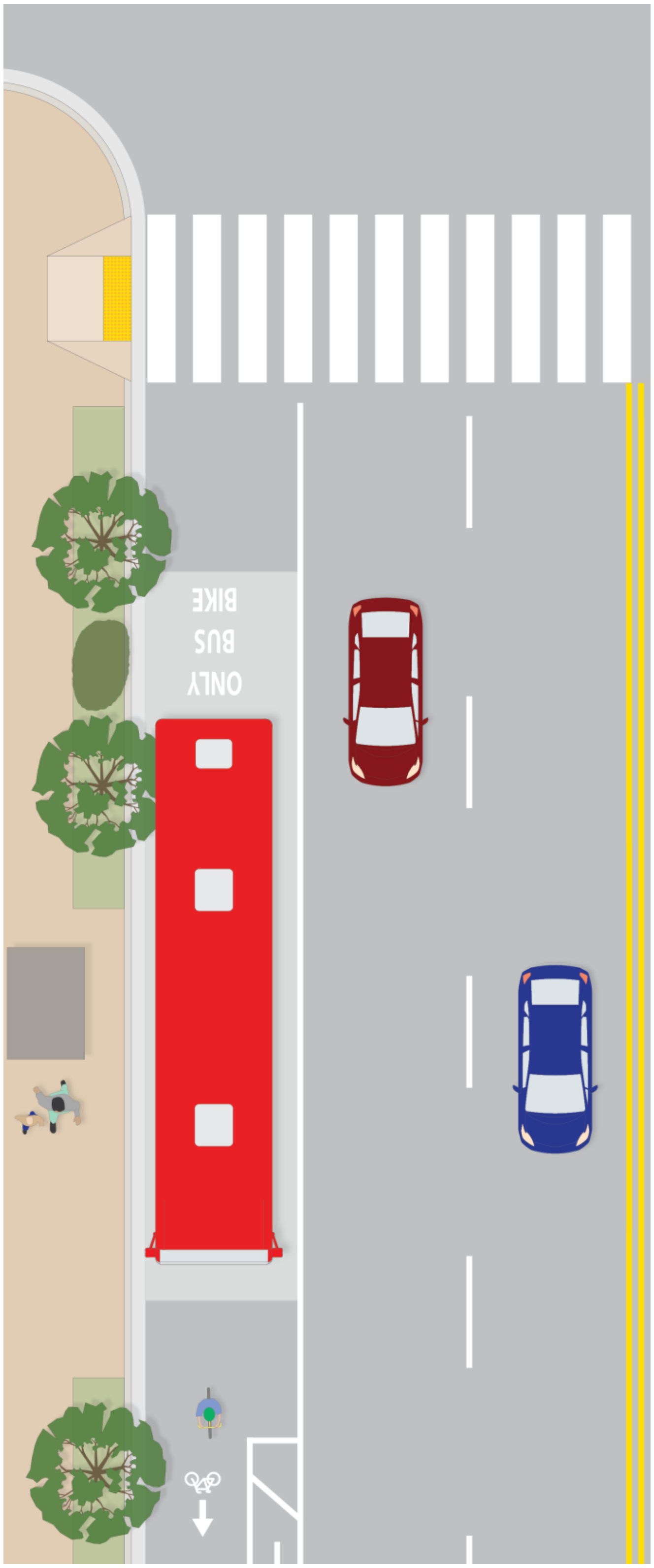

FIGURE 5-25 BUS PAD PLAN VIEW

Note: Sharrows can be used if the posted speed limit is 30 mph or less.

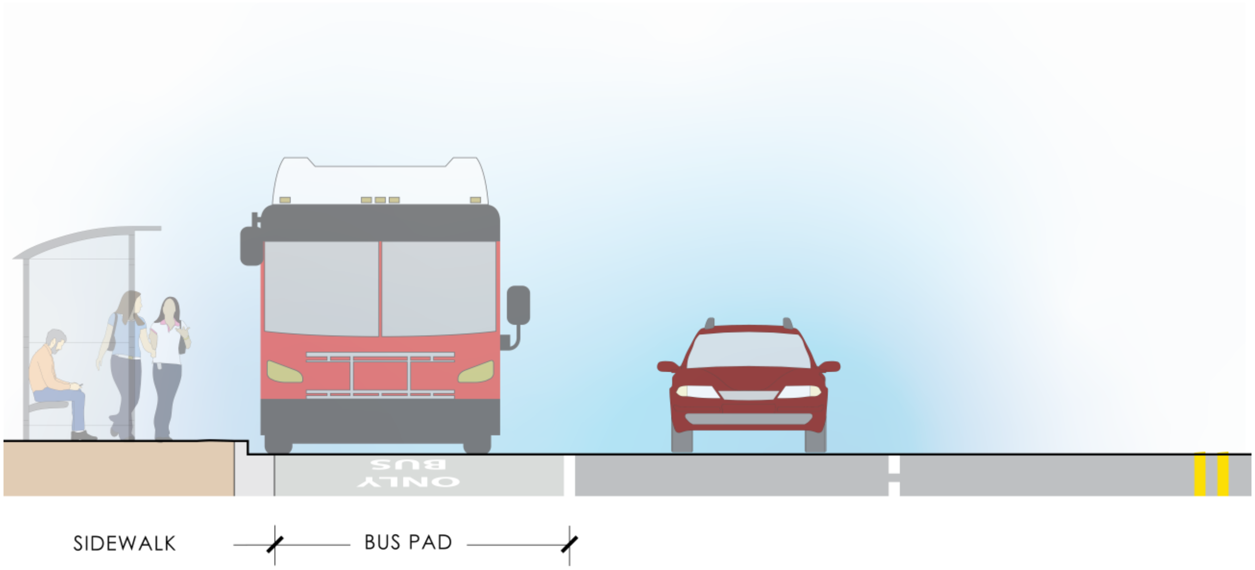

FIGURE 5-26 BUS PAD THROUGH THE LOCATION SECTION VIEW

Facility	Bus Pad Length (feet)	Bus Pad Width (feet)
Minimum	75′	12′
Maximum	100′	-

TABLE 5-8 BUS PAD DIMENSIONS

5.3.5 On-Street Vehicle Parking

On-street parking, typically located within the Flex Zone, provides motorists with parking at their homes or destinations. It can also help separate the parkway or even bicycle facilities from moving traffic.

5.3.5.1 General Guidance

Benefits:

- Parking serves as a barrier for pedestrians and adds a perception of safety while walking within the Parkway Zone between the travel lanes and the Parkway Zone and/or bicycle facilities.
- It can provide accessible parking near destinations.
- It can provide a place to park vehicle near destinations.
- It can provide a space to park vehicles and receive goods from businesses or get to their residence.

Considerations:

- Drivers opening their doors can impede the path of travel for cyclists, sometimes resulting in injury. Parking and bicycle facilities should be planned concurrently to minimize the risk of conflict.
- Parking takes up valuable space within the curb-to-curb width of the Roadway Zone that could be dedicated to users of other travel modes. Careful consideration should be given to nearby off-street parking options and land uses prior to including parking in a street section. Parking in-lieu fees paid by developers instead of providing parking spaces can help finance public or shared parking facilities.
- All taxpayers contribute to the maintenance of on-street parking spaces, regardless of use. Research done throughout the nation suggests that when the real costs of parking are passed on directly to drivers, the demand for parking typically drops, and alternative modes of transportation, where available (such as transit, carpooling, walking, and bicycling) become more attractive and viable for certain trips.
- Parking pricing, time limits, and enforcement may assist with parking management and using parking resources more efficiently. Enforcement of standards, such as using private garages for vehicles not personal storage, can contribute to increased usable supply of parking particularly in residential areas.
- The type of parking provided, outlined in Sections 5.3.5.2 through 5.3.5.5, affects the number of spaces that can fit within a road segment. Parallel parking takes up the least amount of width in the roadway section but provides fewer spaces when compared to angle parking.
- The location of planned driveways should be carefully considered in relation to the parking supply.
- Bicycle parking should be provided in high-use areas to reduce the demand for vehicle parking spaces. See Section 3.7.3.1, “Bike Parking and Corrals.”

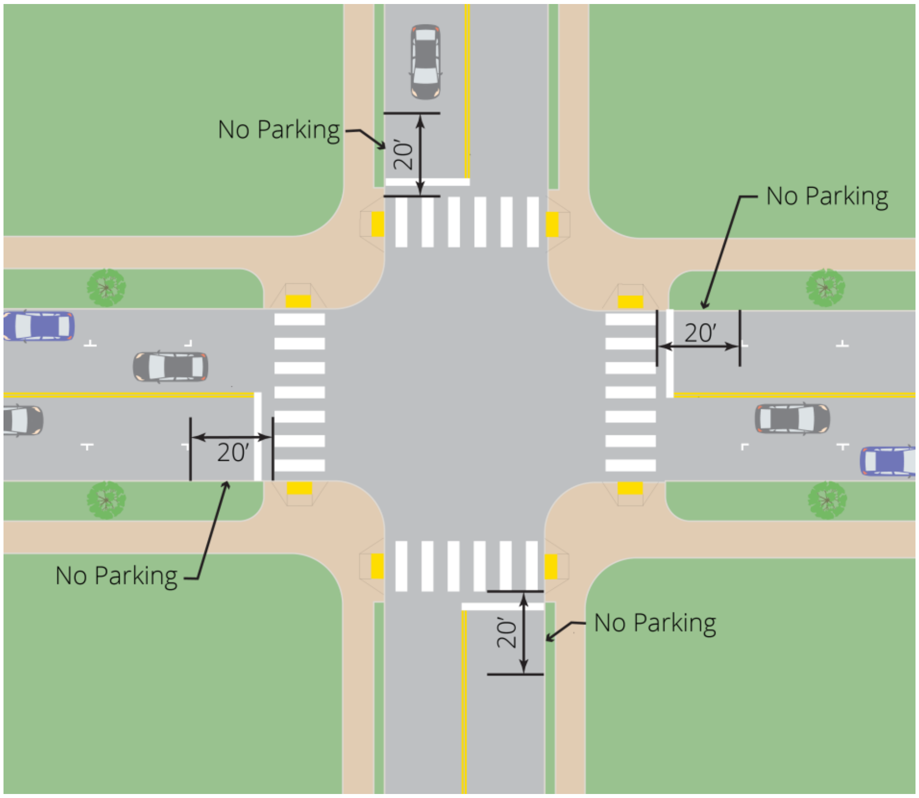

FIGURE 5-27 DAYLIGHTING AT A TYPICAL INTERSECTION

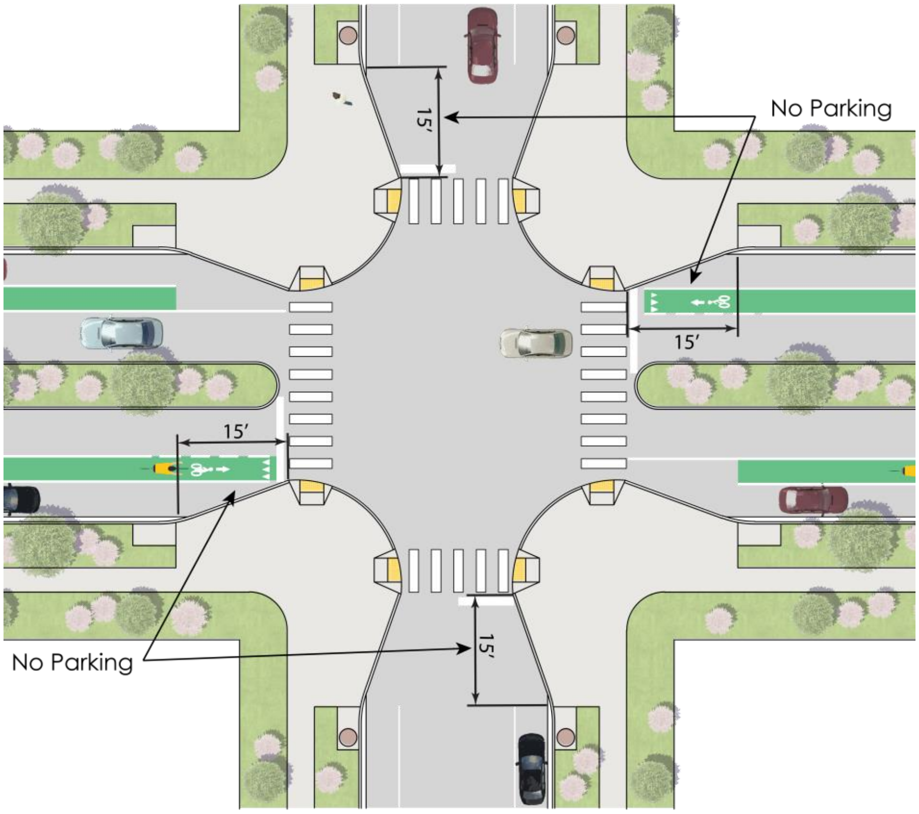

FIGURE 5-28 DAYLIGHTING AT A TYPICAL INTERSECTION WITH BULB-OUTS

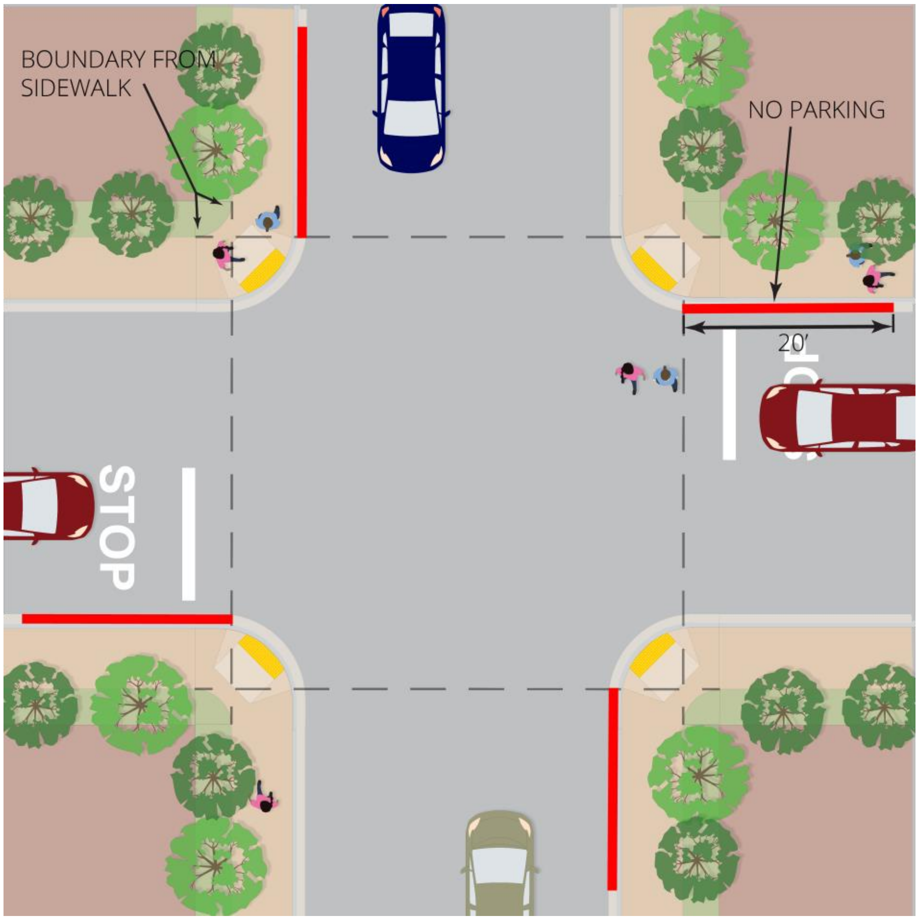

FIGURE 5-29 DAYLIGHTING AT A TYPICAL INTERSECTION WITH UNMARKED CROSSWALKS

Note: Red curbs may not start at the curb return.

Standards and Guidelines:

- Parking, standing, or stopping within 20 feet of the vehicle approach side of any marked or unmarked crosswalk or within 15 feet of any crosswalk where a curb extension is present is prohibited. Refer to Figures 5-27 and 5-28.
- Unmarked crosswalks shall be measured from the boundary line of where two sidewalks intersect at the curb ramp. Refer to Figure 5-29 and Section 105.6 “Pedestrian Crossings” of the HDM.
- Parking for bicycles or motorized scooters within 20 feet of a crosswalk may be permitted to the satisfaction of the City Engineer.
- Existing permitted blue curbs shall be maintained in the same location if streets are reconfigured. Coordinate with the Transportation Department, Community Parking District, or Access Compliance and Accessibility if a blue zone needs to be relocated, other than due to redevelopment of the adjacent property.
- On high-use commercial streets, the parking lane should be demarcated to indicate to drivers how close they are to parked cars. The ratio of accessible parking spaces is required per SDM-117 and Council Policy 500-08.

- In high-demand areas, parking management strategies should be adopted wherever possible. Strategies include parking pricing, time limits, valet parking, permit parking districts, community parking districts.
- The curb should be striped in locations where parking is restricted, as listed below and outlined in the San Diego Municipal Code.

    - Blue: Accessible parking zones
    - Green: Short term parking zones, typically 15 or 30 minutes
    - Red: No Parking zones
    - White: Passenger loading zones
    - Yellow: Commercial loading zones

- Parking information and wayfinding should be provided in high-demand areas.
- Accessible parking should be provided, per the City's Standard Drawings and Council Policy 500-08.

References:

- CA Vehicle Code (CVC 22500) (AB 413), Department of Motor Vehicles, n.d.
- Council Policy 500-08 "Disabled Persons Parking Zone on City Streets", City of San Diego, 1996
- Municipal Code Chapter 8, Article 6, Division 01, City of San Diego, n.d.
- The High Cost of Free Parking, Donald Shoup, 2011
- PROWAG, US Access Board, 2023

5.3.5.2 Parallel Parking

Parallel Parking is the most common and simplest form of parking within the public right-of-way that offers the minimum amount of parking spaces within an urban environment. Parallel parking has a traffic calming effect by narrowing the lane width.

Benefits:

- Less curb-to-curb width used when compared to angle or perpendicular parking.
- Easier to exit a parking space when compared to angle or perpendicular parking.

Considerations:

- Entry to parking spaces may impede traffic flow.
- In some instances, parallel parking can create a potential conflict between vehicles and cyclists.

Standards and Guidelines:

- The minimum width of parallel parking spaces is 7'. In high-speed or high-ADT areas, the minimum width should be 8'.

- In high use areas, parallel parking spaces should be striped to indicate where drivers should park and maintain efficient parking patterns.
- Especially in high use areas, parking should be metered with traditional fixed parking fees or variable parking fees.
- Striped buffers (2'-wide) should be provided between parking spaces and Class II bike lanes where space permits.
- See section 5.3.5.5 for standards related to floating parking.

5.3.5.3 Angle Parking

Angle parking is generally used to increase the number of available parking spaces. However, a positive by-product can be a reduction in vehicle speed. Angle Parking also enhances the maneuverability of for both entering and exiting vehicles. Angle parking includes reverse angle parking and perpendicular parking. Additional discussion for perpendicular parking is included in Section 5.3.5.4.

Benefits:

- Speed reduction: Drivers may slow down in anticipation of vehicles leaving parking spaces.
- Maintains emergency response access.
- Can increase parking supply over parallel parking.

Considerations:

- Angle parking creates a potential conflict between vehicles and cyclists. Striped buffers (2'-wide) should be provided between parking spaces and bike lanes where space permits. 6 ft buffer between the parking spaces and bike lanes is preferred.
- Another option for angled parking is to provide back-in parking, also known as Reverse Angle Parking (RAP), which may decrease the accident potential associated with traditional back-out parking.
- Reverse angle parking is a preferred treatment when on-street bike lanes are present.

Standards and Guidelines:

- Refer to Table 5-10 and 5-11 for Standard Angle Parking angles and dimensions.
- Refer to Table 5-12 for Reverse Angle Parking angle and dimensions.
- Back-in Angle Parking sign shall accompany the installation of reverse angle parking stalls.
- Angle parking spaces should be striped to indicate where drivers should park.
- Angle parking is only permitted on streets with existing or planned ADT at or below 10,000 vehicles.
- Angle parking can create potential conflict with existing street trees, as cars may hit the tree backing in or pulling forward. Increased drivers may increase soil compaction on planting strip or tree well.
- Refer to SDM-117 and PROWAG for additional accessible angle parking requirements.

References:

- Angle Parking Standards, City of San Diego, n.d.
- Municipal Code §86.0104, City of San Diego, n.d.
- On-street Motor Vehicle Parking and the Bikeway Selection Process, FHWA, 2021
- PROWAG, US Access Board, 2023
- Standard Drawings for Public Works Construction (SDM-117), City of San Diego Engineering and Capital Projects Dept, 2021

5.3.5.4 Perpendicular Parking

Perpendicular parking is a type of angle parking. It is generally used to increase the number of available parking spaces over other angle parking alternative. However, a positive by-product can be a reduction in vehicle speed.

Benefits:

- Speed reduction: Drivers may slow down in anticipation of vehicles backing out of parking spaces.
- Increase parking supply over parallel or angle parking.

Considerations:

- Perpendicular parking creates a potential conflict between vehicles and cyclists. Striped buffers (2'-wide) should be provided between parking spaces and bike lanes where space permits. 6 ft buffer between the parking spaces and bike lanes is preferred.
- Another option for perpendicular parking is to provide back-in parking which may decrease the accident potential associated with traditional back-out parking.
- Perpendicular parking can create potential conflict with existing street trees, as cars may hit the tree backing in or pulling forward. Increased drivers may increase soil compaction on planting strip or tree well.

Standards and Guidelines:

- Refer to Table 6-11 for 90º dimensions.
- On-street perpendicular parking is only permitted on local streets and streets where existing or planned ADT is at or below 3,000 vehicles.
- Perpendicular parking spaces should be striped to indicate where drivers should park.
- Refer to SDM-117 and PROWAG for additional accessible angle parking requirements.

The following tables apply to angle parking and perpendicular parking:

Angle	Traffic Flow Configuration (one lane per direction)	Minimum Width of Street Based on Frontage Parking Layout			Lineal Curb Length per Parking Space	Minimum Red Curb/ Clearance from Intersection/ Driveway
		Angle on Both Sides of Street	Angle/ Parallel	Angle/ Parking Prohibited One Side		
39º50'	Two-way	56 feet	48 feet	42 feet	12.5 feet	20 feet
	One-way	52 feet	44 feet	36 feet	12.5 feet	20 feet
45º	Two-way	58 feet	50 feet	43 feet	11.5 feet	18 feet
	One-way	54 feet	46 feet	38 feet	11.5 feet	18 feet
50º	Two-way	60 feet	50 feet	44 feet	10.5 feet	15 feet
	One-way	56 feet	48 feet	40 feet	10.5 feet	15 feet
55º	Two-way	64 feet	52 feet	46 feet	10 feet	13 feet
	One-way	60 feet	50 feet	42 feet	10 feet	13 feet
60º	Two-way	68 feet	54 feet	48 feet	9.5 feet	11 feet
	One-way	62 feet	52 feet	44 feet	9.5 feet	11 feet

TABLE 5-9 ANGLE PARKING GUIDELINES (COLLECTOR STREET, ADT BETWEEN 3,000 AND 10,000)

Angle	Traffic Flow Configuration (one lane per direction)	Minimum Width of Street Based on Frontage Parking Layout			Lineal Curb Length per Parking Space	Minimum Red Curb/ Clearance from Intersection/ Driveway
		Angle on Both Sides of Street	Angle/ Parallel	Angle/ Parking Prohibited One Side		
39º50'	Two-way	52 feet	44 feet	40 feet	12.5 feet	20 feet
	One-way	48 feet	40 feet	32 feet	12.5 feet	20 feet
45º	Two-way	54 feet	46 feet	42 feet	11.5 feet	18 feet
	One-way	50 feet	42 feet	34 feet	11.5 feet	18 feet
50º	Two-way	56 feet	46 feet	44 feet	10.5 feet	15 feet
	One-way	52 feet	44 feet	36 feet	10.5 feet	15 feet
55º	Two-way	58 feet	48 feet	46 feet	10 feet	13 feet
	One-way	56 feet	46 feet	38 feet	10 feet	13 feet
60º	Two-way	62 feet	48 feet	46 feet	9.5 feet	11 feet
	One-way	58 feet	48 feet	40 feet	9.5 feet	11 feet
90º	Two-way	64 feet	52 feet	47 feet	9.5 feet	6-10 feet
	One-way	60 feet	48 feet	40 feet	9.5 feet	6-10 feet

TABLE 5-10 ANGLE PARKING GUIDELINES (LOCAL STREET, ADT BELOW 3,000)

Note:

1. *There is no parking or standing on vehicle approach side within 20 ft in advance of any crosswalk, or within 15 ft in advance of any crosswalk with a curb extension present per CVC 22500 (Assembly Bill 413, 2023).*
2. *Additional accessible requirements for angle parking are listed in SDM-117.*

The following tables apply to reverse angle parking:

Angle	Traffic Flow Configuration (one lane per direction)	Minimum Width of Street Based on Frontage Parking Layout			Lineal Curb Length per Parking Space	Minimum Red Curb/ Clearance from Intersection/ Driveway
		Angle on Both Sides of Street	Angle/ Parallel	Angle/ Parking Prohibited One Side		
40º	Two-way	52 feet	44 feet	40 feet	14.8 feet	20 feet
	One-way	48 feet	40 feet	32 feet	14.8 feet	20 feet

TABLE 5-11 REVERSE ANGLE PARKING GUIDELINES

Note:

1. *There is no parking or standing on vehicle approach side within 20 ft in advance of any crosswalk, or within 15 ft in advance of any crosswalk with a curb extension present per CVC 22500 (Assembly Bill 413, 2023).*
2. *Additional accessible requirements for angle parking are listed in SDM-117.*

References:

- Angle Parking Standards, City of San Diego
- Municipal Code §86.0104, City of San Diego, n.d.
- PROWAG, US Access Board, 2023
- Standard Drawings for Public Works Construction (SDM-117), City of San Diego Engineering and Capital Projects Dept, 2021

5.3.5.5 Floating Parking

Floating parking is located between vehicular travel lanes and a protected bicycle facility.

Benefits:

- Parking provides a buffer for bicycle facilities.
- While not a barrier type on its own, parked cars can provide an additional level of protection and comfort for bicyclists.

Considerations:

- Floating parking, and the associated bicycle facilities, function best when there are few or no driveways, intersections, or other conflicts along the street.
- Refer to Section 5.2.2 “Emergency Vehicles and Access” for minimum clear widths for emergency vehicle access and fire access setback distances.

Standards and Guidelines:

- Floating parking shall be installed in accordance with accessibility parking requirements. Refer to Section 5.3.5.6.
- “No Parking” pavement marking in the access aisle shall be installed per SDM-117.

- The minimum no parking distances from the curb return are 20' on the far side of an intersection and 30' at the near side of an intersection.
- Floating parking is still subject to wheel cramping parking requirement on all grades over 3% (hills) with or without the presence of signs per CA Vehicle Code. A "Type A" AC dike (Caltrans Standard Plans A87B) shall be installed along the entire length of the parking stall for wheel curbing.
- If Class IV cycle tracks (either one-way or two-way) are located between the curb and parking, a minimum 3'-wide buffer must be provided to reduce conflicts between cyclists and car doors and to provide people with a place to disembark from vehicles.
- Sight distance clearance for two-way cycle tracks shall be 30' in either direction.
- Additional vertical elements such as periodic delineator posts should be paired with this design. Barrier types that obstruct the opening of car doors or create tripping hazards should be avoided.
- In addition, parking shall comply with Figure 5-31 "On-Street Accessible Parking Stall Floating Placement Layout."

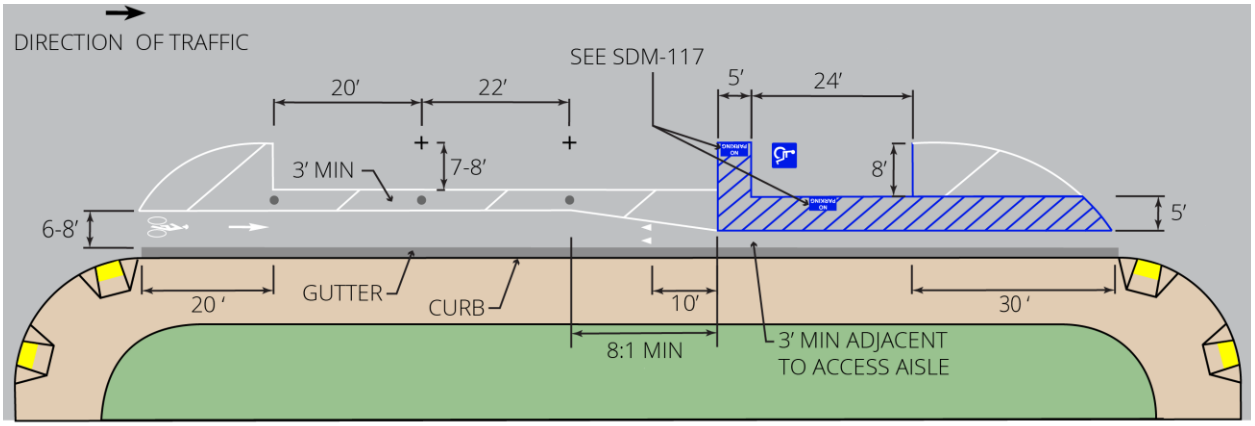

FIGURE 5-30 ON-STREET ACCESSIBLE PARKING STALL FLOATING PLACEMENT LAYOUT

Note: Bicycle facility dimensions exclude the gutter pan width

5.3.5.6 Accessible On-Street Parking

Accessible on-street parking spaces are provided so that those with limited mobility or other accessibility demands with disabilities who have a distinguishing license plate or placard on their vehicles can park near destinations and be connected by an accessible route and curb ramp.

Citizen requested blue curbs as described in Council Policy 500-08 are typically fronting residential properties with limited accessible access to the property, are in a unique circumstance where it is not fully accessible, and do not comply with the following regulations.

Benefits:

- Increased accessibility for persons with disabilities.

Considerations:

- Accessible paths of travel from the accessible on-street parking space to adjacent land uses must be considered and designed.
- Loading and unloading spaces for accessible vehicles must be considered and designed.

Standards and Guidelines:

- Refer to the requirements in PROWAG, City of San Diego Standard Drawings SDM-117, and CA MUTCD.
- Accessible on-street parking spaces shall be designed in accordance with the City's Standard Drawings, SDM-117 and any other applicable City standards.
- Accessible on-street parking spaces must be identified by signs displaying the International Symbol of Accessibility (ISA).
- Where on-street parking is provided on the block perimeter and the parking is marked or metered, accessible parking spaces shall be provided in accordance with the table below. Where parking pay stations are provided and the parking is not marked, each 20.0 ft of block perimeter where parking is permitted shall be counted as one parking space.
- On-street accessible van parking spaces are not required; however, accessible spaces require access aisles.
- In general, locate the accessible on-street parking spaces closest to the corners with curb ramps.
- If the block does not have priority facilities, then locate the parking close to the most public facilities. Priority facilities include:
    - Government services, parks, libraries, community center
    - Senior facilities
    - Medical services
- Disperse the accessible spaces, when possible, to avoid clusters of accessible on-street parking spaces on the same intersection.
- For perpendicular spaces the first option is preferably on the near side of the block face, so the access aisle of the parking space is closer to the corner. If located on the far side of the block the access aisle shall be installed on the drivers' side.

References:

- DIB 82-06 "Pedestrian Accessibility Guidelines for Highway Projects", Caltrans, 2017
- PROWAG, US Access Board, 2023
- Standard Drawings for Public Works Construction (SDM-117), City of San Diego, 2021

5.3.5.7 Metered Parking

Metered parking is a useful solution to parking congestion, particularly along heavily trafficked and dense areas. This intervention plays an important role in the City's parking management strategy, while producing revenue and incentivizing active transportation and transit use.

Benefits:

- Metered parking can help manage on-street parking congestion.
- It facilitates parking turnover, to ensure that more people can access a high-demand area like business land uses than if parking were unconstrained.
- Metered parking fees can help recover some of the estimated reasonable costs associated with parking infrastructure, enforcement, and maintenance.
- Metered parking can incentivize the use of alternative modes of travel, such as transit, walking or biking.

Considerations:

- Metered Parking should be considered in parking impacted areas.
- A community planning group, City-owned nonprofit, or a nonprofit managing a City-assessment district may submit to the Mayor or City Manager a request to form a Community Parking District when existing City mechanisms for implementing parking management solutions have been insufficient or such mechanisms do not exist within the community. See Council Policy 100-18 for more details.

Standards and Guidelines:

- All metered parking spaces must be delineated with lines or marking (parking T's) to designate the parking space for which a meter applies to.
- Refer to SDMC 86.0125 for the establishment regulations of parking meter zones.
- Signs should clearly indicate time limit for metered parking. Metered parking can be paid via an app or a kiosk where a ticket is provided to the person parking in metered area.
- See the City of San Diego Municipal Code Sections §86.0123 to §86.0130 for additional guidance on parking meters, including time of operation, rates, target utilization, and other regulations.
- The City does not install metered parking at accessible parking spaces.

References:

- Council Policy 100-18 "Community Parking Districts", City of San Diego, 2015
- Municipal Code §86.0123, City of San Diego, n.d.

5.3.5.8 Motorcycle Parking

Motorcycle Parking means a parking space designed for any motor vehicle designed to travel on not more than three wheels in contact with the ground. This includes mopeds and motor scooters. Daylighting does not apply to motorcycle parking.

Benefits:

- Provides closer and convenient parking for motorcycle users closer to their destination.

- Providing dedicated motorcycle parking spaces can minimize the risk of larger vehicles accidently hitting the motorcycle.
- Makes efficient use of limited available curb space for parking.
- Motorcycles are generally more fuel-efficient and less polluting than their motor vehicle counterpart, which can reduce traffic congestion.

Considerations:

- Consider the location of motorcycle parking spots in convenient, visible, and accessible areas near popular destinations.

Standards and Guidelines:

- Motorcycle spaces shall be at least 3 ft wide and 8 ft long for motorcycle parking.
- Preferred motorcycle spaces should be at least 4 ft wide at a 45-degree angle. Parking depth to face of curb shall be 8 ft. Minimum red curb distance shall be 8 ft.

References:

- Municipal Code §142.0560, City of San Diego, n.d.
- Motorcycle Stall Dimensions, City of San Diego Transportation Dept, n.d.

5.4. Vehicle Zone

The Vehicle Zone is the portion of the ROW between the Flex Zone and the Median Zone. Its primary function is to define the intended path of travel for vehicles, transit, and other road users along a corridor.

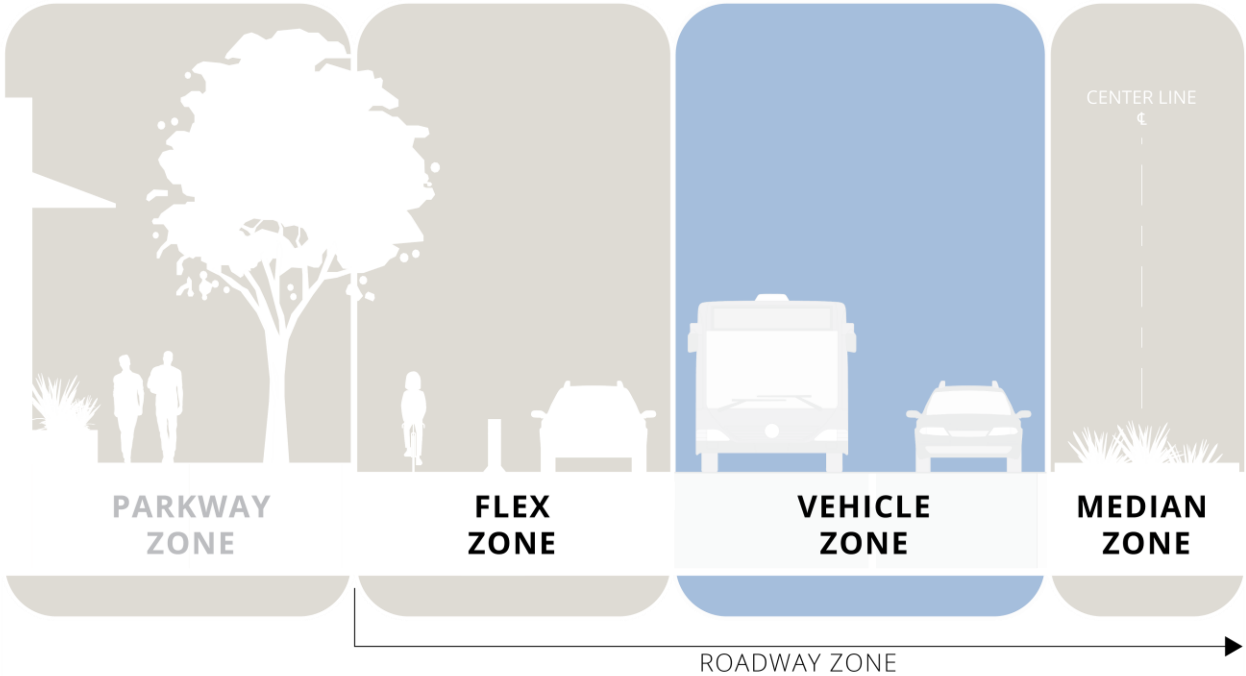

FIGURE 5-31 VEHICLE ZONE

5.4.1 Travel Lanes

Travel lanes are the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking areas.

5.4.1.1 Travel Lane Widths

Lane widths should be considered within the assemblage of a given street delineating space to serve all needs, including travel lanes, safety islands, bike lanes, and sidewalks. Each lane width discussion should be informed by an understanding of the goals for traffic calming as well as making adequate space for larger vehicles, such as trucks and buses. Additional information on travel lane narrowing or reduction can be found in Section 5.8.7.

Benefits:

- Narrower streets help promote slower driving speeds.
- Narrower streets create reduced crossing distances, shorter signal cycles, less stormwater, and less construction material to build.

Considerations:

- For multi-lane roadways where transit or freight vehicles are present and require a wider travel lane, the wider lane should be the outside lane (curbside or next to parking), except where center running transit lanes are present. Major truck or transit routes through urban areas may require the use of wider lane widths.
- Wide lanes encourage higher speeds on streets that can then divide a community.

Guidelines:

- Lane widths of 10 feet are appropriate in urban areas and have a positive impact on a street's safety without impacting traffic operations. Travel lane widths of 10 feet generally provide adequate safety in urban settings while discouraging speeding. In select cases, narrower travel lanes (9–9.5 feet) can be effective as through lanes in conjunction with a turn lane.
- 11-foot lanes should be used for designated truck and bus routes (one 11-foot lane per direction) or adjacent to lanes in the opposing direction.
- Lanes greater than 11 feet should not be used on streets with collector street classifications or lower, as they may cause unintended speeding and assume valuable right of way at the expense of other modes.

5.4.1.2 Transitions

Where the number of travel lanes in a roadway increase or decrease, transitions are incorporated to indicate this change and to facilitate proper road user actions at these points.

The following design standards should be used for transitions:

- No pavement widening transition is required to increase the number of travel lanes beyond that needed for drainage flow.
- When reducing the number of through travel lanes, the paved section shall undergo a transition as follows:
  - For $V \geq 45$ mph, $L = W \times V$
  - For $V \leq 40$ mph, $L = (W \times V^2)/60$
    (where V = design speed, in miles per hour; W = width of roadway transition, in feet; L = transition length, in feet)

5.4.1.3 Design Speeds

On city streets, designers should select a design speed to use in geometric decisions based on safe operating speeds in a complex environment. Speed plays a critical role in the cause and severity of crashes. There is a direct correlation between higher speeds, crash risk, and the severity of injuries.

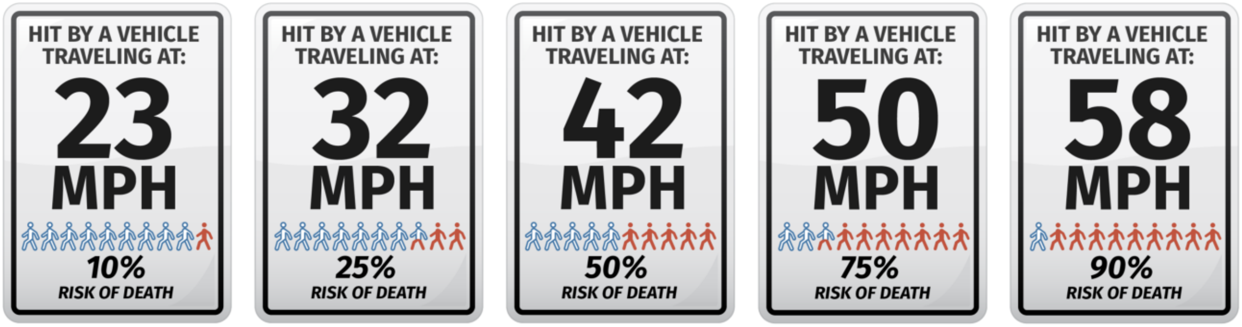

FIGURE 5-32 DESIGN SPEEDS PEDESTRIAN FATALITY RISK

Source: FHWA (2022)

Benefits:

- Embracing a proactive design approach on new and existing streets with the goal of reducing speeds is one of the most consequential interventions in reducing pedestrian injuries and fatalities.

Considerations:

- Higher design speeds often include larger curb radii, wider travel lane widths, on-street parking restrictions, guardrails, and clear zones.
- Lower design speeds may reduce observed speeding behavior and provide a safer place for people to walk, park, and drive.
- In collisions between two street users of different masses, the lighter street user typically experiences more severe injuries compared to those of the heavier street user.

Guidelines:

- Streets should be designed for retrofit using target speed, the speed intended for drivers, rather than operating speed.
- Use design criteria that are at or below the target speed of a given street. The use of higher speeds should be reserved for limited access freeways and highways and is inappropriate on urban streets, including urban arterials.
- Bring the design speed in line with the target speed on roadway retrofits by implementing measures to reduce and stabilize operating speeds as appropriate. Narrower lane widths, roadside landscaping, speed humps, and curb extensions reduce traffic speeds and improve the quality of the bicycle and pedestrian realm.
- Use short signal cycle lengths in downtown areas and networks with closely spaced signals.
- In neighborhoods, designers should consider 20 mph zones to reduce speeds for interaction with children at play and other unpredictable behavior.

- On local roads or in areas with above average pedestrian volumes, retrofit designers may choose to select a design speed below the posted speed limit.
- Alleys may be assigned target speeds as low as 5–10 mph.

References:

- A Policy on Geometric Design of Highway and Streets (Greenbook, 7th ed.), AASHTO, 2018
- Urban Street Design Guide, NACTO, 2013

5.4.1.4 Horizontal Curves

Standards and Guidelines:

- Minimum curve radii with and without superelevation are shown in Chapter 2, "Street Types," for the various classifications of streets. These radii are derived from the Caltrans Highway Design Manual's Maximum Comfortable Speed on Horizontal Curves chart.
- Superelevation:
    - Local streets and two-lane residential collectors generally should not be superelevated at curves.
    - Superelevation is allowed on other street classifications as required to maintain the design speed along curves and adhere to maximum comfortable speed criteria.
    - When superelevation is required, the minimum amount permitted is plus 2 percent. The maximum superelevation permitted, regardless of circumstances, is 4 percent for design speeds of 30 mph and lower, 6 percent for urban classifications with design speeds between 35 mph and 45 mph, and 10 percent for rural classifications and for design speeds of 50 mph and higher.
    - Superelevation must be designed to show length, transition, and crown runoff. Design must follow Caltrans standards as provided in its Highway Design Manual, Chapter 200.
    - Superelevation shall extend uniformly from the flow line of the gutter on the high side of the street to the lip of the gutter on the low side of the street, keeping the standard slope of the gutter on the low side unchanged. This shall also include the slope of median gutters, if any, as shown in City of San Diego Standard Drawing SDG-154.
    - All streets not superelevated shall be crowned at 2 percent.
- Sight distance on horizontal curves shall be determined from Caltrans Highway Design Manual Figure 201.6, "Stopping Sight Distance on Horizontal Curves."
- Compound curves are prohibited.
- Reversing Curves:
    - Reversing curves are permitted; however, for all streets other than local streets, they must be separated by a tangent length adequate to provide safety of travel.

- For non-superelevated reversing curves, the tangent length provided shall be compatible with probable driving speed, type of vehicle use, and individual curve radius and length.
- Superelevated reversing curves shall be separated by tangents sufficient to contain all of the superelevation runoff required.

- Knuckles may be approved on a deviation basis for residential cul-de-sacs with 200 ADT or under, intersecting at right angles plus or minus 5 degrees. Knuckles should not be used in lieu of providing a 100-foot minimum curve radius required on residential streets.
- Sharp horizontal curves must not begin near the top of pronounced crest vertical curves or near the low point of pronounced sag vertical curves.

5.4.1.5 Vertical Curves

<u>Standards and Guidelines:</u>

- Vertical curves shall be designed to the current Caltrans Highway Design Manual Stopping Sight Distance based on design speed.
- For local streets, the minimum acceptable vertical curve is 10 feet of curve for each 1 percent difference in grade.
- Vertical curves leading into intersections shall be designed such that the grade immediately approaching a cross gutter is no greater than 4 percent.
- Sight distance on vertical curves shall be determined from Caltrans Highway Design Manual 201.4, “Stopping Sight Distance on Crest Vertical Curves” and Figure 201.5, “Stopping Sight Distance on Sag Vertical Curves.”

5.4.1.6 Guardrails and other Safety Devices

<u>Standards and Guidelines:</u>

- All guardrail installations must be done in conformance with the latest edition of Caltrans Standard Plans, the AASHTO Roadside Design Guide, the City’s Standard Drawings.
- Guardrails may be required at certain locations for safety purposes in accordance with guidelines in the Caltrans Traffic Safety Systems Guidance (2019).
- Reflectors and other safety structures may be required when necessary for public safety.
- When guardrails are warranted at fire hydrant locations, guardrails shall be installed in a manner not to interfere with the operation of the fire hydrant.

5.4.1.7 Roadway Striping

Roadway striping can change the appearance of the roadway, encouraging drivers to remain in designated lanes or drawing their attention to bike lanes. Adding lane striping to a residential road without lane markings or a bike lane may change the behavior of some drivers. By adding striping, the vehicle travel lanes are visually narrowed which will encourage slower speeds. In general, vehicles will not travel in a designated bike lane. This can have a positive impact on both driver and bicycle safety.

Benefits:

- Speed reduction
- Increase the visibility of bicyclists to drivers.

Considerations:

- Possible loss of on-street parking.

Guidelines:

- Two-way streets with low or medium volumes of traffic may benefit from the use of a dashed center line with narrow lane widths or no center line at all. In such instances, it may be possible to allocate additional right-of-way to bicyclists or pedestrians, while permitting motorists to cross the center of the roadway when passing.
- Raised pavement markers are required for all streets of collector or greater classification. Installation and criteria must be according to the latest edition of the California Manual on Uniform Traffic Control Devices (CA MUTCD).
- See Part 5 "Traffic Control Device Considerations for Automated Vehicles" of FHWA's MUTCD for autonomous vehicle striping guidance.
- Stamped concrete or other types of decorative paving will be permitted in the traveled roadway of a public and/or private street, provided all of the following conditions are met:
    - At signalized intersections to designate pedestrian crosswalks (brick pavers, but not stamped concrete, may be used);
    - The street grade is 8 percent or less; and
    - Maintenance is assured by either an encroachment maintenance removal agreement or by inclusion in an assessment district.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Roadside Design Guide, AASHTO, 2011
- Standard Plans, 7th Ed., Caltrans, 2024
- Traffic Calming Guidelines, City of San Diego, 2010
- Traffic Safety Systems Guidance, Caltrans, 2019

5.4.2 Transitways

A transitway is a dedicated route or corridor designed exclusively for public transportation vehicles. It aims to provide a more efficient and reliable transit experience. Transitways can include features like exclusive lanes, priority signals, and enhanced passenger facilities.

Table 5–14, 5-15 and Figure 5-34 illustrate the design specifications for transitways.

Description	Specifications	Units
Width, Right-of-Way	56 – 68	ft
Design Speed	20	mph
Width, Curb to Curb	28	ft
Maximum Grade	8	%
Minimum Curve Radius	65	ft
Street Lights	Pedestrian scale, both sides	-

TABLE 5-12 SHARED TRANSITWAY SPECIFICATIONS

Land Use	Parkway Configurations
Residential: *Medium-to-Very High Density Multiple Dwelling Residential – no front yards, Commercial Office – no front yards*	UP-6T
Non-residential: Pedestrian-Oriented Commercial Retail, Urban Village Commercial Retail	UP-7T

TABLE 5-13 PARKWAYS FOR SHARED TRANSITWAY

Note: Refer to the MTS publication, Designing for Transit, for more information.

