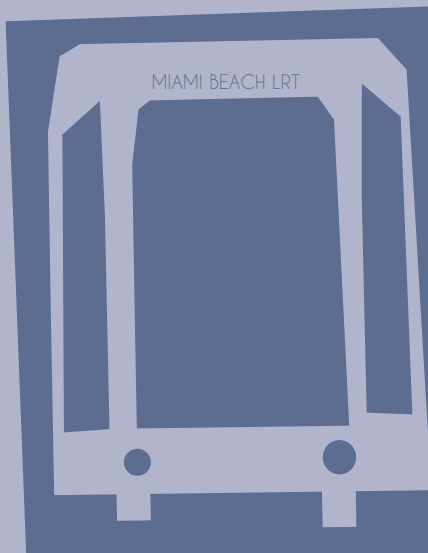
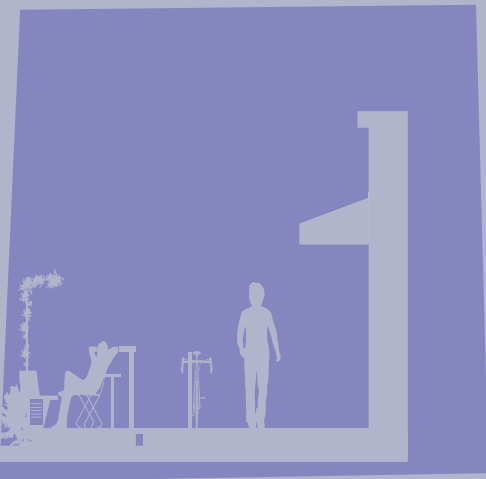


MIAMI BEACH STREET DESIGN GUIDELINES



PREPARED BY: THE STREET PLANS COLLABORATIVE

Communities around the world are rediscovering the multifaceted value of vibrant streets and robust street networks. Growing populations paired with vehicle-oriented design have effectively taken the life out of streets.

Streets are a vital part of urban life, which often comprise a large percentage of the built environment. This guide serves to illustrate the possibilities and outcomes that street design can have towards inclusive, multi-modal transportation for the City of Miami Beach.

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EXECUTIVE SUMMARY

The Miami Beach street design guide has been commissioned by the City to serve as a robust set of tools to implement the vision set forward in the 2015 Bicycle Pedestrian Master Plan and Transportation Master Plan.

The Street Design Guide will offer numerous roadway modifications that will center on a more balanced approach that will accommodate all forms of travel including walk, biking, transit and automobile. This guide has been developed to address the following needs:

- To design streets that create a safe environment for all users, recognizing differences among modes.
- To act as a tool for the transition of Miami Beach from a vehicle trip-based system to a multi-modal one and support the long term vision of the Miami Beach Transportation plan.
- To revitalize street networks in order to allow greater route choice for pedestrians and bicyclists thus relieving traffic congestion and promoting physical activity.
- To promote the creation of third-places where social interactions can take place by redesigning existing streetscapes.

The recommendations set forth in the Bicycle Pedestrian Master Plan are coordinated with this document.

Moving away from auto-centric nomenclature like arterial, collector, etc, and returning to people/use-oriented nomenclature like boulevard, commercial street and shared space, seeks to effectively shift design expectations and the way people interact with the environment.

The following pages detail the possible configurations found in the various types of streets proposed.

It is important to note that neighborhood greenways both heavy and light, are interventions/countermeasures that change the character of an existing street, thus making "Neighborhood Greenway" a specially designated part of the bicycle network in an existing street type.

Due to the fact that Greenways can present various combinations of countermeasures depending on the need of the network, they have been detailed on page 43 as a street type.

By adopting these standards the City is reinforcing the message that the official policy of the City of Miami Beach in the design of city streets is to give priority to pedestrians and bicyclists (and by extension transit users) over all other modes.

It is important to note that not all standards are approved yet. By adopting these standards the City assumes its role as a leader in the region in reforming regional street design standards in favor of bicyclists and pedestrians.

Some strategies rely on reallocating car space in favor of 'low stress' bicycle and pedestrian facilities.

Don't be afraid to test before you invest through iterative design!

THE PURPOSE OF THIS GUIDE

The Miami Beach Street Design Guide aims to provide implementable solutions to shift mode share to a more inclusive multimodal public realm.

The project team looked at the existing transportation network, including bike ways and transit ridership, and street volume to establish a baseline measurement of how people move around Miami Beach. We also talked to residents and neighborhood associations throughout the project to get the everyday view, while also riding around the city in a field test of streets in our handlebar survey.

The Planning Process revealed themes that require attention at a city-wide level. Miami Beach has some of the best tree lined streets in Miami-Dade County and is one of the most compact, urban cities in the Country.

Streets in Miami Beach are well traveled by bicyclists and pedestrians alike, but challenges abound, from missing street trees on many streets, to the lack of protected bicycle facilities.

The character and speeds on many residential streets are appropriate enough to prioritize bicycle traffic, while more intense interventions are saved for the main thoroughfares around the city. Throughout Miami Beach there are locations where the volume of bicyclists and pedestrians is so great that the street design in these areas should prioritize pedestrian and bicycle safety. In other locations the needs of moving commuters at rush hour times north and south must be carefully balanced against the needs of bicyclists, pedestrians, and neighborhood residents.

“ZIPPERS”

In many ways streets act as the “zippers” of a community. By transforming streets, public life is also redefined. In Miami Beach, the smaller pocket communities found on both adjacent edges have similar interests, while having unique character. Streets and provide a rich, accessible space for cultural interaction.



Fig. 1.1 Vehicle-oriented street design segregates uses in communities.



Fig. 1.2 Multi-modal streetscape design allows for inclusion, efficiency and rich social interaction.



Community input at planning meetings held throughout the planning process.



Handlebar survey ride in Miami Beach



Detailed analysis of all neighborhoods within Miami Beach

“A BUSY STREET IS A SAFE STREET”

Streets that accommodate various methods of transportation and users are inherently vibrant places. Streets that generate activity are constantly being watched passively by the people interacting in the space. By creating aesthetically inviting and functional streetscapes, cities achieve a greater level of safety.

The fundamentals of **Complete Streets** policy as defined by Smart Growth America, focus on safety and inclusion of all users regardless of age and ability.

Although there is no specific formula for complete streets design, it is not limited to including bicycle infrastructure where there previously was none. Instead, this policies seek to put public life back into the public realm, elevating all users of the street onto an equitable field.

- Provide pedestrians with a contiguous network of sidewalks, that are wide enough, landscaped, and safe to cross at intersections.
- Support a protected bicycle network that allows people to commute and/ or exercise.
- Provide spaces where neighbors can gather and enjoy .
- Make streets safe though activation of space
- Allocate proper space and facilities for transit riders.



credit: www.usa.streetsblog.org



credit: www.inhabitat.com



credit: www.behbg.com



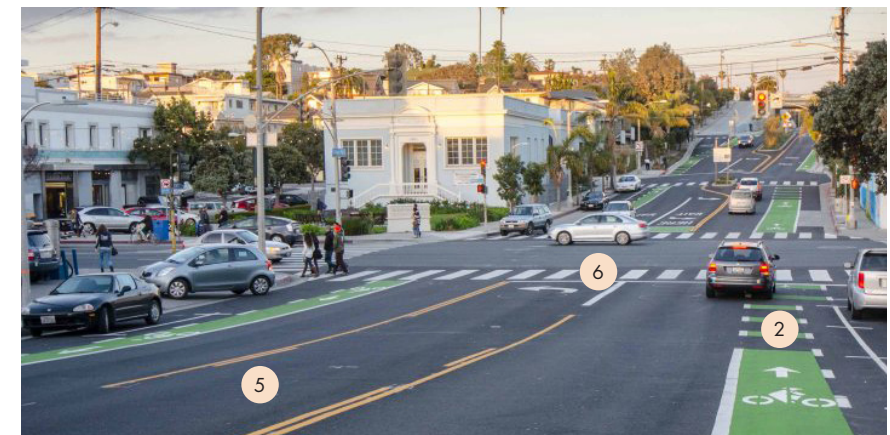
credit: www.momentummag.com



credit: www.citylab.com



credit: wnyc.org



1. Wide sidewalks.
2. Dedicated bicycle facility (paint recommended).
3. Median refuge island, pedestrian protection & traffic calming.
4. Crossing aligned with ramp.
5. Double turn lane, traffic calming.
6. Highly visible pedestrian crosswalk.

Fig. 1.3 Examples of “complete streets” elements.

DESIGN PRIORITIES

UNIVERSAL DESIGN PRINCIPLES

Designing for automobiles has been the highest priority of roadway design for the past few generations. However, the evolution of the urban landscape now calls for the inclusion of all users and modes of transportation in a safe and efficient way.

Transportation design paradigms are shifting to a more universal design approach. Traffic lanes are now motor vehicle dedicated lanes, white-striped bicycle lanes are dedicated bicycles facilities, and people on foot are shifting from walking on a narrow sidewalk towards experiencing a more rich and appealing pedestrian realm.

Street design should reflect the overall image/marketing that The City aims to project. Redesigning the streets of Miami Beach provides a unique opportunity to analyze previous methodologies and restructure design priorities so that they match the needs of the new and evolving urban context.

Well designed street geometry can positively influence patterns of behavior. Design must prioritize in comfortable and safe multi-modal transportation for all users including elderly, children and mobility impaired users. Universal Design makes things safer, easier and more convenient for everyone. It involves designing spaces so that they can be used by the widest range of people possible. Universal Design evolved from Accessible Design, a design process that addresses the needs of people with mobility limitations and other special

Universal Design goes further by recognizing that there is a wide spectrum of human abilities. Everyone, even the most able-bodied person, passes through childhood, periods of temporary illness, injury and old age. Universal design helps make the streets a truly democratic space, and it manifests in many ways in the public realm:

- Signage and Wayfinding that is easy to interpret by international populations (symbols rather than words).
- Braille for signage and tactile surfaces like warning strips.
- Spoken warnings for street crossings and general navigation of space.
- Bicycle facilities that are continuous, protected and visually distinct from motor travel lanes and pedestrian areas.

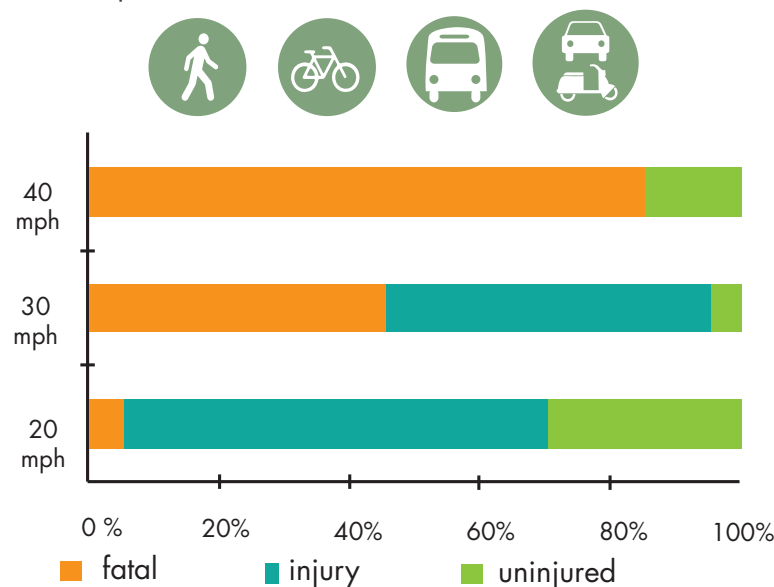


Fig.1.4 Pedestrian level of injury in relation to automobile travel speed.

DESIGN SPEED

Street design plays a crucial role in user behavior. When it comes to vehicular traffic, a well designed street will effectively impose a target speed through the use of various elements, turning speed limit signs into reminders rather than what dictates movement through the space.

Design speed is a speed selected to determine the various design dimensions of the motor travel way, and sometimes the timing of signals.

On streets in Miami Beach, the vehicular design speed shall directly correlate with the desired travel speed of the motor vehicles, or "target" speed. Target speed ranges from 18-30 mph for the street types described in this guide. The lower end of this speed range is a crucial characteristic of a safe and walkable city.

The following design factors contribute to speed management and should be incorporated into the street design process as suitable in urban areas:

- Lanes of appropriate width without surplus.
- No "shy" areas or shoulders between travel lanes and curbs.
- On-street parking. (Parallel or angled).
- Tight curb return radii at intersections and elimination or reconfiguration of high-speed channelized right turns.
- Spacing of signalized intersections and synchronization of signals to the desired speed.
- Paving materials with texture (crosswalks, intersections) detectable by drivers as a notification of the possible presence of pedestrians.

- Vertical shifts, such as raised pedestrian crossings and intersections where appropriate. “Gateway” elements and other appropriate devices to reduce speeds at urban settings.
- Curb extensions.
- Bicycle infrastructure and amenities.
- Sidewalks that are even and wide enough for all users.

PEDESTRIANS



Pedestrians in Miami Beach have unique needs and characteristics that must be considered as part of every design scheme. This include:

- Shelter (sun intensity, monsoon season)
- Continuous even sidewalks for mobility impaired users and parents with strollers.

Sidewalks, street crossings, and other elements in the public right-of-way can pose challenges to accessibility. ADA Accessibility Guidelines focus mainly on facilities on sites. While they address certain features common to public sidewalks, such as curb ramps, further guidance is necessary to address conditions and constraints unique to public rights-of-way. Design parameters for all pedestrians include:

- A maximum pedestrian crossing distance of 50 feet with appropriate treatments. (see countermeasures).
- Smooth, slip resistant surfaces and unobstructed walkways.
- Multi-sensory warnings such as audible warnings, and message systems, tactile warnings, and raised and Braille for communication.

FREQUENT SOURCES OF INJURY % (2012)

Tripped on uneven surface/cracked sidewalk	24
Tripped/Fell	17
Hit by a car	12
Wildlife/pets involved	6
Stepped in a hole	5
Stepped on stone	5

www-nrd.nhtsa.dot.gov/Pubs/812124.pdf

PEDESTRIAN FACTS (2013)

4,735 PED killed (12 people per day all year)
66,000 PED injuries reported
5.2 B/year[cost of ped injuries of children]

www.nhtsa.gov/nti/811841

BICYCLISTS



All urban street design for new and reconstructed streets of Miami Beach shall accommodate bicyclists. Typical cycling speed is 10-18 mph. However, bicyclists can travel as slow as 5 mph up to 30 mph. Bicycle facilities may be provided in the pedestrian realm in the form of sidewalk-level protected bike lane, shared paths or within the traveled way as bicycle lanes or yield lanes. Bike lanes, on and off sidewalk-level and paths occupy a defined space painted in a predetermined color, whereas yield lanes are not delineated and share motor vehicle travel lanes (sharrows).

BICYCLIST FACTS (2013)

743 bicyclist reported killed
48,000 bicyclist injuries reported
Over 4B /year [cost of biking injuries & deaths]

<http://www-nrd.nhtsa.dot.gov/Pubs/812151.pdf>

FREQUENT SOURCES OF INJURY % (2012)

Hit by a car	29
Fell	17
Poor roadway condition	13
Rider error	13
Crashed/Collision	7
Wildlife/Pet involved	4

www.nhtsa.gov/nti/811841

TRANSIT RIDERS



Transit users have basic needs such as safety, and comfort at waiting areas. They also need to be able to cross streets efficiently and conveniently to access transit stops. Transit riders include people with mobility, sight, or other impairments that limit their ability to drive, walk, or bicycle, so they rely on transit as their primary mode of transport.

DESIGN PRINCIPLES

**COST- EFFECTIVENESS**

Long range planning and a defined set of design standards that shift the focus from exclusively auto-centric to universal design should determine the viability of investment and implementation.

- Long range planning and a defined set of design standards that shift the focus from exclusively auto-centric to universal design should determine the viability of investment and implementation.
- Consider full life-cycle costs and benefits when developing street designs. Besides their initial capital outlays, the measurable long-term economic, environmental, safety, health, and other benefits of well-designed, well-managed streets should be taken into consideration.

**ACTIVE LIVING**

Miami Beach's weather and beautiful beaches promote active lifestyles.

- The City has been ranked in the top 5 for most beautiful people.
- Re-designing streets should always encourage safe and healthy living.
- Outdoor recreation is already popular on the beach, this guide seeks to expand on existing trends emphasizing safety.

**ARTS/ CULTURE**

Miami Beach is an art/music destination hosting multiple music festivals and events throughout the year.

Providing robust multi-modal infrastructure has the potential to impact citizen engagement and participation in order to continue to grow the City in this sector.

**HOSPITALITY, NIGHT LIFE**

Miami Beach is home to some of the world's most famous nightclubs and hotels, developing reliable multi-modal transportation and enhancing transit options would reduce drunk-driving incidents. Miami Beach has immense potential for ridership within its City Limits.

- The multimodal bicycle pedestrian master plan should be integrated with the concierge groups in order to provide information and promote the plan and the use of facilities.
- Miami Beach earned the #1 place as "Most Attractive City of 2014"

**MULTICULTURAL POPULATIONS**

Miami Beach is known as a major destination for Florida locals and international visitors of all ages and backgrounds.

- Making streets more desirable places to be, enhances the inter-cultural networks of its residents and visitors alike.
- Miami Beach is a place where everyone can feel like they belong. Diversity is an important asset that can be strengthened through design.



SAFETY

Perception of safety is directly related to the level of street activity across all modes of transportation. Safe streets enhance civic interactions for people of all ages and cultures. The City shall prioritize safety for all street users, particularly more vulnerable groups (children, elderly, the mobility impaired, and more vulnerable modes such as walking and bicycling).

- Design streets so that all users feel equally safe and welcomed on the public domain.
- Research, test, and evaluate innovative safety treatments, particularly those successfully adopted Best Practices in other cities.
- Pioneer initiatives that are context-based and culturally sensitive.



ACCESS & MOBILITY

Growing population, a large tourism influx, the need to design for people aging in place and limited right-of-way, require street designs to be innovative and adaptable. Designs shall provide efficient ways to move people and goods across all modes of transportation.

- Prioritize walking, bicycling, and transit by providing safe, accessible, convenient, and comfortable facilities for these modes, particularly on designated routes and at critical network connections such as major north-south boulevards and routes that connect to the Miami mainland.
- Accommodate truck traffic and deliveries while minimizing their negative impacts on neighborhoods.



CHARACTER

Streets play a significant role in defining the character of neighborhoods. Their design should refer to the surrounding context, and promote the neighborhood's historical value.

- Preserve the unique character of neighborhoods.
- Support connections to adjacent land uses by providing gathering spaces and pedestrian access to and from local destinations.
- Design local streets to be green, traffic-calmed environments that encourage walking, bicycling, and recreational activities for people of all ages and abilities.
- Design through-streets to balance the accommodation of automobile traffic with safety and community needs.



LIVABILITY

Streets comprise an extensive network of public open spaces that can facilitate vibrant social, civic, and economic interactions.

- Expand usable public open space by reallocating underutilized roadway space to create pedestrian plazas, expanded sidewalks, corner and mid-block curb extensions, and opportunities for landscaping and storm water management.
- Design streets to promote physical activity for all ages and populations by making walking, bicycling, and transit safe, attractive and convenient.
- Include public seating when there is an appropriate maintenance partner. Create partnerships for public seating.



SUSTAINABILITY

Street design has the capability to improve the environmental health of the city.

- Collaborate across agencies in testing new materials so that streets are constructed in an environmentally sound way.
- Minimize impermeable surfaces and maximize vegetation on streets.
- Reduce the heat absorption of streets by maximizing tree canopy cover and utilizing paving materials with high Solar Reflectance Index (SRI) values when possible.

NEIGHBORHOOD GREENWAYS & BICYCLE PRIORITY CORRIDORS

BICYCLE PRIORITY CORRIDORS

Bicycle travel is efficient, environmentally sustainable and can accommodate a variety of users depending on ability.

Miami Beach has a mix of leisure and commuter bicyclists at all times. Providing infrastructure for bicyclists is crucial to the success of Miami Beach as a multi-modal city.

The following are characteristics of Bicyclist Priority Corridors (BPC):

- Bicyclist Priority corridor signage along routes promotes slower motor vehicle speeds to encourage leisure riding as well as commuting for all users.(1)
- Designated areas are in proximity to transit
- Require Street trees/ Shade trees/ Shade structures on sidewalks.
- Crossing signals give enough time for crossing safely.
- Travel lanes have a reduced width of 10 feet.
- Provide bike boxes and turn boxes at all intersections.(2)
- Provide bike repair stations along route.
- Require Street trees/ Shade trees/ Shade structures on sidewalks.
- Provide green signal turn and bike signals
- Reduce travel speed.
- Provide short and long-term bicycle parking along route/zone.(3)



MOVING TOWARDS BICYCLE PRIORITY

A true shift on modeshare can only be accomplished successfully through street design that reflects the needs of all types of bicyclist. A bicycle priority zone does not exclude other modes of transportation, instead, it elevates the profile of people traveling by bike making the streets safer and more pleasant for all users. The City can begin moving towards bicycle priority zones through the following:

- **RIGHT ON RED FOR BIKES ONLY:** Right on red turns should be allowed for bicyclists only. This helps bicyclists to keep momentum. Also, in zones of 15 mph - 18 mph bicyclists can go straight on red provided it is safe to do so.
- **CLEAR DESIGNATION OF SPACE:** Painted bike lanes designate clear separation of use within the travel lane. Protected bike lanes increase safety and perception of safety for bikers resulting in higher ridership numbers.
- **SIGNAGE:** Sharrows, bike priority designation markings and other signage helps bicyclists to be aware of these zones and alerts drivers to slow down and expect bicyclists on route.
- Improved bicycle access.

PEDESTRIAN PRIORITY ZONES (PPZ)

Pedestrians are said to be the most vulnerable users of the public realm. Design is at the core of this vulnerability. Rethinking streets as pedestrian priority zones becomes an encompassing framework for all modes of transportation in an urban environment.

The following are characteristics of Pedestrian Priority Zones (PPZ):

- Clear pedestrian path of 6 feet minimum. (1)
- Curbs are aligned with ramps and sidewalks. (2)
- All intersections have visible crosswalks of 10 feet.
- Crossing signals give enough time for crossing safely.
- Travel lanes have a reduced width of 10 feet. (3)
- Provide curb extensions (bulb outs) at all intersections.
- Enhance mid block crossing and lighting.
- Require Street trees/ Shade trees/ Shade structures on sidewalks. (4)
- Prohibit right turns on red. Provide green signal turn.
- Reduce posted speed limit. (5)
- Sidewalks are continuous and present in all roads where vehicular travel is allowed.

MOVING TOWARDS PEDESTRIAN PRIORITY

Street redesign must be implemented in order to truly achieve a palpable and measurable change in the way pedestrians interact with the public realm. When thinking about redesign, all modes of transportation should inform the process equally in order to achieve the greatest and most inclusive use. Design is best when ideas are tested out through pilot tactical urbanism projects accompanied with stakeholder education.

Cities can also start moving towards creating Pedestrian Priority Zones through the following:

EXTENSION OF 18 MPH ZONES:

Vehicles traveling at this speed present a “greatly reduced risk” of accidents. Driver/pedestrian visibility is higher at slow speeds. This zones can be implemented in local streets with relatively low-traffic and most collector streets depending on context.

MEETING/ MIXING/ CONVERGENCE ZONES:

This zones have an even lower speed limit of 15 mph. Pedestrians are given absolute priority of the roadway at all times, even if sidewalks exist, followed by bicyclists and motor vehicles.

NEW STREET MARKINGS/CROSSINGS:

Different makings on pavement as well as signage can alert users about the Pedestrian Priority Zone.

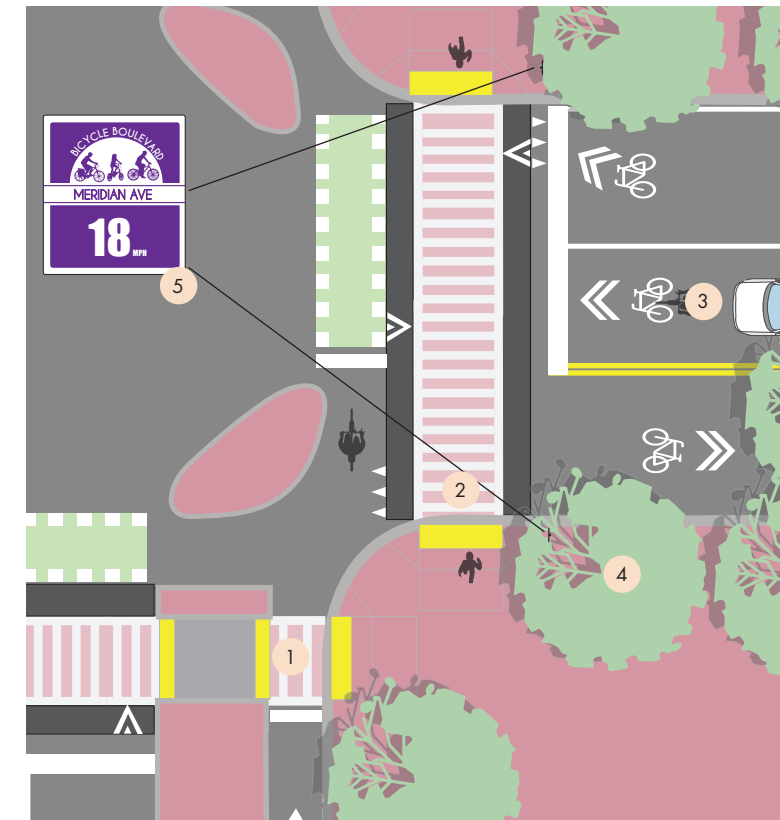


Fig. 1.5 Example of elements present in a pedestrian priority zone.

PEDESTRIAN PRIORITY ZONES

Pedestrian Priority Zones are economic drivers. In Miami Beach the establishments of PPZ's would increase pedestrian traffic in shopping districts, which often translates in economic prosperity without added traffic and parking. PPZ's are specially important in Miami Beach due to development and geographical constraints; the establishment of Pedestrian Priority Zones (along with street activations and awareness programs) has the potential to impact resident and visitor's behaviors towards walking consequently influencing modal split and development patterns.

Although a complete Pedestrian Priority Zone is made up of a variety of elements, PPZ's, as well as BPC's are defined in a continuum ranging from a complete sidewalk network in residential neighborhoods to robust intersections that enhance the safety of multimodal transportation.

SIDEWALKS

Ample, connected sidewalks are at the core pedestrian mobility and ADA compliance. The following steps should be taken in order to attain Pedestrian Priority Design:

- **Assessment:** Conduct a sidewalk survey and create an inventory of all sidewalks and their current state.
- **Fill in the gaps:** Prepare a phasing "sidewalk priority index" plan for the introduction of sidewalks in all areas of the City that do not have them in order to enhance connectivity. Do so through right of way reconfiguration, travel lane reduction and/or reduction of current landscape-only areas.

- Pedestrians, at a minimum, should have comfortable access wherever motor vehicles are allowed (both sides of the street). The Sidewalk Priority Index shall determine the robustness of implementation through analyzing the presence of sidewalks, existing pedestrian use, proximity to trip generators, current and future land use.
- Draft ordinances that include the maintenance, improvement and construction of sidewalks. IE:

"The City shall have control of all sidewalks in the public streets and alleys of the city and may construct, repair and replace such sidewalks as a public improvement and may provide for the payment of the cost thereof by special assessment or it may require the abutting owners to do so. If the latter procedure shall be followed, and any abutting owner shall fail to construct such sidewalk after being required to do so by resolution of the council and upon such notice as the council shall provide, then the city may construct such sidewalk and collect the costs thereof from the abutting property owner, or may make a special assessment in the same manner as herein provided for the making of special assessments where any expense has been incurred by the city upon or in respect to any particular lot or parcel of land."

NEIGHBORHOOD STREET SIDEWALK CONSIDERATIONS:

Neighborhood streets are recommended to be built to the current adopted standard, with a five-foot Pedestrian Travel way and a four-foot Furnishings Zone. The 5' sidewalk provides adequate passing space for the typical volume of pedestrian traffic on a residential street, and the 4' buffer can sustain trees and offers a comfortable buffer from low-speed, low-volume vehicular traffic, which is desirable on such streets.

URBAN AVENUES AND BOULEVARDS CONSIDERATIONS

Boulevards and urban avenues have moderate to high-speed motor vehicle traffic and require a wider buffer between pedestrians and moving vehicles to maintain pedestrian comfort. A five-foot Furnishings Zone is recommended. Because such streets can have a lot of commercial activity and multiple destinations, it is recommended that the width of the Pedestrian Travelway be increased to a minimum of 8' to accommodate a larger volume of pedestrians.

MAIN STREET, PEDESTRIAN STREETS, SHARED SPACE CONSIDERATIONS:

Due to the high volume of pedestrian activity expected on these streets. Sidewalks must be wide enough to support a variety of activities in addition to walking. The furnishing zone shall provide benches, bicycle parking and tree wells. A frontage zone is required for this category of street, providing space for product display, cafe seating, or room for people to stand without blocking the through zone. The width of the frontage zone may vary depending on density and space availability but is recommended to be at least 5 feet.



STREET TYPES + COUNTERMEASURES

Street design has a direct impact on how the public realm is used, the safety of its users and therefore the vibrancy of the City. This section details alternative street designs for people who walk, bike and use public transit.

The countermeasures proposed here, aim to:

- Be inclusive of all users of the public realm.
- Help make the City more resilient to climate change through design that mitigates water surges and helps infiltration.
- Make all users safe regardless of their choice of transportation method.
- Gear streets towards true multi-modal use.

INTRODUCTION

The recommendations set forth the Bicycle Pedestrian Master Plan and this guide propose 10 basic types of street nomenclature.

Moving away from auto-centric nomenclature like arterial, collector, etc, and returning to people/use-oriented nomenclature like boulevard, commercial street and shared space, seeks to effectively shift design expectations and the way people interact with the environment.

The following pages detail the possible configurations found in the various types of streets proposed.

It is important to note that neighborhood greenways both heavy and light, are interventions/countermeasures that change the character of an existing street, thus making "Neighborhood Greenway" a specially designated part of the bicycle network in an existing street type.

Due to the fact that Greenways can present various combinations of countermeasures depending on the need of the network, they have been detailed on page 43 as a street type.

Streets are complex public spaces that support various levels of service for a wide range of people.

Urban life has always been connected to the livelihood of the street realm. This section defines the composition of the streets in relation to the users and the elements various users need in order to have a safe and enjoyable experience.

It helps define streets as the sum of the parts. Wording and the way ideas are communicated have a decisive impact on our perception.

By placing “people” in front of the mode of transportation of our choice at various times, we remember that our roles in the public realm go hand in hand with a range of transportation choices that define how we interact in the space. It does not confine people to one choice, and all modes of transportation are equally gaged as an alternative.

1. The **PRIVATE FRONTAGE** is the area between the building facades and the lot line. The private frontage presents many variations depending on the context.

2. The **PEDESTRIAN REALM** is made up various elements including:

- The Public Frontage
- The Through Zone
- The Furnishing Zone
- The Edge

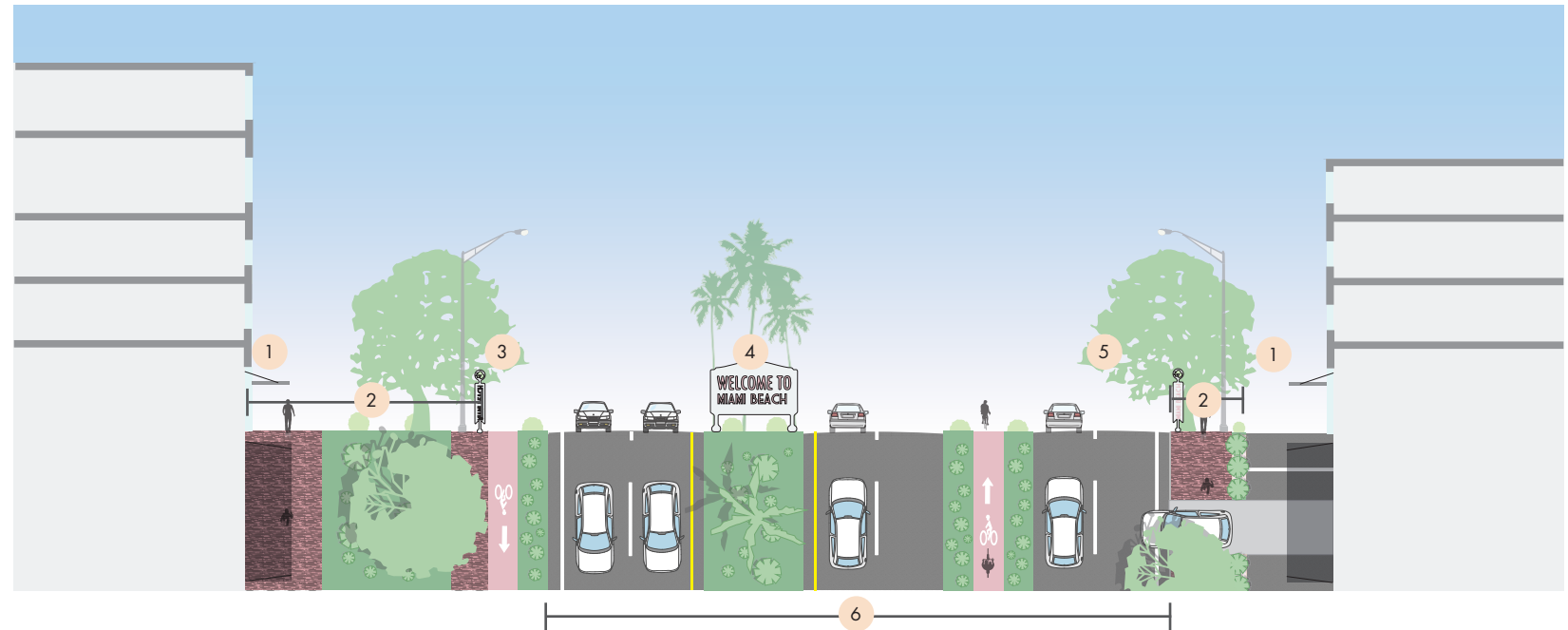


Fig 2.1 General multi-modal streetscape components.

Same as the private frontage, configuration of the above named elements as well as specific dimensions vary according to the context where streets are found.

3. **BICYCLE FACILITIES** can be implemented in a variety of ways depending on context. This section shows protected sidewalk-level bicycle lanes. Streets should always aim to be multimodal in various intensities and configurations.

4. **A MEDIAN, TURN LANE or PEDESTRIAN REFUGE ISLAND** help streets become safer to cross, make better use of R.O.W or have more shade, thus reducing the urban heat island effect depending on configuration.

5. **TRAVEL LANES** should be a standard maximum of 10 feet. This width provides comfortable travel and it allows for R.O.W reconfiguration.

6. The **TRAVEL WAY** is the curb to curb dimension of a street. It may accommodate landscaping, medians, transit facilities, bicycle facilities as well as vehicular travel depending on context.

GENERAL: INTRODUCTION

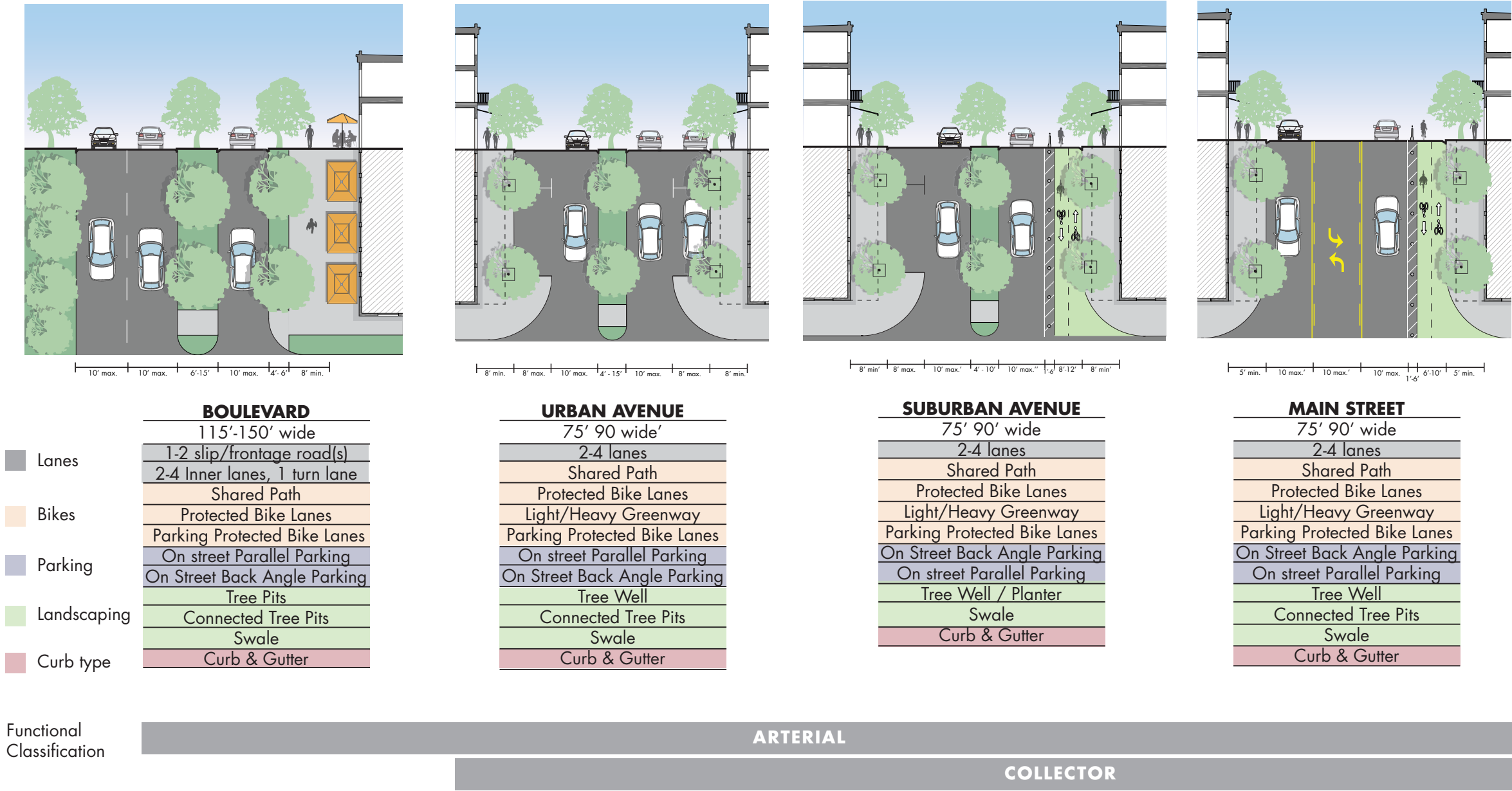
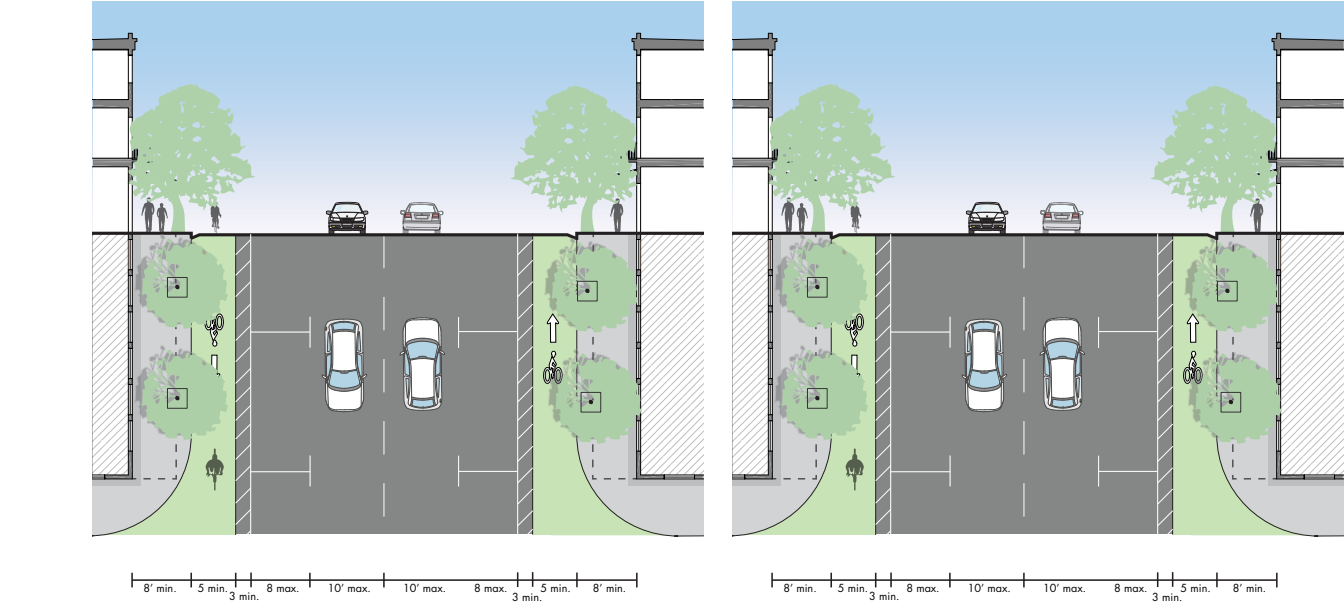


Fig 2.2 Street Type matrix.



**NEIGHBORHOOD STREET
(URBAN)**

75' 90' wide
2-4 lanes
Shared Path
Protected Bike Lanes
Light/Heavy Greenway
Parking Protected Bike Lanes
On street Parallel Parking
On Street Back Angle Parking
Tree Pits
Connected Tree Pits
Swale
Curb & Gutter

**NEIGHBORHOOD STREET
(SUBURBAN)**

75' 90' wide
2-4 lanes
Shared Path
Protected Bike Lanes
Light/Heavy Greenway
Parking Protected Bike Lanes
On street Parallel Parking
On Street Back Angle Parking
Tree Pits
Connected Tree Pits
Swale
Curb & Gutter



SHARED SPACE

75' 100' wide
2 lanes unmarked
Tree Pits
Connected Tree Pits
Swale at times
Curbless

NON-MOTORIZED STREET

115'-150' wide
Shared Path
Tree Pits
Connected Tree Pits
Curbless

Functional
Classification

LOCAL

BOULEVARD

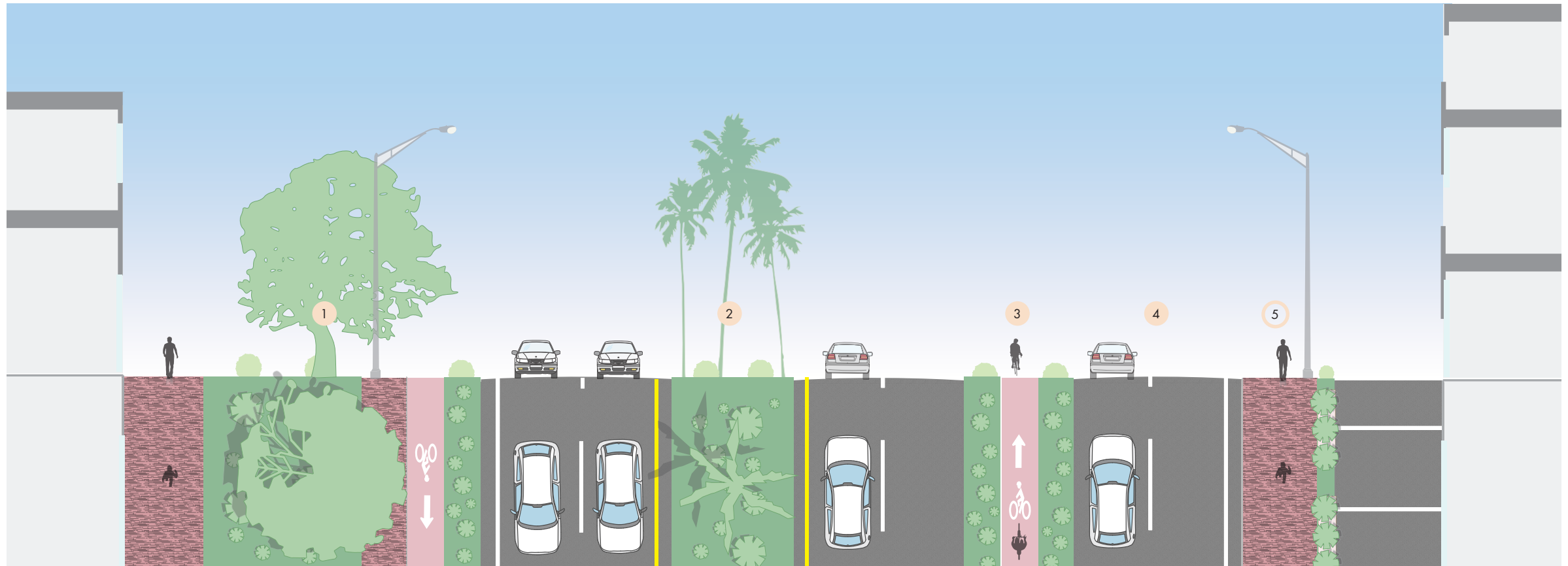


Fig 2.3 Standard multi-modal boulevard streetscape assembly.

The term “boulevard” usually refers to wide streets that act as grand promenades between important destinations. Typically having two or more roadways separated by medians, with the inner roadway(s) intended for through traffic and the outer (frontage roads) for local traffic, Boulevards boast an exceptional level of landscaping, public open space, and visual quality. The medians sometimes include pedestrian and bicycle paths.

Boulevards separate very large streets into parallel urban realms, buffering the commercial or residential street edge from the high speed through way by means of multi-way operations and frontage roads. Today, cities have the opportunity to restore these boulevards to their former stature. they can also apply updated boulevard design standards to overbuilt urban arterials.

TYPICAL TREATMENTS

- 1 Individual Tree Pits/ Connected Tree Pits
- 2 Medians/Robust landscaping
- 3 Protected and Painted Bicycle facilities
- 4 Frontage road / Bus lane
- 5 Pedestrian realm

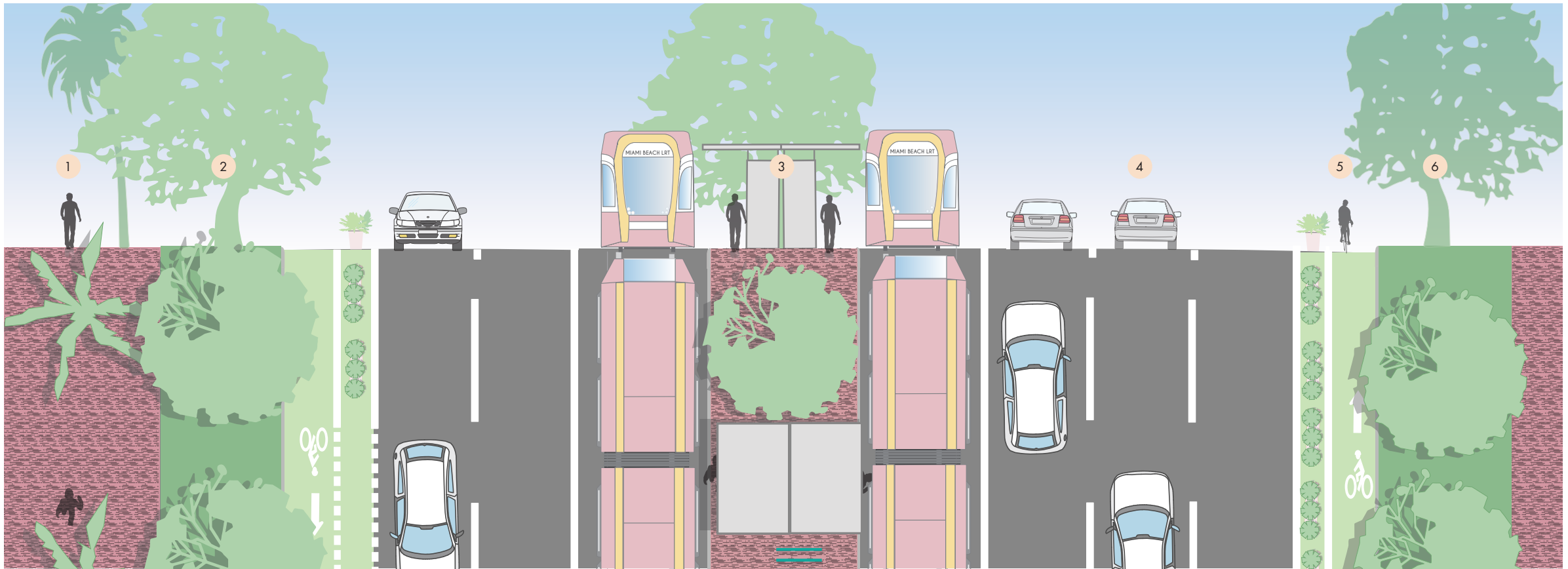


Fig 2.4 Typical multi-modal transit boulevard streetscape assembly at platform section.

The travel way is dominated by buses or trains, and the pedestrian realm is typically geared towards retail and other commercial uses. Excellent pedestrian access to and along the transit streets is critical. Bicycle access should be supported where possible depending on ROW.

Transit streets often emphasize urban design and transit-supportiveness by including outdoor seating, landscaping, attractive street materials, and well-designed bus queuing areas.

These measures help create an appealing street environment in the presence of high numbers of buses. Transit corridors may or may not include vehicular traffic, bicycle transportation facilities are encouraged.

TYPICAL TREATMENTS

- 1 Unit Paver Sidewalk
- 2 Landscape/ Cafe Seating Area.
- 3 Well shaded & Sheltered Transit Platforms.
- 4 Mixed Roadway.
- 5 Landscape protected & painted bike lanes
- 6 Landscape/ Cafe Seating Area

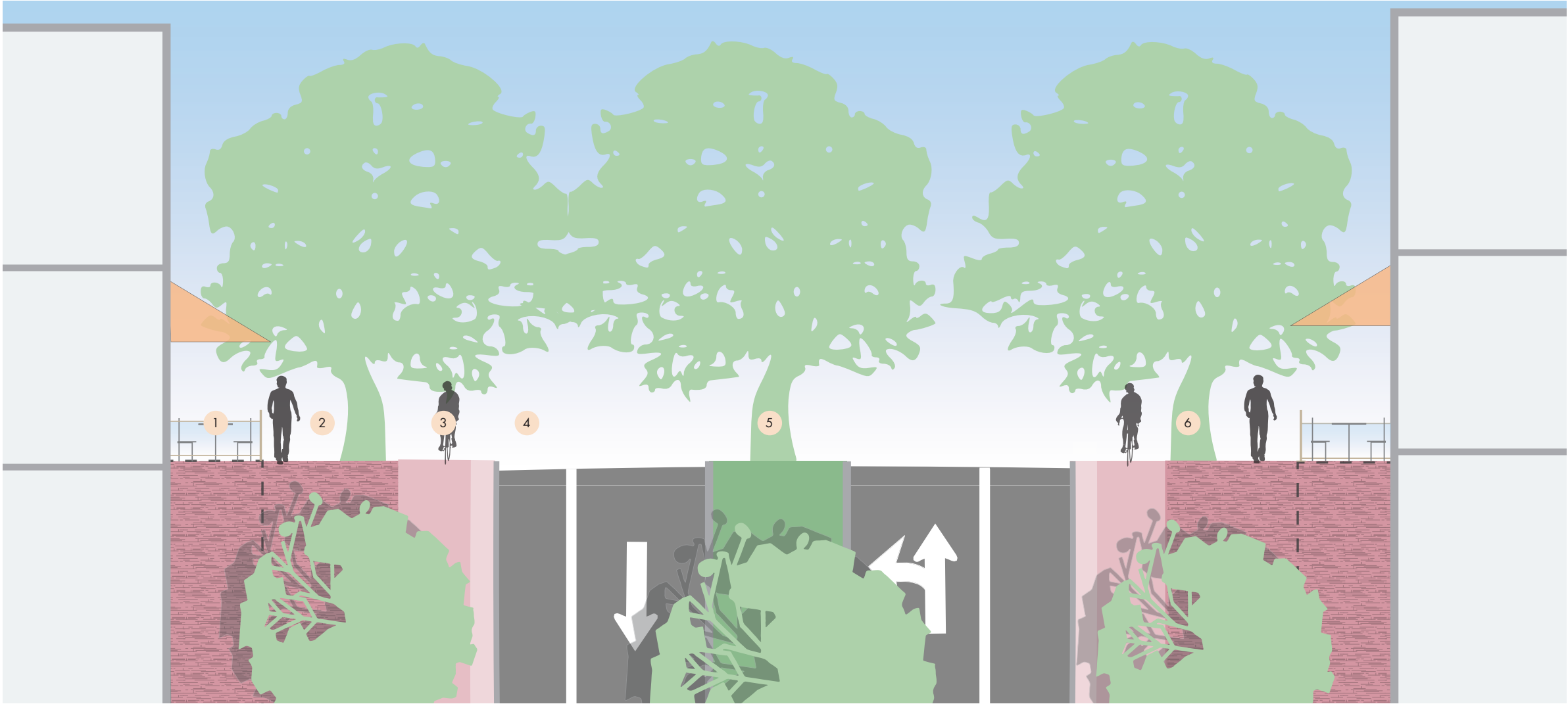


Fig 2.5 Multi-modal commercial avenue assembly with protected bike facilities.

A commercial Avenue is a vibrant street with a variety of shops that serve the surrounding community. This configuration acts as the convergence point with high pedestrian volumes in a neighborhood or district.

TYPICAL TREATMENTS

- | | |
|---|--------------------------------------|
| 1 Unit Paver Sidewalk/ Seating | 4 On Street Parking and/ or parklets |
| 2 Ample Pedestrian throughway | 5 Robust landscaped medians |
| 3 Sidewalk level protected Bicycle Lane | 6 Furnishing zone |

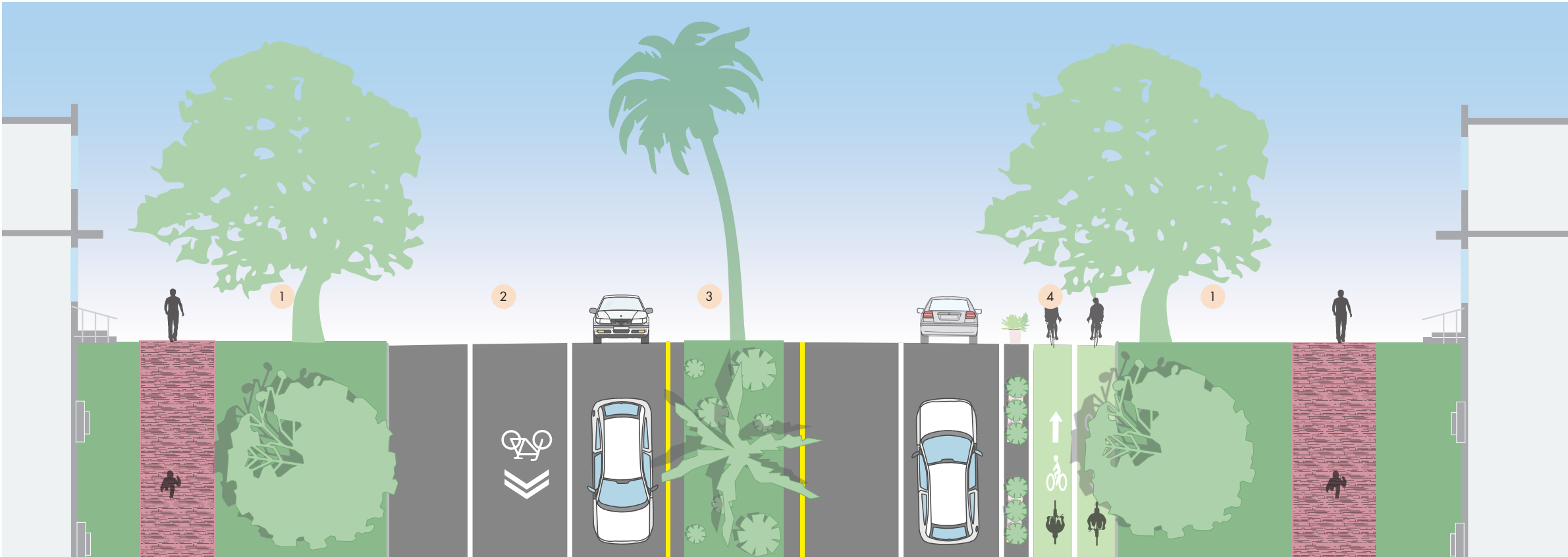


Fig 2.6 Multi-modal residential avenue streetscape assembly with protected bike facilities.

A Residential Avenue avenue is a street of moderate to high vehicular capacity and low to moderate speed acting as a short distance connector between urban centers and may be equipped with a landscaped median. Avenues traverse and connect districts, they also link streets with boulevards. For all vehicles including transit.

