Appendix E: Design Considerations

The following appendix provides detailed design considerations for implementation of bicycle facilities recommended for the on-street network. The design considerations complement the content of Chapter 4: Design and Maintenance Guidance.

Bicycle Boulevards

Design Considerations

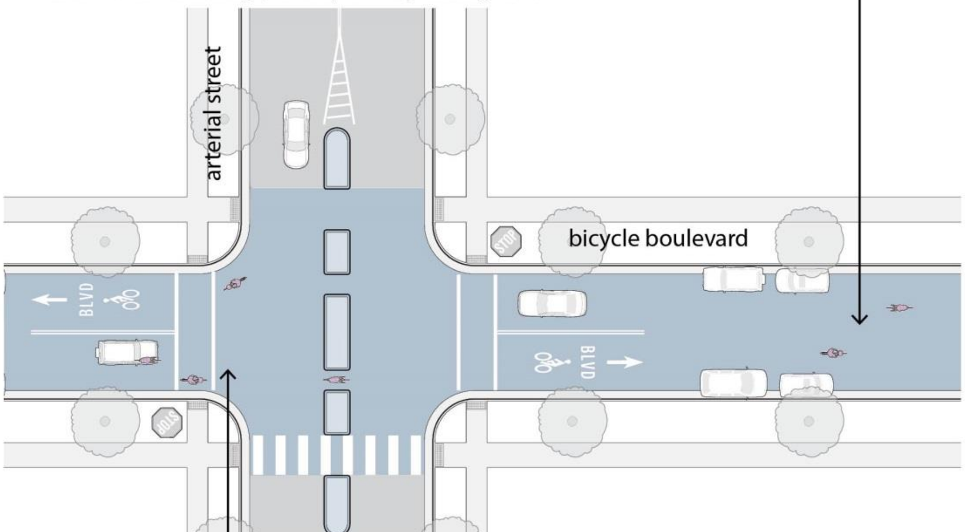
A neighborhood street may already have many of the desired characteristics that make it a comfortable and continuous riding experience, or may incorporate several of the following bicycle boulevard design elements to accommodate bicyclists:

- Traffic-calming features such as neighborhood traffic circles, curb extensions, and chicanes that slow motor vehicle traffic but allow bicyclists to maintain momentum.
- At two-way stop-controlled intersections, priority assignment that favors the bicycle boulevard, so bicyclists can ride with few interruptions.
- Traffic diverters at key intersections to reduce through motor vehicle traffic while permitting passage for through bicyclists.
- Wayfinding signs and/or pavement markings to guide bicyclists along the way and to key destinations.
- Shared lane markings or other markings where appropriate to alert drivers and cyclists to the recommended lane position for bicyclists on a shared roadway.
- Crossing improvements such as median crossing islands, curb extensions, marked crosswalks, rapid flash beacons, or traffic signals where the bicycle boulevard crosses major streets.

Bike Boulevards

On the bicycle boulevard:

- wayfinding signage and pavement markings such as "bike boulevard," shared lane markings, or bicycle wayfinding "dots"

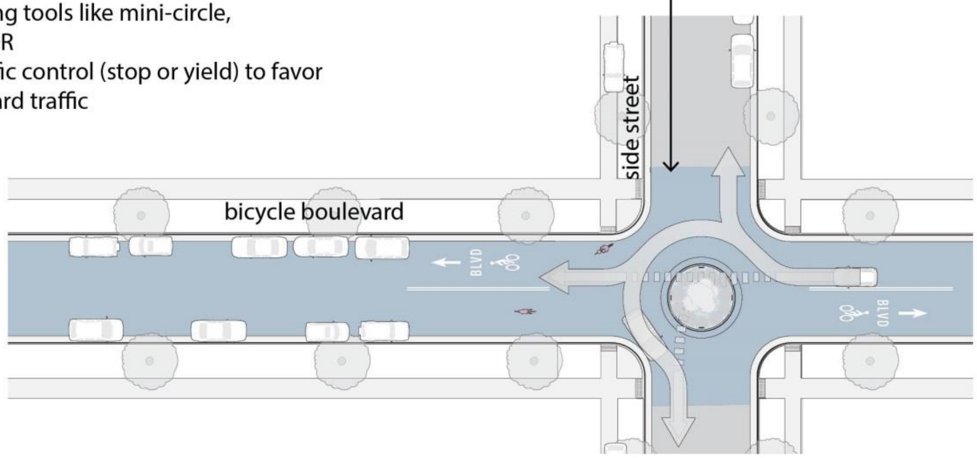


At arterial crossings, a variety of traffic control measures may be employed in order to:

- facilitiate bicycle crossing of the arterial
- slow or limit through traffic on the bicycle boulevard

At intersecting side streets:

- traffic calming tools like mini-circle, bumpouts OR
- positive traffic control (stop or yield) to favor bike boulevard traffic

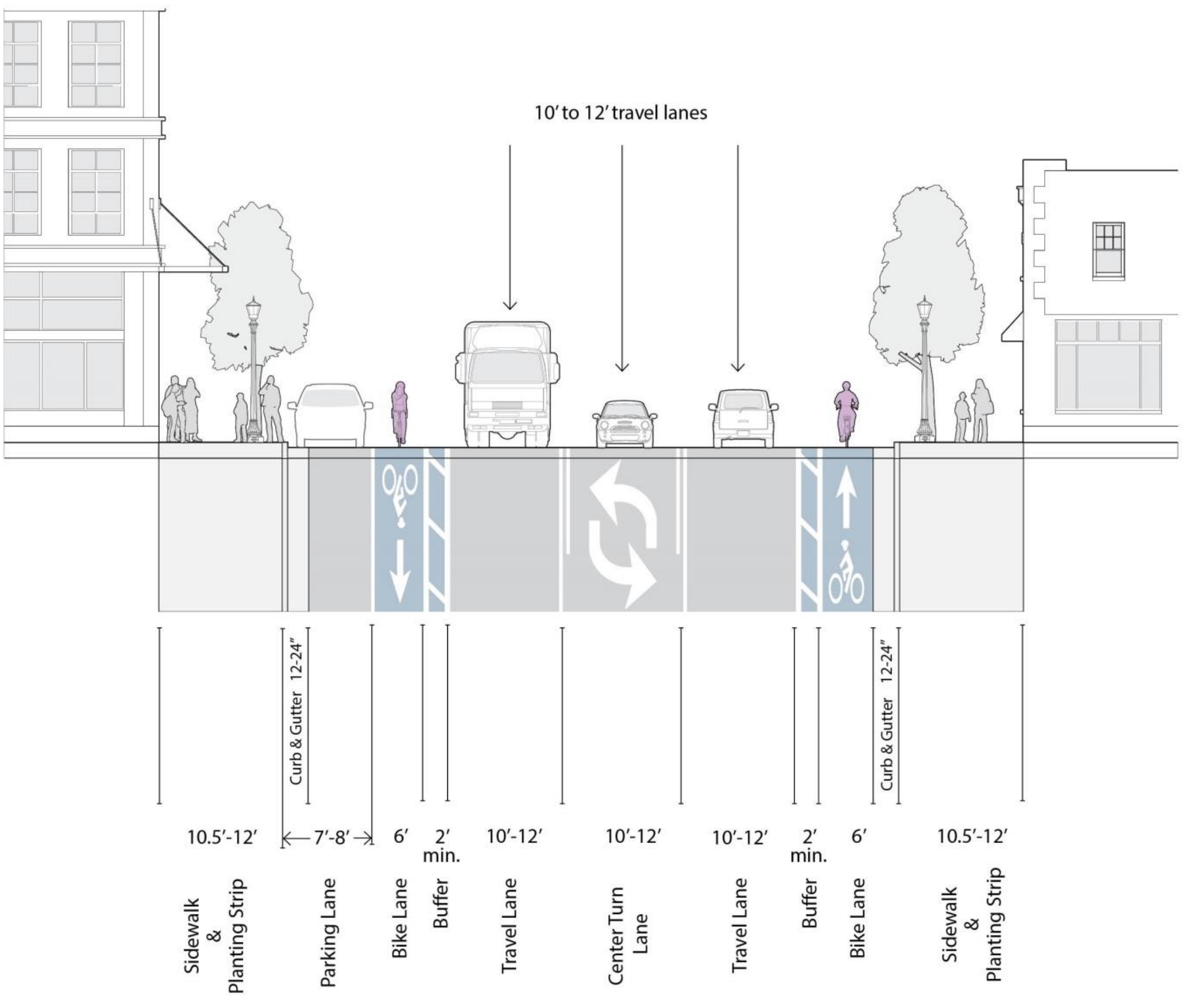


Buffered Bike Lanes

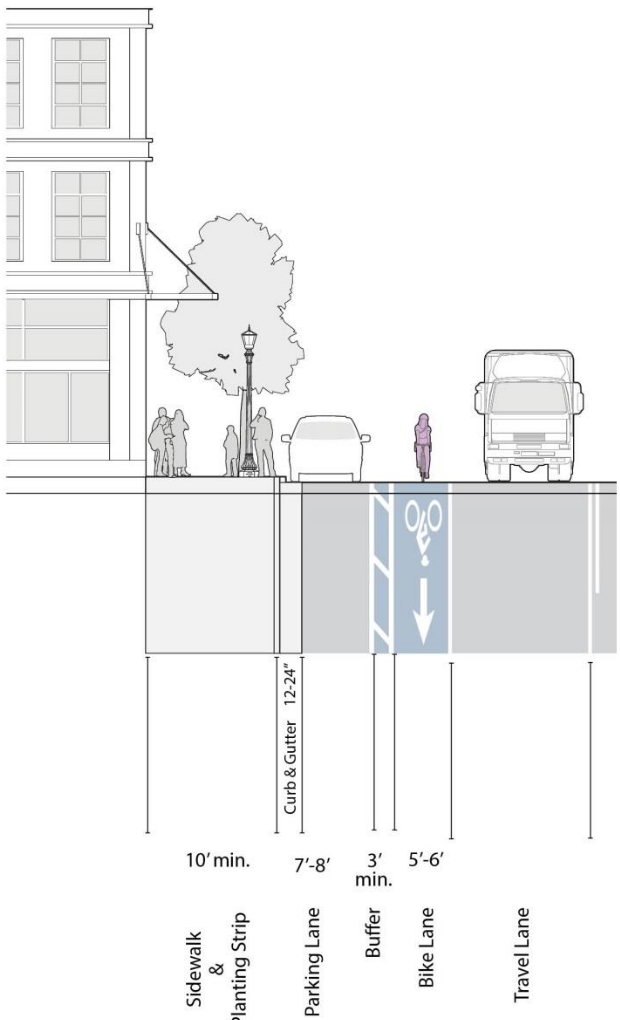
Design Considerations

- The minimum width for the buffer area is 2 feet. There is no maximum.
- Widths of buffered bike lanes are the same as those for bike lanes without buffers.
- Buffer striping will require additional time and materials for installation and maintenance when compared to conventional bicycle lanes.
- Consider placing the buffer next to the parking lane where there is high parking turnover.
- Consider placing the buffer next to the travel lane where speeds are 35 mph or greater or when the ADT exceeds 10,000.