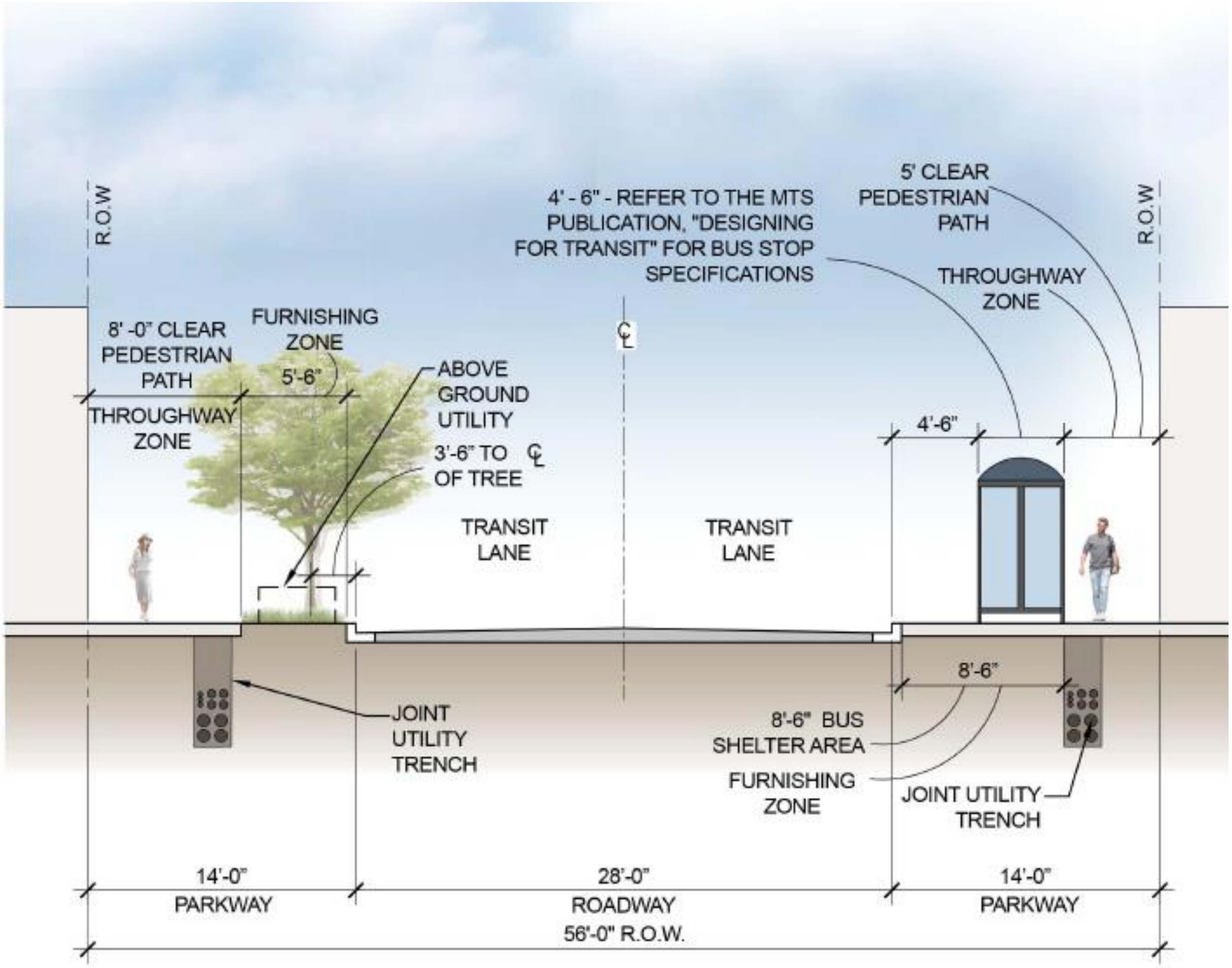

FIGURE 5-33 TRANSITWAY SECTION A-A

5.4.3 Transit Lanes

Transit lanes are dedicated space within the roadway reserved exclusively for public transportation vehicles. By prioritizing transit vehicles, transit lanes can help alleviate traffic congestion, provide traffic calming benefits, enhance transit reliability, and support broader climate action goals.

5.4.3.1 Shared Bus/Bike Lane

Shared bus-bike lanes are not high-comfort bike facilities. However, buses and bicyclists often compete for the same space near the curb. On streets without dedicated bicycle facilities, curbside bus lanes attract bicycle traffic, which in turn leads to permitting bicycles in bus lanes.

Shared bus-bike lanes are most commonly applied on two-way streets with curbside or offset bus lanes, and no existing or planned bicycle facilities.

Benefits:

- Provides bicycle access on transit streets where no space is available for dedicated bike facilities.
- Provides increased space and visibility for active street users while improving transit service reliability.

Considerations:

- Dedicated bus and bicycle facilities are preferred over shared bus-bike lanes.
- Bus-bike lanes are not high-comfort bicycle facilities.
- At peak periods and high-volume bus routes, in particular, bus-bike lanes are not intended to substitute for dedicated bike facilities.
- At high speeds, special care must be taken not to require bicycle and bus traffic mixing.

Standards and Guidelines:

- Senate Bill 1216 (2024) prohibits the use of new sharrows on a roadway that has a posted speed limit greater than 30 mph where bicycle travel is permitted.
- Pavement markings must indicate that the lane is dedicated to transit, including a solid white line and BUS BIKE ONLY or similar marking.
- Install signs permitting buses and bicycles and excluding other traffic. BUS-BIKE ONLY signs may be used.
- If permitted, sharrows should be placed in the center or left side of the lane. At bus stops, place sharrow markings at the left side of the lane.
- The width of bus-bike lane is 11 feet for offset lanes, and up to 12 feet for curbside lanes.
- Lanes that are 13-15 feet wide should be avoided to limit unsafe passing movements.
- If 13-14 feet of width is available, a marked buffer can be added on the left side of the bus-bike lane so that buses are guided to the right, allowing any passing bicycle traffic to use the buffer area at bus stops.
- Additional considerations should be made at bus stops: a bus-bike lane may be wider to allow bikes to pass stopped buses on the left. In these cases, a dashed line should be marked 9 feet from the curb to indicate to bicyclists where to pass. It may appropriate to narrow adjacent general traffic lanes at bus stops to accommodate a bike passing zone.
- No vertical separation should be installed between bus-bike lanes and mixed-traffic lanes.
- See Section 3H.07 of the FHWA MUTCD for standards and guidelines for the optional use of red colored pavement for transit lanes.

References:

- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Transit Street Design Guide, NACTO, 2016

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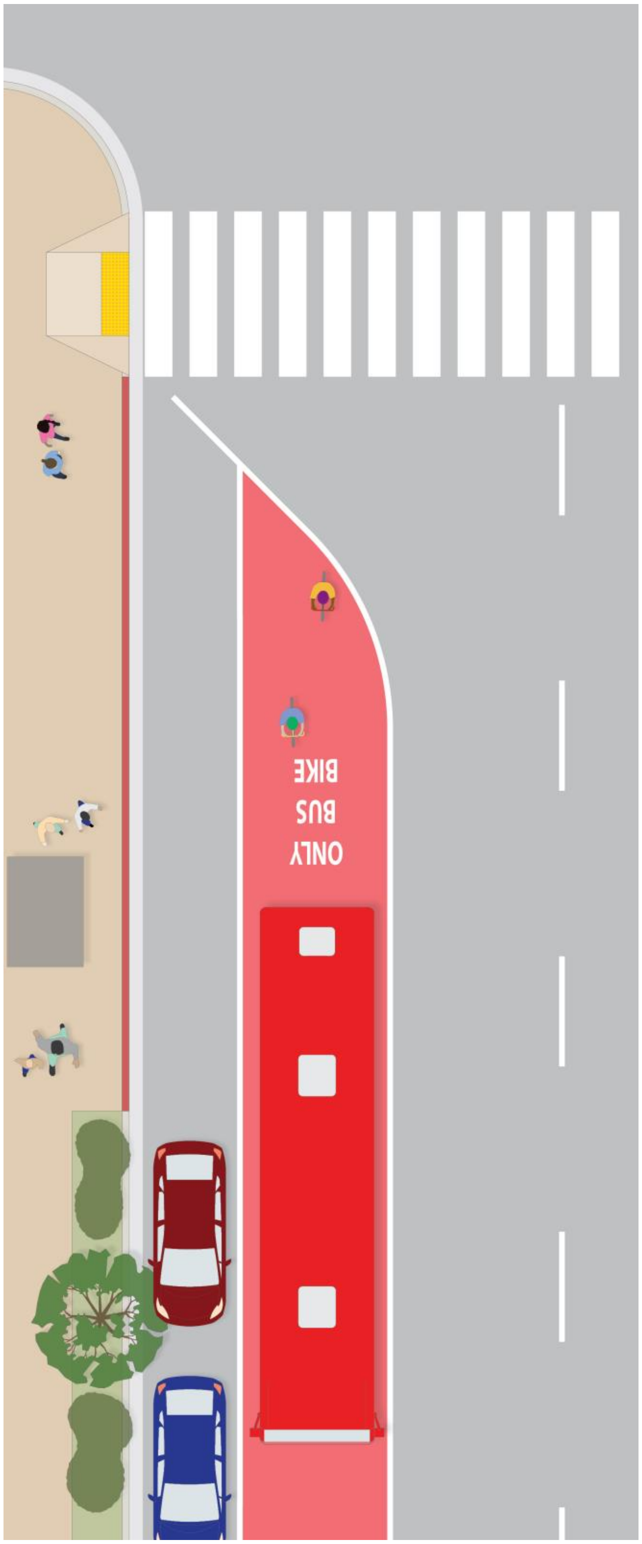

FIGURE 5-34 SHARED BUS/BIKE LANES PLAN VIEW

Note:

1. *Red transit lane paint is optional*
2. *Sharrows can be used if the posted speed limit is 30 mph or less.*

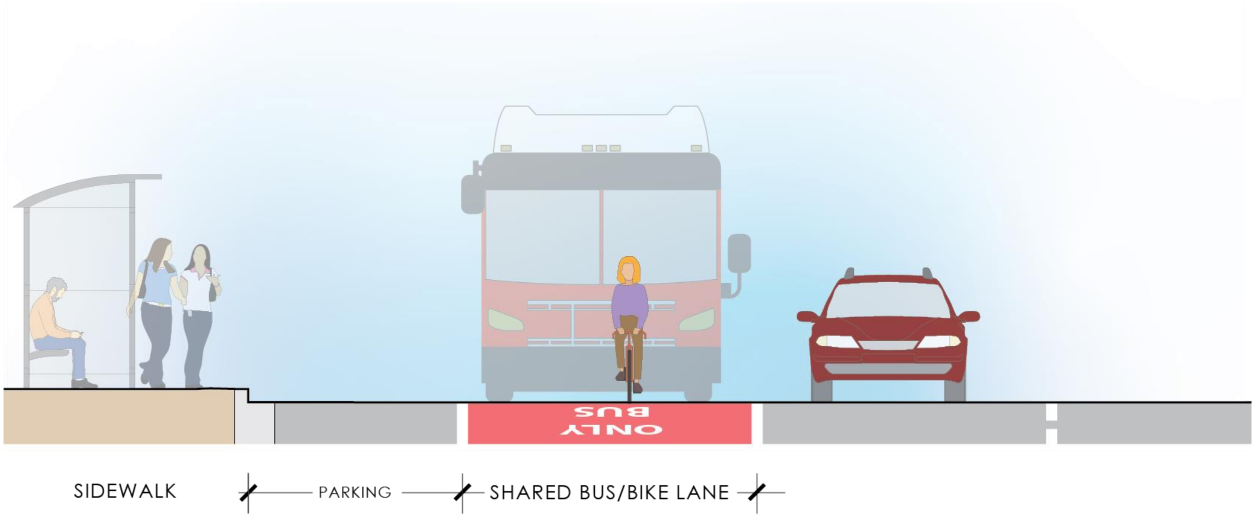

FIGURE 5-35 SHARED BUS/BIKE LANE THROUGH THE LOCATION SECTION VIEW

Facility	Shared Bus/Bike Lane[1]	Buffer
Preferred	11′	n/a
Minimum	11′	n/a
Maximum	12′	3-4′

TABLE 5-14 SHARED BUS/BIKE LANE DIMENSIONS

Notes:

1. *Lane width should exclude the width of the gutter pan.*

5.4.3.2 Peak-Hour Bus Lane

Peak-hour bus lanes allow transit to take precedence over parking and curbside access at peak hours when it most benefits bus operations. Peak-hour bus lanes provide dedicated bus lane operations during peak travel periods and provide general curbside uses at other times.

Benefits:

- Provides a large boost to transit capacity at critical times, improving reliability and transit times.
- Conducive to active transit signal priority treatments.

Considerations:

- Curbside peak-only bus lanes involve a trade-off between faster peak travel times and slower off-peak bus travel times, with slower pull-out stops during off-peak times.
- Because bus stops are typically located directly on the adjacent sidewalk, enough room must be available for waiting passengers, stop amenities, and passing pedestrian traffic.

Standards and Guidelines:

- Pavement markings must indicate that the lane is dedicated to transit, including a solid white line and "BUS ONLY" marking. Skip-lines may be applied where vehicles are permitted to cross, such as at intersections and turn pockets.
- Signage must clearly indicate the lane restriction, as well as hours of enforcement and any turn allocations.
- If the lane permits parking during non-operational hours, signage should clearly communicate parking restriction times (i.e. "No Parking, 7–9 AM") as well as any other parking regulations (e.g. "2 Hour Parking, 9 AM–6 PM").
- Camera enforcement and/or towing services are usually needed to operate successful peak-hour bus lanes.
- A 12- or 13-foot wide lane can accommodate curbside parking with a bike lane during non-peak hours, and operate as a shared bus-bike lane during peak hours. However, signage must communicate that bicycling is permitted at all times.

References:

- Transit Street Design Guide, NACTO, 2016

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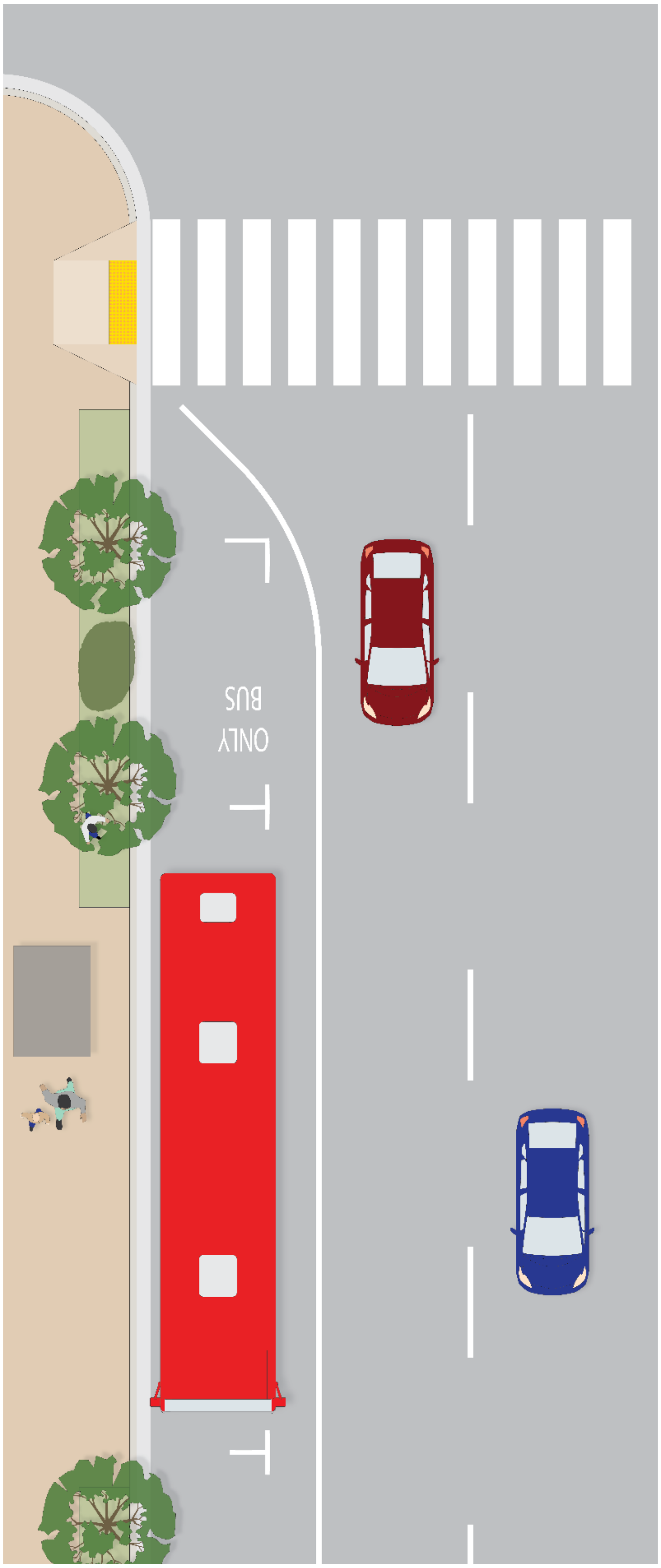

FIGURE 5-36 PEAK-HOUR BUS LANE PLAN VIEW

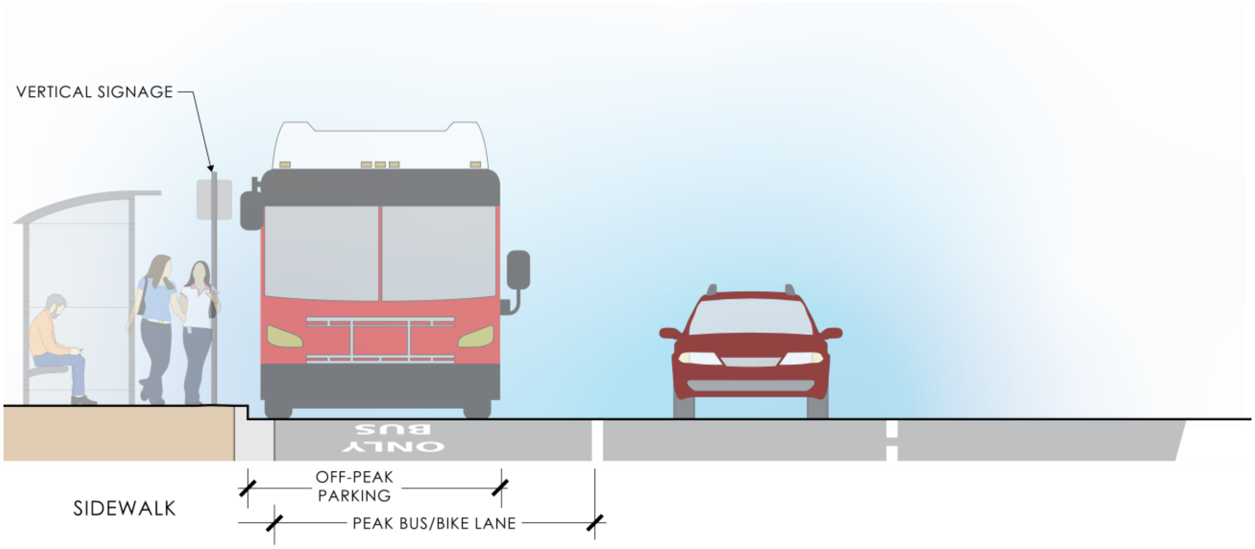

FIGURE 5-37 PEAK-HOUR BUS LANE THROUGH THE LOCATION SECTION VIEW

Facility	Off-Peak Parking	Peak-Hour Bus Lane[1]	Off-Peak Bike Lane (Optional)
Preferred	8′	11-13′	5′
Minimum	8′	11′	n/a
Maximum	n/a	n/a	n/a

TABLE 5-15 PEAK-HOUR BUS LANE DIMENSIONS

Notes:

1. *Lane width should not include the width of the gutter pan.*

5.4.3.3 Offset Bus Lane

Offset bus lanes, also known as “floating” or “parking-adjacent” lanes, place transit vehicles in the right-most travel lane, but are offset from the curb by street parking, curb extensions, or raised cycle tracks.

Offset bus lanes are typically applied on multi-lane streets with on-street parking, loading, and other curbside uses, especially streets with retail.

Benefits

- Offset bus lanes accommodate high transit volumes and improve reliability and travel times on streets operating near or beyond their motor vehicle traffic capacity.
- Offset bus lanes raise visibility of high-quality services, especially rapid bus services.
- Offset bus lanes reduce delays for transit riders.
- Offset bus lanes maintain space for other curbside uses, such as parking, loading, bulb-outs, and parklets.

Considerations

- Implementation is easy; reconstruction of curbs is usually not necessary.
- In commercial areas, lanes are prone to encroachment due to double-parking, deliveries, and taxis; enforcement is critical.
- Vertical separation elements between bus and mixed-traffic lane are usually not feasible because parking is preserved.
- Right-turning conflicts should be considered when implementing offset bus lanes.

Standards and Guidelines

- Designate lanes using BUS ONLY markings and signs (CA MUTCD 3D-01 or similar markings)
- Dedicated transit lanes must be separated from other traffic using solid single stripes or double white stripes.
- Red color treatments are effective in reinforcing lane designation, which should be applied along the entire lane if used.
- Transit bulbs should be installed at stops to enable in-lane stops, and provide space for other stop and sidewalk amenities
- Provide shared right-turn lanes or right-turn pockets at intersections with moderate to high turn volumes.
- See Section 3H.07 of the FHWA MUTCD for standards and guidelines for the optional use of red colored pavement for transit lanes.

References

- Manual on Uniform Traffic Control Devices on Streets and Highways, 11th ed., FHWA, 2023
- Transit Street Design Guide, NACTO, 2016

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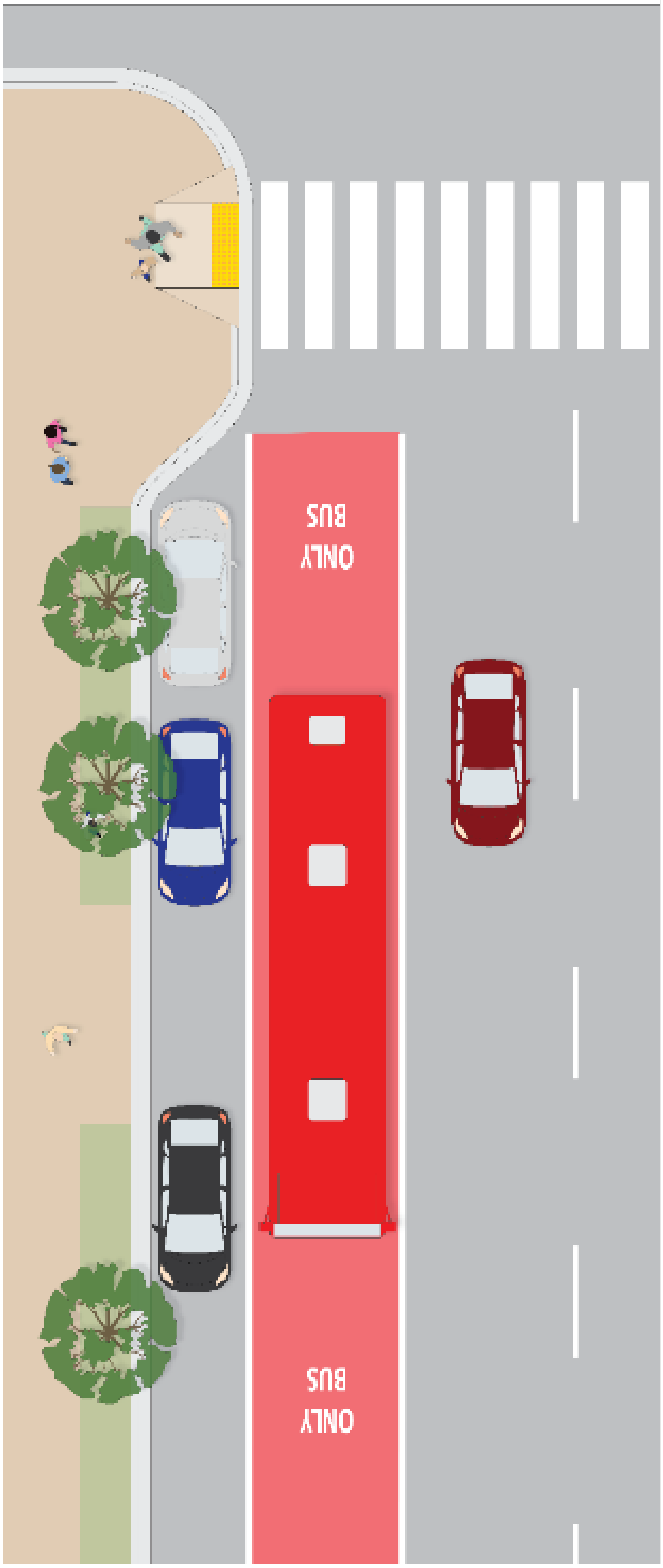


FIGURE 5-38 OFFSET BUS LANE PLAN VIEW

Note: Red transit lane paint is optional.

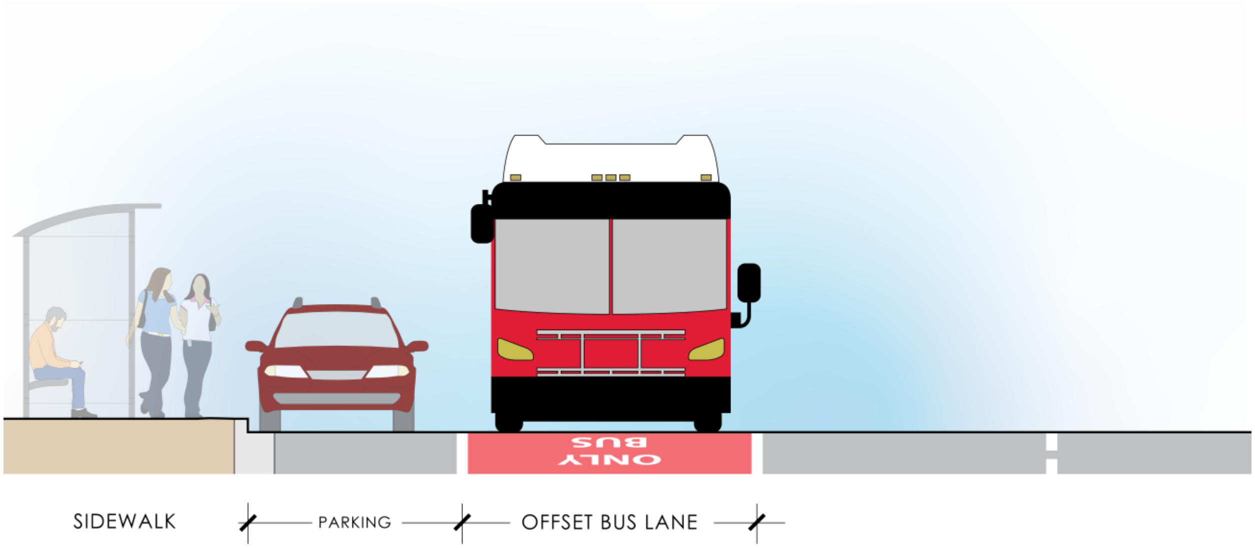


FIGURE 5-29 OFFSET BUS LANE THROUGH THE LOCATION SECTION VIEW

Facility	Parking	Off-Set Bus Lane
Preferred	8-9′	12′
Minimum	7′	11′
Maximum	10′	n/a

TABLE 5-16 OFFSET BUS LANE DIMENSIONS

Notes:

1. *The minimum required dimensions for parking and offset bus lane should not be used in the same location.*

5.4.3.4 Curbside Bus Lane

The lane adjacent to the curb can be dedicated to transit vehicles, especially on through corridors where parking is either not provided or not well utilized. Curbside bus lanes can be implemented with varying levels of separation, increasing service capacity and allowing riders to board directly from the curb.

Benefits:

- Transit vehicles are not delayed by interactions with parking or loading vehicles if well enforced.
- A curbside transit lane can have differing, flexible uses throughout the day, such as parking or a shared bus-bike use. However, full-time lane dedication typically improves integrity.

Considerations:

- Special design attention must be given to right turns from streets with curbside transit lanes.
- Lanes are prone to encroachment by loading, deliveries, and taxicabs. Enforcement is needed.
- Where rain pooling is an issue, gutters and drainage in bus lanes next to the curb must be kept clear to avoid splashing onto the sidewalk. Concrete gutters or lanes may be preferable for curbside bus lanes.
- Because bus stops are typically located directly on the adjacent sidewalk, stops must leave enough room for the alighting, boarding area and passing pedestrian traffic.
- Right-turning conflicts and storm drain inlets should be considered when implementing curbside bus lanes.
- Street trees could be damaged with curbside bus lanes either from oncoming bus or required pruning of the tree for bus clearance which can damage the tree and affect tree health.

Standards and Guidelines:

- Designate lanes using a single or double solid white line, as well as a stenciled “BUS ONLY” marking (refer to MUTCD 3D.01). In some jurisdictions, markings may be required for each permitted user (e.g. “TAXI, LRT, BUS ONLY”).
- Signage must designate the transit lane as restricted. Place signs either on the curbside or overhead (MUTCD 2B.20).
- Mark the transit lane with red color. Red color treatments are effective in reinforcing lane designation.
- The desired width of a curbside bus lane next to a mixed-traffic lane is 11–12 feet, excluding a gutter pan if present. Bus-only lanes should not typically exceed 12 feet in width. If target operating speeds between stops are low, typically below 25 mph, 11-foot lanes are preferable to 12-foot lanes. If buses operate in an adjacent lane, a 12-foot curbside lane is desired.
- At intersections with a high volume of turning movements, the curbside lane may need to drop to maintain traffic flow.
- See Section 3H.07 of the FHWA MUTCD for standards and guidelines for the optional use of red colored pavement for transit lanes.

References:

- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Transit Street Design Guide, NACTO, 2016

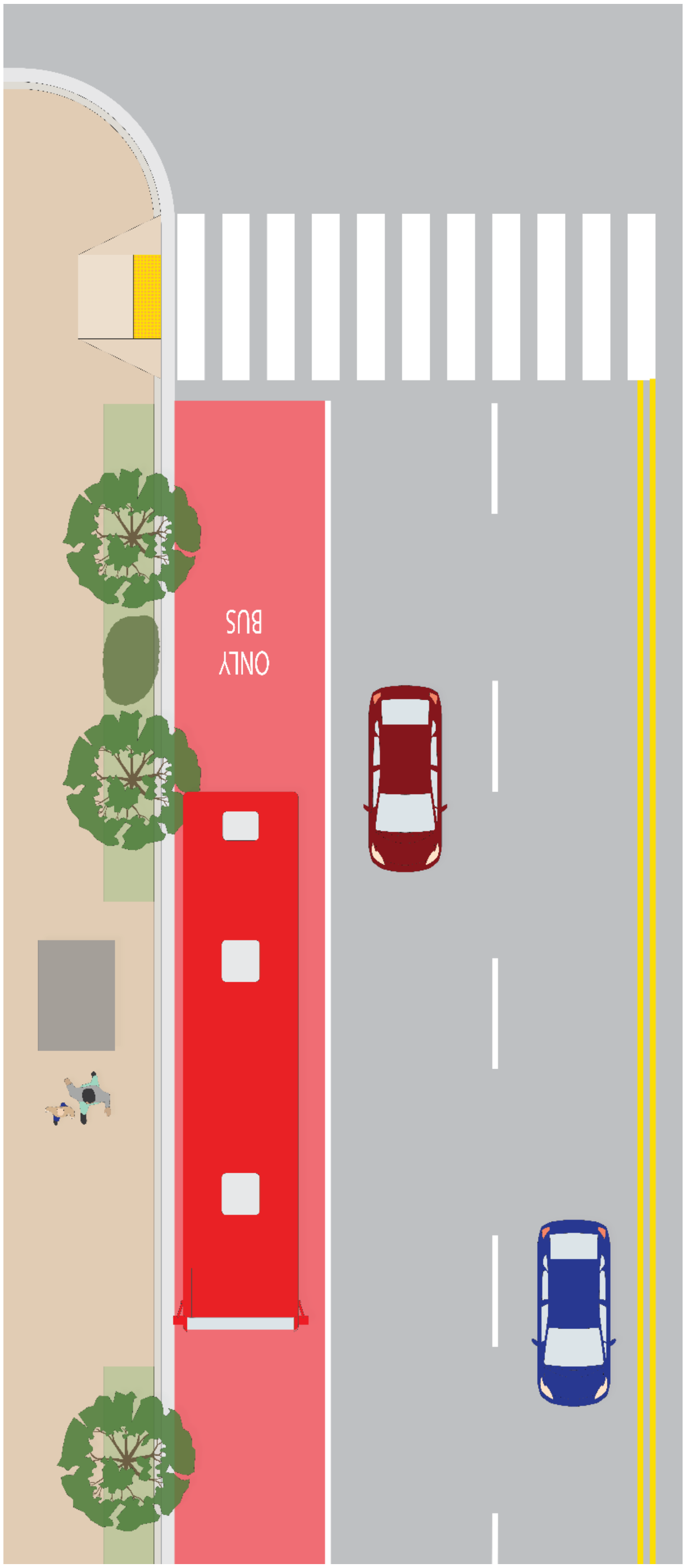


FIGURE 5-40 CURBSIDE BUS LANE PLAN VIEW

Note: Red transit lane paint is optional.

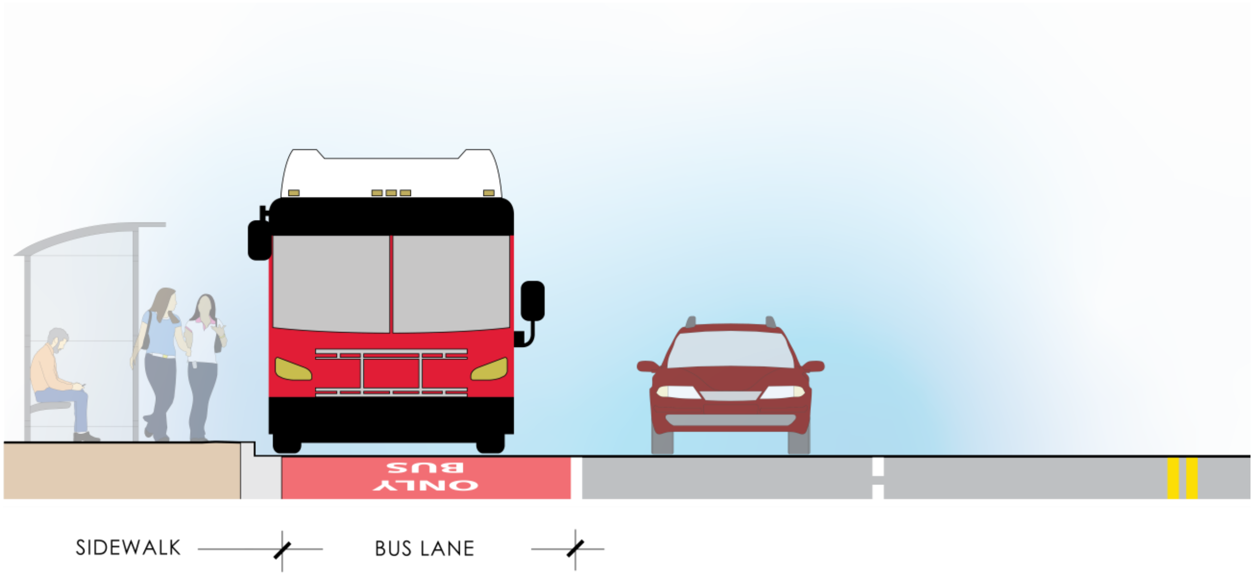


FIGURE 5-41 CURBSIDE BUS LANE THROUGH THE LOCATION SECTION VIEW

Facility	Curbside Bus Lane [1]
Preferred	11-12′
Minimum	11′
Maximum	n/a

TABLE 5-17 CURBSIDE BUS LANE DIMENSIONS

Notes:

1. *Lane width should not include gutter pan.*

5.5. Median Zone

The Median zone encompasses the region of the right of way (ROW) that is often in the center of the roadway between two vehicle zones. A raised median's primary function is to separate opposing directions of travel, but it can also calm or divert traffic, give pedestrians a comfortable place to wait when crossing the street or boarding transit, or beautify the street (see Section 5.8 for traffic calming strategies). Where the median is at-grade with the vehicle zone, it can provide a turning lane for vehicle traffic.

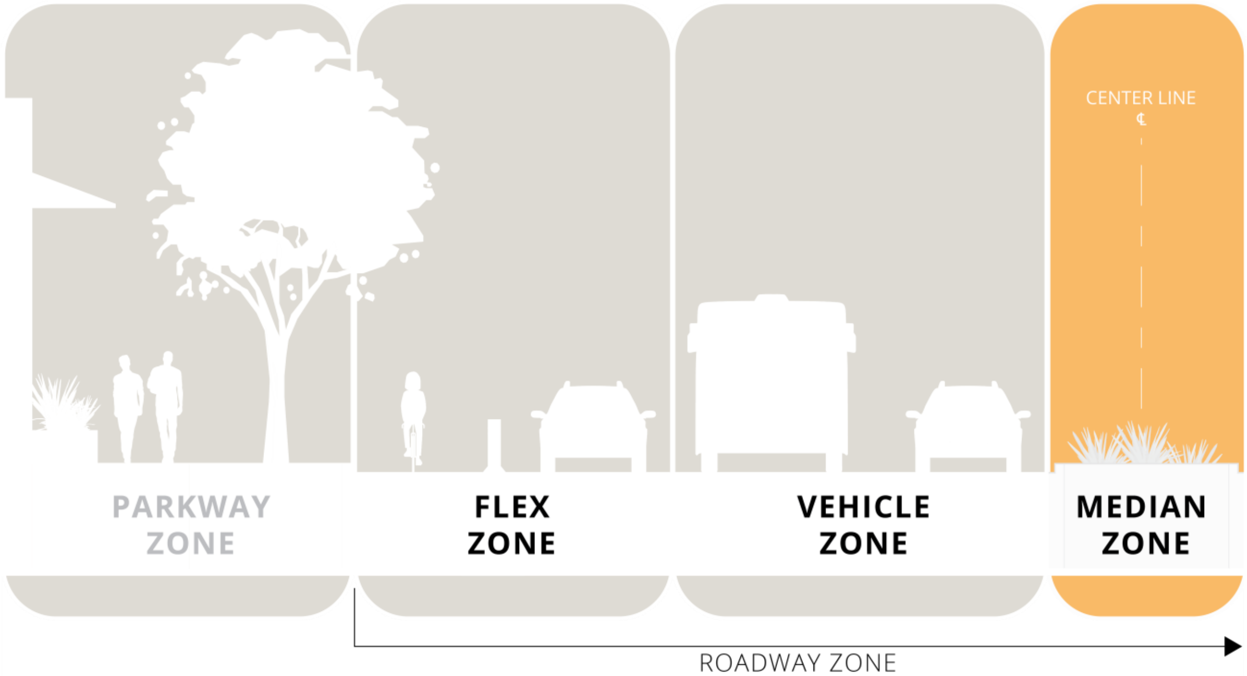


FIGURE 5-32 MEDIAN ZONE

5.5.1 Medians

5.5.1.1 Raised Medians

Raised medians are raised barriers in the center portion of the street or roadway. They come in a variety of forms, such as raised landscaped medians, stamped concrete medians, and concrete barriers (see the City's Standard Drawings SDG-112).

<u>Benefits:</u>

- Raised medians are for access control and may be erected for traffic calming purposes, such as in the case of roundabouts, median slow points, and traffic diverters (see Section 6.7.2 and 5.8).
- Raised islands or medians of sufficient width that are placed in the center area of a street or highway can serve as a place of refuge for pedestrians who are attempting to cross at a midblock or intersection location.

- Raised medians can improve efficiency of transit through dedicated transit lanes or boarding islands.
- Raised medians can enhance placemaking efforts and add character to the public realm when sculptures or gateway signs are incorporated in the design.
- Medians can provide additional space for trees and landscaping.

Considerations:

- Continuous medians may not be the most appropriate treatment in every situation. In some cases, they can increase traffic speeds by decreasing the perceived friction through separating traffic flow directions.
- They may take up space that can be better used for wider sidewalks, bike lanes, landscaping buffer strips, or on-street parking.
- Consider crossing islands if cost is an issue or space is limited.
- Landscaping in medians should not obstruct the visibility between pedestrians and approaching motorists.
- Refer to Standard Drawing SDG-139 for pedestrian islands and cut-throughs.
- Midblock pedestrian crossings must be fully wheelchair accessible. (See Council Policy 200-07).
- Concave medians may not support trees as tree root structures can be affected by pooling water or bioswale infrastructure that does not allow for tree roots or tree root growth.
- All impacts to surface drainage should be evaluated and managed accordingly.

FIGURE 5-43 TYPICAL LANDSCAPE MEDIAN

Location: University Avenue and 29th Street

Standards and Guidelines:

- All raised medians shall be bounded by 6-inch B-2 concrete curbs and surfaced with stamped concrete or concrete as called for in the City's Standard Drawings (SDG-154, SDG-112). See SDG-109 and G-10 for joint details.
- Landscaped medians shall conform to the City's Standard Drawings. The planting, irrigation, brush management, and landscape-related improvements must comply with the regulations in SDMC §142.0403 and with the Landscape Standards in the Land Development Manual.
- Maintenance for landscaped medians shall be provided for through a maintenance assessment district or by other agreement with the City of San Diego.
- Street trees shall be located no closer than 30 inches to the edge of median islands (SDMC §142.0409).
- For landscaped medians, all required plant material shall be irrigated with a permanent, below-grade irrigation system unless specified otherwise in this division. All required irrigation systems shall be automatic, electrically controlled, and designed to provide water to all required plantings to maintain them in a healthy, disease-resistant condition (SDMC §142.0403).
- All pruning shall comply with the standards of the American National Standards Institute (ANSI) for free care operations and the International Society of Arboriculture (ISA) best management practices for free pruning (SDMC §142.0403).
- All median noses shall be painted yellow.
- To accommodate street sweeping, all curves requiring sweeping shall have a min 22' radius.

References:

- Standard Drawings for Public Works Construction, City of San Diego, 2021

5.5.1.2 Green Infrastructure for Concave Medians

Conventional medians are normally designed as a convex surface to shed water onto adjacent pavement and into a curb and gutter system. Concave medians reverse this relationship by designing the median to receive runoff. A diagram and section of a typical concave median is shown in Figure 5-43.

The landscaped median can be designed as a landscaped swale or biofilter to treat runoff. Catch basin and underground storm drain systems may be required for overflows depending on the infiltration conditions and the duration that water is retained (see BASMAA, 1999).

References:

- Proven Safety Countermeasures, FHWA, n.d.
- Start at the Source: Design Guidance Manual for Stormwater Quality Protection, BASMAA, 1999
- Standard Drawings for Public Works Construction, City of San Diego, 2021

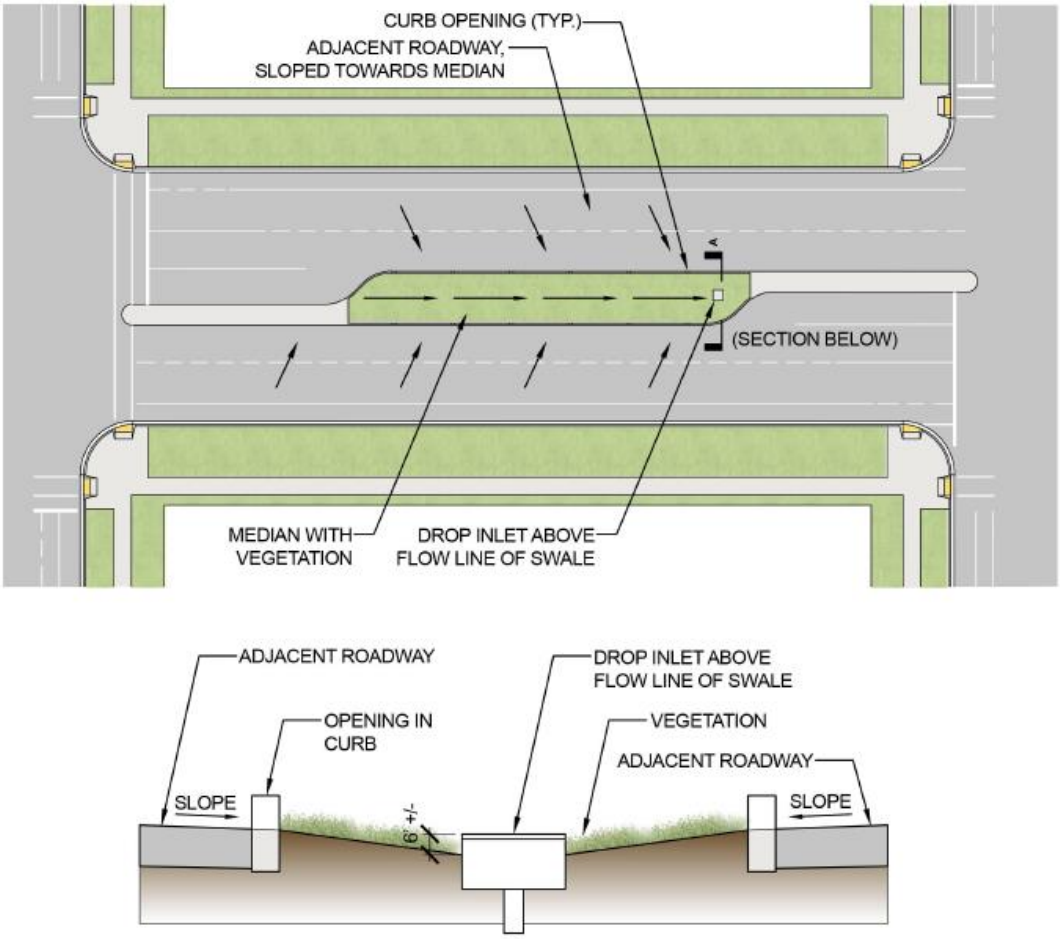


FIGURE 5-44 CONCAVE MEDIAN PLAN AND SECTION VIEWS

Notes:

1. *Conditions, dimensions, and materials shown are typical. Modifications may be required for proper application; consult qualified professional.*

5.5.2 Vehicle Turn Lanes

Vehicle turn lanes allow vehicles to turn into driveways or at intersections along the length of the road or at designated points, provided that vehicles are following the associated traffic rules.

Benefits:

- Exclusive turning lanes for vehicles remove stopped vehicles from through traffic.
- Left-turn lanes at intersections substantially reduce rear-end crashes.
- Left-turn lanes also substantially increase the capacity of many roadways.

Considerations:

- Left-turning vehicles encounter several sources of conflict: pedestrians; bicyclists; opposing through traffic; through traffic in the same direction; and crossing traffic. These conflict types often lead to angle, sideswipe same direction, and rear-end crashes. Left-turn-related crashes typically account for a high percentage of total crashes at an intersection.

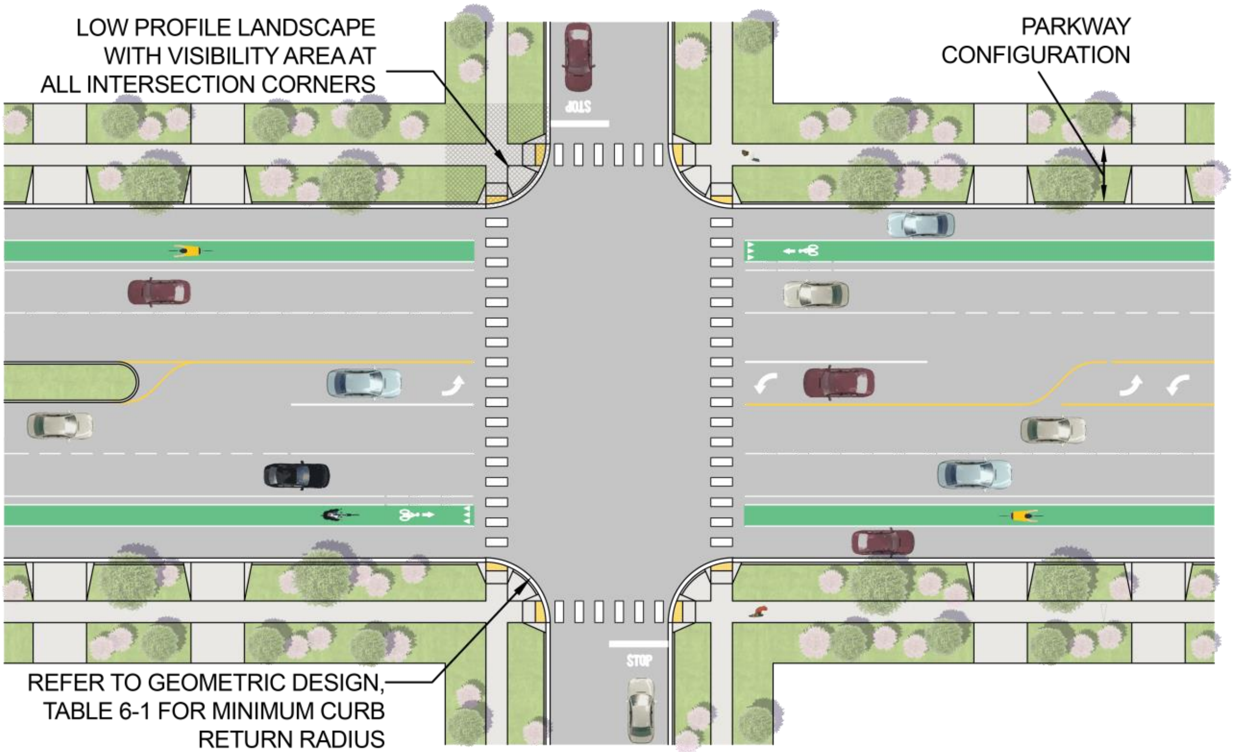


FIGURE 5-45 VEHICLE LEFT TURN LANES

<u>**Standards and Guidelines:**</u>

- When used, yellow markings for longitudinal lines shall delineate the separation of two-way left-turn lanes and reversible lanes from other lanes.
- If a two-way left-turn lane that is never operated as a reversible lane is used, the lane line pavement markings on each side of the two-way left-turn lane shall consist of a normal broken yellow line and a normal solid yellow line to delineate the edges of a lane that can be used by traffic in either direction as part of a left-turn maneuver. These markings shall be placed with the broken line toward the two-way left turn lane and the solid line toward the adjacent traffic lane.
- White two-way left-turn lane arrows may be used in conjunction with the longitudinal two-way left-turn markings at the locations described in Section 3B.20 of the CA MUTCD. Signs may be used in conjunction with the two-way left turn markings (see Section 2B.24 of the CA MUTCD).
- Channelized left-turn lanes in combination with continuous raised-curb medians are used instead of two-way left-turn lanes if one or more of the following conditions exist:
    - Average daily traffic volumes exceed 20,000 vehicles per day,
    - For remediation where there is a demonstrated crash problem,
    - Wherever a need is demonstrated through engineering study.