TYPICAL TREATMENTS

- 1 A key feature is the tree lined central median.
- 2 A landscape strip, or swale, is used rather than a tree well.
- 3 Variable number of Lanes.
- 4 Accommodates bicycle facilities.
- 4 Variable depending on R.O.W flexibility (protected)

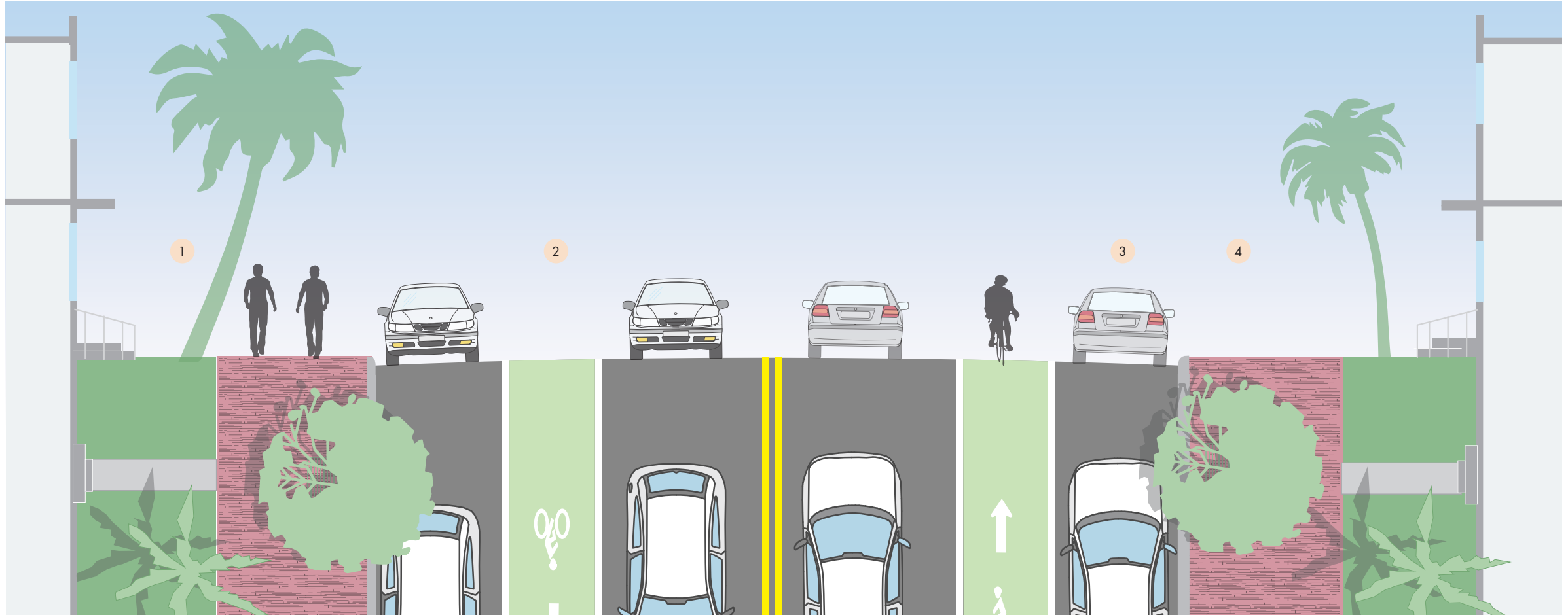


Fig 2.7 Multi-modal urban neighborhood street streetscape assembly with conventional bike facilities.

An urban neighborhood street is a local, multi-movement facility suitable for all urbanized transect zones and all frontages and uses. A neighborhood street is urban in character when it presents raised curbs), drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an alley. Character may vary in response to the commercial or residential uses lining the street.

TYPICAL TREATMENTS

- 1 Character varies according to context (dooryard)
- 2 May accommodate bike facilities
- 3 Typically uses on street parking for traffic calming and pedestrian protection.
- 4 May accommodate curb extensions/ Landscape strips and furnishing zone depending on context

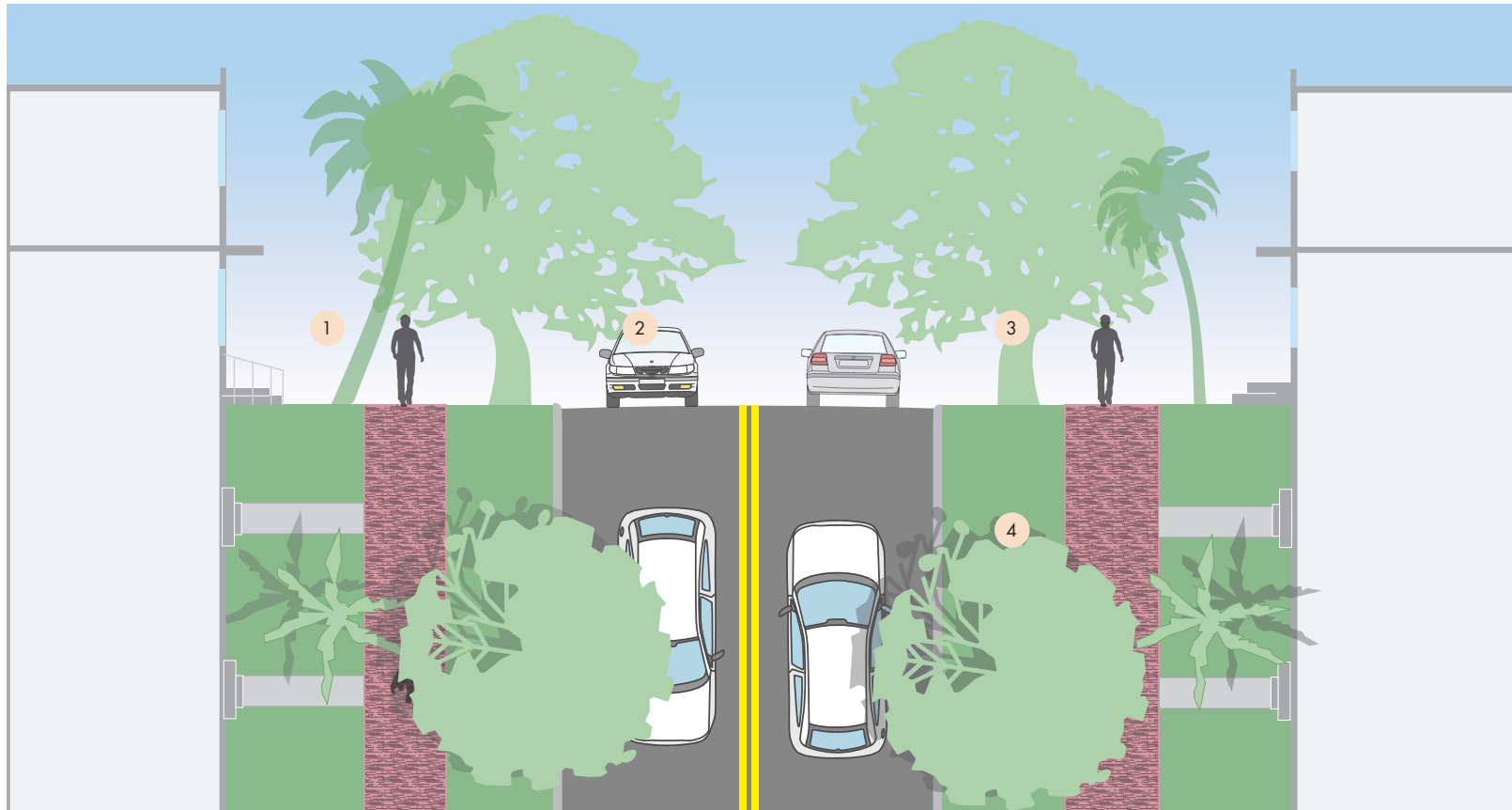


Fig 2.8 Typical neighborhood street streetscape assembly.

A neighborhood street is a local, multi-movement facility suitable for all urbanized transect zones and all frontages and uses. A street is urban in character, with raised curbs (except where curbless treatments are designed), drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an alley. Character may vary in response to the commercial or residential uses lining the street.

TYPICAL TREATMENTS

- 1 Character varies according to street context
- 2 May accommodate bike facilities or sharrows
- 3 May accommodate curb extensions/ landscape strips/ furnishing zone depending on context
- 4 Lower traffic residential streets are regularly designed to accommodate large trees

MAIN STREET

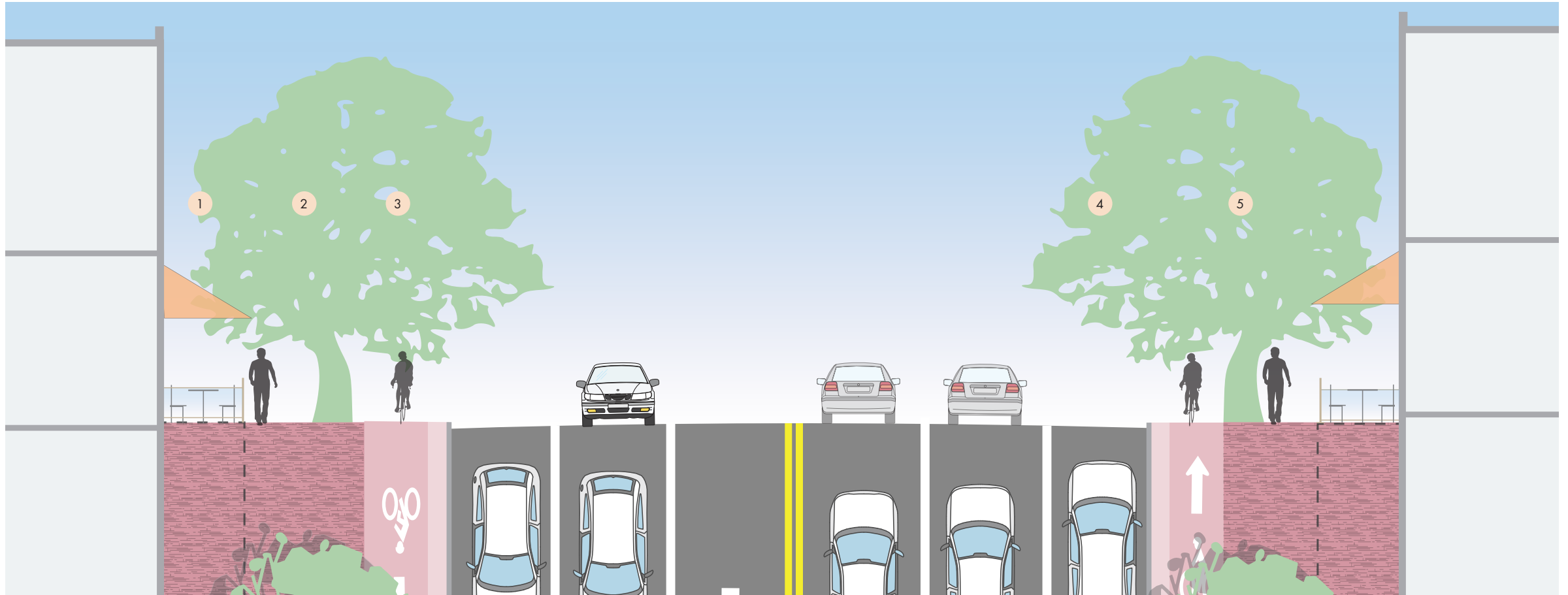


Fig 2.9 Multi-modal main street streetscape assembly with sidewalk-level protected bike facilities.

Main streets are commercial streets that support both goods and services. Main streets support medium to low vehicular speeds and on street parking due to high vehicle-turnover. A typical Main Street configuration doesn't allow for building setbacks unless seating is provided. Sidewalks are wide and unobstructed, with ample tree canopy or other shade structures (see streetscape section), and public seating. Main streets should be equipped with adequate bicycle parking and bicycle infrastructure. Due to high activity in main streets, a protected bicycle lane and reduced posted speeds are desired.

Main Street types can be said to be the original "complete street" where tight geometry, pedestrian amenities, landscaping and minimal setbacks create a sense of enclosure that promotes healthy activity in the public realm.

TYPICAL TREATMENTS

- 1 Covered seating areas are encouraged.
- 2 Ample sidewalks with shade.
- 3 Should accommodate bicycle facilities.
- 4 On street parking serves as traffic calming and pedestrian protection buffer.
- 5 May accommodate curb extensions/ Landscape strips and furnishing zone depending on context



Fig 2.10 Typical non-motorized street (multimodal optional).

Non-motorized multi-modal streets, also known as pedestrian malls or pedestrian streets, in the United States, are the most common configuration of dedicated pedestrian realm design. Pedestrian streets are lined with two store fronts, and provide a free flow of pedestrian movement through out the space. Cafe/ restaurant seating is adjacent to the commercial property. Depending on the width of the street, Pop-up shops, and vendors can be located in the middle as a temporary store front and create another through zone. Pedestrian Streets provide excellent opportunities for social interaction and arts performance. Public access to electricity should be allocated through out for musicians and other artists. Public seating should be creative and plentiful. If pedestrian/cyclist collisions are a concern due to high volumes, a designated path for bicyclist shall be designated. The use of bicycles should be allowed on pedestrian streets. However, if the right of way cannot accommodate dedicated facilities for bicyclists/rollerblades and other wheeled transportation modes, access shall be restricted during heavy traffic.

- TYPICAL TREATMENTS
- 1 Pedestrian Through Zone.
 - 2 Cafe Seating/ Furnishing Zone.
 - 3 Individual Tree Pits and Landscaping.
 - 4 Mixed zone. Art/ Lawn/ Public Seating.
 - 5 Consider a dedicated multi modal area.

SHARED SPACE



Fig 2.11 Typical shared space.

Slow, curbless street where people traveling by car, foot or bicycle share travel space equally. May support café seating, play areas, and other uses. Shared streets are designed in a way that supports all modes of transportation but gives priority to pedestrians and bicyclist while still providing access to vehicular traffic and emergency vehicles. Shared space streets are successful public spaces that support art, entertainment and also function as commercial strips.

TYPICAL TREATMENTS

- 1 Pedestrian Through Zone
- 2 Cafe Seating/ Furnishing Zone
- 3 Individual Tree Pits and Landscaping
- 4 Mixed Roadway with Pedestrian Priority
- 5 Parallel parking (optional)
- 6 Multi-use space/ Landscape

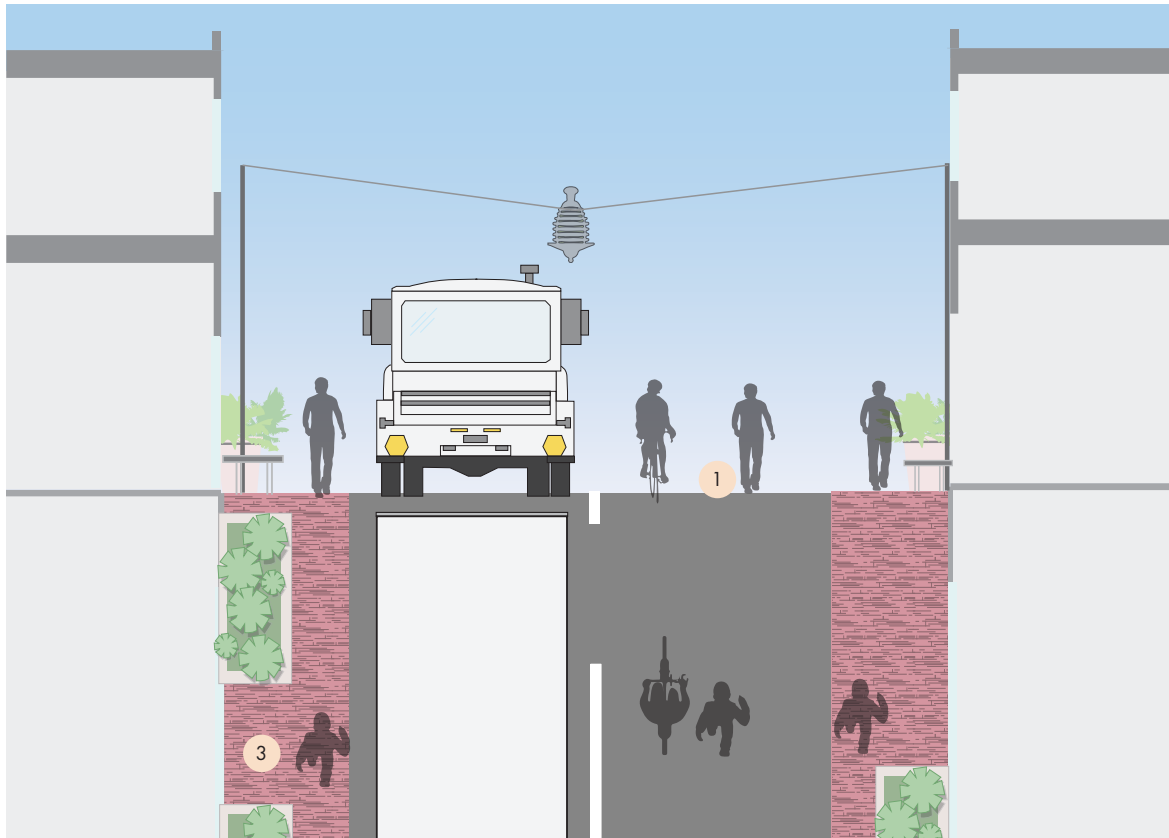


Fig 2.12 Typical commercial alley (a).

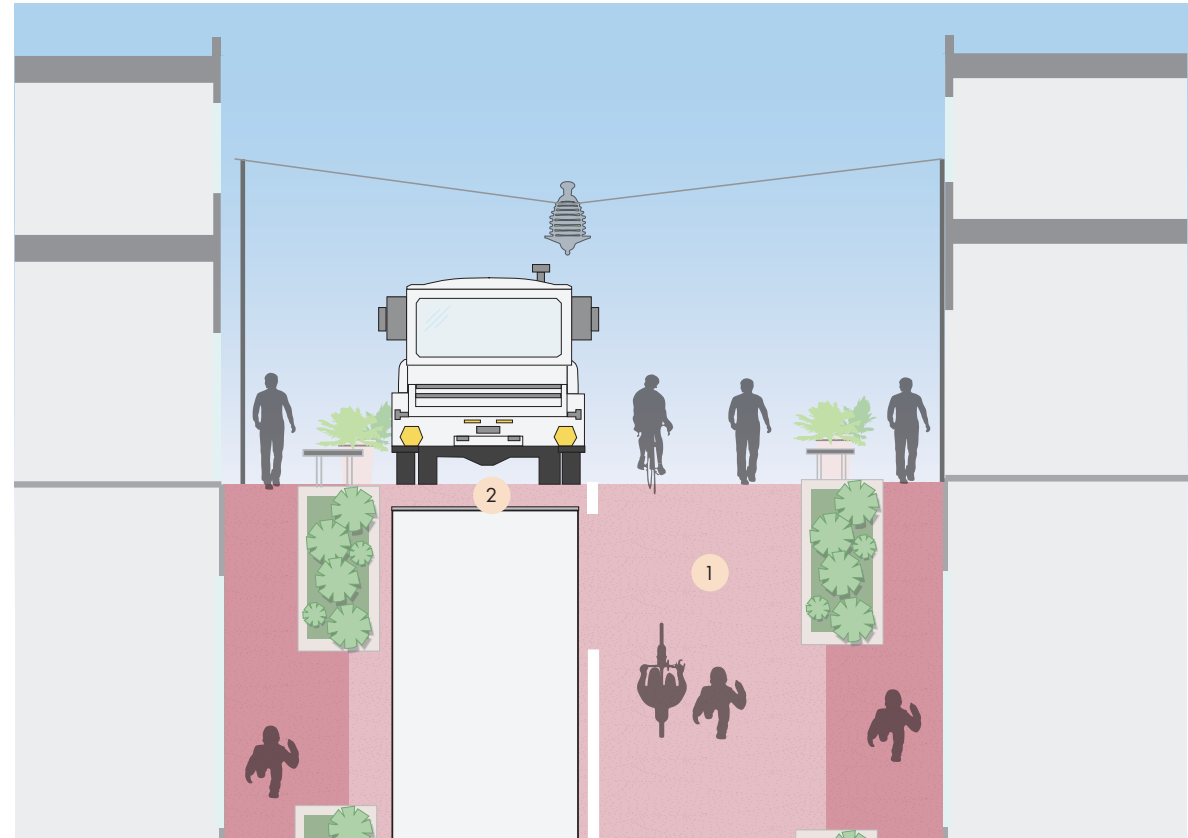


Fig 2.13 Typical commercial alley (b).

Commercial alleys have the potential to support pedestrian and bicycle connectivity. Most alleys function as loading zones during regular business hours, at all other times, commercial alleys should be treated as a shared space. It is also possible to restrict motor vehicles after delivery hours and expand cafe seating, pop-up vending and other alternative uses.

In order to successfully activate alleys for multimodal use, garbage dumpsters must be enclosed within the buildings. In addition, permanent and/or removable seating should be provided depending on right of way constraints. Human-scale lighting should be provided.

TYPICAL TREATMENTS

- 1 Alleys can be treated as shared spaces before/after loading hours.
- 2 In low-volume loading streets, the travel way surface should be constructed with low impact materials like pervious or modular pavement
- 3 Landscaping and furnishing should be located so that it doesn't interfere with loading or unloading.



PEDESTRIAN



Conventional (auto-centric) street design relegates pedestrians to the sidewalk; it has often overlooked the intricacies of pedestrian needs like appropriate shade, comfortable places to rest, highly visible crossings, safe intersections, and wide enough spaces to maneuver comfortably when negotiating space with other pedestrians. Pedestrian countermeasures aim to elevate the profile of people who move about the public realm by foot or wheelchair. Countermeasures regarding pedestrians are specified here primarily as crossing improvements, however, the streetscape section in this guide also alludes to pedestrian experience improvements. Finally, it is worth noting that all recommendations in this guide are aimed towards a multi-modal level of service, thus all countermeasures include guidance for the pedestrian realm at various levels.

PEDESTRIAN: INTRODUCTION

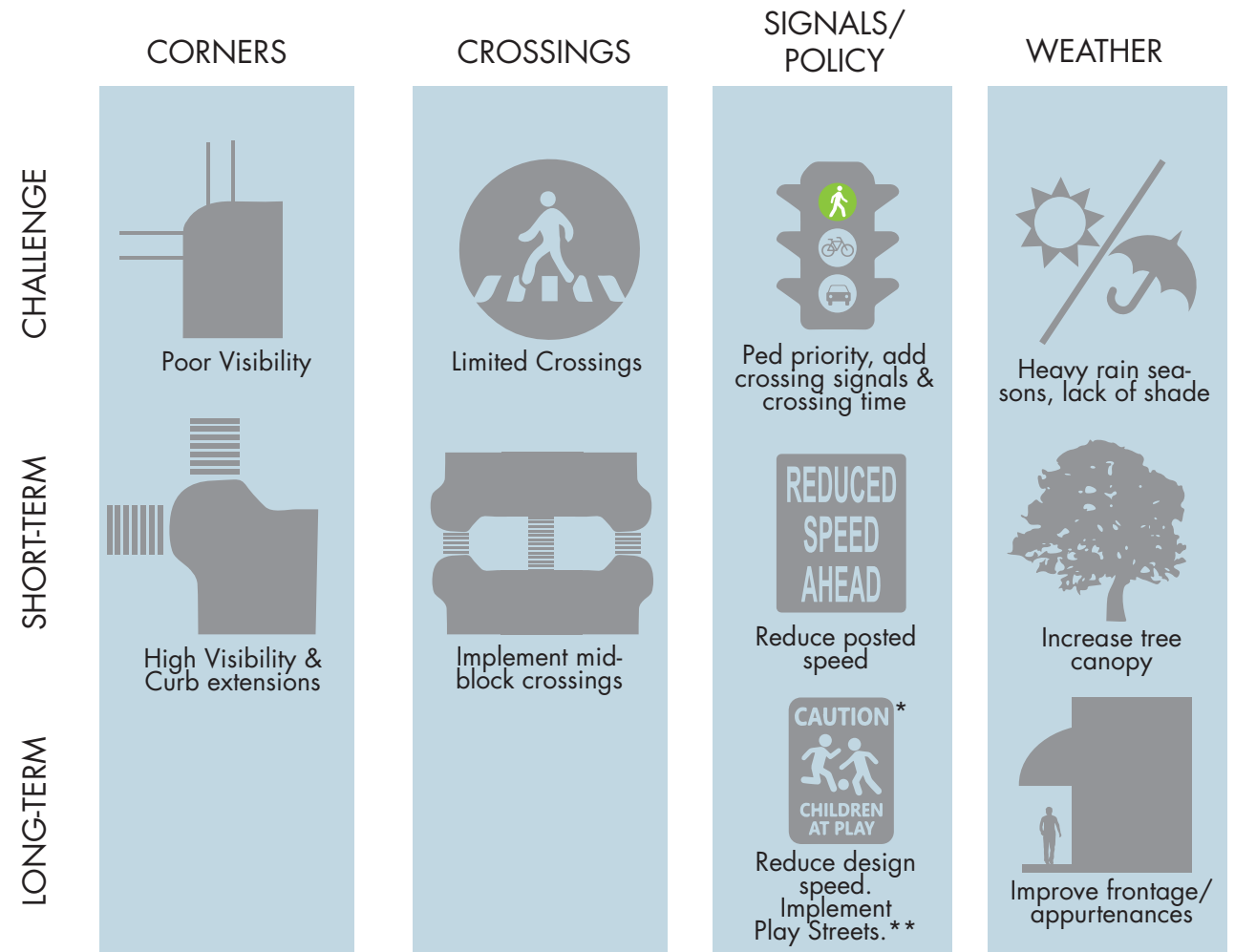
Walking is the most basic mode of transportation, yet pedestrians are often ignored in roadway design. The pedestrian environment is primarily thought as the sidewalk and its components. Pedestrians including those with mobility, hearing and visual impairments are the most vulnerable of all street users, special care and consideration is needed to identify potential issues and to design facilities accordingly.

Most pedestrian crashes occur when a person crosses the road, and the most common crash type is a conflict between a crossing pedestrian and a turning vehicle at an intersection. Traditionally, pedestrian design has been reduced to design that aims to avoid pedestrian crashes rather than truly enhance the vibrancy of the pedestrian experience.

Pedestrian design provides the opportunity to make streets more walkable, where people feel safe and have the desire to interact with other users in the public realm.

One of the most common ways to maximize design possibilities in the pedestrian realm is the narrowing of vehicular travel ways. Narrowing travel lanes may provide extra space that can be allocated to greening streets or to extend the furnishing zone.

In addition, narrowing travel lanes creates a visual constraint for motorist, where even though cars fit in the lanes, the narrow lanes force motorist to negotiate space with each other, thus reducing travel speed and increasing pedestrian's level of safety.



*The "Children At Play" sign represents the implementation of "play street" policies and urban design countermeasures in order to achieve a pedestrian priority zone; not the installation of non-approved MUTCD "Children At Play" signs along residential streets.

** "Play Streets" is a program established by the Partnership for Healthier America and the First Lady Michelle Obama in 2012. Chosen streets are temporarily closed to vehicular traffic temporarily and activated for pedestrian use focusing on children.

Refer to <http://ahealthieramerica.org/play-streets/play-streets-full/> for more information.

Fig. 2.14 Pedestrian Priority design matrix.

INTERSECTION CROSSINGS + RADIUS

Pedestrian crossings shall be provided at all intersections and shall be spaced no greater than 350' apart. Corner radii should encourage slow turning movements for automobiles, and shorter distances to cross for pedestrians, as shown in Figure 3.6 below. .

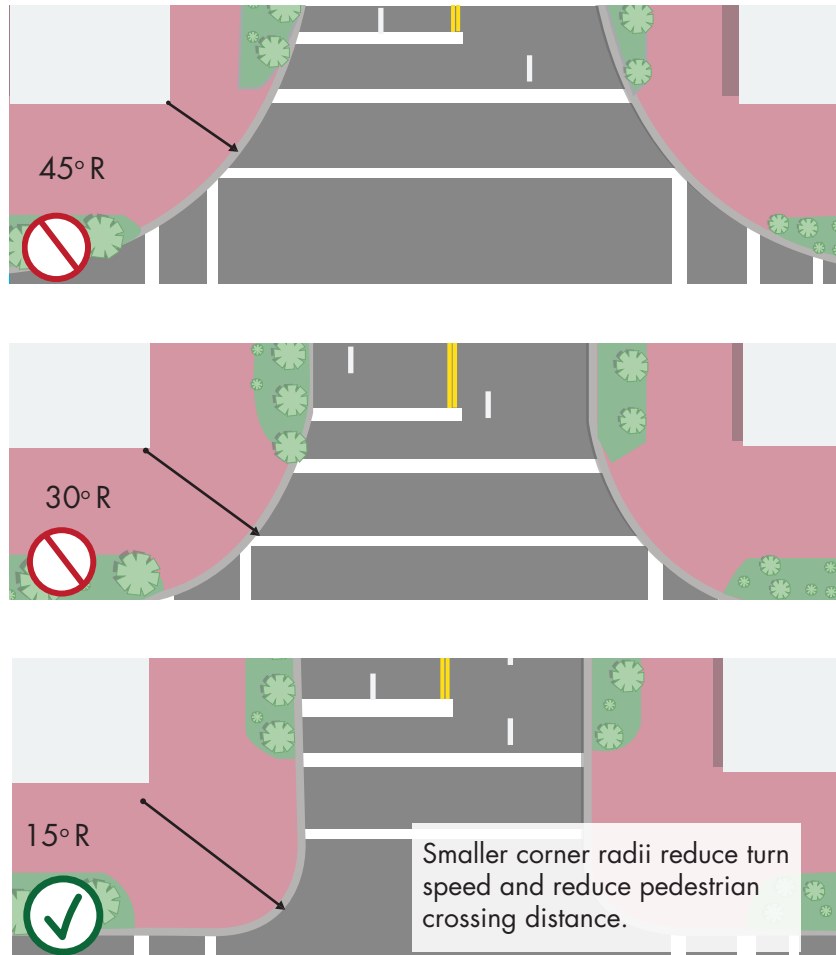


Fig. 2.15 Corner radii and pedestrian crossing safety.



Fig 2.16 Pedestrian crossings should be highly visible. Paint or a simple design throughout the cross walk is a cost-effective way to achieve high visibility.

Poor visibility and high speed are some of the problems that can be addressed through pedestrian-oriented design.

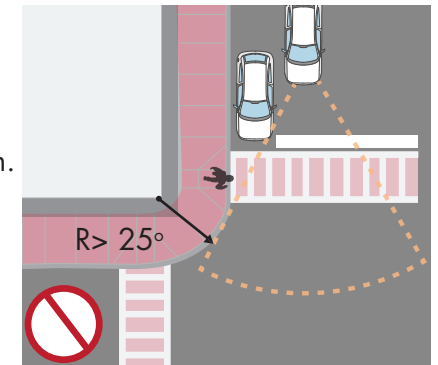


Fig. 2.17 Poor visibility at crossing.

By extending the curb, this design effectively pushes parallel parking away from the intersection and increases the sight triangle of motorists while also reducing pedestrian crossing distances across the intersection.

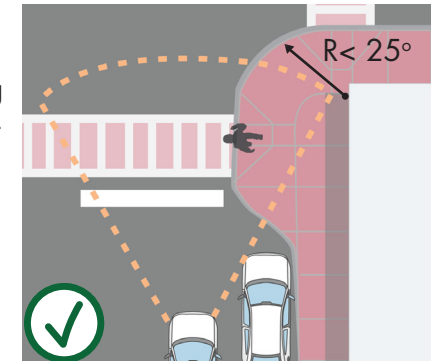


Fig. 2.18 Curb extension.

Full curb extensions are the most desirable configuration. This configuration improves visibility for all users and provides an opportunity for storm water management that is also aesthetically pleasing.

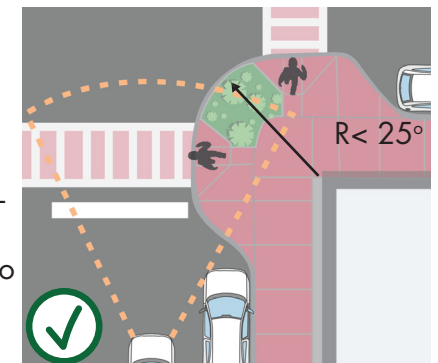


Fig. 2.19 Full curb extension with bioswale.

PEDESTRIAN: CROSSINGS

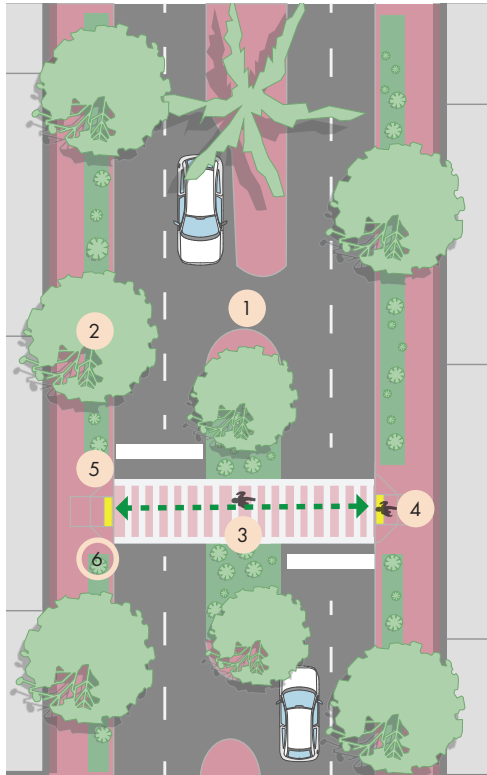


Fig. 2.20 Pedestrian Mid-block crossing.

TYPICAL TREATMENTS

- 1 Raised Median/ Nose
- 2 Street Trees
- 3 Raised/High Visibility Crosswalk
- 4 Curb ramps
- 5 Audible/Dynamic pedestrian signals
- 6 Solar RRFB pedestrian flashing beacon (optional)
- 7 Z-Style offset crosswalk forces pedestrians to face oncoming traffic before crossing.

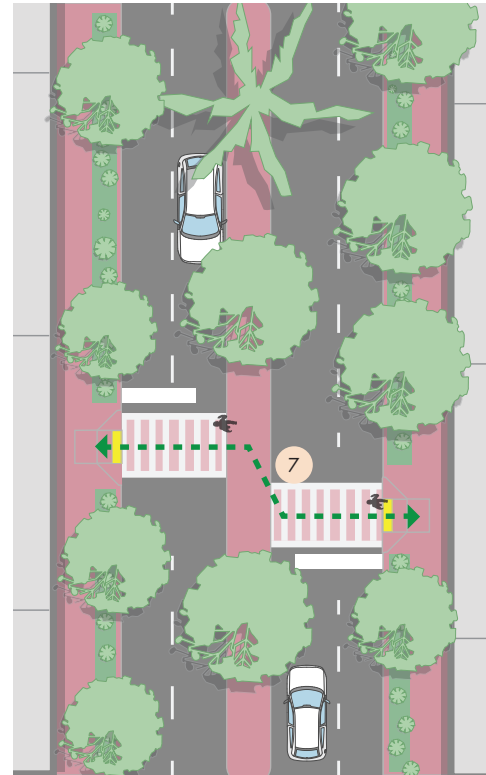


Fig. 2.21 Z- offset pedestrian mid-block crossing.

MID-BLOCK PEDESTRIAN CROSSINGS

Mid-block pedestrian crossings shall be based on frontage access and pedestrian movement desire lines, as in figure 3.1 and 3.2

- They shall be well marked and include overhead signage and RRFB (rectangular rapid flash beacon).
- Provide curb extension where there is on-street parking to enhance pedestrian visibility.
- Provide raised crossings at high traffic areas.

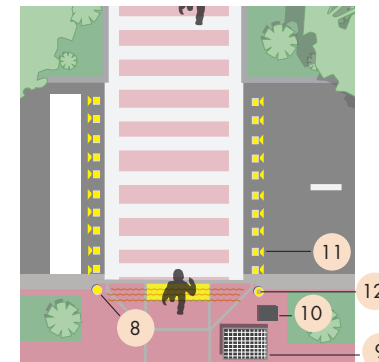


Fig. 2.22 In pavement beacons

- 8 Automatic sensor to activate crosswalk (optional)
- 9 Solar cell panel or AC powered
- 10 Control unit
- 11 Embedded amber LED strobe lights (can be seen 1500 feet away)
- 12 Push button crosswalk activator (optional)

CROSSWALKS

Crosswalks are any portion of a roadway at an intersection or elsewhere, distinctly provided for pedestrian crossing by lines or other surface pavement markings. Crosswalks can legally be marked or unmarked.

Typically, agencies have chosen to provide markings to call special attention to the areas where the agency believes pedestrians should cross the street. However, pedestrian behavior often disregards these cues, thus choosing to cross at the shortest distance regardless of the presence or absence of paint.

Pedestrian-oriented design however, doesn't aim to suggest preferred crossings, but rather call attention to desired crossing areas while improving the safety of all legs of an intersection. This provides multiple safe choices to the pedestrian.

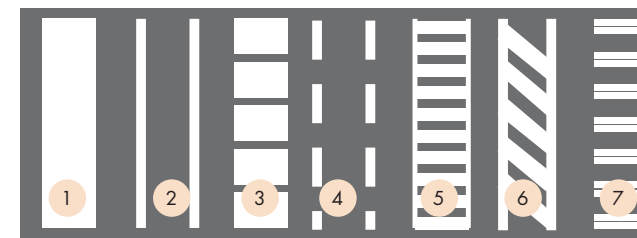


Fig. 2.23 MUTCD approved types of marked crosswalks

1. Solid Crosswalk
2. Standard Crosswalk
3. Continental Crosswalk (preferred)
4. Dashed Crosswalk
5. Zebra Crosswalk (preferred)
6. Ladder Crosswalk (preferred)
7. Piano key style (preferred)

MARKED CROSSWALKS

WHY ARE MARKED CROSSWALKS PROVIDED?

High visibility crosswalks have been associated with a 40% decrease in pedestrian crashes in New York City*. In addition, a decrease of 37% was observed in school zones in San Francisco.**Marked crosswalks are provided for a variety of reasons:

- To indicate to pedestrians the desired path of crossing.
- To alert motorists of the presence of pedestrians at intersections.
- To indicate a legal mid-block crossing for pedestrians in high volume, high crossing areas.

WHEN ARE MARKED CROSSWALKS PROVIDED?

- At locations controlled by traffic control signals
- At intersections controlled by stop or yield signs.
- Where engineering judgment dictates the need of a marked crosswalk because of high demand, or to indicate safest path.

DESIRE LINES/ DESIRE PATH

Pedestrians and bicyclists will always find ways that increase efficiency of travel. Desire lines are those unprescribed paths taken by users of the public realm. These paths shall be analyzed and implemented where possible in order to enrich the pedestrian experience through observation of users.

The MUTCD Section 3B.18 offers general guidance for site-specific crosswalk marking implementation:

- Crosswalk locations should be studied in order to allocate proper funding to marking crosswalks only where necessary.
- Consider the number of lanes.
- Consider the junction geometry.
- Is there a median?
- Study current and anticipated pedestrian volumes and delays.
- What is the average daily traffic?
- What is the posted speed limit?
- Quality of street lighting.
- Possible consolidation of multiple crossing points.
- Distance from adjacent signalized intersections.
- Are there other countermeasures in place like bulbouts and chicanes that might slow traffic enough to where a marked crosswalk is unnecessary?

The following chart is part of the FHWA study “Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations Final Report and Recommended Guidelines”. It illustrates general guidelines to consider when studying possible marking of crosswalks.

The chart specifies treatment options categorized as follows:

1. Compliant (C): The unmarked crossing can be marked and potential increase pedestrian crossing safety depending on site-specific study.
2. Possibly Compliant (P): The crosswalk location should be examined further in order to deter-

mine need of implementation.

3. Not Compliant (N): Applying paint to an existing crosswalk should not be done without implementing more robust solutions like improving intersection geometry, adding traffic calming measures and or traffic signals etc. Doing so is most likely to increase crashes than reduce them.

MARKED CROSSING F.A.Q

- Consider treatments around schools and high crossing areas.
- Resurfacing projects.
- Piano key style crossings have a lower maintenance cost over other high visibility crosswalks due to reduced friction.
- Marked crosswalks are not necessary for every intersection. Marking a crosswalk must be looked in conjunction with possible road diets and other countermeasures.
- retroreflectivity in high visibility crosswalks require 6 pounds of glass beads per gallon of paint

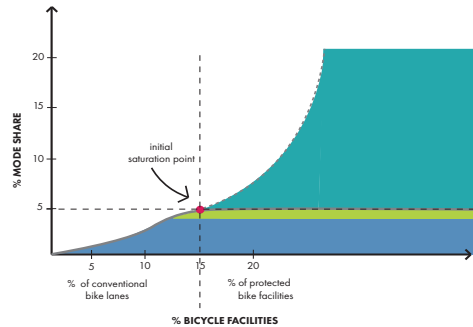


BICYCLES



- Bicyclists should be anticipated to use all streets in the city. This means that streets should always be designed with bicyclists in mind even when a street cannot accommodate a dedicated bicycle facility.
- Reducing lane widths reduces motor vehicle speeds and benefits people traveling by bike.
- Bicycle network connectivity is an important measure of successful street design.
- Since bicycle facilities are highly adaptable to specific situations and Right Of Way constraints, designing for people who ride bikes should be a high priority.
- Bicyclist resemble pedestrian behavior and vary in age and skill levels.
- Designing streets for effective bicycle use helps resolve conflicts among all users in the public realm.
- Designated bikeways successfully separate pedestrians from bicyclists and make them more visible to people traveling by car.
- The average constant speed varies from 10 - 18 mph which means that a 5 mile trip takes a bicyclist about 25 minutes to complete, this is the equivalent of a typical commuter trip.

BICYCLIST: INTRODUCTION

**BIKE ROUTE**

A route marked with signage to be amenable to bicycling.

- A Bicycle Route may just be a set of coordinated signage, but it may also include other types of Bicycle facilities over its trajectory.
- The relationship between the type of facility and level of stress for bicyclists is directly proportional, therefore high-stress roads require robust protected facilities.
- Refer to page 9 in BPMP for additional information.

**NEIGHBORHOOD GREENWAY**

A Thoroughfare with shared Vehicular Lanes that give movement priority to bicyclists. Usually designed on narrow residential streets. Utilize various traffic calming methods. Officially designated through special signage. Purple is the way-finding color conventionally associated with this type of bicycle facility.

- Design streets so that all users feel equally safe and welcomed on the public domain.
- Research, test, and evaluate innovative safety treatments, particularly those successfully adopted Best Practices in other cities.
- Pioneer initiatives that are context-based and culturally sensitive.

**BIKE BOX**

A section of pavement aimed at preventing bicycle/car collisions at intersections, particularly between drivers turning right and cyclists traveling through an intersection within an existing Bicycle Lane. To improve its visibility, a Bicycle Box is often colored and includes a standard white bicycle pavement marking.

- Usually located at high traffic intersections.
- Shall be part of all newly designed streets.
- Red, Blue and Green paint, or colored asphalt are commonly used.
- Must be slip-resistant.

**BIKE LANE**

A lane reserved for bicycle travel within a Thoroughfare, marked by a painted line.

- Serve to facilitate predictable behavior and movements between bicyclists and motorists.
- Not protected from vehicular traffic with physical barriers (bollards, medians, raised curbs).
- Typically located curb-side when parallel parking isn't present.
- Usually run in the direction of traffic.
- They should be distinguished with paint, lane markings, and intersection treatments.

**CONTRAFLOW BIKE LANE**

A designated Bicycle Lane marked to allow bicyclists to travel against the flow of traffic.

- Provides connectivity and access for bicyclists traveling in both directions.
- Decreases sidewalk riding.
- Influences motorist choice of routes with out limiting bicycle traffic.
- Decreases trip distances, the number of intersection encounters.
- Allows bicyclists to use safer, less trafficked streets.

**PHYSICALLY SEPARATED BIKE LANE**

Bicycle Lane separated from the motor vehicle travel lanes by Curbs, railings, plantings, parked cars, and/or grade separation, etc. (Syn: side path)

- Protect bicyclists from motorized traffic.
- Allows for uninterrupted bicycle travel, or minimal interruptions.
- Help reduce the number of collisions between motorists and bicyclists.
- Improves the bicyclists and driver experience by providing a robust buffer between users.

**SHARED USED LANE MARKING**

Pavement marking applied to a Thoroughfare too narrow to accommodate Bicycle Lanes and/or with vehicular target speeds slow enough to allow cyclists to move safely with motor vehicles. (Syn: Sharrow)

- Serve to alert drivers of possibly encountering bicyclists on travel lanes.
- Usually present in streets combined with traffic calming measures.

**SHARED USE PATH**

A two-way physically separated facility from motor vehicular traffic with an open space or barrier (AASHTO " Guide for the Development of Bicycle Facilities", 1999). Shared-use paths should always be designed to include pedestrians even if the primary anticipated users are bicyclists.

- Allow for mixing of non-motorized travel and pedestrians while still being separated from motorized travel lanes.
- Allows for free flow and interaction between users; However, space designation can be achieved through pavement markings if desired.



NEIGHBORHOOD GREENWAYS



These types of facilities are implemented on streets with medium-low to low vehicle traffic like neighborhood/ local streets (AKA collector or access routes). Usually, greenways will have a variety of traffic calming and diversion strategies that aim to control speeds, limit conflicts among users and give priority to bicycles while providing a safe and attractive environment for pedestrians.

Greenways function best as a network rather than isolated, this way, all types of bicyclists can navigate the streets safely and efficiently

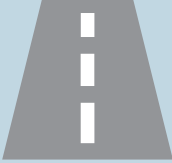
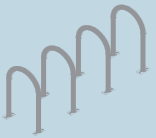
Shared road facilities fall in a continuum of minimal (light) to heavy physical intervention, therefore implementation and cost vary commensurate with the level of intervention.

BICYCLIST: NEIGHBORHOOD GREENWAYS: INTRODUCTION

Neighborhood Greenways, as mentioned before, are primarily bicycle priority streets. However, the retrofit strategies applied to neighborhood greenways enhance the experience of pedestrians and bicyclists of all ages and skills levels, while still providing vehicular access.

The goals of Neighborhood Greenways are:

- Reduce vehicular cut-through: By installing traffic diverters.
- Provide safer bicycle and pedestrian connectivity: By implementing pavement makings, route signage and enhanced crossings for pedestrians and bicyclists.
- Reduce vehicular speeds: By installing speed cushions, speed bumps and reducing posted speeds to 18 mph.
- Guide people along route: By providing signage indicating nearby amenities like the beach, parks, libraries and commerce. (Consider signs that include average riding distance/ time to destination)
- Promote safe streets: More people on bicycle and walking lead to safer streets.
- Lower rider stress: Lowering traffic stress requires neighborhood greenways to operate with low auto volumes and speeds, provide protected crossings at major intersections and maintain an environment that encourages people of all ages and abilities to travel actively. Traffic calming measures not only help to discourage cut-through traffic, they also help to lower the traffic stress on neighborhood greenways for people walking and biking.

	CORNERS	SIGNS	SIGNALS	WEATHER
CHALLENGE	 Wide travel lanes	 Special Signage	 Bike Priority crossing signals & Increased Crossing time	 Non-continuous bicycle facilities
SHORT-TERM	 Remove/ travel lanes	 Clear Pavement Markings	 Reduced Posted Speed	 Fill in gaps/ Implement complete network
LONG-TERM	 Maintains momentum / Avoids collisions	 Dedicated areas along route & intersections (bike box)	 Implement play streets	 Provide robust amenities for bicyclists along routes

*The "Children At Play" sign represents the implementation of "play street" policies and urban design countermeasures in order to achieve a pedestrian priority zone; not the installation of non-approved MUTCD "Children At Play" signs along residential streets.

** "Play Streets" is a program established by the Partnership for Healthier America and the First Lady Michelle Obama in 2012. Chosen streets are temporarily closed to vehicular traffic temporarily and activated for pedestrian use focusing on children.

Refer to <http://ahealthieramerica.org/play-streets/play-streets-full/> for more information.

Fig. 2.24 Bicycle Priority Corridor design matrix.

BICYCLIST: NEIGHBORHOOD GREENWAY (HEAVY)

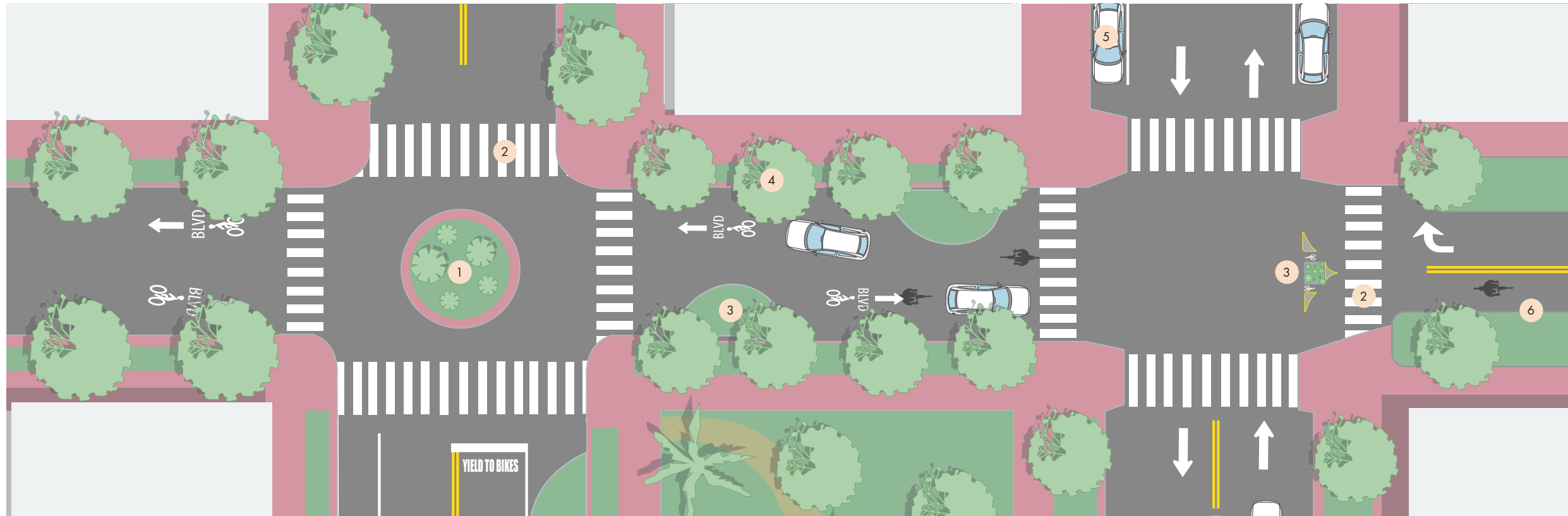


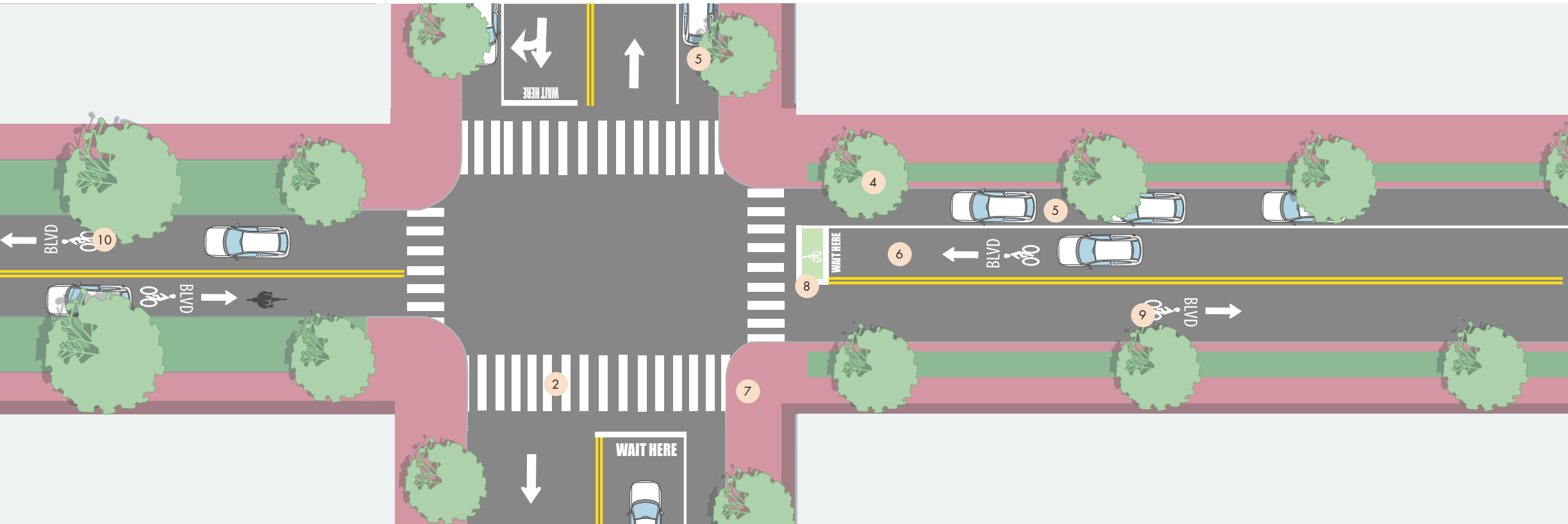
Fig. 2.27 Neighborhood Greenway Heavy to Light continuum.

Neighborhood Greenways (NG), are vital to the bicycle and pedestrian network. Neighborhood Greenway design is flexible and highly customizable to serve the needs of the network while balancing the interests of communities. Greenways from Heavy to Lite are part of a continuum of traffic design and streetscape improvement strategies that prioritize bicycle travel over automobile to various degrees, while providing streetscape improvements that directly benefit pedestrians.

A Neighborhood Greenway “heavy” (NGH) presents higher traffic diversion than a “light”. In addition, NGH usually have a higher concentration of greenway design elements from designation to construction.

TYPICAL TREATMENTS

- 1 Neighborhood Circles
- 2 Highly Visible Crosswalks
- 3 Chicanes & Diverters
- 4 Ample Tree Canopy
- 5 Parallel parking
- 6 Narrow Lanes/ Wide Landscaping



Neighborhood Greenway Lite (NGL), tend to be those local streets which have existing low traffic volumes, or that are easily converted though signage, re-striping and/or minor construction. In Miami Beach, Meridian Avenue offers a variety of contexts along which a Neighborhood Greenway corridor can be implemented. For instance, Meridian along Flamingo Park would be considered “greenway ready”, due to their extensive tree canopy, narrow travel lanes and on-street parking. Pavement markings and signage would suffice In

this portion, while other areas of the street might require the implementation of traffic circles, bulb outs and diverters in order to accomplish the necessary traffic calming and diversion that characterize these types of neighborhood streets.