Buffered Bike Lane



Buffered Bike Lane Adjacent to Parking Lane

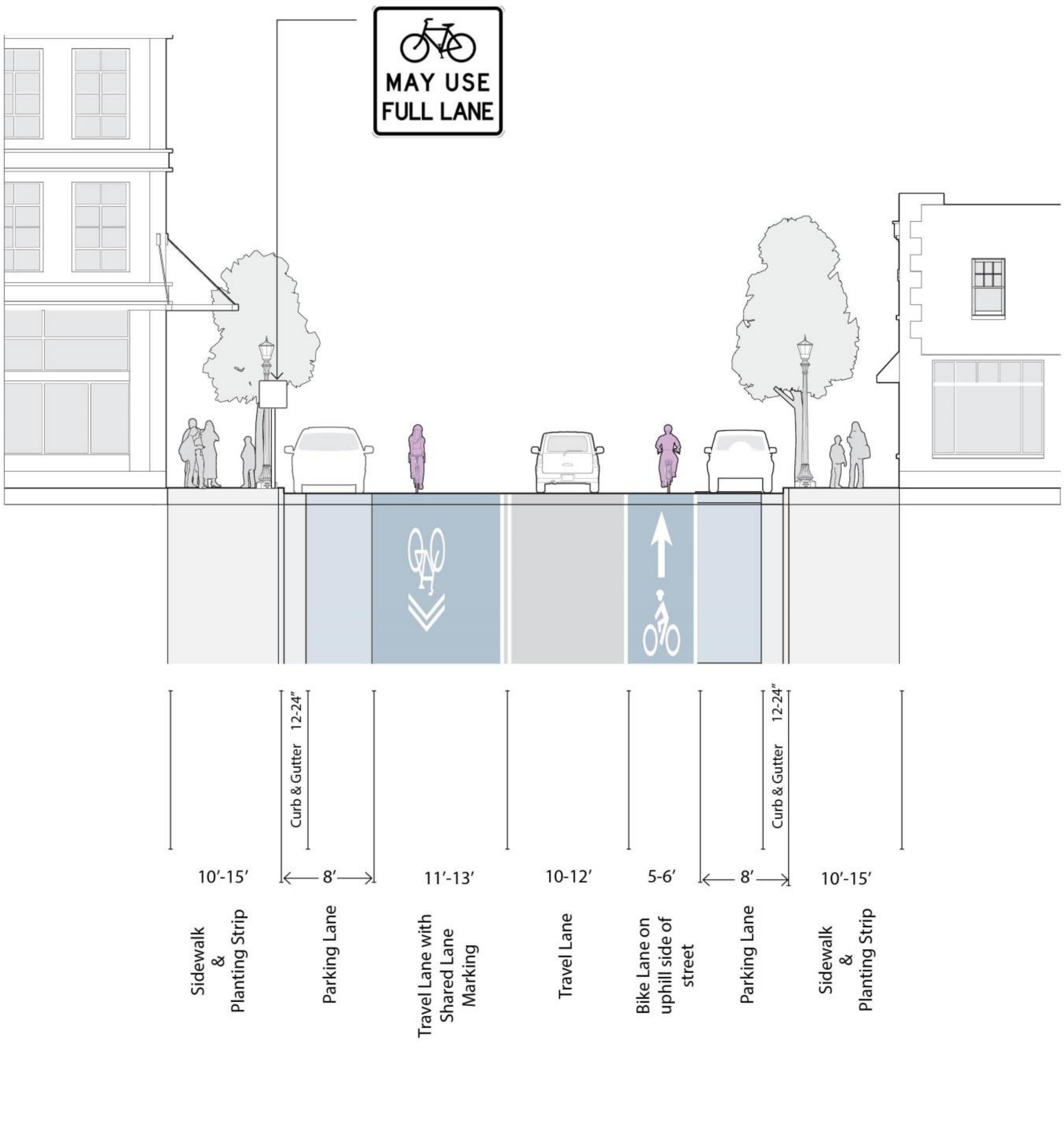


Climbing Lanes

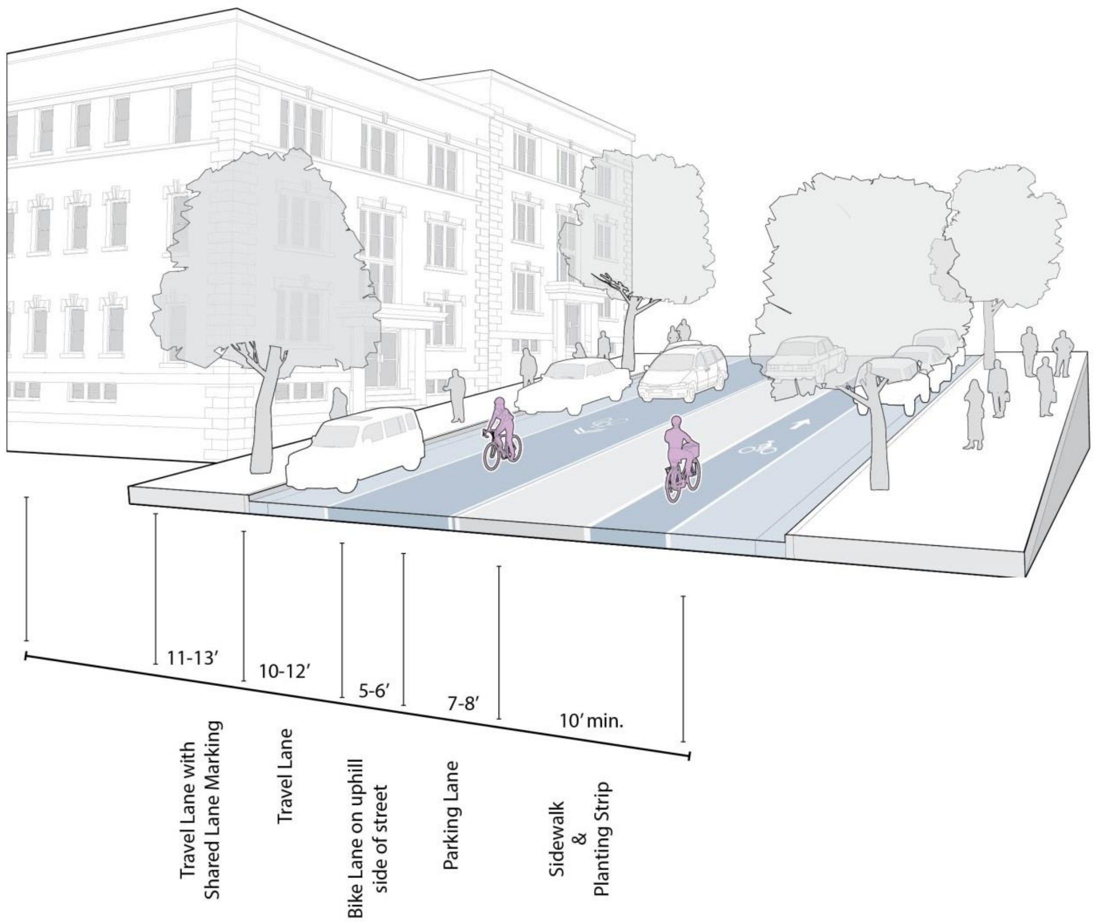
Design Considerations

- Installation of climbing lanes may require vehicle lane striping to be shifted slightly in order to provide sufficient bicycle lane width.
- Wider (i.e. 6 feet) climbing lanes provide more operating space for uphill traveling bicyclists, and should be considered.
- When traveling downhill bicycles pick up speed and can travel at similar speeds as motor vehicles, therefore shared lane markings should be used in the downhill direction to direct bicyclists away from potential hazards (e.g. doors of parked cars), which are more difficult to react to at higher downhill speeds. Downhill bicycle lanes should only be considered where there is sufficient space to provide buffers between the travel lane and parked cars.
- A bike lane on one side of the roadway, without a complementary facility on the other side of the roadway (e.g. shared lane marking) will result in wrong-way riding in the bike lane.
- Bike lanes may require periodic sweeping to clear debris.