- Left-turn or right-turn lanes shall be separated from the through lanes by a single solid 8 inch wide white line.
- Consult the California MUTCD Part 3, "Markings" for additional guidance on turning lane markings.
- The minimum width for a two-way left-turn lane shall be 12 feet. The preferred width is 14 feet.
- Consult the Highway Design Manual Index 301.1 for right-turn lane width requirements.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Highway Design Manual, 7th ed., Caltrans, 2020
- Benefits of Access Management, FHWA, 2003
- Signalized Intersections: Informational Guide, FHWA, 2013

5.5.3 Transit Lanes

5.5.3.1 Center Running Transit Lanes

Median bus lanes are typically used on major routes with shorter headways, and where traffic congestion may significantly affect reliability. Median bus lanes reduce conflicts with parked vehicles. Therefore, these lanes create high-quality transit services.

Benefits:

- Median bus lanes serve buses at potentially very high capacity and volume, while improving the pedestrian and passenger experience.
- Eliminates conflicts with drop-offs, deliveries, illegal parking, bicyclists, and some turning movements.

Considerations:

- A combination of self-enforcing design and enforcement, ideally automated, is necessary to ensure the effectiveness of dedicated median bus lanes.
- Coordinate with MTS on station platform design. Platform configuration must be compatible with transit vehicle characteristics—left-side boarding buses may be more expensive.
- Median platforms may reduce overall space occupied by stations, though side-boarding islands can have space benefits when stations are split across an intersection.

Standards and Guidelines:

- Solid white lines or double white lines must be striped along the right side of the transit lane, along with BUS ONLY or LRT ONLY pavement markings (MUTCD 3D-01).
- Center-running lanes should be designated using red/terra cotta color to emphasize the lane and deter drivers from entering it.
- Left turns should be prohibited or accommodated using left-turn lanes and dedicated signal phase.
- Left turns from the median bus lane add significant safety and operational issues for high-frequency bus service but left turns may be permitted at times of day with longer headways.
- Separation with soft (e.g. rumble strips) or hard (e.g. concrete curbs) barriers may be used to reduce encroachment from general traffic.
- The mixed-traffic lane may transition to the right before a stop and to the left after a stop, creating room for parking and a turn lane.
- Complement median bus lanes with all-door boarding and related fare collection strategies, as well as transit signal strategies.
- Designs should anticipate transit vehicles operating at 25 mph, with higher design speeds only if local speed limits permit them.
- Curves may be regulated for much lower speeds, typically 10–15 mph, permitting vehicles to proceed safely within the same lane width as provided on straight sections of the bus lane.

References:

- Transit Street Design Guide, NACTO, 2016

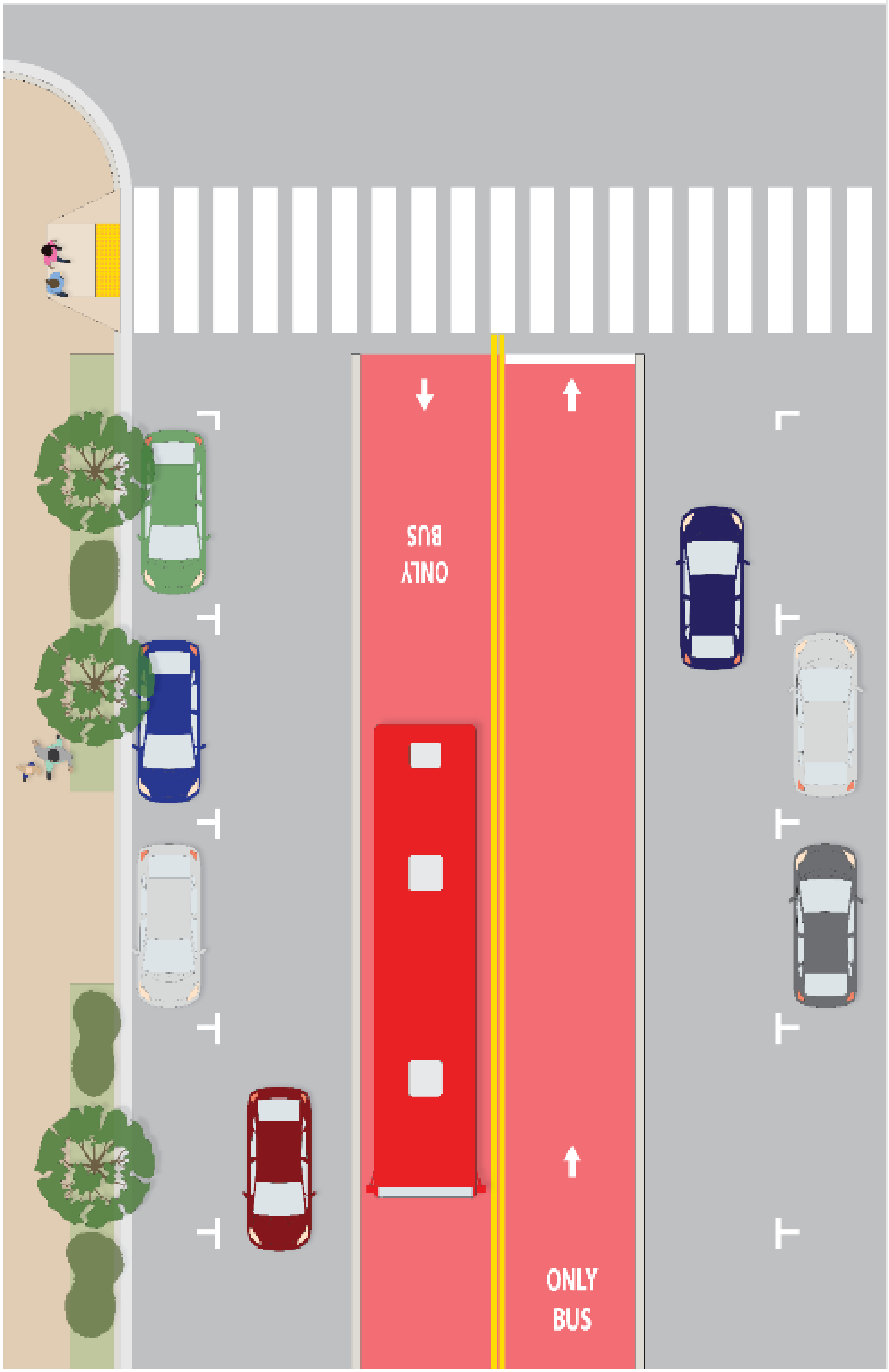


FIGURE 5-4 CENTER RUNNING TRANSIT LANES PLAN VIEW

Note: Red transit lane paint is optional.

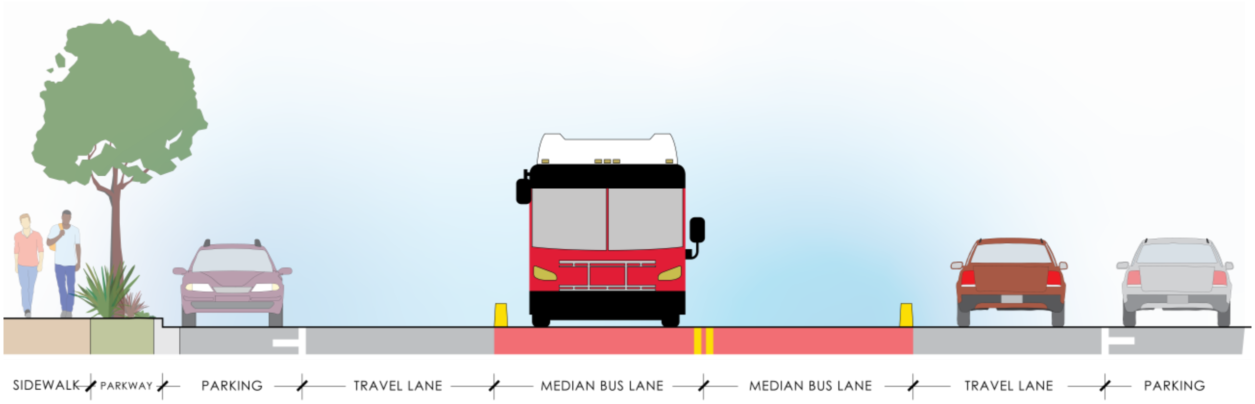


FIGURE 5-5 CENTER RUNNING TRANSIT LANES THROUGH THE LOCATION SECTION VIEW

Facility	Travel Lane #1	Median Bus Lane #1	Median Bus Lane #2	Travel Lane #2
Preferred	11′	12′-13′	12′-13′	11′
Minimum	10′	11′	11′	10′
Maximum	n/a	14′	14′	n/a

TABLE 5-18 CENTER RUNNING TRANSIT LANES DIMENSIONS

5.5.3.2 Median Bus Boarding Island

Located between center-running transit lanes and general traffic lanes to the right, median bus boarding islands create in-lane stops, giving buses priority within the street while allocating space for through-moving vehicles. Median bus boarding islands call for careful management of pedestrian interactions to access the boarding platform.

Benefits:

- Reduces conflicts with curb activity by moving bus stop away from the curb.
- Reduces conflicts with bikes by physically separating bus stop from path of bikes.
- Avoids need to relocate existing catch basins.
- When utilized at a bus stop under an elevated train line, where the bus does not pull over to the sidewalk and passengers regularly stand in the roadway, provides a safer waiting space.

Considerations:

- Designs should provide adequate pedestrian crossing opportunities to and from the island, accounting for potentially high pedestrian volumes. Insufficient crossing width and long pedestrian wait times may increase the incentive for pedestrians to cross traffic lanes unsafely.
- When applied to near-side stops, consider turn management strategies. Near-side applications may be most effective at intersections without the conflicts presented by left-turn movements.

Standards and Guidelines:

- All center medians shall be raised, bounded by 6-inch B-2 concrete curbs and surfaced with stamped concrete or concrete as called for in the City's Standard Drawings.
- Island platforms must be either level or near-level boarding. 24-inch wide detectable warning surfaces should be placed along the boarding edges of the platform to indicate vehicle position.
- Detectable warning surfaces must be placed on both sides of every flush pedestrian crossing.
- Curb ramps shall be provided at the medians to provide access to the crosswalks on the street.
- Platform access ramp may have a maximum slope of 1:12 at a crosswalk or other crossing point, at the sidewalk and onto the platform (ADA Std. 405.2, 810.2.2).
- An accessible boarding area, typically 8 feet wide by 5 feet long, must be provided to permit boarding maneuvers by a person using a wheelchair (ADA Std. 810.2.2), generally requiring islands to be at minimum 8 feet wide. Islands with railings along the rear side will require an extra foot of space, making the total width 9 feet.
- To accommodate street sweeping, all curves requiring sweeping shall have a min 22' radius.
- Reflective signage or other visible raised element on the leading corner (back left corner) of the island. KEEP LEFT or KEEP RIGHT (MUTCD R4-8) or object marker (OM-3) signs may be used.
- Ensure that pedestrian refuge islands crossing transitways are wide enough to allow groups of people to wait, particularly near stations. Discourage pedestrians from waiting in unsafe locations in the roadway, especially near railways.

- At intersections, install refuge island tips at least 6 feet wide to provide pedestrians protection in the crosswalk.

References:

- 2010 ADA Standards for Accessible Design, Department of Justice, 2010
- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Transit Street Design Guide, NACTO, 2016

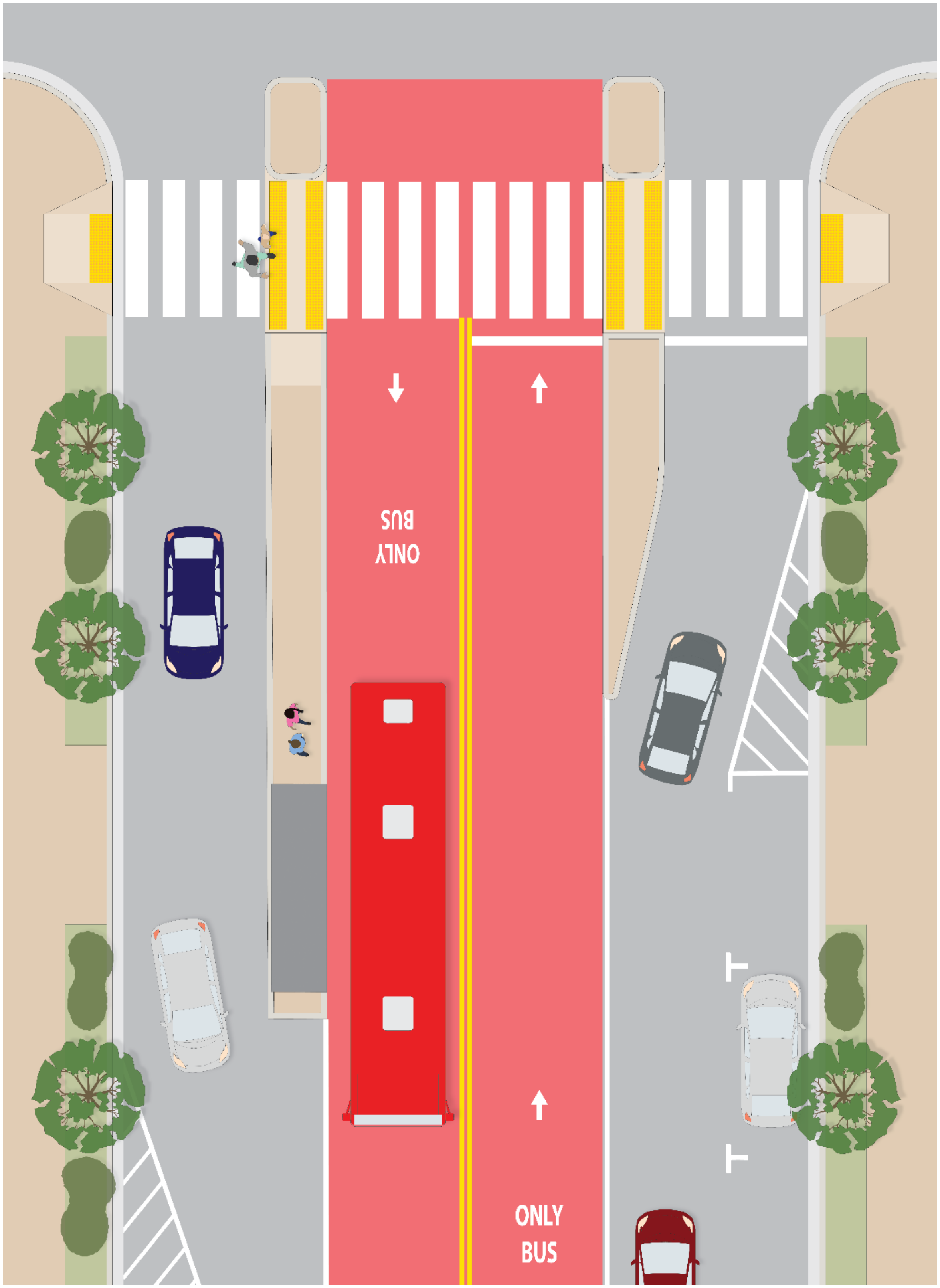


FIGURE 5-48 MEDIAN BUS BOARDING ISLAND PLAN VIEW

Note: Red transit lane paint is optional.

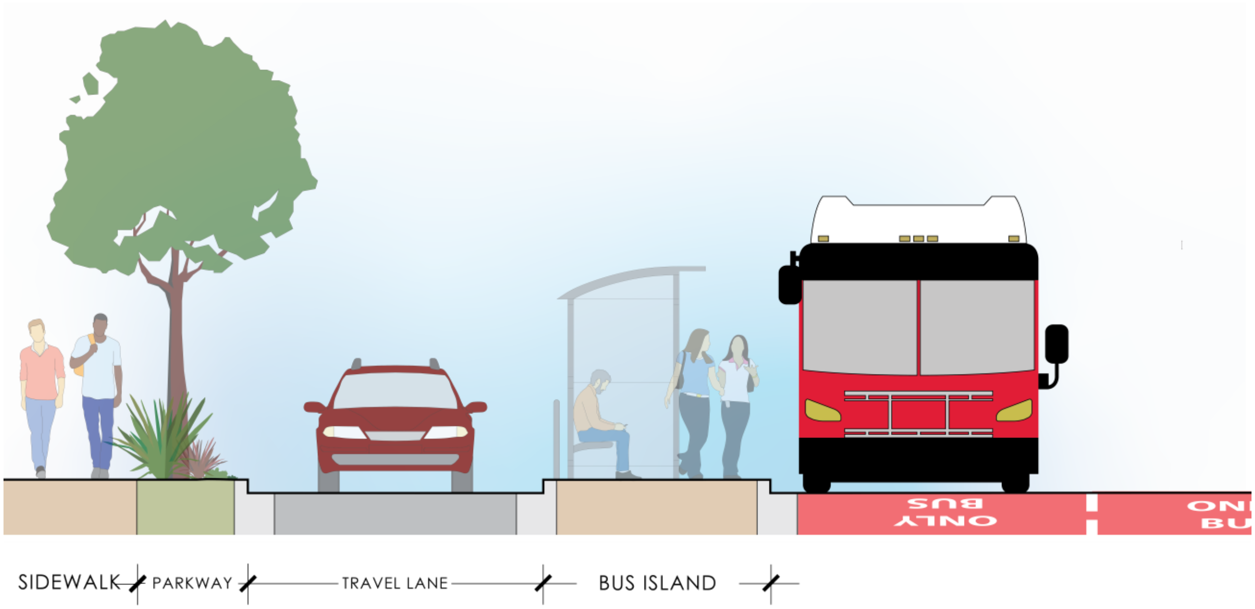


FIGURE 5-49 MEDIAN BUS BOARDING ISLAND SECTION VIEW

Facility	Bus Island
Preferred	9′
Minimum	8′
Maximum	n/a

TABLE 5-19 MEDIAN BUS BOARDING ISLAND DIMENSIONS

5.6. Mid-block Crossing Treatments

Mid-block pedestrian crossings are designated areas for pedestrians to cross the street between where vehicular intersections occur. These crossings should be installed where it is convenient for pedestrians to cross the road, to incentivize greater and safer pedestrian mobility. Frequently, this will mean installation in areas where pedestrians cross mid-block, outside of marked intersections. Midblock crossing treatments may include raised medians/pedestrian cut-throughs, raised crossings, Rectangular Rapid Flash Beacons, or Pedestrian Hybrid Beacons.

5.6.1 General Guidelines

- Refer to Section 5.6.2 Mid-block Crosswalks for additional guidance.
- Refer to CA MUTCD for appropriate pavement markings and signage.
- Drainage requirements must be evaluated and addressed.
- “No Parking” shall be determined based on visibility requirements.
- Placement of landscaping shall be consistent with the Landscape Standards and shall allow for sight distance requirements.
- Curb extensions as shown may be installed to improve pedestrian visibility and reduce crossing distance.

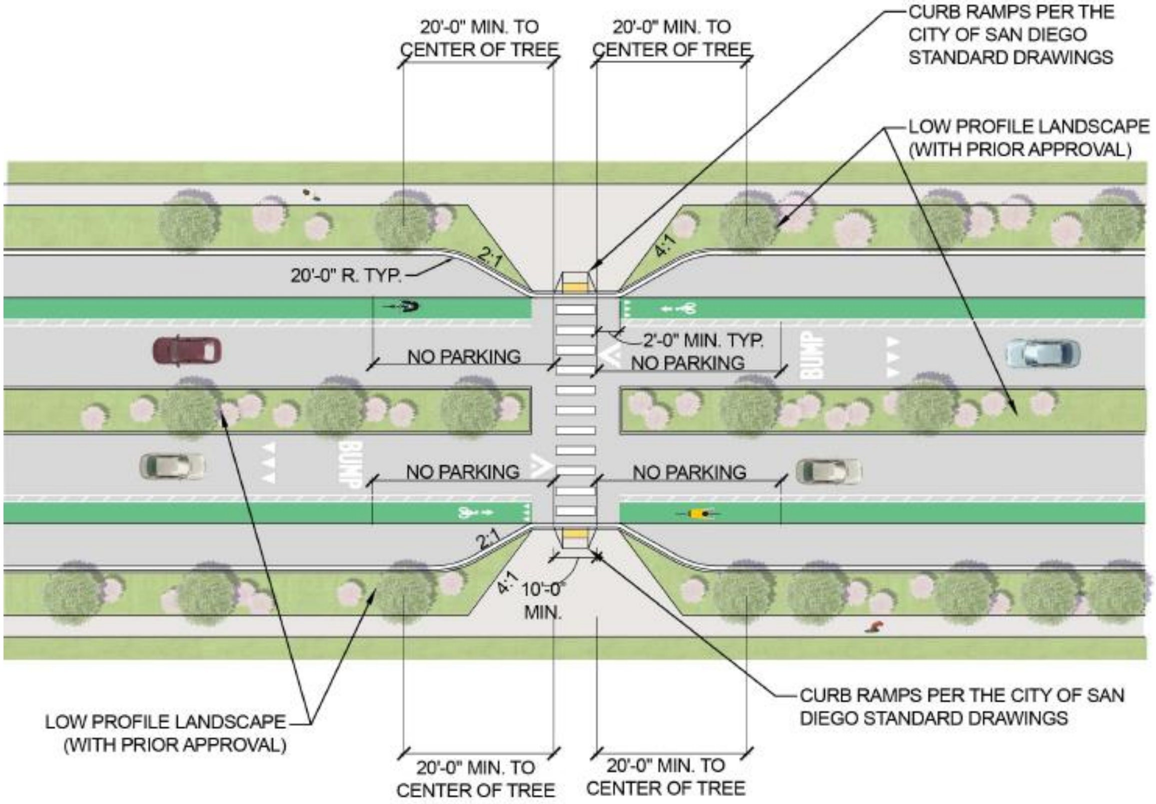


FIGURE 5-50 MID-BLOCK CROSSING PLAN VIEW

5.6.2 Mid-block Crosswalks

Mid-block crossings provide convenient and safe places where people can cross the street in the middle of a long block. Crossings should use clear markings and signs that alert drivers to yield for pedestrians. Accessible rectangular rapid flash beacons (RRFB) and pedestrian hybrid beacons (PHB, HAWKs) activated by a pedestrian push button are other ways to alert drivers to people using a mid-block crossing.

Benefits:

- Mid-block crosswalks provide convenient crossing locations for pedestrians when other crossing opportunities are distant or where there is a presence of concentrated mid-block pedestrian crossing demand.

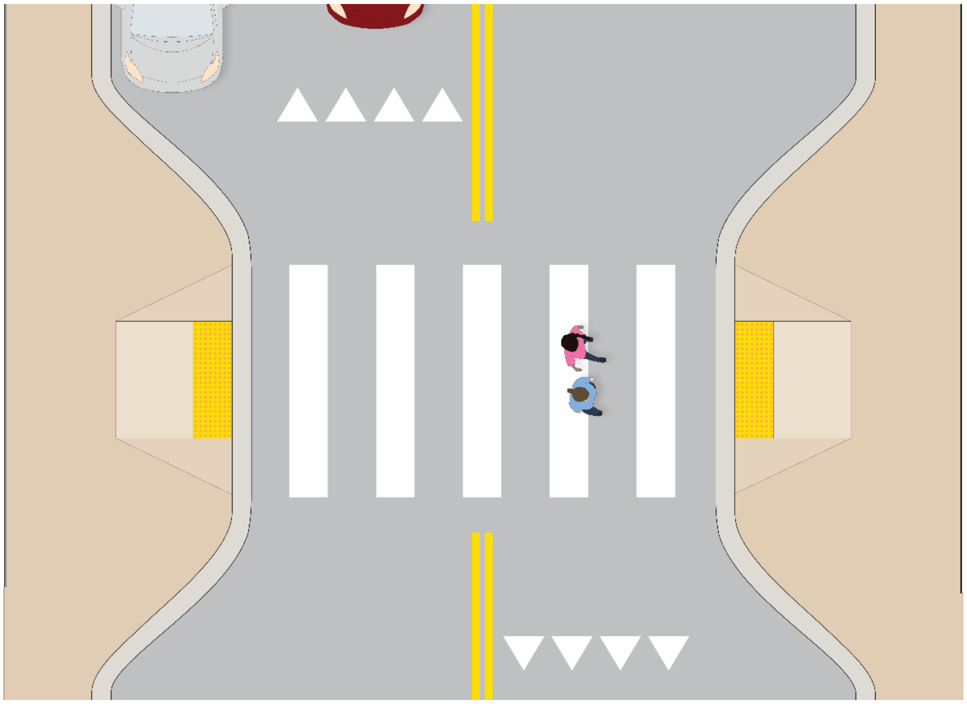


FIGURE 5-51 MID-BLOCK CROSSWALK PLAN VIEW

Considerations:

- Mid-block crosswalk can be an effective part of the overall pedestrian network.
- Requirements for installation of mid-block crossings are contained in the Council Policy 200-07, "Marked Crosswalk Criteria at Uncontrolled Locations."

Standards and Guidelines:

- Crosswalks at uncontrolled intersections and mid-block crosswalks shall be installed in accordance with Council Policy 200-07.

- Parking, standing, or stopping within 20 feet of the vehicle approach side of any marked or unmarked crosswalk or within 15 feet of any crosswalk where a curb extension is present is prohibited.
- Unmarked crosswalks shall be measured from the boundary line of where two sidewalks intersect at the curb ramp. Refer to Figure 5-28 and Section 105.6 “Pedestrian Crossings” of the HDM.
- Parking for bicycles or motorized scooters within 20 feet of a crosswalk may be permitted to the satisfaction of the City Engineer.
- Mid-block crosswalks shall be well illuminated (refer to Chapter 3.6.1, “Mid-Block Street Lighting”).
- A curb ramp shall be provided at each end of the crosswalk.
- Crosswalk marking should be continental crosswalks as per City Standard SDM-116.
- Curb extensions may be considered at the crosswalk to enhance pedestrian crossing visibility and reduce crossing distance.
- If mid-block crosswalks are signalized, accessible pedestrian signals and devices shall be installed.
- On streets that experience excessive vehicle speeds, enhanced pedestrian crossings should be combined with traffic calming measures such as raised crosswalks or curb extensions.

References:

- Council Policy 200-07 "Marked Crosswalk Criteria at Uncontrolled Locations", City of San Diego, 2015

5.6.3 Rectangular Rapid Flashing Beacons (RRFBs)

Rectangular Rapid Flash Beacons (RRFBs) feature amber LED lights that are activated by pushing a button or through technology that automatically detects a pedestrian’s presence. RRFBs may provide a lower cost alternative to traditional traffic signals and pedestrian hybrid beacons. The irregular LED flash pattern is similar to emergency flashers on police vehicles, capturing the attention of drivers more readily than conventional traffic signals. See Council Policy 200-07 for when RRFBs can be used.

Benefits:

- RRFBs can reduce crashes up to 47% for pedestrian crashes. (FHWA)
- RRFBs can increase motorist yielding rates up to 98% (FHWA)

Considerations:

- Install RRFBs in the median rather than the far-side of the roadway if there is a pedestrian refuge or other type of median.
- Reserve the use of RRFBs for locations with significant pedestrian safety issues, as over-use of RRFB treatments may diminish their effectiveness.
- Using solar-power panels eliminates the need for an external power source.

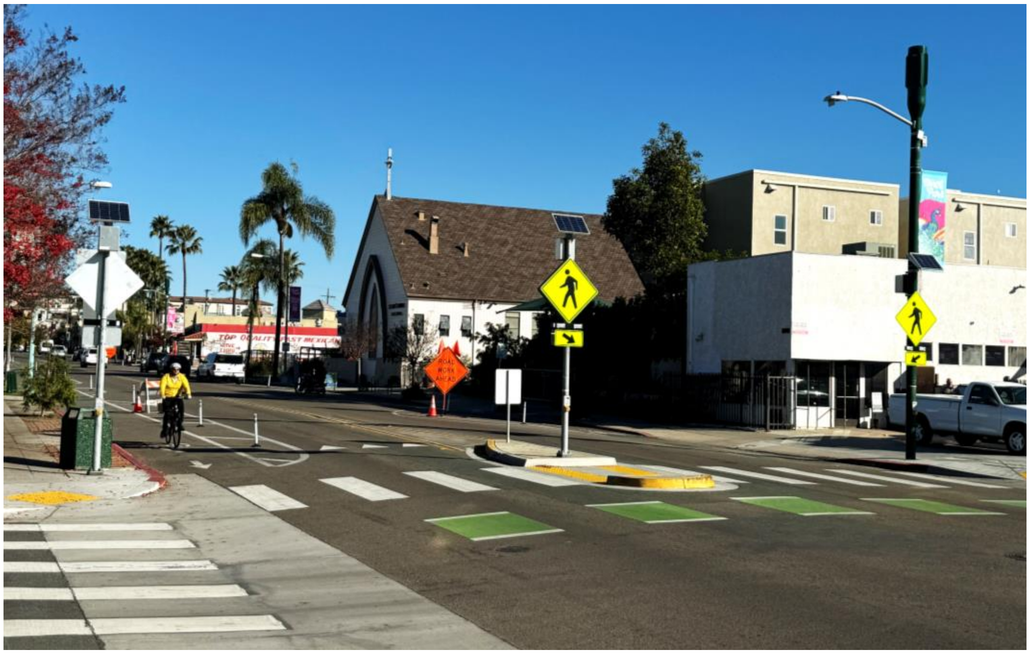


FIGURE 5-52 RECTANGULAR RAPID FLASHING BEACONS

Location: 30th Street and Landis Street

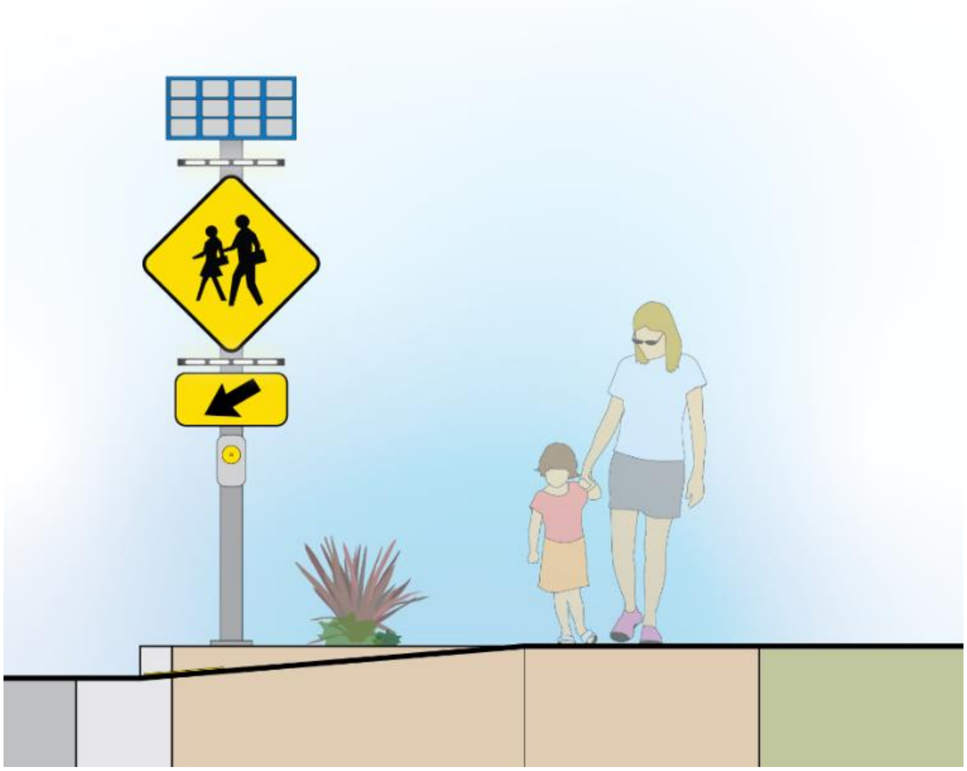


FIGURE 5-53 RECTANGULAR RAPID FLASHING BEACON SECTION VIEW

Guidelines:

- Accessible Pedestrian Signals shall be provided to be accessible to people who are blind or have low vision.

- RRFBs shall have a locator tone and speech notification that the "Lights are Flashing", but no vibration.
- Each RRFB shall consist of two rectangular-shaped yellow indications, each with an LED-array-based light source. The size of each RRFB indication shall be at least 5 inches wide by at least 2 inches high.
- The two RRFB indications for each RRFB unit shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of at least 7 inches, measured from the nearest edge of one indication to the nearest edge of the other indication.
- For any approach on which RRFBs are used to supplement post-mounted signs, at least two W11-2, S1-1, or W11-15 crossing warning signs (each with an RRFB unit and a W16-7P plaque) shall be installed at the crosswalk, one on the right-hand side of the roadway and one on the left-hand side of the roadway. On a divided highway, the left-hand side assembly should be installed on the median, if practical, rather than on the far left-hand side of the highway.
- An RRFB unit shall not be installed independent of the crossing warning signs for the approach that the RRFB faces. If the RRFB unit is supplementing a post-mounted sign, the RRFB unit shall be installed on the same support as the associated W11-2, S1-1, or W11-15 crossing warning sign and plaque. If the RRFB unit is supplementing an overhead-mounted sign, the RRFB unit shall be mounted directly below the bottom of the sign. Additional Design Guidance can be found in IA-21.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- PROWAG, US Access Board, 2023

5.6.4 Pedestrian Hybrid Beacon

A pedestrian hybrid beacon, also known as High-Intensity Activated Crosswalk (HAWKs), is a special type of hybrid beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk.

Benefits:

- Improves mobility and crossing safety for pedestrians and bicyclists.
- Causes fewer delays than a full traffic signal.
- Encourage drivers to yield to fellow community members walking and biking at street crossing.

Considerations:

- In general, PHBs are used where it is difficult for pedestrians to cross a roadway, such as when gaps in traffic are not sufficient or speeds exceed 35 miles per hour.
- They are very effective at locations where three or more lanes will be crossed, or traffic volumes are above 9,000 annual average daily traffic.
- Installation of a PHB must also include a marked crosswalk and pedestrian countdown signal.

- If PHBs are not already familiar to a community, agencies should conduct appropriate education and outreach as part of implementation.

FIGURE 5-54 PEDESTRIAN HYBRID BEACON

Location: C St

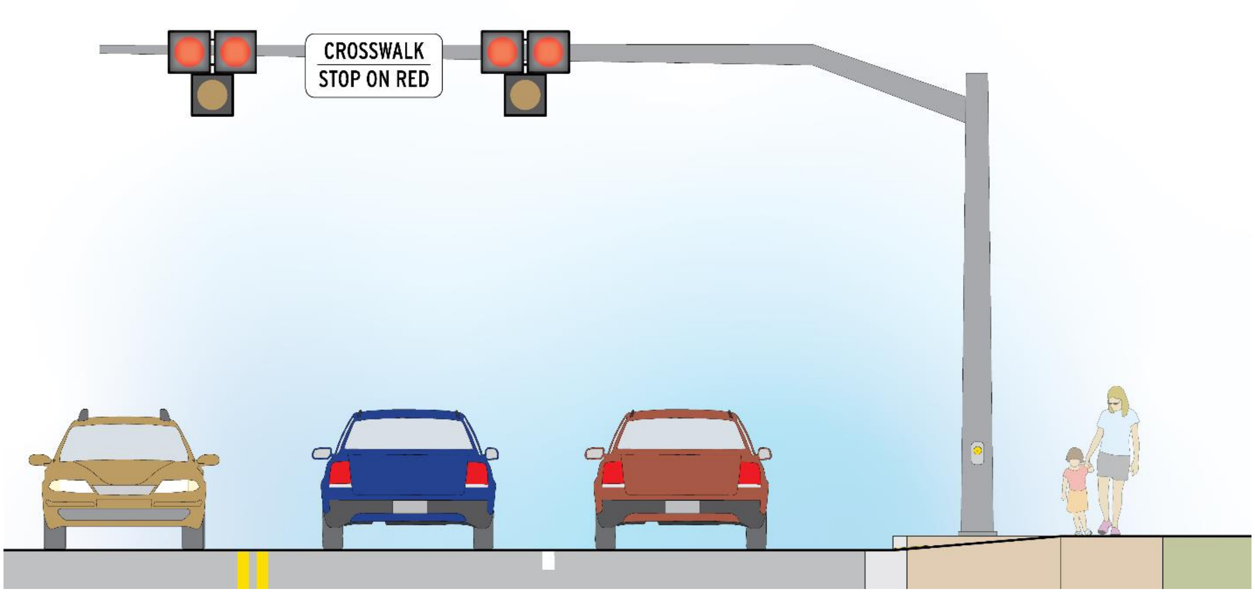


FIGURE 5-55 PEDESTRIAN HYBRID BEACON SECTION VIEW

<u>Guidelines:</u>

- A pedestrian hybrid beacon face shall consist of three signal sections, with a CIRCULAR YELLOW signal indication centered below two horizontally aligned CIRCULAR RED signal indications.
- Accessible Pedestrian Signals shall be provided to be accessible to people who are blind or have low vision.

- The pedestrian push button shall have locator tones, and percussive tone or speech with vibration with the Walk, and the "Wait" when the button is pushed.
- When an engineering study finds that installation of a pedestrian hybrid beacon is justified, then:
    - At least two pedestrian hybrid beacon faces shall be installed for each approach of the major street,
    - A stop line shall be installed for each approach to the crosswalk,
    - A pedestrian signal head conforming to the provisions set forth in Chapter 4E of the CA MUTCD shall be installed at each end of the marked crosswalk, and
    - The pedestrian hybrid beacon shall be pedestrian actuated.
- Additional design guidance can be found in CA MUTCD Chapter 4F. Pedestrian Hybrid Beacons and FHWA MUTCD Chapter 4J. Pedestrian Hybrid Beacons.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Manual on Uniform Traffic Control Devices for Streets and Highways, 11^{th} ed., FHWA, 2023
- PROWAG, US Access Board, 2023
- Traffic Calming Guide, Caltrans, 2023

5.7. Private Streets and Private Drives

5.7.1 Private Streets

Standards and Guidelines:

- Private streets shall be designed and constructed to the same structural, geometric, lighting, and drainage standards as dedicated streets. Private streets with parking on both sides of the street shall have a minimum curb-to-curb width of 34 feet.
- The entrance to private streets shall advise the public of the non-dedicated status of the street system and shall have an entrance design that visibly reinforces the private access. At a minimum, absent other design features, this design shall consist of signage designating the street as private. Such entrances must be provided with adequate visitor parking and turnaround facilities.
- The private street name sign shall be in accordance with the City's Standard Drawings.
- Private streets may be utilized where there is a homeowners association established that will maintain the street system.
- General utility easements will be required over private streets. Width of easement should be consistent with street ROW. The minimum width shall be 20' and 28' where the road serves more than one lot.

5.7.2 Private Drives

Standards and Guidelines:

- Private drives, where permitted in lieu of either dedicated or private streets, must be designed to allow direct access to all developed areas of the project.
- Private drives serving as fire lanes shall be designed with a turning radius of 50 feet.
- Minimum private drive width shall be consistent with the Land Development Code.
- Private drives shall be designed and constructed per the City's Standard Drawings.

5.7.3 Walkways

A system of improved all-weather walkways must be provided connecting each dwelling unit to private and public street sidewalks within and adjacent to the development and to major points of pedestrian attraction within the development.

5.7.4 Parking on Private Streets and Drives

Standards and Guidelines:

- Parking shall meet the requirements established by the applicable zone as contained in the Land Development Code, the ADA, and California Title 24 accessibility regulations.
- An unobstructed minimum distance of 25 feet from the circulation drive curb to the structure or carport area and not less than 20 feet from the back of sidewalk shall be provided.
- Parking bays, both parallel and perpendicular, may be utilized on low-volume residential streets. Such facilities would normally be included within the ROW or private street easement and would be maintained as part of the street. Where a sidewalk is located on the same side of the roadway as the parking bay, a continuous walkway must be maintained either by restricting parking within five feet of the extended curb line or by providing an improved walkway around the parking bay. All parking bays shall accommodate full-size vehicles.

5.8. Traffic Calming

This section is intended to provide design options for traffic calming on new streets and streets being considered for retrofit. Some general design specifications are provided to assist designers in developing comprehensive streetscape plans for proposed development and redevelopment projects. Traffic calming is the process of minimizing negative impacts associated with neighborhood traffic on residents, pedestrians, bicyclists and school children. Traffic calming measures can reduce neighborhood speeding, cut-through traffic, and reckless driver behavior on city streets. While roadways ensure both vehicle and pedestrian connectivity, excessive traffic volumes or speeding can cause adverse neighborhood impacts resulting from their original design and placement. To avoid these negative impacts, city streets can be retrofitted to encourage safer driver behavior. The guidelines and traffic calming measures presented in this section can be implemented on residential streets, and many of these measures can be successfully applied to major and collector roadways as well. New roadways can also be planned and designed with traffic calming in mind for residents, pedestrians, bicyclists, and drivers.

Traffic calming involves the use of various geometric features designed to reduce vehicle speeds or discourage shortcutting traffic. This has the benefit of making streets safer for all users and more comfortable for those outside of a motor vehicle. To achieve the desired effect of traffic calming, the effectiveness of such measures and their impacts should be evaluated on an area-wide basis.
Some measures can be combined to increase the effect on traffic volumes and speeds. For example, a raised crosswalk may be combined with bulb outs, the effect being a crosswalk that is both shortened and raised above the level of the roadway. Motorists must then react to both a vertical deflection and a narrowing. The suitability of a combined measure needs to be assessed.

Landscaping, street trees, street lighting, and street furniture are other methods of traffic calming that also create distinctive and pleasing streetscapes that encourage sidewalk activity. These improvements, outlined in Chapter 3, section 3.4.3, “Furnishings Zone,” may involve consideration of irrigation and long-term maintenance to be provided by maintenance assessment districts or other agreements with the City. Having safe and walkable neighborhoods has been shown to improve a healthy quality of life.

5.8.1 Traffic Calming Techniques

Traffic calming strategies generally fall into the following categories:

- Horizontal deflections (e.g., chicanes, traffic circles, median slow points/chokers)
- Vertical deflections (e.g., road lumps, speed tables, and raised crosswalks)
- Intersection improvements
- Traffic diverters
- Channelization

Enhancing the streetscape environment should have the same level of priority in the design scheme as traffic calming impacts. A general discussion of these categories follows along with more specific details and design guidelines for various traffic calming techniques.

Traffic calming features such as median slow points or chokers, chicanes, traffic circles, and intersection pop-outs may be provided in accordance with this design manual. Road lumps or speed tables may be installed by the City on existing streets under some circumstances. For other tools and detailed information on traffic calming features, refer to the City of San Diego Traffic Calming Guidelines, maintained by the Transportation Department. Designers are required to review such guidelines for additional detailed information regarding traffic calming devices.

5.8.2 Traffic Calming Considerations and Guidelines

Considerations:

- Weigh the undesired effects of traffic calming devices (increased travel times, emergency response times, noise, and traffic diversion) against their prescribed benefits.
- Proposed developments can benefit from neighborhood traffic management strategies. Traffic concerns related to speeding and traffic volumes can often be anticipated and prevented through proper street design. New development and infill (redevelopment) projects can be designed to either incorporate traffic calming devices or avoid the need for traffic calming devices altogether.
- During the development review process the following factors are most crucial in determining the need for traffic calming devices or layout redesign:
  - Traffic volumes: The average daily traffic (ADT) on local residential streets should be minimal, not exceeding 1,500 vehicles. High traffic volumes on local residential streets would be a reason to include traffic calming measures or redesign street layout. During development review, if a residential street were estimated to carry more than 1,500 vehicles then the street layout would require redesign. This would help to reduce speeds on higher volume residential streets.
  - Traffic speeds
  - Street layout
  - Vehicle/pedestrian conflict areas

- Through the City's development review process, if staff determines that the proposed layout is problematic based on the above factors, then staff can request a redesign of the layout to reduce or avoid future traffic-related problems.
- Potential indicators of speeding issues may include:
  - Where there is a distance of greater than 600 feet between traffic control or traffic calming devices
  - Where roadway grades may increase the potential for speeding.
  - Where the effective travel width is large due to a lack of on-street parking or lightly used bike lanes.

Guidelines:

- Traffic calming measures are not typically installed at roadway classifications higher than local streets, per community plan roadway network classifications, except in limited instances (such as use of V-Calm signs).
- Use traffic calming techniques in appropriate locations to reduce vehicle speeds or discourage shortcutting traffic.
- Traffic calming should not impair the mobility of non-motorized users on the street.
- Choose traffic calming devices to best fit the situation for which it is intended. If a pedestrian-oriented land use is located in an area where high speed or high traffic volumes are unavoidable,

then neighborhood traffic management measures should be selected that benefit pedestrians. For example, at an intersection or at mid-block locations, bulb outs, raised crosswalks or center island narrowing should be given some preference over other measures, such as intersection realignment or road lumps.

- Design traffic calming devices appropriately, including consideration for accessibility, drainage, underground utilities, adequate visibility, the needs of emergency, sanitation, and transit vehicles, and landscaping.
- Traffic calming installations must meet State and Federal accessibility requirements including PROWAG and Title 24.
- Delays to emergency vehicles should be minimized by the appropriate placement and design of traffic calming devices. In some cases, certain traffic calming devices may not be appropriate.
- Traffic calming installations should not divert traffic to other local residential streets. The potential impacts of traffic diversion should be evaluated for all traffic calming installations.
- Traffic calming devices on designated transit routes should be limited to those that permit the efficient movement of transit vehicles.
- All traffic calming installations are encouraged to have a landscape element that includes trees and shrubs consistent with the Landscape Standards.
- Maintenance responsibilities must be identified prior to implementation.
- If traffic calming devices include decorative pavement, it shall comply with the standards and guidelines in Section 6.5.1 of this Manual.
- Traffic calming devices will be clearly marked and visible during the day and night. Where appropriate, they should include warning signs on all approaches of traffic affected by the device. All physical devices will be designed with aesthetics in mind to provide for landscaping and visual contrast in the roadway.
- Traffic calming measures should conform to the Traffic Calming Guidelines and the Landscape Standards where applicable.

5.8.3 Horizontal Deflections

Horizontal deflections are used to achieve speed reductions by breaking up the linear path of vehicle travel. Traffic calming designs that involve horizontal shifts in the travel way are inappropriate for multilane collector streets, major streets, and arterials. Horizontal deflections include chicanes (mid-block), traffic circles (intersections), and median slow points (mid-block and intersections).

Curb extensions can be implemented using low-cost, interim materials. In such cases, curb extensions should be demarcated from the existing road- bed using temporary curbs, bollards, planters, or striping.

5.8.3.1 Chicanes

A chicane is a channelization that causes a series of tight turns in opposite directions in an otherwise straight stretch or road (see Figure 5–51). The combination of narrowed street width and the serpentine path of travel slows traffic.

Benefits:

- Slows traffic.
- Potential opportunity for landscaping.
- Tendency not to divert traffic to nearby streets.

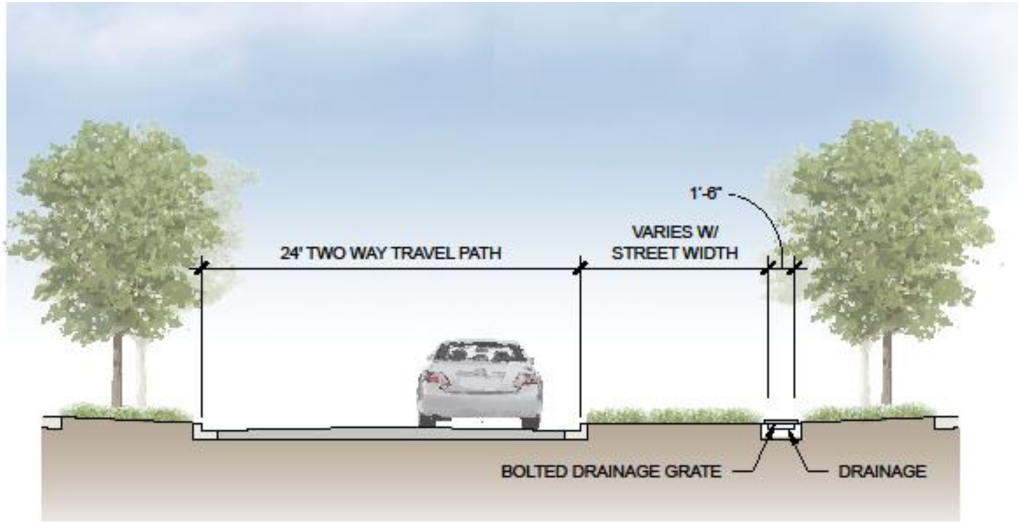


FIGURE 5-56 CHICANE SECTION A-A

Note:

1. *Spacing of chicane segments depend on site considerations, e.g. driveway locations.*
2. *Island plantings should not obscure driver's view of chicane traffic (24" maximum height).*
3. *Stamped concrete may be used in the chicane island.*
4. *Bicycles are to use the same path as motor vehicles, not the drainage channel.*

Considerations:

- On new streets, chicanes narrow the street by widening the sidewalk or landscaped parkway.
- On streets considered for retrofit, raised islands are installed to narrow the street.
- Chicanes are inappropriate for use on streets classified as collector or higher, bus routes or emergency response routes, where there is a grade that exceeds 5 percent, or where there is limited stopping sight distance such as at the crest of a hill.
- Chicanes may cause some loss of on-street parking, may impact driveways, may increase emergency response time, or may affect drainage and street sweeping.
- Careful consideration must go into the design to make sure that drivers are not able to drive directly down the center without any horizontal deflection. This tool should be avoided on roads that have significant horizontal and/or vertical curves.