- TYPICAL TREATMENTS
- 7 Bicycle Signals
 - 8 Bike Boxes/ Bike Priority Intersection Treatment
 - 9 Pavement Markings and Signage

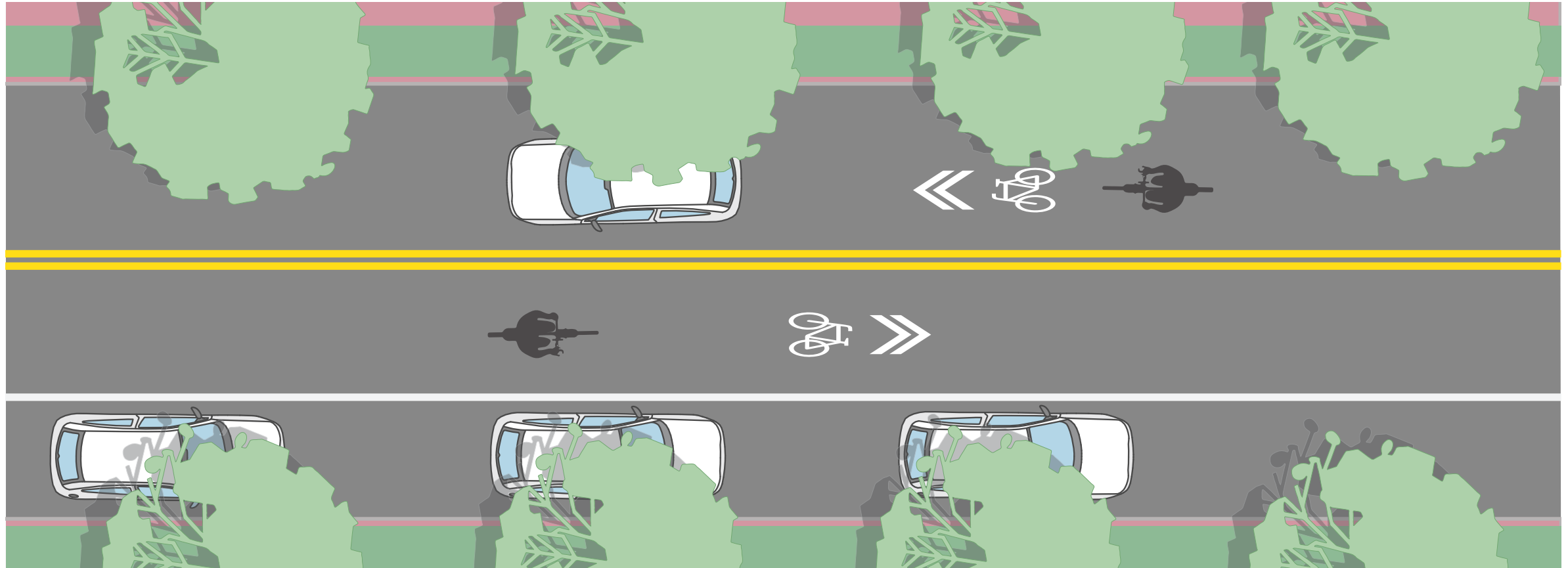


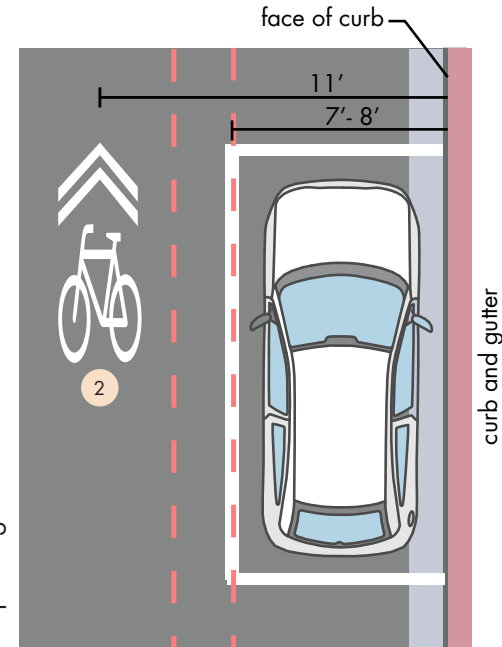
Fig. 2.28 Neighborhood Greenway,sharrows pavement markings.

Sharrows or Shared Lane Markings are pavement markings installed along various types of streets where delineated or segregated bicycle facilities cannot be accommodated due to alignment, or R.O.W constraints. In addition, sharrows can serve as an interim solution for accommodating bicyclists along desired streets and closing gaps in a network before the construction of more robust solutions.

Sharrows facilitate traveling and safety to a certain level for existing bicyclists, and can be useful in a bicycle network, however, they lack the ability to attract the majority of users due to their nature. Most bicyclists do not fall in the “enthused and confident” category, therefore riding with traffic is the least desirable option for the majority of bicyclists.

While most streets can have travel lanes of 10’, lanes that accommodate sharrows can be studied separately to determine the appropriate width according to context. Traffic lanes with sharrows may be wider in order to avoid potential conflicts for cyclists when passing vehicles before an intersection approach.

Fig. 2.29 Pavement marking placement with parallel parking.



door zone

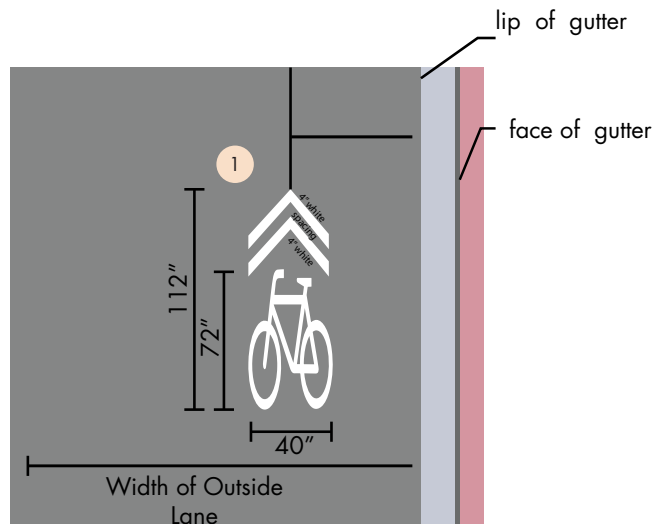


Fig. 2.30 Pavement marking placement on travel lane.

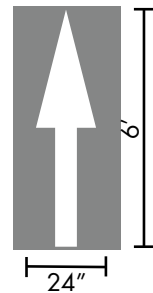
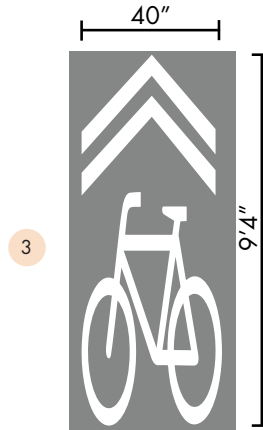
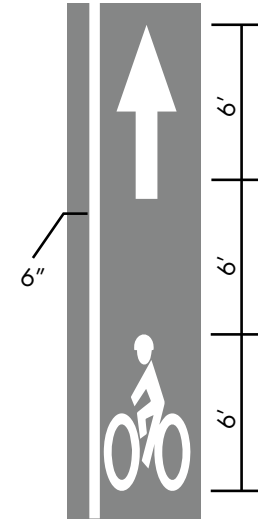


Fig. 2.31 Pavement marking dimensions.

No stripe at edge of curb & gutter or paved shoulders



Pavement markings are an integral part of bicycle facility design. The proper placement of pavement markings visually designates where the bicyclist should travel, alert motorists and pedestrians of the presence of bicyclists and establish a route.

- 1 The minimum placement of a sharrow when no parking is present is 4' away from the gutter. On streets with posted 25 MPH or less, sharrows shall be placed in the middle of the lane
- 2 Minimum placement when parallel parking is present: 11' to avoid the door zone conflict. Center lane placement if posted speed is 25 MPH or less.
- 3 Standard marking MUTCD figure 9C-9
- 4 Color may be used as shown.
- 5 "BLVD" shall accompany sharrow symbol along neighborhood greenways for enhanced wayfinding/ route navigation.

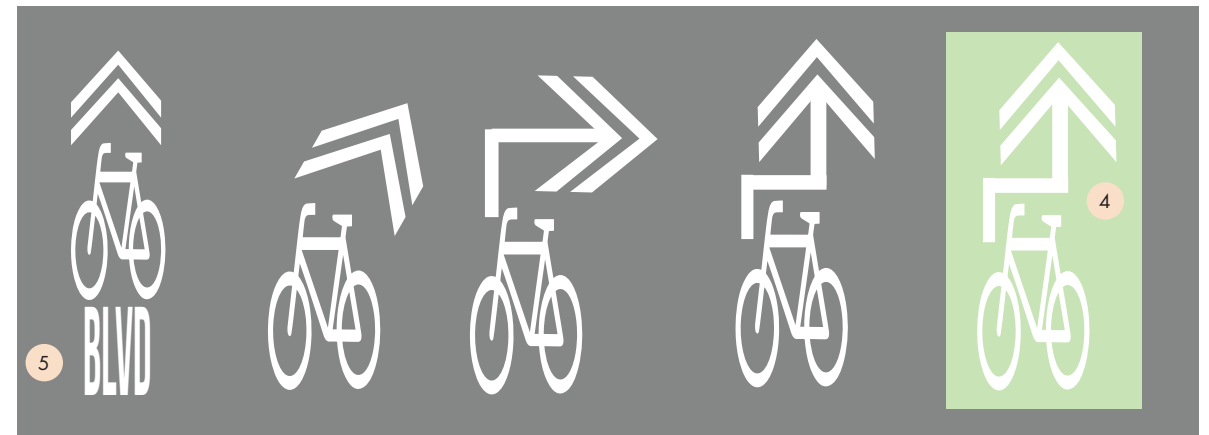


Fig. 2.32 modified shared lane markings for route designation and directionality.

BICYCLIST: ADVISORY BIKE LANE

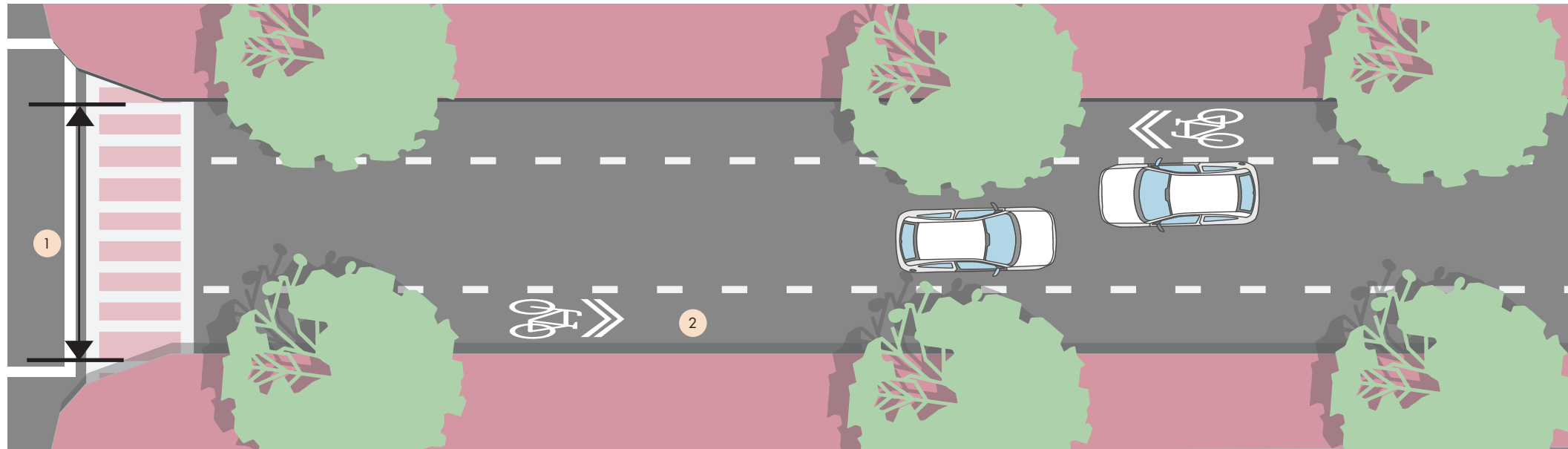


Fig. 2.33 Advisory bike lane with shared lane markings.

- 1 Advisory bike lanes are used on streets that are too narrow for conventional on street treatment/ bicycle facility.
- 2 Advisory bike lanes look like dedicated bike lanes except that a dashed line is used instead of a solid line. This allows drivers to drive on the bicycle space when a bicyclist isn't present

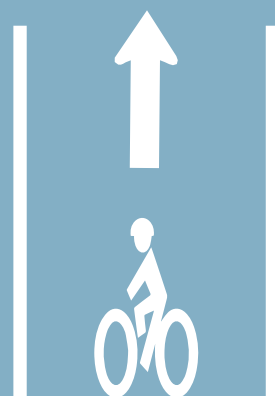
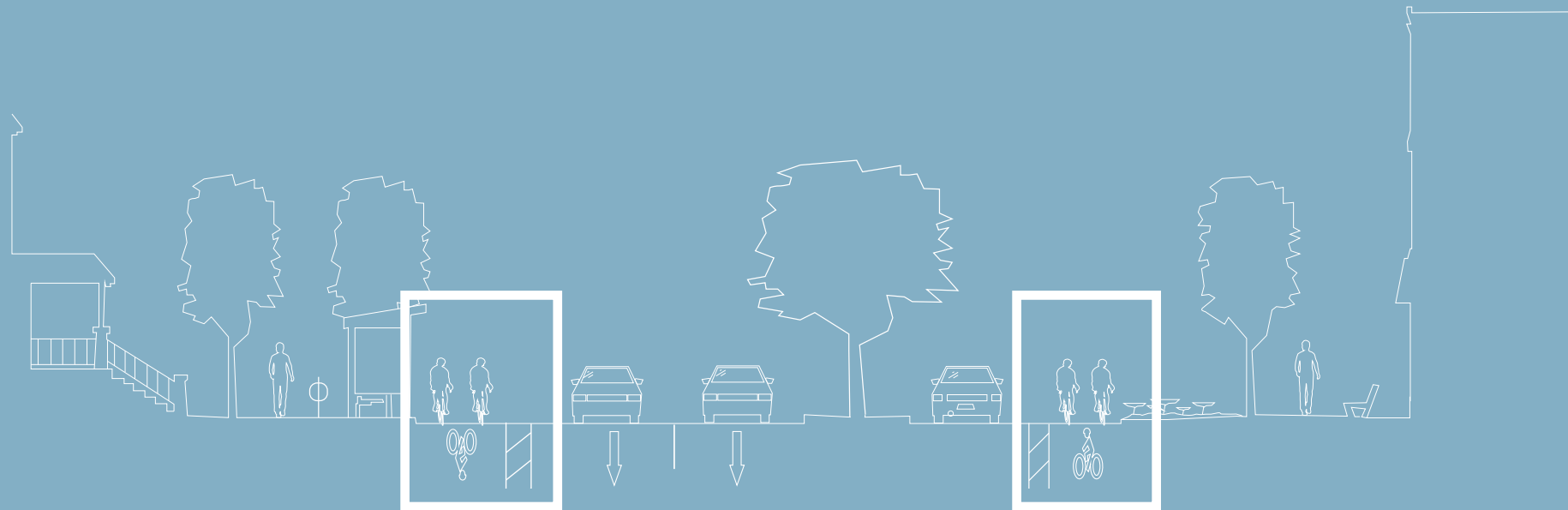
DRIVER

- This facility brings awareness to the travel way as a shared space when a bicyclist is not present. It helps to reduce travel speeds while not narrowing the travel lanes.
- It is OK to drive over the dashed line when bicyclists are not present.
- If a bicyclist is traveling in the advisory bike lane, move to the center completely to pass.
- If there is oncoming traffic and a bicyclist present, stay behind the bicyclist until its safe to pass.

- When passing, the vehicle must leave at least 3 feet between the vehicle and the bicyclist.

BICYCLIST

- Watch for merging motorists
- Use caution, look back when turning left and signal your intentions.
- Always assume that motorists may not see you.



UNPROTECTED BIKE FACILITIES

These types of facilities are the most commonly found in cities across the US to date. Delineated bicycle facilities are easily implementable during and after pilot projects (tactical urbanism), are cost-effective, and cogently help to test the viability of a bicycle route ,as well as ,the potential need to implement additional protection. Same as shared road facilities, delineated facilities fall in a continuum of minimal (lite) to heavy physical intervention, therefore implementation and cost vary commensurate with the level of intervention.

BICYCLIST: BUFFERED BIKE LANE

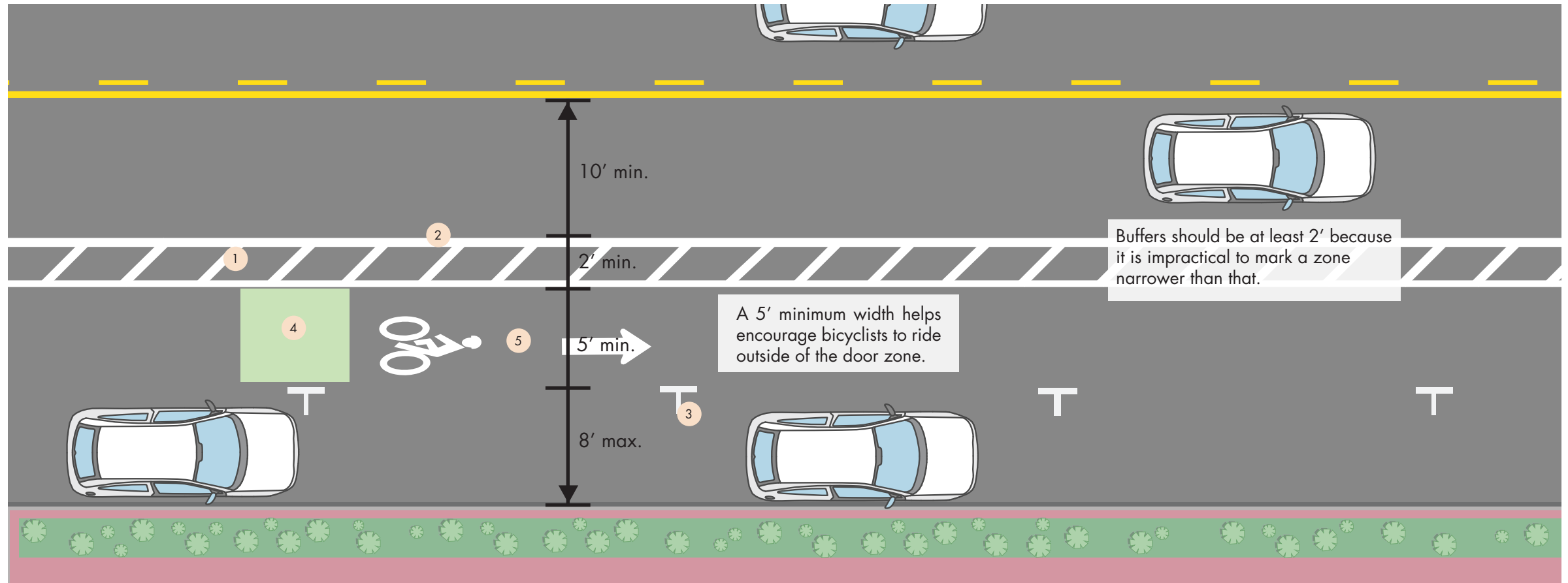


Fig. 2.34 Buffered bicycle lane.

- 1 The buffer shall be marked with two solid white lines with diagonal hatching if 3' of width or wider. Double white lines indicate where crossing is discouraged though not prohibited.
- 2 Like a conventional bike lane, a wide 6" - 8" solid white line is used to mark the edge adjacent to a motor travel lane
- 3 A Solid line or parking T's are acceptable markings to separate parking zone from the bicycle lane.
- 4 Color may be used at the beginning of each block to encourage motorists to stay in motor travel lanes and avoid conflict with people traveling by bicycle.
- 5 Bicycle lane word and/ or symbol and arrow markings shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists. Markings shall be placed outside motor vehicle tread path at intersections, driveways and merging areas in order to minimize wear and tear from the motor vehicle path

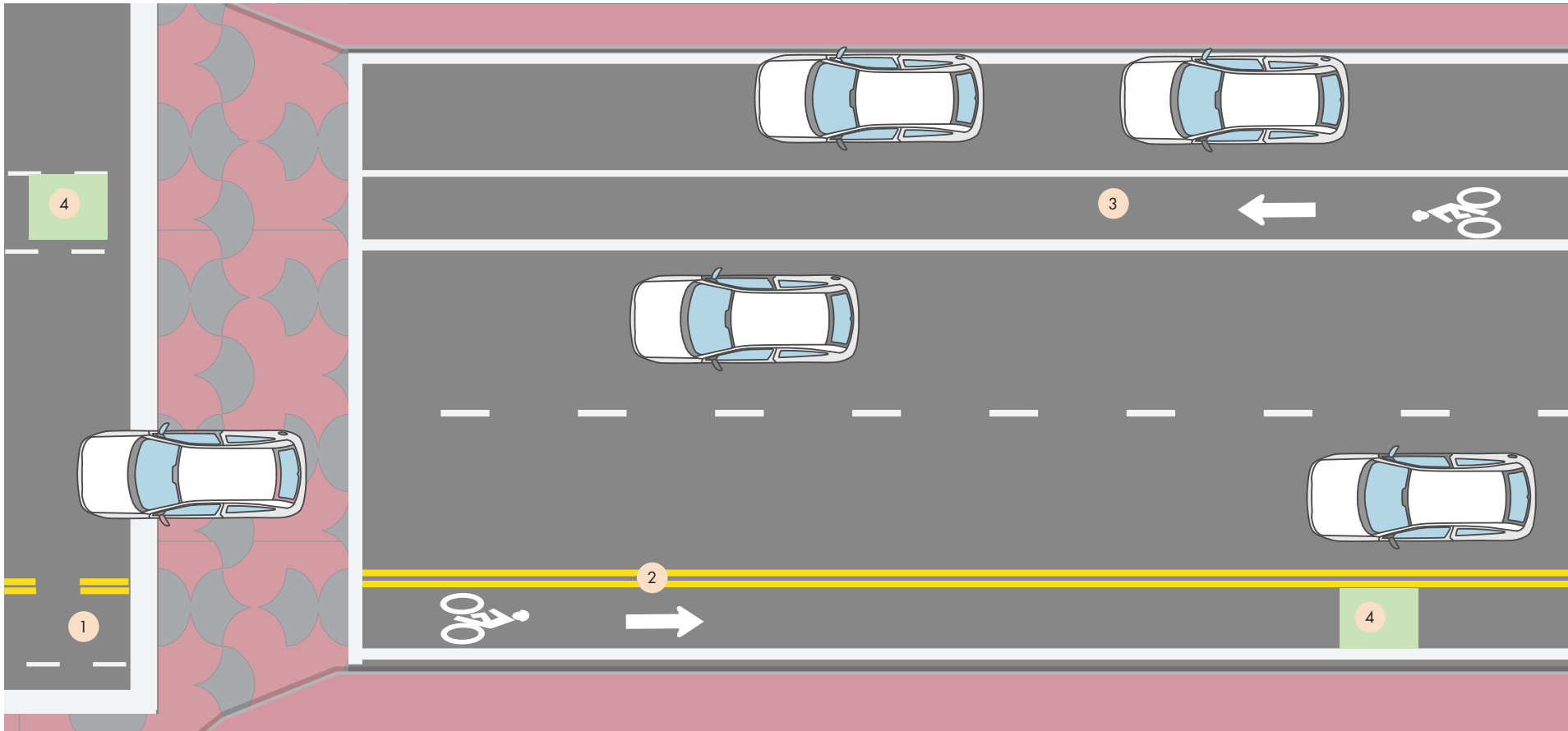


Fig. 2.35 Contraflow bicycle lane.

- 1 Contra-flow bike lane markings should be extended across the intersection, especially for contra-flow bike lanes against the curb, as a way of alerting cross street traffic to look for contra-flow bicyclists.
- 2 When configured without parking, a solid double yellow line marking should be used to separate the contra-flow bike lane from the opposing vehicle travel lane. A curb or median may be used in place of double yellow line. In this case, the facility becomes a contra-flow protected bike lane.
- 3 Where there is room, bike lanes should be used on both sides. When there is no room, for a with-flow lane, shared lane markings should be used to guide with-flow bicyclists to keep to the right side of the road.
- 4 Color may be used along the facility to draw attention to the unique function of the lane, or in areas of cross traffic such as drive ways and intersections.

BICYCLIST: COMBINED TURN LANE

Protected intersections are preferred over mixing zones. However, mixing zones are ideal in constrain conditions or as interim solutions. Mixing zones are only appropriate where the bike facility is unidirectional.

Mixing zones create a defined area in the roadway where motorists yield to bicyclist and cross paths in order to turn right at an intersection. Slow yield movements increase the safety of all users. The following design guidelines should be applied when designing mixing zones:

- Locate the merge point as close as practical to the intersection.
- Keep the merging area as short as possible. From 50' minimum to 100' maximum.
- Provide a buffer and physical separation from the adjacent through lane after the merge area, if possible.
- Highlight the merge/conflict area with green paint, and dashed bike lane markings or shared lane markings (sharrows)
- Install "Begin Right (or Left) Turn Lane Yield To Bikes" sign (R404) at the beginning of the merge area.
- Eliminate parking in the merging area.
- Minimize the length of the storage portion of the turn lane.
- Where posted speeds are 35 mph or higher, or where it is absolutely necessary to provide storage for queued vehicles, a deceleration/storage lane may be necessary in advance of the merging point.

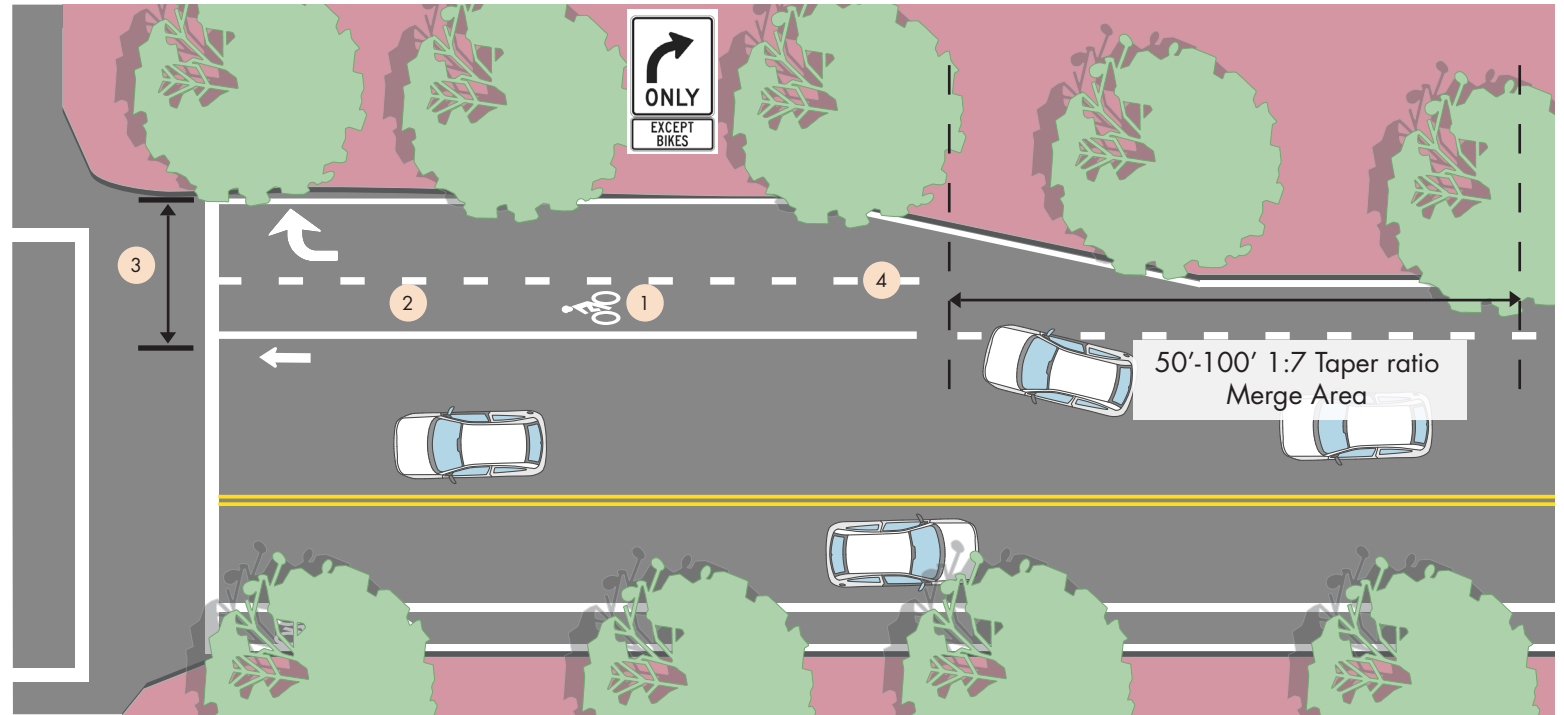


Fig.2.36 Combined turn lane at intersection approach.

- 1 A bicycle marking shall be used to clarify bicyclists position within the combined turn lane.
- 2 The width of the bike travel within the combined turn lane path shall be 4' minimum.
- 3 Width of combined turn lane shall be 9' minimum and 13' maximum. A full bicycle through lane can be accommodated if the vehicle right turn only lane can be made 14' or wider.
- 4 A dashed 4" line and bicycle lane marking shall be used for bicyclist position with the combined lane without excluding cars from the suggested bicycle area. Color may be used to highlight conflict area.

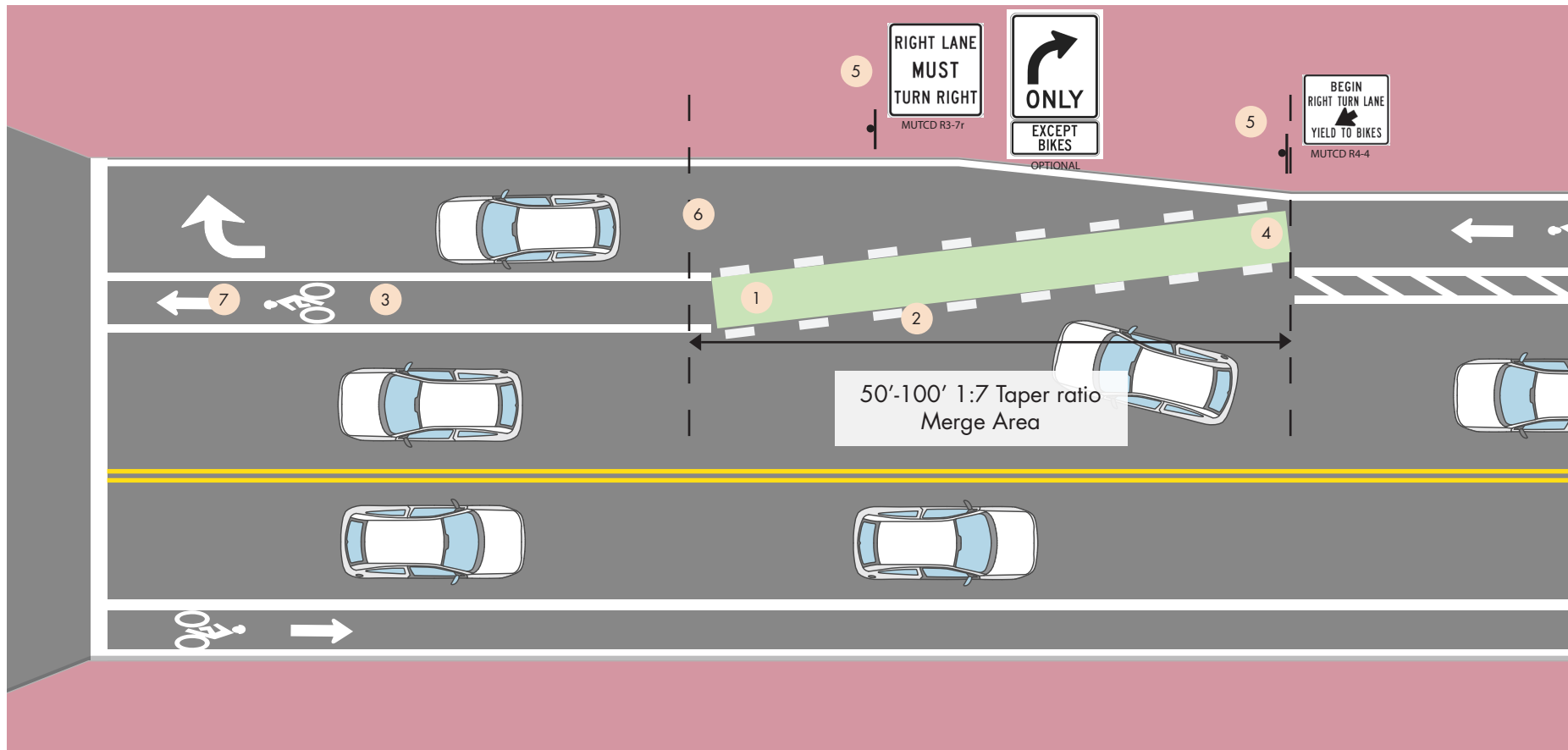


Fig.2.37 Through bicycle lane intersection approach.

- 1 The desirable width of a through lane and dashed bike transition is 6' with a minimum of 4'. Dashed white lines should be 6" wide and 2' long with a 2' to 6' gap between dashes. If lanes are not painted in full, transitions should be painted to emphasize path and conflict zones.
- 2 The through lane shall be placed to the left of the Right Turn Only lane.
- 3 Bicycle lane word and/ or symbol and arrow markings shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists. Markings shall be placed outside motor vehicle tread path at intersections, driveways and merging areas in order to minimize wear and tear from the motor vehicle path.
- 4 Dashed lines signifying the merge area shall begin a minimum of 50' before the intersection. Dotted lines should begin 100' before the intersection if along a high speed/ volume roadway.
- 5 Accompanying signage should include "Right Lane Must Turn Right" MUTCD R3-7r and "Begin Turn Yield To Bikes" MUTCD R4-4.
- 6 Through bike lanes should be provided at any intersection approach where a Right Turn Only Add Lane is created. It is desirable for bicyclists to travel straight to the merging area to reinforce right of way.
- 7 Bicycle signal detection should be provided within through lane.

BICYCLIST: THROUGH BIKE LANE (SHARROWS)

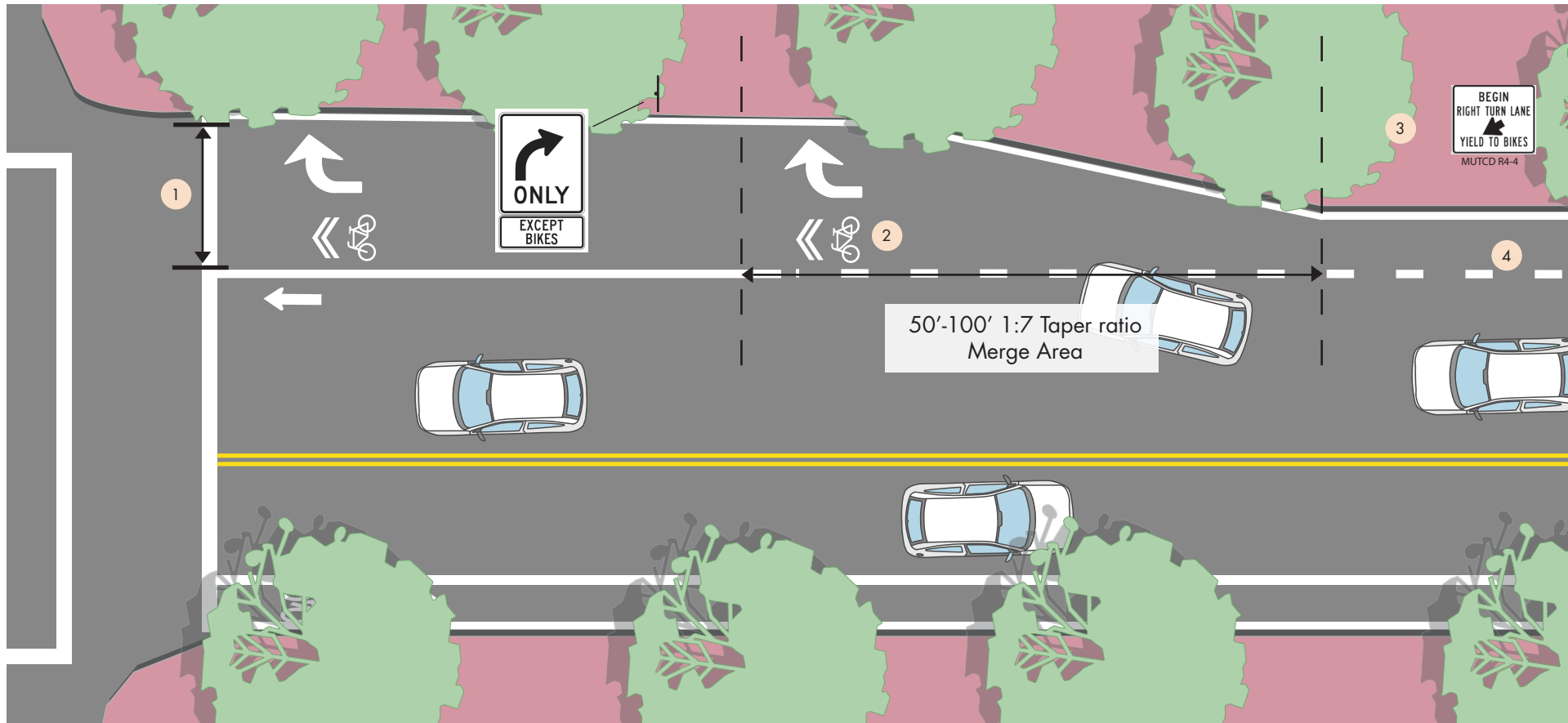
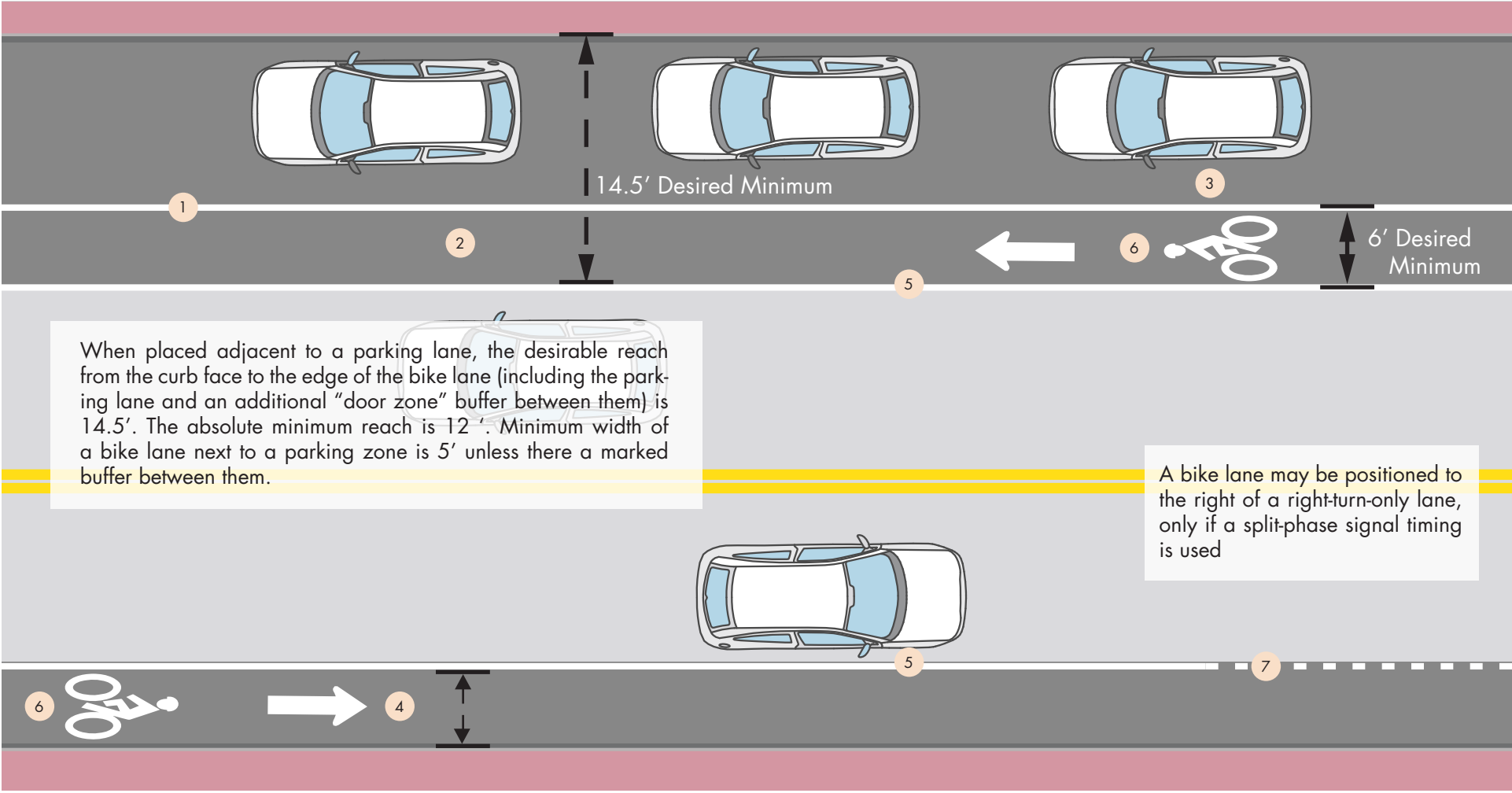


Fig.2.38 Through bicycle lane with sharrows at intersection approach.

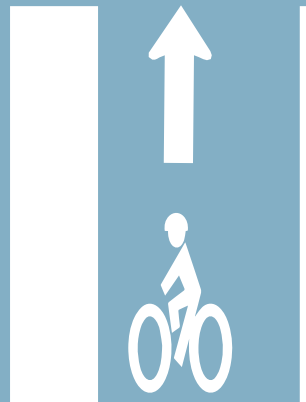
- 1 Width of combined turn lane shall be 9' minimum and 13' maximum. A full bicycle through lane can be accommodated if the vehicle right turn only lane can be made 14' or wider.
- 2 Bicycle symbol indicating a shared lane marking shall be used to designate that portion of the street for preferential use by bicyclists and encourage safety.
- 3 Accompanying signage should include "Right Lane Must Turn Right" MUTCD R3-7r, and "Begin Turn Yield To Bikes" MUTCD R4-4.
- 4 Dashed lines signifying the merge area shall begin a minimum of 50' before the intersection. Dashed lines should begin 100' before the intersection if along a high speed/volume roadway.



- 5 A solid white line shall be used to separate motor travel lanes from the bicycle lane. A 6-8" line is typically used.
- 6 Bicycle lane word and/or symbol and arrow markings shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists. Markings shall be placed outside motor vehicle tread path at intersections, driveways and merging areas in order to minimize wear and tear from the motor vehicle path
- 7 Dashed striping shall be used through high traffic merging areas (intersections, driveways, etc)

Fig.2.40 Conventional bicycle lane.

- 1 When placed adjacent to parking, a solid white line (4"- 6") shall be used between parked cars and the bike lane to minimize encroachment.
- 2 6' is the desired minimum width for a bike lane adjacent to parked cars in order to minimize potential conflicts with pedestrians or motorists.
- 3 Ideally, parking spaces include a "door zone" when designing a non-protected bike lane configuration to ensure comfort for people parking and for the people traveling by bike.
- 4 The desirable bike lane width adjacent to a curb face is 6 feet. The desirable rideable surface adjacent to a street edge or longitudinal joints is 4 feet with a minimum width of 3 feet.



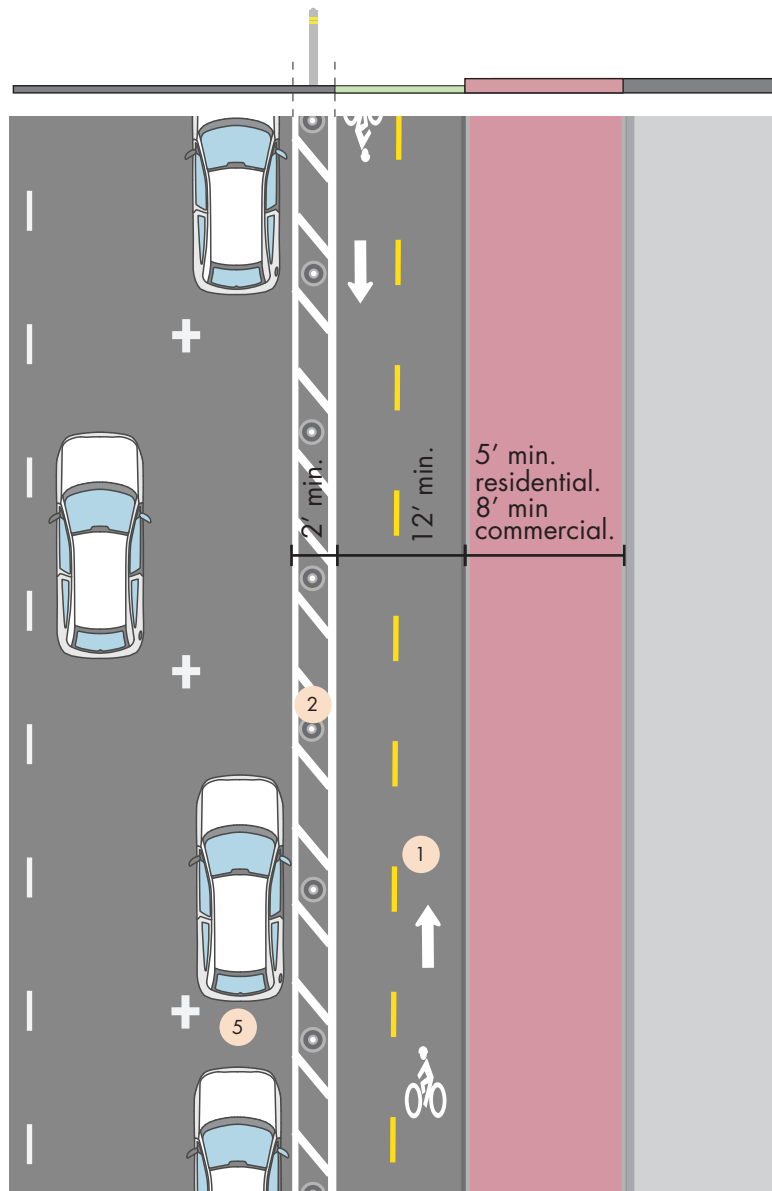
PROTECTED & SEGREGATED BIKE FACILITIES

These types of facilities are implemented on streets with medium to high vehicle traffic (<20,000 ADT), and speeds of 35 mph and above. Segregated bike facilities can range from shared-use paths along parks and golf courses to parking protected bicycle lanes.

Segregated or protected bicycle facilities have the highest potential to get more people on bikes whether for fun or for work. By installing physical separation between the bicyclists and other users, the perceived level of safety as well as the actual level of safety increase, making bicycling a viable alternative to a wide range of people.

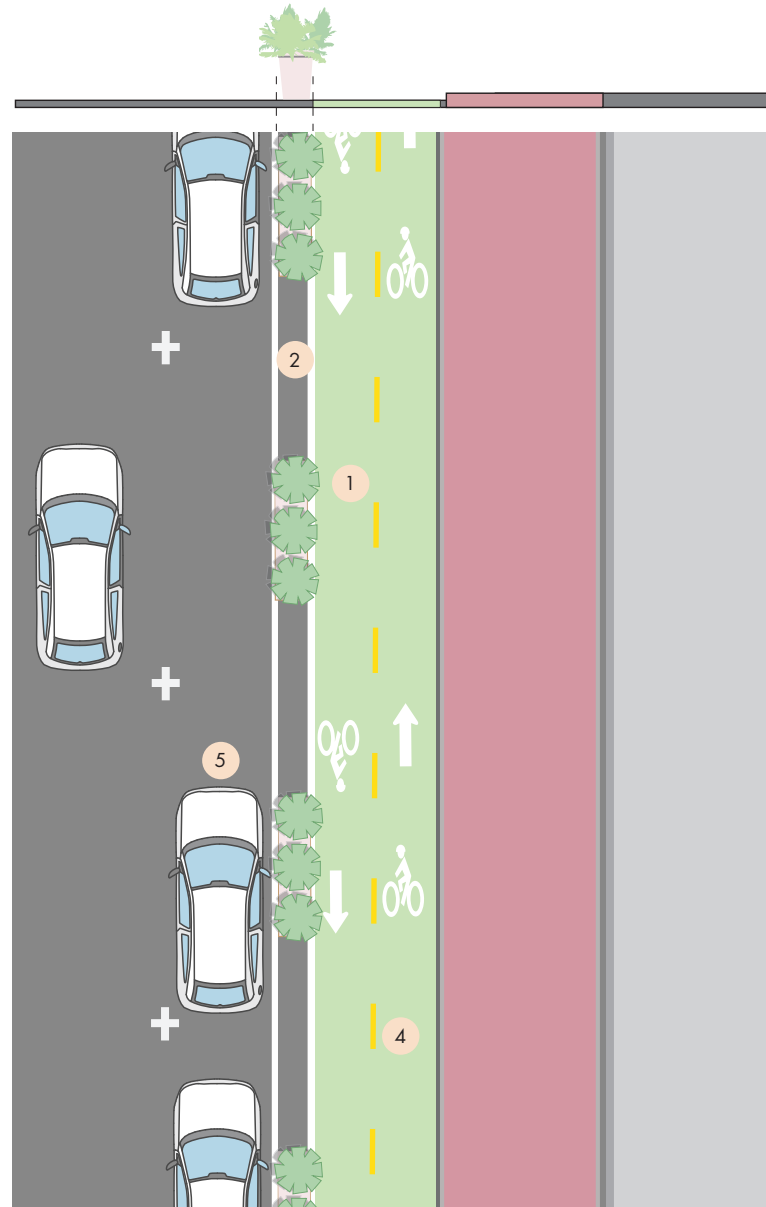
BICYCLIST: ON STREET PROTECTED BIKE LANE

Fig.2.41 Protected bicycle lane with bollards.



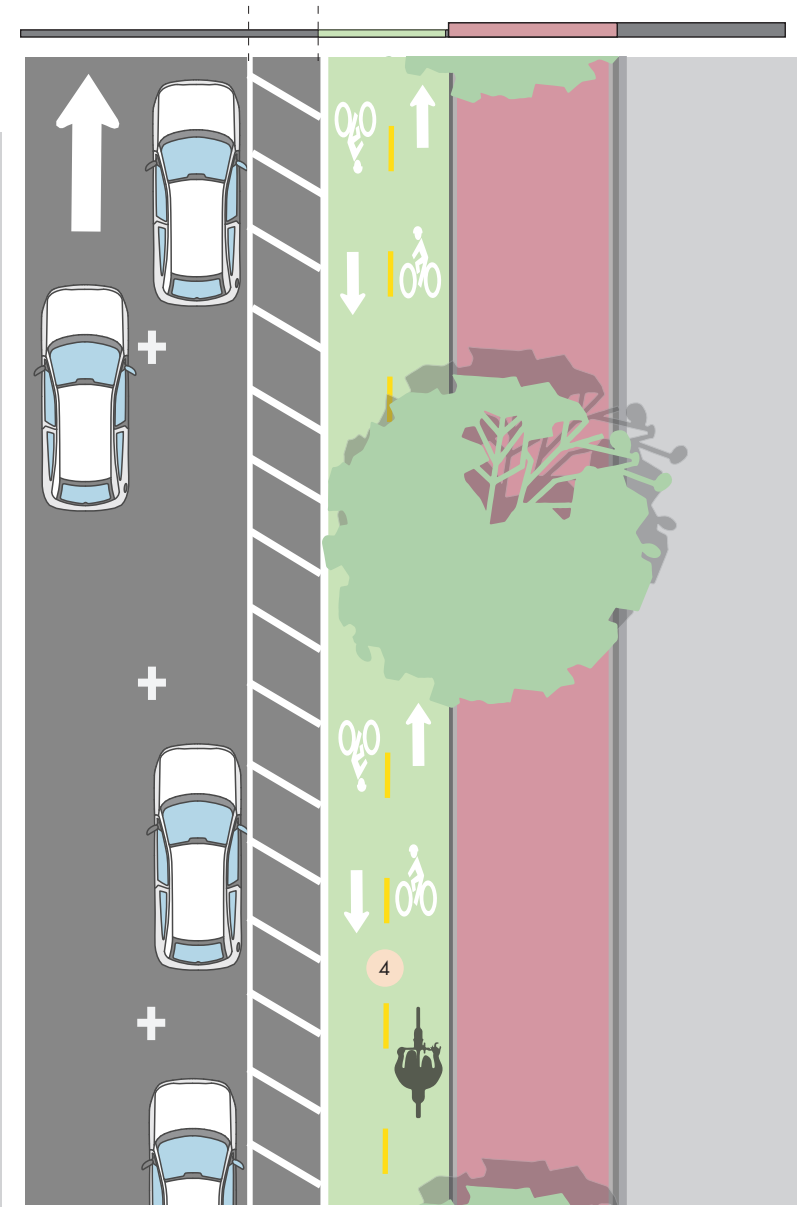
BASIC BOLLARDS

Fig.2.42 Protected bicycle lane with planters.



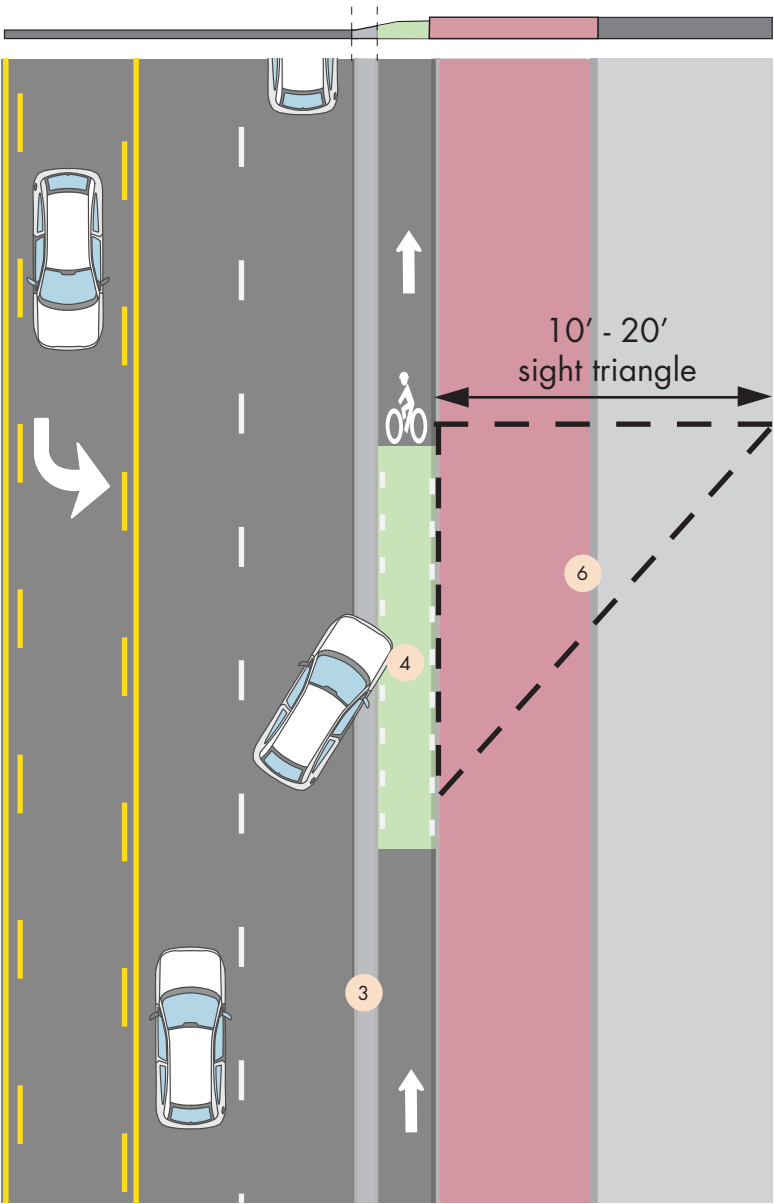
PLANTERS

Fig.2.43 Protected bicycle lane with parked vehicles and buffer.



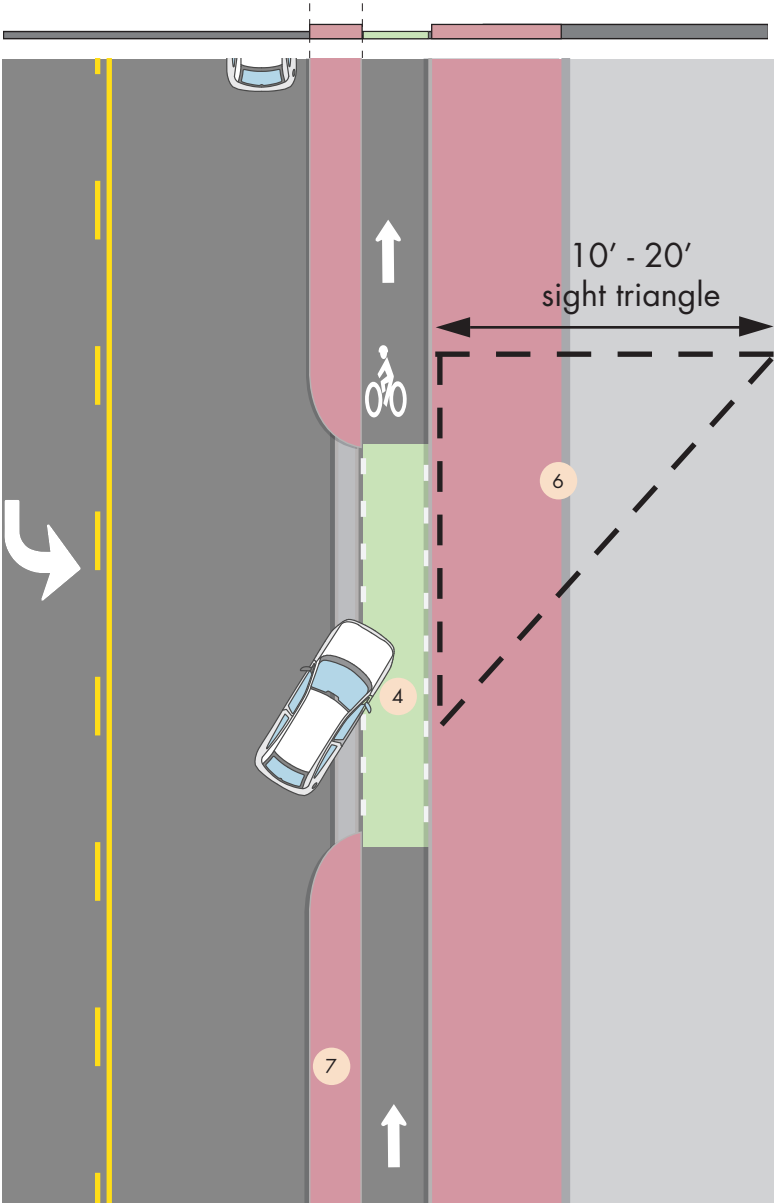
PARKED CARS

Fig.2.44 Protected bicycle lane with mountable curb.