Bike Climbing Lane



Bike Climbing Lane

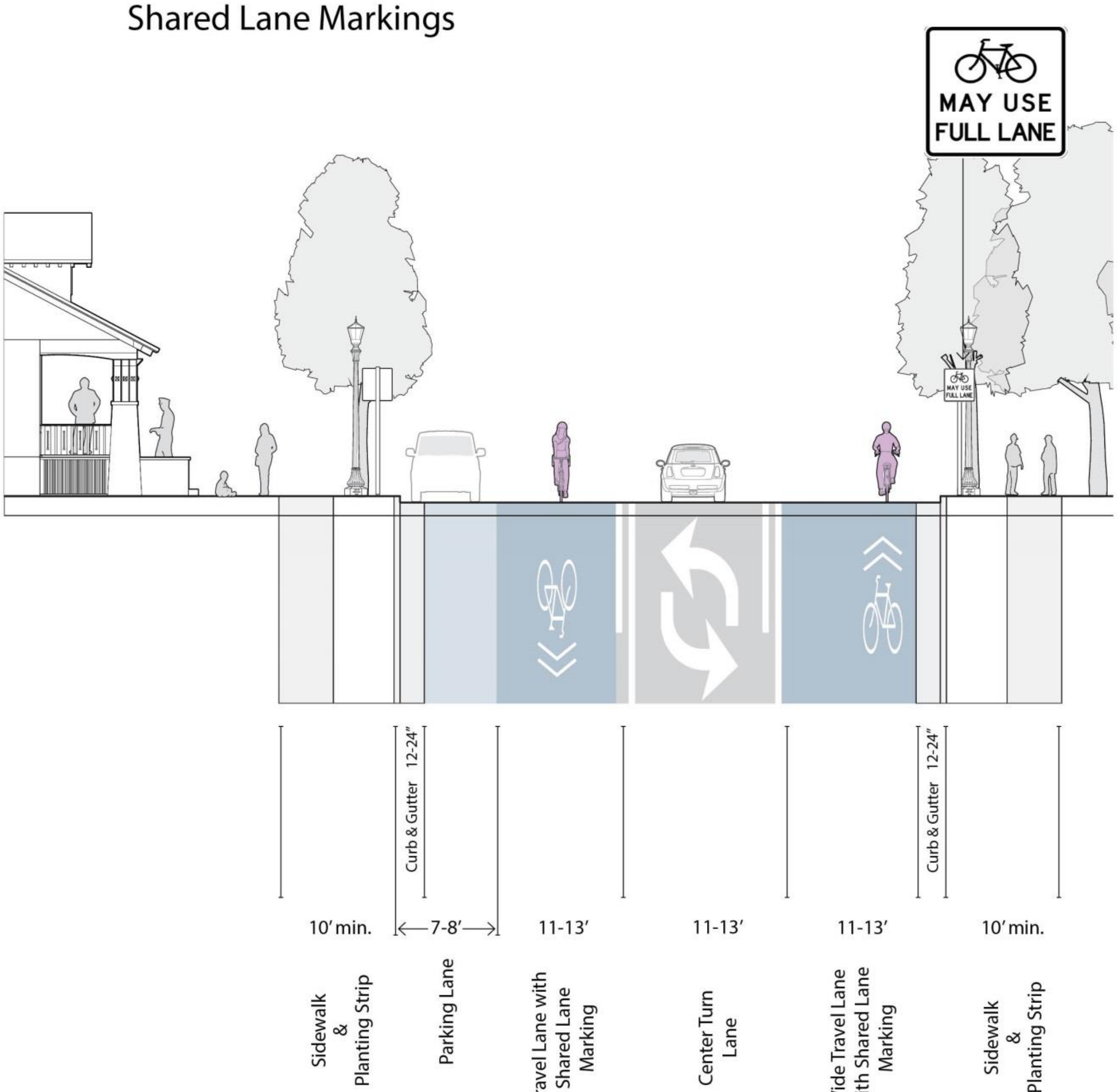


Shared Lane Markings

Design Considerations

- Shared lane markings must not be used on streets with speed limits higher than 35 mph.
- On streets with lanes that are 11 feet or less, the shared lane marking should be placed in the center of the lane to indicate that motorists must change lanes to pass bicyclists.
- Shared lane markings should be placed in a location that is outside the door zone of parked vehicles.
- On multilane streets, shared lane markings are placed in the outside lane.
- On one-way streets, shared lane markings may be placed on both sides of the street if there are high volumes of bicyclists turning left and right.
- Frequency: Shared lane markings are typically placed one at the beginning and one at the end of the block, in each direction of travel.