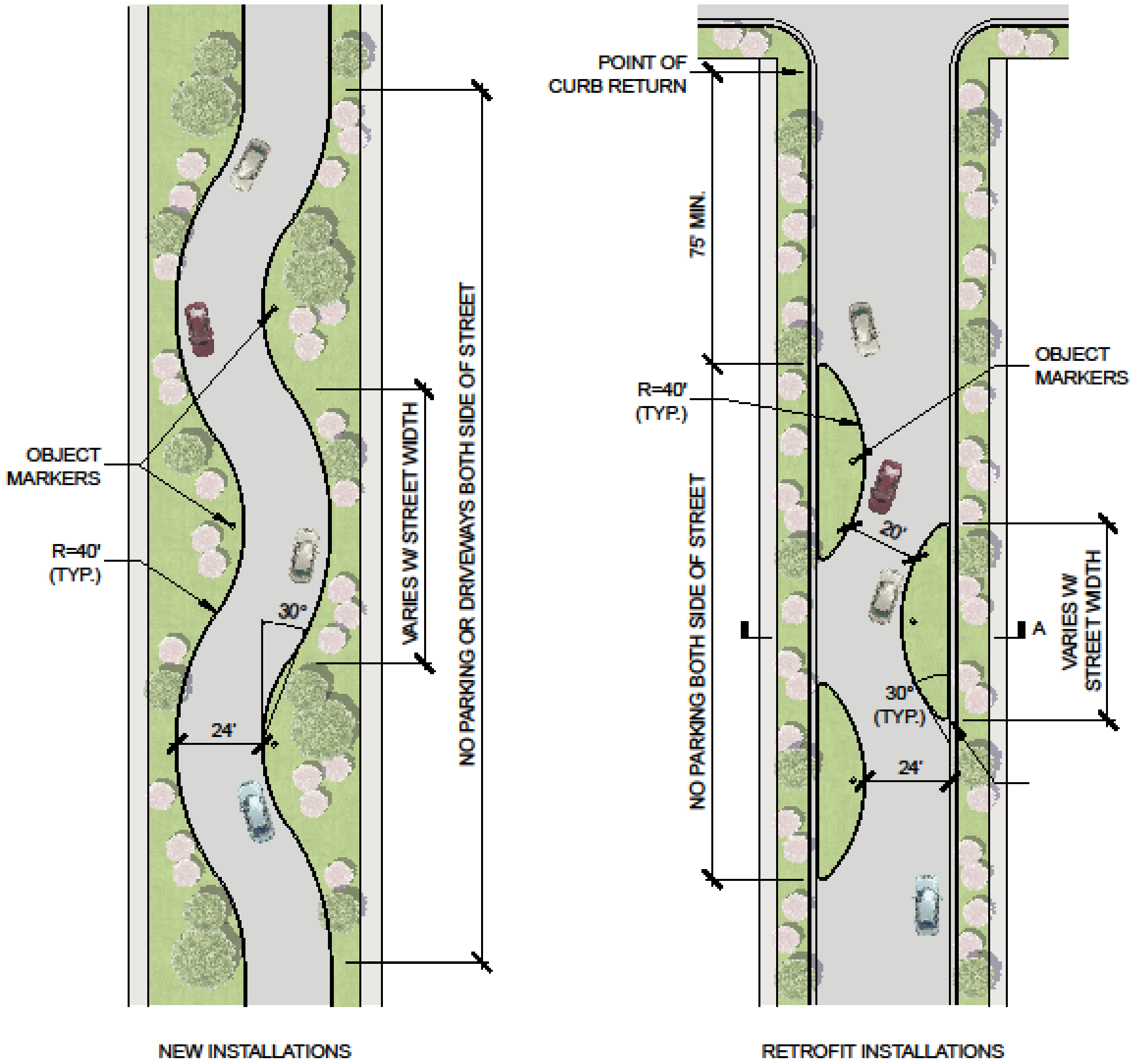


FIGURE 5-6 CHICANE PLAN VIEW

Guidelines:

- Chicanes are created by installing a series of two or more curb extensions, alternating from one side of the roadway to the other. This creates an S-shaped path for vehicles.
- Chicanes can be either one or two lanes. One lane chicanes should only be used on roads with low traffic volumes. This tool is best used on long, straight streets with low volumes due to the single lane of travel through the chicane.

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.3.2 Chokers/Pinch points

Chokers are created by installing one set of curb extensions at opposing locations on a roadway. This narrows the travelway but maintains two-way traffic. Curb extensions visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, and street trees. They may be implemented on downtown, neighborhood, and residential streets, large and small.

Benefits:

- A set of curb extensions decrease the overall width of the roadway and can serve as a visual cue to drivers that they are entering a neighborhood street or area.

Considerations:

- Creates opportunity to install landscaping.
- May cause a reduction of on-street parking.
- May increase maintenance and emergency response time.
- May impact drainage and street sweeping.
- More difficult access for larger vehicles.
- Requires bicyclists to merge with vehicles.
- Bicycle racks can be combined with curb extensions.
- Crossings do not need to be marked unless volumes exceed 2000–3000 vehicles per day or midblock destinations warrant an enhanced treatment.
- Potential location if combined with pedestrian crossing features.
- This device works best at mid-block locations that have sufficient volumes so that opposing traffic would be approaching or passing through the choker at the same time. This discourages drivers from traveling down the center of the roadway to avoid any impacts of the chokers.

Guidelines:

- Narrowing measures, such as bulb outs or chokers, should not be constructed wider than the approximate width of a parked vehicle. Extension of these devices any further than the width of a parked vehicle (or the length of a vehicle in the case of diagonal parking) could present potential safety issues to other drivers.
- Consider including cut-throughs for bicyclists.
- There should be enough roadway width maintained between the chokers to accommodate bicycle and vehicle traffic.

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.3.3 Median Slow Point

A median slow point is a small median or island placed in the center of a roadway that causes traffic to shift its path to the right in order to travel around it (see Figure 5-53). It may be on an approach to an intersection or mid-block. If median slow points are installed across an intersection, the street should have alternative access points.

Benefits:

- Slows traffic
- Creates a pedestrian refuge area.
- Creates a landscaping opportunity.
- Tends not to divert traffic to nearby streets.

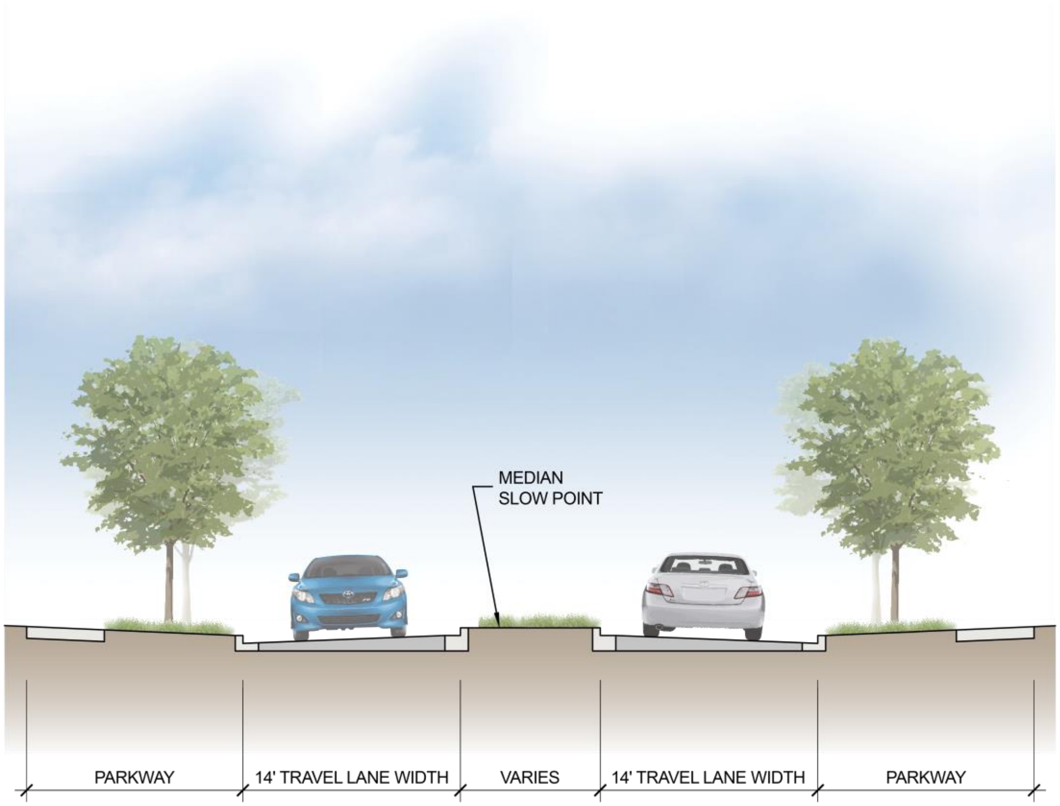
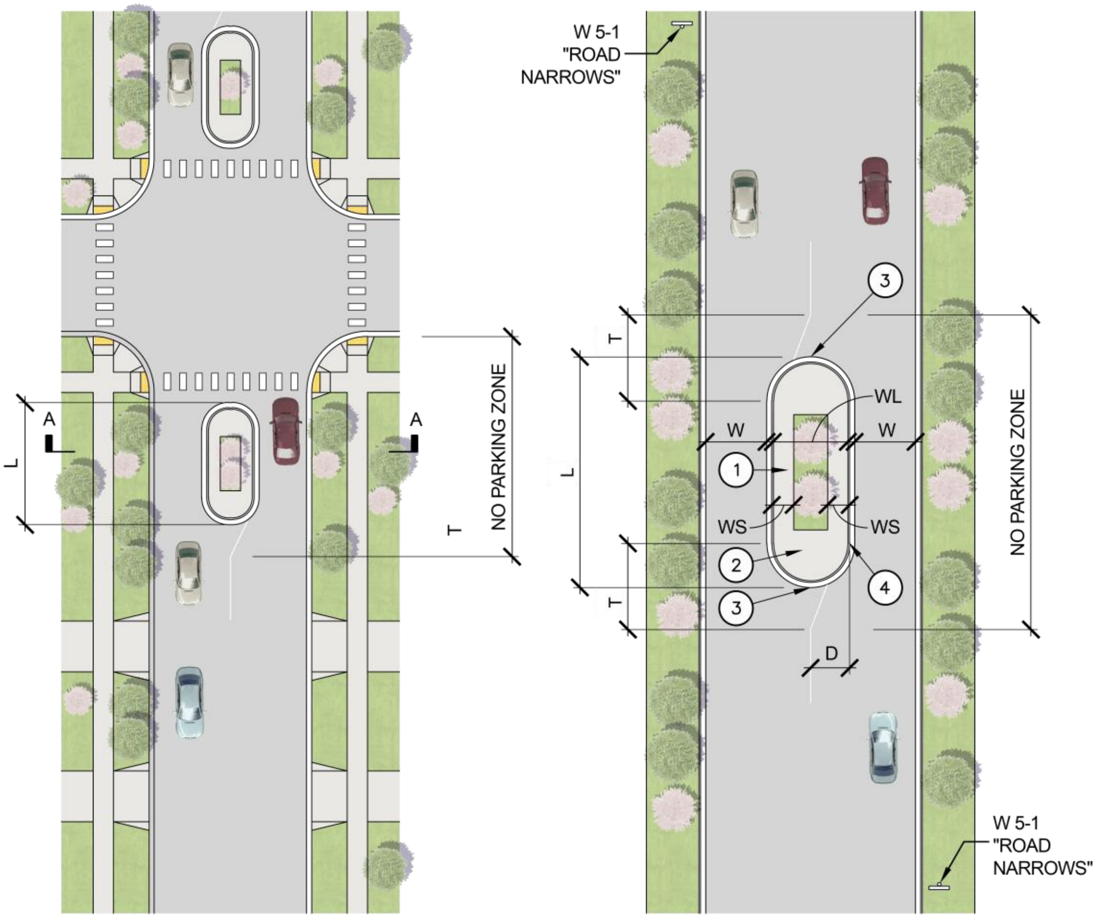


FIGURE 5-58 MEDIAN SLOW POINT SECTION VIEW



1. AREA THAT MAY BE LANDSCAPED (LANDSCAPE, IRRIGATION, AND LONG TERM MAINTENANCE MUST BE CONSIDERED BY A MAINTENANCE ASSESSMENT DISTRICT OR OTHER AGREEMENTS WITH THE CITY OF SAN DIEGO)
2. STAMPED CONCRETE
3. YELLOW PAINTED ISLAND NOSE
4. 6" CURB

W - TRAVEL LANE WIDTH - 14'
WL - WIDTH OF SLOW POINT (VARIES DEPENDING ON STREET WIDTH)
WS - FOR LANDSCAPED SLOW POINT, 2' TYPICAL
L - LENGTH OF SLOW POINT, VARIES DEPENDING ON PARKING AND DRIVEWAYS
D - HORIZONTAL DEFLECTION

$T = \frac{(DXS^2)}{60}$ WHERE:
D = DEFLECTION IN FEET
S = 85TH PERCENTILE SPEED IN MPH

FIGURE 5-7 MEDIAN SLOW POINT PLAN VIEW

Consideration:

- Potential loss of parking.
- May impact large vehicles' turns when installed at intersections.
- May be used on two-lane streets.
- If installed across an intersection, street should have alternative access.
- Inappropriate for use on streets classified as major or higher or where there is limited stopping sight distance.

Guidelines:

- Median slow points may be used on two-lane streets. They should not be used on streets classified as major or higher or where there is limited stopping sight distance.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.3.4 Treatment on Curves

Curve Treatments such as raised median or raised pavement markers placed along the centerline of a sharp curve will prevent or discourage vehicles from cutting across the centerline and into the opposing travel lane.

Benefits:

- Speed reduction: Vehicle speeds are generally reduced due to the shorter radius of the vehicle path around the curve.
- Channelizes vehicular traffic and limits midblock left turns where appropriate.
- Provides, at times, a pedestrian refuge on a wide street at pedestrian crossings.
- Collision reduction.

Considerations:

- Potential loss of parking.
- May restrict access to driveways in vicinity of device.

Guidelines:

- Raised pavement markers (Botts dots) can be installed.
- Medians can be installed if there is sufficient roadway width. However, median installation has the potential to block driveway access. Openings may be cut in the median to accommodate this situation.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.4 Vertical Deflections

Vertical deflections are an effective traffic calming technique for speed reductions and discouraging shortcutting on local streets. Traffic calming designs that involve vertical shifts are inappropriate for collectors, major streets, and arterials. Vertical deflections include road humps and speed tables/raised crosswalks.

Vertical speed control elements should be applied where the target speed of the roadway cannot be achieved through the use of conventional traffic calming elements, such as medians, narrower roadways or lanes, curb extensions, enforcement or lower speed limits.

Streets with speed limits of 25 mph and under are good candidates for vertical speed control, especially where those streets have higher than desired operating speeds or are used by cut-through traffic on a regular basis.

Vertical speed control elements are most effectively implemented at a neighborhood level, rather than by request on a single street. Designate "Slow Zones" where traffic calming treatments should be targeted or coordinated in a comprehensive way.

Unless otherwise desired, vertical traffic calming should reduce a street's target speed to 20 mph or less.

5.8.4.1 Road Lumps

Road lumps are rounded, raised areas placed across the road. Road lumps are approximately 12 feet long (in the direction of travel), 3.5 inches high, and parabolic in shape. They are usually constructed with a taper on each side within 1 or 2 feet of the gutter line to allow unimpeded drainage between the hump and curb. Road lumps have cut-outs placed in them so that an emergency vehicle can pass through lumps instead of going over them (see Figure 5-55 and 5-57).

Benefits:

- Speed reduction: reduce speeds to 15–20 mph
- Volume reduction
- Collision reduction
- May discourage cut-through traffic

Considerations:

- Uncomfortable for bicyclists and vehicle passengers.
- Creates noise when vehicles brake and accelerate.
- EMS/Fire vehicles forced to almost stop at ramp.
- Road lumps will not impede EMS/ Fire response as much as traditional road humps.
- Will have less of an effect on larger vehicles.
- The disadvantages of road lumps may include diverting traffic to other low-volume local streets, increasing emergency response time, and increasing noise.
- The height causes the driver to be jolted if traveling at too high of a speed. However, due to the advance in vehicle suspension systems, this device may not affect all drivers. It must be cautioned that these devices do have a severe impact on emergency response services and can create an uncomfortable situation for all passengers including those in ambulances.

Guidelines:

- Road lumps should not be used on streets classified as collector or higher, bus routes or emergency response routes, where there is a grade that exceeds 5 percent, or where there is limited stopping sight distance.
- Ramp profile describes the angle or approach of the vertical measure that a vehicle would traverse. Vertical measures (e.g., speed lumps) should use parabolic profiles on the approach and departure ramps to the device. Parabolic profiles have consistently been used in other programs around the nation and are a recommended design according to Institute of Transportation Engineers: Guidelines for the Design & Application of Speed Humps (ITE 1993).

    - Sinusoidal profiles have slightly less reduction effects on speed than circular and parabolic profiles but higher comfort levels for vehicles and bicyclists and are typically more difficult and expensive to construct due to the slope of the profile.
    - Circular profiles have moderate reduction effects on speeds (compared to the two other profiles) and comfort levels for vehicles and bicyclists.
    - Parabolic profiles have the greatest reduction effects on speeds but have the lowest comfort levels for vehicles and bicyclists due to the greater rise in the slope of the profile.

- Edge taper refers to the transition area between a vertical measure at its full height and the edge of the device. Edge tapers on vertical measures (e.g., speed lumps and excluding raised crosswalks) should extend to the edge of the pavement (i.e., not into the gutter) to prevent blocking the gutter drainage.
- On streets without vertical curbs, the edge taper should extend the full length of the pavement width to discourage drivers from straddling or driving around the vertical measure. In addition, an advisory sign (or other barrier) should be placed on either approach of the vertical device to prevent drivers from driving around the device.
- Vertical devices should extend across any parking or bike lane to prevent drivers from veering into the bike lane. Consequently, bicyclists will traverse the even section (as opposed to the tapered portion) of the device. In addition, vehicles parking on the street will have the option to park on a portion of the device or avoid the device entirely.
- Road humps should be designed to the following criteria:

    - Slopes should not exceed 1:10 or be less steep than 1:25.
    - Side slopes on tapers should be no greater than 1:6.
    - The vertical lip should be no more than a quarter-inch high.
    - Road humps should be approximately 3 ½ inches tall and span the width of the road.
    - The ramp length should span 3–6 feet.
    - Vertical speed control elements should be located where there is sufficient visibility and available lighting.
    - Road humps shall not be placed in front of driveways or other significant access areas. Where frequent driveways make the application of a speed hump difficult, reduce the overall size of the speed hump, or work with local residents to find a workable solution.

- Road humps may be applied on 1-way or 2-way roads.
- Spacing for vertical speed controls should be determined based on the target speed of the roadway. Speed humps should be spaced no more than a maximum of 500 feet apart to achieve an 85th percentile speed of 25–35 mph. To achieve greater speed reductions, space speed humps closer together.

- Bus routes may have speed cushions installed on certain routes. Work with local transit providers and bus companies to ensure that drivers are aware of traffic calming devices and can effectively use wheel cut-outs provided.

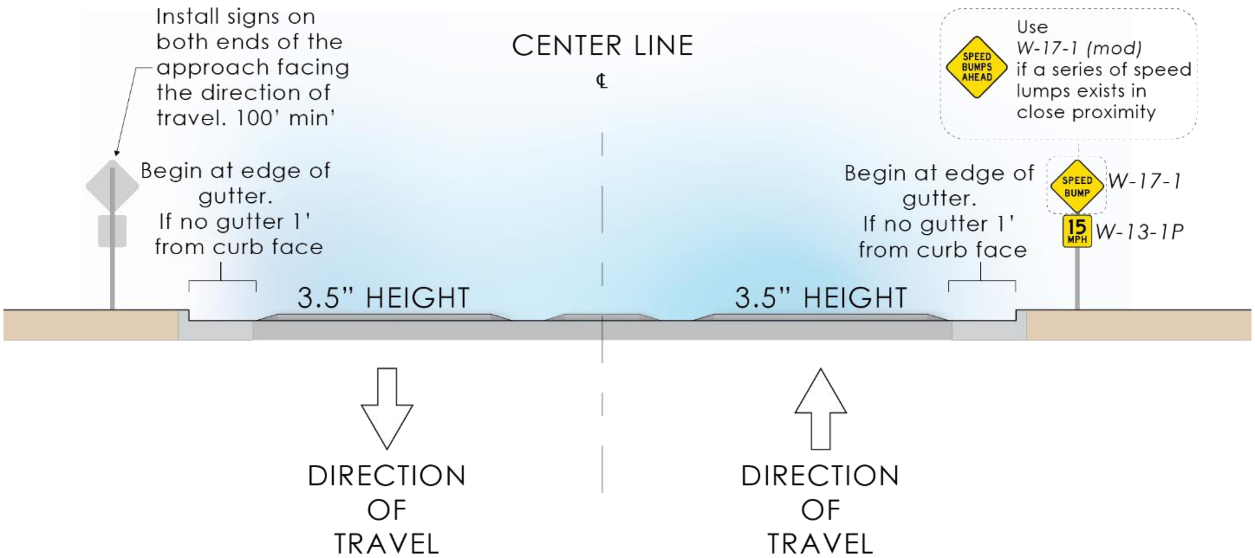


FIGURE 5-60 ROAD LUMPS SECTION A-A

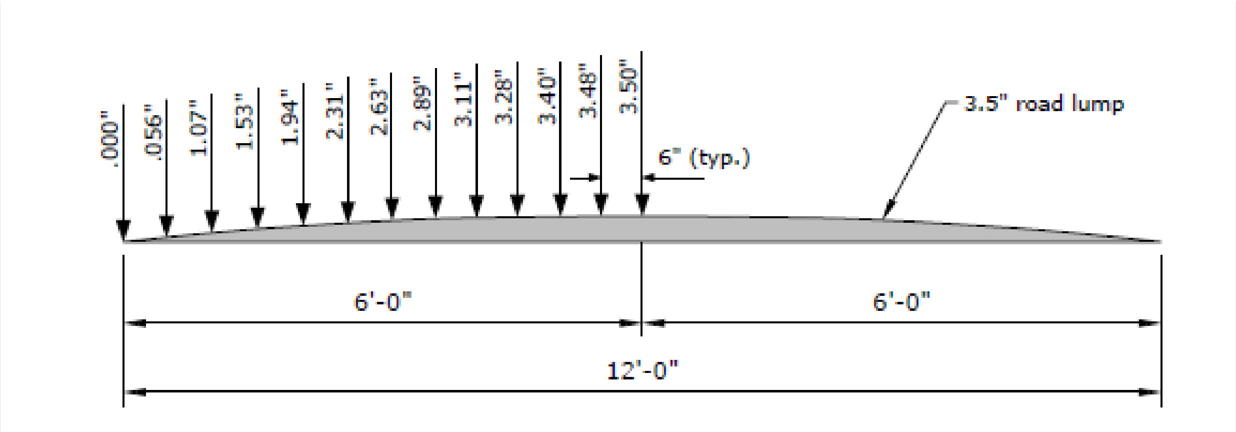


FIGURE 5-61 ROAD LUMP SECTION B-B

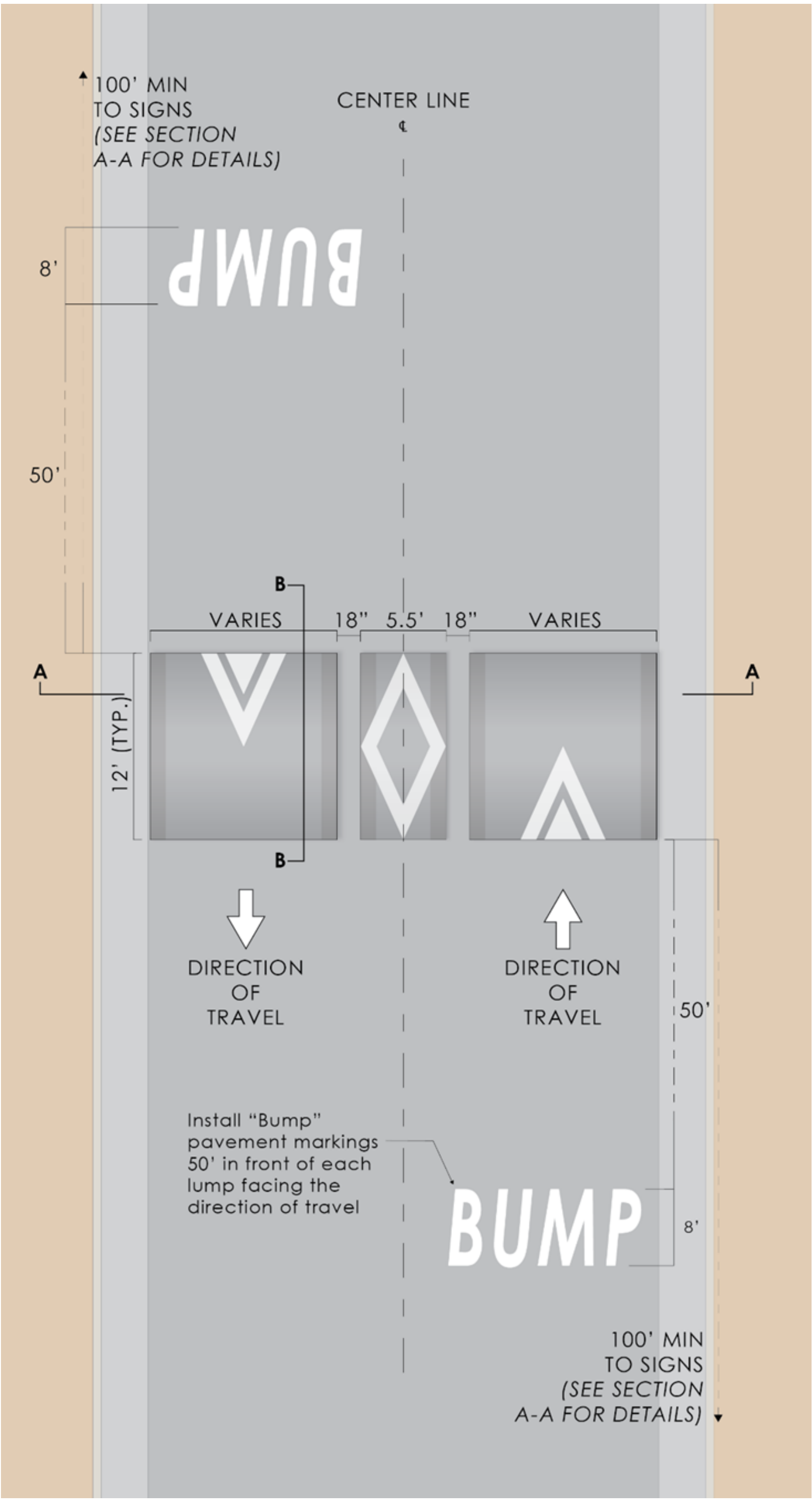


FIGURE 5-62 ROAD LUMPS PLAN VIEW

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.4.2 Speed Tables/Raised Crosswalks

Speed Tables are vertical deflection devices that have ramps on both sides of a flat surface. The vertical deflection encourages traffic to slow down.

Essentially, speed tables are flat-topped speed humps, often constructed with concrete, brick, or other textured materials on the flat section.

Benefits:

- Speed tables and raised crosswalks reduce vehicle speeds.
- Raised crosswalks enhance pedestrian safety.
- Slows traffic
- Discourages short-cutting

Considerations:

- EMS/Fire vehicles forced to almost stop at ramp.
- Creates more noise from decelerating and accelerating.
- May cause bicycle safety issues if non-standard pavement treatments are used.
- Speed tables are often designed using unit pavers or other distinctive materials. Distinctive materials may require additional maintenance responsibilities, but help to highlight and define the speed table for both bicyclists and pedestrians.
- They are most effective when installed in groups of two or more, about 300 feet apart.
- The effectiveness of the speed table can be varied by changing the shape of the ramps and/or texture of the table. Steeper ramps will cause a greater reduction in vehicular speeds. Similarly, texturing the table will also cause a greater reduction in speeds. Textured pavement may affect bicyclists but can be designed to take bicycle safety into account.
- The disadvantages of speed tables/raised crosswalks may include diverting traffic to nearby low-volume local streets, increasing noise, and increasing emergency response times. Speed tables/raised crosswalks should not be installed on streets classified as collector or higher, bus routes or emergency response routes, where there is a grade that exceeds 5 percent, or where there is limited stopping sight distance.
- Inappropriate for use on:
  - Streets classified as collector or higher
  - Emergency response routes
  - Where there is limited stopping sight distance
  - Where there is a grade that exceeds 5%

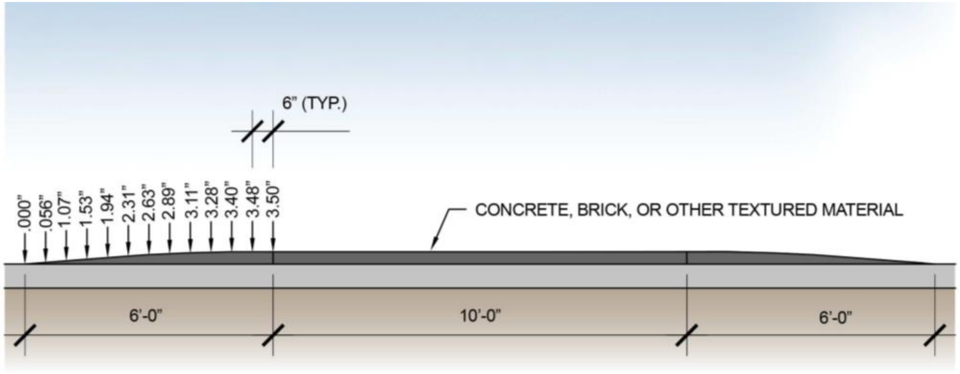


FIGURE 5-63 SPEED TABLE PITCH SECTION A-A

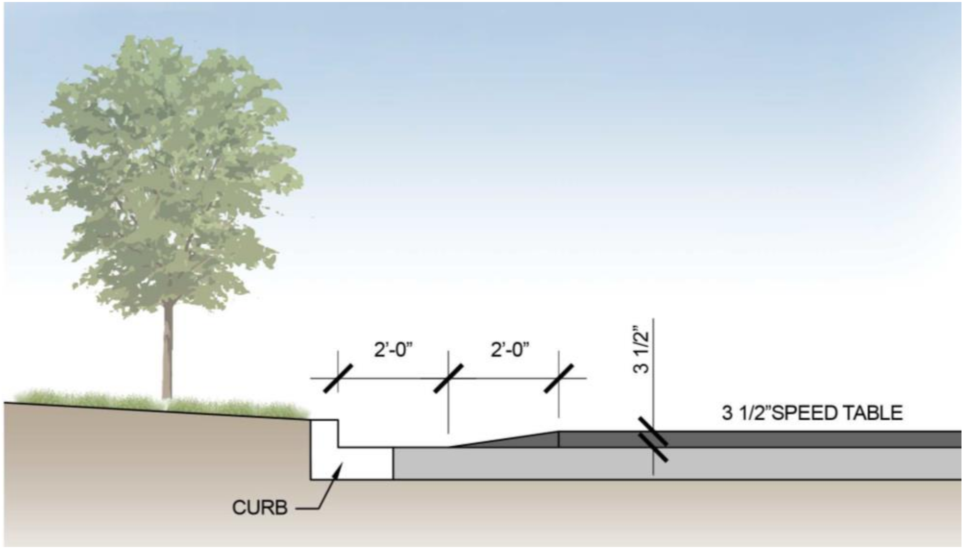


FIGURE 5-64 SPEED TABLE SECTION B-B

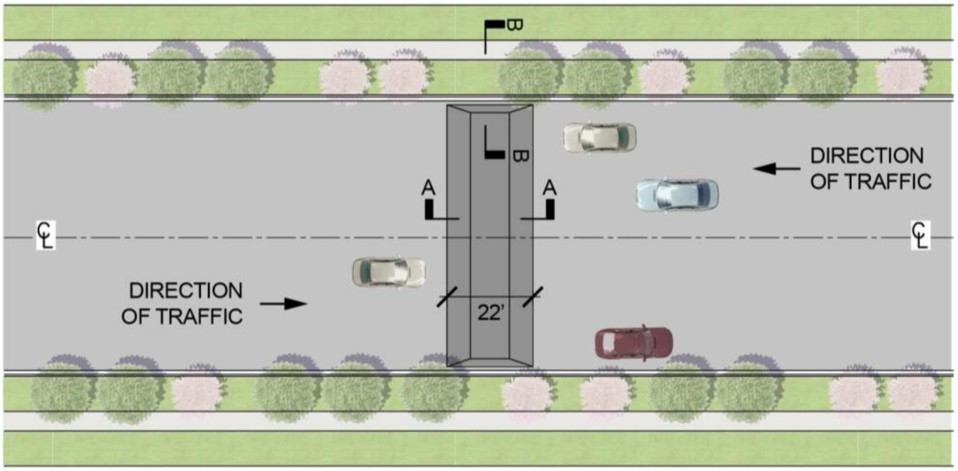


FIGURE 5-65 SPEED TABLE PLAN VIEW

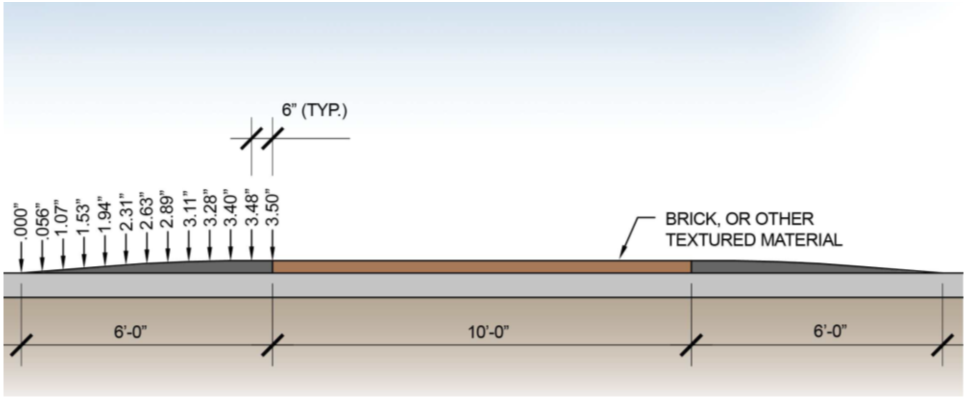


FIGURE 5-66 RAISED CROSSWALK SECTION A-A

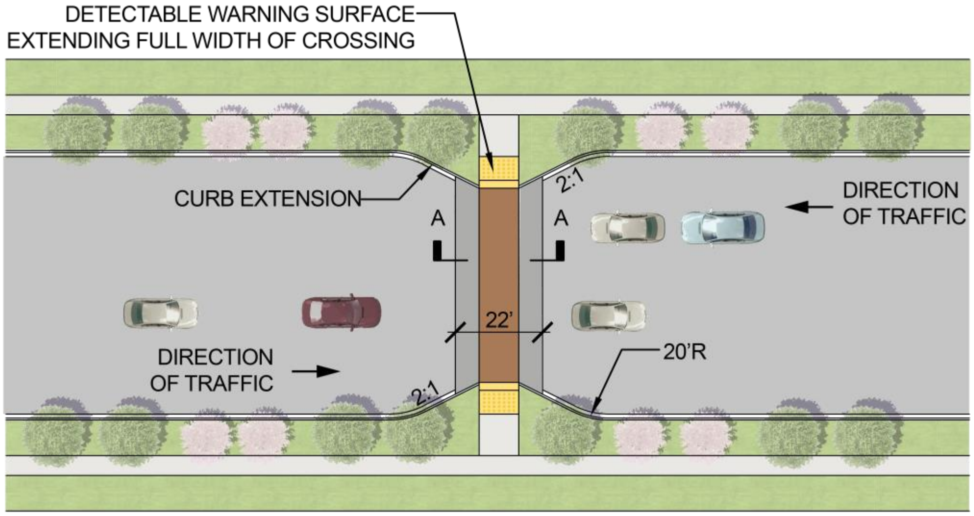


FIGURE 5-67 RAISED CROSSWALK PLAN VIEW

Notes:

1. *Drainage requirements must be evaluated and addressed.*
2. *Crosswalk should meet traffic engineering requirements approved by the City Council. Refer to Council Policy 200-07.*
3. *Refer to CA MUTCD for appropriate signs and markings.*

Guidelines:

- Vehicle operating speeds for streets with speed tables range from 25–45 mph, depending on the spacing.
- Where extended from curb-to-curb and appropriately marked, speed tables serve as raised crosswalks. Drainage requirements must be evaluated and addressed where raised crosswalks are installed (see Figures 5-63 through 5-67).
- Speed tables may be used on collector streets and/or transit and emergency response routes. Where applied, speed tables may be designed as raised midblock crossings, often in conjunction with curb extensions.
- Speed tables should not be applied on streets with curb-to-curb width wider than 50 feet. On 2-way streets, speed tables should be applied in both directions.
- Slopes should not exceed 1:10 or be less steep than 1:25.

- Side slopes on tapers should be no greater than 1:6.
- The vertical lip should be no more than a quarter-inch high.
- Locate vertical speed control elements where there is sufficient visibility and available lighting.
- Speed tables and raised crosswalks are 3.5 inches high and 22 feet long in the direction of travel, with 6-foot ramps at the ends and a 10-foot flat area on top. Concrete, brick, or other textured materials improve the appearance of speed tables/raised crosswalks and draw attention to them. Speed tables are less jarring than the standard 12-foot road lumps.
- Where a speed table coincides with a crossing or crosswalk, it should be designed as a raised crosswalk. See Section 6.4.4. for additional guidance on integrating raised crosswalks with speed tables.
- Speed tables can be used in conjunction with a mid-block pedestrian crossing. The speed table may increase the visibility of pedestrians at mid-block locations (see raised crosswalk).
- May only be used on low ADT two-lane collectors that do not have two-way left-turn lanes or dedicated left-turn pockets.

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept 2010

5.8.5 Improvements at Intersections

Traffic calming improvements at intersections discussed in other sections of this Manual include:

- Raised intersections and crosswalks (Section 6.4.4)
- Roundabouts and traffic circles (Sections 6.7.2 to 6.7.4)
- Pedestrian islands (Section 6.4.5)

5.8.5.1 Gateway and Entrances

Gateway/Entrance features are used on local streets at the intersection with a collector or major arterial. The purpose of a gateway/ entrance feature is to alert the driver that they have left the arterial roadway and have entered a residential neighborhood. An example of a gateway treatment is a median with a specimen tree or neighborhood sign and textured roadway pavement.

Benefits:

- Speed reduction
- Increases visibility
- Reduces pedestrian crossing distance
- Allows for enhancements such as greenery
- Improved pedestrian safety
- May discourage cut-through traffic
- May provide a pedestrian crossing refuge

- Strengthens neighborhood identity
- Changes driving environment (e.g. major to residential)

Considerations:

- May cause difficulty for large vehicles to make right turns.
- The use of textured pavement may affect bicyclists, but can be designed in order to take bicycle safety into account.
- Similar to Median Slow Points (6.4.3.5), Gateway/Entrance Features may be used on local streets at their intersections with collector, major, or arterial streets. They alert the driver that they are entering a residential neighborhood. A typical gateway treatment may include a center median with a specimen tree or neighborhood sign and textured roadway pavement.
- Combine stormwater management features, such as bioswales or rain gardens, with curb extensions to absorb rainwater and reduce the impervious surface area of a street.
- In advance of a full reconstruction, gateways can be designed using striping or signage that communicates the entrance into a slow zone.

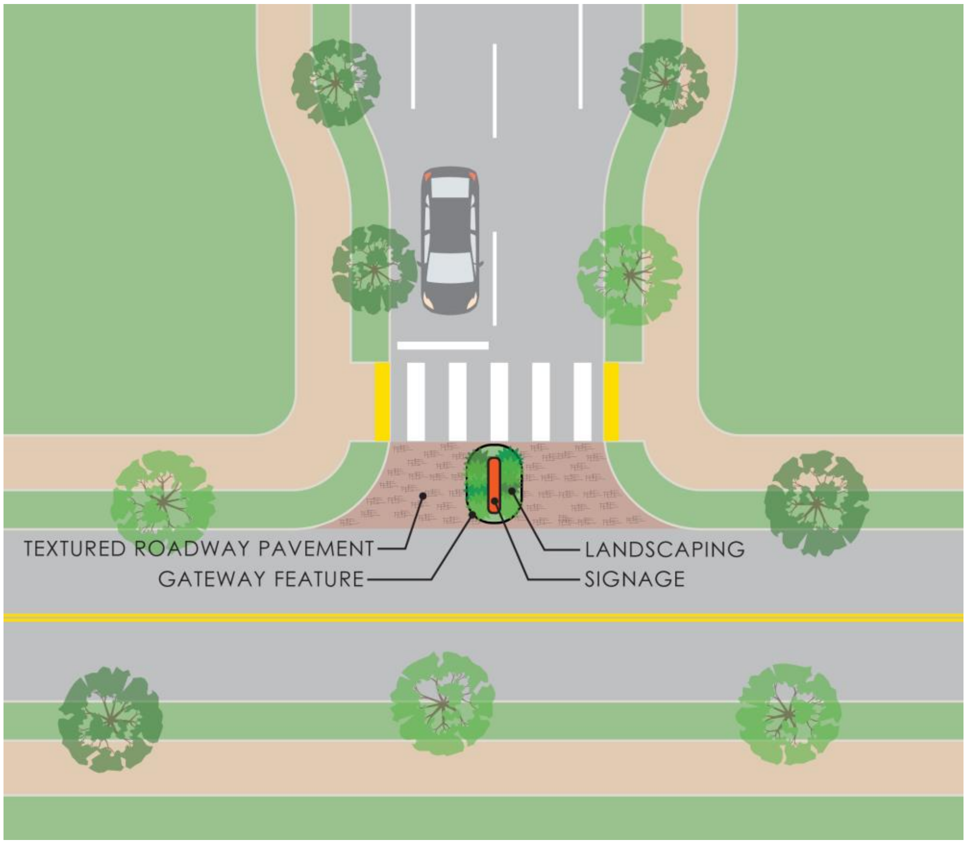


FIGURE 5-68 GATEWAY TREATMENT

Guidelines:

- The length of a curb extension should at least be equal to the width of the crosswalk but is recommended to extend to the advanced stop bar.

- A curb extension should generally be 1–2 feet narrower than the parking lane, except where the parking lane is treated with materials that integrate it into the structure of the sidewalk.
- Curb extensions should be installed whenever on-street parking is present.
- Neighborhood Signs may be placed at the entrances to the neighborhood raising driver awareness about the type of area they are entering.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.5.2 Short Intersection Medians/Median Slow Points

Short Intersection Medians/Median Slow Points can be installed on any leg of an intersection to slow fast-turning vehicles. The median forces vehicles to make a turn along a smaller radius, rather than making a higher speed turn on a larger radius, thereby slowing traffic.

Benefits:

- Speed reduction
- Collision reduction
- Pedestrian safety and refuge
- Potential for reduction of left-turn speeds
- Possible opportunity for landscaping

Considerations:

- Potential loss of parking
- May restrict access to driveways in vicinity of device.
- The medians may restrict some larger vehicles, such as fire trucks, buses or moving vans, from making left turns at the intersection.

Guidelines:

- This device may be installed at mid-block locations to achieve the same effect by forcing traffic to shift its path to travel safely around the median. However, this tool may block access to some driveways. Also, it may require removing some parking.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.5.3 Intersection Bulbouts/Pop-Outs

Intersection bulbouts, also known as pop-outs, are curb extensions that narrow the street at intersections by widening the sidewalks at the point of crossing.

Benefits:

- Speed reduction
- Shorten pedestrian crossings and reduce the visual width of long, straight streets.
- Where intersection pop-outs are constructed by widening the landscaped planting strip, they can have a positive effect on the visual appearance of the neighborhood.
- Pop-outs can be used at intersections to create a street gateway effect, visually announcing an entrance to a neighborhood. Intersection pop-outs must accommodate bicyclists, transit vehicles, and emergency response vehicles (see Figure 5-64).
- Volume reduction
- Improved pedestrian safety
- Collision reduction
- Increase the visibility of pedestrians to drivers.
- Speed reduction for through traffic
- Speed reduction for right turning vehicles as curb extensions tighten intersection curb radii and encourage slower turning speeds.

Considerations:

- Difficult for emergency vehicles and larger vehicles to turn.
- May force bicyclists into travel lanes.
- Should be coordinated with bicycle and pedestrian crossing features (see Chapter 6)
- May require parking removal.
- Intersection pop-outs may be installed on local streets, collector streets, and urban major streets.
- Minimal geometric features are included in this manual because intersection pop-outs are site-specific and should be designed on a case-by-case basis.
- Drainage requirements must be evaluated and addressed.
- Additional curb ramps may be required in order to serve accessible parking spaces.

Guidelines:

- Narrowing measures, such as bulbouts, should not be constructed wider than the approximate width of a parked vehicle. Extension of these devices any further than the width of a parked vehicle (or the length of a vehicle in the case of diagonal parking) could present potential safety issues to other drivers.
- Bulbouts are best used in locations with high pedestrian volumes, such as downtown areas and near schools.

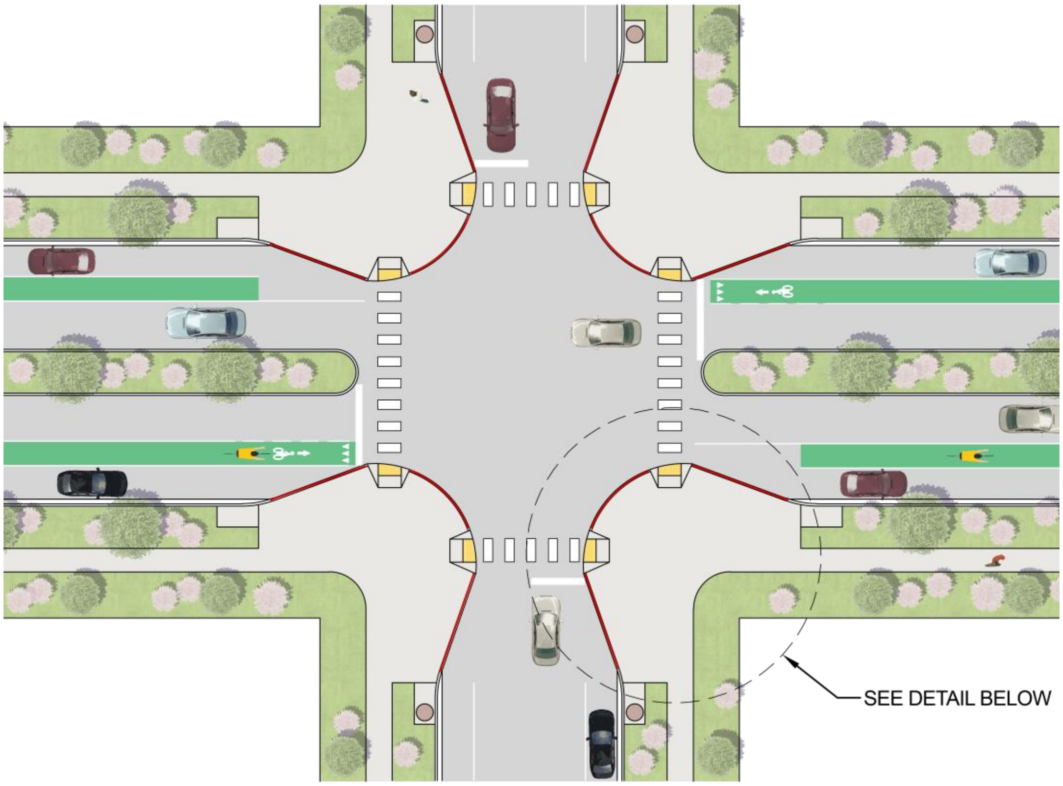


FIGURE 5-69 INTERSECTION POP-OUTS PLAN VIEW

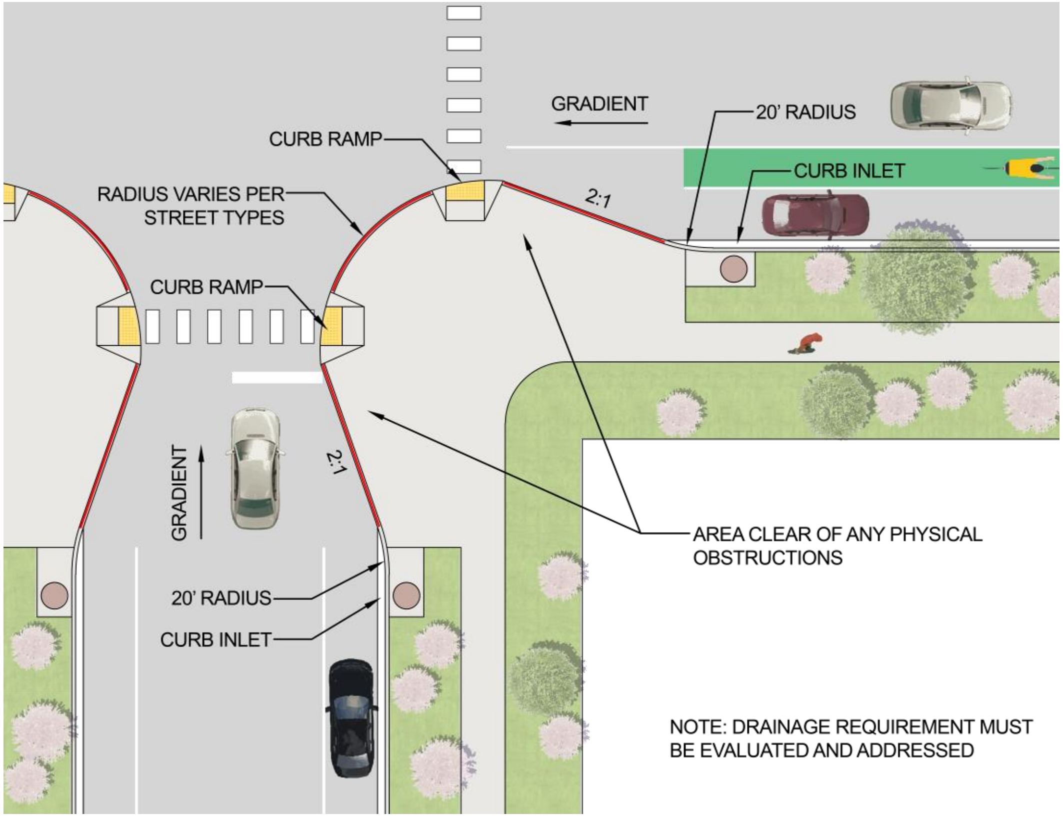


FIGURE 5-70 INTERSECTION POP-OUT DETAIL VIEW

References:

- General Plan, City of San Diego, 2024
- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.5.4 Curb Radius Reduction

Curb Radius Reductions provide tighter corner radii at intersections.