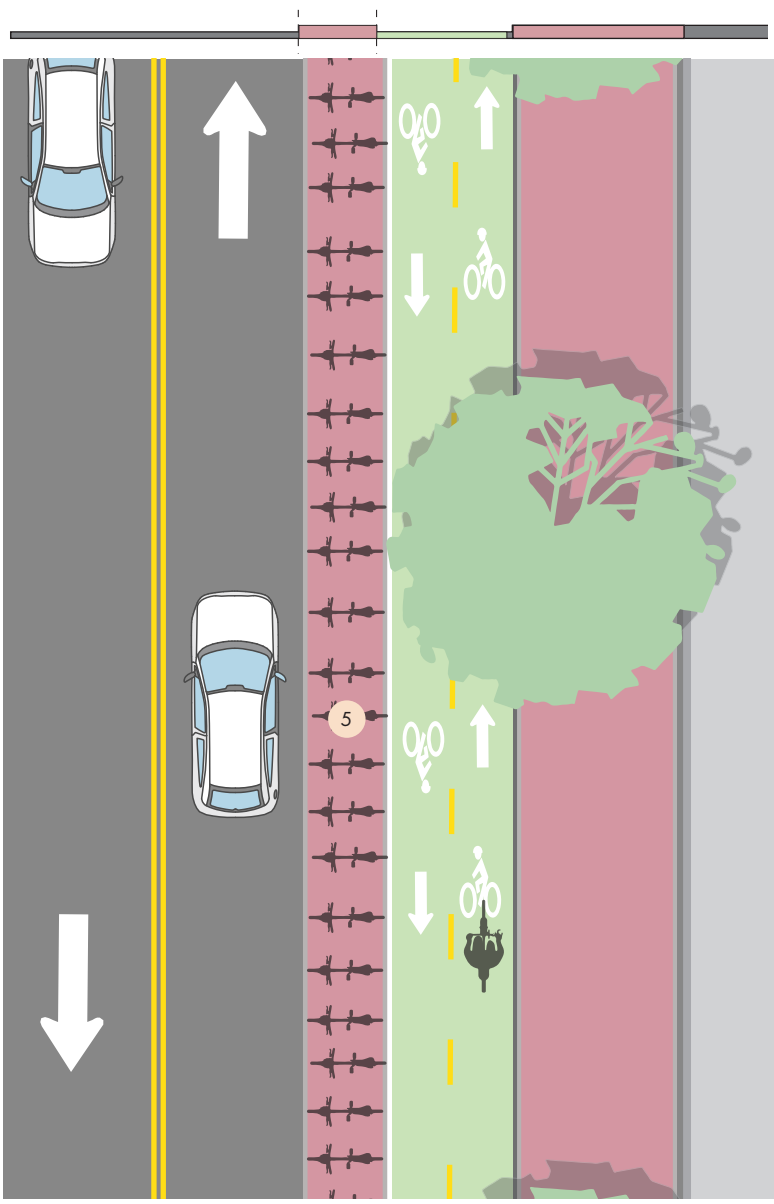
MOUNTABLE CURB

Fig.2.45 Protected bicycle lane with modular curb.



MODULAR CURB

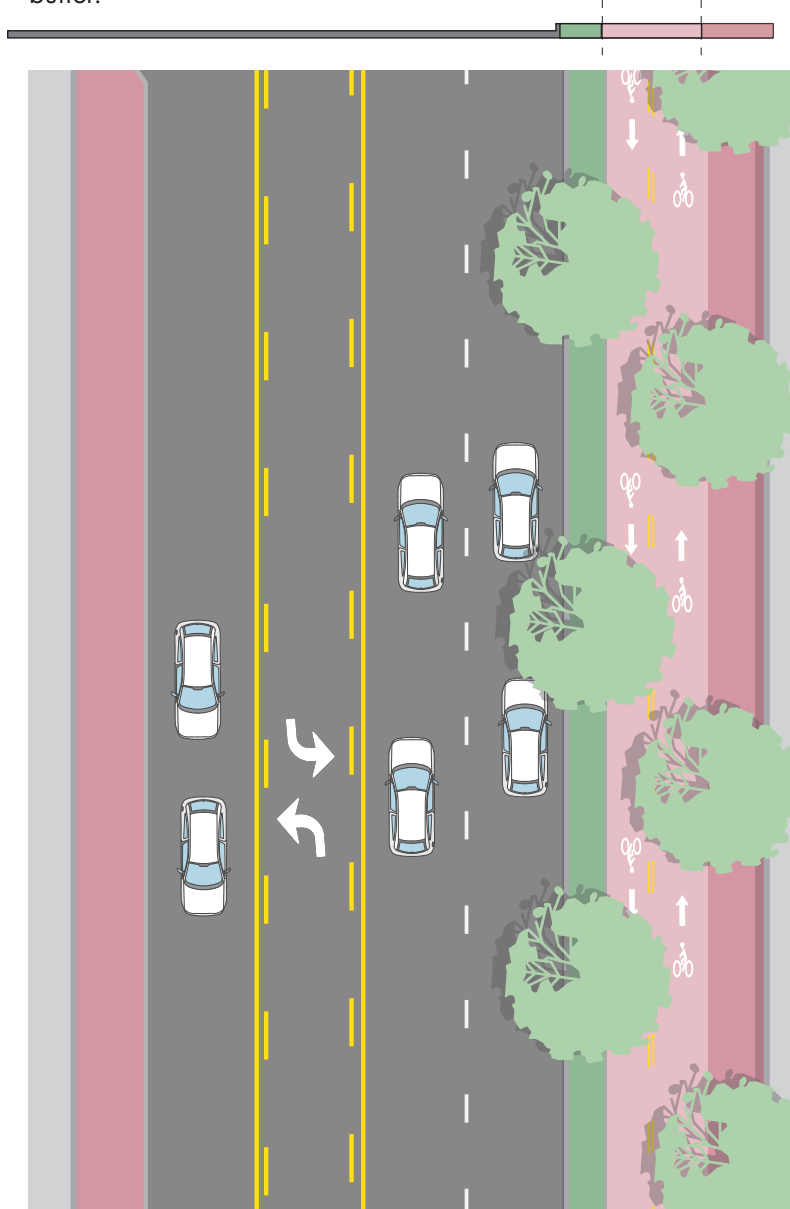
Fig.2.46 Protected bicycle lane with buffer and bicycle parking.



BIKE PARKING

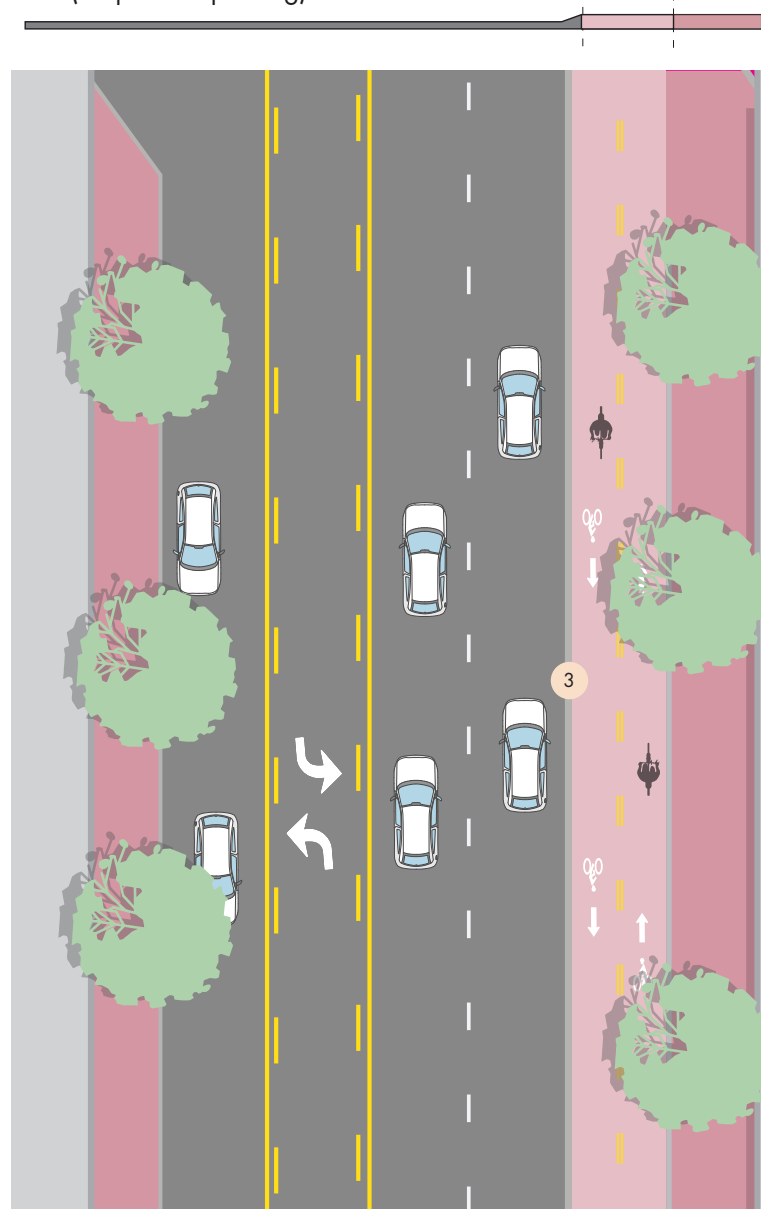
BICYCLIST: SIDE WALK LEVEL PROTECTED BIKE LANE

Fig.2.47 Sidewalk-level Protected bicycle lane with landscape buffer.



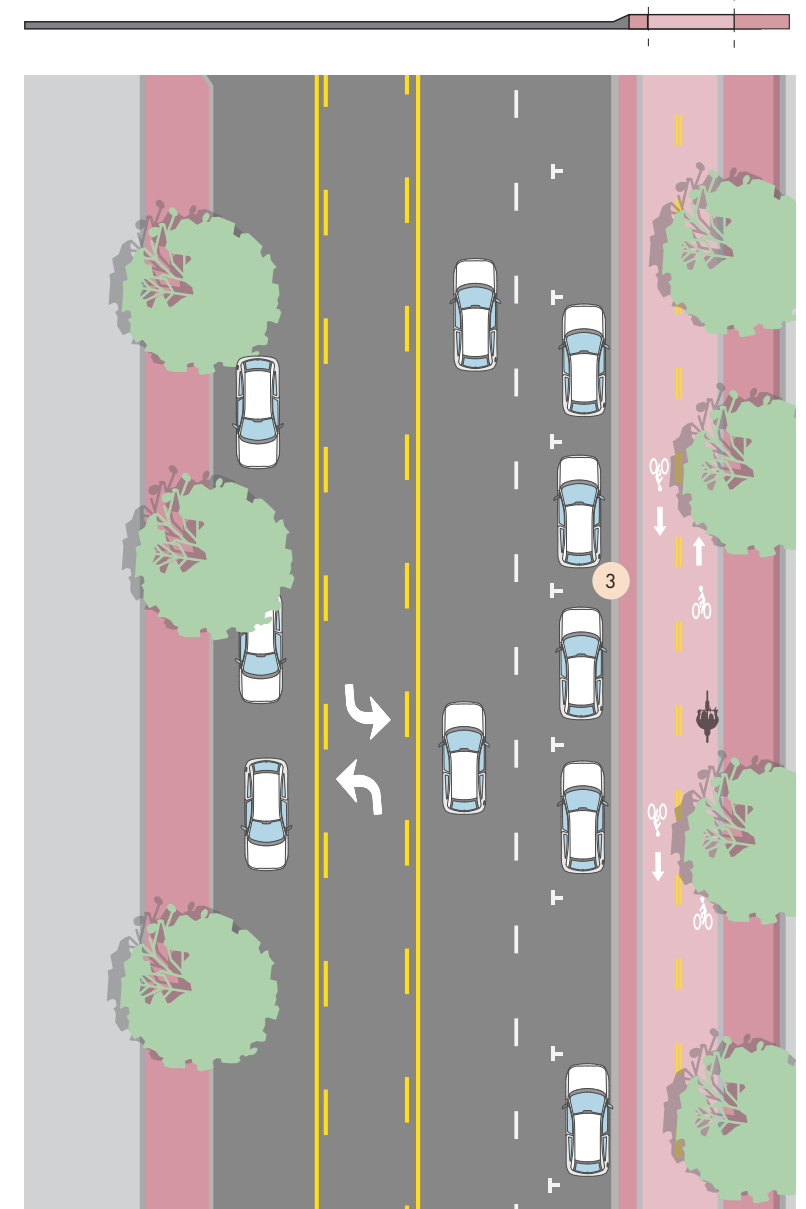
LANDSCAPE BUFFER

Fig.2.48 Sidewalk-level Protected bicycle lane with mountable curb (no parallel parking).



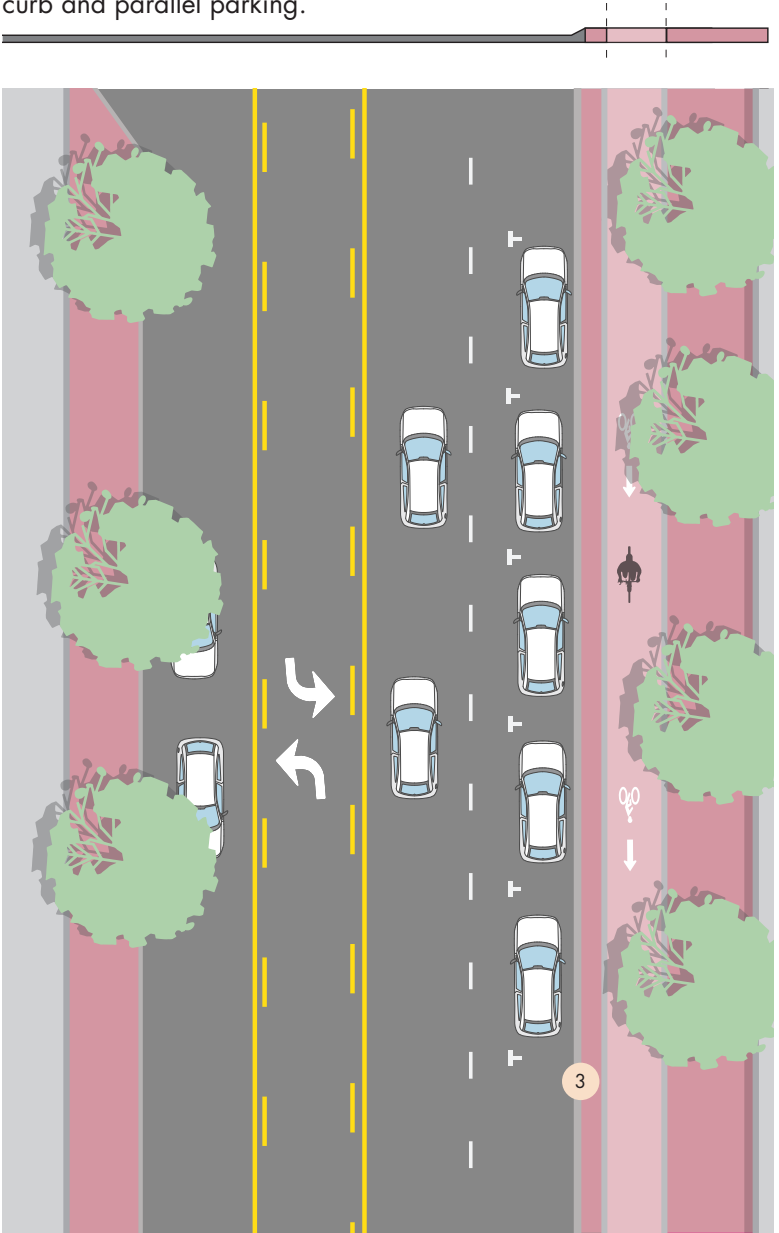
MOUNTABLE CURB

Fig.2.49 Sidewalk-level Protected bicycle lane with parked vehicles, mountable curb and buffer.



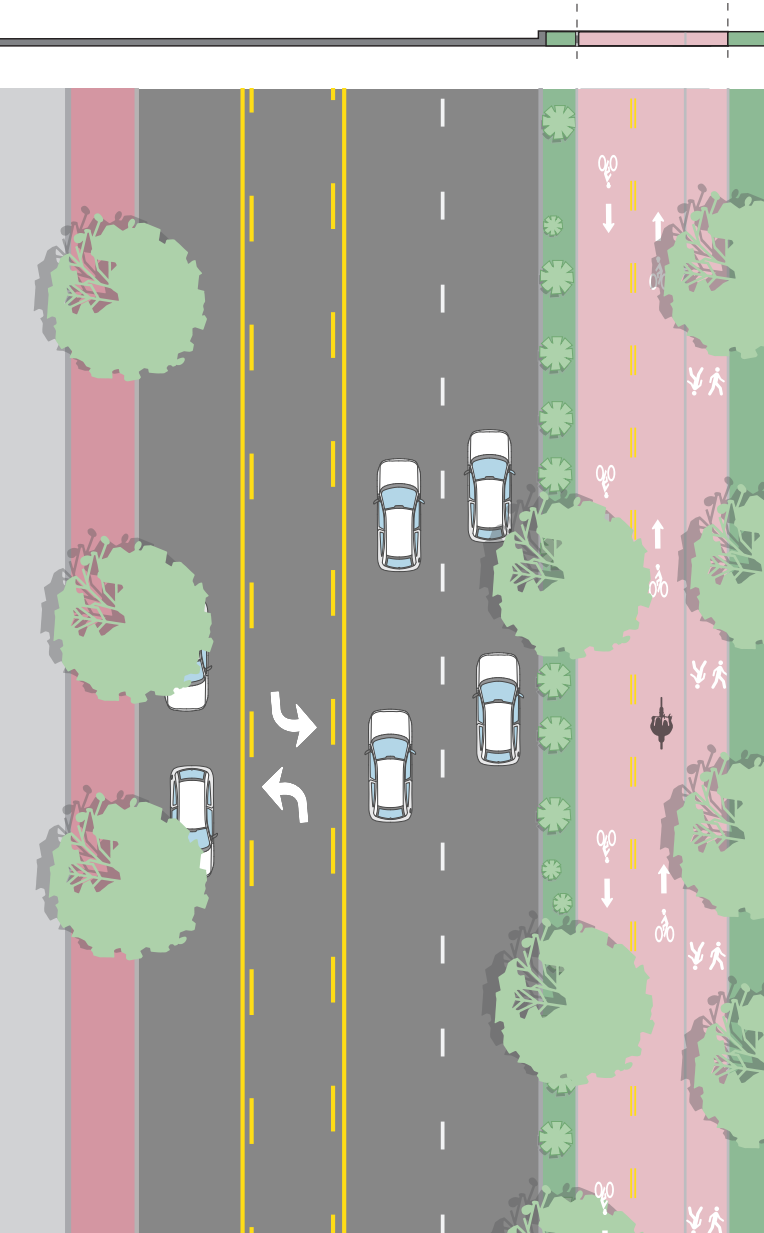
PARKED CARS & MOUNTABLE CURB

Fig.2.50 Sidewalk-level Protected bicycle lane with mountable curb and parallel parking.



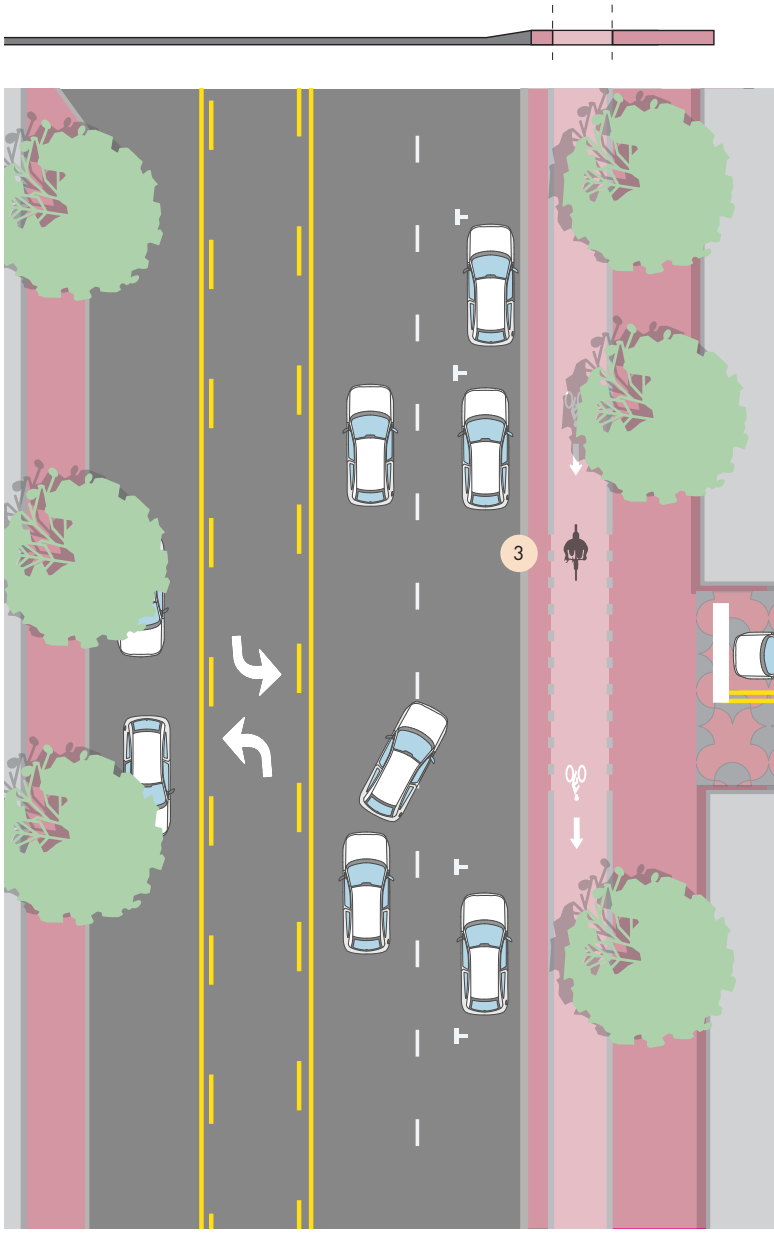
ONE WAY & MOUNTABLE CURB

Fig.2.51 Sidewalk-level Shared use path.



SHARED PATH

Fig.2.52 Sidewalk-level Protected bicycle lane driveway condition.



DRIVE WAY CONDITION

BICYCLIST: PROTECTED BIKE LANE

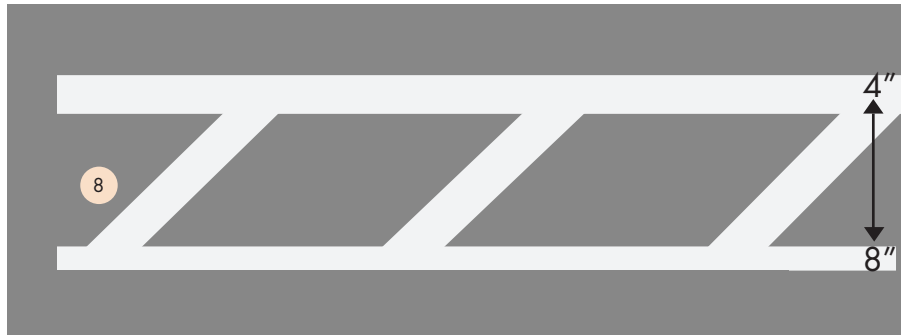


Fig 2.53 Typical dimension of buffer stripes. Width varies. Desired Minimum 3 feet.

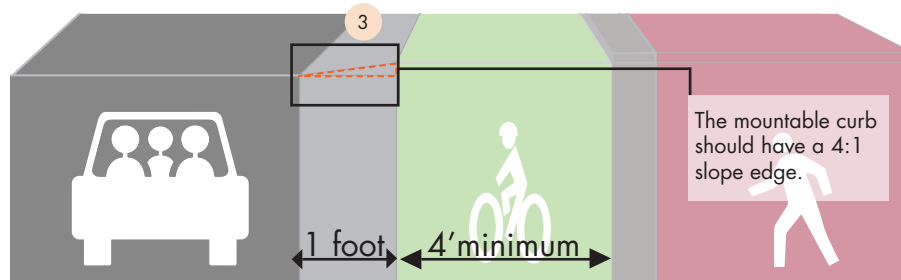


Fig 2.54 Mountable curb detail.

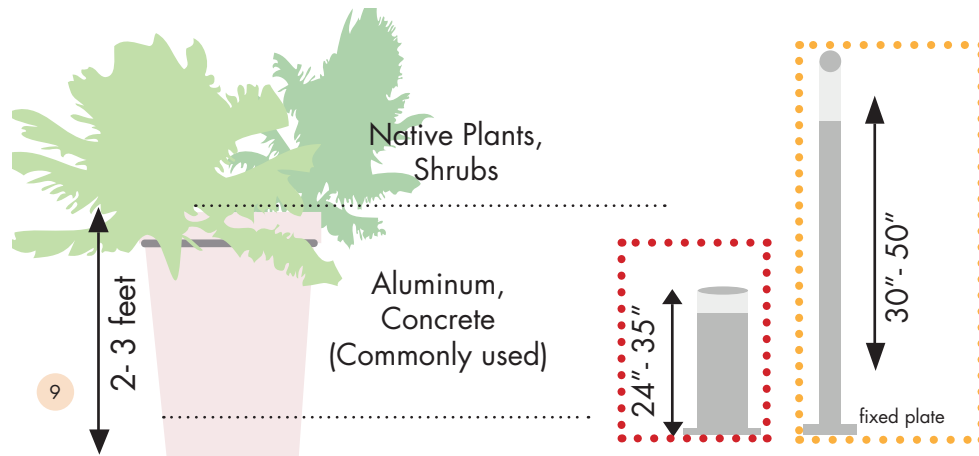


Fig 2.55 Planter detail
(Design, material and size may vary.)

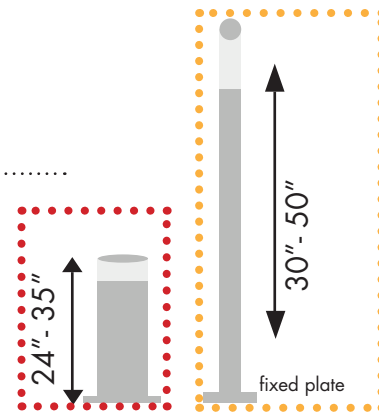
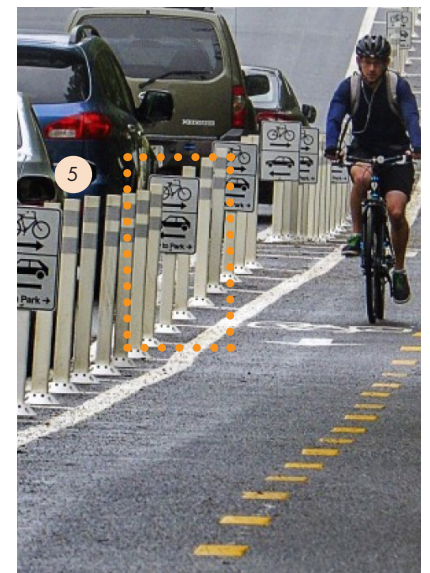
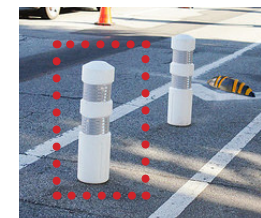


Fig 2.56 Bollard detail.
(Design, material and size may vary.)

- 1 Bicycle lane word and/ or symbol and arrow markings shall be used to define the bike lane and designate that portion of the street for preferential use by bicyclists. Markings shall be placed outside motor vehicle tread path at intersections, driveways and merging areas in order to minimize wear and tear from the motor vehicle path.
- 2 When protected by a parking lane, 3' is desired for unloading and to prevent dooring collisions.
- 3 When configured next to travel lanes, a mountable curb should be provided to allow bicyclists to pass other bicyclists.
- 4 Color may be used along the facility to draw attention to the unique function of the lane, or in areas of cross traffic such as driveways and intersections.
- 5 On-street parking of cars, motorcycles and bicycles should be used as a traffic calming method as added protection when possible.
- 6 For motor vehicles attempting to cross the protected bike lane facility from the side street or driveway, street and sidewalk furnishings and/or other features should accommodate a sight triangle of 20' to the protected bike lane from minor street crossings, and 10' from driveway crossing.



Fig 2.57 Modular curb detail.



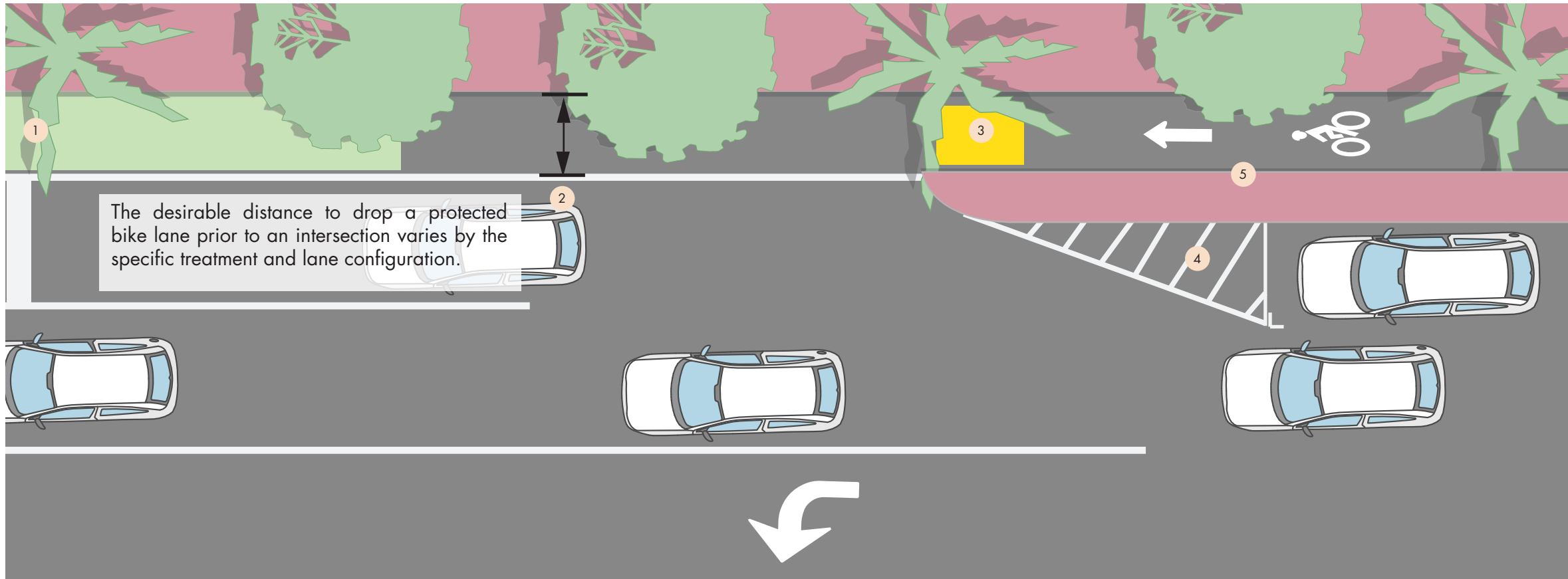


Fig 2.58 Protected bike lane intersection approach.

- 1 When the protected bike lane is dropped on an intersection approach, the intersection shall provide some type of bicycle facility to receive the protected bike lane users. This may be a conventional bike lane, bike box or combined bike lane/turn lane.
- 2 For a transition to a bike lane, minimum desirable width is 6' with an absolute minimum of 4'. At constrained intersections with right turn lanes, consider transitioning to a mixing zone. (See pages 54-56)
- 3 Tactile warnings or pavement markings should be used on slopes from raised protected bike lanes to slow bicyclists speed prior to the transition out of the protected bike lane, and to warn users of potential conflicts with motor vehicles.
- 4 Parking should be prohibited 30' - 50' in advance of where the protected bike lane buffer ends to promote visibility between people riding bicycles and traveling by car.
- 5 Bicycle-friendly curbs use short (3") angled curbs, to maximize operating space. Full height vertical 6" curbs are not bicycle friendly. Riders risk hitting their pedals on them, and must shy away, reducing the useful space in the protected bike lane.

Fig 3.38 MUTCD R7-8

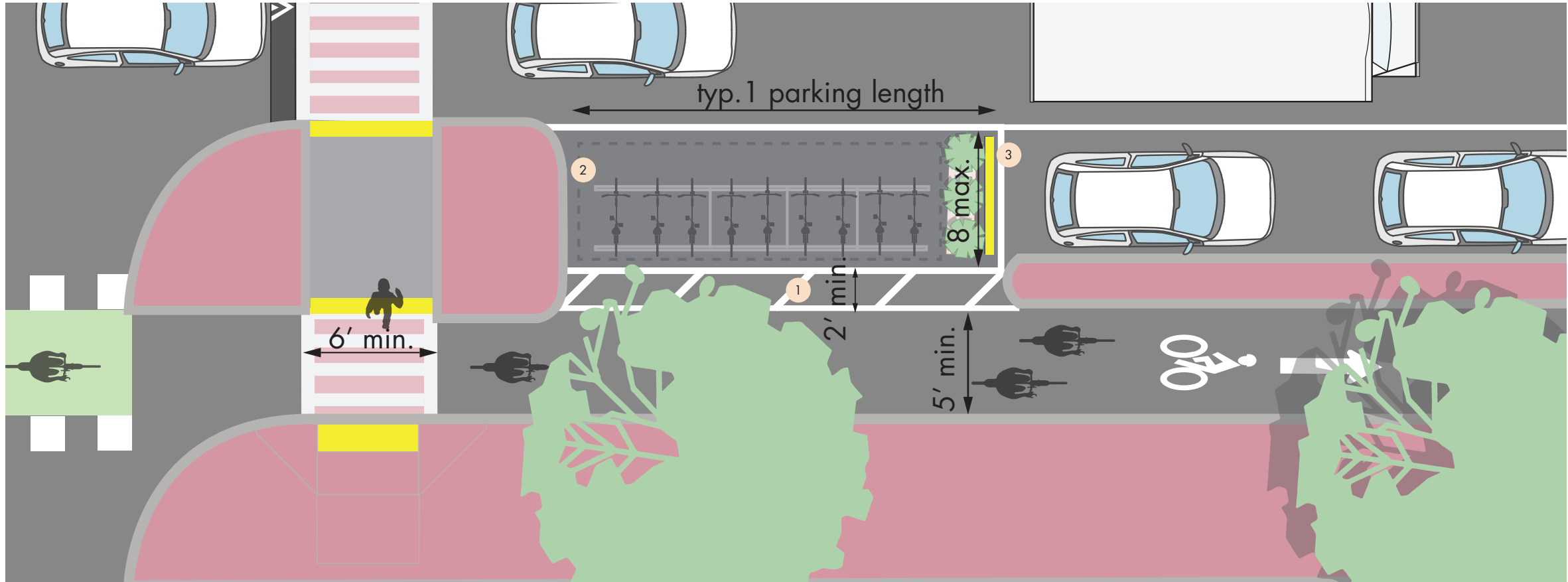


Fig 2.60 Bike Corral protected bike lane intersection approach.

- 1 Access aisle must match the length of parking space. A 2 ft minimum width is recommended
- 2 Consider providing shelter to the bicycle corral without obstructing the corner visibility triangle.
- 3 Stop bars and vertical elements should be used to differentiate motor vehicle parking from bike corral.

BICYCLIST: PROTECTED BIKE LANES: MATRIX

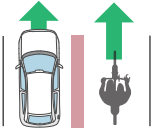
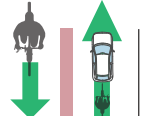
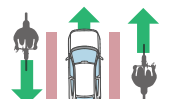
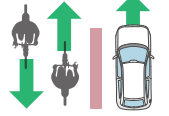
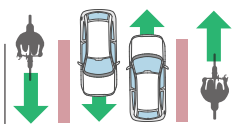
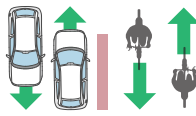
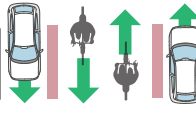
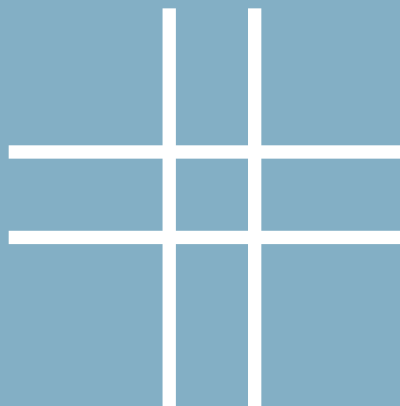
CORRIDOR SCALE DESIGN CONSIDERATIONS	ONE WAY PROTECTED BIKE LANE 	CONTRA-FLOW PROTECTED BIKE LANE 	ONE WAY PROTECTED BIKE LANE + CONTRA-FLOW PROTECTED BIKE LANE 	TWO WAY PROTECTED BIKE LANE 	ONE WAY PROTECTED BIKE LANE PAIR 	TWO-WAY PROTECTED BIKE LANE 	MEDIAN TWO WAY PROTECTED BIKE LANE 
ACCESS TO DESTINATIONS	People on bicycle have limited access to the other side of the street.	People on bicycle have limited access to the other side of the street.	People on bicycle have full access to the other side of the street.	People on bicycle have limited access to the other side of the street.	People on bicycle have full access to the other side of the street.	People on bicycle have limited access to the other side of the street.	People on bicycle have limited access to the other side of the street.
NETWORK CONNECTIVITY	Does not address contraflow demand which may result in wrong way riding	Bicyclists riding in the direction of traffic share a lane with motorists. May result in wrong way riding in the contraflow bike lane	Allows for two-way bicycle travel but contraflow crossings may be inefficient.	Allows for two-way bicycle travel but contraflow crossings may be inefficient.	Accommodates two-way bicycle travel	Accommodates two-way bicycle travel	Accommodates two-way bicycle travel
CONFLICT POINTS	Few. Turning drivers and pedestrians expect 1 way bicycle traffic	Turning drivers and pedestrians may not expect contraflow traffic	Turning drivers and pedestrians may not expect contraflow traffic	Turning drivers and pedestrians may not expect contraflow traffic	Few. Turning drivers and pedestrians expect concurrent bike riders	Turning drivers and pedestrians may not expect contraflow traffic	Turning drivers and pedestrians may not expect contraflow traffic. Median may improve visibility and reduce conflict
INTERSECTIONS	May use existing signal phases, bike signal may be required depending on volumes	Usually requires additional signal equipment. Bike phase may be required depending on volume	Usually requires additional signal equipment. Bike phase may be required depending on volume	Usually requires additional signal equipment. Bike phase may be required depending on volume	May use existing signal phases, bike signal may be required depending on volumes	Usually requires additional signal equipment. Bike phase may be required depending on volume	Usually requires additional signal equipment. Bike phase may be required depending on volume

Fig 2.61 Protected bike lane configurations matrix.



INTERSECTIONS/ JUNCTIONS

Intersections are the highest point of potential conflict between users. A well designed intersection is able to effectively communicate what each user must do in order to have a successful crossing. Good intersection design makes convergence points into a stress-free experience where certain elements are highlighted in order to increase visibility of users.

A successful intersection has the following characteristics:

- Clearly defined waiting zones for people in motorized vehicles, bicycles and on foot.
- Has accessible pedestrian signals (voice, tactile, and visual aid).
- Is as compact as possible, meaning that all users have the shortest possible distance to cross.
- Is designed with the hierarchy of users in mind for crossing priority. Pedestrians are the most vulnerable and potentially slow, followed by bicyclists and last, motor vehicles.
- Avoid extreme angles and complex movements.
- Pedestrians and bicycles must be routed through the intersection with minimum deviation from their direct path.
- Provide shade at and near junctions, particularly in areas where pedestrians are waiting to cross the street.

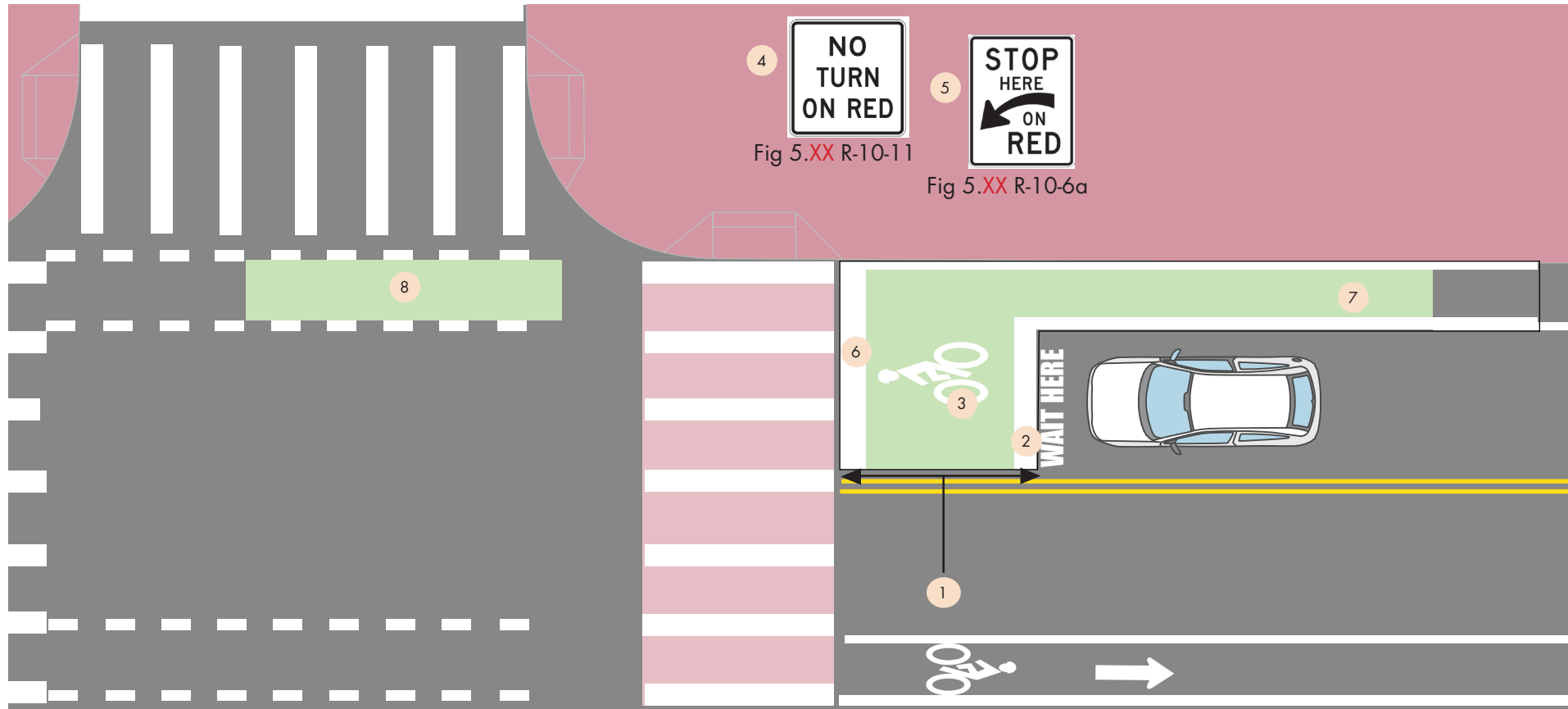


Fig 2.62 Bicycle box at intersection.

- 1 A box formed by transverse lines shall be used to hold bicyclist. Typically 10' - 16' deep. Deeper boxes show less encroachment by motor vehicles.
- 2 Stop lines shall be used to indicate the point behind which motor vehicles are required to stop in compliance with a traffic control signal.

- 3 Pavement markings shall be used and centered between the crosswalk line and the stop line to designate the space as a bike box. A "Wait Here" Legend making may be used to supplement the MUTCD R-10-6a marking at bike box.
- 4 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 bike box.

- 5 A "Stop Here on Red" sign should be post-mounted at the stop line to reinforce observance of the stop line. Additional signs may be used to clarify signal control. Among the legends that may be used is : " Bikes Stop Here on Red"

*Bike box treatments are most helpful when bicyclists arrive at a red signal, giving cyclists a head start at intersections and high visibility.

- 6 Colored pavement should be used within the bike box to encourage compliance by people traveling by motor vehicle.
- 7 An ingress lane should be used to define the bicycle space. Color pavement may be used. When color is used, length shall be 25' - 50' to guarantee bicyclists access to the box.
- 8 An egress lane should be used to clearly define the potential area of conflict between motorists and bicyclists at the intersection. An egress lane should not be used when there is no complimentary bike facility or lane on the far side of the intersection.

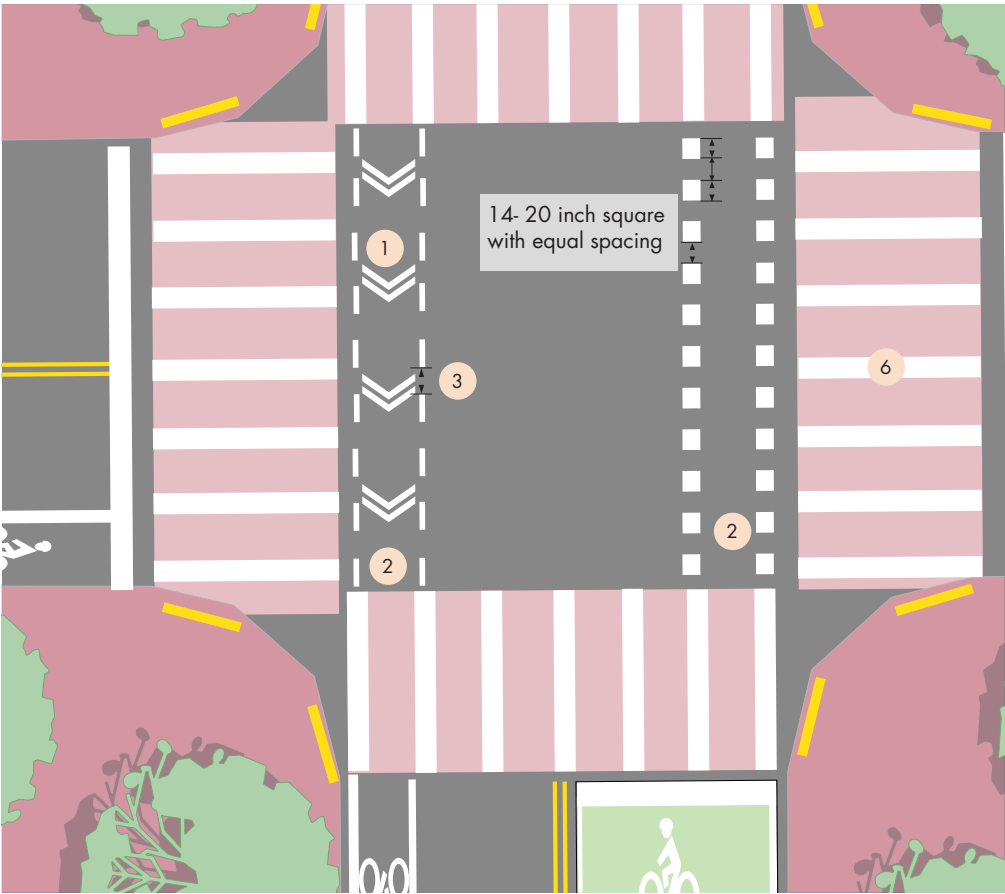


Fig 2.63 Pavement markings variations at intersection (a).

- 1 Chevrons might be used in conflict areas or across entire intersections.
- 2 Crossing lane width shall match width and position of the leading bike lane in all cases.
- 3 Dashed lines shall be 2' lines with 2' to 6' feet spacing. Markings shall be white, skid-resistant and retro reflective.
- 4 Shared Lane markings might be used in conflict areas or across entire intersections.
- 5 Colored pavement might be used in conflict areas or across entire intersections for increased visibility
- 6 Colored pavement might be used for increased visibility of pedestrian crosswalk

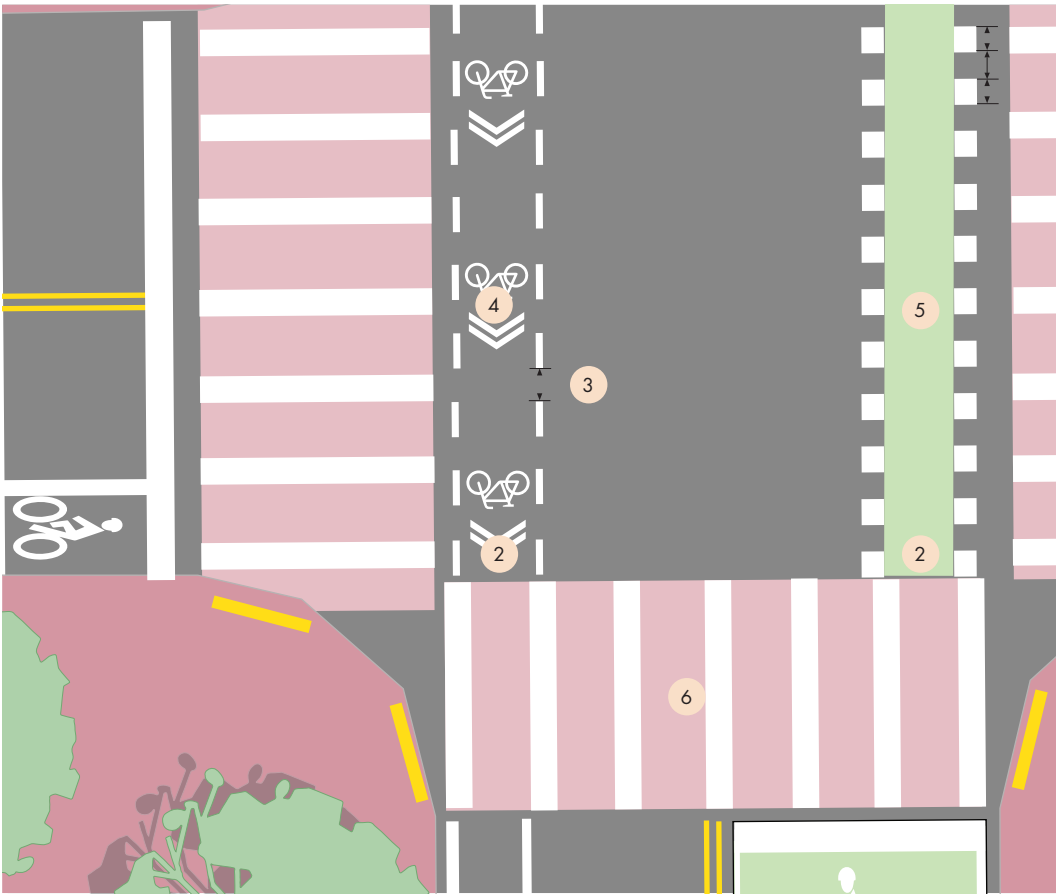
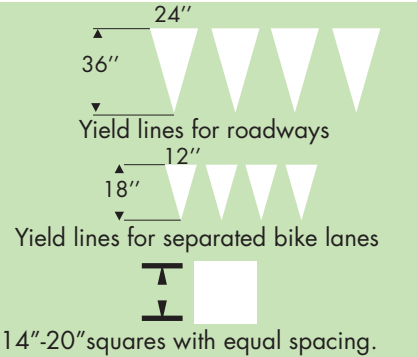


Fig 2.64 Pavement markings variations at intersection (b).

“Shark Teeth” yield markings may be used when crossing driveways and alley ways to mark the edge of the bike lane as well as in potential pedestrian/ bicycle conflict areas. People traveling by bicycle shall yield to pedestrians.

“Elephant Feet” markings may be used as an alternative to dotted line extensions to offer increased visibility



BICYCLIST: TWO STAGE LEFT/ QUEUE BOX*

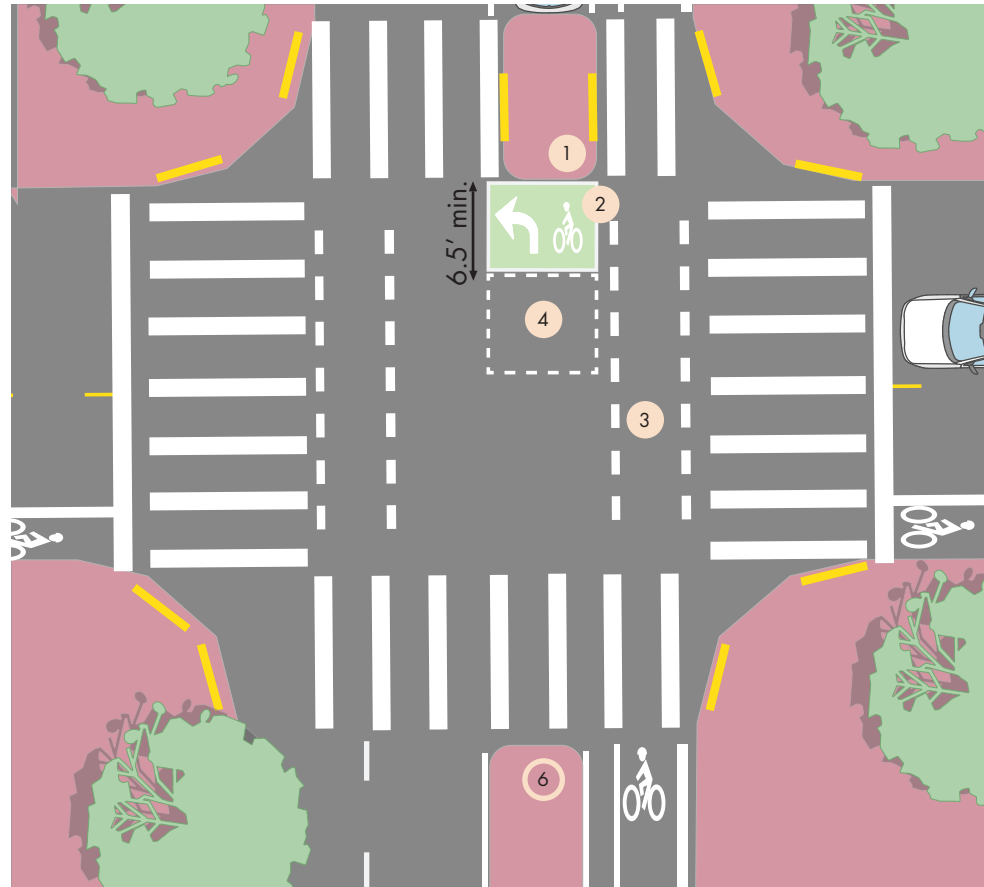


Fig 2.65 Two- stage left turn bike box at median.

- 1 An area shall be designated to hold queuing bicyclists and formalize 2-stage turn maneuvers.
- 2 Pavement markings shall include a bicycle stencil and a turn arrow to clearly indicate proper bicycle direction and positioning. In addition, the box shall be painted for improved visibility.
- 3 Markings across intersections should be used to define through bicyclist positioning.