Benefits:

- Speed reduction
- Improved pedestrian safety
- Collision reduction
- Slows right turn speeds.
- May discourage cut-through traffic.
- Increases the visibility of pedestrian to drivers.
- Shortens pedestrian crossing distance.

Consideration:

- Difficult for large vehicles to make right turns.
- The size of the corner relates directly to the length of the crosswalk. Longer crosswalks take more time to cross, increasing pedestrian exposure risk and diminishing safety.
- A smaller curb radius expands the pedestrian area, allowing for better pedestrian ramp alignment.
- This treatment may not be appropriate in areas that experience high volumes of large vehicles.

Guidelines:

- Table 6-1 refers to the City's standard curb return radii based on intersecting street classification types.
- Additional lane width may be necessary for receiving lanes at turning locations with reduced curb radius.
- In urban settings, smaller corner radii are preferred and actual corner radii exceeding 15feet should be the exception.
- Reduced curb radii should be 10–15 feet in urban areas. These radii lengths could pose issues with street sweeping.
- Minimize effective turning radius where possible by employing one or more of the following techniques:
    - Accommodate trucks and buses on designated truck and bus routes.

- Restrict right turns on red so there is no expectation of turning into the nearest receiving lane.
- Design so that emergency vehicles may utilize the full area of the intersection for making turns.
- Various techniques that accommodate large vehicles, while restricting the turning speed of smaller vehicles, such as truck aprons, may be used to avoid unnecessary widening of the intersection.

- In cases where the curb radius of a given intersection has resulted in an unwieldy crossing distance, but where funding is not available to reconstruct the curb immediately, the appropriate curb radius may be delineated using interim materials such as epoxied gravel, planters, and bollards. This should be a temporary option until funding becomes available for more permanent treatment.
- The effective turn radii must be taken into account when determining the design speed for turning vehicles. The effective turn radius measures the curve of vehicle movement from travel lane to travel lane.

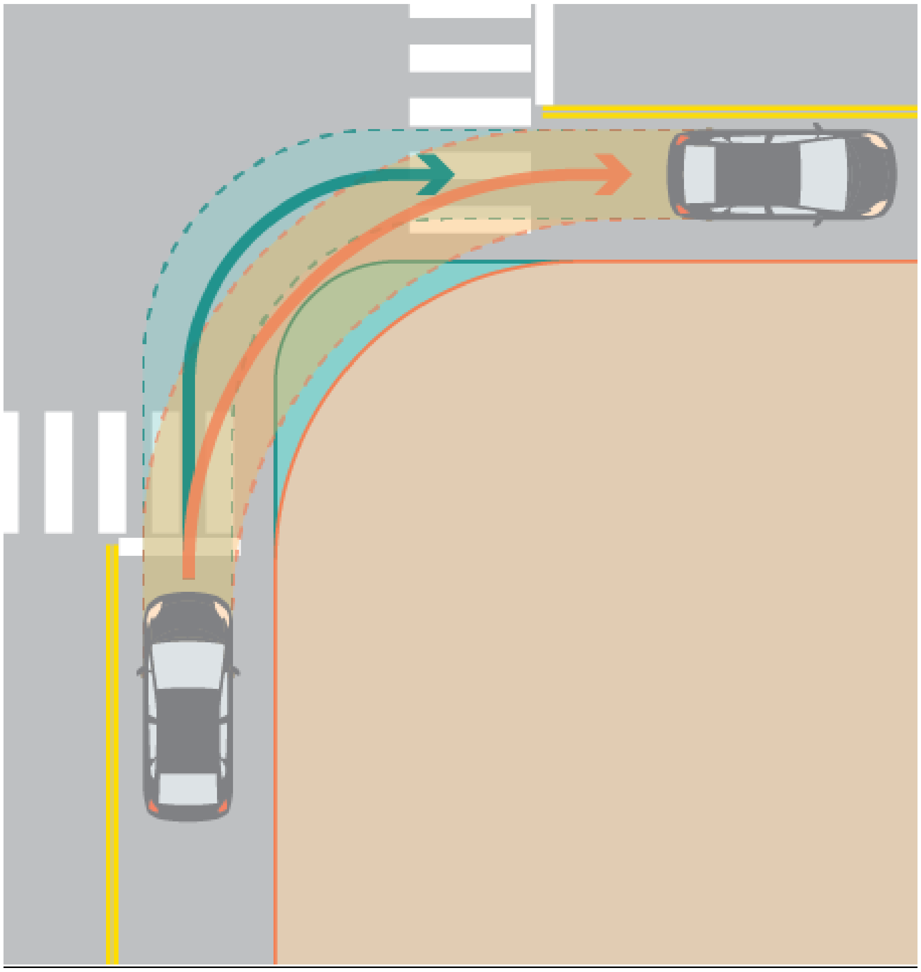


FIGURE 5-71 CURB RADIUS REDUCTION

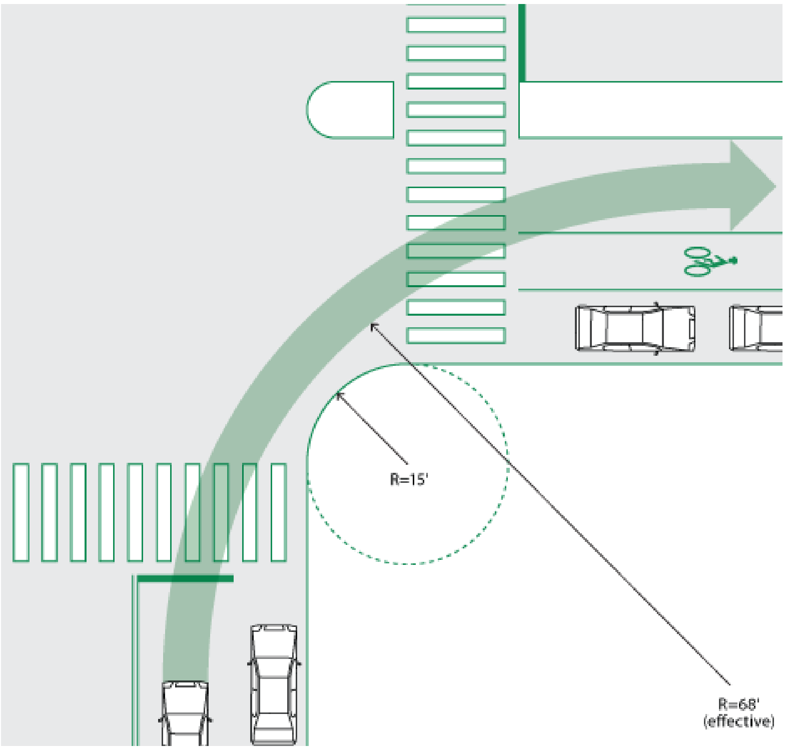


FIGURE 5-72 CURB RADIUS

Source: NACTO Urban Street Design Guide

References:

- General Plan, City of San Diego, 2024
- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.5.5 Realigned T-intersection

Realigned T-Intersections have a bulb-out in the intersection to deflect the through movements so they will follow a curvilinear path. Medians may also be installed on the through street approaches to guide traffic through the intersection.

Realigned T-intersections modify the existing alignment, forcing the once straight through movement to follow a slower, curvilinear travel route. A bulbout is constructed on the major road in the intersection.

Benefits:

- Speed reduction
- Volume reduction
- Collision reduction
- Improves safety
- Reduce overall intersection speeds.
- Provides an opportunity for additional landscaping.

Considerations:

- May be more difficult for large vehicles to make right turn.
- May reduce available parking.
- Need to ensure intersection has adequate lighting.
- Additional right-of-way may be required.

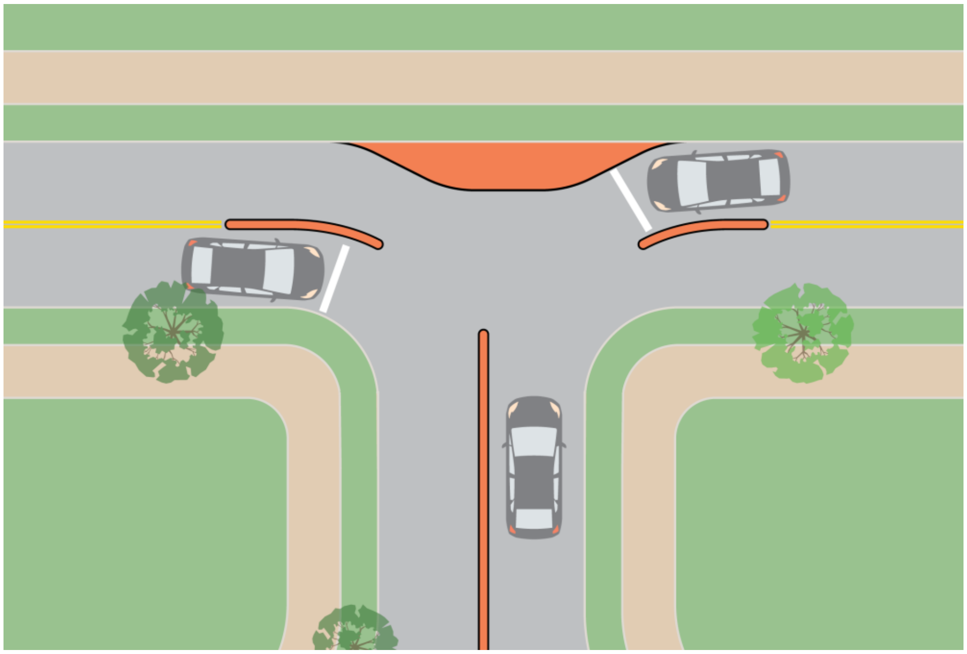


FIGURE 5-73 REALIGNED T-INTERSECTION

Guidelines:

- Stop signs should be installed on the through street rather than the side street. This would allow the side street movement the right-of-way while stopping the through street.
- Medians should also be installed on the major approach legs to guide the traffic through the intersection.

References:

- General Plan, City of San Diego, 2024
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.6 Traffic Diverters

Traffic diversion devices eliminate through trips on streets on which they are installed and divert those trips to other streets. There are several available traffic diversion designs that may be used to calm traffic.

Traffic diverters are not primarily installed for the purpose of speed control. Diverters are best suited on long, straight, low-volume, local residential streets.

Wherever traffic diversion techniques are employed, provision should be made for continuation of pedestrian and bicycle routing around or through the diversion. Care must be taken in design of diversion installations to allow for emergency vehicles.

5.8.6.1 Semi-Diverters

A semi diverter is a barrier to traffic in one direction of a street that permits traffic in the opposite direction to pass through. It is an alternative to one-way street operation for a block and it allows residents on the block limited two-way travel opportunity. A semi diverter may be used on low-volume, local residential streets and it is best located at the end of a block to prevent entrance and allow exit.

Benefits:

- Speed reduction
- Reduces pedestrian crossing widths.
- Volume reduction
- Collision reduction
- Increases pedestrian safety.
- Elimination of cut-through traffic in one direction.
- Potential landscaping opportunity.
- Maintains emergency response access.

Considerations:

- Will change neighborhood traffic patterns.
- Will increase trip length for many residents.
- Will increase traffic on adjacent roadways.
- Drivers can bypass device by traveling on the wrong side of the road.
- Semi diverters may divert traffic to other low-volume streets, may increase trip lengths, may cause loss of parking, and may increase emergency response time.
- Semi diverters are inappropriate for use on bus or emergency response routes or on streets classified as collector or higher.

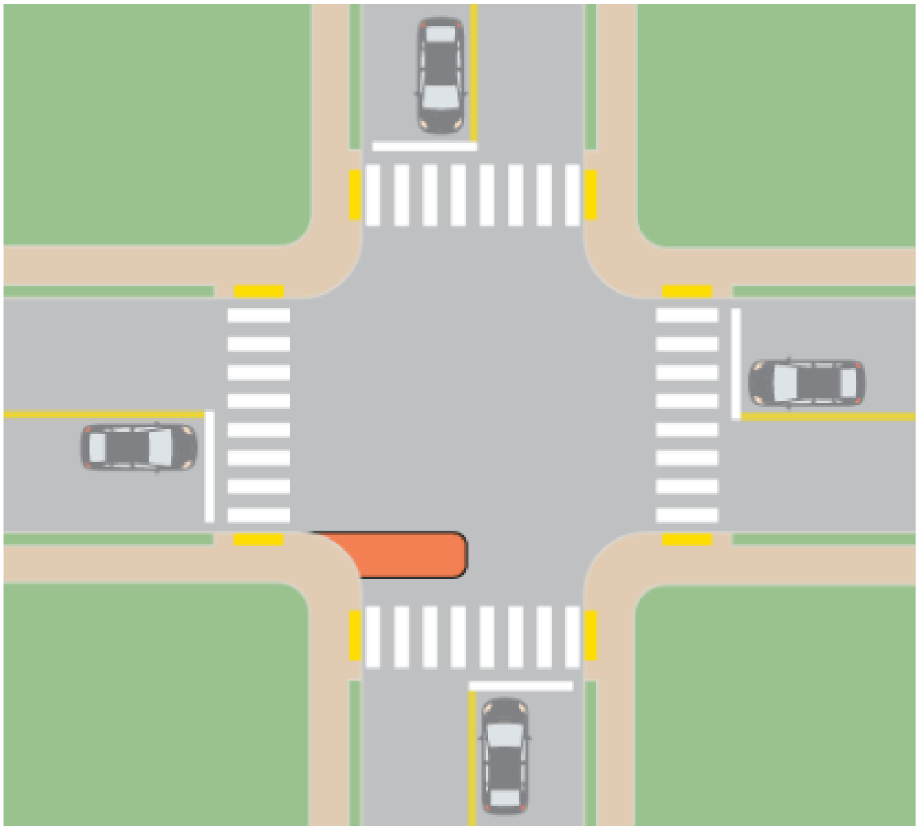


FIGURE 5-74 SEMI-DIVERTER PLAN VIEW

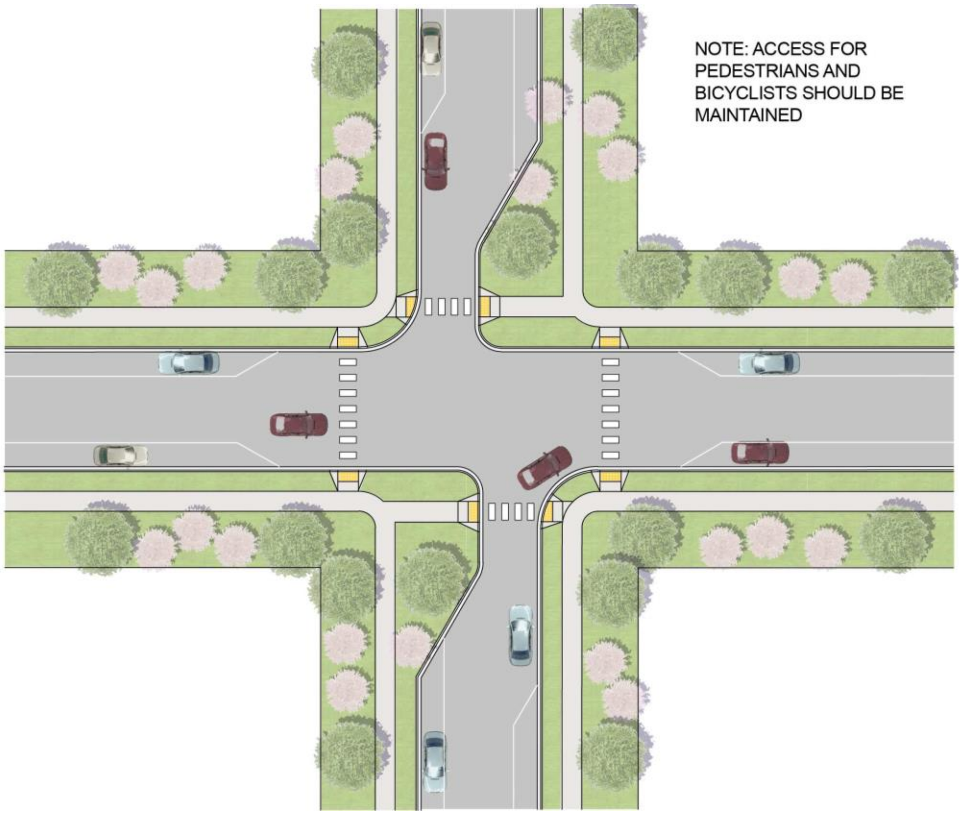


FIGURE 5-75 POP-OUT SEMI-DIVERTER PLAN VIEW

Guidelines:

- No specific geometric features are included in this manual because semi diverters are site-specific and should be designed on a case-by-case basis.

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.6.2 Diagonal Diverters

Diagonal diverters are barriers constructed diagonally across a four-legged intersection blocking the through movements.

Benefits:

- Speed reduction
- Volume reduction
- Collision reduction
- Eliminate cut-through traffic.
- Potential landscaping opportunity.

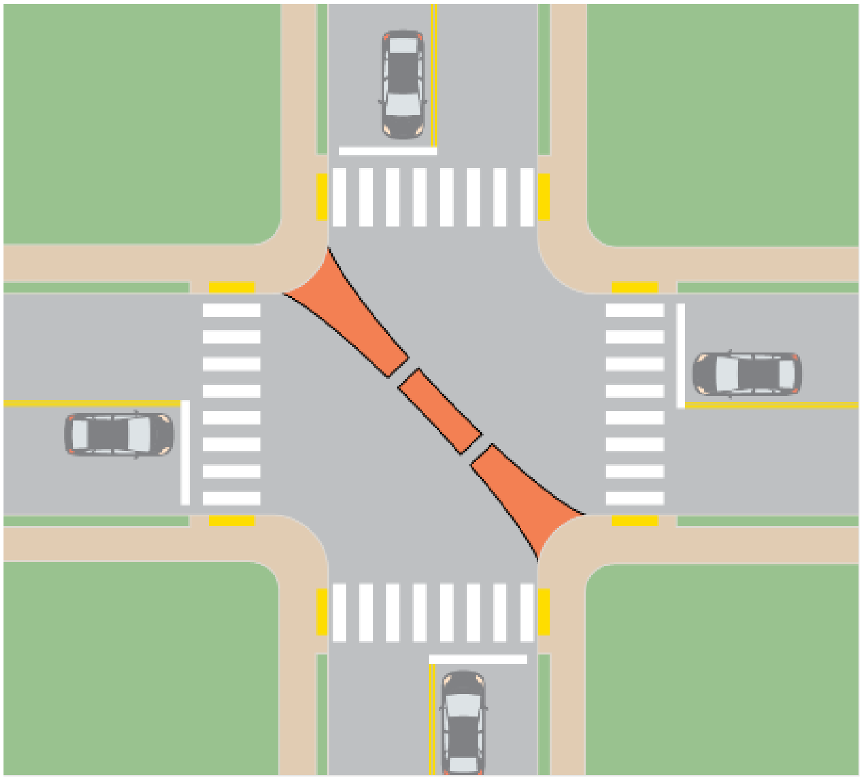


FIGURE 5-76 DIAGONAL DIVERTER

Considerations:

- Will change neighborhood traffic patterns.
- Will increase trip length for some residents.
- Will increase traffic on adjacent roadways.
- Emergency response routes may lengthen.

Guidelines:

- Where applicable, the design of the diverter should consider access for pedestrians, bicyclists, and EMS/ Fire services.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.6.3 Full Street Closure/Cul-De-Sac

A Full Street Closure/Cul-de-Sac is created by constructing a barrier across an entire street, closing the street to all through vehicular traffic with considerations to maintain pedestrian, bicycle, and emergency vehicle access.

Benefits:

- Speed reduction
- Volume reduction
- Collision reduction
- Eliminates cut-through traffic.
- Potential for landscaping opportunity.

Considerations:

- Will change neighborhood traffic patterns.
- Will increase trip length for many residents.
- Will increase traffic on adjacent roadways.
- Emergency response routes may lengthen.
- Cul-de-sac bulb radius must be large enough to allow turnarounds.

Guidelines:

- Where applicable, the design of the barrier should consider access for pedestrians, bicyclists, and EMS/Fire services.
- See Section 2.3.1 for more information on cul-de-sacs.

FIGURE 5-77 FULL STREET CLOSURE

Location: Armour Street and Ruffner Street

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.6.4 Median Barriers and Channelization

Channelization may be used on arterial streets to prevent cut-through traffic onto local streets or to control turning traffic in or out of a neighborhood. Channelization can be achieved through regulatory signs and pavement markings, landscaping, or raised channelization islands aimed at motorized, non-motorized, or pedestrian traffic.

Benefits:

- Speed reduction
- Collision reduction
- Prevents cut-through traffic in residential neighborhoods.
- Increased pedestrian safety.
- Provides potential for a safer pedestrian crossing.
- Possible opportunity for landscaping.
- Can reduce traffic volumes on residential streets.
- Stacking caused by vehicles waiting for a gap to make a left turn will be eliminated.

Considerations:

- May shift traffic volumes to neighboring roads.
- Restricts access to neighborhood.
- Restricts EMS/Fire access.
- May cause difficulty in mapping routes to a location due to roadway change.
- The raised median is used on the major street, restricting traffic from continuing from one residential neighborhood to the next. The median barrier also restricts left-turns to and from the major street.
- Typically, right-in and right-out are the only turn movements allowed to and from the minor street. However, a variation on the median barrier is an “S” Median which allows for left turn movements from the major street onto the minor street but still prevents through traffic from crossing.
- In addition to preventing cut-through traffic, channelization may be designed to reduce speed, create opportunities for landscaping, control turning traffic in and out of a neighborhood, and to physically guide pedestrians.
- Pedestrians may also use the median barrier as a refuge while crossing the major street, given a minimum median width of 6’.
- These medians can be landscaped to break up the sight line of the driver and enhance the aesthetics of the neighborhood. Landscaping also increases the visibility of the tool.
- The disadvantages of channelization may include creating out-of-direction travel, increasing trip lengths, increasing emergency response time, and impacting accessibility.

Standards and Guidelines:

- At signalized intersections, pedestrian push buttons are required.
- No specific geometric features are included in this manual because channelization devices are site-specific and should be designed on a case-by-case basis.
- Where applicable, the design of the median barrier should consider access for pedestrians, bicyclists, and EMS/ Fire services.
- At signalized intersection, pedestrian push buttons are required.

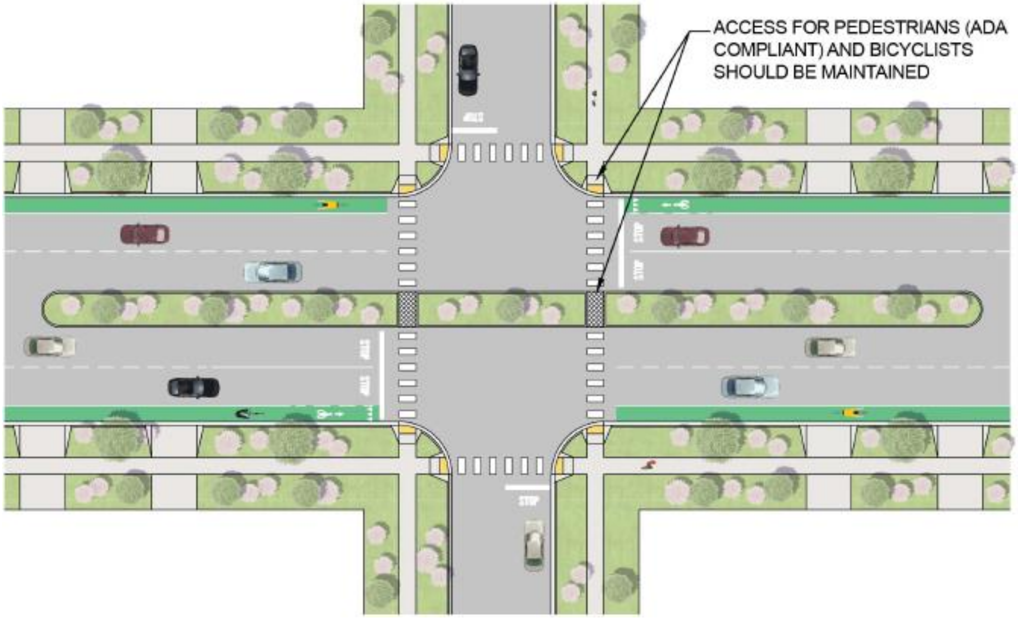


FIGURE 5-78 CHANNELIZATION PLAN VIEW

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.6.5 Right-in/Right-out Islands

Right-In/Right-Out Islands restrict left-turns into and out of a particular street. Rather than relying on a sign to discourage drivers from turning left, right-in/right-out islands force drivers to make the desired movement using a raised island.

Benefits:

- Speed reduction
- Volume reduction
- Collision reduction
- Slows right turn speeds.
- May discourage cut-through traffic.
- May provide pedestrian refuge.

Considerations:

- Difficult for large vehicles to make right turn.
- May shift traffic to adjacent streets.
- This device may be particularly effective at locations where local streets intersect with uncontrolled collector streets. If a left turn in or out of a particular street is difficult due to speed

and/or sight distance, the installation of a right-in/right-out island may be very beneficial. However, on low volume roadways, the device may be ineffective as drivers may still be able to make left turns, thereby bypassing the device.

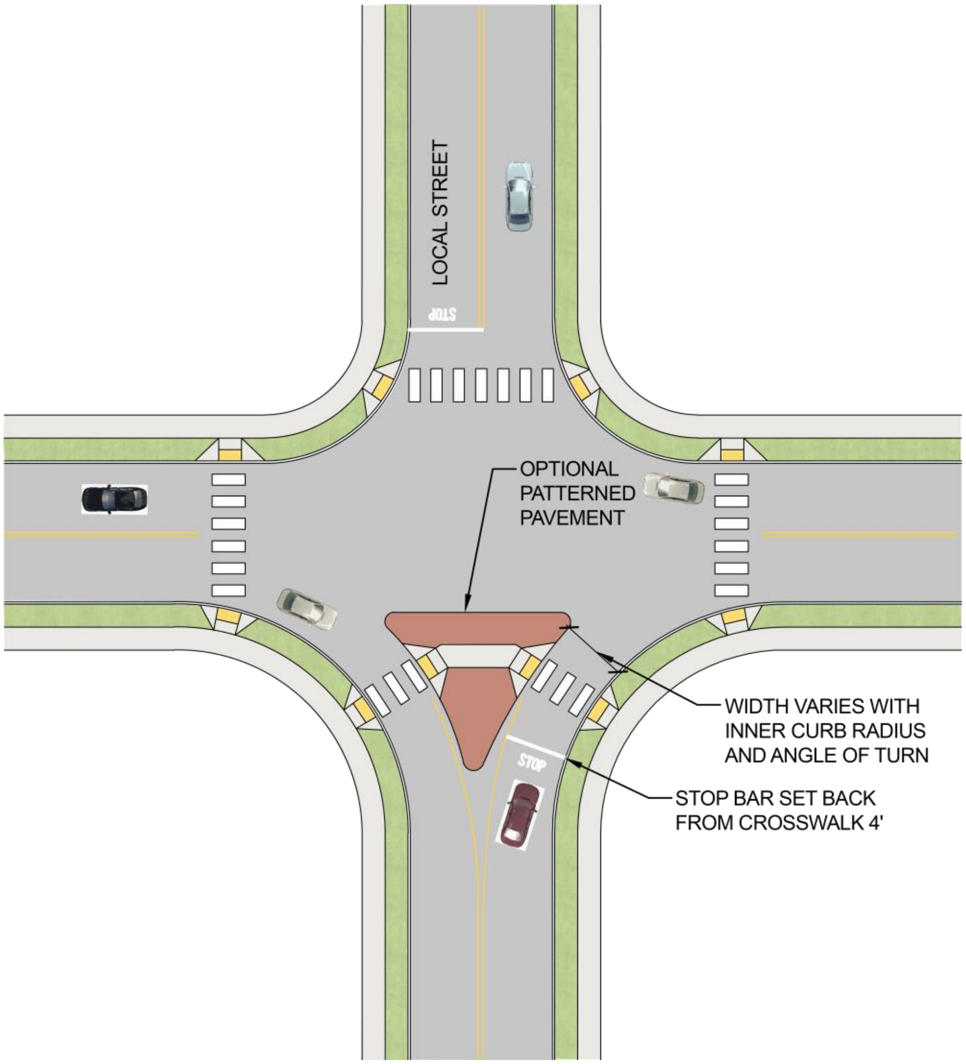


FIGURE 5-89 RIGHT IN/RIGHT-OUT ISLAND PLAN VIEW

Guidelines:

- The right-in/right-out island can be constructed to restrict a single left-turn. For example, the left-turn out may be restricted, but the left-turn in may be maintained.

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.7 Travel Lane Narrowing or Reduction

5.8.7.1 Travel Lane Narrowing

On-street parking can provide a buffer between pedestrians on the sidewalk and moving vehicles and narrow travel lane width. On-street parking guidelines are in Section 5.3.5, "On-Street Vehicle Parking." Angle Parking and Perpendicular Parking are generally used to increase the number of on-street parking spaces. However, a positive by-product can be a reduction in vehicle speeds due to narrowing of the traveled way and driver anticipation of vehicles backing out of parking spaces.

5.8.7.2 Travel Lane Reduction

Roadway Reconfiguration through lane reduction can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. This can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost.

Benefits:

- Can decrease lane crossing distances and exposure for pedestrians.
- Can reduce vehicle speeds.
- Left-turning drivers can exit the traffic stream while waiting for a gap to complete their turn.

Considerations:

- Lane reductions may be uncommon in a community. Consider conducting an outreach effort to educate the public on the purpose and potential benefits.
- Determine if and how alternative routes will be impacted by a lane reduction.
- Consider the importance a particular street plays in the pedestrian or bicycle network and the relationship between creating more livable streets and supporting economic development.
- The common four-to-three-lane lane reduction is very compatible with single-lane roundabouts.
- Strongly consider conducting before-and-after studies of the conversion for safety and traffic flow conditions

Guidelines:

- Four to three lane conversions should be considered for roadways with documented safety concerns, moderate volumes (less than 15,000 ADT, up to 25,000 ADT in special cases), and along priority bicycling and walking routes.
- Incorporating raised medians and left-turn bays can help eliminate the potential for TWLTL to be used as acceleration lanes by some motorists.

References:

- Pedestrian Safety Guide and Countermeasure Selection System, FHWA, n.d.

5.8.8 Landscaping and Surfaces

Landscaping Improvements may be desirable by communities wishing to beautify their neighborhood and the surrounding street system.

Benefits:

- Adds an aesthetic touch to the project.
- Landscaping strengthens impact if speeding is a primary neighborhood concern.

Considerations:

- Landscaping can also aid in visual narrowing of the roadway which can further help to reduce travel speeds.
- Decorative Pavement Treatments such as brick pavers, interesting or unusual color patterns, or concrete stamping can also add an aesthetic touch to a traffic calming device.
- The additional price of decorative pavement treatments is due to the cost of the material, additional installation time and ongoing required maintenance.

Standards and Guidelines:

- All traffic calming measures that include landscaping improvements must be consistent with the City of San Diego Landscape Standards. This manual includes standards, guidelines, and criteria for all landscaping in the public right-of-way, such as location, plant selection, maintenance, median landscaping, irrigation, and electrical services.
- Also, it is important that landscape improvements not impair sight distances at intersection approaches or on curved roadway segments.
- These improvements should also not block traffic signal indicators, traffic signs, pavement markings or streetlights.
- The additional costs for landscaping improvements are potentially significant. These costs stem from the purchase and installation of the landscaping feature in addition to the required on-going maintenance. Typically, the maintenance costs are much greater than the installation costs since traffic calming features are designed to be permanent improvements to the neighborhood.
- Watering and maintenance will need to be assured through an agreement with the City for all street trees and landscape plantings through street tree permits, encroachment removal and maintenance agreements, or through maintenance assessment districts.

References:

- Drainage Design Manual, City of San Diego Stormwater Dept, 2017
- Landscape Standards, City of San Diego, 2016
- Traffic Calming Guide, Caltrans, 2023

5.8.9 Signage and Feedback

5.8.9.1 Turn Restrictions

Turn Restrictions can help reduce cut-through traffic, eliminate turn movements, or prohibit turn movements during pedestrian crossing.

Benefits:

- Speed reduction
- Volume reduction
- Can prohibit pedestrian-vehicle conflict when implemented with LPIs.
- May discourage cut-through traffic.
- Maintains emergency response access.

Considerations:

- May increase trip length for many residents.
- May increase traffic on adjacent roadways.
- Drivers can bypass device.

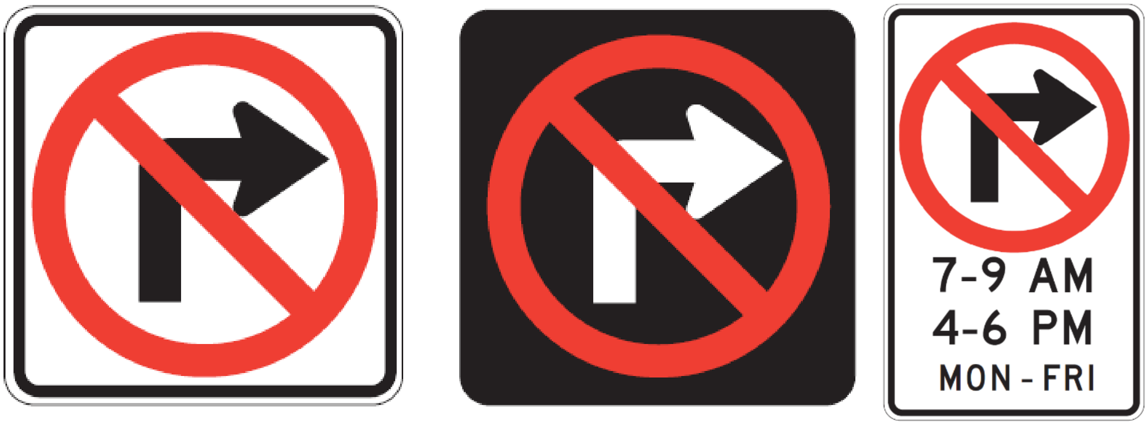


FIGURE 5-80 TURN RESTRICTION SIGNAGE

Guidelines:

- Turn restrictions, such as “No Right-Turns 6AM-9AM” may help reduce traffic from cutting through a residential neighborhood to avoid a congested arterial. This type of treatment, however, relies on enforcement to make sure drivers are abiding by the restriction.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.9.2 Vehicle-oriented Signage related to Traffic Calming

Benefits:

- Speed reduction
- Pedestrian safety
- May discourage cut-through traffic.
- Raise driver awareness.

Considerations:

- Effect is often temporary.
- Drivers may not obey the device without enforcement.

Guidelines:

- Concurrent with the installation of neighborhood traffic management devices, device-specific symbol-based signs should be installed next to each device. Roundabout center islands will include signage symbolically indicating the permitted travel paths around the center island.
- Vertical traffic calming measures shall include advanced warning markings on the approach ramps.
- Raised crosswalks and raised intersections with crosswalks should always have pavement markings due to concerns about visibility of pedestrians to drivers.
- Special signing for bicyclists may sometimes be appropriate. For example, the approaches to narrowing devices that do not include a bypass lane for bicyclists could include signage warning motorists to watch for merging bicyclists.
- “School Zone” signs are installed at appropriate locations to remind drivers that there is a school and there are children in the vicinity.

5.8.9.3 Electronic Speed Feedback (V-Calm) Sign

Permanent Electronic Speed Feedback Signs are used to make drivers aware of their speeds.

Temporary Speed Feedback Signs are used to educate drivers of their speed, especially as they travel on residential streets. Radar speed trailers are mobile and can be used as a temporary warning device. This type of tool can be a first attempt at getting drivers to reduce their speeds. The driver’s behavior may change when the radar speed trailer is first introduced; it will not necessarily modify driving behavior permanently.

Benefits:

- Speed reduction
- Volume reduction
- Inexpensive measure for traffic calming.

- No increase in EMS/ Fire response time.
- Raises driver awareness.

Considerations:

- Changes in driver behavior may only be temporary.

FIGURE 5-819 ELECTRONIC SPEED FEEDBACK SIGN (V-CALM)

Guidelines:

- Most effective if dynamic feedback sign is installed with a Speed Limit sign.
- Need to determine the operating speed that will activate the sign. May be used with an LED flash that is activated if the motorist is traveling above a threshold speed.
- If solar-powered, the batteries must be checked on regular intervals. Used batteries represent a hazard waste stream for an agency.

References:

- Traffic Calming Guide, Caltrans, 2023
- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

5.8.10 Shared Streets

Shared Streets are typically streets without curbs and sidewalks, and vehicles are slowed by placing trees, planters, parking areas, and other obstacles in the street. Motorists become secondary to pedestrians and cyclists and must travel at very low speeds below 10 mph. This makes a street available for public use that is essentially only intended for local access. A shared street identification sign is placed at each street entrance.

Benefits:

- Limiting vehicular speed not only improves residents' feelings of safety, but also promotes greater use of the public space.
- Shared streets allow more room for new features in the street such as street furniture (e.g., planters, street trees, benches) and areas for social interaction, bringing more people out on the streets to walk, bike, play, and interact with each other.

Considerations:

- Designed for low volume streets, limited use, and primarily local access streets.
- A shared street is generally not appropriate where there is a need to provide for nonresident motorists to access services or circulation element roadways.
- The design needs to keep vehicle speeds very low in order to make the streets safe for people of all ages and abilities.

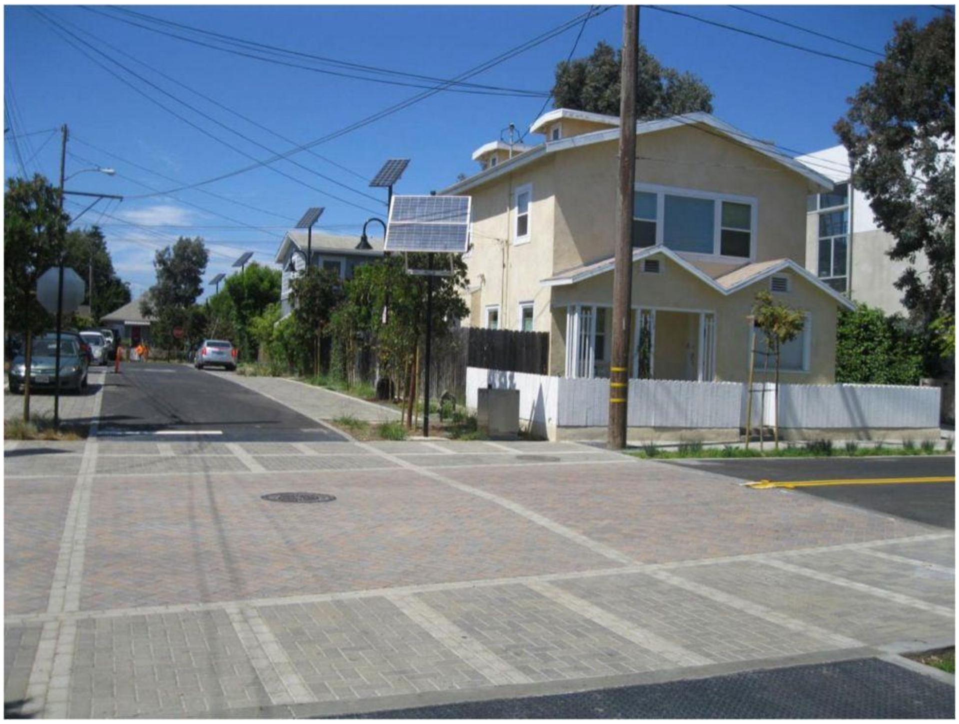


FIGURE 5-102 SHARED STREET

Location: Longfellow Street and Navy St, Santa Monica
Source: NACTO

Guidelines:

- A shared street should be marked by some kind of entrance and exit. This can be achieved by incorporating gateway features such as trees and planters, curbs extensions to make the roadway narrow, and a ramp up to the shared surface. Any of these approaches should also be accompanied by a sign indicating the shared street status.
- Pedestrian and auto space should be on the same level. Shared surfacing encourages drivers to travel more slowly and carefully since the travel way is not specifically dedicated to vehicles. Using different colors or textures in pavement material is also important for guiding the users of the street within the roadway (e.g., pedestrian vs. auto lanes).
- The design of the street should add slight curves to break up the sightlines of a driver and also introduce physical and visual features that will encourage people to drive slowly and with greater caution, though these traffic calming measures cannot be an obstacle for emergency responders.
- If available, parking should be provided intermittently rather than continuously so the car is not the predominant element in the street.
- Research suggests that streets need to be used by fewer than 100 vehicles per hour at peak times to be good candidates for shared street conversion.
- Directional indicators are often used internationally to help pedestrians navigate through large open spaces, avoid obstacles, follow an accessible pathway, and find crosswalks, transit stops, and other amenities, when other cues in the built environment do not provide enough guidance.

References:

- Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities, FHWA, 2017
- University Course on Bicycle and Pedestrian Transportation Lesson 20: Traffic Calming, FHWA, 2006
- Urban Street Design Guide, NACTO, 2013

6 Intersection Design and Operations

The word *intersection* means more than just the meeting of two or more streets. It can also mean the intersection of two different modes of travel. It is where multiple modes of transportation (bike, pedestrian, auto, transit) converge, sometimes in conflict. It is because of this that intersections are often the most vital areas along a street. They are the point of most conflicts between vehicles, pedestrians, and bicycles.

Intersections must be designed with pedestrian safety and accessibility in mind.

If pedestrians are either prohibited from crossing or discouraged from crossing, walking as a mode of travel is hampered. The spacing of intersections or crossing points is also an important element in the creation of a supportive pedestrian environment.

6.1. General Considerations

- Pedestrians should be made as visible as possible because multiple conflict points for vehicles and pedestrians exist at intersections.
- Intersections that minimize pedestrian crossing distance and crossing time reduce the exposure to traffic and pedestrian/vehicular conflicts.
- Drivers traveling at a slower rate of speed have more time to process and react to pedestrian conflicts at intersections.

6.1.1 Intersection Control

Where two or more streets intersect, some form of traffic control is usually needed to define the ROW of the vehicles entering the intersection. This control can take the form of yield signs, stop signs on the minor street, all-way stop control, a traffic signal, or a roundabout.

6.2. General Principles

- Design intersections to be as compact as possible.
- Analyze Intersections as part of a network, not in isolation.
- Integrate time and space.
- Intersections are shared spaces.
- Utilize excess space as public space.

6.3. General Standards and Guidelines

- Streets are to intersect at 90-degree angles or as close as practicable.
- Two streets intersecting opposite sides of a third street are to have the same points of intersection or else their centerlines are to be separated by a minimum of 120 feet for local streets and a minimum of 200 feet for all other streets on the third street.
- Median breaks for intersections along major streets with other streets of collector or higher classification shall be no closer than 1,320 feet.
- Full access intersections of local streets with major streets should be kept to a minimum, and such intersections shall be at least 500 feet apart, measured between centerlines, and shall be farther apart where turn pockets dictate longer spacing. The need for left-turn storage may require a greater distance. Pedestrian access to transit and adjacent commercial uses should be considered in major street intersection spacing.
- Local streets should not intersect primary arterials.
- Maximum grade across intersections along local and two-lane sub-collector and two-lane collector streets shall not exceed 8 percent and along four-lane streets and greater shall not exceed 5 percent.
- Curb return radius should accommodate the expected amount and type of traffic and allow for safe turning speeds at intersections. Curb return radius shall be installed in accordance with Table 6–1.

	Local Residential	Collector	Major
Local Residential	15 ft.	20 ft.	30 ft.
Collector	20 ft.	25 ft.	30 ft.
Major	30 ft.	30 ft.	30 ft.

TABLE 6-1 CURB RETURN RADIUS

Note: Curb return radius for all other intersections not covered in Table 6-1 shall be determined by the appropriate reviewer.

- Sight distance at intersections must consider the following factors: grades, curvature, and superelevation.
- The minimum corner sight distance at an intersection of a street (public or private) or multiple dwelling residential/commercial/industrial driveway with a collector or higher classification street shall be in conformance with AASHTO Intersection Sight Distance Standards per AASHTO Greenbook.

- Adequate sight distances at intersections and along horizontal curves must be maintained. A sight distance easement that requires fences, monuments, signs, landscaping, walls, and slopes or any other obstruction at and beyond the ROW line to be eliminated, kept below 36 inches, or set back is only acceptable when relocation of the intersection or redesign of the curve does not permit adequate sight distance.
- The City Engineer or designee may prohibit parking at critical locations.
- The City Engineer or designee may control access along major streets at critical locations.
- All pedestrian street crossings in the City shall utilize Council Policy 200-07, "Marked Crosswalk Criteria at Uncontrolled Locations."
- All pedestrian street crossings must be accessible to persons with disabilities.
- Pedestrian facilities (including curb ramps, signal equipment, etc.) must comply with ADA standards and California Title 24 regulations and take into account the entire range of disability categories.
- Parking restrictions near crosswalks, within 20 ft of the vehicle approach side or within 15 ft of the vehicle approach side if a curb extension is present, is required to remove potential obstructions to the pedestrian's line of sight, particularly for young children and those in wheelchairs. Daylighting discussion per CVC 22500 (Assembly Bill 413, 2023) is further discussed in Sections 5.3.5.1 and 5.6.2.
- When street furnishings or other objects that obstruct view cannot be relocated, curb extension or other treatments should be considered.
- When deciding what type of control an intersection should have, follow Caltrans Intersection Control Evaluation (Traffic Operations Policy Directive 13-02). When expansion or addition of one type of traffic control is considered, this evaluation ensures a comparison with other types of traffic control and the no-build scenario on the basis of system impacts, safety and mobility benefits for all modes, and life-cycle costs.
- Stop signs and all-way stop controls are installed according to Council Policy 200-08 "Criteria for the Installation of Stop Signs". Traffic signals are installed according to Council Policy 200-06 "Criteria for Installation of Traffic Signals", except those references within Council Policy 200-06 to the latest version of the CA MUTCD. These Council policies prescribe warrants based on City, State of California, and federal standards. The warrants take into consideration vehicular and pedestrian volumes, accident history, traffic safety, the transportation system, and other relevant factors.
- Metal street name signs on metal posts are required at each intersection, at any point of street name change, and at midpoint in blocks over 2,000 feet in length, in conformance with the City's Standard Drawings. New street names and street name changes shall follow the procedures contained in the San Diego Municipal Code Chapter 12, Article 5, Division 11. A private street sign within public ROW shall be the same color as public street signs, with the letters *PVT* or the word *Private* written on it in place of the City logo.
- Schools, parks, community centers, or other high pedestrian generators have particularly high potential for vehicle and pedestrian conflicts. The major pedestrian routes to school should be identified and traffic controls should be structured so that the number of crossings at uncontrolled cross-streets is minimized, and pedestrians are directed to the most appropriate crossing locations. For both schools and parks, entrances tend to focus pedestrian street

crossings at particular locations. These entrances can be made safer by combining them with roadway intersections so that the intersection's traffic control can also allocate right-of-way to pedestrians.

6.3.1 New Development versus Retrofit

- Prior to improvements to an existing intersection, utilities (e.g., lighting, electrical, and storm drains) should be identified and either incorporated into the design or relocated.
- New intersections provide the opportunity to clarify new forms of traffic control that may create a more pedestrian-friendly setting.

6.4. Pedestrian Crossings

One of the most effective means of turning an important corridor into a community "spine" or "seam" rather than a community "divider" is providing for safe street crossings. Pedestrian crossings can be located at either controlled intersections such as stop signs and traffic signals, or in some cases uncontrolled intersections. Guidelines for installation of marked crosswalks at uncontrolled intersections and mid-block crossings are contained in Council Policy 200-07, "Marked Crosswalk Criteria at Uncontrolled Locations".

Mid-block Crossing Treatments will be discussed in Section 5.6.

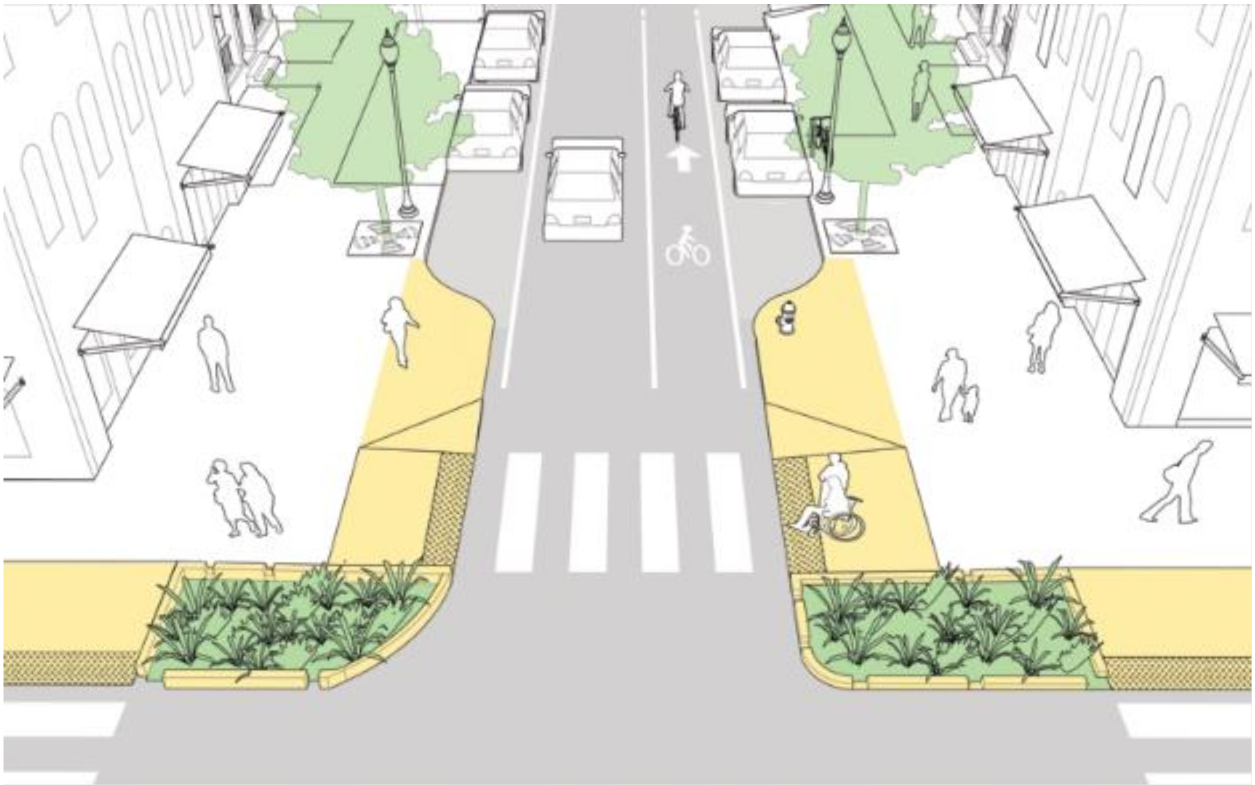


FIGURE 6-1 PEDESTRIAN CROSSING

Source: NACTO Urban Street Design Guide

Benefits:

- Marked crosswalks can help to reduce risk for pedestrians attempting to cross the road, as they provide a clearly defined crossing point where pedestrians are 'expected'. This improves safety for all road users.
- Marked crosswalks are useful in channelizing pedestrian crossing activity at specified locations.
- Marked crosswalks identify appropriate crossing locations for pedestrians and alert drivers to the possible presence of pedestrians.

Considerations:

The following are general issues that should be considered for pedestrian crossings, including residential street crossings and mid-block crosswalks:

- The width of the street, the geometry of the intersection, the timing of signalization, and the frequency of crossing opportunities all play important roles in achieving a pedestrian-friendly environment.
- Crossing opportunities should be provided at regular and convenient intervals.
- The use of marked crosswalks is generally considered appropriate at signalized intersections where pedestrian activity occurs.
- Street width and traffic speed can be reduced with the use of sidewalk pop-outs.
- Some pedestrians may become overconfident or be less aware of vehicles when crossing in a marked crosswalk; therefore, marked crosswalks should not be used indiscriminately.
- Transit stops that require pedestrians to cross the street should be provided with appropriate street crossings within proximity of the transit stop.

Standards and Guidelines:

- The installation of crosswalks shall conform to Council Policy 200-07 and in accordance with CA MUTCD.
- Marked crosswalks shall be provided at all signalized intersections where pedestrian crossing is allowed.
- Curb ramps shall be provided at all crosswalks. If a raised median extends into the crosswalk, the median nose should be relocated out of the crosswalk or an island passageway with truncated domes must be provided through the median.
- The width of all crosswalks shall be a minimum of 10 feet wide per SDM-116 or per dimensions specified by the ADA and PROWAG. Unless small-scale intersection conditions dictate otherwise, widths shall be increased where there is greater pedestrian activity. At diagonal curb ramps, the marked crossing shall extend 2 feet beyond the flares of the curb ramps.

- The number of pedestrian crossings should be maximized in order to prevent a street from becoming a barrier in the community.
- More frequent intersections along arterial roads (even if they only provide right-in and right-out access for cars, coupled with an overall interconnected system of roads within the grid of arterial streets should be built in new development. This will allow better transit coverage and pedestrian access as well as improved overall circulation and community aesthetics.
- Adequate lighting at the levels specified in Chapter 6.8, "Intersection Street Lighting", should be present.
- See Section 1.5 for discussion regarding ADA and Designing for Various Disabilities and Ages.

6.4.1 Curb Ramps

Federal and State provisions require that a separate curb ramp is provided to serve each pedestrian crossing (marked or unmarked) when new curb ramps are being installed or where curb ramps are triggered by project improvements. Refer to the City's Curb Ramp Design Guidelines, supplemental policies, and City Standard Drawings.

Benefits:

- Provides access across intersections and inclusive design for all individuals.
- Provides a curb cut for pedestrians pushing bicycles, strollers, and other wheeled devices.
- Detectable warning surfaces placed at the base of the curb ramp make crosswalk destinations visible while also providing a tactile vibration for visually-impaired pedestrians.

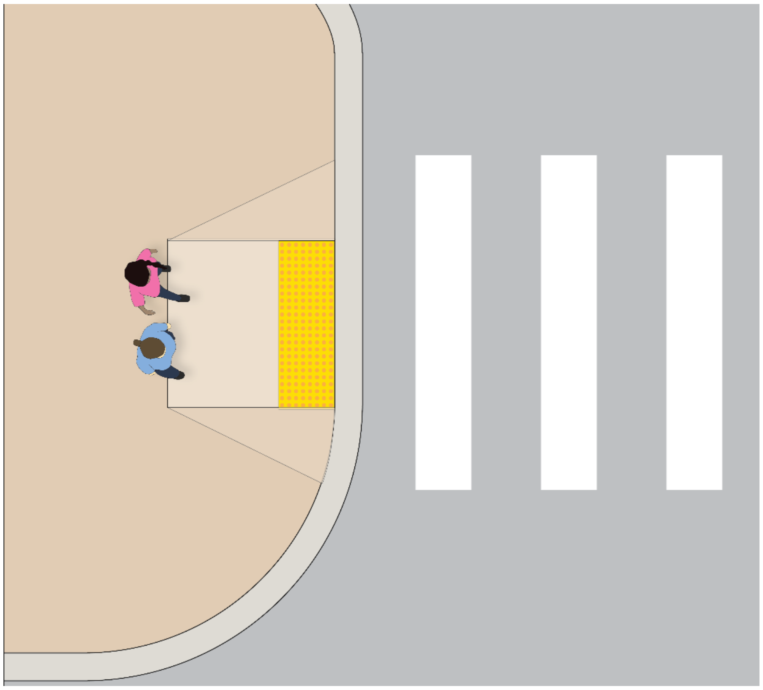


FIGURE 6-2 CURB RAMP PLAN VIEW

Considerations:

- A single, bi-directional ramp (one ramp diagonally at the corner) forces users to undertake a longer, more circuitous path of travel to the other side of the crossing. These curb ramps orient users to the center of the intersection where they risk greater exposure to vehicular traffic. Therefore, single diagonal curb ramps should be avoided at all cost.
- Installing two curb ramps serving two crossing at existing corners may be infeasible because of existing utilities and physical site-specific conditions, including street trees.
- Perpendicular curb ramps are preferred over parallel curb ramps to avoid the accumulation of water or debris at the base of curb ramps.

Standards and Guidelines:

- At new intersections, curb ramps shall be in line with the direction of crosswalks, with two curb ramps per corner to be considered to the maximum extent feasible unless existing constraints, conditions, or other extraneous circumstances deemed appropriate by the City Engineer prevent two-curb ramp design. If a single curb ramp or blended transition is allowed, it must be placed in the center to allow pedestrian access to either direction of the sidewalks. If crossing is allowed for only one direction, a single direction curb ramp can be installed.
- For existing intersections, City Standards require a curb ramp to be provided at each pedestrian crossing to the maximum extent feasible. If a curb return has two pedestrian crossings (marked or unmarked), then two curb ramps shall be installed at the curb return with one curb ramp serving each pedestrian crossing.
- Curb ramps shall be installed in accordance with the City's Standard Drawings.
- Curb ramps serving shared use paths shall be the same width as the width of the shared use path.
- Curb ramps at roundabouts shall be for exclusive use for pedestrians only. Bike ramps shall be provided for bike users. In cases where bicyclists must cross the crosswalks being used by pedestrians, then the crosswalks, median cut-throughs, and curb ramps shall comply with the Shared Use Path Accessibility guidelines.
- Curb ramps or full cut-throughs 60 inches in width minimum with truncated domes should be provided at channelization and island passageways. Refer to the City's Standard Drawings for additional information.
- Storm drainage inlets should be placed on the uphill side of the curb ramps to prevent standing water at corner.
- A modified directional curb ramp may be used in lieu of Type B and Type D curb ramps to the satisfaction of the City Engineer. See Figure 6-3 for more detail.
- Where pedestrian crossing is prohibited, curb ramps or blended transitions shall not be provided, and the pedestrian circulation path shall be either:
    - Separated from the roadway with landscaping or other non-prepared surface or
    - Separated from the roadway by a detectable vertical edge treatment with a bottom edge 15 inches maximum above the pedestrian circulation path.

- Curb ramps shall be installed at all legal crosswalks (marked or unmarked) at all intersections unless technically infeasible.

References:

- Curb Ramp Design Guidelines, City of San Diego Engineering and Capital Projects Department, 2022
- PROWAG (Shared Use Path Accessibility Guidelines), US Access Board, 2023
- Standard Drawings for Public Works Construction, City of San Diego, 2021

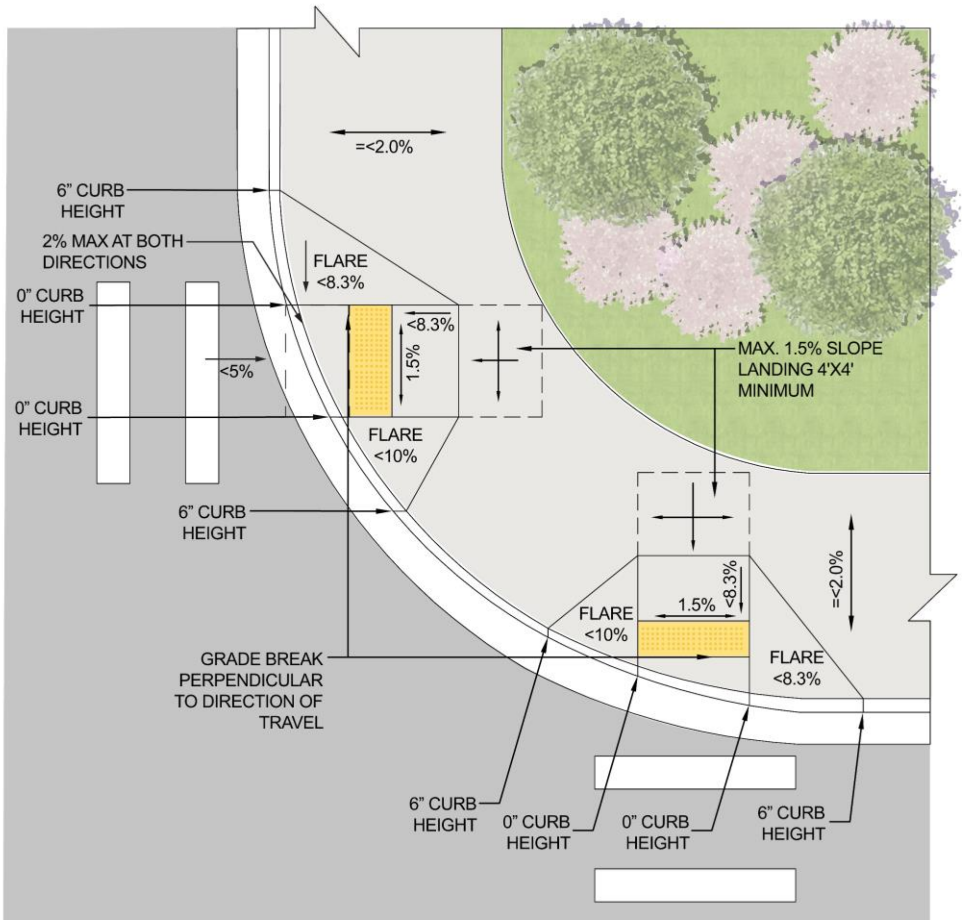


FIGURE 6-3 MODIFIED DIRECTIONAL CURB RAMP

6.4.2 Crosswalk Markings

Crosswalk markings delineate a preferred path for pedestrians to cross while also signaling to motorists to prepare to yield or stop. Markings improve and reinforce the pedestrian environment.

Benefits:

- Provides a direct, visible, and accessible path for pedestrians to cross the street.

- Improves and reinforces the pedestrian environment.
- Alerts motorists to stop or yield for pedestrian crossings.

Considerations:

- Marked crossings should be provided on all legs of a signalized intersection unless an intersection's unique geometry warrants restricting access for safety and visibility reasons.
- See City Engineer Memorandum "Extension of Pilot Program for Creative Crosswalks in Public Right-of-Way (ROW)" for installing creative crosswalks with decorative elements over the unpainted, paved surface between white continental crosswalk bars at certain intersections.

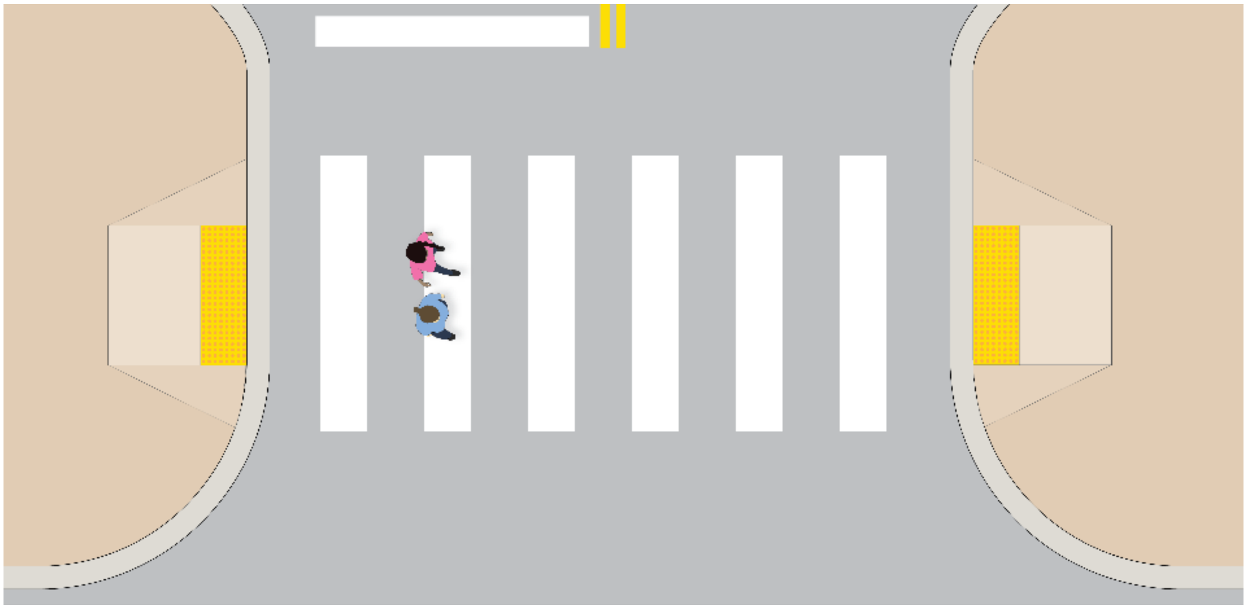


FIGURE 6-4 CROSSWALK MARKINGS PLAN VIEW

Standards and Guidelines:

- Council Policy 200-07 provides the requirements uncontrolled pedestrian crossings must meet in order to be considered for a marked crosswalk, how a crosswalk must be marked, and the process of removal, if necessary.
- Design standards for continental crosswalks are found in the City's Standard Drawings SDM-116.
- Marked crosswalks must be a minimum of 10 feet in width (the City's Standard Drawings SDM-116).
- Marked crosswalks shall be painted white. If the marked crosswalk is within 600 ft of a school or other
- Marked crosswalks should be provided on all intersection legs controlled by traffic signals unless pedestrian crossing is prohibited.
- Every crosswalk at a signalized intersection should be a continental crosswalk as per City Standard SDM-116 (Traffic Signal Design Guidelines).

- Limit lines for traffic signals and stop signs should be installed perpendicular to the traffic lane with the closest point at least 4 feet from the marked crosswalk.
- The following factors should be considered in determining whether a marked crosswalk should be used: vehicular approach speeds from both directions, vehicular volume and density, vehicular turning movements, pedestrian volumes, roadway width, day and night visibility by both pedestrians and motorists, desirable clarity of pedestrian routes for sighted or sight-impaired pedestrians, discouragement of undesirable pedestrian routes, consistency with marking at adjacent intersections or within the same intersection.

References:

- CA MUTCD Rev. 8 (Section 3B.18), Caltrans, 2024
- CA Vehicle Code (CVC 21368), Department of Motor Vehicles, n.d.
- Council Policy 200-07 "Marked Crosswalk Criteria at Uncontrolled Locations", City of San Diego, 2015
- “Extension of Pilot Program for Creative Crosswalks in Public Right-of-Way (ROW)” City Engineer Memorandum, City of San Diego, 2024
- Urban Street Design Guide, NACTO, 2013
- Standard Drawings for Public Works Construction, City of San Diego, 2021
- Traffic Signal Design Guidelines, City of San Diego Transportation Dept, 2018

6.4.3 Raised Intersection and Crosswalks

Raised intersections are created by raising the intersection to be level with the sidewalk. Similar to a speed table, this device has ramped edges on all approaches and exits and can incorporate textured paving materials on the flat intersection portion. Intersection tables force drivers to slow down upon entry and exit of the intersection. To distinguish between the road and sidewalk, bollards can be used to outline the sidewalk. This will serve to protect pedestrians by prohibiting vehicles from traveling on the sidewalk.

Raised crosswalks are similar to speed tables; however, they provide a marked pedestrian crossing. This device can be used at intersections or mid-block locations. Raised pedestrian crossing and bicycle lane are highly effective in areas with large volumes of pedestrian and bicycle traffic, such as schools or downtown business land uses.

Benefits:

- Provides accessible and convenient crossings for pedestrians, especially those with mobile and visual impairments, because they do not require vertically transitioning up and down a curb ramp.
- Improves motorists’ visibility of pedestrians, especially at midblock crosswalks.
- Discourages motorists from speeding through crossings and intersections and signals the presence of pedestrians.
- Eliminates water ponding and debris collection at the base of typical curb ramps.

Considerations:

- Raised crosswalks should be avoided on wide multi-lane arterial roadways and on streets with steep grade changes and sharp curves.
- The impact of raised crosswalks on the operational needs of transit buses and emergency vehicles should be considered.
- The impact to drainage patterns should be examined to ensure that raised crossings properly accommodate the flow of water.

FIGURE 6-5 RAISED INTERSECTION

Source: NACTO Urban Street Design Guide

Guidelines:

- Where traffic speeds and conditions allow, raise the crosswalk crossings so they are flush with the connecting sidewalk and use special paving material to differentiate them from the roadway.
- Raised intersections shall have 3 feet of detectable warning surfaces along the flushed surfaces.
- Raised crosswalks may not be appropriate on streets with bus routes, because they can slow and impede the flow of bus traffic.
- Raised crosswalks should be 15′ to 20′ wide.
- Raised crosswalks should be wide enough (10′ minimum) that both the front and rear wheels of a passenger vehicle can sit atop the speed table at the same time when traveling over it.

References:

- Traffic Calming: State of the Practice, ITE/FHWA, 1999
- Traffic Calming Guide, Caltrans, 2023

6.4.4 Pedestrian Islands and Cut-Throughs

Pedestrian islands, also known as pedestrian refuge islands, allow for shorter crossing lengths for pedestrians as they wait to cross busy multi-lane streets with traffic traveling in both directions. These islands may include curbs, bollards, pedestrian push buttons or other features to protect people who are waiting. Pedestrian islands can have either cut-throughs or curb ramps if the walking surface is raised to sidewalk level. Cut-throughs refer to a lowered section of raised median that allows pedestrians to cross at the surface level.

FIGURE 6-6 PEDESTRIAN ISLAND

Location: 30th Street and Landis Street

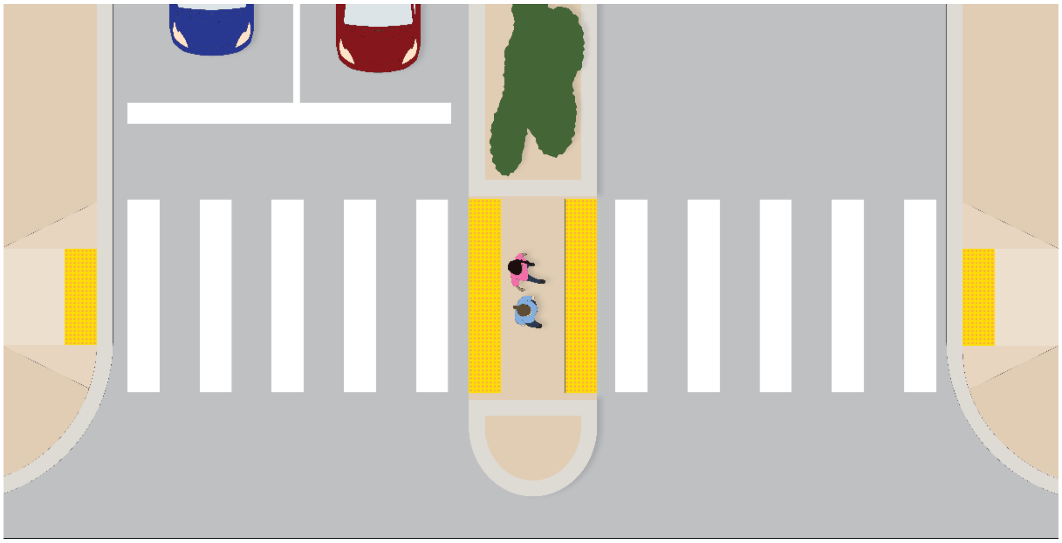


FIGURE 6-7 PEDESTRIAN ISLAND PLAN VIEW

Benefits:

- Allows pedestrians to cross wide streets in two stages, which benefits slower-walking pedestrians, seniors, children, or persons with disabilities.
- Allows pedestrians to focus on oncoming traffic in one direction at a time when crossing.
- Allows pedestrians to find gaps in traffic in order to cross at unsignalized crossings.
- Slows vehicle speeds when drivers are conscious of pedestrians waiting on the refuge island.
- Reduces risk of left turn collisions (at intersections) and vehicle head-on collisions (at the midblock).
- Provides low profile landscaping opportunities on the median next to the refuge island.

Considerations:

- Pedestrian safety islands may be enhanced using plantings or street trees. Plantings may require additional maintenance responsibilities and need to be maintained to ensure visibility.
- May impact underground utilities.
- Design must account for impact of raised median on emergency vehicle movement and access.
- In general, island passageways work best on wider streets with long pedestrian crossing times and exposure to vehicular traffic or on streets with speeds higher than 35 mph.
- Island passageways may be installed at intersections or mid-block locations deemed appropriate through engineering studies. They should be considered from the outset of design for intersections that are either complex, irregular in shape, excessively wide, or in areas where children and the elderly are expected to cross frequently.
- Pedestrian islands with cut-throughs and detectable warning surfaces are particularly useful for slower pedestrians such as the very young, the elderly, or persons with mobility disabilities. Where it is not possible to include ramps and waiting pads that meet accessibility requirements waiting areas should be at-grade with the roadway (channels).

- The use of island passageways should be considered where transit is "running" with the street ROW, particularly in station areas.

Standards and Guidelines

- Pedestrian islands shall be designed per the City's Standard Drawings (SDG-139).
- Pedestrian islands should be well illuminated.
- Pedestrian refuge islands should be considered where crossing distances are greater than 50'.
- NACTO recommends that pedestrian safety islands have a minimum width of 6 feet, although a width of 8 to 10 feet is preferred.
- These medians can be landscaped to break up the sight line of the driver and enhance the aesthetics of the neighborhood.
- They should be located in places where pedestrians commonly cross, such as schools, large offices, retail destinations, senior housing, transit stations, and major midblock bus stops.
- They should have proper lighting, signage, reflectors, and drainage accommodations.
- On wider medians, the pedestrian island should be raised to provide more visibility for waiting pedestrians. Raised pedestrian islands should include curb ramp access, detectable warning surfaces on the curb ramps, and at least a 5' wide level waiting area.
- At intersection crossings, median "noses" should be provided perpendicular to the crosswalk, at the tip of the median, pointed toward the intersection.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010
- Standard Drawings for Public Works Construction (SDG-139), City of San Diego Engineering and Capital Projects Dept, 2021
- Urban Street Design Guide, NACTO, 2013

6.5. Intersection Treatments

Intersection treatments are a component of street design that enhance the safety, accessibility, and efficiency for all road users. These treatments encompass a range of physical and operational modifications aimed at improving the previously stated goals as well as promoting and facilitating active transportation. These treatments should be selected and designed based on the specific context and needs of each intersection.

6.5.1 Intersection Mural

Intersection murals add a supplemental placemaking component to neighborhoods and destinations. Painted murals are allowed at all controlled intersections on unclassified streets and two-lane classified collector streets (one travel lane in each direction) with a speed limit of 25 miles per hour or less, to the satisfaction of the City Engineer or his designee, but this does not apply to decorative crosswalks. See the

"Installation of Murals in Public Right-of-Way (ROW) Pavements and Sidewalks" Memorandum for more information.

Stamped concrete or other types of decorative paving will not be permitted at uncontrolled intersections to designate pedestrian crosswalks or at locations where it might appear to be a pedestrian crosswalk, in cross-gutters or gutters, or to be used to delineate pedestrian ramps. Stamped concrete and other types of decorative paving are permitted at other locations designated and marked as pedestrian crosswalks.

FIGURE 6-8 MURAL IN THE INTERSECTION

Source: San Diego Downtown Partnership, Ladies Who Paint
Location: 3rd Avenue and Cedar Street, Cortez Hill

References:

- Installation of Murals in Public Right-of-Way (ROW) Pavements and Sidewalks Memorandum, City of San Diego, 2018
- Mural Toolkit, Department of Cultural Affairs, n.d.
- Temporary Exhibit Toolkit, Department of Cultural Affairs, n.d.

6.5.2 Protected Intersections

Protected intersections have been implemented across North America as cities have expanded their protected bikeway networks. Also known as setback or offset intersections, this design keeps bicycles physically separate from motor vehicles up until the intersection, providing a high degree of comfort and safety for people of all ages and abilities. This design can reduce the likelihood of high speed vehicle turns, improve sightlines, and dramatically reduce the distance and time during which people on bikes are exposed to conflicts (see NACTO's Don't Give Up at the Intersection).

Benefits:

- Protected intersections provide shorter, safer crossings for people walking. With low-speed vehicle turns and room for accessible pedestrian islands, people on foot and using personal mobility devices get many of the benefits of curb extensions.
- Protected intersections create shorter, simpler crossings, more predictable movements, and better visibility between people on bikes and people driving. As a result, the intersection is more comfortable and safer for people using the bikeway and the crosswalk.

Considerations:

- They are most commonly found on streets with parking-protected bike lanes or buffered bike lanes. Variants can be applied where there is no bike facility on the intersecting street, as well as streets with two-way protected bike lanes.
- Where no parking lane exists, a setback can be created by shifting the bikeway or motor vehicle lanes away from one another as they approach the intersection. This can be achieved through a buffer.

Guidelines:

- No Stopping/No Standing Zones: Zones should be long enough to allow approaching drivers and bike riders to see and recognize one another ahead of the intersection. Features that permit visibility, such as plants, seating, bike parking, and shared micromobility stations, can be placed here.
- Bike Yield Line & Bike Lane Crosswalk: Bike traffic should be expected to move forward to the stop bar on any signal phase, and pedestrian traffic should also be expected to cross to the island on any phase. This operation may be formalized with optional yield teeth on the bikeway before the crosswalk.
- Pedestrian Islands: Wider islands support high volumes of people walking and biking, raising the person-capacity of the intersection. Refer to Standard Drawing SDG-139 and Section 6.4.5 for standards and guidelines of pedestrian islands.
- Bike Queue Areas: Queue areas should be large enough for anticipated bicycle volumes, which often increase substantially after implementation of protected bike lanes. The bike queue area should be at least 6.5’ deep, but dimensions of 10’ or greater are desirable to accommodate trailers, cargo bicycles, and high bike volumes.
- Bikeway Setback: The bikeway setback distance determines most other dimensions of the protected intersection. A 10’ setback, created in the shadow of the parking/loading lane, is shown. Where practical, a setback of 14-20’ is preferred. If setbacks smaller than 12’ are used, they should be accompanied by longer clear distances, and additional signal phasing or speed reduction strategies should be considered. Setbacks larger than 20’ may increase turn speeds, and setbacks larger than 25’ should be treated as a separate intersection.

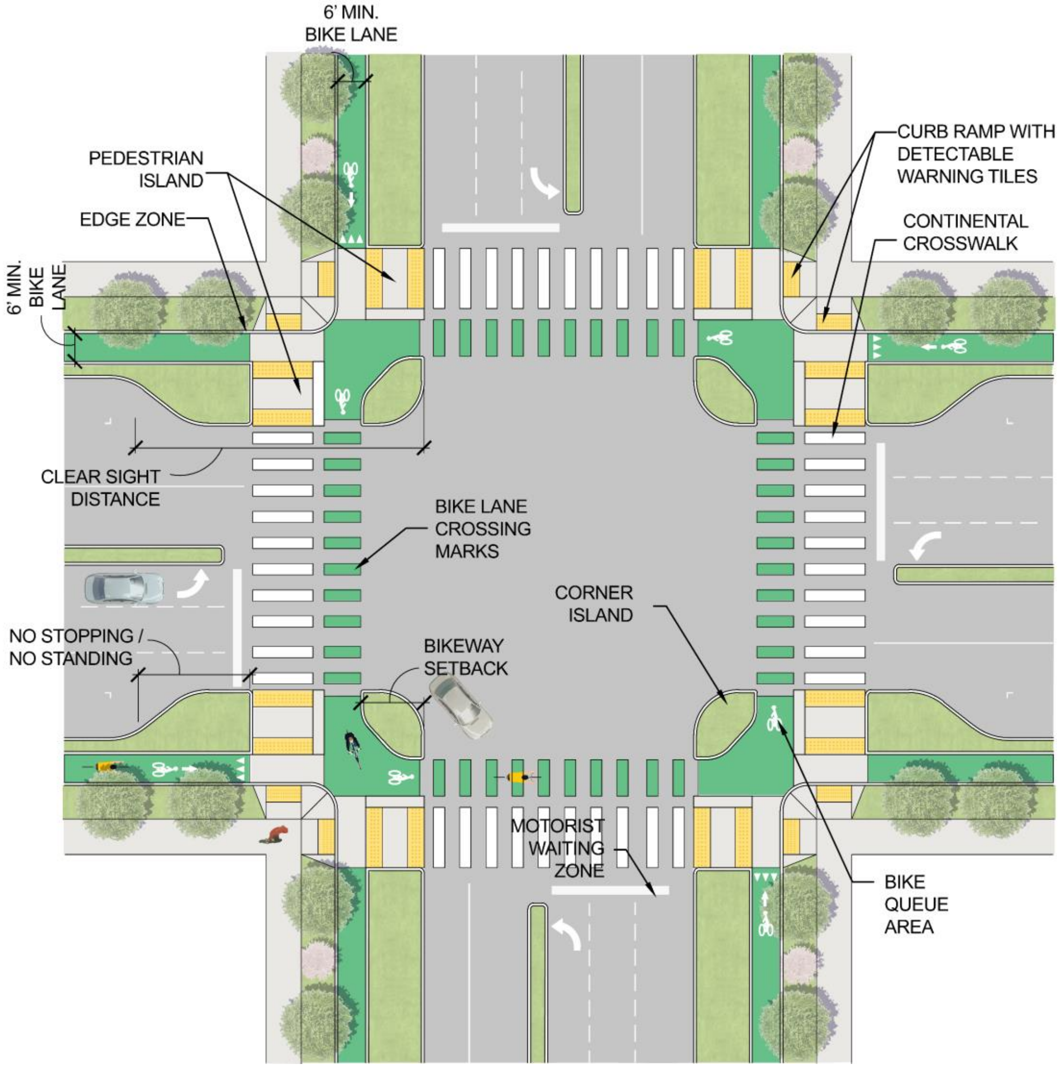


FIGURE 6-9 PROTECTED INTERSECTION

- Corner Island: Radii should be small enough that passenger cars are discouraged from turning faster than 10 mph. This is accomplished with an effective turn radius of less than 18', usually resulting from a 10' to 15' curb radius. Corner islands may have a mountable override area to accommodate large vehicles. Corner islands may also be implemented as channelization markings that are reinforced by mountable vertical elements such as modular speed bumps.
- Crossbikes/Intersection Crossing Markings: Crossbike markings can be marked with dotted bicycle lane line extensions and may be supplemented with green color or bike symbols between these lines.
- See CA MUTCD, PROWAG, other national guidance, and local standards for signal timing, signage and location guidance.

References:

- Don't Give Up at the Intersection, NACTO, 2019
- Improving Intersections for Pedestrians and Bicyclist: Informational Guide, FHWA, 2022

- Signalized Intersections Informational Guide, FHWA, 2013

6.5.3 Bicycle Accommodations at Intersections

6.5.3.1 Bend-In Bicycle Treatment

When a separated bike lane approaches an intersection with right-turning vehicles still positioned to the left of the separated bike lane, the designer may choose to either “bend-in” or “bend-out” the separated bike lane at the intersection to reduce the likelihood of conflicts with right-turning vehicles. To increase the visibility of bicyclists for turning vehicles, the bend-in design positions bicyclists adjacent to the vehicle turn lane. (Federal Highway Administration Separated Bike Lane Planning And Design Guide)

Benefits:

- Motorists on a side street can see bicycles and vehicles in a similar field of vision.
- Requires less space than bending out
- A bend-in design creates the opportunity to construct a curb extension to reduce pedestrian crossing distances. The design can create public space which could be used for:
    - Bike parking corrals
    - Bikeshare stations
    - Parklets
    - Public art exhibits
    - Bioswales/rain gardens

Considerations:

- Bicyclists may perceive less separation due to proximity of through vehicles.
- Bike lane symbols should be placed periodically to reduce the intrusion of pedestrians and motorists into the separated bike lanes. The words BIKE LANE may be used as an alternative to the bike symbol. Periodic maintenance will be required to ensure markings remain visible.

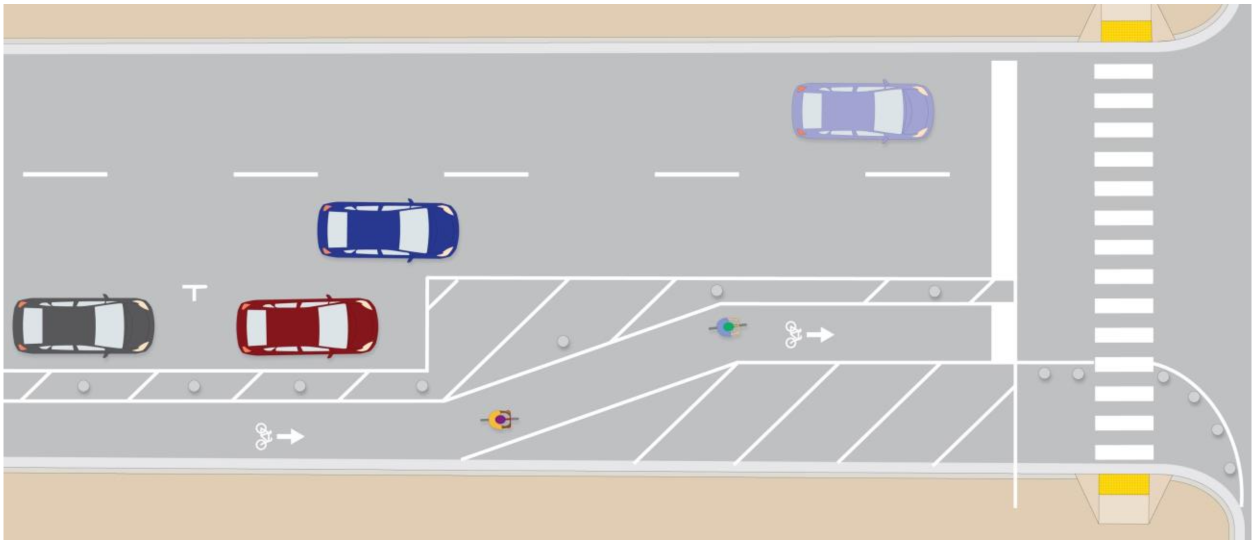


FIGURE 6-10 BEND-IN BICYCLE TREATMENT

Standards and Guidelines:

- Shift bicycle lane closer to motorized traffic so motorists and bicyclists can see each other better.
- A 'Turning Vehicles Yield To Bikes' sign may be placed on the mast arm.
- Guidance for parking space markings can be found in CA MUTCD Section 3B.19.
- For further guidance on typical signs and markings for separated bike lanes, see the Federal Highway Administration Separated Bike Lane Planning And Design Guide.

References:

- CA MUTCD Rev. 8 (Section 3B.19), Caltrans, 2024
- Separated Bike Lane Planning and Design Guide, FHWA, 2015

6.5.3.2 Bend-Out Bicycle Treatment

The bend-out design positions bicyclists downstream on the side street away from the intersection, allowing vehicles to complete turning movements before interacting with bicyclists. This design, which could be used on lower-volume side streets or driveways, provides space for a vehicle to yield to crossing bicycles without blocking through traffic on the main street. A Bicycle/Pedestrian Warning (W11-15) sign may be used as driveways approach separated bike lanes to alert drivers to be aware of bikes and pedestrians. (Federal Highway Administration Separated Bike Lane Planning And Design Guide)

Benefits:

- Allows vehicle traffic turning across separated bike lane to queue out of the way of through traffic and before the separated bike lane.
- Allows a queuing location for cyclists wanting to turn left.
- Raised crossing provides traffic calming for automobiles and can also slow bicyclists.

- Bend-out design provides opportunity for an ample pedestrian refuge between the separated bike lane crossing and the roadway crossing.

Considerations:

- Requires more space than Bend-in
- Less familiar design
- Adequate sight distance may be difficult for vehicles approaching on the side street.

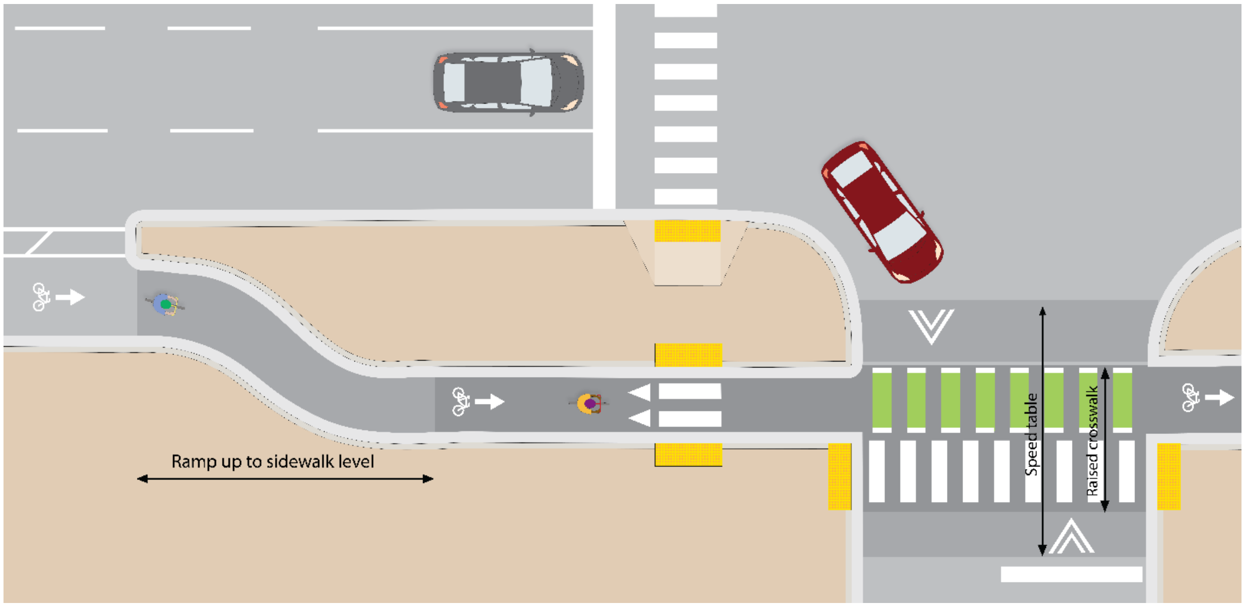


FIGURE 6-11 BEND-OUT BICYCLE TREATMENT

Guidelines:

- Separated bike lane and crosswalk may be raised to sidewalk level through the intersection, providing a traffic calming effect.
- A 'Turning vehicles yield to bikes' sign may be placed on the mast arm.
- For further guidance on buffer selection and installation and typical signs and markings for separated bike lanes, see the Federal Highway Administration Separated Bike Lane Planning And Design Guide.

References:

- Separated Bike Lane Planning and Design Guide, FHWA, 2015

6.5.4 Bicycle Pavement Marking Approaching an Intersection

Bicycle pavement markings alert bicyclists and motorists of each other's presence as they approach intersections.

Benefits:

- Maintains continuity of the bicycle facility.
- Guides bicyclist movements when approaching intersections.
- Alerts motorists to expect and yield to merging bicycle traffic.
- Signifies an appropriate location for motorists to safely merge across the bike lane into the right-turn lane.
- Reduces potential for conflicts between bicyclists and automobiles.

Considerations:

- If a full bike lane pocket cannot be accommodated, a shared bicycle/right turn lane can be installed that places a standard-width bike lane on the left side of a dedicated right-turn lane. This treatment may include signs advising motorists and bicyclists of proper positioning within the lane.
- In cases where there is insufficient roadway space to accommodate a bike lane pocket, the bicycle lane may have to be dropped altogether. However, sharrows provide an alternative option for marking a bikeway through an intersection where a bike lane pocket cannot be accommodated.

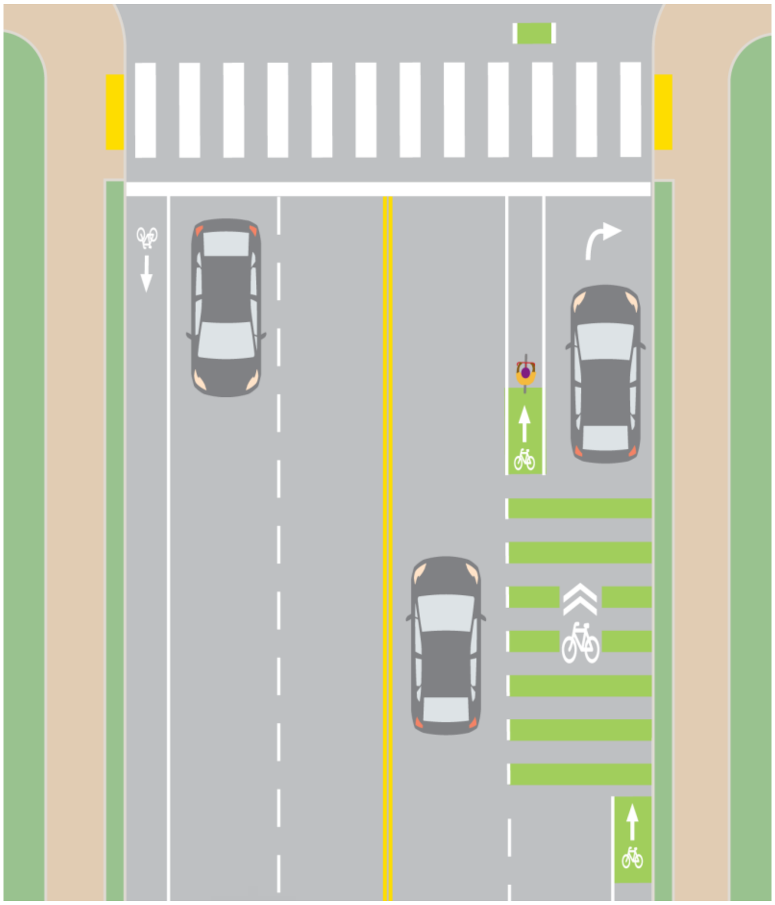


FIGURE 6-12 BICYCLE PAVEMENT MARKING APPROACHING AN INTERSECTION

Guidelines:

- Green colored pavement increases the visibility of conflict areas between bicyclists and vehicles (e.g., intersection approaches, driveways, and transitional zones).
- Apply dashed white lines (4" wide, 2' long) in the merging area at least 50' before the intersection or 100' if along a high speed/volume roadway.
- Bicycle lane pocket and through lane (next to a vehicular right turn pocket) should be 4' minimum but 6' preferred.
- Include signage (CA MUTCD 2B.20) to force vehicle in right turn lane to turn right.
- Consult CA MUTCD Part 9 for guidance regarding traffic control for bicycle facilities.
- Merging across two lanes exceeds the comfort zone of most bicyclists. Double right turn lanes or an inside through/right combination lane should be avoided on routes with heavy bicycle use. To prevent vehicles in the outside right turn lane from turning into a bicyclist it is important to encourage proper lane positioning for the bicyclist. This can be accomplished by providing a bicycle lane to the left of the outside turn lane with a bicycle lane. This design positions bicyclists using a bicycle lane to the outside of a double right-turn lane. This treatment should only be considered at locations where the right most turn lane is a pocket at the intersection. In this instance, the bicyclist would only have to merge across one lane of traffic to reach the bicycle lane. While non-standard colored bicycle lanes may also help distinguish the bicycle lane in the merging area, bicyclists should not be expected to merge across two lanes of traffic to continue straight though an intersection.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Guide for the Development of Bicycle Facilities, AASHTO, 2012
- Highway Design Manual, 7th ed., Caltrans, 2020
- Urban Bikeway Design Guide, NACTO, 2014

6.5.5 Bicycle Pavement Markings Through an Intersection

Bicycle pavement markings, also known as bicycle lane extensions, provide a clear boundary to help guide bicyclists safely through intersections.

Benefits:

- Raises awareness for both bicyclists and motorists to potential conflict areas within the intersection.
- Guides bicyclists through an intersection in a straight and direct path.
- Alerts motorists to not veer into the path of bicyclists also passing through the intersection.
- Relieves bicyclist stress by delineating clear travel paths.
- Reduces conflicts between bicyclists and motorists.

Considerations:

- Striping may not be required for every signalized intersection and should be evaluated and implemented on a case-by-case basis.

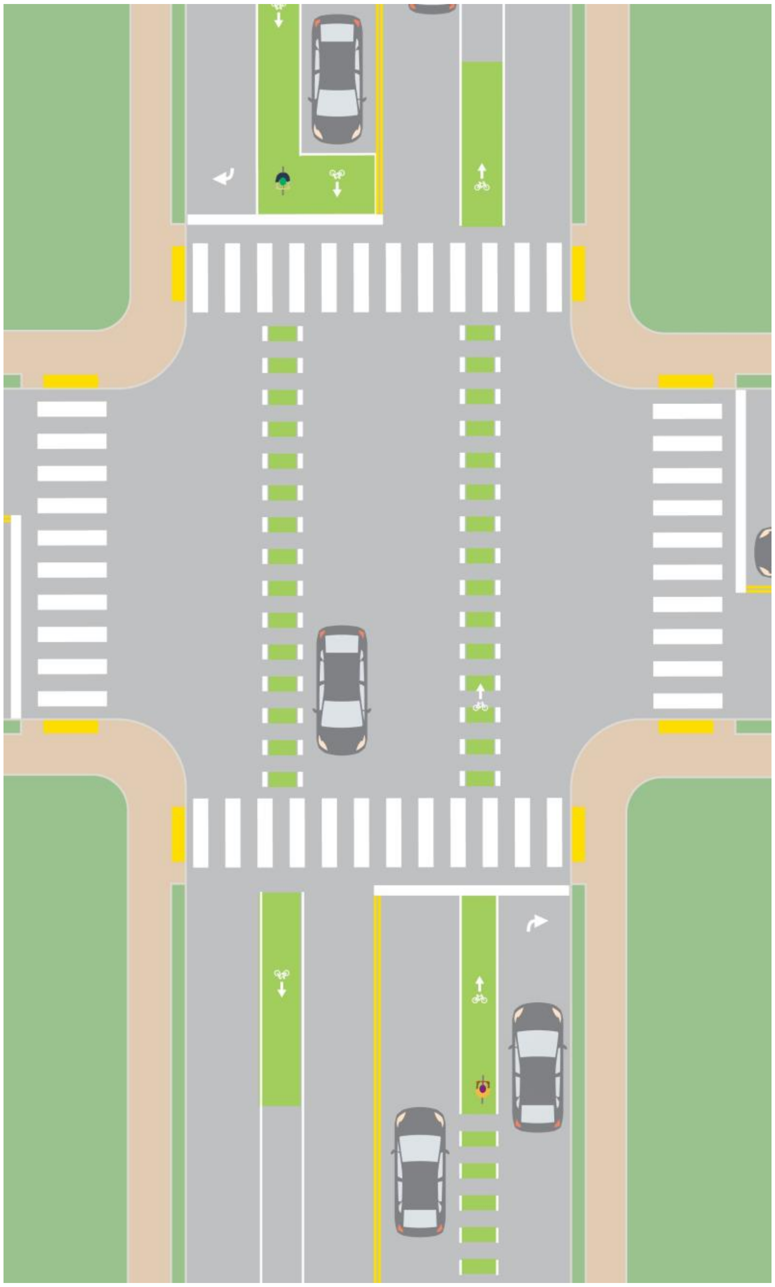


FIGURE 6-13 BICYCLE PAVEMENT MARKINGS THROUGH AN INTERSECTION

Guidelines:

- Striping width shall be a minimum of 6" (Standard Plans A20D Detail 40) adjacent to motor vehicle travel lanes and/or should otherwise match the striping dimensions and lateral positioning of the leading bike lane. Green-colored pavement may be used in-between the bike lane extension striping.