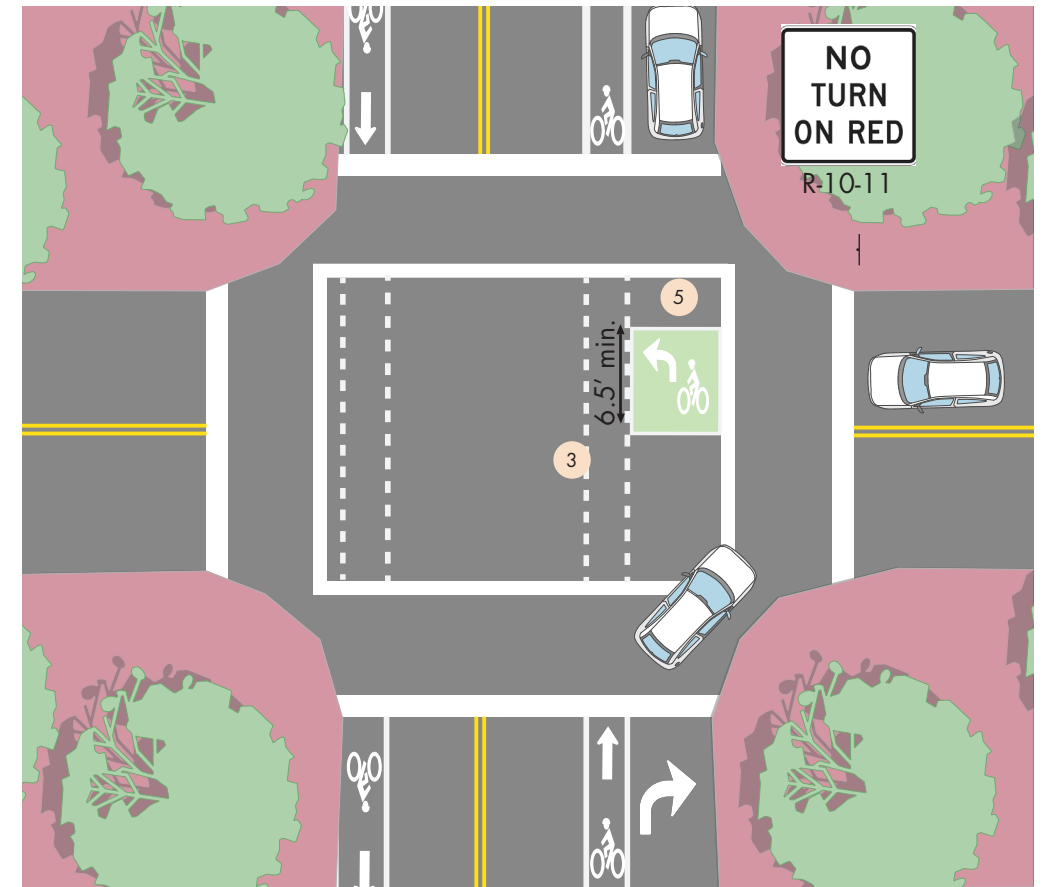


Fig 2.66 Two - stage left turn bike box at parallel parking configuration.

- 4 The queue box should be positioned laterally in the cross-street, to promote visibility of bicyclists.
- 5 The queue box may be positioned laterally in the cross street parking lane rather than in front of the travel lane. This may require bicyclists to weave into the travel lane to resume through movement if no dedicated bicycle facility is present since the parking lane ahead may be occupied.
- 6 When protected bike lane is configured as parking protected, consider dedicating bicycle parking space towards intersection.

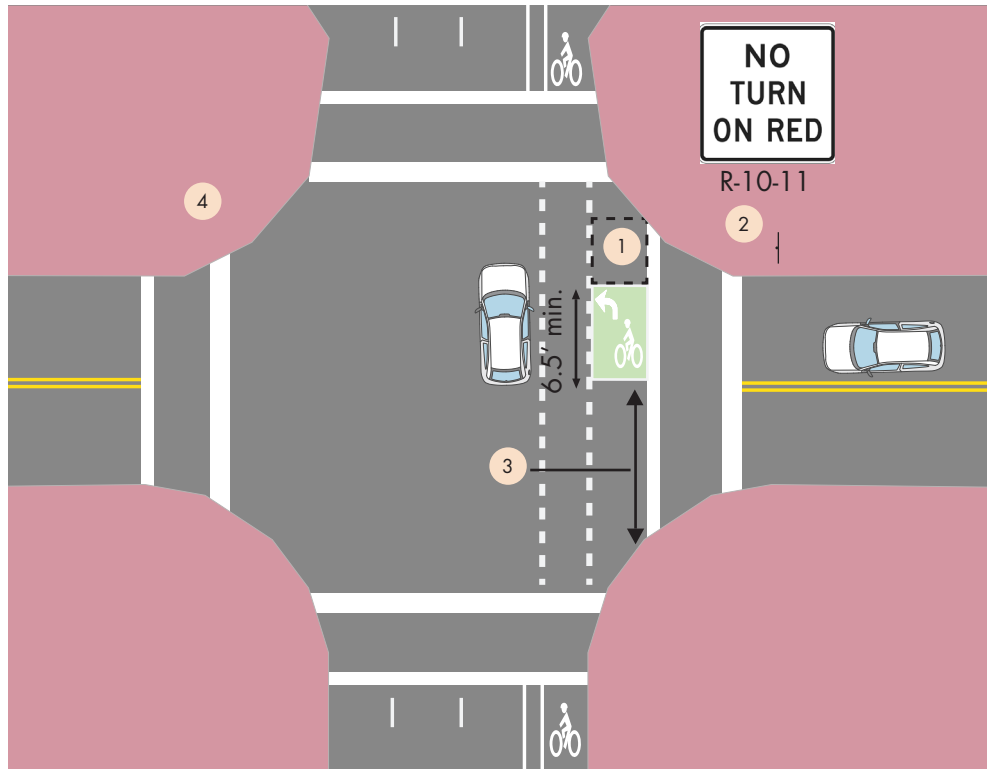


Fig 2.67 Two- stage left turn bike box and through bike lane configuration.

- 1 The queue box could be positioned laterally in the cross street parking lane rather than in front of the travel lane.
- 2 Wider corner radius and setback pedestrian crossing provide opportunity for bicyclist queuing area.
- 3 The queue box shall be placed in a protected area. Typically this is within and on-street parking lane or between the bicycle lane and the pedestrian crossing.
- 4 A "No Turn on Red" sign shall be placed overhead in cities where right turn on red is allowed.

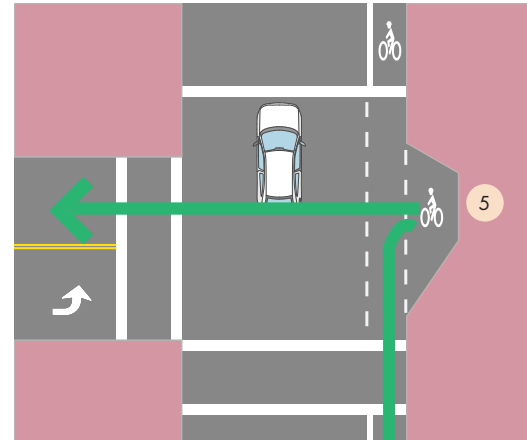


Fig 2.68 Two- stage left turn at mid-block.

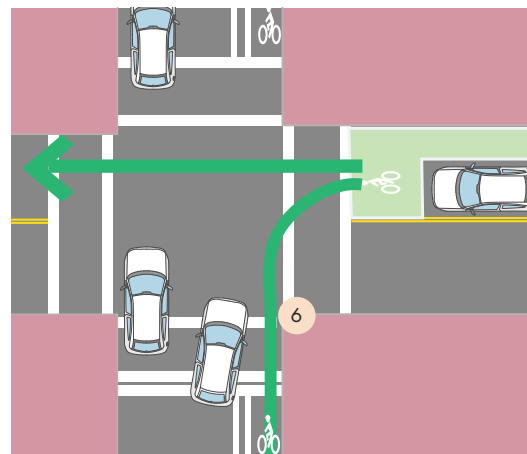


Fig 2.69 Two- stage left turn at bike box.

*Two-stage left queue boxes are helpful on streets with longer green periods and streets where cyclists might be less comfortable turning left from a turn lane. It gives bicyclists a safe area to make a turn without conflicting with through traffic, unlike the bike box alone.

- 5 At mid-block turning locations, the queue box may be integrated into the sidewalk space. This configuration is also known as the "jughandle". Consider the use of some form of signalization at these locations.
- 6 Bicycle box configuration. Bicycles yield to pedestrians. Not recommended in areas with high pedestrian volumes.

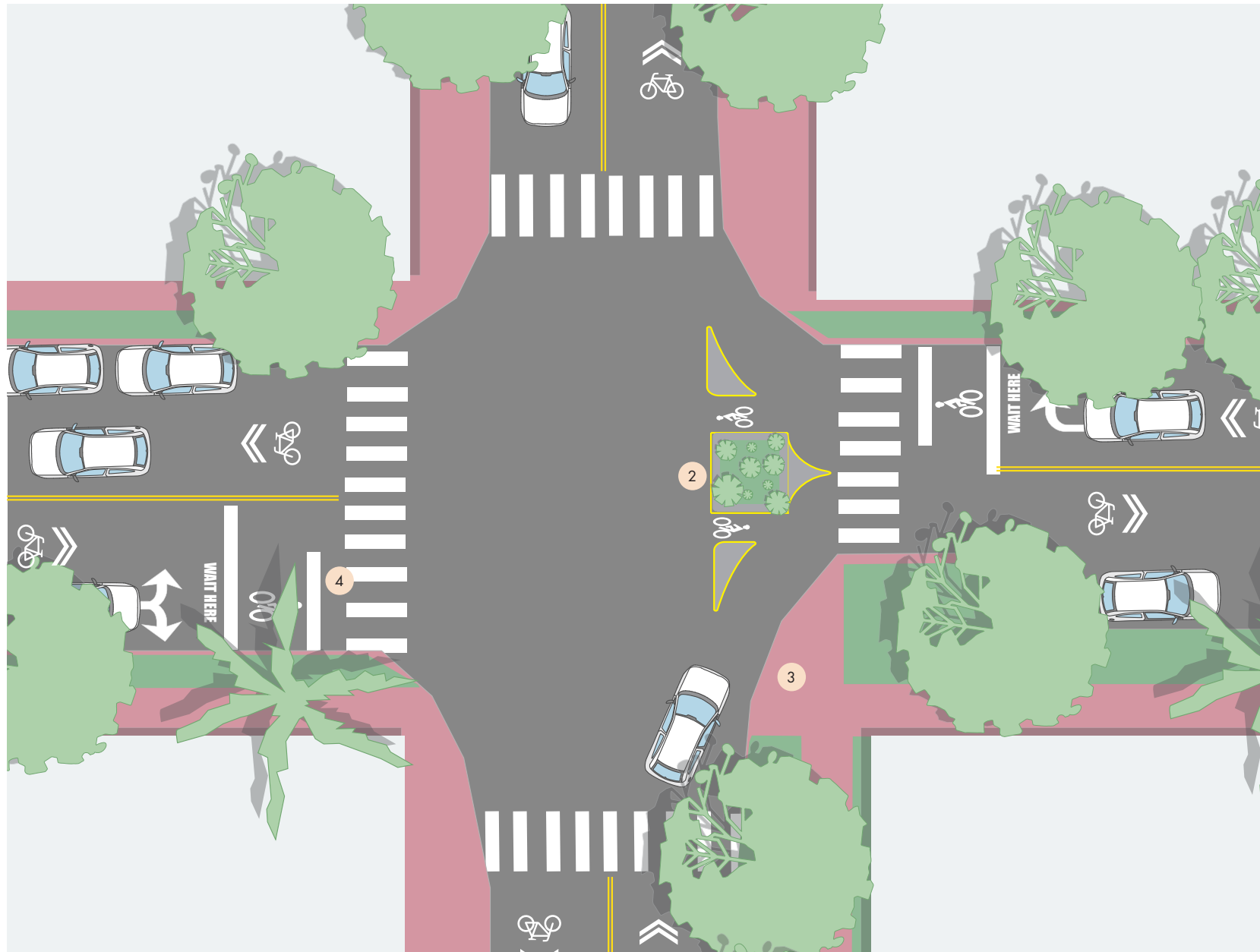


credit: SuOm Francis



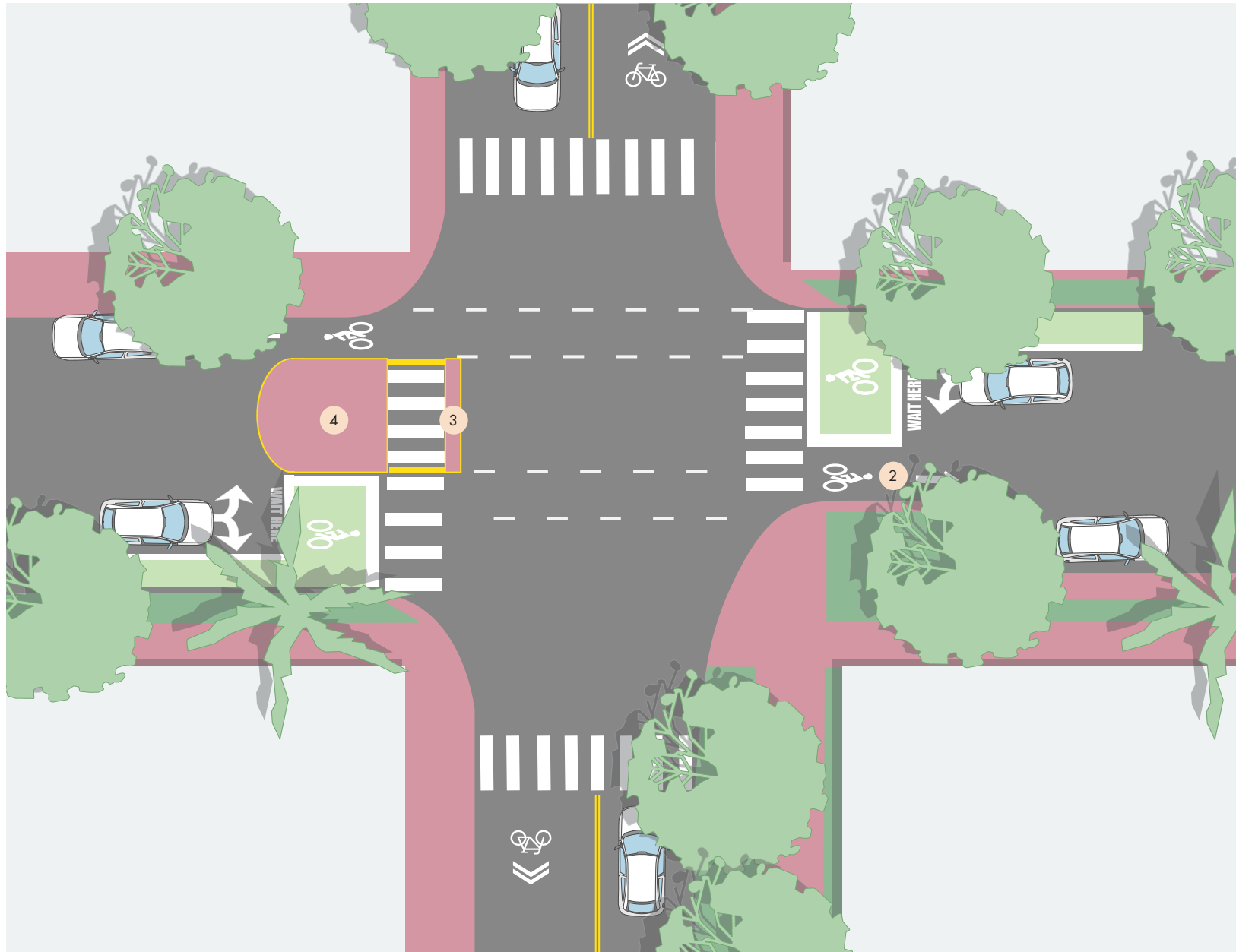
credit: suOm Francis

BICYCLIST: RIGHT-TURN-ONLY WITH TRAFFIC DIVERTER



- 1 Appropriate education for use of proposed treatments should be provided to neighbors and others who are likely to use the corridor.
- 2 Closures and diverters should be liberally marked to alert drivers to expect bicyclists emerging from or not turning at the feature.
- 3 Supplemental signage and markings should be provided at crossings of major roads to improve crossing visibility.
- 4 A forward stop bar should be provided for bicyclists at minor crossings in order to increase visibility and reduce crossing distance. Minimum requirement when other geometric treatments are not immediately implementable.

Fig 2.70 Right turn-only movement with traffic diverter.



- 1 Treatments should be selected based on the numbers of existing gaps and the selected gap profile.
- 2 Volume management should be considered at signalized intersections along the bicycle boulevard to discourage motorists for using route.
- 3 Supplemental signage and markings should be provided at crossings of major roads to improve crossing visibility.
- 4 Geometric elements like median refuge islands, curb extensions, neckdowns, and raised crosswalks may be provided to improve sight distances for bicyclists and drivers

Fig 2.71 Bike box with partial closure configuration.

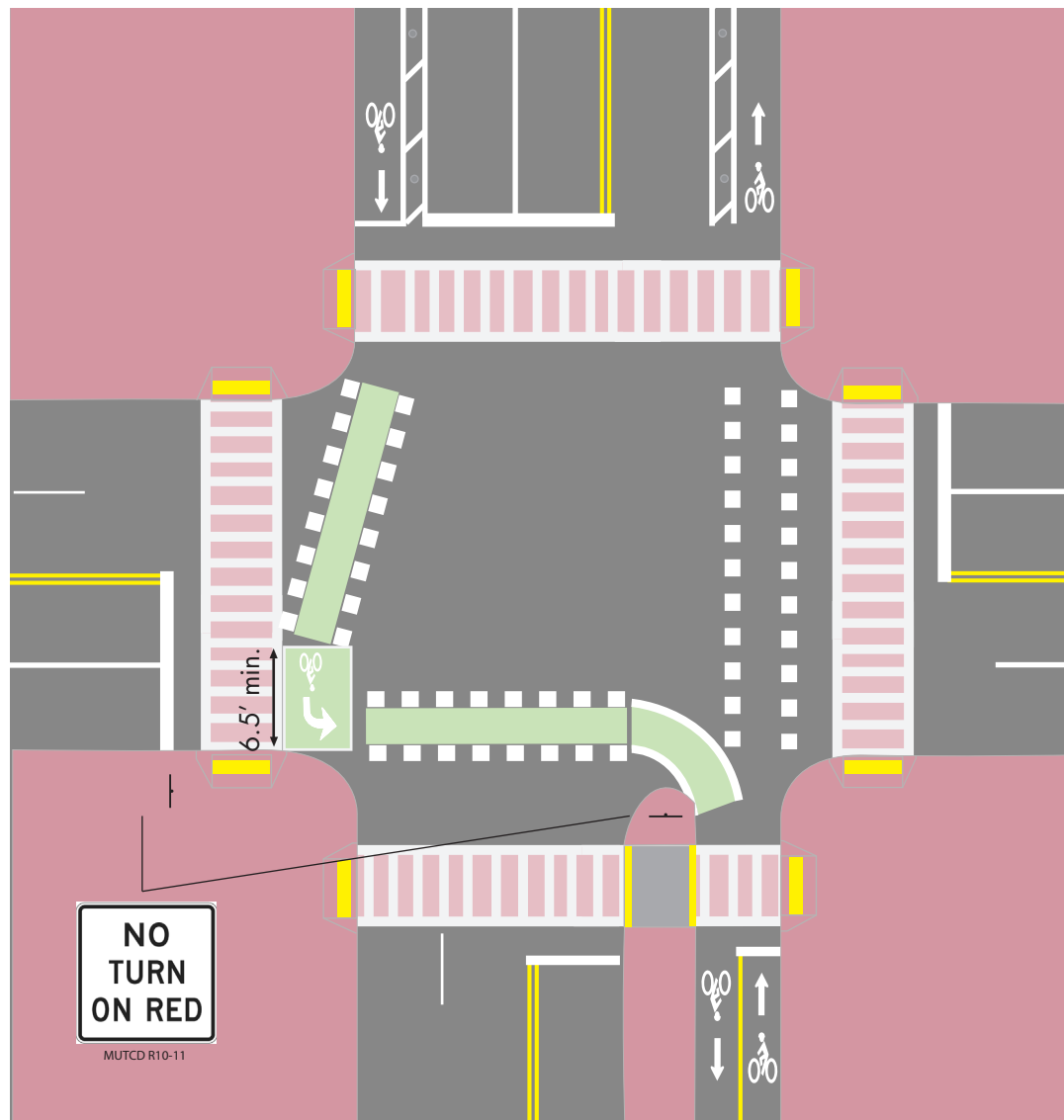


Fig 2.72 Bicycle facilities transition (a)

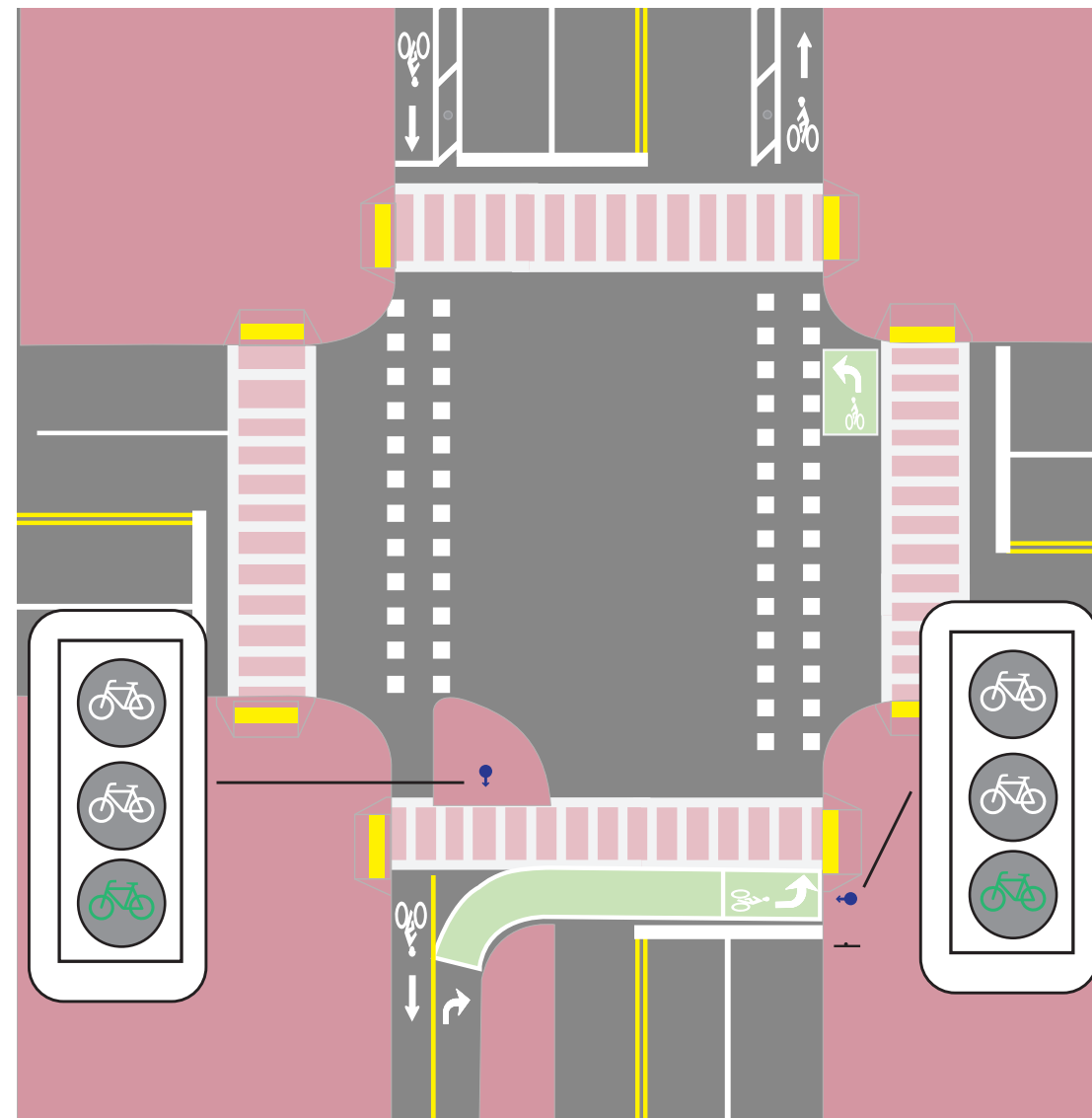
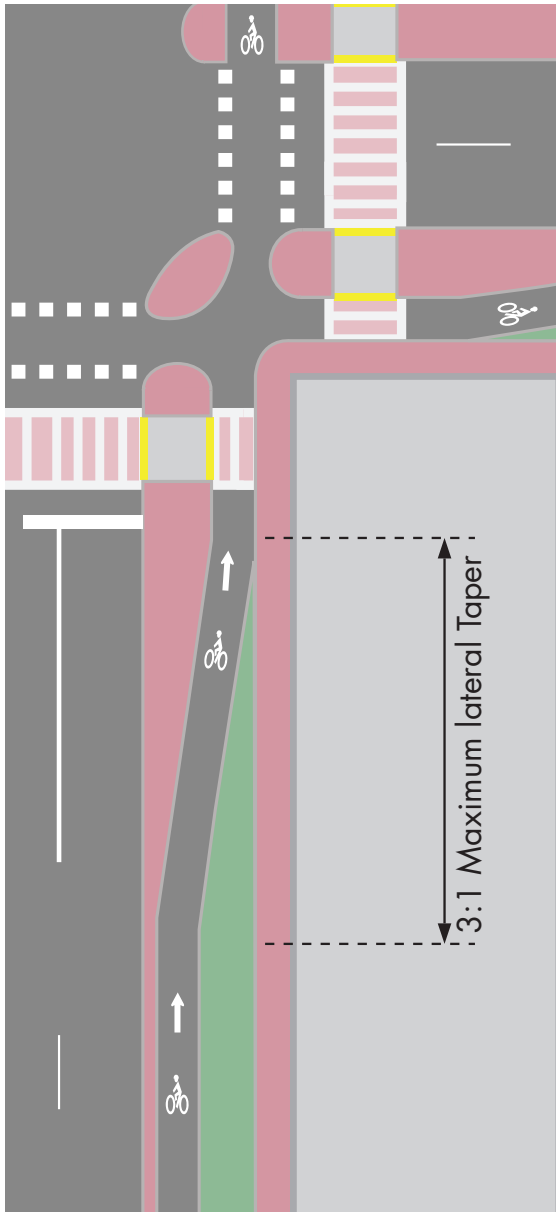


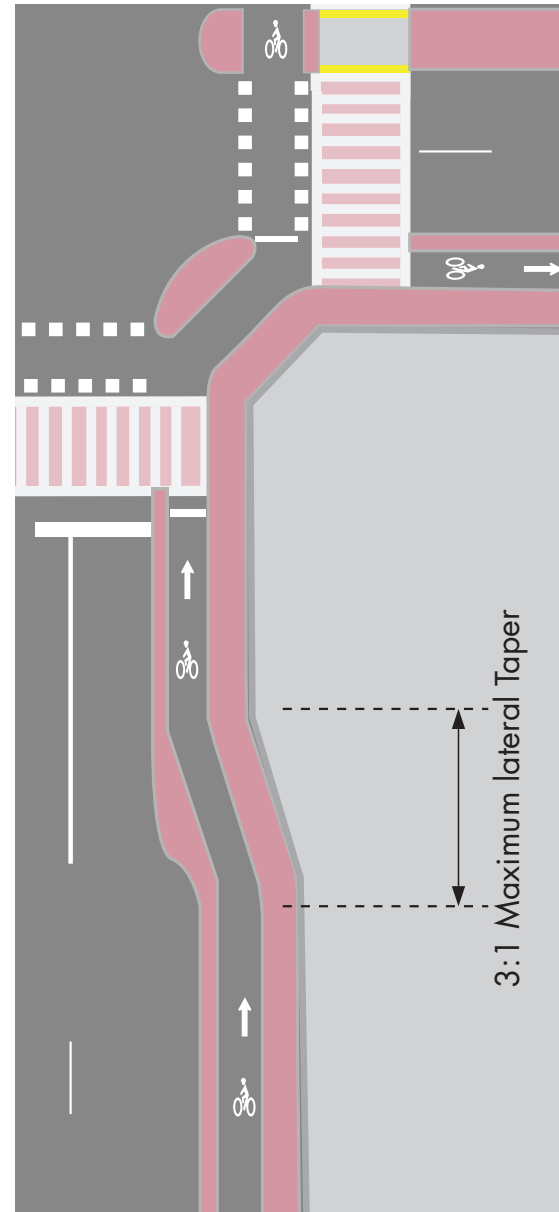
Fig 2.73 Bicycle facilities transition (b)

Fig 2.74 Protected bike lane bend-out condition.



BEND-OUT CONSTRAINED CONDITION

Fig 2.75 Protected bike lane bend-in condition



BEND-IN CONSTRAINED CONDITION

At constrained locations, it may not be possible to maintain the preferred widths of travel lanes, buffers, bike lanes, and sidewalks to the corner. (Sidewalk widths must comply with ADA requirements). Sometimes, it may be necessary to narrow a zone to the minimum dimensions or to eliminate the sidewalk buffer in order to achieve the desired design. At locations where there are no conflicts with turning vehicles, the street buffer can be minimized and the motorist yield zone can be reduced or eliminated.

If a lateral shift of the bicycle facility is required, the maximum taper allowed is 3:1.

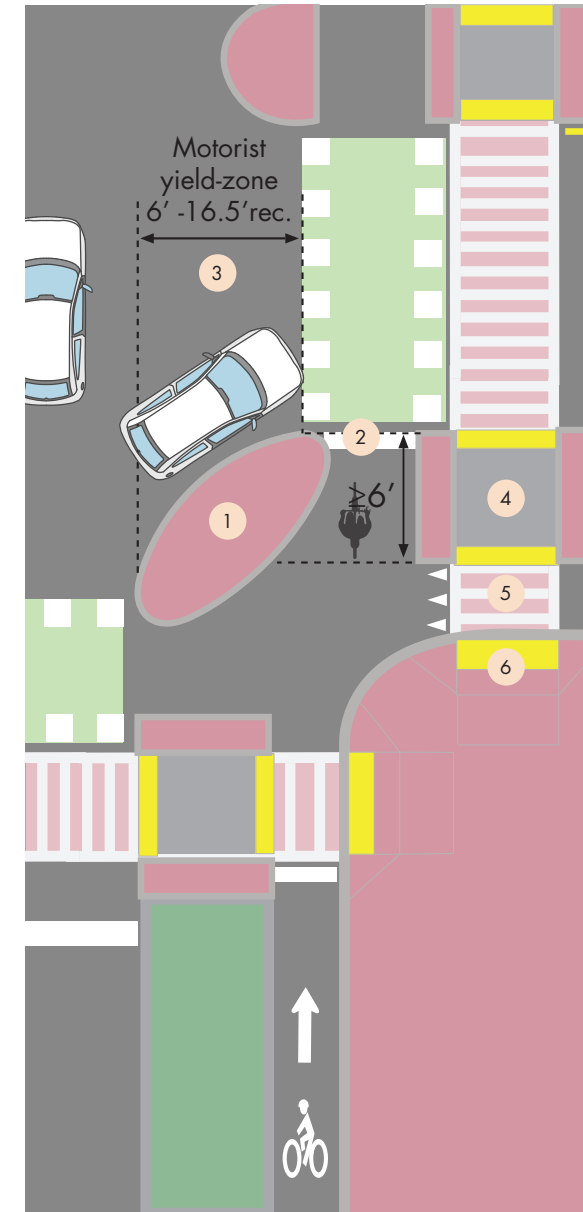
BEND-OUT DEFLECTION

- Allows for greater queuing areas for bicyclists and pedestrians within the protected intersection.
- Desirable where is necessary to provide a pedestrian platform for transit stops or queuing space for parking and loading.
- Provides greater yielding area for motorists

BEND-IN DEFLECTION

- Recommended only in cases where sidewalk width minimums must be maintained in conditions that require the elimination of sidewalk buffers and narrowing of street buffers.
- A motorist yield zone is provided by enlarging the corner island.

Fig 2.76 Protected intersection.



PROTECTED INTERSECTION

BICYCLIST: PROTECTED BICYCLE FACILITIES TRANSITION

PROTECTED INTERSECTION ELEMENTS

- 1 Corner Refuge Island:
 - Creates a bicycle queuing area.
 - Creates a motorists storage area
 - Reduces Ped/Bike crossing distances
 - Controls motorists crossing speeds
 - If design exceeds an SU-30, a mountable truck apron should be considered.
- 2 Forward Bicycle Queuing Area:
 - Provides high visibility to cars waiting at the stop bar before turning.
 - Enables bicyclists to enter the intersection before motorists thus establishing a right of way similar to a leading bicycle interval.
 - Typical length and width should be a minimum of 6 feet, size should reflect demand.
- 3 Motorist Yielding Zone:
 - Crossing setbacks provide a safe yielding distance for pedestrians and bicyclists resulting in crash reduction benefits.
 - Bicycle and pedestrian crossings should be separate but parallel in order to consolidate potential conflicts for motorists. (does not apply to shared paths).
- 4 Pedestrian Crossing Island:
 - It should be a minimum of 6' with detectable warning strips on each end.
 - Reduces the likelihood of pedestrians crowding the bike lane while waiting for a walk signal.
- 5 Pedestrian Crossing of Protected Bike Lane:
 - Pedestrian crossings communicate the clear message that bicyclists must yield to pedestrians.
 - Direct pedestrians to specified crossing locations thus reducing the likelihood of pedestrians crossing the bike lane at unmarked locations.
- 6 Pedestrian Curb Ramp:
 - Should be provided wherever there is a change in elevations.
 - The ramp must comply with ADA standards.
 - Detectable warning signals must be provided at the edges of all street and bike crossings.
- 7 Mountable Truck Aprons:
 - Create a safer intersection approach for large turning vehicle where a large curb radius is necessary.
 - The mountable area should be distinct in color from the travel way, separated bike lane, and refuge island.
 - The height of the mountable area should be a maximum of 3 inches.
 - The mountable surface is considered part of the travel way and its design should discourage pedestrians and bicyclists from using it as a refuge.

Fig 2.77 Set back crossing.

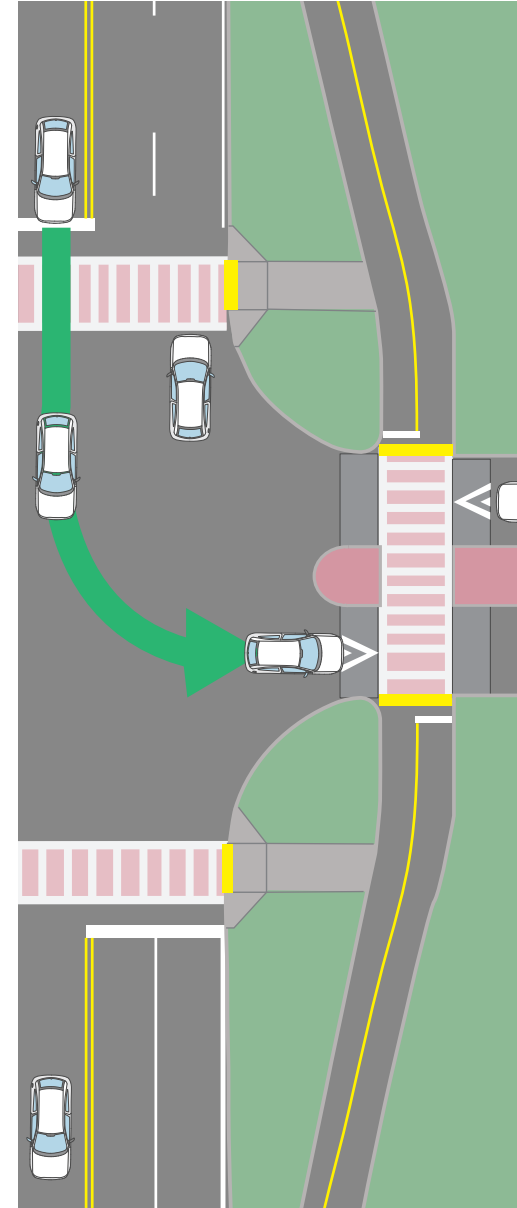
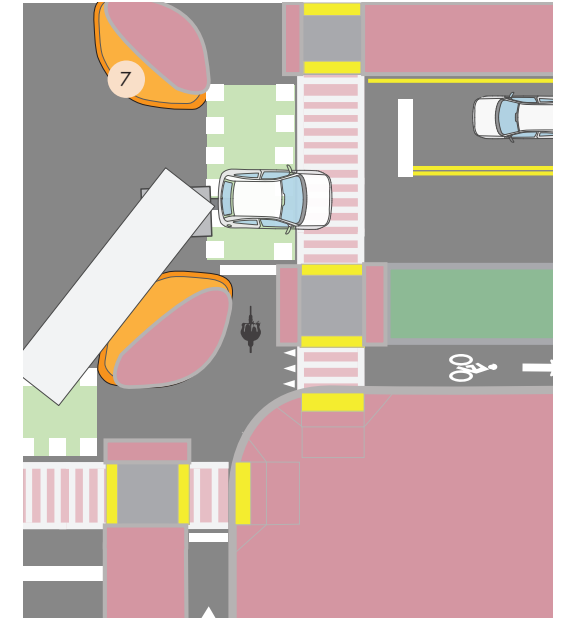
SET BACK CROSSING
CONDITION

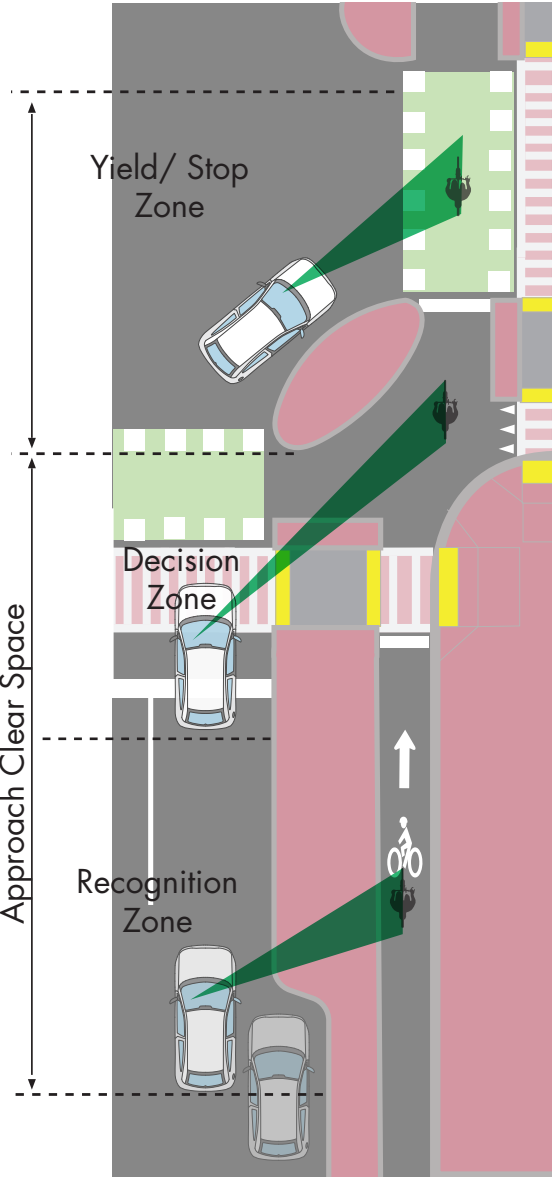
Fig 2.78 Mountable truck apron.



SET BACK CROSSINGS

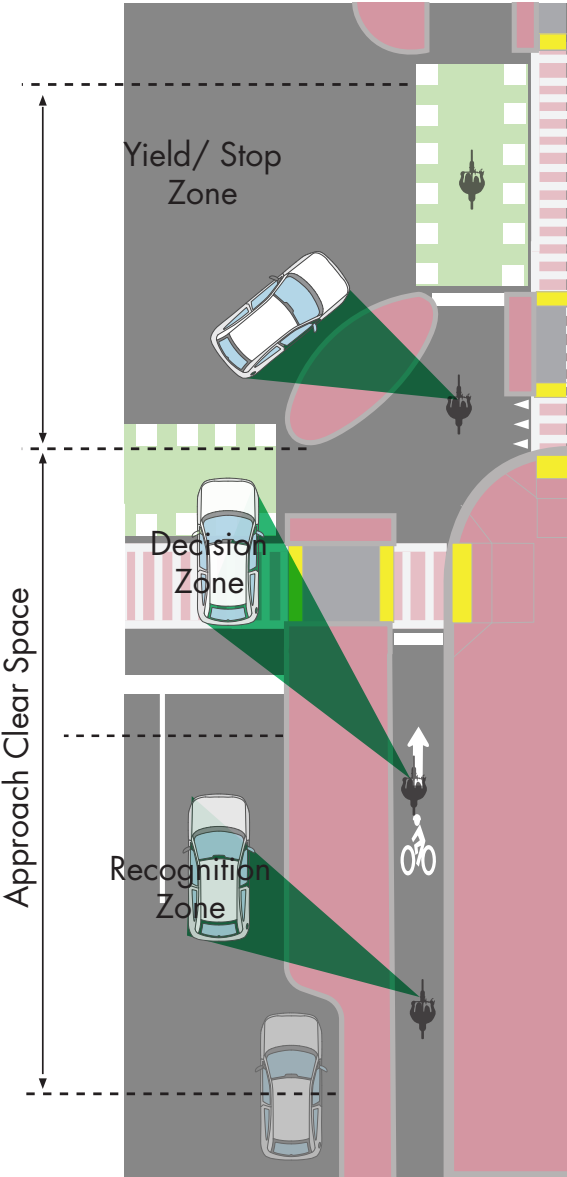
- When crossings are set back, as mentioned in the motorist yielding zones (3), the result is an increase in yielding distance and motorist reaction time to crossing pedestrians and bicyclists.
- The typical setback is about one car length.
- Shared path crossings do not require separate crossings for pedestrians and bicyclists.

Fig 2.79 Vehicle visibility of bicyclist intersection approach.



RIGHT TURNING DRIVERS YIELD TO BIKES

Fig 2.80 Bicyclist visibility of motor vehicle at intersection approach.



THROUGH BIKES YIELD TO TURNING DRIVERS

RIGHT TURNING DRIVERS YIELD TO BICYCLISTS:

This occurs when a through moving bicyclist arrives at the crossing before a turning motorist who must stop or yield to the through bicyclist. On street parking setbacks must be sufficient in order to provide adequate sight distances for both bicyclists and drivers.

THROUGH MOVING BICYCLIST YIELDS TO TURNING DRIVER

This occurs when a turning driver arrives at the crossing before a bicyclist; the bicyclist must wait at the forward stop bar and yield to the turning vehicle before resuming through movement. In this case, on street parking setbacks must also be sufficient in order to provide adequate sight distances for both the cyclist and the driver.

APPROACH CLEAR SPACE: SIGHT DISTANCE

The recommended approach clear space assumes that bicyclists are traveling at a constant speed of 15 mph. Recommendations for turning motorist assume a turning speed of 10 - 20 mph depending on the geometry of the corner and the travel path of the driver.

The recommended sight distances allow 1 second of reaction time by both parties as they approach the intersection.

VEHICULAR TURNING SPEED	APPROACH CLEAR SPACE
10 mph	40 ft
15 mph	50 ft
20 mph	60 ft

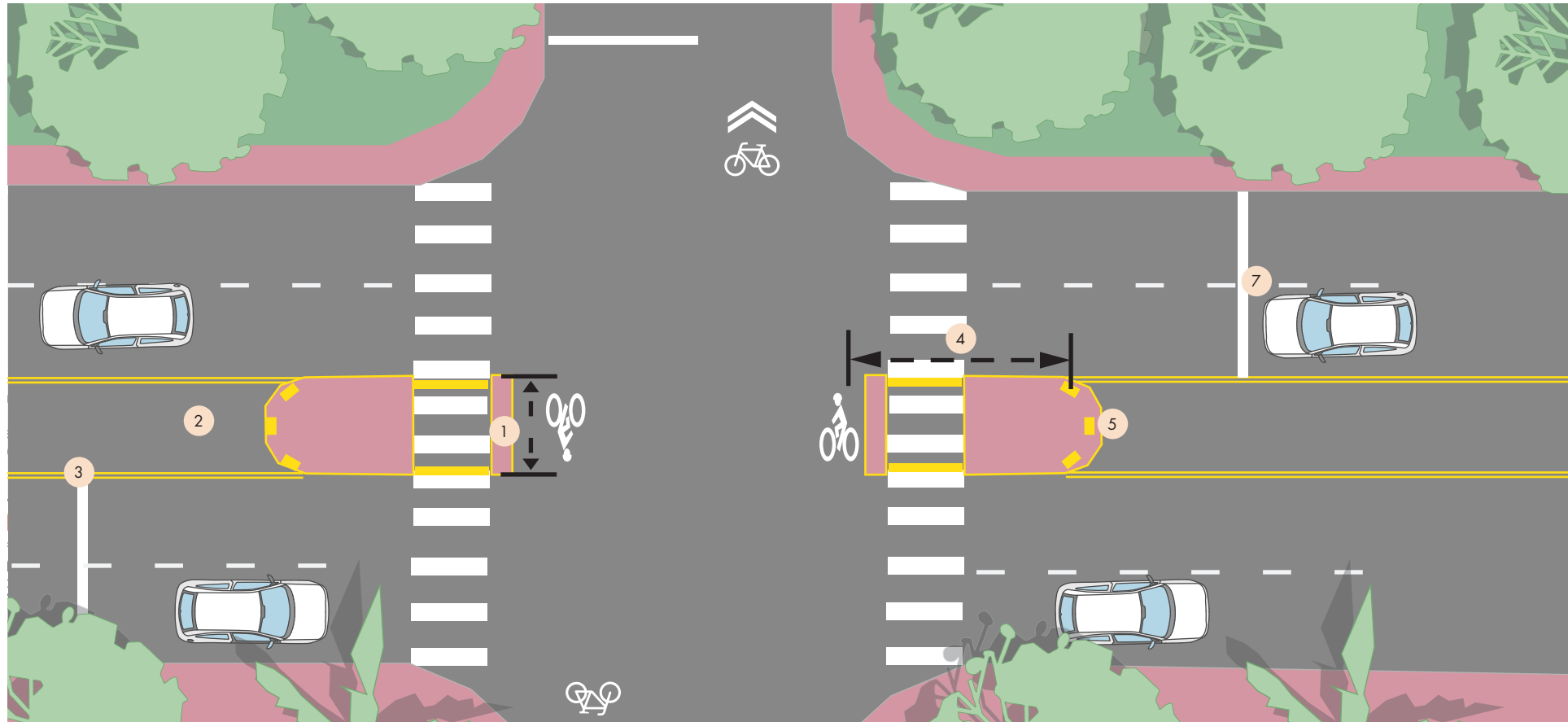


Fig 2.81 Pedestrian and Bicyclist median refuge island.

- 1 The desirable width of the median refuge is 10' or greater. The absolute minimum is 6'.
- 2 When applied on a two-way street, the median refuge shall be placed along the centerline of the roadway between the opposing directions of travel.
- 3 Pavement markings on the approach to the refuge island shall follow guidance provided in section 31.02 of the MUTCD.
- 4 The length of the refuge island should be greater than 6'.
- 5 Reflective markers should be used on the approach to the nose of the island's curb.
- 6 The refuge area should be wide enough to accommodate two-way bicycle traffic.
- 7 Advanced stop signs and markings may be included to increase awareness of pedestrian/bicycle crossing.

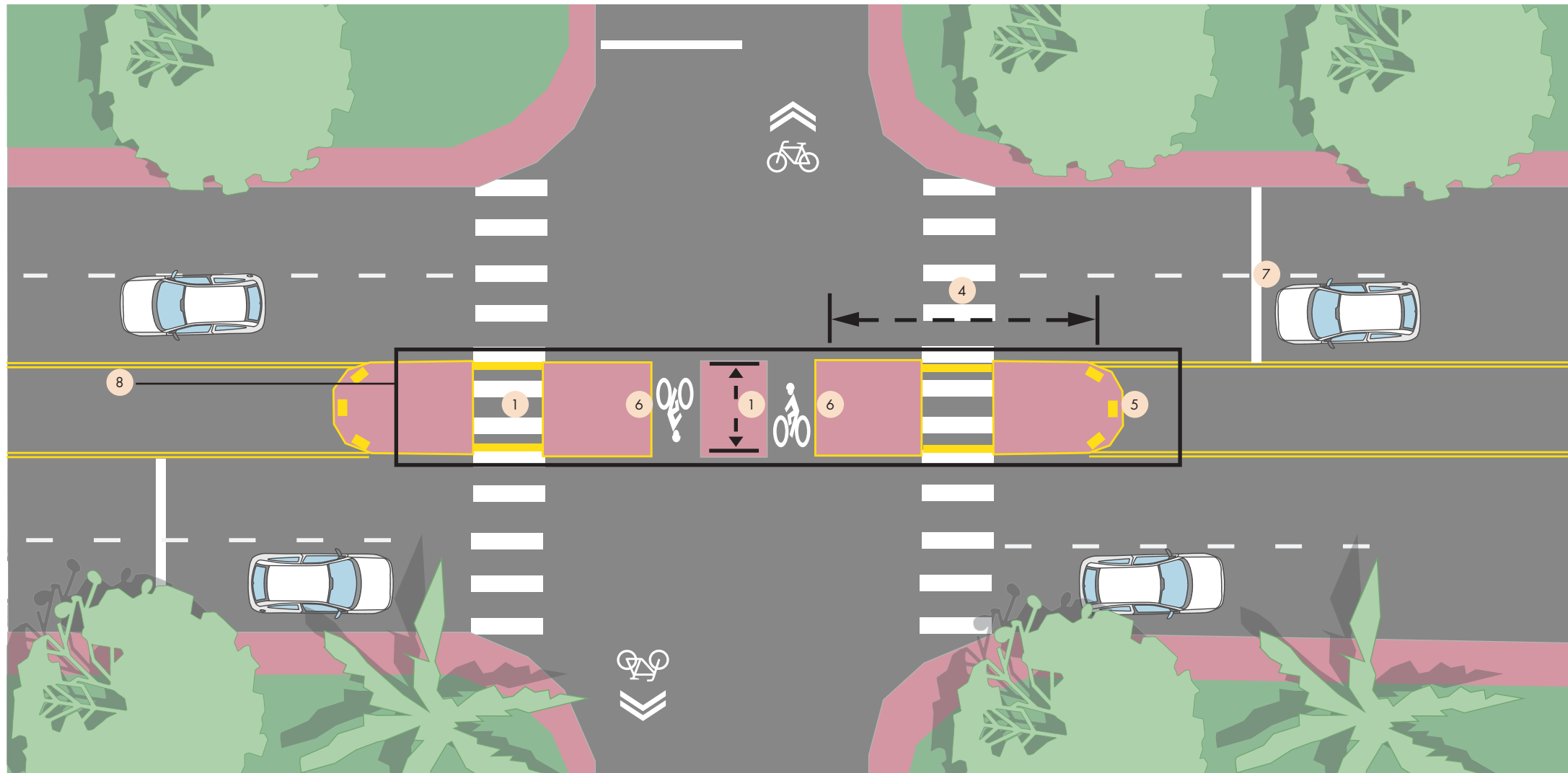


Fig 2.82 Pedestrian and Bicyclist median refuge island with full closure.

- 8 The median refuge can be carried across an entire cross street approach to act as a diverter to prevent cut-through traffic on bicycle routes

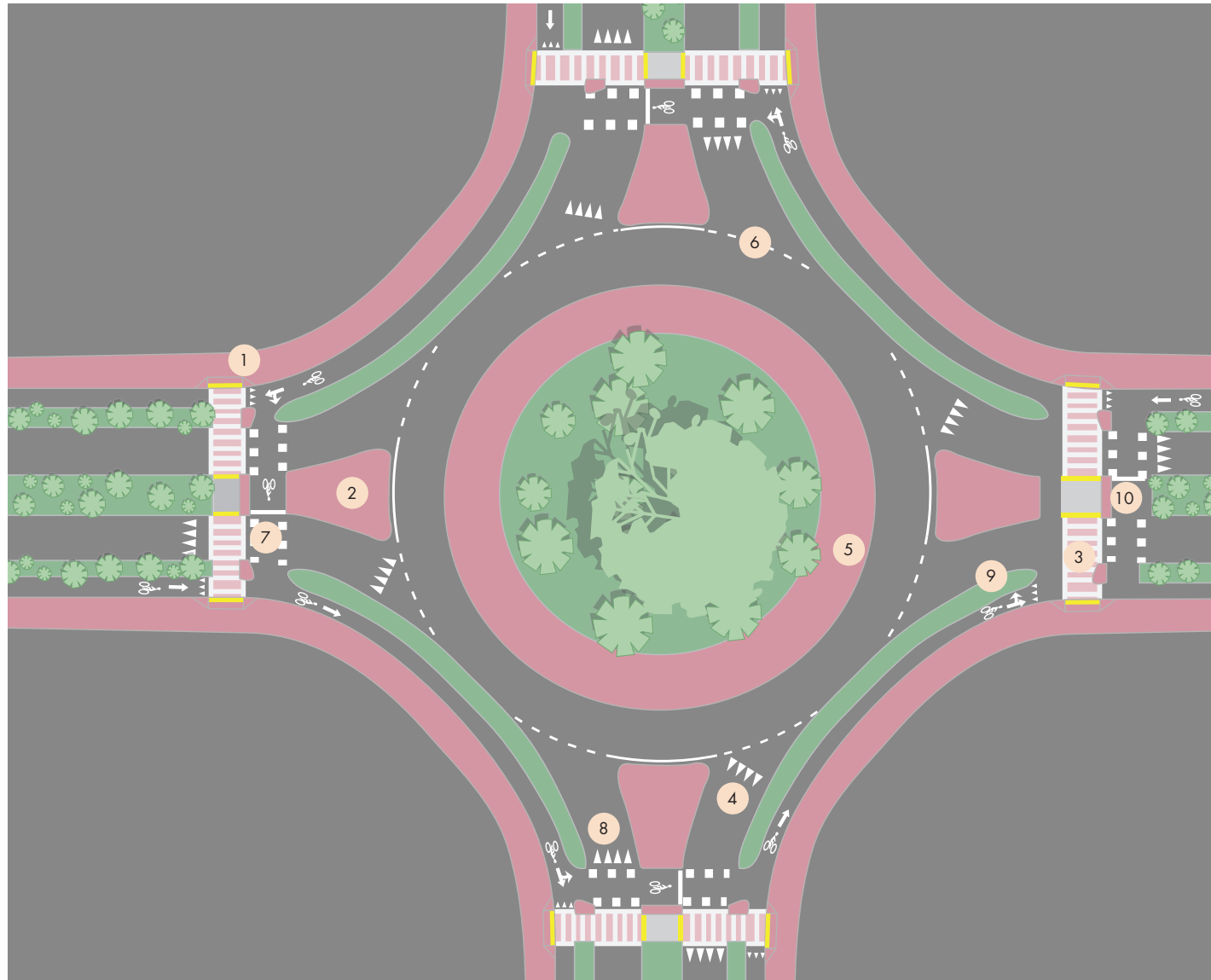


Fig 2.83 Typical roundabout with pedestrian crossings and separated bike facilities.

Roundabouts are common a common traffic calming method. They can be used in main streets as well as in a neighborhood context (1) in order to slow down motorized traffic and reduce the incidence of "cut through" traffic.

In addition to slowing down traffic, roundabouts provide a great opportunity for adding greenery to the urban context. Shade trees help reduce the heat island effect and provide habitat for birds and other animals. Water elements like fountains are also commonly used as central elements in roundabouts (3). Large roundabouts can often be configured as small plazas and enhance opportunities for social interaction, provide a focal point for the community, beautify and intersection and enhance the neighborhood's character through landscaping and/or public art (2).

- 1 Separated sidewalks direct pedestrians to crosswalks.
- 2 Splitter Islands/ Medians, serve as pedestrian refuges and direct traffic in the right direction.
- 3 Pedestrian crossings are located one car length away from the roadway in order to shorten pedestrian crossing distance and enhance pedestrian visibility.
- 4 Slow speed entry / Yield movement.
- 5 Deflection ensures slow speed movements through out intersection.
- 6 Slow Speed exit/ Yield movement.
- 7 Bicycle crossing should be adjacent to pedestrian crossing and maintain the same elevation.
- 8 Additional yield signs at exits should be considered to highlight crossings
- 9 Curb radius should be a minimum of 5 ft.to enable bicyclists to turn into the queuing area
- 10 Channelizing islands are preferred to maintain separation between bicyclists and pedestrians, but may be eliminated if different surface materials are used.