- Bicycle lane markings may be extended through intersections consistent with the provisions of the CA MUTCD Section 3B.08.
- Bicycle lane markings as shown in Figure 9C-106 (CA MUTCD) may be used within the boundaries of bicycle lane extensions.

References:

- CA MUTCD Rev. 8 (Section 9C.04 and Figure 9C-106), Caltrans, 2024
- Guide for the Development of Bicycle Facilities, AASHTO, 2012
- Standard Plans (A20D), 7th Ed., Caltrans, 2022
- Urban Bikeway Design Guide, NACTO, 2014

6.5.6 Bicycle Box

A bicycle box is generally right-angle extension to a bicycle lane at the head of a signalized intersection. Bicycle boxes give bicyclists a clear, designated space in front of queued vehicles while waiting for a green light at intersections. Motorists must stop behind the white limit line at the back end of the bicycle box and are restricted from making a right turn on a red light at the intersection. Bicycle boxes allow bicyclists to safely position themselves before shifting into their desired travel lane.

Benefits:

- Improves visibility of bicyclists.
- Allows bicyclists to safely position themselves at the front of the queue and establish position in the intersection when the light turns green.
- Reduces signal delay for bicyclists.
- Allows bicyclists to avoid breathing in exhaust fumes from queued vehicles.
- Facilitates ideal positioning for bicyclist left turns on a two-lane roadway with traffic in each direction, or at offset/jogged intersections.
- Reduces conflicts between bicyclists and motorists, especially where collisions occur when vehicles turn right.

Considerations:

- Colored pavement surface may be costly to maintain.
- Placement of markings between tire tracks will reduce wear.
- Bicycle boxes may extend across multiple travel lanes to facilitate bicyclist left turn positioning. A two-stage turn queue box may be an alternative approach to facilitating left turns where there are multiple vehicle through lanes.

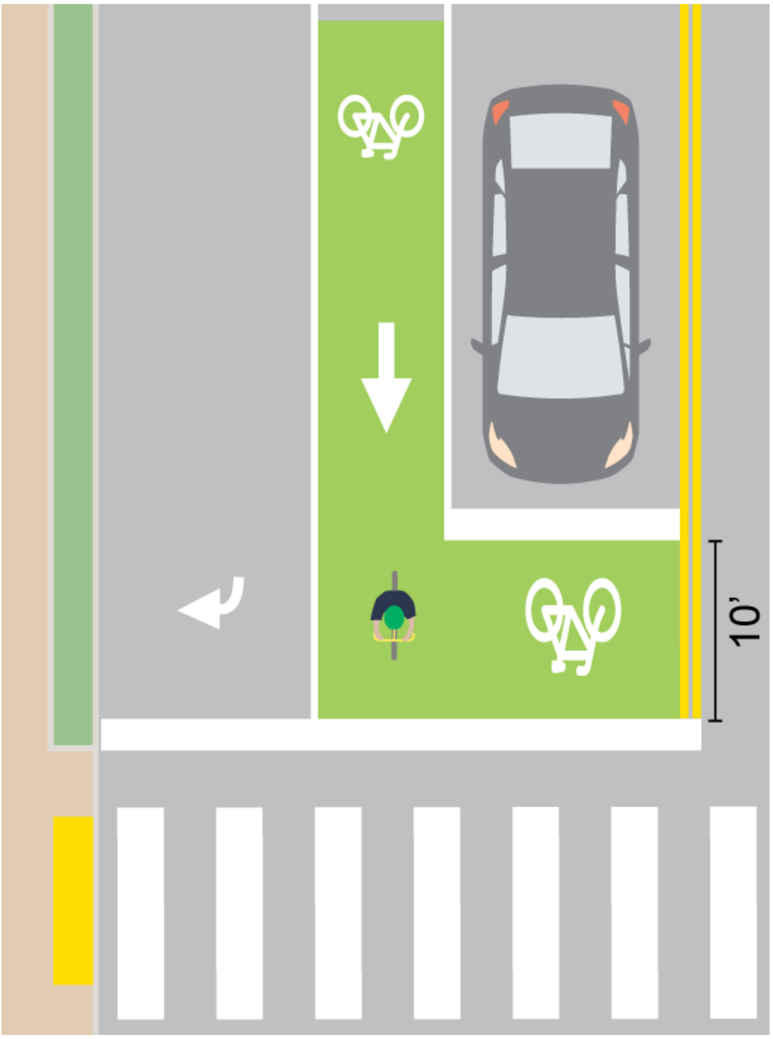


FIGURE 6-14 BICYCLE BOX

Guidelines:

- The bicycle box shall be 10' deep to allow for bicycle positioning with a pronounced stop line (MUTCD 9E.12) at the back edge as a buffer from vehicles.
- Signage should be present to prevent 'right turn on red' and to indicate where the motorist must stop (CA MUTCD 2B.54).
- A "Wait Here" marking can also be used to supplement the intent of the stop line.
- Where right-turn-only lanes for motor vehicles exist, bicycle lanes should be designed to the left of the turn lane. If a right-turn-on-red is desired, consider ending the bicycle box at the edge of the bicycle lane to allow motor vehicles to make this turning movement.

References:

- CA MUTCD Rev. 8 (Section 2B.54), Caltrans, 2024
- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Urban Bikeway Design Guide, NACTO, 2014

6.5.7 Two-Stage Turn Queue Box

A two-stage turn queue box, or a "Copenhagen left turn," helps facilitate bicyclist left turns at multi-lane signalized intersections. When bicyclists enter the intersection from a right-side bicycle lane, they can wait in a queue box that allows them to reposition their bike and complete their original left turn at the next green light.

Benefits:

- Improves bicyclist ability to make left turns safely and comfortably.
- Provides a formal queuing space for bicyclists making a two-stage turn.
- Reduces turning conflicts between bicyclists and motor vehicles.
- Prevents conflicts arising from bicyclists queuing in a bike lane or crosswalk.
- Separates turning bicyclists from through bicyclists.

Considerations:

- There are various queue box configurations to consider depending on roadway geometry. These include a cycle track buffer configuration, a parking lane configuration, a crosswalk setback configuration, a bike box configuration, a T-intersection parking lane configuration, and a T-intersection "jughandle" sidewalk configuration. More information can be found in NACTO's Urban Bikeway Design Guide.
- While two stage turns may increase bicyclist comfort in many locations, this configuration typically results in increased delay for bicyclists. Bicyclists now need to receive two separate green signal indications (one for the through street, followed by one for the cross street) to turn. At unsignalized intersections this configuration may also increase delay for bicyclists due to the need to wait for appropriate gaps in crossing motor vehicle traffic.
- On Trolley routes, use two-stage turn queue boxes to encourage bicyclists to cross tracks at a safe angle. (MTS Designing for Transit)

Guidelines:

- See Section 9E.11 of the FHWA MUTCD for standards and guidelines for the optional Use of Two-Stage Bicycle Turn Boxes within an intersection.
- A queue box shall be designated to hold queuing bicyclists and formalize two-stage turn maneuvers.
- Pavement markings shall include a bicycle stencil and a turn arrow to clearly indicate proper bicycle direction and positioning.
- The queue box shall be placed in a safe, designated area that does not conflict with the path of motor vehicle travel. Typically, this is between the bicycle lane and the pedestrian crosswalk within the intersection. Colored paving inside of the queuing area should be used to further define the bicycle space.
- Markings across intersections should be used to define through bicyclist positioning.

- In cities that permit right turns on red signal indications, a "No Turn on Red" sign shall be installed overhead to prevent vehicles from entering the queuing area (CA MUTCD 2B.54).

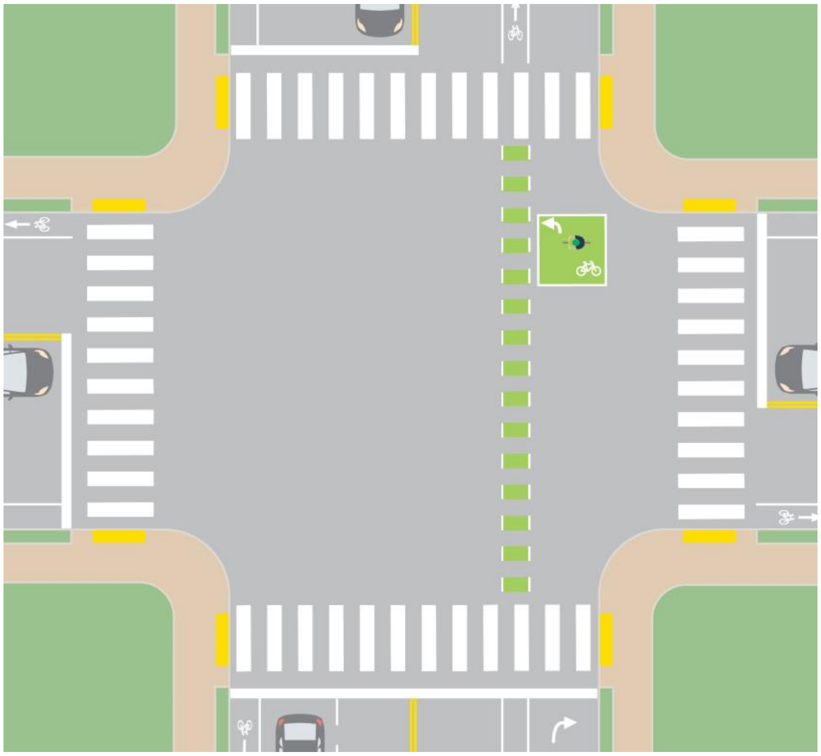


FIGURE 6-15 TWO-STAGE TURN QUEUE BOX

- In cases where a constrained roadway geometry or right of way prevents the creation of a dedicated two stage turn queue box in a protected location:
    - The pedestrian crosswalk may be adjusted or realigned to enable space for a queue box.
    - A bike box may be provided behind the pedestrian crossing to serve the same purpose. This configuration should only be considered if pedestrian volumes are low, as bicyclists must yield to pedestrians in the crosswalk before entering the queue.

References:

- CA MUTCD Rev. 8 (Section 2B.54), Caltrans, 2024
- Designing for Transit, MTS, 2018
- Urban Bikeway Design Guide, NACTO, 2014

6.5.8 Bicycle-Only Left Turn Pockets

A bicycle-only left turn pocket grants exclusive left turn access to bicyclists from the center turn lane. At locations with jogged and T-intersections, bicyclists can enter a left turn pocket in the center turn lane and wait for a gap in traffic before continuing left onto the intersecting local street.

Benefits:

- Provides route continuity for bicycle travel along local streets that have jogged or offset intersections.

Considerations:

- If traffic volumes are moderate to high, restricting vehicular left turns (at offset intersections where bicycle left turn pockets are present) may reduce conflicts between bicyclists and vehicles.

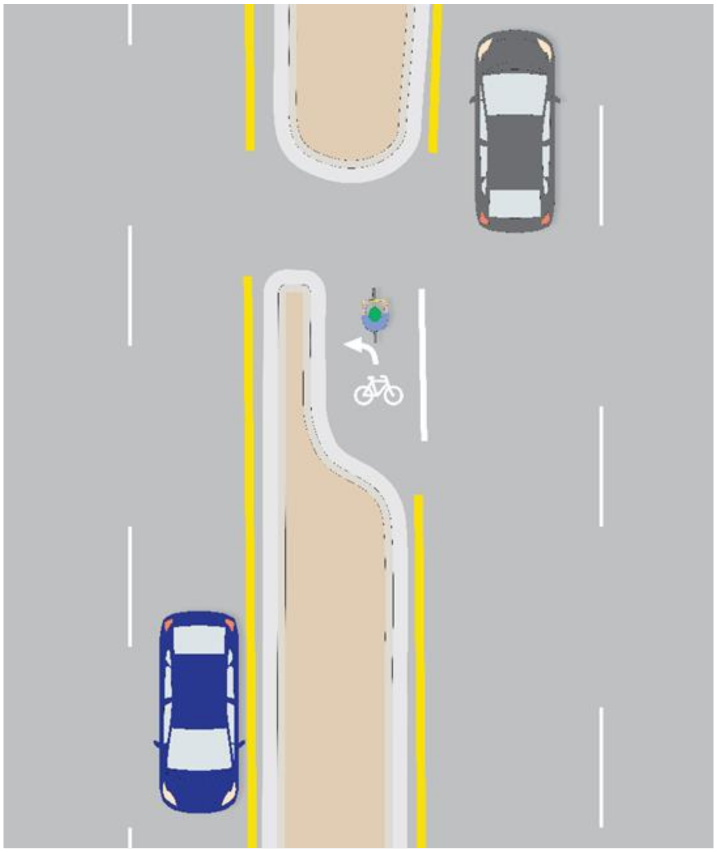


FIGURE 6-16 BICYCLE-ONLY LEFT TURN POCKET

Guidelines:

- The bicycle left turn pocket should be 4' minimum in width, with 5' preferred.
- Signs and raised median design restrictions should be provided that prohibit motorists from turning, while allowing access to bicyclists.
- Bicycle only signal heads may also be used at busy or complex intersections.
- The left turn pocket should be protected by a raised curb, but the pocket may also be defined by striping if necessary.

6.6. Signalized Intersections

Traffic signals are electrically operated traffic control devices that provide indication for roadway users to advance their travels by assigning right-of-way to each approach and movement. Traffic signals are a common form of traffic control to address roadway operations and safety issues. They allow the shared use of road space by separating conflicting movements in time and allocating delay and can be used to enhance the mobility and safety of some movements. (FHWA Signalized Intersections Informational Guide).

Traffic signals can be designed to improve pedestrian safety at intersections. Pedestrians can be given lead time so they can enter an intersection before vehicles; as a result, they'll be more visible to drivers. Meanwhile, shorter signal cycles can reduce the amount of time that pedestrians wait to cross; this can reduce delays and discourage people from crossing against the light. Traffic signals that prevent vehicles from turning right on red also may help prevent conflicts between drivers and pedestrians at crowded intersections. Traffic signals furthermore can be aligned with transit headways; this can help prioritize crossing for pedestrians.

Different technologies can be utilized such as a fiber optic network or a wireless traffic signal interconnect. Fiber optic network could be a good solution for an area with wide communication infrastructure that can serve all proposed and future ITS needs. Wireless traffic signal interconnect system can provide communication between two or more traffic signal controllers which are part of an interconnected traffic signal system using radio.

6.6.1 Pedestrian Signals and Phasing

Pedestrian signals provide an indicator to pedestrians for when they should cross at an intersection.

6.6.1.1 Exclusive Pedestrian Phase

An exclusive pedestrian phase, or pedestrian scramble, allows intersection crossings in all directions (including diagonally) while vehicles are stopped.

Benefits:

- Allows pedestrians to cross in any direction, negating the need to cross twice to reach destinations diagonally across the intersection (when diagonal crossings are employed).
- Reduces conflicts between motorists and pedestrians by isolating movements for each to occur in separate signal cycles.

Considerations:

- Exclusive pedestrian phases should be reserved for locations that have extremely high pedestrian volumes throughout the day. Leading pedestrian intervals (LPI) are typically a better choice for most locations.
- The tradeoff to safer, multi-directional crossings afforded by an exclusive pedestrian phase is increased wait times for all intersection users.
- This treatment may potentially confuse visually impaired pedestrians who rely on traffic sounds to decide when and where to cross.
- This treatment may affect the ability to synchronize timing at adjacent traffic signals.

FIGURE 6-17 EXCLUSIVE PEDESTRIAN PHASE

Location: Market Street and 5th Avenue

References:

- CA MUTCD Rev. 8 (Section 2B.54, 3B.18), Caltrans, 2024
- Proven Safety Countermeasures, FHWA, n.d.
- PROWAG (Section R308.3.2.2), US Access Board, 2023
- Steps to a Walkable Community: A Guide for Citizens, Planners, and Engineers, AmericaWalks, 2012

6.6.1.2 Lead Pedestrian Interval

Lead Pedestrian Intervals (LPI) at Traffic Signals enable pedestrians to establish themselves in the crosswalk before concurrent traffic movements get a green indication. This reduces conflicts between pedestrians and turning vehicles.

Benefits:

- LPIs increase the visibility of crossing pedestrians and give them priority within the intersection.
- LPIs typically require adjustments to existing signal timing that are relatively low cost compared to other countermeasures.

Considerations:

- This treatment may potentially confuse visually impaired pedestrians who rely on traffic sounds to decide when and where to cross. Non-visual format such as audible tones, speech messages, and/or vibrating surfaces should be provided.
- This treatment may affect the ability to synchronize timing at adjacent traffic signals.

FIGURE 6-18 LEAD PEDESTRIAN INTERVAL

Location: Aero Drive and Convoy St/Linda Vista Road

Guidelines:

- Accessible Pedestrian Signals are required with an LPI implementation.

- Leading pedestrian intervals grant pedestrians a walk signal 3 to 7 seconds before a green light is given to vehicles traveling in the same direction or turning left at the intersection. Additional time can be
- To increase the effectiveness of an LPI and improve the visibility of pedestrians, a curb extension could be installed at the intersection corners.
- “NO TURN ON RED” signs and “NO RIGHT TURN ON RED” blank-out signs should be considered with LPIs. Refer to Section 5.8.9.1 “Turn Restrictions”.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- General Plan, City of San Diego, 2024
- Traffic Safety Bulletin 21-01: LPI Implementation Guidelines, Caltrans, 2021
- Urban Street Design Guide, NACTO, 2013

6.6.1.3 Accessible Pedestrian Signal

Accessible Pedestrian Signals (APS) are devices that communicate information about pedestrian timing in nonvisual format such as audible tones, verbal messages, and/or vibrating surfaces. APS is required at all new and major modified traffic signals.

Benefits:

- Improve ability of pedestrians with hearing and visual impairments to cross the street safely.
- Allow pedestrians to more accurately judge beginning of “WALK” interval.
- Reduce crossings begun during “DON’T WALK” phase.

Considerations:

- Audible signals can be heard six to twelve feet from the push button. Volumes become louder or softer in response to level of traffic noise.
- Passive detection and automatic pedestrian signals reduce the need for those with limited mobility to contact a pushbutton.

Guidelines:

- All new and major alterations of traffic signal require the installation of APS.
- Pedestrian push button shall be located to comply with PROWAG and CA MUTCD.
- APS should be installed at every signalized intersection and pedestrian hybrid beacon.
- APS detectors may be push buttons or passive detection devices.
- APS is typically integrated into the pedestrian detector (push button), so that the audible tones and/or messages come directly from the push button housing.
- They should have a push button locator tone and tactile arrow and can include audible beaconing and other special features.
- The tone of the walk signal should be distinct from the push button locator tone.

- When accessible pedestrian signals are located as close as possible to where pedestrians are waiting to cross the street, they provide the clearest and least ambiguous indication of which pedestrian crossing is served by a device.
- See the "Whitebook" Section 700-4.5 for required elements for Accessible Pedestrian Traffic Signals.

FIGURE 6-19 ACCESSIBLE PEDESTRIAN SIGNAL

Location: India Street and Broadway

References:

- CA MUTCD Revision 8 (Sections 4E.09, 4E.10, 4E.11, 4E.12, and 4E.13), Caltrans, 2024
- Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide, FHWA, 2001
- PROWAG, US Access Board, 2023
- The "Whitebook", City of San Diego Engineering and Capital Projects Dept, 2021

6.6.1.4 Pedestrian Countdown Displays at Traffic Signals

Pedestrian Countdown Displays at Traffic Signals let pedestrians know how much crossing time remains.

Benefits:

- Helps pedestrians judge whether there is sufficient time to cross.
- Provides certainty as regards the duration of the flashing DON'T WALK phase.
- Especially helpful to mobility-challenged, elderly pedestrians, and adults accompanying small children.

Considerations:

- May not be easily understood by children or other persons with limited counting ability.
- Does not benefit vision-impaired pedestrians unless the signal is equipped with an audible pedestrian signal.
- Countdown signal technology will not currently work for railroad-preempted traffic signals (i.e. at signalized crossings near rail lines).

FIGURE 6-20 PEDESTRIAN COUNTDOWN DISPLAY

Location: India St and Broadway

Guidelines:

- Pedestrian signal heads provide special types of traffic signal indications exclusively intended for controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DON'T WALK).
- Engineering judgment should determine the need for separate pedestrian signal heads (see CA MUTCD Section 4D.03).
- All pedestrian signal heads used at crosswalks where the pedestrian change interval is more than 7 seconds shall include a pedestrian change interval countdown display in order to inform pedestrians of the number of seconds remaining in the pedestrian change interval.
- See CA MUTCD 4E.06 for pedestrian walk and clearance time guidance.
- See CA MUTCD 4E.07 for guidance on countdown pedestrian signals.

References:

- CA MUTCD Rev. 8 (Section 4C and 4E), Caltrans, 2024
- General Plan, City of San Diego, 2024
- PROWAG, US Access Board, 2023

6.6.2 Bicycle Signals and Phasing

6.6.2.1 Bicycle Signals

A bicycle signal head is a traffic control device at intersections that facilitates bicycle movements separately from cars.

Benefits:

- Separates bicycle movements from conflicting motor vehicle, streetcar, light rail, or pedestrian movements.
- Provides priority to bicycle movements at intersections (e.g., a leading bicycle interval).
- Accommodates bicycle-only movements within signalized intersections (e.g., providing a phase for a contra-flow bike lane that otherwise would not have a phase). Through bicycle travel may also occur simultaneously with parallel auto movement if conflicting automobile turns are restricted.
- Protects bicyclists in the intersection, which may improve real and perceived safety at high-conflict areas.
- Improves operation and provides appropriate information for bicyclists (as compared to pedestrian signals).
- Helps to simplify bicycle movements through complex intersections and potentially improve operations or reduce conflicts for all modes.

Considerations:

- Bicycle signal heads require the same maintenance as standard traffic signal heads, such as replacing bulbs and responding to power outages.

Guidelines:

- Bicycle signal lenses should be 8" in diameter and have yellow housing, yellow visors, and yellow backplates.
- The use of a bicycle signal face is optional. However, such use shall be limited to situations where bicycles moving on a green or yellow signal indication in a bicycle signal face are not in conflict with any simultaneous motor vehicle movement at the signalized location, including right (or left) turns on red. See Chapter 4H of the FHWA MUTCD for additional standards and guidelines.
- Bicycle signal heads typically use standard three-lens signal heads in green, yellow, and red with a stencil of a bicycle.

- A Bicycle Signal (R10-10b) sign shall be installed immediately adjacent to every bicycle signal face that is intended to control only bicyclists, including signal faces that are comprised of all bicycle symbol signal indications, all arrow signal indications, and every combination thereof.
- The purpose of the sign is to inform any motor vehicle drivers who can also see the signal face that these signal indications are intended only for bicyclists.

FIGURE 6-21 BICYCLE SIGNAL HEAD

Location: 5th Avenue and Market Street

References:

- CA MUTCD Rev. 8 (Sections 4C.102 and 4D.104), Caltrans, 2024
- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Urban Bikeway Design Guide, NACTO, 2014

6.6.2.2 Bicycle Only Phase

Bicycle-only phases can be used to increase safe turning for bicycles at certain intersections. Generally, bicycle signal faces (bicycle signal heads) are installed to indicate to cyclists when it is their turn to travel, as well as which directions are permitted during that phase.

Benefits:

- A bicycle only signal phase at high-volume intersections for both bicyclists and vehicles may increase bicycle safety due to a lower number of bicycle/vehicle conflicts.

Considerations:

- One of the biggest issues designers face with a bicycle only phase is that it does not permit any conflicting vehicle turn movements when the bicycle signal is green or yellow. This restriction can limit the application of bicycle signals because of the need to prohibit conflicting turning movements such as left or right turns (including turns on red) during the green bicycle signal phase.
-

FIGURE 6-22 BICYCLE ONLY PHASE

Location: Russell Boulevard and Sycamore Lane, Davis, CA
Source: NACTO

Guidelines:

- The minimum duration of the yellow change interval shall be 3 seconds, while the maximum duration of the yellow change interval should be 6 seconds.
- If the bicycle signal is used to separate bicycle movements from right turning vehicles, then right turn on red shall be prohibited when the bicycle signal is active. This can be accomplished with

the provision of a traffic signal with red, yellow, and green arrow displays. An active display to help emphasize this restriction is recommended.

- Bicycle signal faces shall not be used to provide a bicycle phase that stops all motorized vehicles and pedestrians at the signalized location to allow multiple bicycle movements from multiple conflicting directions. (FHWA MUTCD: Chapter 4H)

References:

- "Benefit-cost analysis of added bicycle phase at existing signalized intersection", Korve and Niemeier, 2002
- Manual on Uniform Traffic Control Devices for Streets and Highways, 11th ed., FHWA, 2023
- Urban Bikeway Design Guide, NACTO, 2014

6.6.2.3 Bicycle Green Wave

A green wave is when traffic signals are deliberately timed to coordinate successive green lights along a corridor. Therefore, bicyclists that travel along a green wave street at moderate speeds benefit from not having to intermittently stop at intersections.

Benefits:

- Reduce the amount of stops along a corridor.
- Provides for a continuous flow of bicycle traffic at the target speed.
- Lessens the physical demands of bicycling, especially for younger, older, and/or newer riders.
- May encourage vehicular drivers to decrease their speeds in order to reap the benefits of the green wave.
- Slower car speeds improve safety conditions for both pedestrians and bicyclists.

Considerations:

- Before making traffic signal timing modifications, the presence of major transit routes and their ability to meet on-time performance goals should be evaluated on potential green wave streets.

Guidelines:

- The appropriate signage should be posted to let bicyclists know they are traveling on a street with a green wave.

FIGURE 6-23 GREEN WAVE SIGNAGE

Source: ITE/SFMTA

References:

- Urban Street Design Guide, NACTO, 2013

6.6.2.4 Bicycle Loop Detector

A bicycle loop detector notifies traffic signals to change when bicyclists are waiting at a red light. When a bike is positioned squarely on top of the designated pavement marking (where the loop detector lies underneath), it will be picked up and trigger a green light at the next available signal phase for the bicyclist.

Benefits:

- Improves efficiency and flow of bicycle traffic.
- Reduces delay for bicyclists.
- Increases convenience and safety of bicycling.
- Affords bicyclists the same technology given to motorized vehicles.
- Provides more time for bicyclists to clear the intersection by prolonging the green light phase.
- Discourages red light running by bicyclists, which reduces the risk of collisions with motorized vehicles.

Considerations:

- Loop detector sensitivity settings need to be monitored and adjusted over time.
- Higher car speeds and wider intersections may warrant specific signal timing consideration for bicyclists.

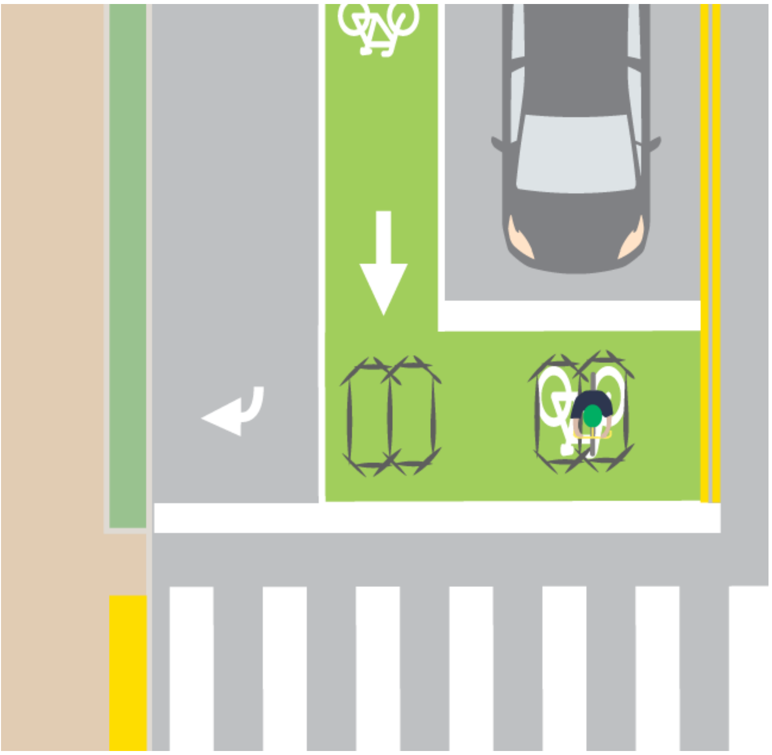


FIGURE 6-24 BICYCLE LOOP DETECTOR

Guidelines:

- Section 4D.105(CA MUTCD) and Figure 4D-111 (CA MUTCD) contain information on bicycle detectors and their locations.
- Loop detectors shall be designed in accordance with the City's Standard Drawings SDE-104 and any other applicable City standards.
- A symbol (see CA MUTCD Figure 9C-7) may be placed on the pavement indicating the optimum position for a bicyclist to actuate the signal.
- An R10-22 sign (see CA MUTCD Section 9B.13 and Figure 9B-2) may be installed to supplement the pavement marking.

References:

- CA MUTCD Rev. 8 (Section 4D.105 and 9C.05), Caltrans, 2024
- CA Vehicle Code (CVC 21450.5), Department of Motor Vehicles, n.d.
- Standard Drawings for Public Works Construction, City of San Diego, 2021
- Standard Plans (ES-5B), 7th Ed., Caltrans, 2024

- Urban Bikeway Design Guide, NACTO, 2014

6.6.3 Transit Signal Prioritization

Transit signal prioritization allows transit vehicles to shorten red lights or extend green lights at signalized intersections with minimal impact to the traffic signal system.

Benefits:

- Reduces delay for transit vehicles.
- Improves transit reliability and travel times.

Considerations:

- Signal coordination should not increase delay for all modes (including transit itself), and should take into consideration the acceleration rates and speeds of bicyclists.

Guidelines:

- Transit signal prioritization requires the installation of specialized equipment at an intersection's traffic signal controller and on the transit vehicle.
- Transit signal priority (TSP) projects are more effective when bus stops are placed at the far side of signalized intersections.
- A corridor's traffic signals can also be programmed to achieve a green wave for transit vehicles by timing the signals to match a bus's average operating speed instead of an automobile's average speed.

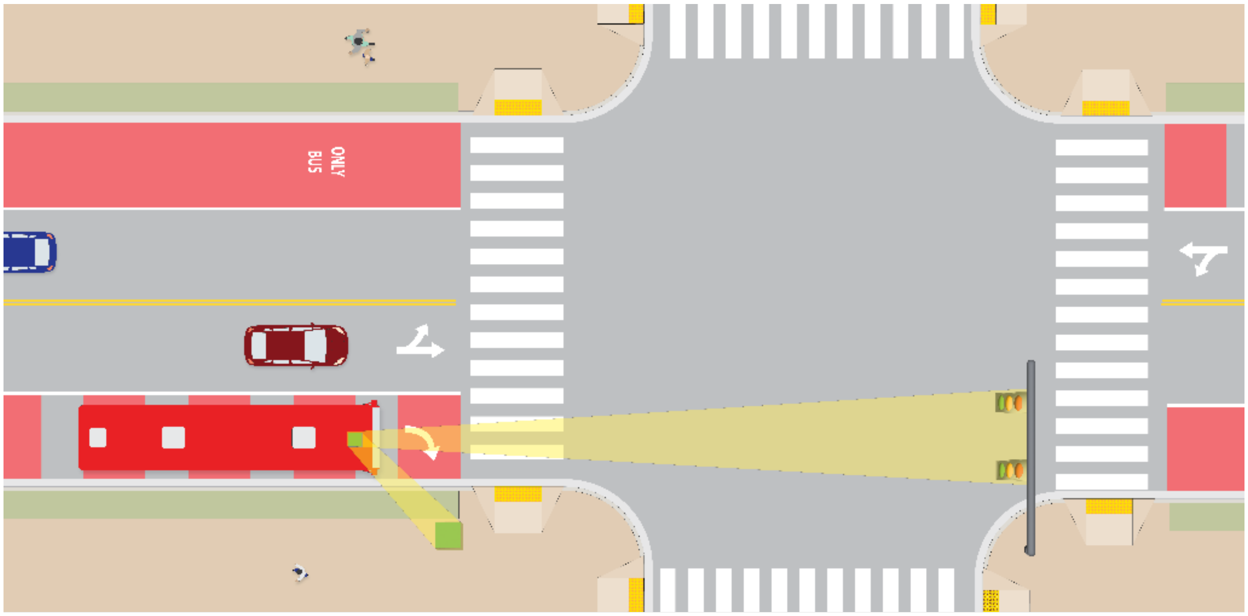


FIGURE 6-55 TRANSIT SIGNAL PRIORITIZATION

References:

- Transit Street Design Guide, NACTO, 2016

6.6.3.1 Queue Jumps

Queue Jumps are design elements with two distinct features: the bypass lane and the traffic signal transit phase. A queue jump is a phase insertion treatment intended to exclusively serve transit vehicles stopped at a red signal and positioned at a near-side stop in a right-turn lane. During the red phase, passengers may board and alight the transit vehicle. The vehicle is then given a green signal in advance of the adjacent lanes, allowing the vehicle to merge back into a through travel lane ahead of the queued traffic in the adjacent lanes. Typically, the time for this phase is allocated from the parallel general traffic movement and lasts three to four seconds. The treatment is also possible at far-side stop locations, where it would be located in the curbside through-movement lane.

Benefits:

- A bus head start can significantly improve bus performance by routing vehicles through congested intersections ahead of traffic.
- As congestion increases, bus queue jumps and bypasses become more effective.

Considerations:

- Queue jumps are most useful at traffic bottleneck locations and don't need to be tied to bus stops.
- If vehicle right-turn volumes are high enough for right-turn queues to occur with regularity, right turns should be accommodated separately from transit in a turn pocket.

Guidelines:

- Separate signals must be used to indicate when transit proceeds and when general traffic proceeds. Transit signals should be a transit specific signal head.
- A transit phase may not be needed if there is a receiving lane for the bus on the far side of the intersection.
- If provided as a shared right-turn/queue jump, a protected right-turn signal may be used with a sign indicating RIGHT TURN SIGNAL and EXCEPT BUSES.
- See the CA MUTCD for guidelines on preferential lanes and signal faces.

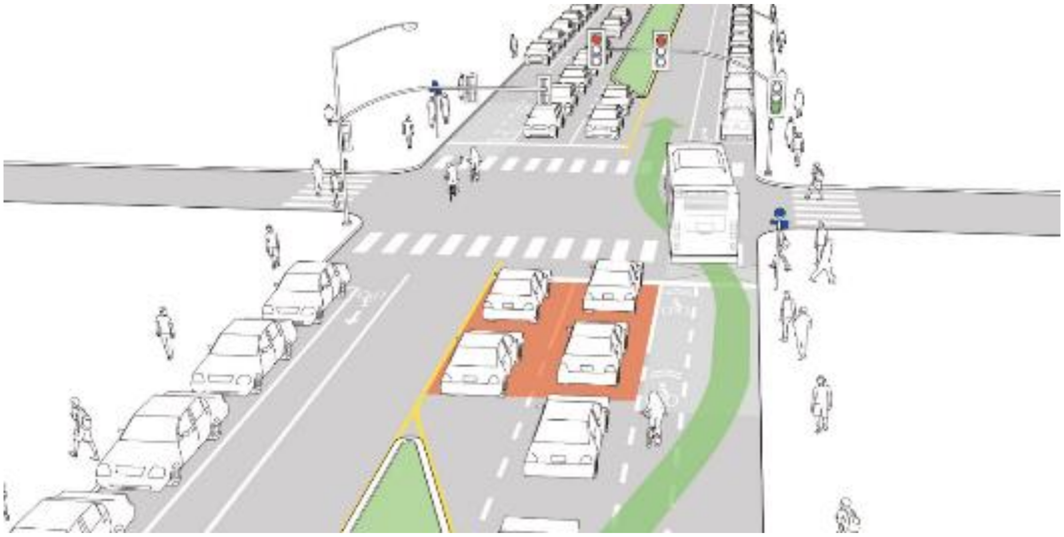


FIGURE 6-26 QUEUE JUMP

Source: NACTO Transit Street Design Guide

FIGURE 6-27 QUEUE JUMP WITH TRANSIT SIGNAL

Location: Ash Street and 1st Avenue

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- Transit Street Design Guide, NACTO, 2016

6.7. Unsignalized Intersections

Unsignalized intersections are those at-grade junctions of two or more public roads where the control of right-of-way is determined by the presence of a YIELD or STOP sign, or no sign at all (uncontrolled).

6.7.1 Stop Signs

The stop sign is used to assign right of way at an intersection and to make sure that traffic flows smoothly and predictably.

Benefits:

- Lower in cost than traffic signals, both to install and maintain.
- Decreases the speed at which vehicles enter the intersection, reducing potential crash severity particularly at intersections with low visibility.
- Provide for the orderly movement of traffic.

Considerations:

- STOP signs should not be used for speed control.
- STOP signs should be installed in a manner that minimizes the numbers of vehicles having to stop. At intersections where a full stop is not necessary at all times, consideration should be given to using less restrictive measures such as YIELD signs.
- Once the decision has been made to install two-way stop control, the decision regarding the appropriate street to stop should be based on engineering judgment. In most cases, the street carrying the lowest volume of traffic should be stopped.
- A STOP sign should not be installed on the major street unless justified by a traffic engineering study.
- STOP signs should be used if engineering judgment indicates that one or more of the following conditions exist:
    - Intersection of a lower volume road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;
    - Street entering a through highway or street;
    - Unsignalized intersection in a signalized area; and/or
    - High speeds, restricted view, or crash records indicate a need for control by the STOP sign.

FIGURE 6-28 STOP-CONTROLLED INTERSECTION

Location: Brookhaven Road and Deep Dell Road

Standards and Guidelines:

- Refer to Council Policy 200-08 for the installation of stop signs within the public ROW.
- When it is determined that a full stop is always required on an approach to an intersection, a STOP (R1-1) sign shall be used.
- The STOP sign shall be an octagon with a white legend and border on a red background.
- Secondary legends shall not be used on STOP sign faces.
- At intersections where all approaches are controlled by STOP signs (see Section 2B.07), an ALL WAY supplemental plaque (R1-3P) shall be mounted below each STOP sign. The ALL WAY plaque (see Figure 2B-1) shall have a white legend and border on a red background.
- The ALL WAY plaque shall only be used if all intersection approaches are controlled by STOP signs.
- Supplemental plaques with legends such as 2-WAY, 3-WAY, 4-WAY, or other numbers of ways shall not be used with STOP signs. See CA MUTCD Section 2B.05-2B.07 for additional guidance.

References:

- CA MUTCD Rev. 8 (Section 2B.05-2B.07), Caltrans, 2024
- Council Policy 200-08 "Criteria for the Installation of Stop Signs", City of San Diego, 1997

6.7.2 Roundabouts

Roundabouts are circular intersections with specific design and traffic control features. These features include yield control of all entering traffic, channelized approaches, and appropriate geometric curvature to ensure that travel speeds on the circulatory roadway are typically less than 30 mph.

The design standards in the following sections apply within the boundaries of roundabouts, mini-roundabouts, and traffic circles. If the volume on any leg of an intersection is greater than 3,000 vehicles per day, a roundabout is recommended over a traffic circle, and must be designed following the standards described in this chapter to ensure that it embodies the fundamental Safe Systems principles of redundancy for human mistakes and low crash energy for human vulnerability. NCHRP has released the most recent version of roundabout guidance (Research Report 1043). It must be followed except when there is a conflict with City of San Diego guidance, which supersedes.

Benefits:

- The physical shape of roundabouts eliminates crossing conflicts that are present at conventional intersections, thus reducing the total number of potential conflict points and the most severe of those conflict points.
- When operating within their capacity, roundabouts typically have lower overall delay than signalized and all-way stop-controlled intersections. The delay reduction is often most significant during non-peak traffic periods.
- Roundabouts often provide environmental benefits by reducing vehicle delay and the number and duration of stops compared with signalized or all-way stop-controlled alternatives.
- Because roundabouts can facilitate U-turns, they can be a key element of a comprehensive access management strategy to reduce or eliminate left-turn movements at driveways between major intersections.
- Roundabouts can have traffic calming effects on streets by reducing vehicle speeds using geometric design rather than relying solely on traffic control devices.

Considerations:

- A roundabout may reduce the amount of widening needed on the approach roadways in comparison to alternative intersection forms. While signalized or stop-controlled intersections can require adding lengthy left-turn and/or right-turn lanes, a roundabout may enable maintaining a narrower cross section in advance of the intersection. However, roundabouts usually require more space for the circulatory roadway, central island, and sidewalks than the typically rectangular space inside traditional intersections. Therefore, roundabouts often have greater right-of-way needs at the intersection quadrants compared with other intersection forms.
- Pedestrians with vision impairments may have more difficulty crossing roundabouts, which can be mitigated with adequate design. Look to the design guidelines below and to the NCHRP Research Report 1043 “Guide for Roundabouts” for more information on making roundabouts accessible.

General Guidelines:

- Signs, striping, and markings at roundabouts are to comply with the CA MUTCD.
- The design of landscaping should consider lines of sight for motorists approaching and traveling around the roundabout. Sufficient sight triangles should be provided to allow for adequate visibility.
- The radius of roundabouts should take into account the design speed for turning vehicles.
- Roundabouts must adhere to the California Highway Design Manual (Chapter 400).
- Roundabouts must adhere to City of San Diego CFC Section 503 for emergency vehicle access.
- For single lane entries, entering fastest paths must be 25 mph or less, constrained by three concrete curbs that provide sufficient entry deflection, and measured using the City of San Diego's fastest path method.
- For two lane entries, entering fastest paths must be 30 mph or less, constrained by three concrete curbs that provide sufficient entry deflection, and measured using the City of San Diego's fastest path method.
- For two lane entries, the outside entry lane must not be close to parallel with the inside circulating lane, maintain a Phi angle of 20-40 degrees for each entry lane (measured using the City of San Diego's Phi Angle method)
- Center, splitter, and curb-extension islands must all be present and raised if volume on that leg is greater than 3,000 vehicles per day.
- For multi-lane approaches, the crosswalk must be raised or include a Rectangular Rapid Flashing Beacon.
- Curbs designed to accommodate long truck off-tracking must be at least 2.5 inches above the roadway surface, and no more than 3.5 inches above it.
- The offset between the face of curb and the design vehicle tire (not vehicle envelope) is:
    - 6 inches for mountable curb with no gutter
    - 12 inches for non-mountable curb with no gutter
    - 18 inches for curb with gutter

Guidelines for Accessible Pedestrian Design with Roundabouts:

- Buffers must be included between the sidewalks and the circulating roadway. The buffer discourages pedestrians from crossing to the central island or cutting across the circulatory roadway of the roundabout, and it helps guide pedestrians with vision impairments to the designated crosswalks.
- A buffer width of 5 ft (minimum 2 ft) or greater may include planting low shrubs, grass, or non-walkable surface in the area between the sidewalk and curb to maintain sight distance needs.
- Crosswalks must be oriented perpendicular to traffic so that pedestrians have maximum cones of hearing and vision no matter which direction they are crossing. If a pedestrian refuge is present, the crosswalk must have an angle point in the center of the refuge.
- Crosswalks must be one car length (20 ft) away from the circulating roadway on each leg that has more than 3,000 vehicles per day (two-way volume).

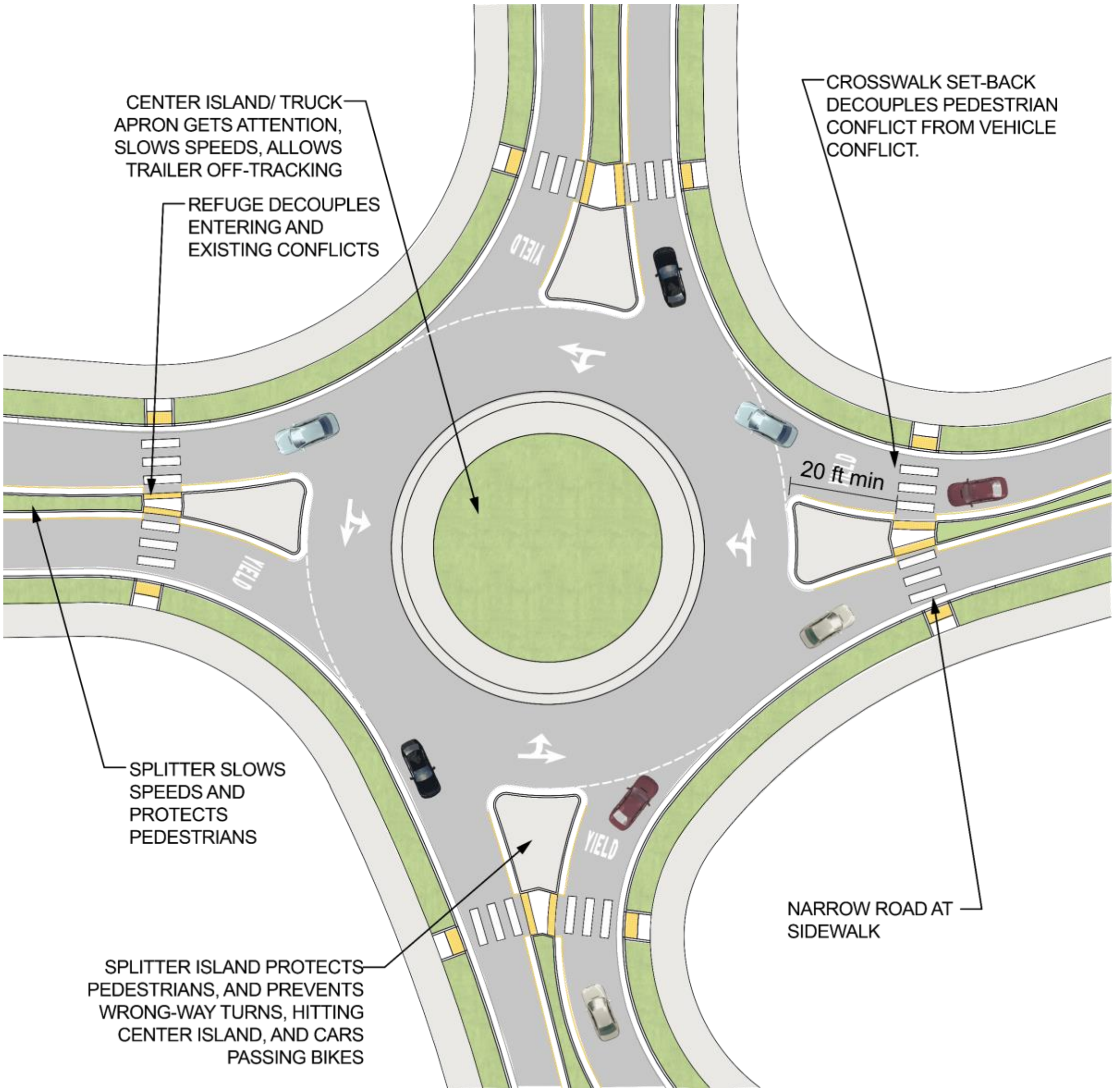


FIGURE 6-29 ROUNDABOUT

- Crosswalks should be located in vehicle-length increments away from edge of the circulatory roadway.
- The pedestrian refuge island must be present between entering and exiting vehicles on each leg that has more than 3,000 vehicles per day (two-way volume).
- Pedestrian refuge islands must be at least 6 feet wide at their narrowest point, with 2 ft of truncated domes aligned with the crosswalks on both sides and at least 2 feet between the domes.
- The pedestrian refuge islands must have an angle point in the center and the edges of the refuge must reflect this angle point in the center.
- If there is no pedestrian refuge island, the crosswalk must not have an angle point and must be as perpendicular as possible to both entry and exit vehicle traffic.
- Pedestrian curb ramps must not have flares so their edges can be used for orientation.

- Bicycle ramps must not resemble pedestrian curb ramps and shall not merge with the curb ramp top landings.
- At some roundabouts, it may be desirable to place the crosswalk two or three car lengths (45 ft or 70 ft) back from the edge of the circulatory roadway. This longer setback is typically used in situations with relatively high volumes of pedestrian crossings that may cause queues on the exit roadway to frequently extend into the circulatory roadway.

Guidelines for Bicycle Facilities within Roundabouts:

- Bicycle lanes the exterior of the circulatory roadway is an impractical solution that is to be avoided, as it creates overlap between bicycle movements and exiting vehicular movements.
- Where bicycle lanes or shoulders are used on approach roadways, they should be terminated in advance of roundabouts. Bicyclists may choose to merge with traffic and travel like other vehicles, or they may choose to exit the roadway onto the sidewalk (or shared use path) and travel as pedestrians. Sufficient sidewalk width for mixed traffic should be provided unless the lane only turns right and is separated from circulating vehicles with raised channelization.
- If a right turn bypass lane for cyclists is provided, it must be separated from the circulating roadway with raised curb to prevent cyclists from proceeding straight into the circle.
- The full width bicycle lane should normally end at least 100 feet before the edge of the circulatory roadway. An appropriate taper (a rate of 7:1 is recommended) should be provided to narrow the combined travel lane and bike lane width down to the appropriate width necessary to achieve desired motor vehicle speeds on the roundabout approach.
- Because some bicyclists may not feel comfortable traversing some roundabouts in the same manner as other vehicles, bicycle ramps can be provided to allow access to the sidewalk or a shared use path at the roundabout.
- Provide bicycle ramps for cyclists to access the shared sidewalks and to return to their lane on the roundabout exits when a driveway is not close enough to serve this purpose.
- Bicycle ramps must align with bicycle lanes and include an angle point to control bicycle speeds.
- Directional indicators may be used to guide visually-impaired to help them stay on the sidewalk.
- In general, bicycle ramps should only be used where the roundabout complexity or design speed may result in less comfort for some bicyclists. Ramps may not be needed at urban one-lane roundabouts, as the low-speed and lower-volume environment will typically allow cyclists to navigate as comfortably as vehicles.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- California Fire Code (Section 503), California Building Standards Commission, 2022
- FPB Policy A-14-1 "Fire Access Roadways", City of San Diego Fire-Rescue Dept, 2015
- Highway Design Manual, 7th ed., Caltrans, 2020
- Improving Intersections for Pedestrians and Bicyclist: Informational Guide, FHWA, 2022
- NCHRP Research Report 1043: Guide for Roundabouts, National Academies of Sciences, Engineering, and Medicine, 2023
- PROWAG, US Access Board, 2023

6.7.3 Mini-Roundabouts

Mini-roundabouts are a type of roundabout characterized by a small diameter and traversable islands (central island and splitter islands). Mini-roundabouts offer most of the benefits of regular roundabouts with the added benefit of a smaller footprint. As with roundabouts, mini-roundabouts are a type of intersection rather than merely a traffic calming measure, although they may produce some traffic calming effects. They are best suited to environments where speeds are already low and environmental constraints would preclude the use of a larger roundabout with a raised central island.