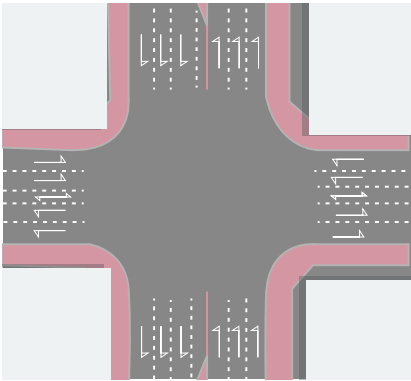
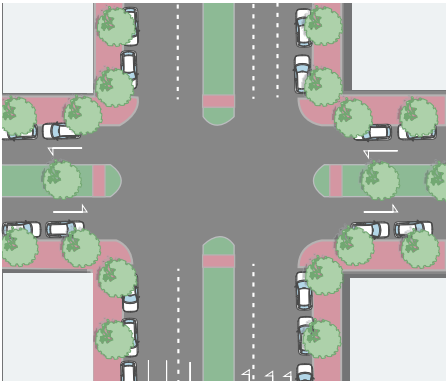
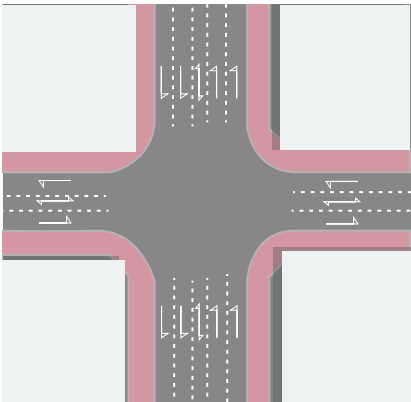
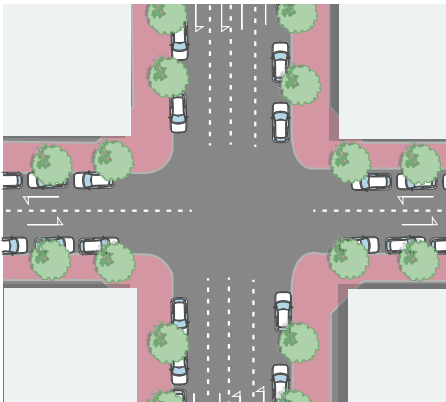
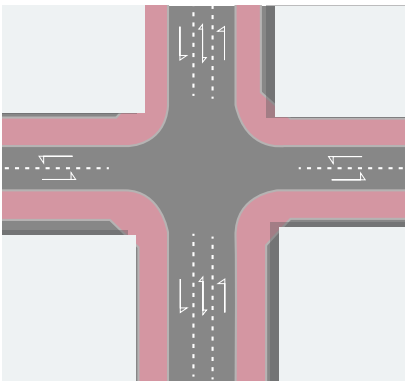
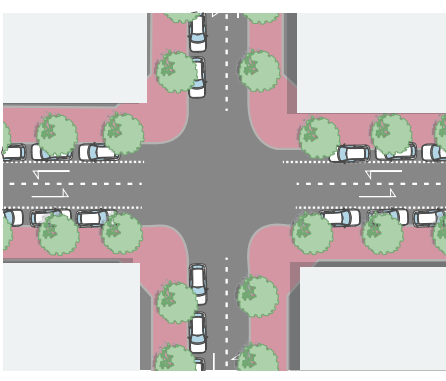
SPRAWL TYPES		TECHNIQUES	COMPLETE INTERSECTIONS	
ARTERIAL		• Replace conventional suburban intersections with urban intersections. • Reduce lane widths. • Introduce access lanes • Introduce medians. • Introduce parallel parking. • Introduce Transit. • Assemble public frontages according to street type. • Introduce appropriate bikeway intersection enhancements	BOULEVARD/ AVENUE	
COLLECTOR		• Reduce number of lanes. • Reduce curb radii. • Introduce a median. • Introduce parallel parking • Assemble public frontages according to street type • Introduce appropriate bikeway intersection enhancements.	MAIN STREET/ AVENUE	
LOCAL		• Reduce curb radii. • Reduce lane widths. • Introduce parallel parking • Assemble public frontages according to street type. • Introduce appropriate bikeway intersection enhancements.	NEIGHBORHOOD STREET	

Fig 2.84 From sprawl to complete intersections matrix.

PEDESTRIAN/BICYCLIST/ MOTOR VEHICLE: PUTTING IT ALL TOGETHER

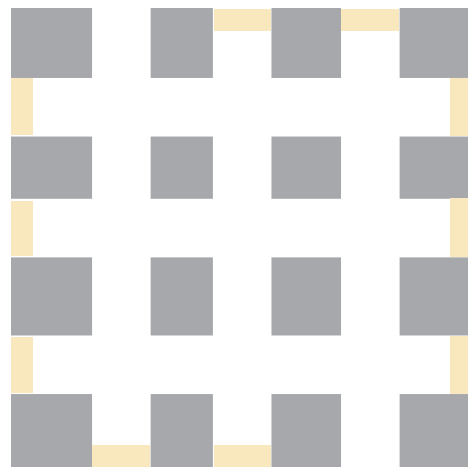
Countermeasures as shown in the previous pages can vary greatly. Their effectiveness and appropriate use depends on the context of the street(s) within the network, and the ultimate goal for modeshare shift.

BORDER RESTRICTIONS

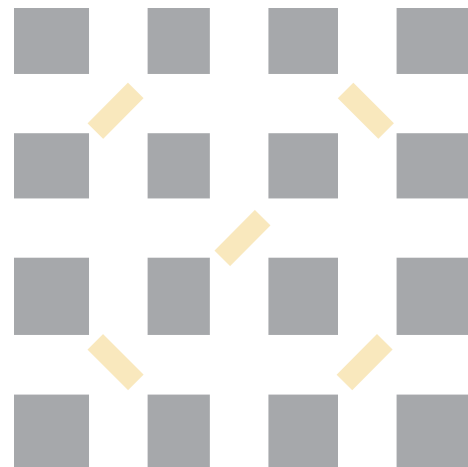
Prohibiting parking at the center of a district and/or directing all parking in the form of on street parking or structures to the border, tends to increase trips by foot and bike.

INTERNAL DETOURS

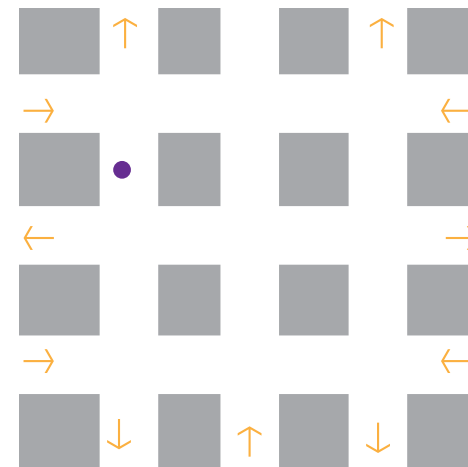
Partial closings, detours of internal traffic at certain times of the day or specified days of the week. Physical and permanent street closures shall only apply to motor vehicles and maintain adequate pedestrian and bicycle access.



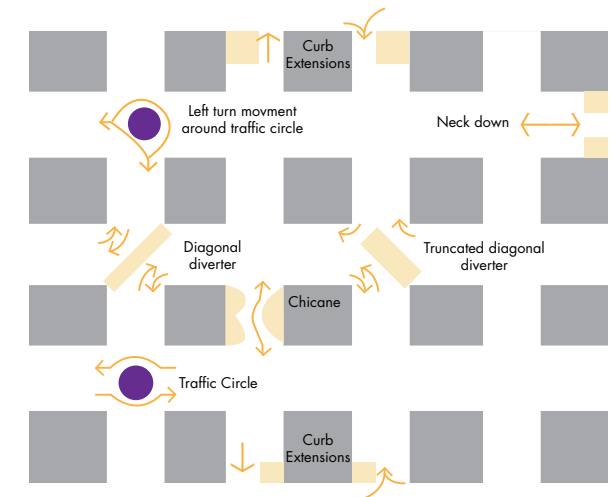
Border restrictions*



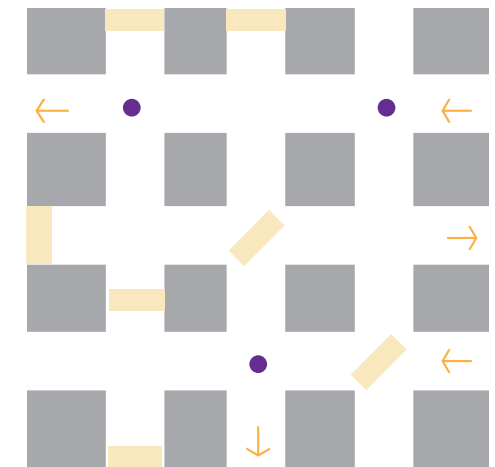
Internal detours*



Traffic flow conversion*



Combined countermeasure strategy example (a)



Combined countermeasure strategy example*(b)

Fig 2.85 Traffic calming countermeasures at neighborhood scale.

TRAFFIC FLOW CONVERSION

Another countermeasure in the toolkit is the traffic flow conversion of two-way streets to one-way streets. This strategy may benefit the overall multimodal network by providing extra space in the existing ROW to implement protected bicycle facilities, and reducing the cut through traffic in certain areas.

PUTTING IT ALL TOGETHER

A thorough evaluation of the street network may yield a variety of ways to create the best street calming scenario. Physical countermeasures like bike lanes, neighborhood circles, and normative countermeasures like temporary closures, or parking can achieve a network flow that is steady and can support a healthy multimodal network in the long term.

*Adapted from Sanz, 1998

ON STREET PARKING AS TRAFFIC CALMING

Motor vehicle parking is an important factor for business, although more and more people are traveling and shopping by bicycle, the availability of convenient parking influences business owners and shoppers alike.

Motor-vehicle parking is the quintessential friend and foe of design. Reducing car parking to meet the actual demand of businesses is an important and necessary step towards true multimodal redesign. However, thinking about parking as a traffic calming solution mitigates the friction that might occur among stakeholders while serving various purposes simultaneously.

On street parking is easily implemented traffic calming method that benefits commercial corridors as well as pedestrians and bicyclists.

It is important to keep all users in mind when designing for motor vehicles:

1. Angled parking should be Back angled parking to facilitate visibility of bicyclists.
 - Changes the perception and function of a street.
 - Drivers pulling out must be aware of oncoming traffic
 - Oncoming drivers must be aware of cars pulling out
 - Can add up to 40 % more parking capacity than parallel parking.

2. Parallel parking should be placed on the outer side of a bicycle facility in order to provide buffer between traffic and the bicycle facility
Parallel parking stall widths should be a maximum of 8 feet depending on the adjacent uses.
3. Buffers of to avoid door collisions with bicyclists should always be provided.



Credit: Gonzalo Camacho, Kansas City Better Block.



Credit: www.peopleforbikes.org

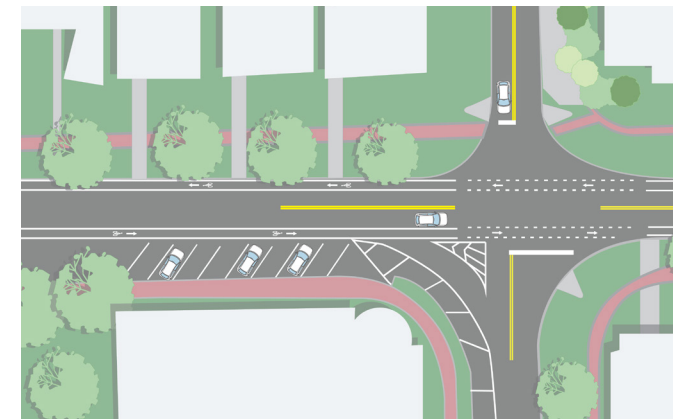


Fig 2.86 Proposed condition for 51st street @ Cherokee Avenue in Miami Beach.

PEDESTRIAN/ BICYCLIST/ DRIVER : COUNTERMEASUREMATRIX

STREET TYPES + COUNTERMEASURES

STREET TYPES	LOCAL STREET	MAIN STREET	BOULEVARD	TRANSIT BOULEVARD	AVENUE	PEDESTRIAN STREET	SHARED SPACE	NEIGHBORHOOD GREENWAY
WIDE SIDEWALKS 6' MIN.	●	●	●	●	●			●
WIDE SIDEWALKS 6'- 10'		●	●	●				
ALIGN CROSSWALK & RAMP	●	●	●	●	●	●	●	●
MID-BLOCK CROSSING	●	●	●	●	●	●		●
HYBRID BEACON (HAWK)								●
BRAILLE/ VOICE PED CROSSING	●	●	●	●	●	●	●	●
CURB EXTENSION	●	●	●	●	●			●
MEDIAN		●	●	●	●			●
IMPROVED LIGHTING	●	●	●	●	●	●	●	●
CHICANES	●	●			●			●
STRIPING/ DOUBLE TURN LANE	●	●	●	●	●			●
FRONTAGE LANE			●	●				
ON-STREET PARKING	●	●	●	●	●		●	●
DRIVEWAY MANAGEMENT	●	●	●	●	●			●
NO RIGHT ON RED (BIKES OK)	●	●	●	●	●	●	●	●
SHARED LANE MARKINGS (SHARROW)	●	●	●	●	●			●
DIVERTER	●	●			●			●
CONVENTIONAL BICYCLE LANE	●	●	●				●	
PROTECTED BICYCLE LANE	●	●	●	●	●	●	●	●
SHARED USE PATH		●	●					●
GREEN PAINT ON BIKE FACILITY	●	●	●	●	●			
BIKE BOX AT INTERSECTION	●	●	●	●	●	●	●	●
STREET TREES / TREE CANOPY	●	●	●	●	●	●	●	●
TRAFFIC CIRCLE	●				●		●	●
BACK ANGLE PARKING		●	●		●			●
SPEED CUSHION	●						●	●
GATEWAYS	●	●	●	●	●	●	●	●
BIOSWALE	●	●	●	●	●	●	●	●

●

 Required

●

 Suggested

Fig 2.87 Street types and countermeasures matrix



SPECIAL CONDITIONS

The success of street design can be gaged by the efficiency and inclusivity of all users in the public realm. Intersections and other special zones present a higher possibility of conflict among users. In places where space is limited, specially in transit-oriented corridors, bicycling and pedestrian conflicts must be minimized without restricting routes or pedestrian comfort.

PEDESTRIAN/BICYCLIST/ DRIVER : DRIVEWAY CONDITION

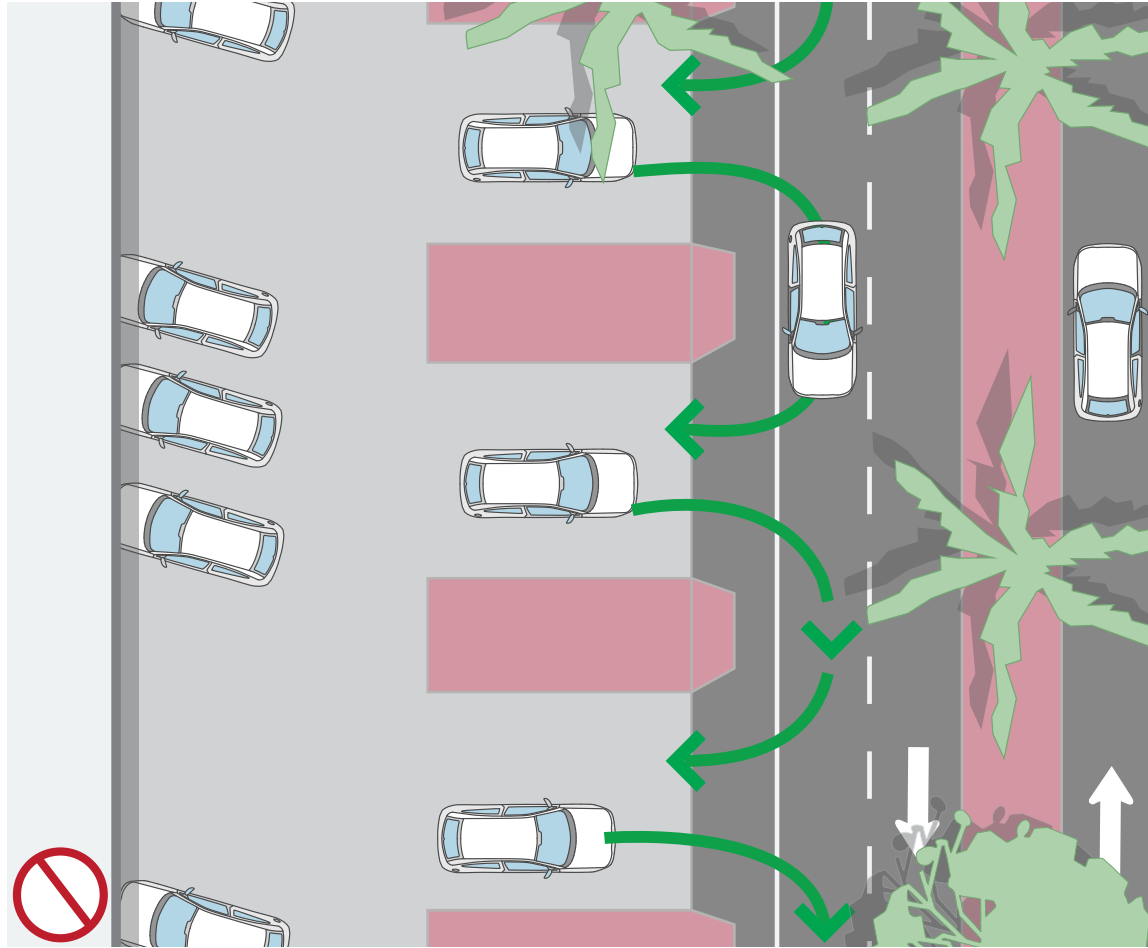


Fig 2.89 Undesirable driveway condition.

Vehicular access management through consolidating driveways and providing raised medians positively impacts the pedestrian and bicyclist experience:

- Pedestrian crossing opportunities are enhanced.
- Universal access for pedestrians is easier, since the sidewalk is less frequently interrupted by driveway slopes.
- Fewer driveways result in more space available for higher and better uses.
- Improved traffic flow may reduce the need for road widening, allowing part of the right-of-way to be recaptured for other users.

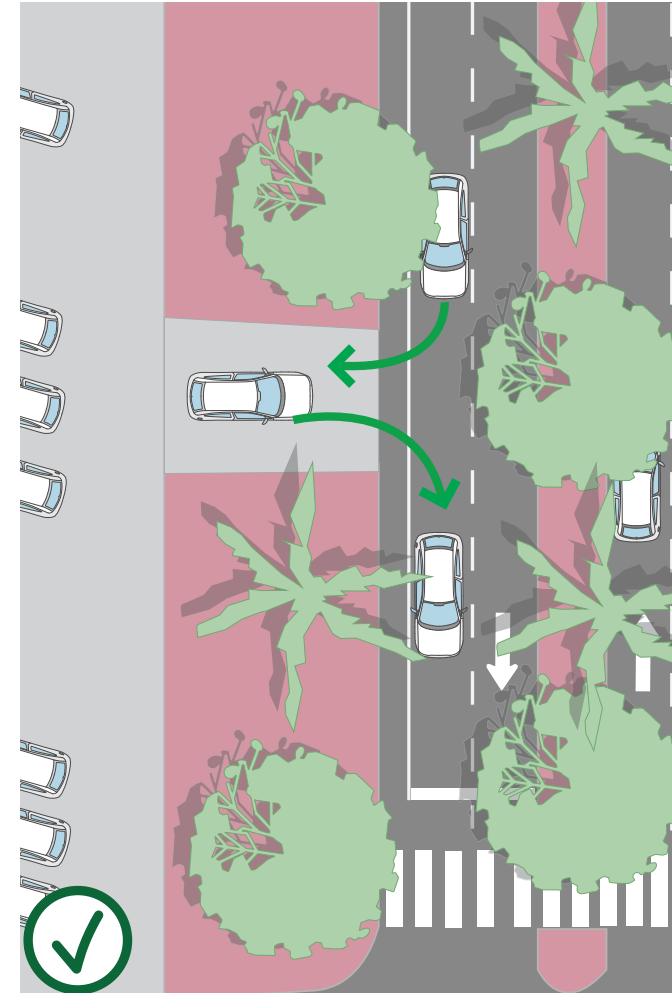


Fig 2.90 Consolidated (desirable) driveway condition.

Consolidating driveway access is desirable where possible to minimize the number of conflict points among users.

DRIVEWAY CONSIDERATIONS

- Driveways shall be designed to ensure pedestrians have right-of-way over motor vehicles.
- Driveways shall be designed as ramps not as minor intersections.
- Vehicle access shall be controlled through the use of yield signs.

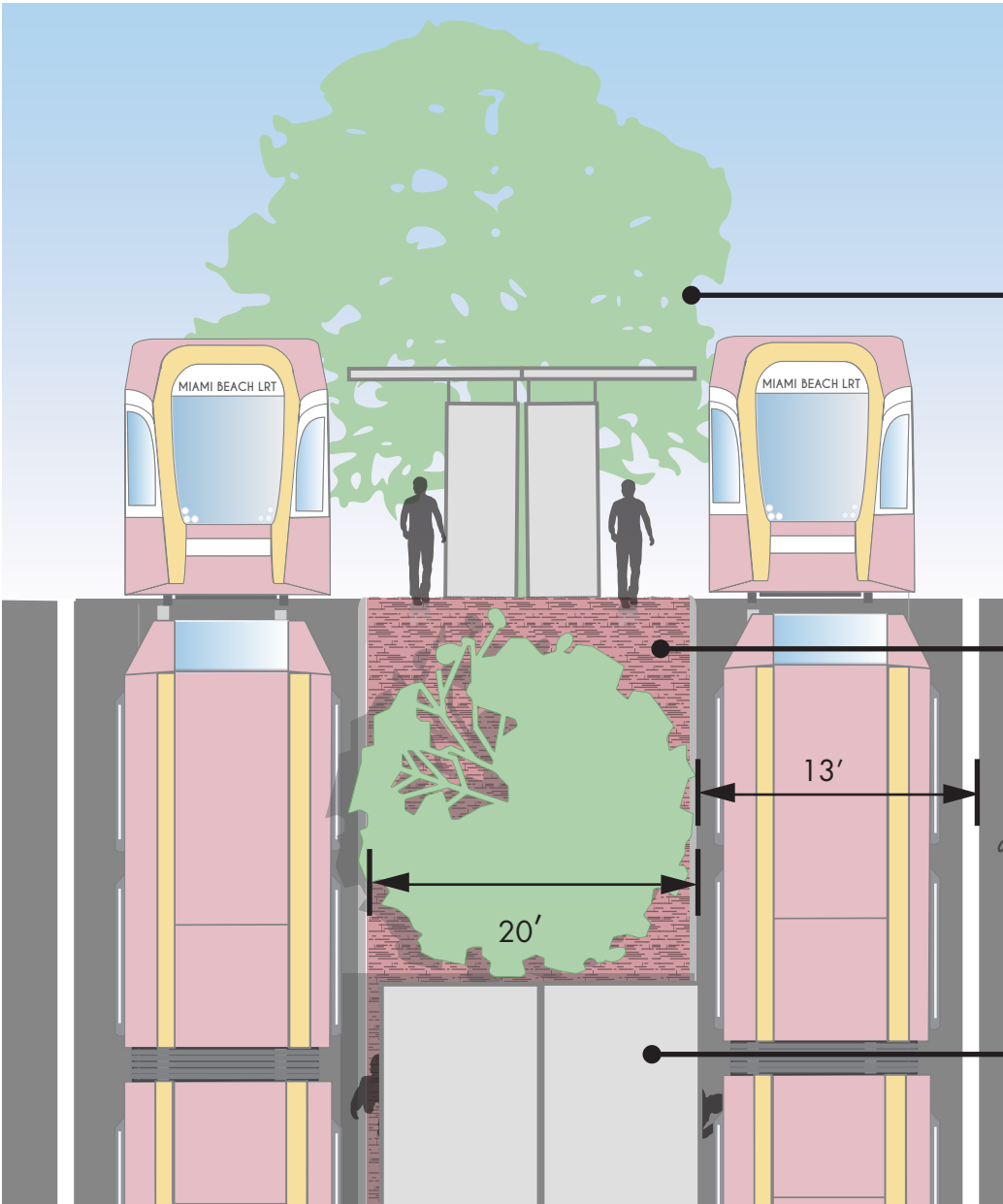


Fig 2.91 LRT/ BRT transit center platform condition.

Street trees and /or shade structures are encouraged to make the transit rider experience comfortable.

Center platforms can vary in size with a preferred minimum of 20 feet. (Includes buffer) Unidirectional platforms may vary with a preferred minimum of 10 feet (includes buffer)

Transit Shelters should be comfortable and large enough to hold the appropriate number of queuing passengers according to the expected number of riders and surrounding land use. They should also accommodate protected bicycle parking. [Please refer to the street scape section for examples of transit shelters]

A Light Rail system is very similar to a trolley or a streetcar. The term Light Rail was coined in the 1960's due to the fact that Trolleys had a negative connotation. LRT's are electric railway systems characterized by their ability to operate single or multiple car consists along exclusive rights-of-way at ground level, on aerial structures, in subways or in streets, able to board and discharge passengers at station platforms or at street, track, or car-floor level and normally (but not necessarily) powered by overhead electrical wires.

PEDESTRIAN/BICYCLIST/ MOTOR VEHICLE: TRANSIT STOP

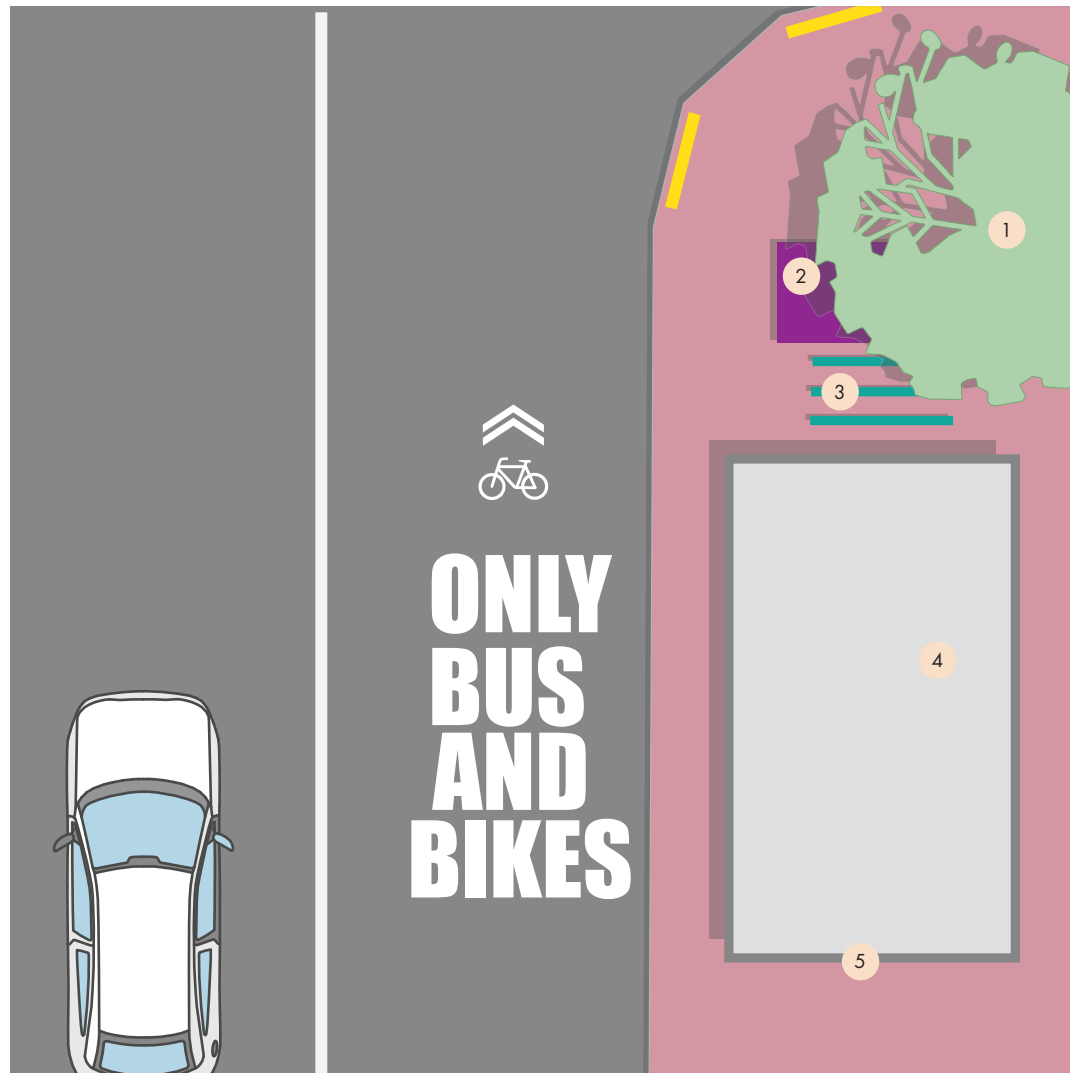


Fig 2.92 Transit stop standards, plan view.

Mixed use development and multi-use parking structures in close proximity to transit hubs is encouraged and necessary for the success of Transit Oriented Development. Park and ride gives transit access to those users who might not live close enough to walk or have mobility impairments while still supporting the T.O.D system

- 1 Street trees and /or shade structures are encouraged to make the pedestrian and transit rider experience comfortable.
- 2 Bicycle lockers should be provided at large / most active transit hubs to encourage bike and ride combinations of transit. Integrating bicycle parking with transit stops, encourages transit ridership as well as bicycling.
- 3 Bicycle parking should be oriented in a way that maximizes space and does not protrude on to the pedestrian through zone
- 4 Transit Shelters should be comfortable and large enough to hold the appropriate number of queuing passengers according to the expected number of riders and surrounding land use
- 5 Maps, diagrams and graphic directories of the surrounding area shall be clearly provided. In addition, bicycle route maps shall be provided.
- 6 Shelter bicycle parking can be a stand alone facility or function in combination with transit stops.



Fig 2.93 Shelter bicycle parking example.

PEDESTRIAN/BICYCLIST/MOTOR VEHICLE: TRANSIT STOP AND SIDEWALK LEVEL BIKE LANE (A)

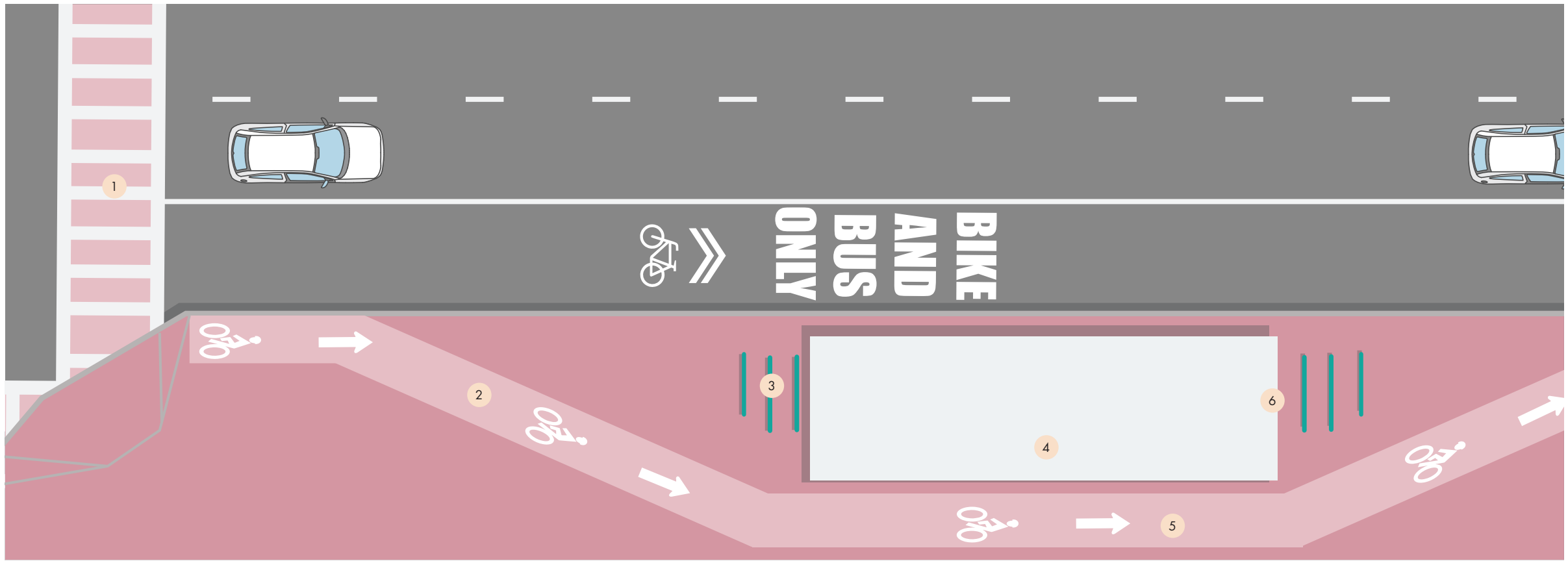


Fig 2.94 Sidewalk- level protected bicycle lane at transit stop (a).

- 1 Painted sidewalks enhance the aesthetic appeal of pedestrian realm while effectively providing high visibility for bicyclists and motor vehicles and improving safety at crossings.
- 2 Protected bicycle lanes at sidewalk level can be painted in a lighter shade of pink in order to provide a visual path for people on bicycle without disrupting the visual coherence of the sidewalk.
- 3 Bicycle parking should be located close to transit shelter. Parking should be oriented in a way that does not obstruct pedestrian through zone. If possible, bicycle parking should be sheltered.
- 4 Transit shelters should be placed close to the street and be sheltered. Where possible, street trees and landscaping shall be planted for shelter and storm water management (rain gardens, bioswales).
- 5 If protected bike lane cannot be shifted to the street or continue on the street side, path must be moved to the back of the transit stop to provide uninterrupted movement to bicyclists.
- 6 Transit shelters shall provide transit maps as well as bicycle maps that are easy to understand by the multicultural population of Miami Beach.

PEDESTRIAN/BICYCLIST/ MOTOR VEHICLE: STOP AND SIDEWALK LEVEL BIKE LANE (B)

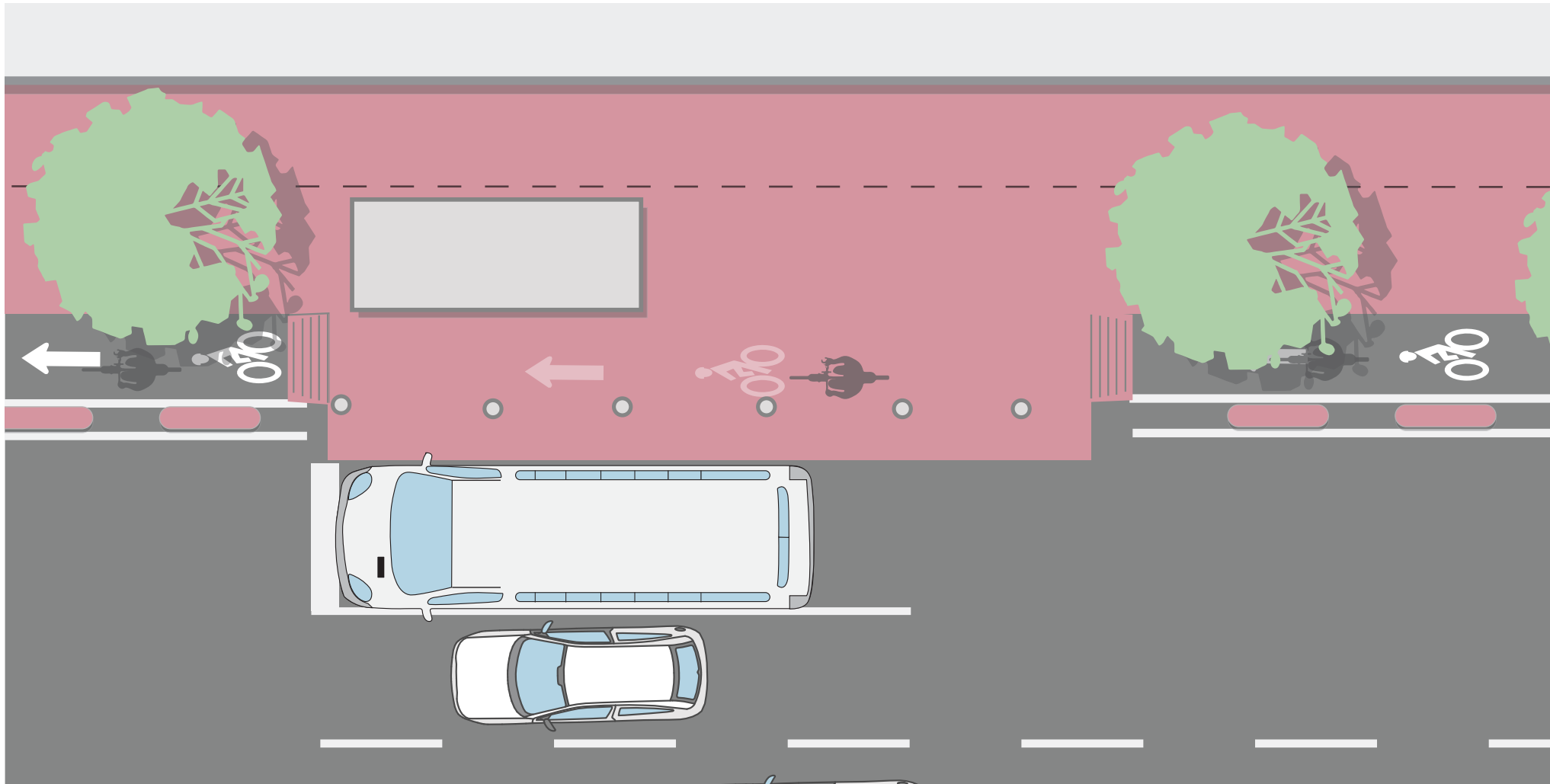


Fig 2.95 Sidewalk-level protected bicycle lane at transit stop (b).

In this design, the transit stop remains in its original location. However the Transit platform extends onto the protected bicycle lane creating a temporary sidewalk-level protected bike lane condition. Bikes follow a direct route in front of the transit shelter while yielding to pedestrians upon pick-up and drop-off. The transit rider queuing area is separated from the bicycle lane by bollards, planters or any other street furnishing/landscape elements appropriate depending on space constraints.

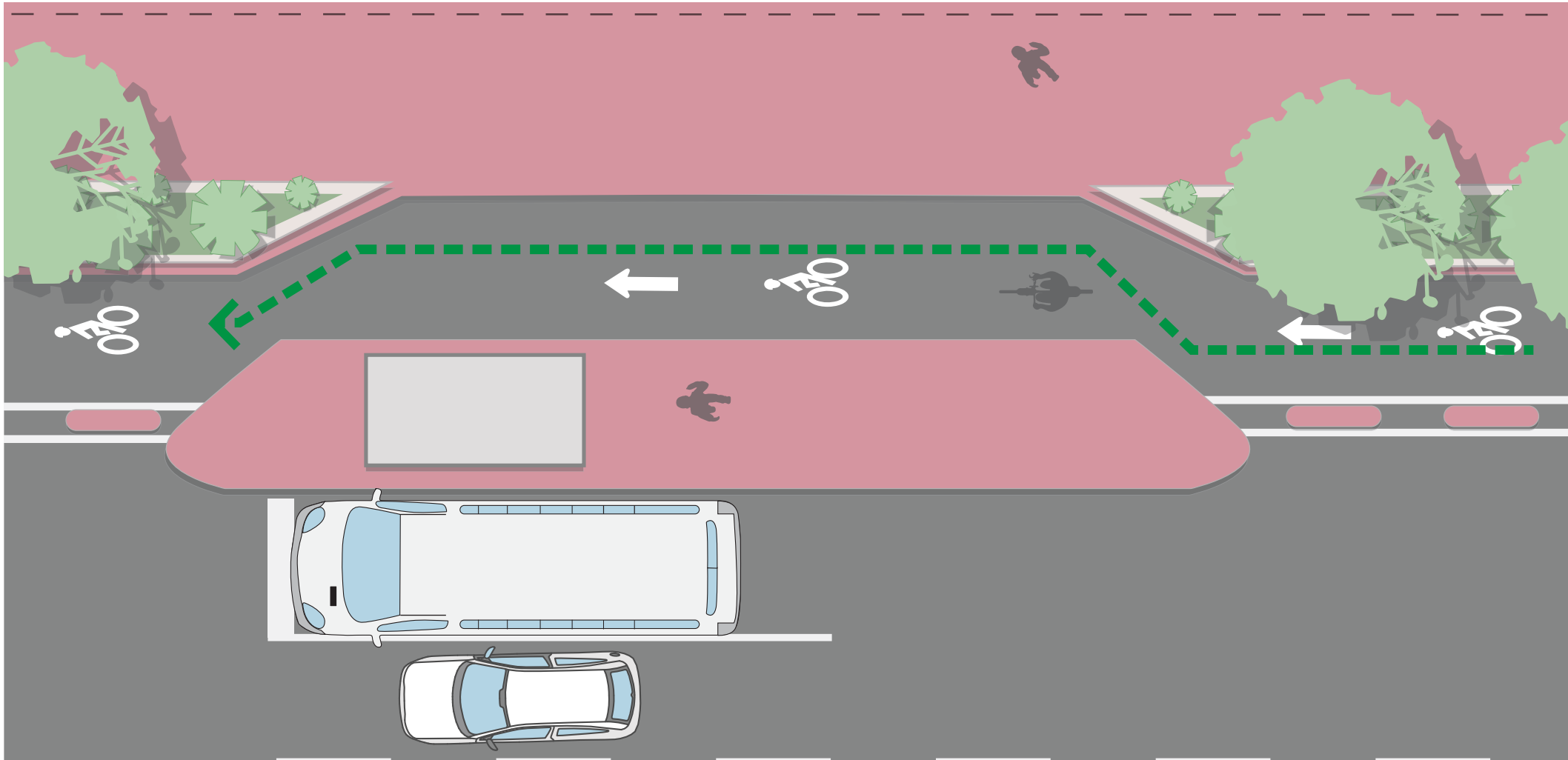


Fig 2.96 Sidewalk-level protected bicycle lane at transit stop (c).

In this design, the transit stop is located on the outside of the protected bicycle lane. Bicyclists yield to pedestrians at crossing. Passenger pick-up and drop-off is carried out on the travel lane.

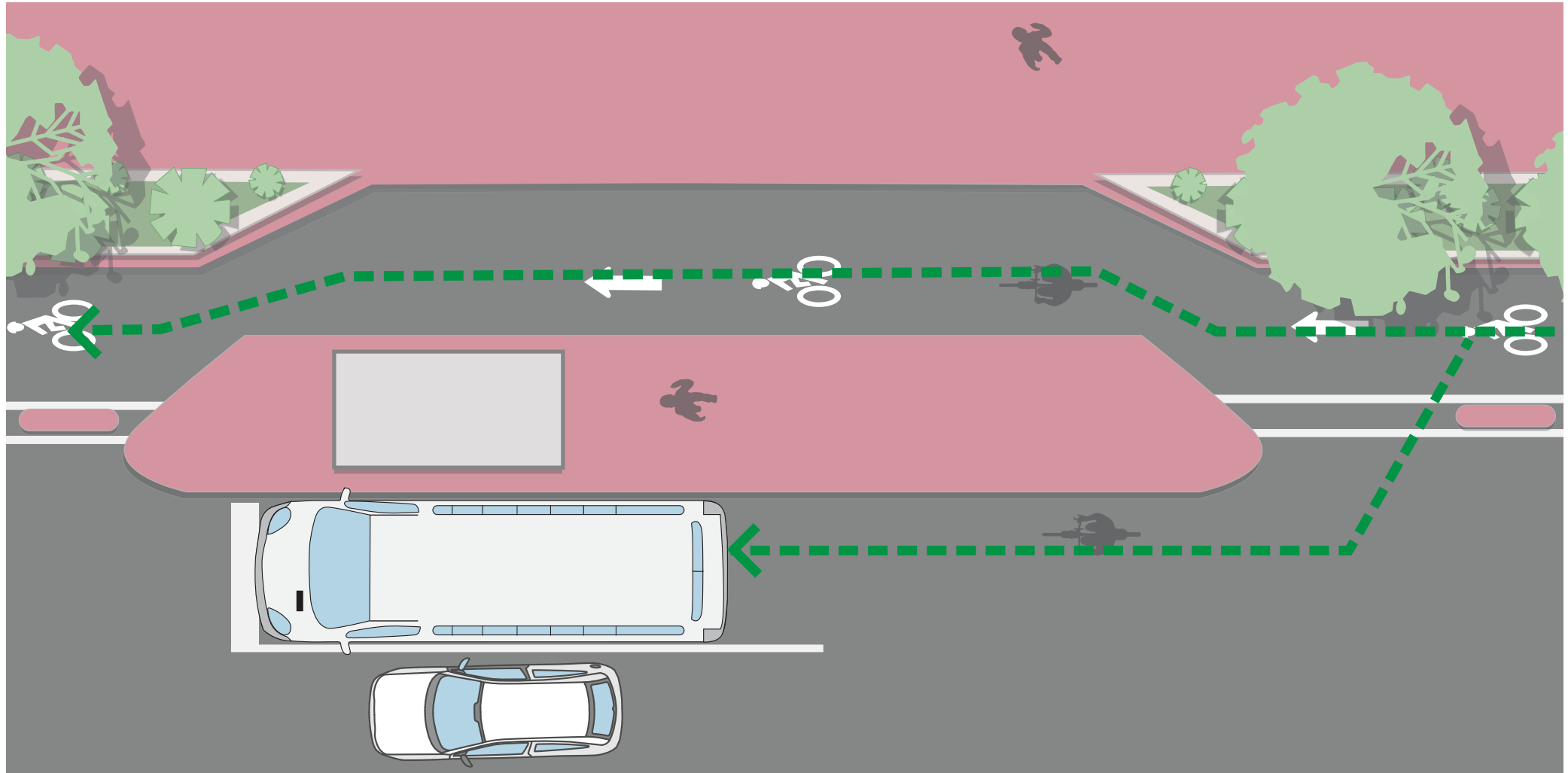


Fig 2.97 Sidewalk- level protected bicycle lane at transit stop (d).

This configuration allows bicyclists to operate behind the transit stop in the dedicated bicycle lane during drop-off and pick-up of passengers. However, If there is no bus, bicyclists may use the transit lane if necessary.

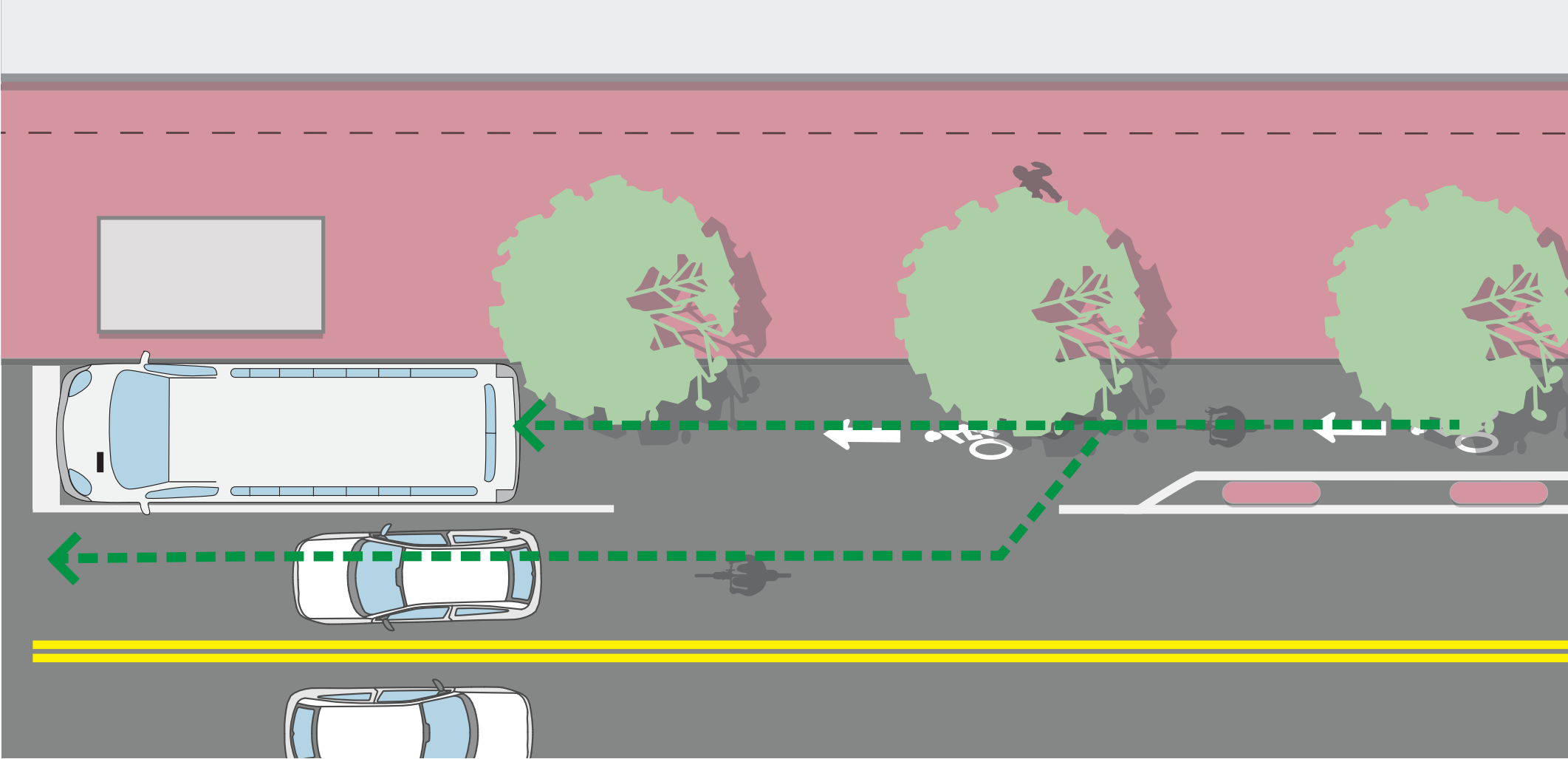


Fig 2.98 Sidewalk- level protected bicycle lane at transit stop (e).

For this solution, the intersection approach is shared between the transit and bicyclist. This means that the protected bicycle lane condition is interrupted at a crucial point of convergence which is highly inadvisable. In addition to being unprotected, bicyclists are usually forced to queue behind transit vehicles during drop off and pick-up times, in which case bicyclists lose momentum and breathe in larger than normal amounts of exhaust fumes unnecessarily. However, this can be avoided if the transit bay is widened to accommodate a wide enough passing zone for bicyclist along with a bike box at the intersection, thus given priority to bicyclist at the intersection approach to improve visibility, health, and maintain bicyclists momentum.



PORTUGUESE PAVING

Traditional paving style used for all pedestrian areas in Portugal. Currently used on the west end of Lincoln Road.

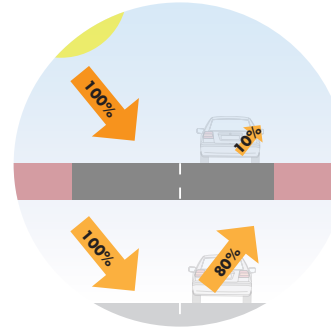
- Aesthetically pleasing.
- Presents certain hazards to people with physical impairments.
- Reduced longevity in comparison to other materials.
- Slippery when wet.



IMPRINTED ASPHALT

Machine - heated asphalt, imprinted with a pattern and colored with protective coating.

- Can be installed on existing asphalt that is in good condition.
- Can visually define pedestrian or non-vehicle areas.
- Apt for shared spaces and pedestrian streets.



HIGH ALBEDO ASPHALT

A lane reserved for bicycle travel within a Thoroughfare, marked by a painted line.

- Serve to facilitate predictable behavior and movements between bicyclists and motorists.
- Not protected from vehicular traffic with physical barriers (bollards, medians, raised curbs).
- Typically located curbside when parallel parking isn't present.
- Usually run in the direction of traffic.
- They should be distinguished with paint, lane markings, and intersection treatments.



POROUS ASPHALT

- Allows storm water to drain through, reducing runoff into the sewer system.
- Not appropriate for use where there is water-sensitive subsurface infrastructure.
- Only certain surfaces are appropriate as sub bases for infiltration.
- May require routine street cleaning to maintain porosity.
- Installation of this type of pavement should go in hand with chemicals/vehicle standards to avoid infiltration of harmful chemicals into the watershed and ocean.
- Can be used to pave entire roadways, or just parking lots, and gutters.



CONCRETE

Cement aggregates, water and other chemical mixtures poured over metal reinforcement bars which is then smoothed, forming a solid road surface.

- Highly available and cost effective.
- Should be used wherever engineering criteria dictates, such as bridges, vaulted roads or bus pads.
- Provides a durable surface with high friction.



MODULAR COBBLESTONE

Transforms the character of roadways from vehicle oriented to pedestrian/bicyclist oriented.

- Smooth surface unlike traditional cobble stone, is unlikely to hinder mobility for people using mobility aids.
- If necessary, adapt a “reduced vibration zone” that accommodates people with mobility impairments.
- Consider use on streets not intended for regular vehicle travel.
- Should not be used in areas where frequent utility cuts are likely.
- Various colors and designs available.



INTERLOCKING PAVINGS

Interlocking pavings allow for vegetation to grow in between units, providing a hard surface while allowing for infiltration.

- Can be made of asphalt or concrete.
- Reduces likelihood of ponding.
- Unit pavers might become loose and require additional maintenance.
- Commonly used in parking lots.
- Pleasant visual character.



TINTED CONCRETE

Same mixture as concrete with an added pigment.

- Signature of most Miami Beach sidewalks.
- Gives emphasis to the pedestrian zone.
- Sparkle adds distinction and visual enhancement.



MODULAR CURB

Modular curbs are one of the alternatives to implement a segregated bike facility in a time-effective manner.

- Separate bicyclist from motor vehicles in ROW.
- Durable
- Easy installation

STREET FURNISHINGS



STREET BANNERS AND HANGING PLANTS

- Banners offer opportunity for branding and way finding.
- Metal banners are durable and can have a large variety of designs.
- Hanging plants give aesthetic value to streetscapes. Use climate appropriate plants.



PLANTERS AND SEATING

- Planters can incorporate public seating.
- Provide resting areas at regular intervals for pedestrians.
- Should never encroach on pedestrian through zone.



REST AIDS

Parklets can be installed for additional seating and gathering spaces.

Large bollards can act as an informal resting spaces while providing a barrier from the motorized travel way.



SHADE STRUCTURES

- Shade sculptures provide much needed shade and can act as trellises.
- Custom designed shade structures give character to the streetscape.
- Shade structures are also crucial as refuge from the heavy rains in the summer months.



LANDSCAPE PLAZAS AND STREET TREES

- Large public gathering spaces should incorporate large vegetation and water elements when possible.
- Well maintained landscaped areas in Miami Beach have become meaningful “third-places” and successful gathering areas.





VERTICAL LANDSCAPING

- Vertical landscaping can serve to separate furnishing zones from pedestrian through zones, as landmarks or to add greenery and character to a specific zone.
- Living walls mitigate the heat island effect while decorating long stretches of otherwise plain frontage

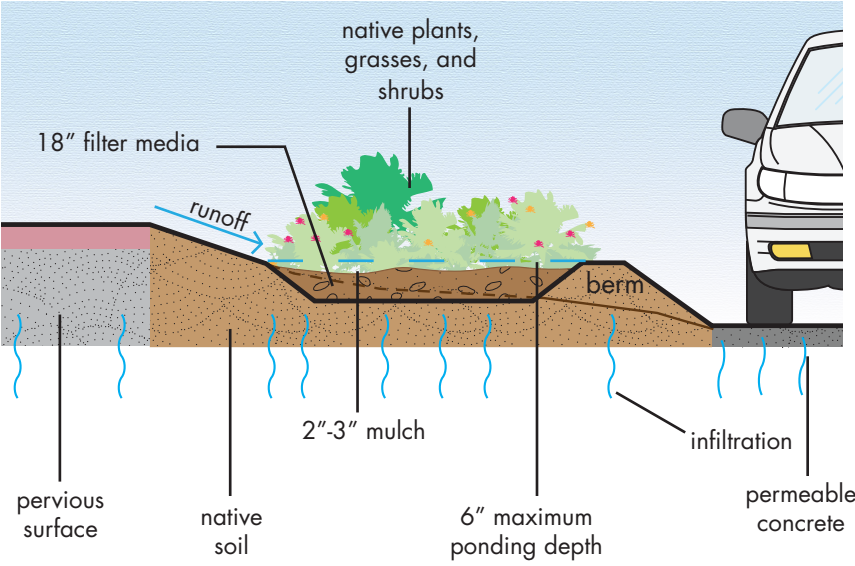
TRELLIS & SHADE

- Trellises can act as small gateways as well as shade structures .
- Walkways should incorporate attached or detached shade structures rather than individual kiosk umbrellas for aesthetic purposes.

BIOSWALES & STORM WATER MANAGEMENT

- Swaled drainage course with gently sloped sides (less than six percent)
- Filled with vegetation, compost and/or riprap.
- Add greenery to the streetscape while providing ecosystem services.

Fig 3.1 Bioswale cross section.



Bioswales, rain gardens, bioretention curbs, permeable concrete and other materials/ treatments that aid to slow down and filtrate storm water run off, should be considered and implemented in all street design projects. In addition, policy could be developed around the implementation of rain gardens in private properties to develop a resilient and robust environmentally sensitive landscaping program for Miami Beach residents.



LIGHTING



OVERHEAD PEDESTRIAN LIGHTING

Human-scale lighting directly influences the quality of the public realm. Large flood lights, although appropriate for highways and large open spaces, change the perception of the public realm.

Street lighting should be thought of not only as a safety measure but an aesthetic measure. Street lighting should be implemented according to scale



LIGHT BOLLARDS

Light bollards serve to illuminate paths and can serve as accents where extensive tree canopy may prevent light from reaching the ground.

Light bollards are as functional as they are decorative. The bottom photo shows how patterns on the lamp display an ornate shadow on the ground when lit. All lighting, including bollards can be powered through solar technology.



ALLEY & PEDESTRIAN BRIDGE LIGHTING

Pedestrian bridges and alleyways present an opportunity for pedestrian connectivity.

Making sure that these areas are well lit is crucial for their intended purpose to be fulfilled.

Pedestrians are particularly vulnerable in poorly lit areas which limits pedestrian activity in the public realm.



LIGHT TREES

These type of structures serve as rest areas for pedestrians and bicyclists through the public seating provided below. Above, the "light tree" harvests solar energy during the day providing light at night.

Note:

Lights along the coastal pathways should be approved by Florida Fish and Wildlife Conservation Commission. The City is using Triada bollard with amber LED lights at this time.



BUS STOPS AND REST STOPS

Bus stops and rest stops are yet another opportunity for functional design. Green roofs increase greenery and habitat in urban areas, while solar bus stops might be able to provide a variety of additional services powered by the panel like :

- Electronic device charging station
- Digital information and maps
- Cooling systems like small fans.

WASTE RECEPTACLES

Appropriate waste disposal is crucial to an enjoyable public space. Providing adequate receptacles in accordance to streetscape design helps maintain spaces clean and free of unwanted pests

Waste receptacles should be located at regular intervals, alongside bus stops and gathering spaces

PAINTED INTERSECTIONS AND CROSSWALKS

Crosswalks and intersections can be redesigned with durable materials and include designs. This helps with aesthetic enhancement as well as traffic calming through visual changes in the convergence zone.

To promote longer lifespan when using paint, use a "high build grade" with glass beads for retro-reflectivity. High build uses and acrylic cross-linking emulsions that allows for applications of up to 20 mils.

PUBLIC FRONTAGE ASSEMBLY

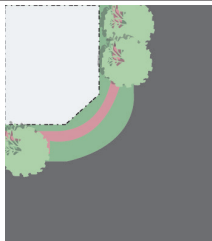
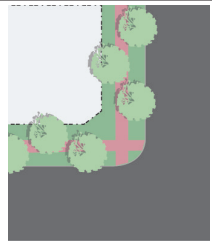
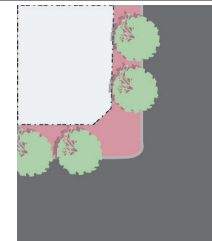
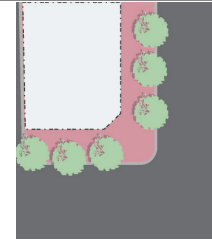
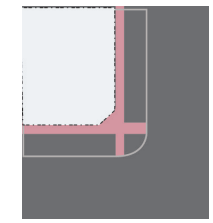
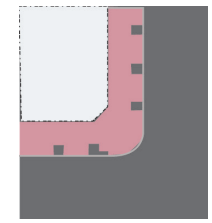
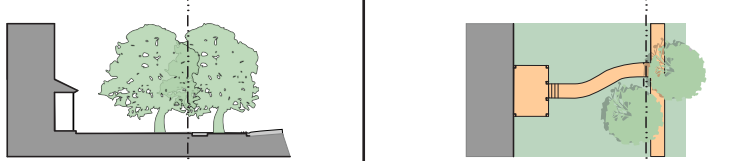
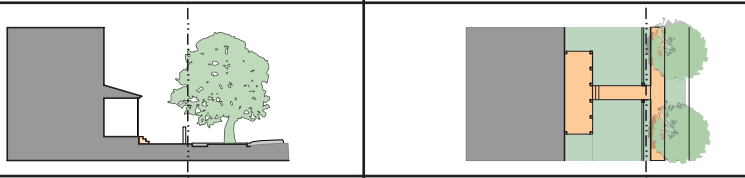
STREET TYPE	NEIGHBORHOOD STREET SUBURBAN	NEIGHBORHOOD STREET SUBURBAN	NEIGHBORHOOD STREET SUBURBAN	BOULEVARD	BOULEVARD- SUBURBAN AVENUE	NEIGHBORHOOD STREET URBAN - BOULEVARD- MAIN STREET- URBAN AVENUE
A. ASSEMBLY: The principle variables are the type and dimension of curbs, walkways, planters and landscapes. TOTAL WIDTH						
	16 - 24 FEET	12 - 24 FEET	12 - 18 FEET	12 - 18 FEET	12 - 20 FEET	12 - 24 FEET
B. CURB: The detailing of the edge of vehicular pavement, incorporating drainage. TYPE RADIUS						
	OPEN SWALE 10- 30 FEET	OPEN SWALE 10- 30 FEET	RAISED CURB 5 - 20 FEET	RAISED CURB 5 - 20 FEET	RAISED CURB 5 - 20 FEET	RAISED CURB 5 - 20 FEET
C. WALKWAY: The portion of the thoroughfare dedicated exclusively to pedestrian activity. TYPE WIDTH						
	PATH OPTIONAL N/A	PATH 4 - 8 FEET	SIDEWALK 4 - 8 FEET	SIDEWALK 4 - 8 FEET	SIDEWALK 8 - 12 FEET	SIDEWALK 10 - 20 FEET
D. PLANTER: The portion of the thoroughfare accommodating street trees and other landscape ARRANGEMENT SPECIES PLANTER TYPE PLANTER WIDTH						
	CLUSTERED CLUSTERED CONT. SWALE 8 - 18 FEET	CLUSTERED CLUSTERED CONT. SWALE 8 - 16 FEET	REGULAR ALTERNATING CONT. PLANTER 8.5 - 12 FEET	REGULAR SINGLE CONT. PLANTER 8.5 - 12 FEET	REGULAR SINGLE CONT. PLANTER 8.5 - 9 FEET	OPPORTUNISTIC SINGLE TREE WELL 4 - 9 FEET

Fig 3.2 Public Frontage Assembly Matrix.

1. Common Yard: A planted Frontage wherein the Facade is set back substantially from the Frontage Line. The front yard created remains unfenced and is visually continuous with adjacent yards, supporting a common landscape. The deep Setback provides a buffer from the higher speed Thoroughfares.



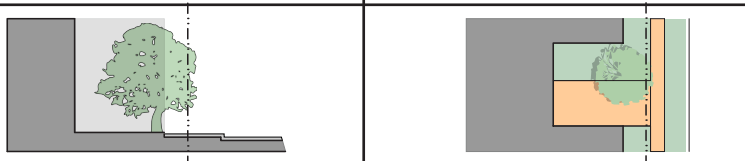
2. Porch & Fence: a planted Frontage wherein the Facade is set back from the Frontage Line with an attached porch permitted to Encroach. A fence at the Frontage Line maintains street spatial definition. Porches shall be no less than 8 feet deep.



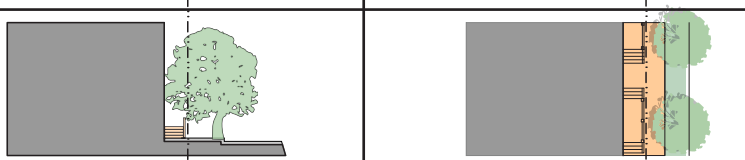
3. Terrace or Lightwell: a Frontage wherein the Facade is set back from the Frontage line by an elevated terrace or a sunken Lightwell. This type buffers Residential use from urban Sidewalks and removes the private yard from public Encroachment.



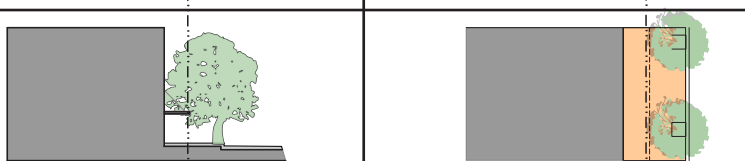
4. Forecourt: a Frontage where a portion of the Facade is close to the Frontage Line and the central portion is set back. The Forecourt created is suitable for vehicular drop-offs. Should be allocated in conjunction with other Frontage types. Large trees within the Forecourts may overhang the Sidewalks.



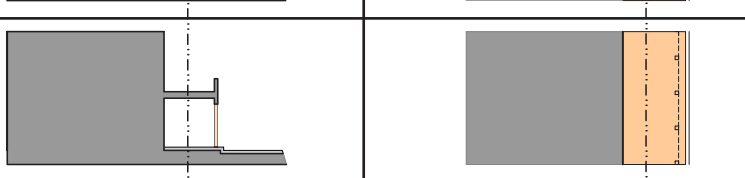
5. Stoop: Frontage wherein the Facade is aligned close to the Frontage Line with the first Story elevated from the Sidewalk sufficiently to secure privacy for the windows. The entrance is usually an exterior stair and landing. This type is recommended for ground-floor Residential use.



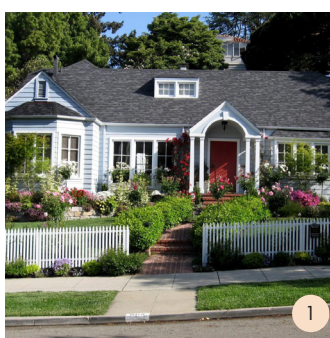
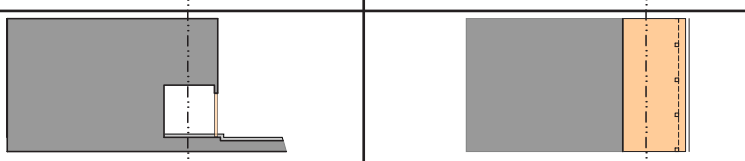
6. Shopfront: Frontage wherein the Facade is aligned close to the Frontage Line with the building entrance at Sidewalk grade. This type is conventional for Retail use. It has a substantial glazing on the Sidewalk level and an awning that may overlap the Sidewalk to within 2 feet of the Curb.



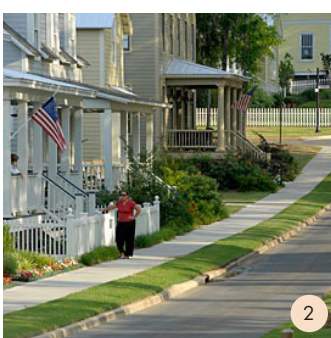
7. Gallery: Frontage wherein the Facade is aligned close to the Frontage line with an attached cantilevered shed or a lightweight colonnade overlapping the Sidewalk. Conventional for Retail use. IT hall be no less than 10 feet wide and should overlap the Sidewalk to within 2' of the Curb.



8. Arcade: a colonnade supporting habitable space that overlaps the Sidewalk, while the Facade at Sidewalk level remains at or behind the Frontage Line. This type is conventional for Retail use. The Arcade shall be no less than 12 feet wide and should overlap the Sidewalk to within 2 feet of the Curb.



1



2



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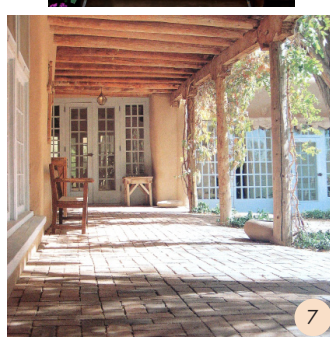
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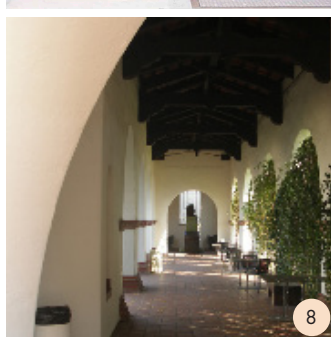
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6



7



8

Fig 3.3 Private Frontage Assembly types

PEDESTRIAN REALM

PEDESTRIAN ENVIRONMENT

The pedestrian environment is commonly made up of four different zones:

THE FRONTAGE ZONE (1)

The zone immediately adjacent to the buildings. Depending on regulations, businesses may use this area as an extension of their shop for small displays where space allows.

- This area shall be kept narrow.
- Paving material should match the through zone material but an accent color may be used to highlight the edge of the space.
- This area shall provide shade to pedestrians in the form of awnings or street trees with large canopy located on the edge.

THE THROUGH ZONE (2)

As the name describes, this is the main area for people who walk. It serves as the physical connective infrastructure for pedestrian desire lines.

- This area shall be free of obstacles.
- Paving shall be slip resistant and even.
- This area shall be as wide as possible where foot traffic is most likely to occur, but always be wide enough for wheelchairs and parents with strollers so as to provide a comfortable space for people on foot to walk along other users.

FURNISHING ZONE (3)

This area shall accommodate aesthetically pleasing and comfortable seating areas for pedestrians.

They can range from a few preset styles that fit the overall context while allowing room for individuality.

Utility equipment, sidewalk cafes, landscaping and kiosks are also located in this area.

The furnishing zone shall:

- Have all elements clearly defined by a coherent layout that maximizes public space.
- Provide through access for pedestrians at various points.
- Efficiently accommodate transit stops and bicycle parking in an aesthetically pleasing manner.

EDGE ZONE (4)

This is the zone adjacent to the travel ways. It provides a safe transitional space for cars parked along the street to open doors.

Street signs, and light posts are usually placed here on most streets.

Edge zones shall:

- Combine furnishings zone and edge zone where necessary for transit stops and taxi waiting zones

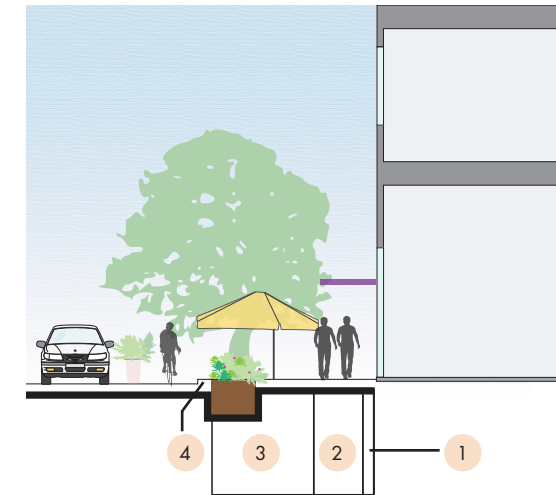


Fig 3.4 Pedestrian realm.

The pedestrian environment is usually defined by two common boundaries: The property line and the curb. The pedestrian environment can also be conditional. Pedestrians might occupy the entire street during festivals, bicycle days, block parties and markets.

PARKLETS: ANATOMY OF A PARKLET

A Parklet is a small “park”, plaza or creative public space that is formally and permanently installed in what would usually be an on-street parking area. Parklets are most commonly the length of 1 to 2 parallel parking spaces or 3- 4 angled parking spaces, however, length may vary according to design and street configuration.

Streets make up a large part of urban public space. Parklets offer many advantages to the quality of public space and the context that surrounds them. Parklets come in many shapes, and vary greatly in purpose. Specific programing and design of the parklet should be subjected to an approval process to determine the best suitable use according to location.

- 1 Parklets are allowed on streets with speed limits of 25 mph or less.

- 2 In general, Parklets must be located at least 1 parking space away from the corner. Bulb-outs and other physical barriers that protect the parklet, may allow for corner parklets.
- 3 All parklets must include 4-foot setbacks on either side to buffer the parklet from adjacent on-street parking spaces and driveways. They must include bollards or other elements of physical separation.
- 4 A 3 foot wheel stop must be placed at both ends of the parklet to prevent accidents.
- 5 ADA access must ALWAYS be included in all parklet configurations.
- 6 Parklets should attempt to include bicycle parking in all the designs.

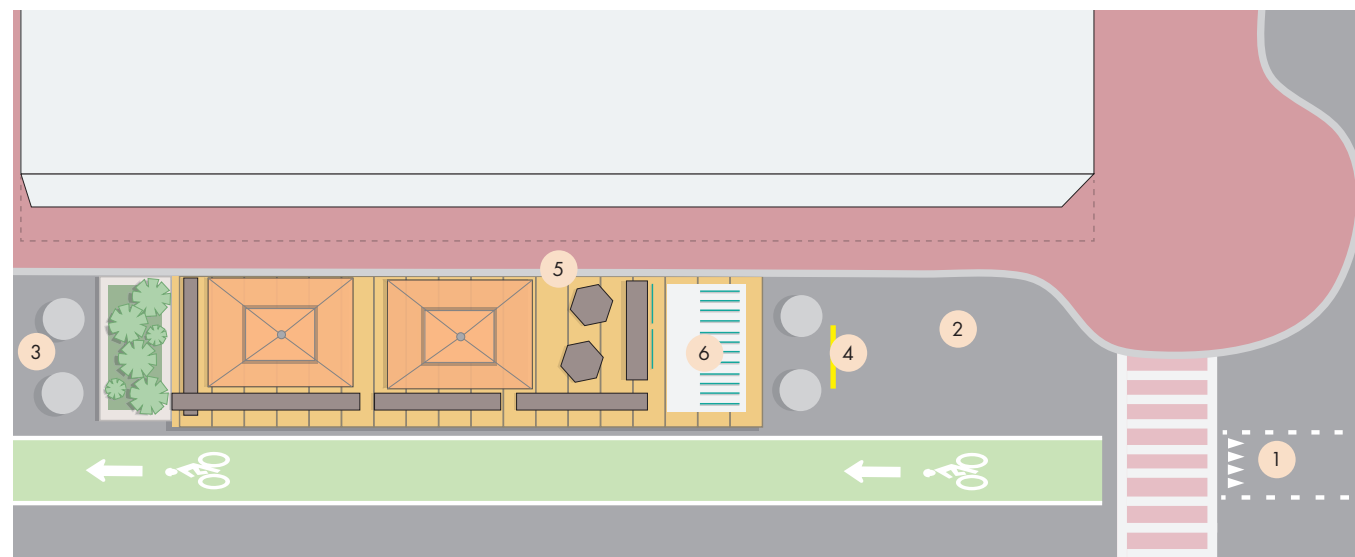


Fig 3.5 Parklet standards (a).

In addition, Parklets must comply with the following standards:

- The parklet must be installed in metered spaces only.
- Parklets may not be installed on bus lanes, in front of active driveways, fire hydrants or access points. If a parklet is located next to a driveway, the parklet must be set back 2 feet from the outer edge of the driveway.
- Parklets cannot be installed in a parking lane that becomes a travel lane at any time of the day.
- Parklets cannot be installed in close proximity to high turn over businesses like: Post offices and banks.
- The parklet should have an edge to buffer the street. This can take the form of planters, railing, cabling, or some other materials approved. Height and scale of the buffer required may vary according to local context. For example, on some low-traffic streets, a continuous edge may not be required.
- Parklets must maintain visual porosity between the sidewalk and adjacent travel lanes. Columns and other vertical elements are allowed. Elements like continuous opaque glass or vegetation may not be higher than 42"
- The space underneath the parklet must be accessible through removable pavers or planks. Parklets are platform surfaces.
- Parklets are public space.
- With standard setbacks, the dimensions of a parklet in one space (9'x20') would be 6' x 12'.

In order to guarantee high standards of safety, aesthetic compliance and accessibility, parklet proposals shall include :

1. A map with the parking location and context.
2. A detailed plan of the adjacent area including:
 - sidewalk width.
 - manholes and other access points.
 - existing metered parking spaces.
 - Identified entrances and uses of adjacent buildings.
 - Existing utility panels, lights, bike racks, fire hydrants etc.
 - Adjacent bicycle facility or travel lane
 - Proposed parklet dimensions including setbacks.
3. A detailed section of the parklet including:
 - All elements included in the design.
 - If plants are to be used (always encouraged), a list of all species must be provided.
 - Detailed elevation.
 - Materials to be used.
4. A detailed construction drawing approved by a drawing sealed by a professional engineer/ architect that includes:
 - Hardware to be used.
 - A detailed drawing of the drainage channel as well as accessibility to the channel if it gets blocked.

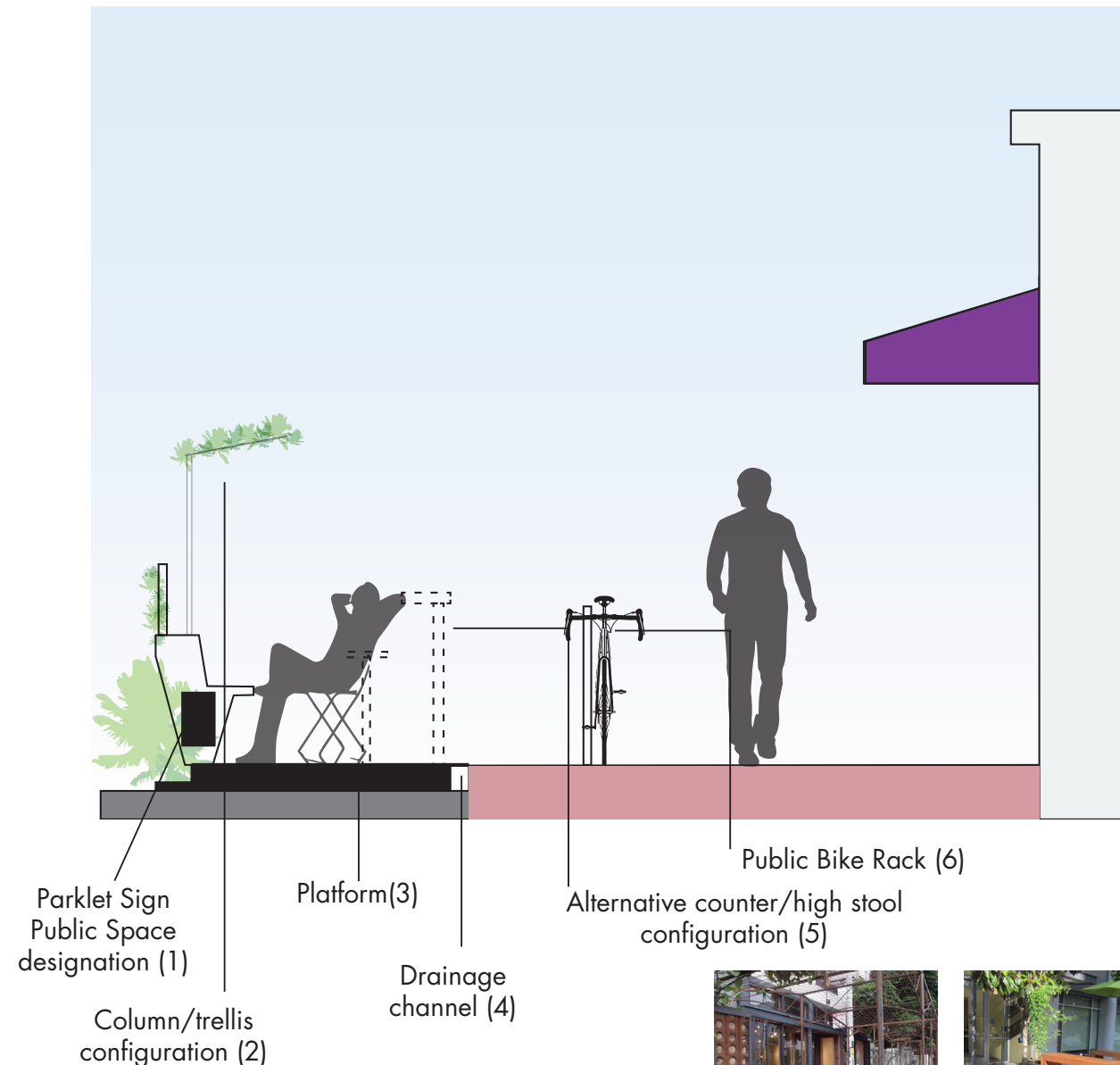
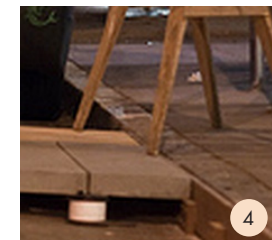
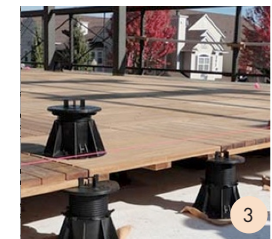


Fig 3.6 Parklet standards (b).



PARKLETS: TYPES

COMMON TYPES OF PARKLETS

Currently, most parklets around the country/world are either a :

- Sidewalk Extension
- Sidewalk Café
- Landscape Lounge

Among these three types, designs and construction materials may vary greatly and is dependent on artistic vision while considering sustainable materials and surrounding context. The following are examples of possible configurations of the various types of parklets.

Parklets are versatile in style and function. So far, designs have incorporated seating, gardens, bicycle parking, small lending libraries, performance stages exclusively or in various combinations. Design schools, stake holders and government entities usually host competitions for innovative parklet design and programming.

The parklets on these pages illustrate a few examples of designs from around the country and internationally. Most parklets tend to incorporate bicycle parking, seating and landscape elements. Parklets have permanent structures, however, they may be removed/relocated with relative ease if any street repairs are needed. In addition, parklets may be temporarily closed without need of removal. IE : access to manholes and drainage channel cleaning.

THE SIDEWALK EXTENSION (1)

Commonly used when sidewalks are not wide enough for the amount of foot traffic they support. Sidewalk extensions provide extra room for pedestrians as well as comfortable and aesthetically pleasing places to sit and relax. Sitting structures are usually located on the perimeter of the parklet; this allows a seamless extension of the sidewalk.



credit: San Francisco Planning Department



credit: dailycars-us.blogspot.com

Sidewalk extension configurations feature built-in seating and in some cases built-in tables

SPONSOR DAILY RESPONSIBILITIES:

- Water plants,remove dead plants.
- Maintain parklet free of debris and garbage.
- Maintain drainage channel clean.
- Remove unauthorized graffiti.
- Report any accidents as they occur.
- Monitor and fix any damaged elements.

THE SIDEWALK CAFE (2)

Sidewalk cafe configurations, are commonly but not exclusively found along street-fronting businesses serving food and beverages.

Sidewalk cafe parklets feature movable furniture that offers a larger versatility of use. Parklet users don't need to be patrons of the sponsoring community partner,however, a high number of users found in this type of parklets usually are.

The sidewalk cafe parklet provides a great place for a meeting, a place to enjoy lunch or catch up with work.

SPONSOR DAILY RESPONSIBILITIES:

- Store all movable furniture after business hours.
- Water plants,remove dead plants.
- Maintain parklet free of debris and garbage.
- Maintain drainage channel clean.
- Remove unauthorized graffiti.
- Report any accidents as they occur.
- Monitor and fix any damaged elements.



credit: labikas.files.wordpress.com



credit: www.berkeleyside.com

PARKLETS: TYPES



credit: hblog.archpaper.com



credit: www.sustainablecitiescollective.com



credit: www.gehlarchitects.com

THE LANDSCAPE LOUNGE (3)

The landscape lounge configuration features creative designs of built-in seating while integrating abundant landscaping elements. This type of parklet is perfect for relaxing and people watching.

Steps, planters and slopes are common elements found in lounge parklets.

SPONSOR DAILY RESPONSIBILITIES:

- Water plants, remove dead plants.
- Maintain parklet free of debris and garbage.
- Maintain drainage channel clean.
- Remove unauthorized graffiti.
- Report any accidents as they occur.
- Monitor and fix any damaged elements.

WHY PARKLETS?

Parklets serve many functions. Physically, they help with traffic calming by creating the chicane effect. In addition, parklets turn a few parking spaces into people-oriented spaces; they help expand the usable open space network in the city, providing people with places to gather. Parklets may also serve as additional seating for restaurants and cafes while generally increasing/encouraging pedestrian activity and non-motorized modes of transportation.

WHO CAN APPLY FOR A PARKLET?

Parklets are sponsored by: Business Improvement Districts (BID's), Community Benefit Districts (CBD's), community organizations, non-profit agencies, storefront business owners or tenants, property owners (commercial or residential) and other eligible organizations may apply to become Community Partners who are then responsible for the operation, maintenance and management of the parklet. However, parklet amenities must remain open and free to use by any member of the public.

ARE PARKLETS OPEN TO THE PUBLIC?

Yes. Parklets are considered public open space. If a parklet is located in front of a business, parklet users don't need to be patrons to enjoy the parklet.

HOW LONG WILL IT TAKE TO INSTALL A PARKLET?

Installation takes about one to two weeks, the entire process from application to approval may take 3 to 6 months.

HOW MUCH DOES A PARKLET COST?

If a permit is granted, the sponsor is responsible for :

- The system-wide revenue generated by a single metered parking space or the highest annual revenue generated by a single metered parking space multiplied by the number of spaces occupied by the parklet.
- \$200 for site inspection before and after installation.
- All costs related to design, materials and installation.
- In case of removal, the sponsor is responsible for all removal costs.

WHAT IF A PARKLET GETS VANDALIZED OR DAMAGED?

Parklet sponsors are responsible for the ongoing maintenance the parklet including replacing, painting or fixing elements damaged due to vandalism.

ARE PARKLETS ADA ACCESSIBLE?

All parklet designs shall contain at least 1 ADA compliant accessible entrance.

HOW LONG IS A TYPICAL PARKLET?

Parklets are usually 1 to 3 parallel parking spaces in length or its equivalent in angled parking. In cases where community partners desire corridor-long interventions, further coordination and in depth feasibility studies are necessary. Corridor-long interventions are referred to as *linear plazas*.

WHAT HAPPENS TO MOVABLE FURNITURE?

Community partners are responsible for upkeep of any movable furniture. In addition, all movable parts of the parklet must be locked or stored after business hours.

PARKLET LANDSCAPING

Landscaping elements are encouraged in parklet design due to the fact that they increase patches for habitat and are aesthetically pleasing. All landscaping maintenance is the responsibility of the parklet sponsor .

WHAT IS GENERAL PARKLET MAINTENANCE?

Sponsors, as mentioned in this section as responsible for general maintenance including furniture and non-approved graffiti removal. In addition, community partners must maintain the area under the parklet free of debris in order to allow proper drainage, and power wash parklet annually or more often if necessary.

CAN I APPLY FOR A PARKLET IF MY BUSINESS DOES NOT FACE THE STREET?

No. Only street-fronting property owners, or tenants may apply for a parklet.

DO APPLICANTS NEED LETTERS OF SUPPORT?

Parklets are public spaces, applicants must gather letters of support, petitions and other documentation from surrounding businesses or residents in order to prove community outreach and involvement as part of the parklet application process.

PARKLETS: F.A.Q

WHAT IS THE PURPOSE OF A PARKLET?

Passive:

Typically parklets have been implemented for passive uses like sitting to take a break from walking or as a small plaza where parklet users can have their lunch or a cup of coffee.

Active:

However, parklets may also support active recreation or public services depending on the sponsor. For instance: A parklet sponsored by a sporting good store may host related events on the parklet like parklet bootcamp, yoga class etc. In addition, the parklet may support a bicycle pump, and repair , exercise equipment or other creative and active uses as long as they are available to the general public without the need of being patrons of the sponsoring business.

Bike Corrals:

A bike corral is a parking space or series of parking spaces that have been re-purposed to serve as bicycle parking serving adjacent businesses. Basic bike corrals provide a rack onto which users can lock their bicycles. Bike corrals may offer shelter, bike pumps, repair vending machines, etc.

WHERE CAN A PARKLET BE LOCATED?

Parklets are mostly installed on parallel or angle parking spots along the right of way of low to moderate speed streets. However, parklets may also be installed in medians, excess asphalt space at irregular intersections, traffic circles, and along the frontage of uncovered parking lots.



BICYCLE PARKING

Bicycle parking is often overlooked. The placement, type and frequency of bicycle parking facilities are crucial to the bicycle network and its overall usage. Bicycle parking has the potential to increase business revenue, increase commuter trips and get citizens riding at various times of the day/night.

BICYCLE PARKING

In order to obtain the goals set forth in this plan, the City of Miami Beach should work with residents, local property owners, business tenants, and government partners to offer more expansive bicycle parking options, including bicycle parking shelters, in-street bicycle parking corrals, and seriously consider the viability of a bicycle commuter center and decorative public art doubling as bicycle parking. Recommendations for improving supply and integrating new types of facilities throughout Miami Beach are described and illustrated in the pages ahead.

INTRODUCTION

The provision of accessible, attractive, and safe bicycle parking options for both short and long-term use is critically important to supporting bicycling as a viable mode of transportation in Miami Beach. In recent years, the City of Miami Beach, private property owners, and business owners have installed hundreds of new, well-designed bicycle racks, particularly for short-term use. This bicycle parking plan makes recommendations for developing high quality, plentiful, and visible bicycle parking options serving residents and visitors for years to come.

EXISTING CONDITIONS

Today, there are more than 600 publicly accessible short-term bicycle parking spaces in Miami Beach, and more being added each year. As the map at right indicates, these spaces are created by a variety of bicycle parking types found throughout The City.

Yet, analysis reveals that supply is not meeting the current and coming demand. And in many locations, existing bicycle parking facilities are often undersupplied and/or poorly sited, which detracts from their usefulness and viability.

Unsurprisingly, most of the city's current bicycle parking supply is found where demand is high.

These locations include public parks, at civic buildings, and along commercial streets like Washington Avenue, Lincoln Road, 41st Street, and 71st Street.

The bicycle parking intensity use map this page demonstrates where demand is concentrated. In many of these locations, the supply but also the quality of the infrastructure needs to be increased.

For example, bicycle parking at key destinations, like gyms, pharmacies, restaurants, and bars is often oversubscribed or in some cases underused because of a poor selection in bicycle parking type and/or placement. Both conditions cause people to choose to lock their bicycles to other vertical elements, like street signs, parking meters, and fences. When this occurs, the city's high number of pedestrians are inconvenienced and made less comfortable as they navigate around bicycle-strewn sidewalks.

In addition, long-term bicycle parking options, for say three hours or more, are few and far between. Bicycle parking of this kind — covered, high security, easily accessible — is needed within residential neighborhoods and at transit hubs, schools, large residential and commercial developments, and employment hubs. Such facilities will encourage more people to bicycle for transportation.

Without an increase in supply, quality, and type, it will be difficult for Miami Beach to obtain the bicycle mode share goals set forth in this plan. A more detailed analysis is found in the pages ahead for South Beach, Mid-Beach, and North Beach.

600+	BICYCLE PARKING LOCATIONS
89	CITIBIKE LOCATIONS
6	BICYCLE PARKING TYPES



Fig 3.7 City-wide existing bicycle parking locations.



Placement of bike parking is integral for success. Without adequate supply and visibility, bicyclists will lock their bicycles to the nearest vertical element. Not the preferred bicycle parking. Low bike efficiency. Correct placement of parking provides a clear pedestrian through zone. Parking must address all types of bikes.

BICYCLE PARKING

PROPOSED BICYCLE PARKING

The bicycle parking plan illustrated at right identifies 804 new locations for bicycle parking. The locations were determined by analyzing land use and urban characteristics, demand, and available space. Each location was then matched with an appropriate type of parking to serve as many users as possible. The analysis revealed that many of the short-term racks found throughout the city do not meet best practice specifications and that long-term parking is almost non-existent. Thus, the following five short and long-term parking facilities types are being recommended.

Short-term Parking Types

- Bike Corral
- Public Art Rack

Long-term Parking Types

- Bicycle Shelter
- Bicycle Locker
- Bicycle Station

These five types, plus the city's standard inverted-u rack, should comprise the bulk of the city's parking in the future.

Fig 3.8 City-wide existing + Proposed bicycle parking locations.



Fig 3.9 City-wide existing bicycle parking intensity.



Bicycle parking types range from basic bicycle racks to semi-enclosed bicycle shelters, to full “bike stations” that provide a combination of amenities that include indoor bicycle storage, repair facilities, showers, lockers, changing rooms, rentals, and even café/social gathering spaces. While countless bicycle parking designs and configurations exist, they may be described as two overarching types: short- and long-term parking. Each of these types is explained below.

Short-term parking facilities consist of standard bicycle racks, and temporary event “valet” parking. Long-term parking facilities include semi-enclosed bicycle shelters, fully enclosed bicycle lockers, and fully enclosed bicycle stations/storage rooms. Matching each of these types and the available configurations to the right land use context is not difficult, but requires an analysis of the following conditions.

- Intended bicycle user group
- Length for which bicycles are likely to be parked
- Proposed location and surrounding land uses
- Local climate considerations (shade, rain)
- Ability of the proposed facility to provide orderly, safe, and attractive bicycle parking
- Basic performance standards and parking site guidelines
- Currently, the City of Miami Beach offers no long-term parking facilities.

SHORT-TERM BICYCLE PARKING

The majority of bicycle parking facilities are intended for short-term use, generally less than three hours.

Short-term bicycle parking is generally associated with commercial/retail, civic, and/or recreational land uses. As a result, proximity to destination is often prioritized over protection from weather and absolute security. Beyond the use of a personal bicycle lock and the quality of the rack, passive surveillance — otherwise known as “eyes on the street” — is the only security provided

BICYCLE RACKS

Bicycle racks allow for the temporary storage of bicycles in a safe and organized manner. The most effective types are those which are easy to identify visually, efficient in their ability to accommodate the intended amount of parked bicycles, allow for easy bicycle maneuverability in and out of the designated bicycle parking space, enable the bicycle to be secured properly by providing at least two points of contact with the bicycle frame, and allow both the frame and the wheel to be secured to the bicycle rack.

Two simple and recommended forms that meet these standards are the inverted “U” Rack and the “Post and Ring.” The former comprises the standard Miami Beach city rack.

STANDARD BICYCLE RACK RECOMMENDATION

It is recommended that Miami Beach continue to use its standard silver inverted “U-rack.” However, certain contexts may allow or dictate a different parking facility or design type, as described below. In particular, the addition of bicycle corrals may require the city’s existing racks to be placed on ground rails.

BICYCLE RACKS LOCATION RECOMMENDATIONS

It is recommended that the city’s standard bicycle racks be considered as a replacement to those locations where bicycle racks do not currently meet the design standards included in this plan.



The above bicycle parking is well-spaced, properly oriented parallel to the curb, and a safe distance from the tree and the curb.

BICYCLE PARKING: TYPES & STANDARDS

BICYCLE RACK SAFETY AND PERFORMANCE STANDARDS

To prevent theft and to ensure public safety, all bicycle racks should meet the following design guidelines:

- Support the frame of the bicycle in at least two locations
- Allow the frame and one wheel to be locked to the rack when both wheels remain on the bike
- Allow the frame and both wheels to be locked to the rack if the bicyclist decides to remove the front wheel
- Allow the use of cable, chain, and U-shaped locks
- Be securely anchored to the ground;
- Be usable by bicycles with bottle cages, panniers, etc.
- Be usable by a variety of bicycle sizes and types (children's bicycles; tricycles, step-through frames, etc.) keep both wheels on the ground.

In addition, all bicycle racks should not be capably compromised by hand tools, especially those that are easily concealed such as wire cutters or screwdrivers. Bicycle racks and the bicycles secured to them should not create a tripping hazard or barrier for pedestrians and the visually impaired (see location standards on page x). Finally, all outdoor bicycle racks and any related facilities should be well-lit and highly visible at night so that users feel safe using them at all hours.

EVENT-BASED VALET BICYCLE PARKING

Miami Beach is home to an incredible amount of events that draw thousands and thousands of people to concentrated points. One way to manage the stress on the street network is to encourage other forms of transportation, such as cycling. In many instances, doing so could overwhelm the existing bicycle parking infrastructure. Thus, another option is to seek out organizations, like the Green Mobility Network, to help staff, manage, and promote temporary event bicycle parking.

LONG-TERM BICYCLE PARKING

Long-term bicycle parking facilities are intended for use that generally exceeds two hours (see Table 2). Long-term bicycle parking is associated with residential, workplace, and transit-related land uses where parking for long durations is common. As a result, proximity to the final destination is a lower priority than protection from the elements and guaranteed security.

BICYCLE SHELTERS

Bicycle shelters provide highly visible, semi-enclosed protection from the elements. Bicycle shelters should be placed at highly frequented bicycle destinations where users tend to park for periods of two-hours or more. Such places include, but are not limited to, employment centers, transit stops, civic buildings, parks, and schools.

Bicycle shelters provide an opportunity to display safety information, a map of the regional and local bicycle network, and/or any other relevant bicycle or local information.

The spacing between individual bicycle racks and/or other streetscape elements must be taken into account and should follow the general bicycle parking performance and location standards. Likewise, bicycle shelters should be easily identifiable, well lit at night, and sufficiently protect bicycles from the elements.

Developers of property in Miami Beach may consider pursuing the implementation of bicycle shelters in strategic locations, such as within the grounds of the project. Doing so will raise the profile of bicycling and provide a parking amenity for residents and visitor that provides shelter for longer parking stints.

BICYCLE LOCKERS

Bike lockers are medium to large in size and depending on size can be located at transit hubs, bus stops, on a high turnover commercial strip, or at pedestrian-only streets. They provide security and shelter and promote multimodal ridership and traffic alleviation.

BICYCLE STATIONS

Bicycle stations are intended to serve as a local/regional hub for all bicycling activities. Such facilities may offer a wide variety of services, such as secure and attended parking facilities; bicycle rentals; showers, lockers and changing facilities; repair services or facilities; and cafe/social space.

The combination of these facilities provides the highest level of bicycle parking service for long-term and frequent use, and will elevate the visibility and viability of bicycling in Miami Beach.

Bicycle stations are most appropriate in urban core, central business district locations, and at transit hubs where bicycle commuters and tourists may maximize the services offered. Cities such as Chicago, IL, Santa Monica, CA, Cambridge, MA, Washington DC, Berkeley, CA, and Long Beach, CA all provide working models.

It is recommended that the City of Miami Beach pursue a bicycle station-like facility in South Beach, within the center city. An ideal location would be within a short distance of Lincoln Road where such a facility would be highly visible and of utility to bicyclists cycling to work. Some ideas include a facility within a municipal parking garages, built within a municipal parking lot, or even in a leased storefront.

BICYCLE CORRAL RECOMMENDATIONS

The bicycle corral is an increasingly common type of short-term bicycle parking type used where bicycle parking demand is high and sidewalk space is either limited or duly accommodates high volumes of pedestrian traffic. Bicycle corrals most commonly replace automobile parking spaces or are placed within site triangle visibility zones, which still allow for motorist a clear view yet also allow the added amenity of bike parking to be added. Depending on the configuration, a single motor vehicle parking space may yield between six and 12 bicycle parking spaces within a single corral.

PUBLIC ART BICYCLE RACKS

The City of Miami Beach standard bicycle rack is already an attractive element in the streetscape. Neighborhood, civic, district, non-profit, institutional, or business groups located within the city, should be encouraged to pursue bicycle parking facilities that reinforce an existing cultural, historical, business, or social character. In such instances, custom or public art bicycle racks can creatively address bicycle parking needs while simultaneously enhancing the profile of bicycling and the destination served by such racks. While custom bicycle racks do cost more than off-the-shelf racks, they raise the profile and visibility of bicycling in general, and improve the public perception regarding city or organizational/business values. They also bring positive attention to bicyclists for making sustainable and healthy transportation choices.

However, many art rack designs unintentionally undermine the intended function, often resulting in inefficient or unrecognizable facilities that are avoided by users. Therefore, the provision of art racks must meet or surpass the guidelines and performance standards in this Plan.

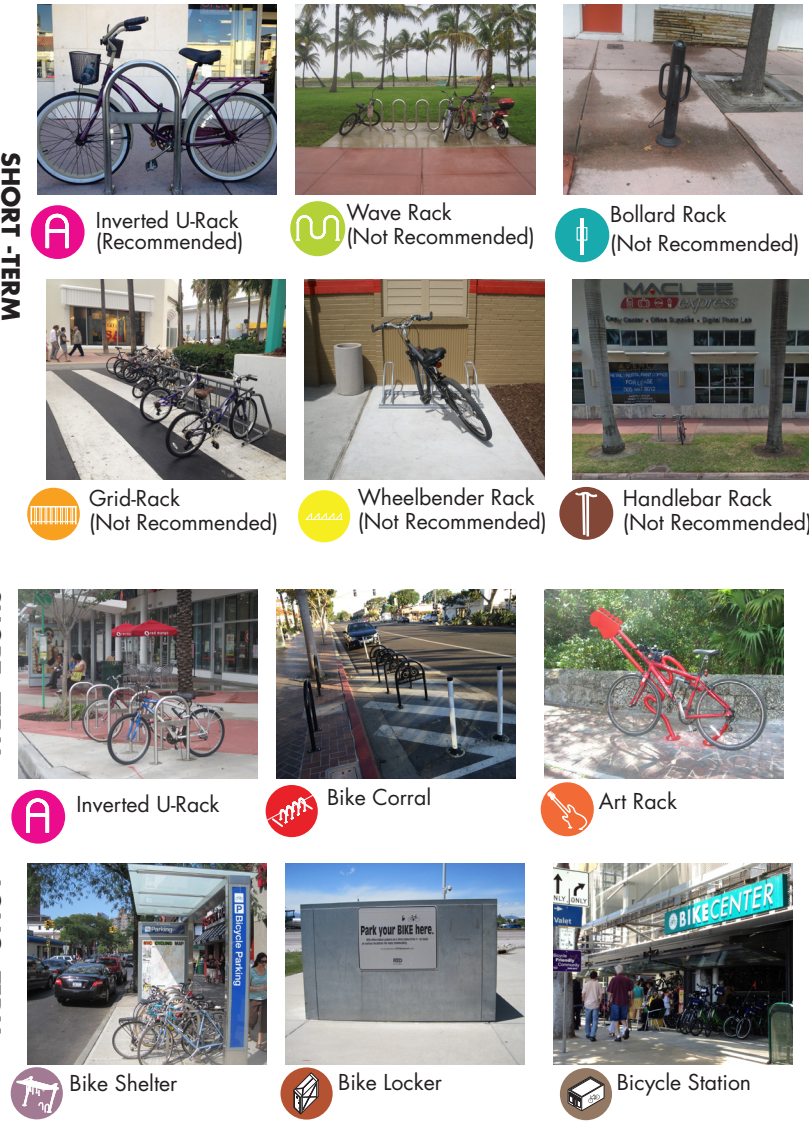


Fig 3.10 Bicycle parking types matrix.

BICYCLE PARKING: TYPES



Bicycle parking corrals help maintain a clear sidewalk, increase overall parking supply, and often become social spaces.



Adding a bike valet can help attract hundreds of cyclists who might have otherwise driven.



Bike Station Store Front and parking lot.



Art rack located next to a Parklet.



Efficient, safe parking inside a bicycle station.



Bike Station, Washington D.C.

GENERAL BICYCLE PARKING LOCATION AND PERFORMANCE STANDARDS

The use of bicycle parking and other end-of-trip facilities is largely dependent on their location. Similar to motorists, bicyclists desire to park as close and as conveniently to their destination(s) as possible. However, the degree of proximity may vary by the type of facility being provided and the type of trip/user it is intended to serve.

Short-term parking facilities, like bicycle racks, should be located as close as possible to the destination(s) they serve. This is especially important for streets served by concentrations of retail where any prolonged effort to find adequate bicycle parking is as frustrating for the bicyclist as circling the block for vehicle parking is for the motorist.

Long-term parking, such as bicycle stations or shelters, should also be as convenient as possible. However, the protection from inclement weather and the enhanced level of safety/service that such facilities provide often compensates for lack of immediate proximity.

Similarly, shower, changing rooms, and locker facilities need not be located inside the destination they serve, but should provide enough access and measurable convenience that commuting by bicycle is as easy as possible for the greatest number of people. Employers unable to provide such facilities may consider negotiating access with nearby fitness gyms for their bicycling employees.

Short- and long-term bicycle parking facilities should adhere to the following location and standards. In general, safe bicycle rack locations should:

- Maximize visibility and minimize opportunities for vandalism by being located in locations within easy view of pedestrian traffic, windows, doors, and/or well-lit areas.
- Protect bicycles from inclement weather, as long as the facilities meet or exceed visibility, spacing, and performance standards.
- Locate bicycles a safe distance away from automobiles parked on-street, in lots, or in structures so that bicycles will not be damaged by opening doors or errant driving behavior.
- Not obstruct pedestrian traffic in any way by providing at least 5 feet in clear path.
- Place the rack(s) between the primary road/path used by bicyclists and the entrance to the destination(s) they serve.
- Not be located on or near stairs, walls, berms, or within handicap accessible ramps.
- Provide enough space for bicycles of all types to maximize the bicycle parking capacity of a given facility.

Specifically, bicycle racks for short-term parking should be located within 30 feet of the entrance(s) they serve. If impossible, racks should be no more than a 30-second walk, approximately 120 feet, away or at least as close as the nearest automobile parking space

Bicycle racks should be clearly visible from the approach to a destination's most actively used entrance. If located along a sidewalk, within the public right-of-way, bicycle parking should be visible from the street for which the sidewalk serves. Additionally, a large, single bicycle rack cluster should not serve an entire urban block. Rather, it is preferable to place several smaller rack clusters, or even single bicycle racks in multiple, convenient locations along the sidewalk.

SIGNS

If a bicycle parking facility is unable to be sited visibly in front of the destination it serves, or in another conspicuous location, then attractive signs should be provided at all primary entrances to direct bicyclists to the nearest bicycle parking location.

CLEAR PATH

Bicycle racks, shelters, lockers, and bicycle sharing stations must allow a minimum clear path of five feet in width so that pedestrians and disabled people may move past without obstruction.

CURB CLEARANCE

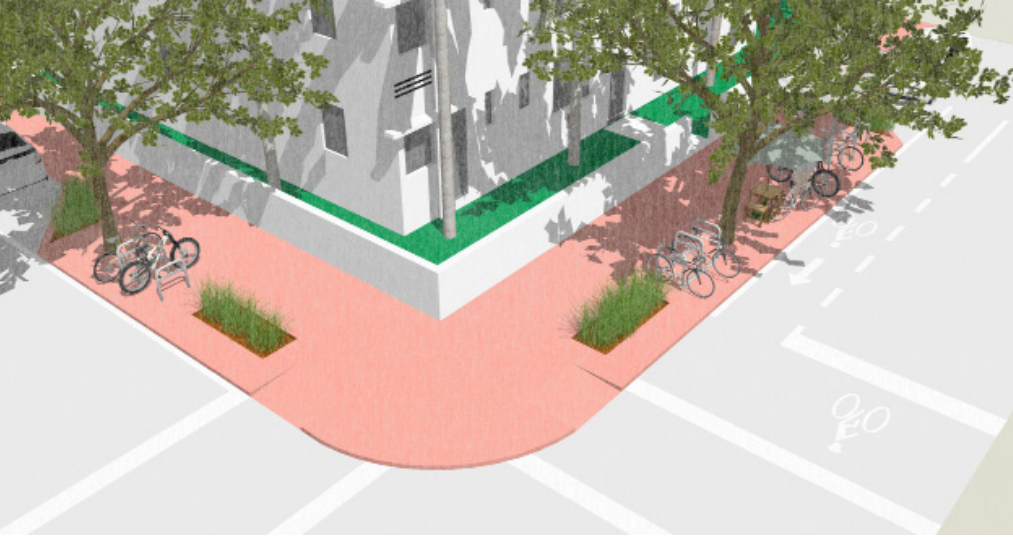
If located parallel to the thoroughfare, all bicycle racks must be placed at least 24 inches from the curb. Those placed perpendicular to the curb, however, must locate the nearest vertical component of the rack at a minimum of 48 inches from the curb's edge. Both dimension requirements will help prevent bicycles from being struck by car doors or moving motor vehicles.

DISTANCE BETWEEN RACKS

Bicycle racks aligned parallel to each other must be at least 36 inches apart. This includes racks that are sold as multiple rack units, which may be attached together. Racks that are aligned end-to-end should be at least 96 inches apart.

BICYCLE PARKING: STANDARDS

Fig 3.11 Bike parking on sidewalk. (a)



The temporary materials may be replaced by more permanent infrastructure, such as wider sidewalks, rain gardens, trees, public seating, and bicycle parking.

Fig 3.12 Bike parking on sidewalk. (b)



The result is a more environmentally-friendly and amenity laden streetscape for the neighborhoods of Miami Beach.



Bicycle parking located next to bicycle facilities promotes ridership. This particular set up elevates the perception of bicyclists belonging as users of the travel way.



Parklets extend the pedestrian realm, provide a wider through zone for pedestrian travel as well as a wider furnishing zone. Bike Parking can be incorporated into the parklet.

DISTANCE FROM WALLS/MAINTAIN PEDESTRIAN AISLE

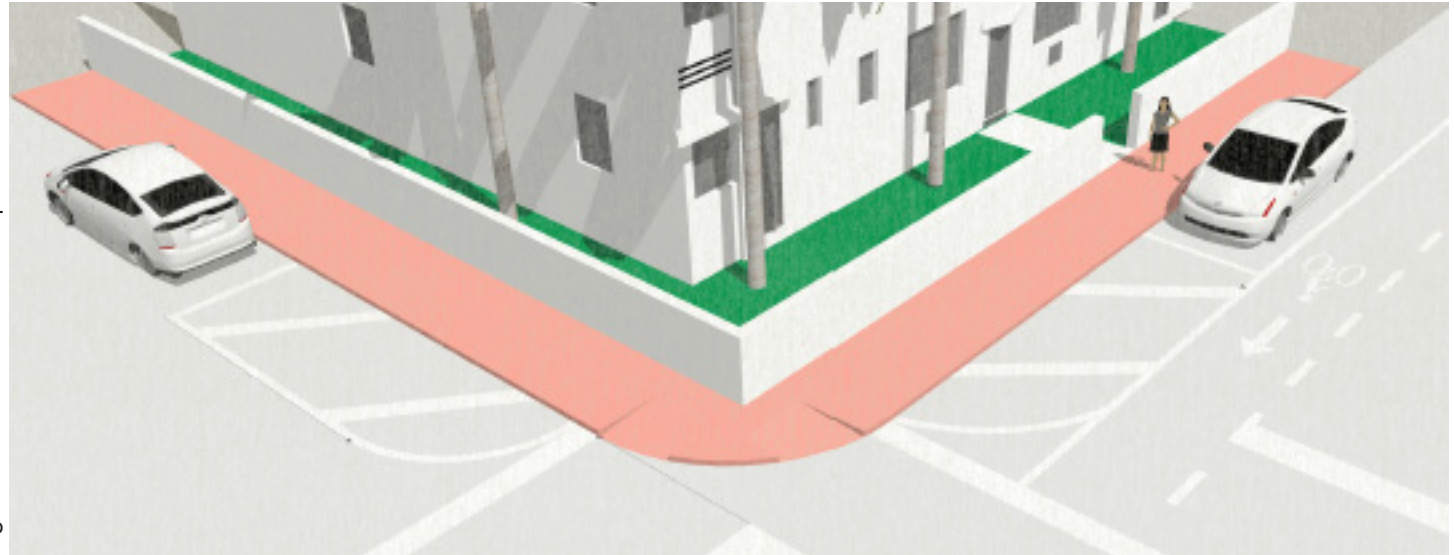
To ensure safe maneuvering and circulation, bicycle racks placed perpendicular to a wall must be at least four feet from the wall to the nearest vertical component of the rack. Bicycle racks placed parallel to a wall must be at least three feet from the wall. For indoor racks placed in groups, an adequate pedestrian aisle must be provided so that bicyclists can access and maneuver their bicycles in and out of the parking position. Bicycle racks placed perpendicular to a pedestrian aisle must be at least four feet from the aisle. Pedestrian aisles should be at least five feet wide wherever possible.