Benefits:

- A mini-roundabout can often be developed to fit within existing right-of-way constraints.
- A mini-roundabout may provide less delay for a critical movement or for an overall intersection in comparison to other intersection alternatives.
- Mini-roundabouts have been used successfully in the U.K. to improve safety at intersections with known crash problems, with reported crash rate reductions of approximately 30 percent as compared to signalized intersections.
- Designed properly, a mini-roundabout reduces speeds and can be implemented as part of a broader traffic calming scheme.
- Because of the traversable design of the central island and splitter islands, emergency vehicles are unlikely to have significant difficulty negotiating a mini-roundabout.

Considerations:

- Mini-roundabouts cannot provide the same level of speed reduction as their larger counterparts and thus are less suited for roadways with speeds exceeding 30 to 35 mph.
- Pedestrians are accommodated at pedestrian crosswalks around the perimeter of the mini-roundabout. The splitter islands at mini-roundabouts typically do not provide the same degree of refuge as those at other roundabouts, thus typically requiring pedestrians to cross the street in one stage (as with many conventional intersections).
- Mini-roundabouts are generally located in environments where bicyclists are comfortable negotiating the roundabout as a motor vehicle. In the event a bicyclist desires to navigate the intersection as a pedestrian, sidewalks and crosswalks are provided.
- High volumes of trucks will significantly reduce the capacity of a mini-roundabout, as trucks will occupy most of the intersection when turning. Additionally, high volumes of trucks overrunning the central island may lead to rapid wear of the roadway markings.

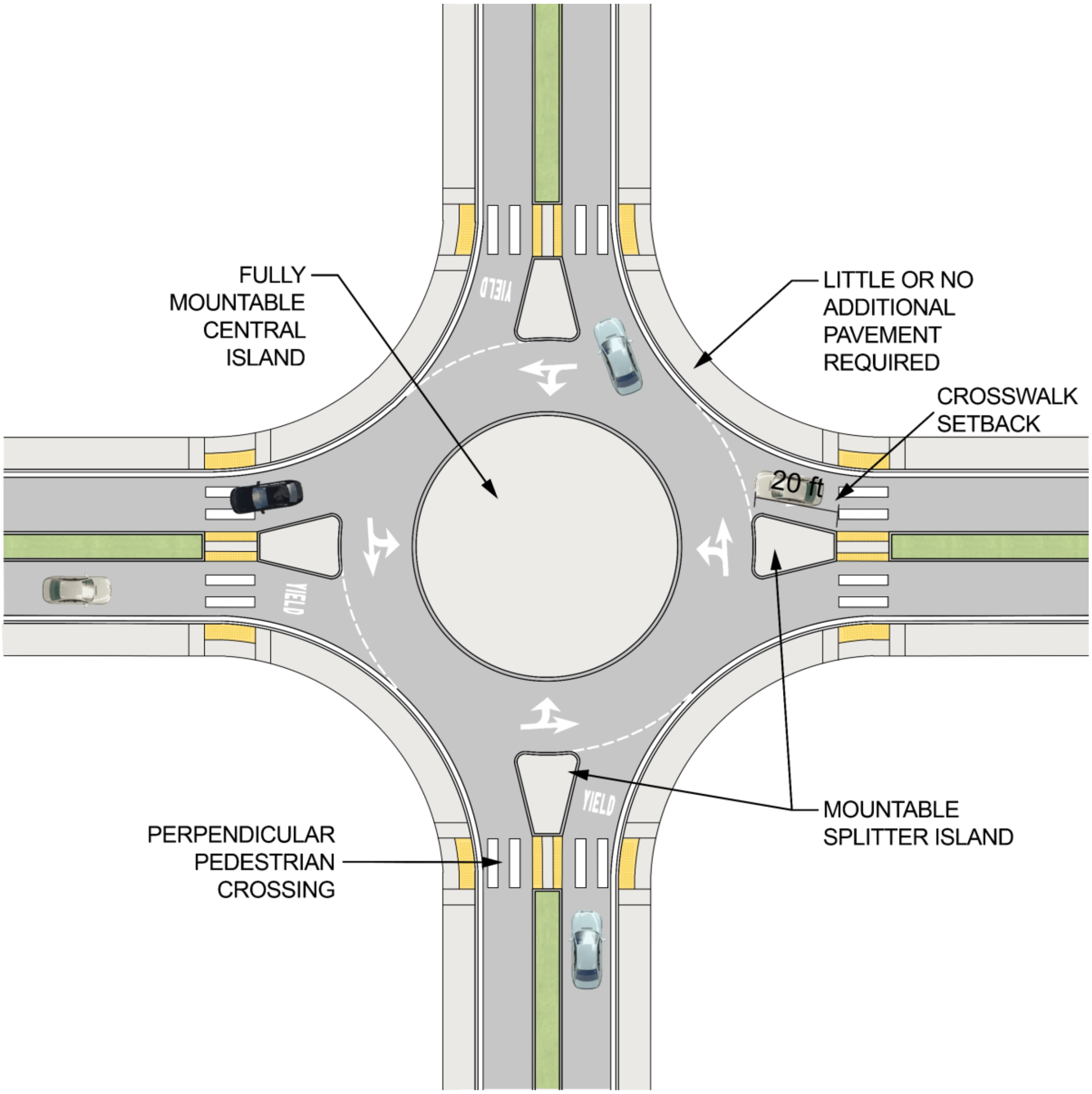


FIGURE 6-30 MINI-ROUNDABOUT

Guidelines:

- A mini-roundabout inscribed circle diameter generally should not exceed 90 ft.
- The central island should be domed using 5 to 6% cross slope, with a maximum height of 5 inches.
- The advanced entrance line into the circulatory roadway should be placed at least 2 ft outside of the vehicle paths.
- Splitter islands at least 6 ft in width should be provided as deflection and as refuge island for pedestrian crossings.
- Reflective signage should be placed within the center island and reflective paint should be used on the curb.
- Sidewalks should be set back from the edge of the circulatory roadway by at least 5 ft so that pedestrians with visual impairments can clearly follow designated crossing paths.

- Signage and detectable warning plates should be provided to delineate pedestrian crossing paths and signal drivers to yield.

References:

- CA MUTCD Rev. 8, Caltrans, 2024
- NCHRP Research Report 1043: Guide for Roundabouts, National Academies of Sciences, Engineering, and Medicine, 2023
- PROWAG, US Access Board, 2023

6.7.4 Traffic Circle

Traffic circles are circular medians placed in the center of an intersection. Traffic flows around the median counter-clockwise through the intersection. Drivers yield to vehicles already circulating within the intersection. These devices may reduce speeds through neighborhoods and the frequency of collisions. Due to the horizontal deflection, vehicles must slow to maneuver around the device. The circular median can be landscaped to help beautify a neighborhood. Traffic circles are appropriate on 25 mph or slower local streets, often within residential neighborhoods rather than in urban centers.

Benefits:

- Traffic circles produce a traffic calming effect.
- Traffic circles can create a landscaping opportunity.

Considerations:

- If medians are raised, traffic circles may impact large vehicles’ turns.
- As with all roundabout types, traffic circles do not provide explicit priority to specific users such as trains, transit, or emergency vehicles.
- If the volumes on all legs of an intersection are less than 3,000 vehicles per day, a traffic circle may be used, which may or may not include raised splitter islands on some or all legs or a truck apron.
- They may impact emergency response time.

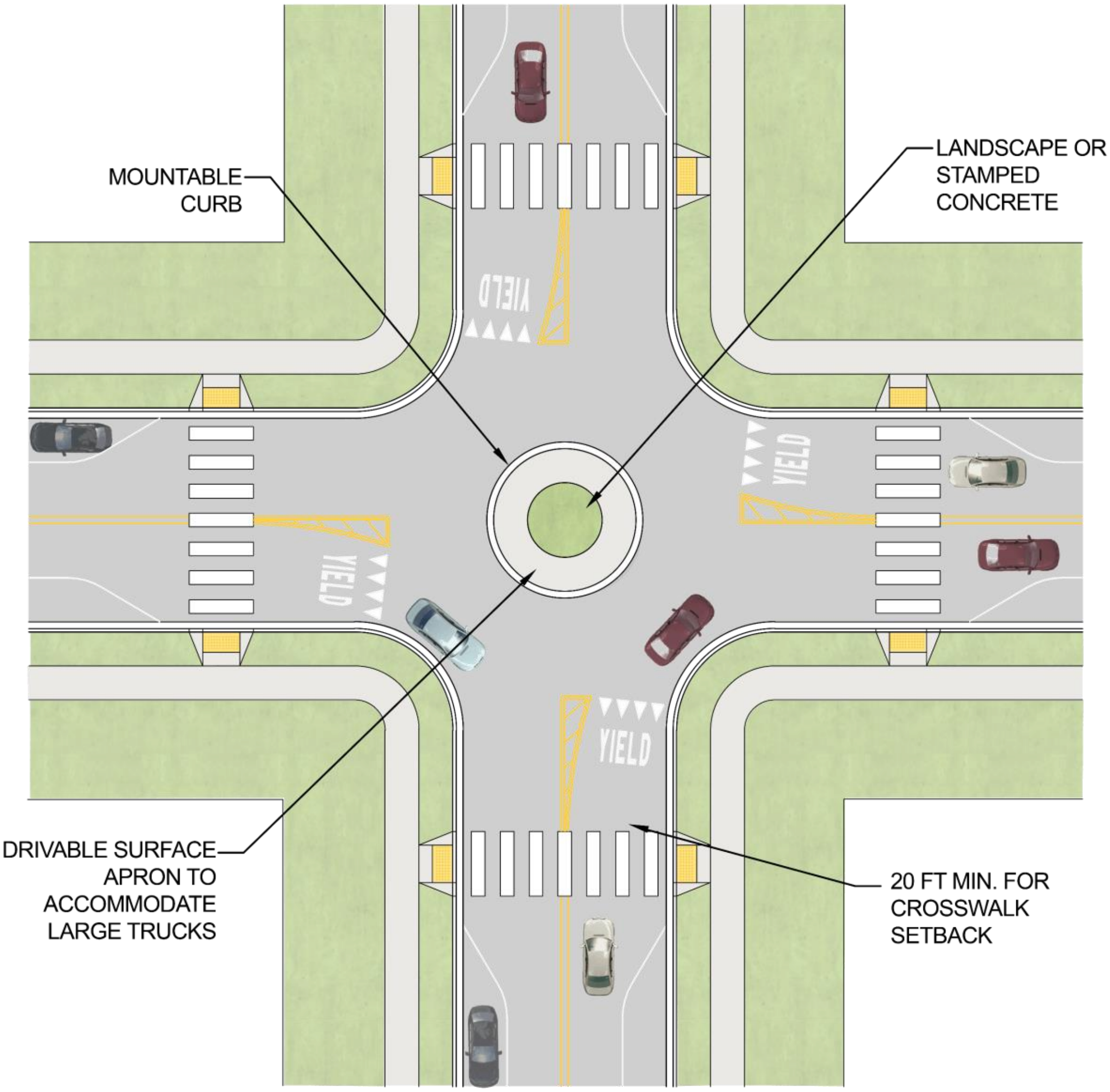


FIGURE 6-31 TRAFFIC CIRCLE

Guidelines:

- Where feasible, landscaping should be incorporated.
- Compared to mini-roundabouts and roundabouts, in which yield control is used on all entries, traffic circles can use stop control or be uncontrolled on one or more entries.

References:

- Traffic Calming Guidelines, City of San Diego Transportation Dept, 2010

6.7.5 Pedestrian Crossings at Uncontrolled Intersections

A marked crosswalk or pedestrian warning sign can improve safety for pedestrians crossing the road, but at times may not be sufficient for drivers to visibly locate crossing locations and yield to pedestrians. To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) or pedestrian hybrid beacons (PHB/HAWKs) to accompany a pedestrian warning sign.

More discussion of these treatments are discussed in Sections 5.6.3 and 5.6.4.

6.8. Intersection Street Lighting

Increased visibility at intersections at nighttime is important since various modes of travel cross paths at these locations. Intersection lighting should be based on factors such as a history of crashes at nighttime, traffic volume, the volume of non-motorized users, the presence of crosswalks and raised medians, and the presence of transit stops and boarding volumes.

Benefits:

- Intersection lighting can reduce pedestrian crashes up to 42% (USDOT FHWA).

Considerations:

- Selecting the most appropriate lighting system is best done through lighting design and calculation on a per-project basis as opposed to using a one-size-fits-all approach.
- Most new lighting installations are made with breakaway features, shielded, or placed far enough from the roadway to reduce the probability and/or severity of fixed-object crashes. Modern lighting technology gives precise control with minimal excessive light affecting the nighttime sky or spilling over to adjacent properties.

Guidelines:

- Lighting shall be installed at all street intersections. Lighting at non-signalized intersections shall conform to Table 6-2.
- Street Lighting at Signalized Intersections shall conform to Caltrans' Roadway Lighting Manual (2021).
- Street Lighting Standards, arms, bases, and mounting heights shall conform to the City of San Diego Standard Drawing (SDE-101) for intersection and mid-block lighting.
- All signalized intersections shall utilize cobra head style luminaires on Type 15 standards per City requirements. Operation of the street light systems shall be network controlled unless otherwise noted.

- See the City's Standard Drawings and City of San Diego Whitebook, Part 7: Street Lighting And Traffic Signal Systems, for required street lighting material requirements, construction requirements, and design guidance.

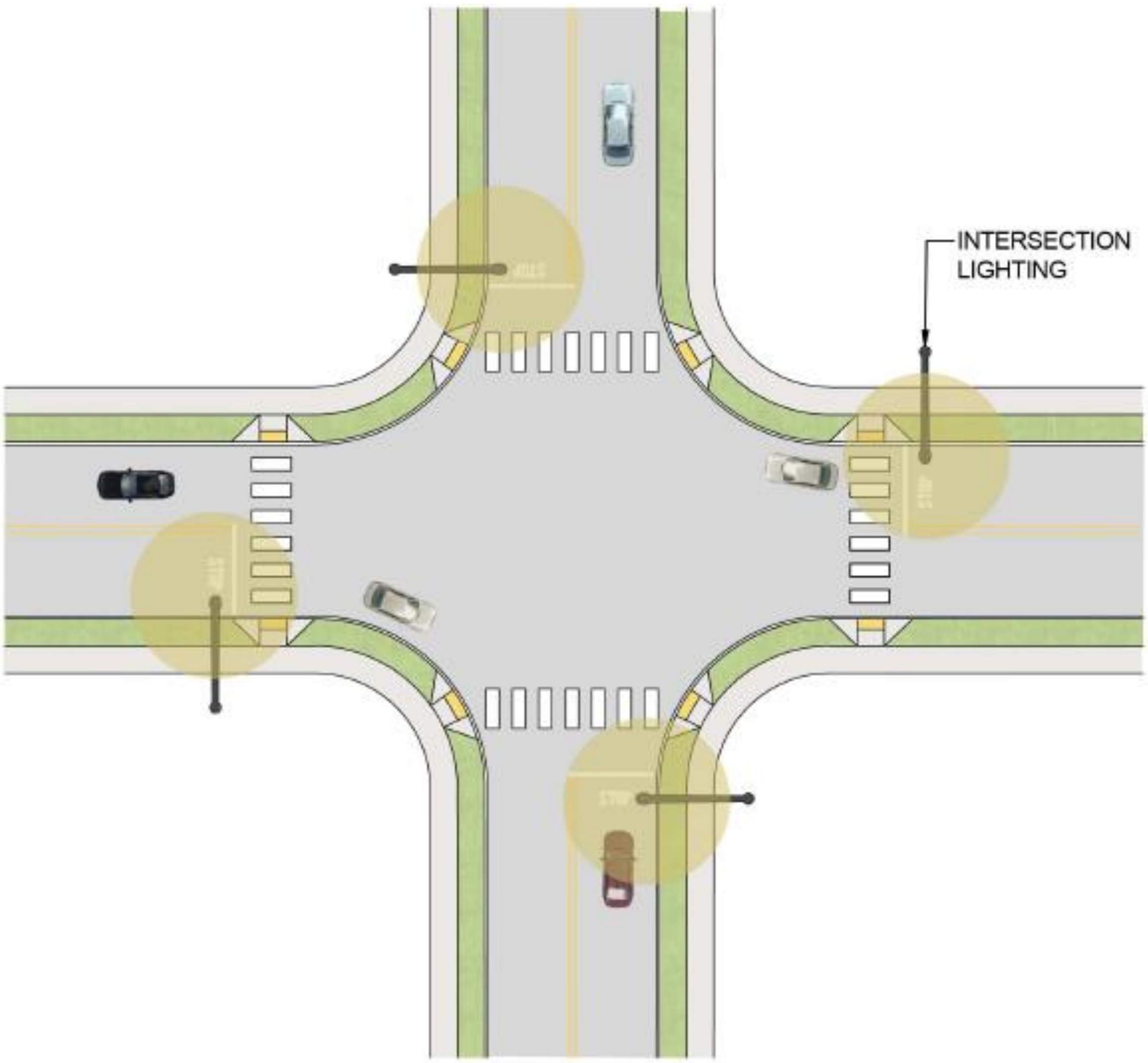


FIGURE 6-32 INTERSECTION LIGHTING

References:

- Approved Materials List for Street Lighting, City of San Diego, 2020
- CA MUTCD Rev. 8 (Part 4), Caltrans, 2024
- Lighting Handbook, FHWA, 2023
- Roadway Lighting Manual, 1st ed., Caltrans, 2021
- Standard Drawings for Public Works Construction, City of San Diego, 2021
- The "Whitebook", City of San Diego Engineering and Capital Projects Dept, 2021

Street A / Street B	**B1** Local residential streets (any width) and collector or higher streets up to and including 40 feet wide, curb to curb	**B2** Collector or higher streets greater than 40 feet and up to and including 52 feet wide, curb to curb	**B3** Collector or higher streets greater than 52 feet wide, curb to curb
A1 Local residential streets (any width) and collector or higher streets up to and including 40 feet wide, curb-to-curb	**A1 to B1** Install (1) pole with a Type Y-INT luminaire on one far right corner of the wider street	**A1 to B2** Same as A2 to B1	**A1 to B3** Same as A3 to B1
A2 Collector or higher streets greater than 40 feet and up to and including 52 feet wide, curb-to-curb	**A2 to B1** Install (2) poles with a Type Z-INT luminaire on both far right corners of the wider street	**A2 to B2** Same as A2 to B1	**A2 to B3** Same as A3 to B2
A3 Collector or higher streets greater than 52 feet wide, curb-to-curb	**A3 to B1** Install (2) poles with a Type Z-INT luminaire on both corners of the wider street and (2) poles with a Type Y-INT luminaire on both corners of the narrower street.	**A3 to B2** Install (4) poles with a Type Z-INT luminaire on each corner.	**A3 to B3** Same as A3 to B2

TABLE 6-2 STREET LIGHTING AT NON-SIGNALIZED INTERSECTIONS

Luminaire Type	Min. Required Luminaire	Street Light Distribution
Type X	3500 Lumens, Min.	Type II
Type Y-INT	6500 Lumens, Min.	Type III
Type Y-MID	6500 Lumens, Min.	Type II
Type Z-INT	11000 Lumens, Min.	Type III
Type Z-MID	11000 Lumens, Min.	Type III

TABLE 6-3 LUMINAIRE REQUIREMENTS

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Glossary of Terms

A

Accessible/Accessibility: A pedestrian facility or element in the public right-of-way that complies with ADA guidelines.

ADT (Average Daily Traffic): The number of vehicles to pass a given point on a roadway during a 24-hour period on an average day of a given year. Existing volumes may be measured with a recording device (machine counter) placed on the roadway. Existing volumes may also be estimated, or future volumes forecast, with the aid of computerized travel models representing existing or future land use and transportation networks.

Artwork: May be permanent, temporary, fixed, or portable; may be an integral part of a building, facility, or structure; and may be integrated with the work of other design professionals.

B

Buffer: See Furnishings Zone.

C

Commercial: A land use classification that permits facilities for employment, shopping, services, recreation, and lodging.

Complete Streets: Streets designed and operated to enable mobility for all users. Users include people of all ages and abilities, regardless of whether they are traveling as pedestrians, bicyclists, transit users, or motorists.

Concrete/P.C.C./A.C.: Terms and abbreviations used to describe the materials used in the construction of roadways, bridges, and sidewalks. *Concrete* and *P.C.C.* refer to Portland cement concrete, a material consisting of Portland cement, coarse and fine aggregates, and water. *A.C.* refers to asphaltic concrete, a material consisting of asphalt cement, coarse aggregates, and fine aggregates.

Continuous Lighting: Fixed overhead lighting system designed to provide a specific level of illuminance, luminance and uniformity of light on the roadway throughout a highway complex.

Community Plan Implementation Overlay Zone (CPIOZ): Specific sites within community plan areas of the City with tailored supplemental development regulations. The intent of these regulations is to ensure that development proposals are reviewed for consistency with the use and development criteria that have been adopted for specific sites as part of the community plan update process.

Crosswalk: (a) That portion of a roadway included within the prolongation or connection of the boundary lines of sidewalks at intersections where the intersecting roadways meet at approximately right angles, except the prolongation of such lines from an alley across a street.

(b) Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Curb: A raised feature along the side of a *street* that delineates the edge of the *roadway* or *pedestrian circulation path.*

Curb Ramp: A sloped connection that is cut through or built up to a *curb. Curb ramps* may be perpendicular or parallel to the *curb* or to the *street* they serve or be a combination thereof.

D

Daylighting: Intersection daylighting is a safety improvement that restricts parking near intersections. This makes it easier for road users to see and respond to each other.

Design Speed: A selected speed used to determine the various geometric design features of the roadway.

Detectable warning surfaces: Detectable warning surfaces are a distinctive surface pattern of domes detectable by cane or underfoot that alert people with vision impairments of their approach to street crossings and hazardous drop-offs.

Development: The act, process, or result of dividing a parcel of land into two or more parcels; of erecting, placing, constructing, reconstructing, converting, establishing, altering, maintaining, relocating, demolishing, using, or enlarging any building, structure, improvement, lot, or premises. The act of clearing, grubbing, excavating, embanking, filling, managing brush, or agricultural clearing on public or private property including the construction of slopes and facilities incidental to such work; or of disturbing any existing vegetation.

E

Easement: an interest in land owned by another that entitles its holder to a specified limited use or enjoyment.

Edge Zone: Commonly referred to as the “Curb”, it is the interface between the roadway and the sidewalk. This area can be wider at transit stops and bus shelters.

Encroachment: An encroachment is any privately owned and maintained improvement located within the public right of way or a public easement.

Esplanade: v integrates an off-street bicycle path (typically two-way), a pedestrian walkway, trees, and landscaping into a travel corridor alongside a vehicular roadway.

F

Flex Zone: The area of the Roadway Zone that encompasses between the Parkway Zone and the Vehicle Zone.

Flexible (Flex) Lane: Re-purposed lanes for transit and/or other congestion-reducing mobility forms. Flex Lanes provide dedicated space for moving people more efficiently through a corridor.

Frontage Zone: The area within the Parkway Zone that is adjacent to the property line that may be defined by a building façade, surface material change, landscaping, or a fence.

Furnishings Zone: The area located on the curb side of the Parkway Zone and can include seating, lighting, signage and wayfinding, public art, transit amenities, and bicycle amenities.

G

Green Streets: Streets designed to incorporate best practices for stormwater management and other components beneficial to the environment. Features of green streets include use of drought tolerant, native plants; permeable pavements; bioswales and other stormwater facilities.

Greenways: See Linear Parks.

Gutter/Gutter Pan: A portion of the roadway structure used to intercept pavement runoff and carry it along the roadway shoulder.

H

Horizontal Curve: A geometric design feature of a roadway that provides a smooth change in direction to the left or right.

I

Industrial: A land use classification to accommodate a range of industrial and manufacturing activities.

Intersection Sight Distance: The distance a motorist can see approaching vehicles before their line of sight is blocked by an obstruction near the intersection.

L

Land Use Plans: The General Plan and adopted community plans, specific plans, precise plans, and sub-area plans.

Landscaped Buffer: A piece of land located between the rear of a curb [Edge Zone] and the front of a sidewalk [Throughway Zone], usually used for planting low ground cover and/or street trees, also known as a "planter strip." See Furnishings Zone.

Linear Park: Passive or active recreation uses in urban areas, arranged parallel to the public right-of-way or a geographical feature; can be continuous or a sequence of recreational spaces, linked by a pedestrian and/or multi-use path.

Local Access Lanes: also "Side access lanes" or "Side lanes". Vehicle and bicycle lanes on a multi-way boulevard that serve parking, loading, and adjacent land uses, separated by a median from through traffic.

Low Profile Landscaping: Landscaping that contains plantings with a mature height of no more than 36 inches. Refer to §142.0409 (b) (2).

M

Major Street/Minor Street: Descriptive terms of the relative traffic volumes on two streets at an intersection. The major street carries the higher volume of traffic and is usually wider than the minor street. At a T-intersection, the major street is the through street and the minor street forms the stem of the "T."

Median: The part of the roadway, wider than a double yellow line, that separates opposing directions of traffic. It is usually raised and delineated by curbs and may be landscaped. It may also be depressed or level with the traffic lanes.

Median Zone: The region of the right of way (ROW) that is often in the center of the roadway between two vehicle zones.

Micromobility: Mobility devices that consist of electric scooters, electric skateboards, bicycles, electric pedal assisted bicycles, pedelec ("pedal electric cycle") bicycles, and neighborhood electric vehicles (NEV). While micromobility devices are available for individual purchase, they are more commonly rented/shared through on-demand or subscription-based services.

Mode: A means of travel used during a trip, including, but not limited to walking, biking, transit, or driving.

Multimodal: Having or involving multiple travel options (modes) within a corridor or facility; also connections between modes.

Multi-Use Path: Also referred to as a shared-use path, they provide a completely separated right-of-way designated for the exclusive use of active transportation users, such as pedestrians and bicyclists, with minimal crossings by motorists.

N

Non-residential: A type of land use that does not accommodate residential development. Typically non-residential refers to commercial or industrial uses.

O

Open Space: A land use designation to protect land for outdoor recreation, education, and scenic and visual enjoyment.

P

Park: Park means any public property, whether developed or undeveloped, held out by the City or used by the public for active or passive park and recreation uses, including adjacent buffer lands and natural areas and any adjacent parking lots and perimeter sidewalks. The definition of park includes open space and all public beaches, beach areas, bays, and wetlands within the City.

Parkway/Parkway Zone: The region of the public right-of-way between the property line and the curb of a street. The Parkway Zone is composed of four distinct zones: the Edge Zone, Furnishings Zone, Throughway Zone, and Frontage Zone.

Passing Sight Distance: The distance required for a vehicle to safely overtake a slower vehicle on a two-lane roadway by maneuvering into the lane of opposing traffic and then back into the right lane when past the slower vehicle. It is rarely provided on urban streets, but it is common on rural roads in flat or rolling terrain.

Pedestrian: A person on foot, travelling by wheelchair or other mobility device, on skates, or on a skateboard.

Pedestrian Access Route: An accessible, continuous, and unobstructed path of travel for use by persons with disabilities within a pedestrian circulation path.

Pedestrian Circulation Path: A prepared exterior or interior surface provided for pedestrian travel in the public right-of-way.

Pedestrian-Scale Lighting: Adequate and aesthetically pleasing lighting should be provided for safety, security, and a greater sense of comfort for pedestrians of all abilities, allowing them to quickly and accurately recognize cues that will enable their safe navigation. The appropriate height for pedestrian lighting is between 12 and 20 feet. Light standards may also be combined on one post. Low, pedestrian-oriented lights can be affixed to a post and direct light onto sidewalks while the same post may also accommodate auto-oriented lights directed at roadways.

Pedestrianways: A facility that primarily provides for pedestrian circulation between two closely-spaced (250 feet or less) streets. It has a walkway surface and landscaping and may include pedestrian-scale lighting and an underground utility corridor.

Placemaking: The temporary use of public right-of-way and private property that activates streetscapes by enhancing the pedestrian experience and providing neighborhood-serving activities, experiences, or spaces and includes temporary, small-scale development specifically designed to support that temporary use.

Planting Strip: Also referred as the Furnishings Zone, is the landscaped area between the Throughway Zone and Edge Zone. This area must be a minimum of 2 feet wide to accommodate trees, but ideally 6 feet wide to encourage tree growth of larger shade tree species.

Precise Plan: A detailed, long-term plan for the development of a sub-area of a community plan. Generally, a precise plan would include a residential neighborhood, commercial area, industrial area, or some geographical area sharing common facilities or problems. Usually a precise plan proposes specific land uses for each parcel and is often based on a detailed grading plan. In some instances, very specific proposals relative to the layout of buildings, parking, and landscaping are included within the precise plan. A precise plan is adopted by City Council resolution.

Promenade: The partial or complete street closure to vehicular traffic to facilitate active transportation uses such as walking, biking, recreation, outdoor dining, and enjoyable public interaction.

Property Line: A line that defines the boundaries of a lot of premises for the purposes of applying development regulations.

Public Service Easement: An easement granted to the City of San Diego for public utilities of any kind and related facilities.

Public Right-Of-Way (ROW): A public easement or public property that is or may be used for streets, alleys, or other public purpose.

R

Residential: A type of land use that is designated for housing.

Retrofit: An upgrade, modification or addition to an existing street or facility to improve its operation, safety, or functionality.

Roadway: The portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder.

Roadway Zone: The region of the right-of way or street between curb faces that is composed of three distinct zones: the Flex Zone, Vehicle Zone, and Median Zone.

S

Shared Use Path: A multi-use path designed primarily for use by bicyclists, pedestrians, and other authorized motorized and non-motorized users, for transportation purposes, and that may also be used for recreation. Shared use paths are physically separated from motor vehicle traffic by an open space or barrier and are either within the highway or other public right-of-way.

Shared Pedestrian/Bikeway Facilities: A facility that primarily provides for pedestrian and bicycle circulation between two closely-spaced (250 feet or less) streets. It has a walkway/riding surface and landscaping and may include pedestrian-scale lighting and an underground utility corridor.

Shared Street: A street or portion of a street where pedestrians, bicyclists, and motorists share the road; however, pedestrians have priority over vehicles. The street is designed without barriers, which gives pedestrians freedom to roam and increases social interaction opportunities, but counter-intuitively, improves safety by forcing motorists to slow down, pay attention, and negotiate right-of-way with pedestrians and bicyclists.

Sidewalk: That portion of a highway between the curb line, or the lateral line of a roadway, and the adjacent property line, or on easements of private property, that is paved or improved and intended for use by pedestrians. See Throughway Zone.

Single Loaded Street: a street serving property (front yard or side yard) on one side only, with no need for access (to a rear yard or to open space) or parking on the other side.

Specific Plan: A type of land use plan that contains detailed land use polices for a specific area. The minimum contents of a specific plan are stipulated by state law. Specific plans are adopted by a City Council ordinance.

Stopping Sight Distance: The distance required for a vehicle traveling at a particular speed to come to a safe stop to avoid colliding with an object in the roadway. It is measured with a driver's eye height of 3.50 feet (1070 mm) above the roadway and an object height of 6 inches (150 mm) above the roadway. The distance includes vehicular travel during the driver's perception of and reaction to the object and the vehicular travel during braking.

Street: See Roadway.

Street Tree: A tree adjacent to a street and located within the public ROW.

T

Target Speed: The operating speed that the designer intends for drivers to use.

Transit-Oriented Development (TOD): A mixed-used community within a typical 2,000-foot (600 m) walking distance of a transit stop and core commercial area. The design, configuration, and mix of uses emphasize a pedestrian-oriented environment and reinforce the use of public transportation without ignoring the role of the automobile. TODs mix residential, retail, office, open space, and public uses within a comfortable walking distance, making it convenient for residents and employees to travel by transit, bicycle, by foot, or by car.

Transit: The carrying of passengers in a bus or trolley along a regularly scheduled route for a fixed, basic fare.]

Throughway Zone: The area intended for pedestrian travel only, such as a sidewalk, and should be entirely clear of obstacles, including driveway aprons, typically between the Furnishings Zone and the Frontage Zone.

Traveled Way: The lanes of a street or roadway in which the moving vehicles travel. Does not include shoulders or parking lanes.

Tree Well: The box housing that provides space around the trunk of a tree that allows for healthy growth of the tree.

V

Vehicle Zone: The portion of the public ROW between the Flex Zone and the Median Zone. Its primary function is to define the intended path of travel for vehicles, transit, and other road users along a corridor.

Vertical Curve: A geometric design feature of a roadway that provides a smooth transition between an ascending grade and a descending grade, or vice versa. A *crest* vertical curve begins with an ascending grade and ends with a descending grade. A *sag* vertical curve begins with a descending grade and ends with an ascending grade.

Visibility Areas: Specified areas along intersection corners that should be clear of obstructions that might block a driver's view of pedestrians and potentially conflicting vehicles. The dimensions of visibility areas depend on the design speeds of the intersecting roadways and the types of traffic control used at the intersections.

Vulnerable Road User (VRU): Road users not in a car, bus or truck, generally considered to include pedestrians, motorcycle riders, cyclists, children 7-years and under, the elderly and users of mobility devices. In the event of a crash, VRUs have little to no protection from crash forces.

W

Walkway: A general exterior route designed to provided pedestrian accessibility and includes plazas, courts, and sidewalks.

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A Appendix: Land Use

Land use categories are consistent with the 2024 General Plan. Refer to Table LU-4 General Plan and Community Plan Land Use Category Descriptions of the Land Use and Community Planning Element.

General Plan Land Use	Recommended Community Plan Designation	Use Considerations	Description	General Plan Density Range (du/ac)[1]
Park, Open Space, and Recreation	Open Space	None	Provides for the preservation of land that has distinctive scenic, natural, or cultural features; that contributes to community character and form; or that contains environmentally sensitive resources. Applies to land or water areas that are undeveloped, generally free from development, or developed with very low-intensity uses that respect natural environmental characteristics and are compatible with the open space use. Open Space may have utility for: primarily passive park and recreation use; conservation of land, water, or other natural resources; historic or scenic purposes; visual relief; or landform preservation.	N/A
	Population-based Parks	None	Provides for areas designated for passive and/or active recreational uses, such as community parks and neighborhood parks. It will allow for facilities and services to meet the recreational needs of the community as defined by the community plan.	N/A
	Resource-based Parks	None	Provides for recreational parks to be located at, or centered on, notable natural or man-made features (beaches, canyons, habitat systems, lakes, historic	N/A

			sites, and cultural facilities) and are intended to serve the citywide population as well as visitors.	
	Private/Commercial Recreation	None	Provides for private recreational areas or commercial recreation areas that do not meet the definition of population-based or resource-based parks, but that still provide recreational opportunities.	N/A
Agriculture[1]	Agriculture	None	Provides for areas that are rural in character and very low-density or areas where agricultural uses are predominant. This designation is intended to accommodate a wide range of agriculture and agriculture-related uses such as: dairies; horticulture nurseries and greenhouses; raising and harvesting of crops; raising, maintaining, and keeping of animals; separately regulated agriculture uses; and single dwelling units when applicable.	(Low-density residential estates) 1 du/ 10 ac - 1 du/ac
Residential[1]	Residential Low-1	None	Provides for single-family housing within the lowest-density range.	0 - 4 du/ac
	Residential Low-2	None	Provides for single-family housing within a low-density range.	0 - 9 du/ac
	Residential Low-3	None	Provides for single-family housing within a low-density range.	0 – 14 du/ac
	Residential Low-4	None	Provides for multifamily housing within a low-density range.	0 – 29 du/ac
	Residential Medium-1	None	Provides for multifamily housing within a medium-density range.	0 - 44 du/ac
	Residential Medium-2	None	Provides for multifamily housing within a medium-density range	0 - 54 du/ac
	Residential Medium-3	None	Provides for multifamily housing within a medium-density range	0 - 73 du/ac
	Residential Medium-4	None	Provides for multifamily housing within a medium-density range	0 – 109 du/ac
	Residential High-1	None	Provides for multifamily housing within a high-density range.	0 - 145 du/ac
	Residential High-2	None	Provides for multifamily housing within a high-density range.	0 – 218 du/ac
	Residential High-3	None	Provides for multifamily housing within a high-density range.	0 – 290 du/ac
	Residential High-4	None	Provides for multifamily housing within the highest density range.	0 – 290+ du/ac
Co	Neighborhood Commercial	Residential Permitted	Provides local convenience shopping, civic uses, and services serving an approximate three-mile radius.	0 – 73+ du/ac

			Housing may be allowed only within a mixed-use setting.	
		Residential Prohibited	Provides local convenience shopping, civic uses, and services serving an approximate three-mile radius.	N/A
	Community Commercial	Residential Permitted	Provides for shopping areas with retail, service, civic, and office uses for the community at large within three to six miles. It can also be applied to Transit Corridors where multifamily residential uses could be added to enhance the viability of existing commercial uses.	0 – 73+ du/ac
		Residential Prohibited	Provides for shopping areas with retail, service, civic, and office uses for the community at large within three to six miles.	N/A
	Regional Commercial	Residential Permitted	Serves the region, within five to 25-plus miles, with a wide variety of uses, including commercial service, civic, retail, office, and limited industrial uses. Residential uses may occur only as part of a mixed-use (commercial/residential) project.	0 – 29+ du/ac
		Residential Prohibited	Serves the region, within five to 25-plus miles, with a wide variety of uses, including commercial service, civic, retail, office, and limited industrial uses.	N/A
	Office Commercial	Residential Permitted	Provides for office employment uses with limited, complementary retail uses. Residential uses may occur only as part of a mixed-use (commercial/residential) project.	0 – 73+ du/ac
	Visitor Commercial	Residential Permitted	Provides for the accommodation, dining, and recreational uses for both tourists and the local population. This designation is intended for land located near employment centers and areas with recreational resources or other visitor attractions. Residential uses may occur only as part of a mixed-use (commercial/residential) project.	0 – 73+ du/ac
	Heavy Commercial	Residential Prohibited	Provides for retail sales, commercial services, office uses, and heavier commercial uses such as wholesale, distribution, storage, and vehicular sales and service. This designation is appropriate for transportation corridors where the previous community plan may have allowed for both industrial and commercial uses.	N/A

Institutional, Public, and Semi-Public Facilities[4]	Institutional	None	Provides a designation for uses that are identified as public or semi-public facilities in the community plan and which offer public and semi-public services to the community. Uses may include but are not limited to: airports, military facilities, community colleges, university campuses, landfills, communication and utilities, transit centers, water sanitation plants, schools, libraries, police and fire facilities, cemeteries, post offices, hospitals, park-and-ride lots, government offices and civic centers.	N/A
Multiple Use	Neighborhood Village	Residential Required	Provides housing in a mixed-use setting and convenience shopping, civic uses as an important component, and services serving an approximate three-mile radius.	0 – 73+ du/ac
	Community Village	Residential Required	Provides housing in a mixed-use setting and serves the commercial needs of the community-at-large, including the industrial and business areas. Integration of commercial and residential use is emphasized; civic uses are an important component. Retail, professional/administrative offices, commercial recreation facilities, service businesses, and similar types of uses are allowed.	0 – 73+ du/ac
	Urban Village	Residential Required	Serves the region with many types of uses, including housing, in a high-intensity, mixed-use setting. Integration of commercial and residential use is emphasized; larger, civic uses and facilities are a significant component. Uses include housing, business/professional office, commercial service, and retail.	73+ du/ac (upper limit is to be determined by the adopted land use plan and associated implementing ordinances).
	Downtown	None	Provides a range of single and multiple uses in a setting of high intensity appropriate to downtown's unique role as the regional center. Integration of commercial, residential, civic, institutional, and open space uses is emphasized.	Density range to be determined by the adopted land use plan and associated implementing ordinances.[5]

Industrial Employment[1,2]	Scientific Research	Office Use Limited	Provides for activities limited to scientific research, product development and testing, engineering, and any other basic research functions leading to new product development with limited light manufacturing. Office uses, except corporate headquarters, are not permitted, except as accessory to the primary use or as direct support for scientific research uses. This designation would not permit storage and distribution uses.	N/A
	Technology Park	Office Use Limited	Allows high technology related to applied sciences, including: light manufacturing, research and development, corporate headquarters, and storage and distribution uses. This designation also allows office uses which provide administrative, sales, and service functions directly related to these high technology uses. It is appropriate to apply in light industrial areas with some office development.	N/A
	Business Park	Office Use Permitted	Allows office, research and development, and light manufacturing uses. This designation would not permit storage and distribution uses except as accessory to the primary use. It is appropriate to apply in portions of communities primarily characterized by single- and multitenant office development with some light industrial uses.	N/A
	Business Park - Residential	Office Use Permitted	Applies in areas where employment and residential uses are located on the same premises or in close proximity. Permitted employment uses include those listed in the Business Park designation. Multifamily residential uses are optional with the density to be specified in the community plan. Development standards and/or use restrictions that address health and compatibility issues will be included in future zones.	0 – 44+ du/ac Residential densities are to be determined by the adopted land use plan and associated implementing ordinances.
	International Business and Trade	Office Use Permitted	Combines the uses permitted in both the Business Park and Light Industrial designations. Allows single- and multi-tenant office, research and development, light manufacturing, and storage and distribution uses. It is appropriate to apply in portions of communities adjacent to the border, other ports of entry, or areas in transition to higher intensity industries.	N/A

	Light Industrial	Office Use Limited	Allows a wider variety of industrial uses by permitting a full range of light manufacturing and research and development uses and adding other industrial uses such as storage and distribution and transportation terminals. Multi-tenant industrial uses and corporate headquarters office uses are permitted. Otherwise, only limited office or commercial uses should be permitted which are accessory to the primary industrial use. Heavy industrial uses that have significant nuisance or hazardous effects are excluded.	N/A
	Heavy Industrial	Office Use Limited	Provides for industrial uses emphasizing base sector manufacturing, wholesale and distribution, extractive, and primary processing uses with nuisance or hazardous characteristics. For reasons of health, safety, environmental effects, or welfare these uses should be segregated from other uses. Non-industrial uses, except corporate headquarters, should be prohibited.	N/A

TABLE A-1 GENERAL PLAN AND COMMUNITY PLAN LAND USE CATEGORY DESCRIPTIONS

Source: 2024 General Plan

Notes:

1 *Residential density ranges will be further refined and specified in each community plan Residential densities may also be narrowed within the density ranges established for the Commercial Employment, Retail, and Services General Plan land use category in this table Community plans may also establish density minimums where none are specified in the Commercial Employment, Retail, and Services General Plan Land Use category Calculation of residential density is to be rounded to the nearest whole number if the calculation exceeds a whole number by 050 or more in most cases In all other remaining instances, such as in the coastal areas, calculation of density is to be based on established policies and procedures Whenever a plus (+) sign is identified next to a density number, the upper limit may be further specified in a community plan without causing the need for amending the General Plan, upon evaluation of impacts For uses located within an airport influence area, the density ranges should be consistent with the Airport Land Use Compatibility Plan and Air Installation Compatible Use Zone study or steps should be taken to overrule the Airport Land Use Commission.*

2 *Consult the Economic Prosperity Element for policies related to the commercial and industrial land use designations.*

3 *Commercial land use designations may be combined to meet community objectives.*

4 *Community plans will further define the specific institutional use allowed on a particular site.*

5 *The Downtown Community Plan provides building intensity standards.*

B Appendix: Lighting Standards and Guidelines

This section serves as a centralized resource for all the Street Lighting standards and guidelines detailed in the Street Design Manual. Each section is pulled directly from the chorological chapter it resides in.

Will include once lighting standards have been formalized

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C Appendix: Deviation from Standards Form (DS-266)

This form is used by projects submitted to the Development Services Department, like private development projects, to request a design deviation to a City Standard design due to uncommon circumstances. It is also available on the City's Development Services Department website.

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THE CITY OF SAN DIEGO
City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Deviation From Standards

FORM
DS-266
October 2021

DRAWING NUMBER(S):	DSD PROJECT NUMBER:	WBS OR IO NUMBER(S):
PROJECT TITLE/DESCRIPTION: PROJECT LOCATION(S):		PLACE RCE STAMP OF EOR HERE:
ENGINEER OF RECORD: ______________________ (EOR) (Print Name) ______________ (Signature) ______________ (RCE NUMBER) ______________ (Date)		
STANDARDS DEVIATING FROM (e.g. 2018 Greenbook Section; 2018 Standard Drawing SDG-133 Curb Ramps Type A and B): LOCATIONS OF DEVIATION(S) (Street names/intersections or facility locations):		
DESCRIPTION OF DEVIATION(S):		

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Upon request, this information is available in alternative formats for persons with disabilities.
DS-266 (10-2021)

FIGURE E-1 DEVIATION FROM STANDARDS FORM

REASON(S) FOR DEVIATION(S):

MITIGATION MEASURES FOR DEVIATION:

SEE ATTACHED SHEETS (e.g. D sheets, photos or sketches) PROVIDE SHEET NUMBERS WITH DESCRIPTIONS.:

REVIEWED BY:
DESIGN/PLAN CHECK ENGINEER:______________________________
(Print Name)

______________________________ ______________
(Signature) (Date)

APPROVED BY:
DEPUTY CITY ENGINEER (DCE): ______________________________
(Print Name)

______________________________ ______________
(Signature) (Date)

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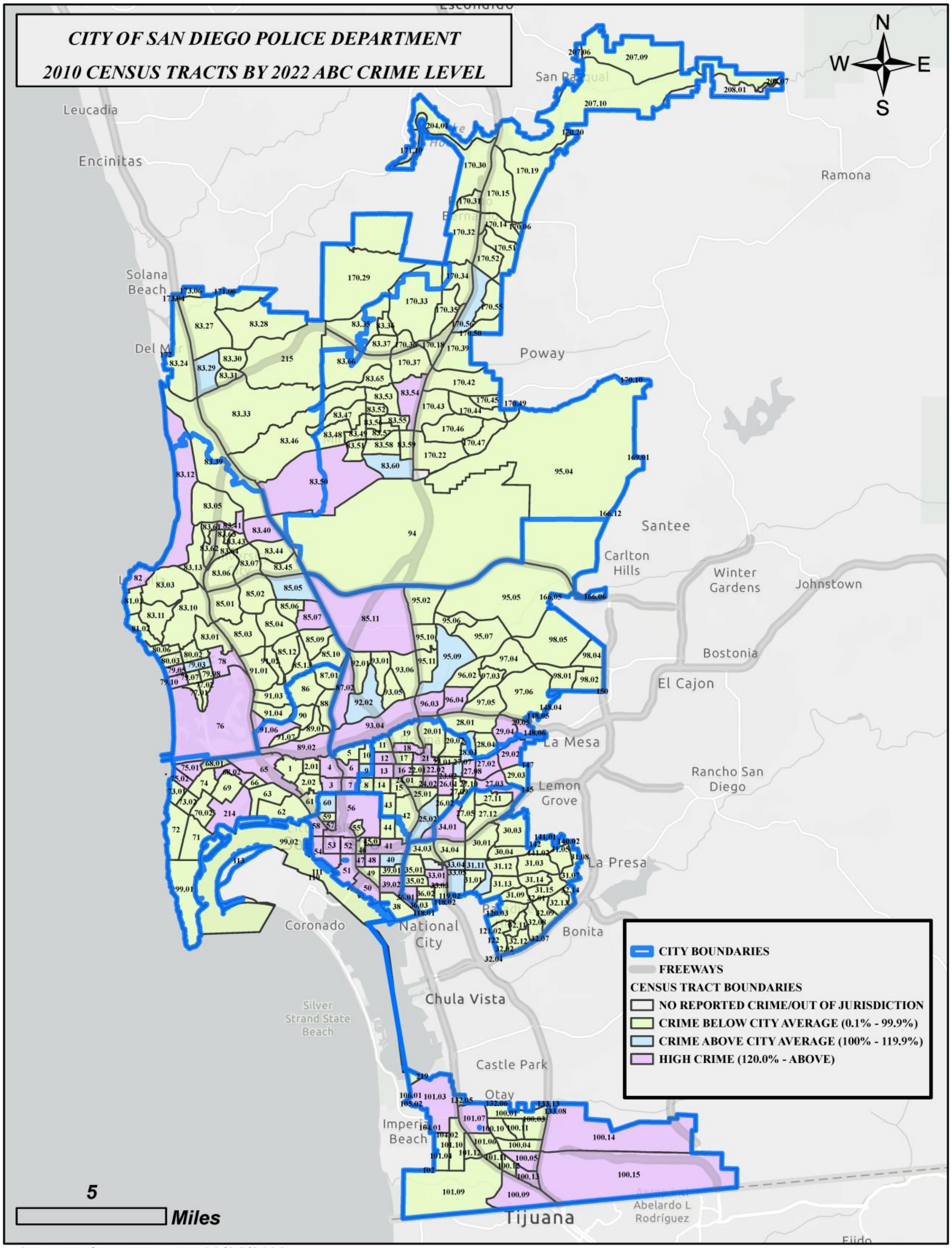
DS-266 (10-2021)

FIGURE E-2 DEVIATION FROM STANDARDS FORM (CONTINUED)

D

Appendix: High Crime Census Tract Map (2022)

This map from the San Diego Police Department is used to determine the placement of streetlights. Please note that this map is 2010 Census tracts with 2022 high crime data.



Crime Analysis Unit - DW 09/26/2023

FIGURE D-1 HIGH CRIME CENSUS TRACT MAP (2022)