OTHER RECOMMENDED SITE DISTANCES

To ensure safety and convenience, bicycle racks should be located:

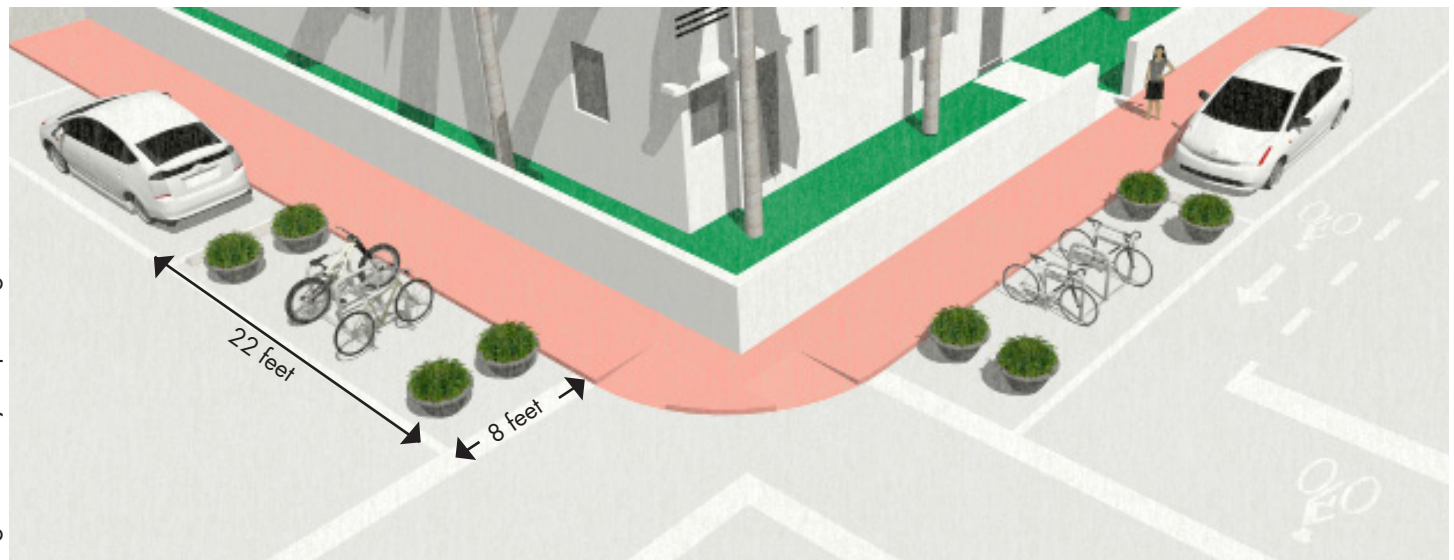
- 15 feet from fire hydrants, bus stops, taxi stands, hotel loading zones, transit stops, newspaper kiosks, etc.
- 10 feet from intersections/driveways/curb cuts five feet from any standpipes, or above-ground vertical structures like signs, meters, lights, mail boxes, planters, public bathrooms, pay phones, etc.
- Three feet from tree pit edges, grates, utility covers, etc.

Fig 3.13 Underutilized curb space at corner



Within residential neighborhoods, underutilized curbside space may be put to more efficient use.

Fig 3.14 Bicycle parking/corral at corner



In the short-term, temporary and low-cost materials may be used to provide landscape and bicycle parking amenities, while also maintaining visibility at the intersections for people driving.

BICYCLE PARKING: IMPLEMENTATION

POLICY + IMPLEMENTATION

It is the intent of this Bicycle Parking Plan to foster bicycling as a viable, safe, and sustainable form of recreation and transportation. Implementing bicycle parking and other end-of-trip facilities plays a key role in realizing this goal.

This Miami Beach Bicycle Parking Plan is conceived at the scale of the city, but will ultimately be implemented at the block and individual building scale as property is developed and redeveloped, and as requested by property and storeowners. Specific site analysis should be undertaken so that bicycle parking remains convenient, visible, and located properly in relation to the destinations and bicyclists it serves.

Like the overall bicycle network plan, the bicycle parking must be implemented in cooperation with a number of inter-related city, county, state, and private entities that have jurisdiction over the governance and physical development of Miami Beach and its public right-of-ways.

OPT-IN PROGRAMS

Many municipalities have created bicycle parking programs that encourage public and private partnerships that reduce the cost of purchasing and installing bike racks while simultaneously expanding the supply. For example, 50-50 match bicycle parking implementation programs encourage businesses to partner with the municipality to help cover the cost that ultimately serves them well. Such programs are worth researching and potentially adapting to certain contexts within Miami Beach.

Encouraging bicycle parking means inviting local property and business owners to help expand the supply to meet their tenant, employee, and customer needs. In some instances, upgrading bicycle parking facilities will be needed. Should property owners currently supply facilities that are less than desirable then this program should help them make their bicycle accommodations more robust.

MAINTENANCE

Once implemented, bicycle parking facilities of all types must be well maintained. All facilities should be kept clean, orderly, free of abandoned bicycles, bicycle locks, and other debris. These steps will help ensure that bicycle parking is used safely and frequently.

To remain attractive and functional, areas around the bicycle parking facility—whether it be a rack, shelter or otherwise—must remain well-paved, mowed, plowed, or otherwise tended and cared for so that bicyclists are not deterred from using the facility. The security of bicycle racks and other long-term parking facilities should be checked periodically so that each remains free from vandalism. This includes checking the function of lighting, enclosure conditions, and changing key codes or key fittings after facility use turnover.

Failing to meet basic maintenance standards will deter use and create additional opportunities for theft.

The responsibility for maintenance should be conferred upon the sponsoring entity (developer, businesses, individual property owner, etc.), or agreed upon between mutual public/private parties and/or multi-jurisdictional interests.

This will help ensure that bicycle parking remains viable, safe, and attractive.

BICYCLE PARKING RATIOS

The City of Miami Beach does not currently require bicycle parking to serve new development. It should. The bicycle parking ratio table on the opposite page is intended to inform the inclusion of bicycle parking into the city's zoning code. Doing so will help the city meet current and future demand, support the ongoing viability of two-wheel travel, and ultimately help the city to obtain the mode share goals set forth in this plan. The bicycle parking ratios are organized by short and long-term parking types and are keyed into the city's land use categories using square footage, employee, and/org building function to guide implementation. Peer cities with excellent bicycle parking requirements include Santa Monica, CA, Cambridge, MA, and Portland, OR.

This guidance is intended to aid the city so long as it's bicycle mode share remains at or below 10 percent. That said, Miami Beach is a very dynamic place. New development and changing land uses are common, with some serving as major bicycle trip generators. Thus, in some locations the supply may need to be increased and the parking type changed. For example, frequently oversubscribed bicycle racks on a sidewalk may be removed in favor of an in-street bicycle corral so as to serve the demand better and lessen the clutter for people walking on the sidewalk. Bicycle parking ratios and requirements should be reviewed in conjunction with each bicycle master plan update, or at least every five years.

LAND USE	SHORT-TERM BIKE PARKING	LONG-TERM BIKE PARKING
Single-Family Residential (RS-1, RS-2, RS-3, RS-4,TH)	No spaces required	No spaces required
Multifamily Dwelling		
a) RM-1, RM-2, RM-PRD1, RPS-1, RPS-2	0.05 spaces/bedroom, min. 4 spaces	0.5 spaces/bedroom, minimum 4 spaces
b) RM-3, RMPS-1, RM-PRD2, RPS-3, RPS-4	0.1 spaces/bedroom, min. 8 spaces	0.75 spaces/bedroom
Civic and Government Use (GU, CCC, WD2, MR)	1 space/20 persons of allowed capacity	1 space/10 employees
a) assembly (church, stadium, convention center etc.)	1 space/15 persons of allowed capacity	.25 space/15 persons of allowed capacity
b) non-assembly (library, marina, government building etc.)	1 space/8,000 s.f. of floor area,min. 4 spaces	1 space/10 employees, min. 2 spaces
Education (GU,SPE, CD-1, CD-2, CD-3)		
a) public/private day-care centers for 15 or more children	1 space/20 students of planned capacity, min. 2 spaces	1 space/10 employees, min. 1 space
b) public/private nursery schools, kindergartens, elementary schools (grade1-4)	1.0 space/20 students of planned capacity, min. 2 spaces	0.5 space/per classroom, min. 1 space
c) public/private junior high (grade 5-8), and high schools (grade 9-12)	1.5 space/20 students of planned capacity	1 space/10 employees, AND 1 space/20 students of planned capacity
Hospitals/Healthcare Institutions (HD)	1 space/5,000 s.f. of floor area, min. 4 spaces	1 space/10,000 s.f. of floor area, or 1/10 employees, whichever is greater, min. 4 spaces
Transit Hub		
a) rail station and high-use bus stops	Consider spaces for 1.5% of a.m. peak period daily ridership	Consider spaces for 10% of projected a.m. peak period daily ridership
b) off-street parking lots/garages available to the general public, with or without fees	Minimum of 6 spaces or 1 per 20 auto spaces. Unattended surface parking lots excepted.	1 space for each 20 automobile spaces* Unattended surface parking lots excepted.



BICYCLE PARKING: IMPLEMENTATION

Commercial (CD-1,2,3, RO, CPS-1,2,3,4 TC-1,2, TC-3,TC-3c, MXE)		
a) restaurant (restaurant, coffee shop, cafe etc.)	1 space for each 2,500 s.f. of floor area, min. 2 spaces	1 space/10 employees, min. 2 spaces
b) general food (grocery, convenience store, etc.)	1 space for each 5,000 s.f. of floor area, min. 2 spaces	1 space/10 employees, min. 2 spaces
c) general retail (clothing, souvenirs, electronics etc.)	1 space for each 1,000 s.f. of floor area, min. 2 space	1 space/10 employees, min. 2 spaces
d) office	1 space for each 8,000 s.f. of floor area, min. 2 spaces	1 space/10 employees, min. 2 spaces
Urban Light Industrial (I-1)		
	1 space for each 10,000 s.f. of floor area, minimum of 4 spaces	1 space/15,000 s.f. of floor area, minimum of 2 spaces

Fig. 5.14 land use and bike parking types matrix.

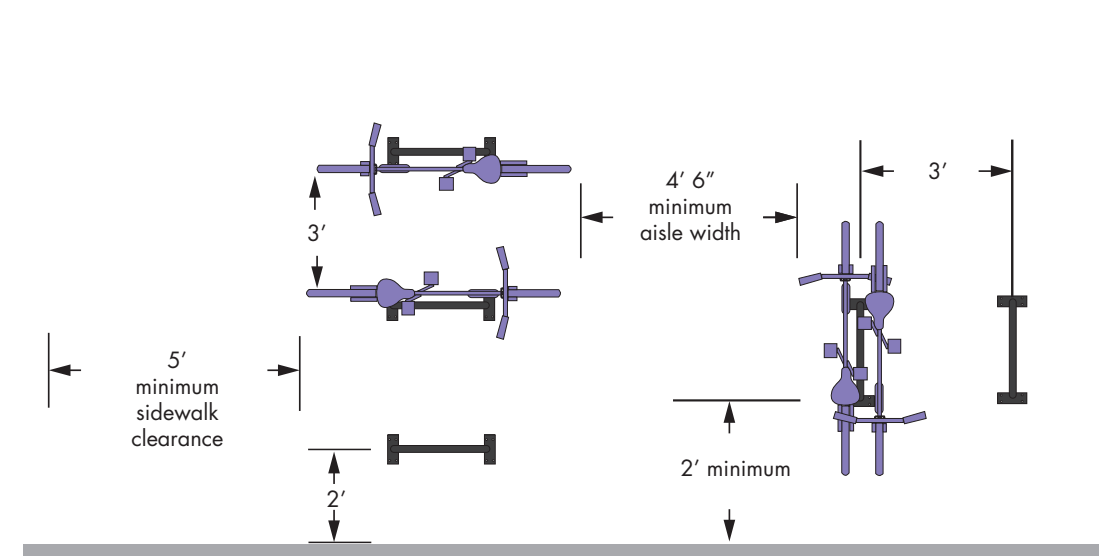


Fig 3.15 Inverted U bicycle parking installation standards.

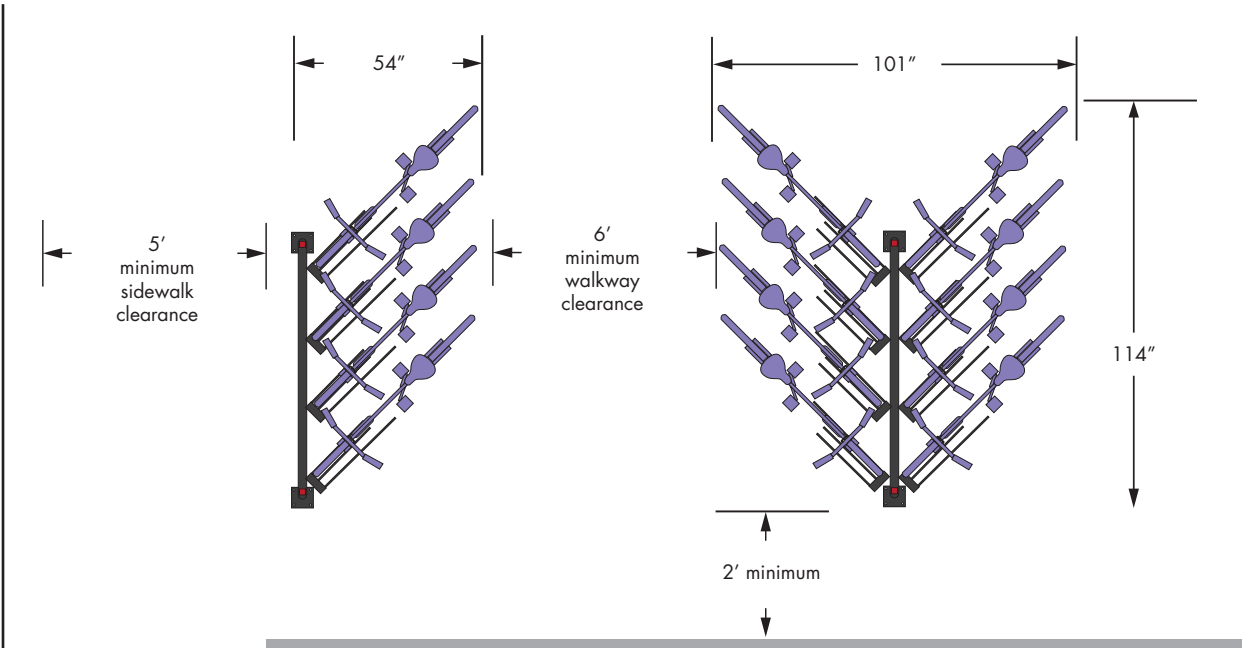


Fig. 3.16 Bike stall installation standards.



SIGNALS & SIGNS

Vertical signalization refers to signs affixed to posts or other structures which serve to inform all users of the public realm of potential hazards, speed limit, and information necessary to navigate the streets at ease like location of landmarks for wayfinding.

Horizontal signalization refers to various pavement markings, in-pavement detection signals for all users and elements that define the cyclist travel way separate from motor-vehicles.

SIGNALS & SIGNS: VERTICAL

Successful street design is measurable both qualitative and quantitative at various points throughout the public realm and in various contexts. While perception of success can range from user to user, street design is tested at convergence zones.

Intersections, as described previously in this guide, must be calibrated to accommodate all users spatially. Implementation of appropriate signals and calibrated timing are also of equal importance to minimize conflict among users. The design of signal timing varies by context, however, timing must be optimized along corridors and geared towards serving users in the appropriate level of priority.

PEDESTRIAN ACTUATED SIGNALS:

These signals integrate a push button that activates a "WALK / DON'T WALK" interval. Actuated pedestrian signals are sometimes paired with accessible technology. Accessible actuated signals are user activated and also provide assistance both spoken and visual. Accessible pedestrian signals can speak, however a simple steady sound may cue pedestrians informing them of crossing time while being unobtrusive.

Accessible pedestrian signals are also known as: Acoustic signals, audible pedestrian crossing signals and audio-tactile signals. Pedestrian Actuated Signals provide directional information either spoken, written, in Braille or all.

PEDESTRIAN FIXED SIGNALS:

Fixed signals are the signals commonly found on most roads. These signals are predictable and usually require less maintenance than actuated signals.

Fixed signals are commonly found in urban settings. They make complex interactions most predictable for all users. In most cases, however, they must be calibrated to serve pedestrian priorities first. This means that crossing intervals are sufficiently long for crossing while coordinating with adjacent signals.

At crossings where the signal is uncoordinated with adjacent traffic signals (free setting), designers can reduce pedestrian delay by reducing the minimum green time. At coordinated signal locations, designers have multiple options to decrease delay, including increasing the permissive window, adjusting signal timing for responsiveness at certain times of day, and setting the signal to recall on the pedestrian phase.

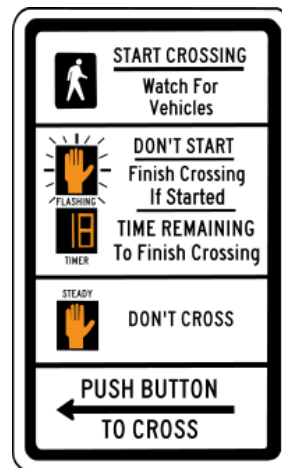


Fig. 3.17 MUTCD - R10 3e

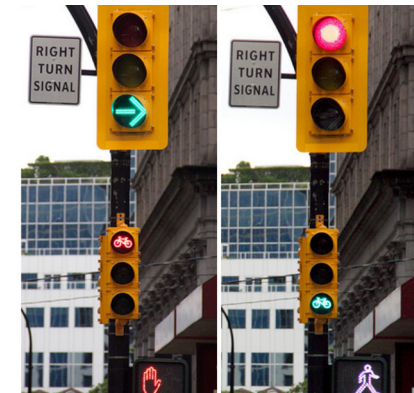
BICYCLE SIGNAL HEADS

A bicycle signal is traffic control device that should be used solely in conjunction with an existing conventional traffic signal or hybrid beacon. Bicycle signals are commonly used to improve identified safety or operational problems involving bicycle facilities, or to provide guidance for bicycle only movements and leading bicycle intervals.

Bicycle signal heads may be installed at signalized intersections to indicate bicycle-specific timing strategies or signal phases. In The United States, a vertical 3 lens signal (red, yellow and green) is commonly used.

BENEFITS

- Improves level of safety at high conflict areas. (Actual/ perceived).
- Helps to simplify traffic movements for bicycles and clarifies bike- specific movements for all users.
- Accommodates bicycle-only movements in complex intersections. (Bicycles may travel parallel to automobiles using the same signal if conflicting turns are restricted).
- Provides priority to bicycle movements at intersections.



An adequate clearance interval (i.e., the movement's combined time for the yellow and all-red phases) shall be provided to ensure that bicyclists entering the intersection during the green phase have sufficient time to safely clear the intersection before conflicting movements receive a green light.

TYPICAL APPLICATIONS

Where a bicycle facility or shared path crosses a street, particularly where the necessary bicycle clearance time is substantially different from the necessary pedestrian clearance time.

- At intersections where bicycle facilities may change (IE: Sidewalk-level protected bike lane to regular bike lane) if turning movements are significant.
- At intersections with contra-flow bike lanes that otherwise would not have a signal indication.
- At intersections with high number of motor vehicles and bicycle collisions.
- At intersections nearby schools and parks.
- To make it legal for bicycles to enter an intersection during an all-pedestrian phase(may not be appropriate in some cities).
- To give bicycles are leading green light at intersections or to indicate an all-bike phase were turning movement volumes are significant.

BICYCLE SIGNAL DETECTION& ACTUATION

Bicycle detection is used at actuated signals to alert the signal controller of bicycle crossing demand at an intersection. Bicycle detection can be activated through the use of push buttons just like pedestrian activated signals or it can occur automatically through detection mechanisms like microwaves, video or in-pavement loops, etc.

MICROWAVE

Miniature microwave radar that picks up non-background targets. It is more cost effective than video and is not affected by weather, or sun light changes.

Currently, Pleasanton, California is the only municipality in the country using this technology. Cyclists have reported improved efficiency and safety.

The microwave sensors are able to monitor up to eight detection zones, specified by the city, and can send up to four commands to the traffic signal control box; ie: "straight through", "left turn". The system updates information 20 times per second and is able to track moving and stationary vehicles.

Microwave systems cover a large area, allowing the cyclist to be positioned freely at the intersection while still being detected.

VIDEO

Video detection is aimed and calibrated to detect bicyclists. While this system might be effective for South Florida climate, the continuous video monitoring may cause a privacy concern.



PUSH BUTTON

User activated push button mounted on a pole facing the street.

Push buttons must be installed in a way that allows the cyclist to reach the button without dismounting the bicycle. In addition, a rest bar may be implemented along routes with expected heavy bicycle traffic.



credit: www.bicyclenetwork.com.au

SIGNALS & SIGNS: VERTICAL

HYBRID BEACON FOR BIKE ROUTE CROSSING OF MAJOR STREET:

A Hybrid beacon or High-Intensity Activated Crosswalk (HAWK), is made up of a signal-head with 2 red lenses over a yellow lens on the major street, and pedestrian/or bicycle signals on the minor streets.

The minor street approaches don't have signals for motor vehicles.

HAWKs are used to improve non-motorized crossings on major streets in places where the volume in the side streets does not support the installation of a conventional traffic signal. In addition, HAWKs can be installed on side streets instead of regular signal heads if there is a concern that a signal head might encourage additional motor traffic on sides streets.



credit: www.fhwa.dot.gov

1			
2			
3			
4			
4			
5			15
6			10
7			5
8			
1			

Fig 3.18 MUTCD sequence for Pedestrian Hybrid Beacon (Interim approval July 2008)

YIELD SIGNS

TURNING VEHICLES YIELD TO BICYCLES AND PEDESTRIANS (R10-15 alt.) sign may be used to show a permissive left or right turn to motorists who are requirement to yield to bicyclists at the crossing. If used at a crossing, the sign should be mounted on the far side of the intersection to improve visibility to left turning motorists. If possible, it should be mounted on the vehicle sign face.



Fig 3.19 MUTCD R-10-15 alt.

YIELD HERE TO BICYCLES (R1-5 alt. A) is used at locations where yield lines are provided to denote the location for motorists to yield to bicyclists in crossings of separated bike lanes. If the yield condition includes pedestrians, the YIELD HERE TO BICYCLES AND PEDESTRIANS (R1-5 alt. B) sign should be used.

These signs are not required, and should not be used in locations where sign clutter is an issue; however, these signs may prevent collisions in areas of high traffic volumes and should be considered.

The BEGIN RIGHT TURN YIELD TO BIKES sign (R4-4) should be placed at locations where the beginning of the right turn lane is also the merge point where motorists cross the separated bike lane

The YIELD sign (R1-2) may be used to warn bicyclists merging into a travel lane, or to warn motorists of other motorists when merging or at roundabouts.



Fig 3.20 R-10-15 alt. A



Fig 3.21 R-10-15 alt. B



Fig 3.22 MUTCD R4-4



Fig 3.23 MUTCD R1-2

Warning Signs

The BICYCLE WARNING sign (W11-1) may be placed at, or in advance of, uncontrolled crossings of separated bike lanes to alert motorists of approaching bicyclists. Using this sign should be limited to locations where the bike lane might be unexpected to crossing motorists. A TWO-WAY (W1-7 alt.) supporting plaque should be mounted below the W11-1 where the separated bike lane operates as a two-way facility



Fig 3.24 MUTCD W11-1



Fig 3.25 MUTCD W1-7 alt.



Fig 3.26 MUTCD W11-15

The BICYCLE/PEDESTRIAN WARNING sign (W11-15) may be used as a substitute of the W11-1 where a sidewalk is parallel to the separated bike lane and motorists may not be expecting to cross either the bicycle or pedestrian crossing

Confirmation Signs (1)

These signs are indicate to bicyclists that they are on a designated bikeway while at the same time, they alert motorists of bicycle priority or bicyclists presence along a particular street.

MUTCD PLACEMENT

Every 1/4 to 1/2 mile on off-street bike facilities like shared paths and sidewalk-level protected bike lanes. Every 2 to 3 blocks along on- street bicycle facilities unless another type of sign is used within 150 ft of a turn or decision sign) Should be placed soon after turns, to confirm destination. (Pavement markings can also act as confirmation signs)

Decision Signs (2)

These signs mark the junction of two or more bike routes. These signs inform bicyclists of a designated route as well as key destinations and distance.

MUTCD PLACEMENT

Near-side intersections where bike routes merge with another route or along the route to indicate a nearby destination.

Turn Signs(3)

These signs are used to indicate where a bikeway turns from one street onto another street. They include destinations, approximate distance and arrows.

MUTCD PLACEMENT

Near-side intersections where bike routes turn. Modified pavement markings on page 47 can also indicate the need to turn to the bicyclist.



SIGNALS & SIGNS: VERTICAL

ACTIVE WARNING BEACON FOR BIKE ROUTE AT UNSIGNALIZED INTERSECTION:

An Active warning beacon is a user-actuated sign with amber flashing lights that enhance the effectiveness of warning signs at unsignalized intersections or mid-block crosswalks.

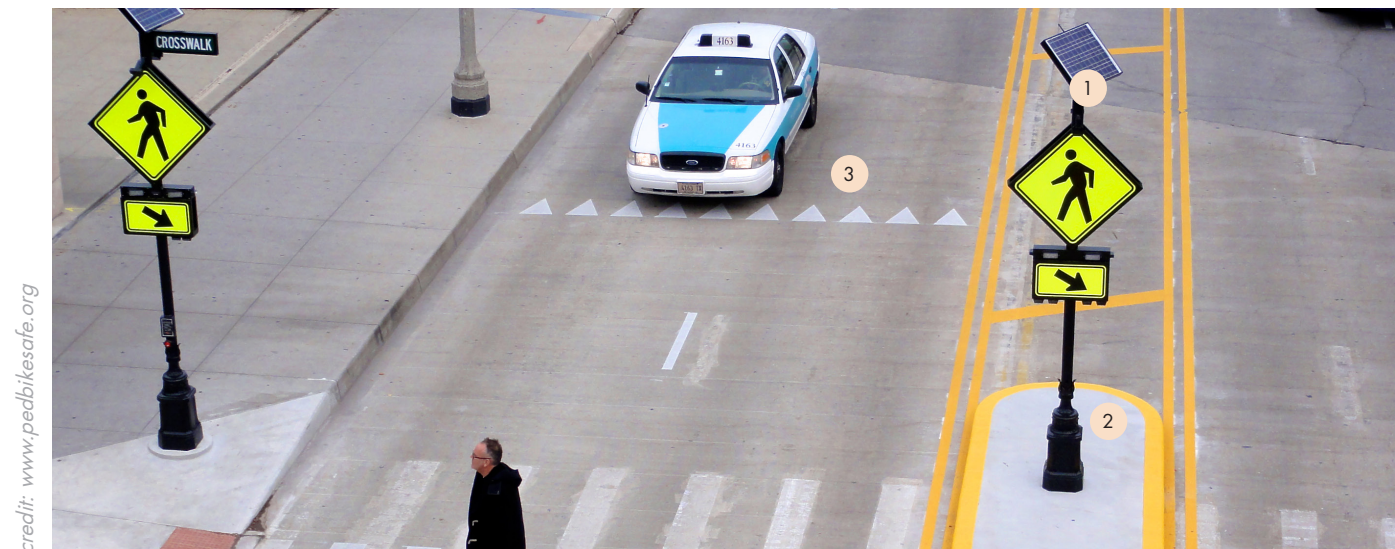
Bacons can be activated with a push-button system or passively through detection.

Rectangular Rapid Flash Beacons (RRFBs), a type of active warning beacon, use an irregular flashing pattern that resembles emergency flashers on police vehicles. They can be installed on two-lane or multi-lane roadways.

Active warning beacons are used to alert drivers of the presence of bicycle and/or pedestrian crossings, the flashing lights enhance the awareness of all users and prompts vehicles to yield to pedestrians and bikes from a considerably longer sight distance improving safety.

TYPICAL APPLICATIONS

- Where vehicle yield to bicycles and pedestrians compliance is low.
 - At high-volume pedestrian/ bicycle crossings.
 - To reinforce bicycle/pedestrian crossing priority at a particular zone or crossing.
 - At mid block crossings where signal heads are not feasible or desired.
- 1 Solar-Powered RRFB can be a low-cost addition to an existing crossing
 - 2 If a center island or median exist, installing RRFB here, helps improve driver yielding behavior.
 - 3 "Shark Teeth" markings also aid to improve driver yielding behavior.



credit: www.pedbikesafe.org

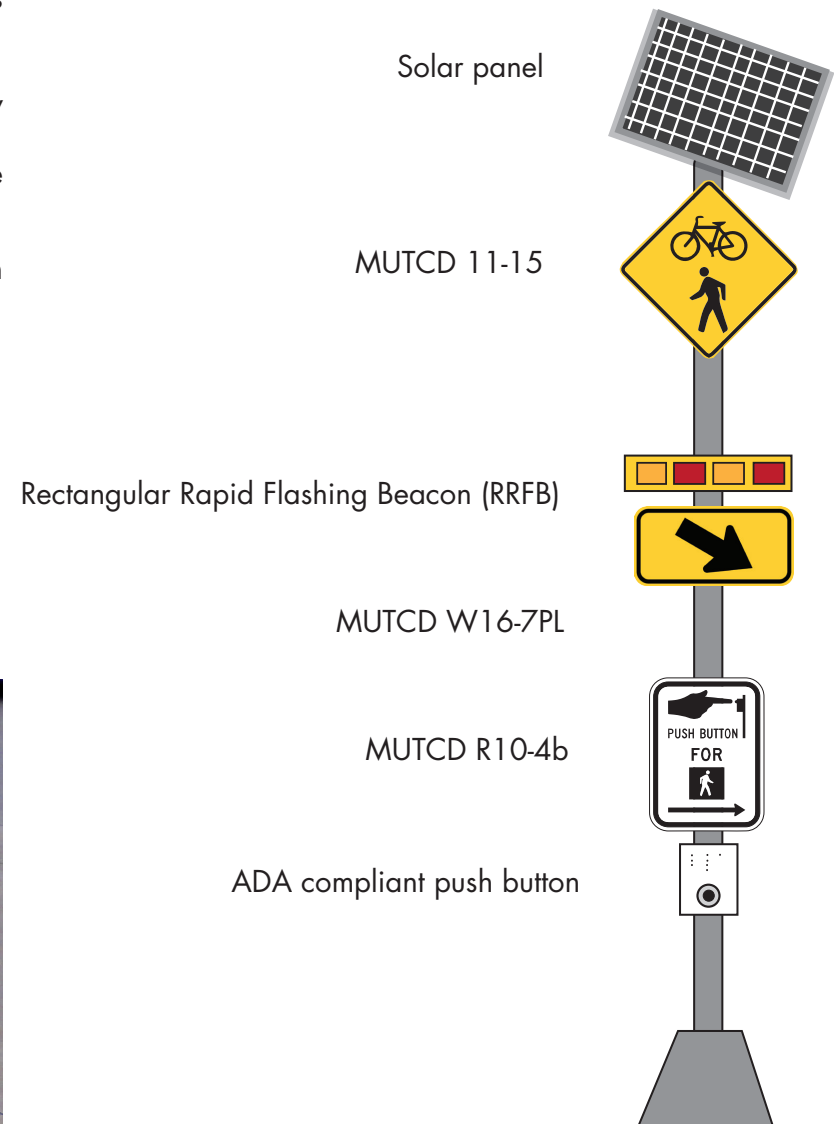


Fig 3.27 RRFB detail.

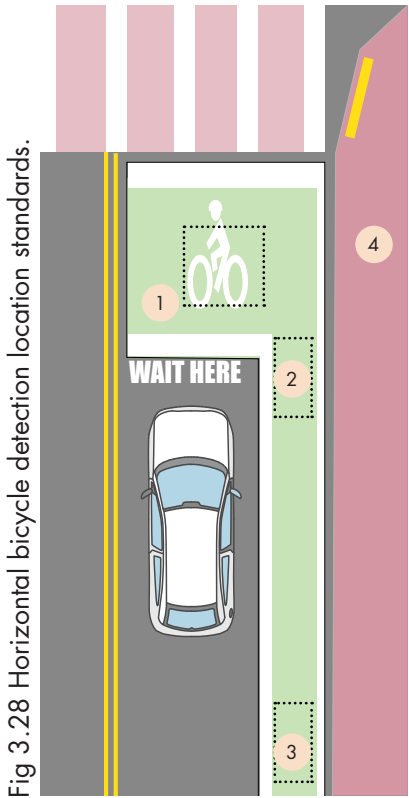
Inductive loop vehicle detection is usually calibrated to the size or metallic mass of a car. In order for bicycles to be detected, loops must be calibrated for bicycles. Otherwise, undetected bicyclists must wait for a car to arrive at the intersection, or dismount their bikes to press the user activated crossing signal if available, or cross illegally.

IN- PAVEMENT LOOP

An induction loop embedded in the pavement that is calibrated to the size and metallic mass of bicycles in order to be detected.



- 1 If detection is not provided within the dedicated facility or shoulder, detection shall be visible to bicyclists through signs and/ or stencils that delineate detection zone so that bicyclists position the bicycles appropriately to active signal.
Bicycle detection should be provided in the bike lane and where bicyclists are intended to wait.
- 2



- 3 Streets with bike lanes or bikeable shoulders shall have bicycle detectors in the bike lane or shoulder. Detection shall be located where bicyclists are intended to travel and/or wait. If a leading signal detector is provided, it shall be located along the bike lane or in the outside travel lane. Detection at intersections shall be provided in the middle of the bike box or immediately behind the stop bar in the bike lane. Intersections without painted infrastructure shall provide detection in the center of the outside lane.

- 4 If provided, push-button activation shall be located so bicyclists can activate the signal without having to dismount their bikes. If used, push-buttons should have additional signage facing the bicyclists approach to increase visibility.

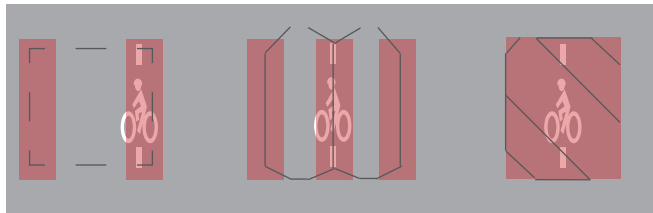
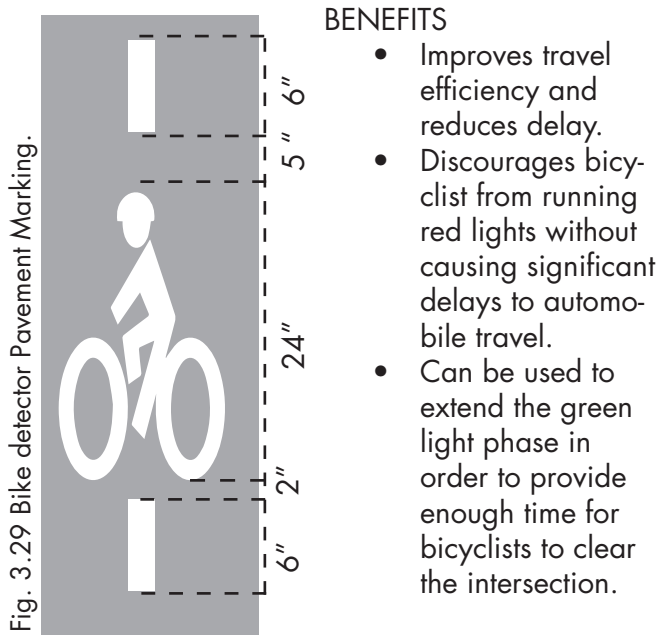


Fig 3.30 Signal detection areas by Loop Detector Type.

SIGNALS & SIGNS: COORDINATED SIGNAL TIMING

Timing signals in a way that coordinates among all modes of travel helps to manage the progression speed of specific modes where uninterrupted flow is desired.

Traditionally, timing and coordination of signals has been geared towards increasing vehicular traffic flow and reduce peak hour delay. The same tool can be used in order to optimize slower speeds, thus creating an uninterrupted flow for people traveling by bicycle or to achieve low vehicle progression speeds for pedestrian-friendly corridors.

Signals may also be timed to coordinate transit along routes where transit has low variability.

CONSIDERATIONS

- Coordinating traffic signals may reduce the number of stops along a corridor and provide a continuous traffic flow at the target speed.
- Progression speed should be set below the target speed instead of the existing 85th percentile speeds.
- Off-peak signal timing should be developed to reflect the lower traffic conditions.
- Weekend signal timing and coordination has the opportunity to incentivize alternative modes of travel.

SIGNAL TIMING FOR BICYCLISTS

Bicyclists traveling at speeds between 13-15 mph are able to travel with minimum interruptions at intersections along a corridor, this results in a platoon of bicyclists along a corridor.

SIGNAL TIMING IN DOWNTOWN AREAS

Coordinated signal timing is particularly useful in downtown areas where there is a consistent pedestrian flow and bicycle travel. Timing signals to reward slower motor vehicle speeds of 15-20 mph gives priority to pedestrians and bicyclists.

SIGNAL COORDINATION WITH TRANSIT

Shorter signal cycle lengths may improve transit times along transit routes. Coordination helps increase reliable turn-over and reduce side street delay.

SIGNAL CYCLES AND LENGTHS

Traffic signal lengths have a very significant impact on the quality of the urban environment. Long signals compounded over multiple intersections turn streets into barriers and discourage pedestrian and bicyclist activity.

High-Visibility crosswalks have very few benefits for pedestrians if the average pedestrian is not given sufficient time to cross the street. Consider elderly people, parents with strollers and/or small children and people with mobility and visual impairments.

SHORT CYCLE LENGTHS OF 60-90 SECONDS ARE IDEAL FOR URBAN AREAS.

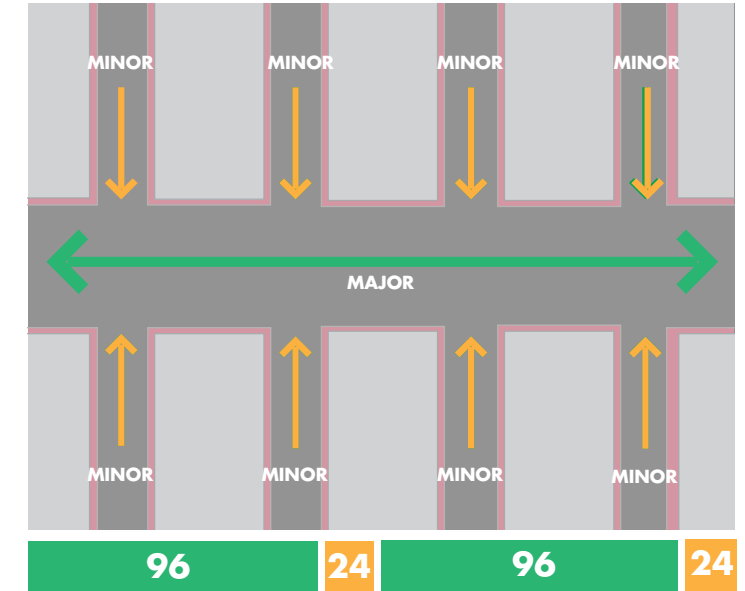


Fig 3.31 Signal timing as a barrier to multi-modal network connectivity.

When signal cycles are timed for corridor priority, major streets become barriers that separate neighborhoods rather than join them.

The graphic above shows how major streets get almost 4 times more green signal than the side streets. This scheme unfortunately incentivizes people traveling by car to avoid minor streets and increase congestion on the main routes. At the same time, Longer green periods hinder pedestrian crossing times, resulting in pedestrians crossing the major streets without a proper cross-signal. This often translates into pedestrian/driver collision

Shorter cycles along both major and minor streets help the city function as a complete network. The recalibration of signal timing into shorter intervals of a 3:2 ratio allows pedestrians and bicyclists to cross streets more often while also relieving major streets from unnecessary congestion. Cycle lengths shorter than 60 seconds are only recommended where a city uses “feathering” (intervals that decrease as they approach a pinch point) to relieve an upstream bottleneck. In such cases, adequate crossing time for pedestrians should be taken into account based on a crossing speed between 2.5–3.5 feet per second.

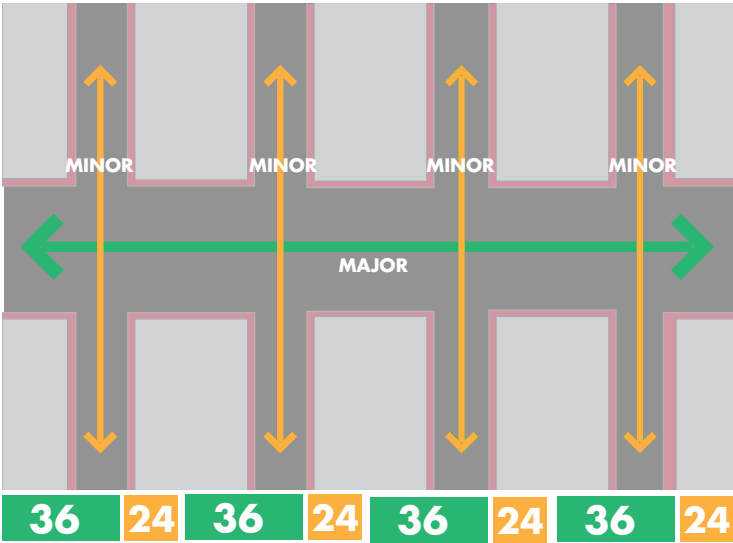


Fig 3.32 Signal timing in function of multi-modal network connectivity.

Shorter cycles along both major and minor streets help the city function as a complete network. The recalibration of signal timing into shorter intervals of a 3:2 ratio allows pedestrians and bicyclists to cross streets more often while also relieving major streets from unnecessary congestion. Cycle lengths shorter than 60 seconds are only recommended where a city uses “feathering” (intervals that decrease as they approach a pinch point) to relieve an upstream bottleneck. In such cases, adequate crossing time for pedestrians should be taken into account based on a crossing speed between 2.5–3.5 feet per second.

A minimum of 7 seconds is required for the **WALK** signal. Short cycle lengths of 60–90 seconds are ideal for urban areas that allow frequent gaps and consistent crossing opportunities, creating a more permeable network for pedestrians and bicyclists.



credit: www.seattlebikeblog.com



credit: www.garyridesbikes.blogspot.com



credit: www.flickr.com

SIGNALS & SIGNS: WAYFINDING

Signage provides users with meaningful information about navigating the built environment.

Wayfinding, also known as environmental graphic design, incorporates the city's brand and identity and is crucial for a successful user experience.

Large scale wayfinding can help to neighborhoods within the city and provide opportunities for individuality while adhering to an overall design scheme.

WAYFINDING PRINCIPLES

The following principles help make information spaces more navigable:

- Create an identity at each location.
- Use landmarks to provide orientation cues and memorable locations.
- Create well-structure paths.
- Create regions with unique visual character.
- Limit choices to avoid confusion.
- Use maps or diagrams for overall orientation.
- Use sight lines to show what's ahead.



CREATE AN IDENTITY AT EACH LOCATION

Give every location a unique perceptual identity so that the user can orient himself in the larger context. Establish a unified visual language.

USE LANDMARKS TO PROVIDE CUES

A landmark is usually highly visible object that can be seen from specific directions at a distance. There are local landmarks, which are closer in proximity and global landmarks which tend to be larger and can be seen from various angles. Landmarks are commonly placed at decision points, where the user must choose a specific direction to follow.

CREATE WELL STRUCTURED PATHS

Space navigation paths should be well - defined from beginning to end. The user should be able to see the end of the path. If the path does not have a contiguous visual structure due to distance or directionality, additional signs must be placed to orient the user.

CREATE REGIONS WITH UNIQUE VISUAL CHARACTER

Subdivide larger regions into subregions that fit into the larger context. IE: using a flamingo as the over all Miami Beach Signage while each neighborhood might a specific color.

LIMIT CHOICES TO AVOID CONFUSION

Spaces should be designed coherently so that each path is clearly defined

USE MAPS OR DIAGRAMS

Wayfinding should incorporate various methods of communication and cater to different styles of learning. Diagrammatic wayfinding is a successful and easy way to convey information about a space if landmarks are well placed.

Detailed maps are useful in conveying the size of the space.

USE SIGHT LINES TO SHOW WHAT'S AVAILABLE

Give users a clear path of navigation in a particular direction to show what's available. Sight lines encourage users to move further in a particular direction. Sight lines give long but narrow views of unfamiliar space.



The City of Miami Beach is home to one the most diverse populations in the world. Effective wayfinding and signage that is rooted in design adds aesthetic value to the streetscape. In addition, it helps to further develop the Miami Beach brand that is recognized around the world. Signs should always aim to include graphics over words, universal signage minimizes the possibility of confusion. Wayfinding for users with mobility, hearing and visual impairments should be seamlessly integrated into the wayfinding system. Creative wayfinding might also help develop neighborhood identities in terms of districts, which positively affects the ability of the user to navigate space as well as economic activity.

NEIGHBORHOOD SCALE

Breaking up the city into its individual neighborhoods for the purposes of wayfinding signage presents an opportunity for creativity, community involvement and individual expressions of neighborhood pride while working within the framework of the city's overall brand. The city of Miami Beach in conjunction with neighborhood associations and artists, could help develop the Miami Beach brand at the neighborhood scale. Color coding neighborhood signage in conjunction with other design elements is a simple way to define boundaries and areas in an unobtrusive way.

The Flamingo sculptures currently placed around the city, serve as small memorable landmarks, and are a good example of aesthetically pleasing wayfinding. Other neighborhoods in the county like Little Havana, have also adopted picturesque sculptures as a way of branding and wayfinding with much success.

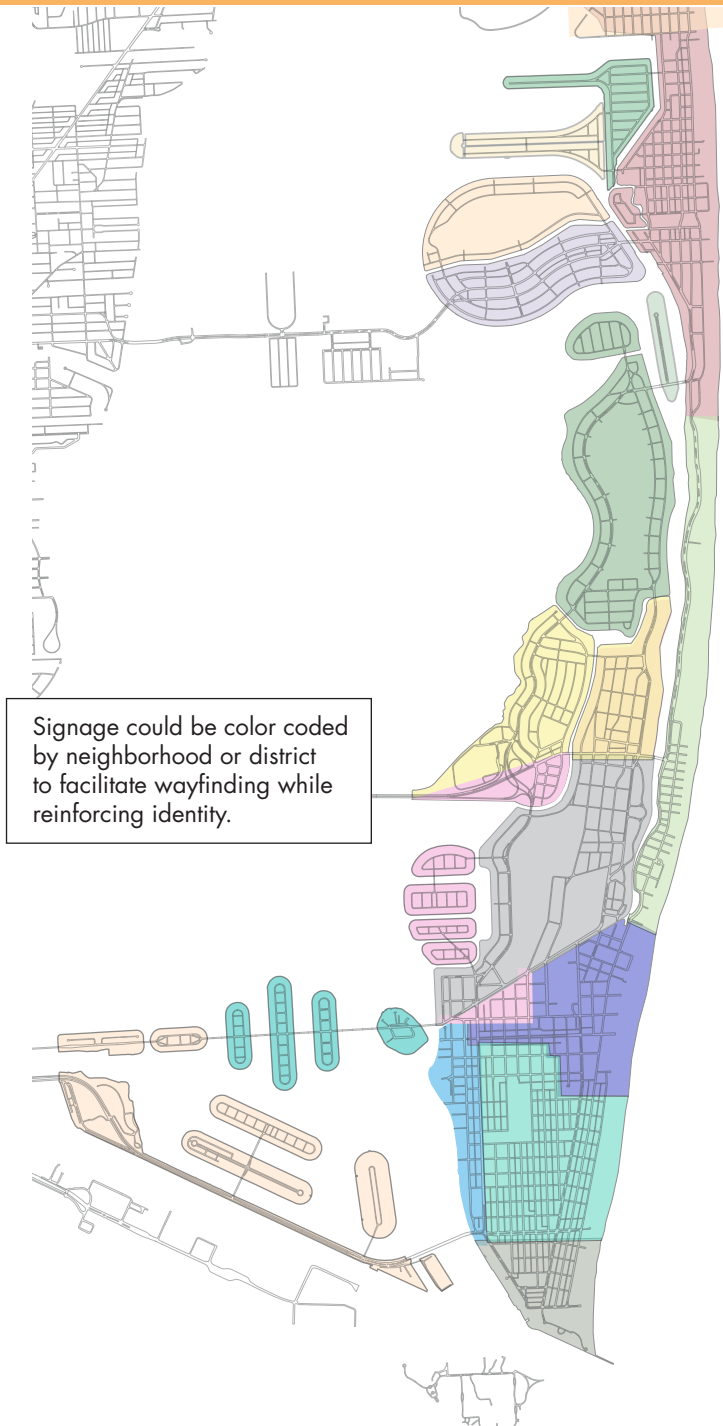


Fig 3.33 City of Miami Beach neighborhood map.

TAKING BACK THE STREETS

COMMUNITY ENGAGEMENT

When stakeholders are involved, plans can be more inclusive and develop specific solutions for issues that otherwise might not be addressed.

Community engagement is a feedback loop where stakeholders and Miami Beach City officials inform the process of design.

Community engagement is the basis for a democratic process in street design. Understanding the needs of a particular community from the beginning has many advantages when it comes to planning and decision making. Successful community engagement has the following characteristics:

- It involves all sectors of the population.
- It's adapted to reach all audiences (Translation, hearing/ visual aids)
- Tailored to fit stakeholders schedules for maximum participation.
- Meetings are held more than once if possible
- Recorded information and meeting materials are made available on-line after meetings.
- Informal meetings can be held at libraries, outdoors or in partnership with local businesses
- that cater to the specific subject being discussed.
- Meetings are well advertised on official websites, blogs, newspapers, social media and around town in highly visible areas.

EMERGING PRACTICES IN COMMUNITY ENGAGEMENT

Local governments are mandated to publish a notice for public meetings, information sessions and a variety of other meetings on the classified section of the news paper as well as their official website.

This type publication is merely informative and must transition from a formality to be seen as an opportunity for advertisement and participation in order to foster real community engagement.

ONLINE

Social media, blogs, forums and web based applications for reporting information enable citizen engagement and direct communication with City officials.

Web-based reporting applications allow the public to track concerns and incidents which may result in faster resolutions on the City's behalf. Concerns for specific areas may be cataloged by a specific address and compared to accidents reported on site in real time.

Small reports regarding citizen concerns and accidents may be presented graphically on a map every 90 days on BIKEMIAMI BEACH.ORG. This tool informs The City on possible changes to an existing facility, the need for a dedicated signal, periodic observation, which then results in a efficient and safe environment for all users.

ON LAND

Traditional community engagement doesn't currently reach a diverse enough audience that is representative of the population the agencies try to serve. The following recommendations may help increase participation:

- The City may partner with local interest groups and foster the formation of such, in order to establish and maintain a partnership between the City and the public regarding bicycle and pedestrian interests.
- Public meetings should be held at a time when the most people can attend, and have translators available. Written material should be printed/translated in various languages including but not limited to: English, Spanish, Portuguese and Haitian Creole.
- The Miami Beach Art Deco Welcome Center, libraries, post office locations, and other government buildings, should have a designated display box that is easily recognizable. The display should have maps, safety information and any other information regarding the Miami Beach bicycle network and how it connects with adjacent municipalities.



Fig 4.1 Proposed Miami Beach bicycle information racks.

Cities often face challenges when it comes to project implementation. Approval processes, departmental coordination, budgeting processes and construction times, often result in delayed delivery of public projects according to the community's expectations.

Tactical Urbanism also known as Transitional tactics is a design/build process that in many cases shortcuts the rigid bureaucracy that often characterizes government processes.

The premise of Tactical Urbanism is "short-term action, long term change". Meaning that any design hypothesis can be tested out at a low-cost before investing heavily in a new idea.

Emerging practices in urban design around the world, might be appealing to Miami Beach residents and City Officials. However, cultural differences, climate, and overall understanding of necessary behavioral changes may prevent the City and its citizens from openly embracing change and new ideas.

Change in the built environment presents incredible opportunities and possible setbacks. The possibility of negatively affecting the integrity of the street network is an intricate concern for engineers, planners, designers, and emergency response forces as well as the general population.

Tactical urbanism enables :

- **SHORT TERM-ACTION:** The City and residents can work together to temporarily install possible solutions to problems like: lack of third-places, a new bicycle facility, bike parking, bicycle routes, traffic circles.
- **Low-cost investment:** Pilot projects require less investment (time and funds) since construction is not part of this phase.
- **TESTABLE SOLUTIONS:** In the case of a new protected bicycle lane, re striping the street or using temporary materials to divide the travel lane from the bicycle lane can be tested immediately by the public, while being actively monitored by City planners and engineers.
- **CITY-COMMUNITY PARTNERSHIP:** Tactical Urbanism can be carried out as a community event. This approach incentivizes citizens to take ownership of the positive changes happening in their built environment while being informed of the processes shaping the future of Miami Beach as a more inclusive, multi-modal and innovative City.
- **LONG-TERM CHANGE:** By instituting Tactical Urbanism as a necessary step in any new construction/change, cities can analyze in great detail the impacts of proposals before committing large amounts of time. In addition, actively informing residents and visitors of these projects from the beginning stages, gather necessary support that increases gradually before moving into the building phases.

"Tactical Urbanism functions as the Urban Design equivalent to the Hypothesis Testing/ Analysis steps of the Scientific Method. Thus, enabling the City to test out proposals in the built environment at a low-cost and actively gathering data from users in order to make informed decisions for consequent stages"

Tactical urbanism can be applied to projects of small, medium and large scale.

- It functions as the urban design equivalent of hypothesis-testing in the scientific method.
- Allows for fluidity, rather than rigid parameters.
- Calls for citizen participation from building + testing in order to gather real data that informs the consequent building/more permanent stages.
- Promotes high- levels of civic engagement.



Fig 4.2 The role of tactical urbanism.

TACTICAL URBANISM

In recent years, Tactical Urbanism has proved to be an effective step in the design/build process. In addition, Tactical Urbanism projects have proved to be true catalyst in the implementation of innovative temporary ideas into government programs like the Pavement to Parks program in the City of San Francisco.

Tactical Urbanism projects range in scope, and serve different purposes from purely aesthetic to highly functional alternative uses in the public realm. The following examples have been widely successful in various cities around the country:

CURB

The street curb has generally been confined to serve as the physical separation element between pedestrians and cars. Curbside configurations include street furniture and vegetation at times. However, curbside lanes are either on-street parking or travel lanes.

Envisioning the potential of existing curbside parking through tactical urbanism interventions has had a positive, measurable impact in the public realm.

Extending the curb can be done by reallocating on-street parking space onto the curb dimensions; sometimes this is coupled with re-striping street lanes and reducing travel lane widths as a traffic calming measure.

WIDENING THE SIDEWALK (1)

As the Miami Beach Bicycle Master Plan is developed, Miami Beach neighborhoods will see an increase in multimodal transportation. Changes in transportation modes may allow certain neighborhoods to expand their sidewalks in order to accommodate more pedestrian activity a dedicated bus lane, or a sidewalk-level bicycle route.

Sidewalks can be temporarily expanded by using gravel, bollards, planters or bollards in order to delineate the new pedestrian space or bicycle facility.

ROAD DIET (2)

The City may choose to install temporary chicanes in order to test traffic calming solutions or to enact an already approved traffic calming project before permanent construction takes place.

BICYCLE PARKING (3)

Curbside parking spaces can also serve as bicycle parking.

A parallel parking space accommodates 1 car and has the potential to accommodate 10 bicycles side by side. More or less bicycles can be accommodated depending on the design.

DECO BIKE/ BIKE SHARING (4)

Miami Beach has already experienced the success of bike sharing programs. Citi Bike/ Deco Bike has grown in popularity and support among residents and tourists. Bike sharing makes transportation more accessible while reducing traffic congestion. Removing a few parking spaces around The City to accommodate bike docking stations is a sensible trade off.

PARK(ing) Day! to PARKLETS (5)

The concept of parklets sprouted from the PARK(ing) Day initiative. The premise of PARK(ing) Day is based on paying for a parking space for a set amount of hours and temporarily installing a creative alternative to typical use of the space. People have installed libraries, parks, yoga spaces, stages for various performances, mini-golf, etc.

The flexibility and inherent legality of occupying the space for an alternate use while paying the parking meter is a clever way to physically manifest creative ideas while engaging the community. Parklets function as the permanent manifestation of some of the parking day ideas.

Businesses and neighborhoods in general benefit from parklets in the many forms they manifest in. Whether as extra seating, a small garden, bicycle parking or a stage, parklets attract locals and visitors traveling by foot or bike, thus increasing street activity and potential sales. Generating positive street activity, as mentioned in this guide, is an effective way to keep the public realm active and safe.

In addition to the uses mentioned above, parklets function as a traffic calming measure when implemented on both sides of a corridor by creating the slalom effect.

STREET (6)

Festivals, grower's markets, ciclovias and block parties take place on the public realm. Temporary street closures are an effective way to activate business districts, promote community interaction and participation, and incentivize non-motorized modes of transportation.

Street closures can be seasonal or year long on weekends or off-peak hours depending on the location and traffic volume.

Restricting access on already low-traffic neighborhood streets allows children to play outside safely, interact with neighbors and increases the overall vibrancy of communities. Longer corridor closures can be coordinated with local businesses in order to boost sales periodically.

INTERSECTIONS (7)

Intersections are the convergence point for all users. Sometimes due to engineering standards or naturally occurring “awkward” geometry, the effectiveness of intersections is directly affected. The result is an over designed intersection that, although accommodates all users, could be redesigned to expand public space.

Redesigning intersections in order to install public plazas or pocket parks may require the permanent closure of a block-length(s) of a street.

Careful traffic analysis reviews and community engagement are crucial in order to gather information/support for intersection redesign into any type of public space.