Shared Lane Markings



Cycle Tracks

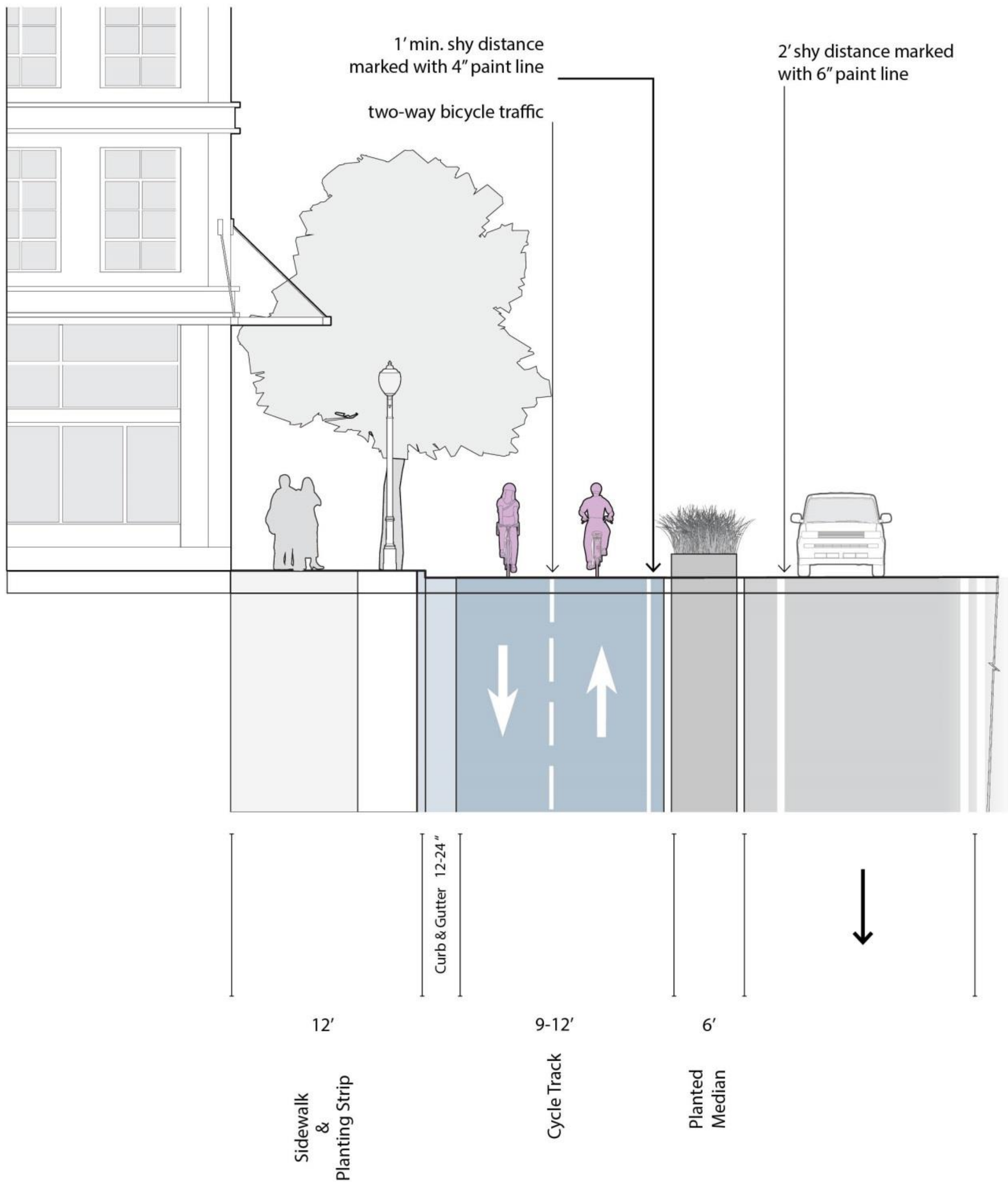
Design Considerations

- The bike lane line should resume with a solid line on the far side of the intersection (outside crosswalk area).
- One-way cycle tracks typically range in width from 5 feet to 7 feet. The buffer between the cycle track and adjacent traffic should be a minimum of 2 feet.
- Two-way cycle tracks typically range in width from 10 feet to 12 feet. In constrained locations, an 8 foot, cycle track may be considered. The buffer between the cycle track and adjacent traffic should be a minimum of 3 feet.
- When protected by a parking lane, 3 feet is the desired width for a buffer between parking lane and cycle track to allow for passenger loading and to prevent dooring collisions.
- Streets with the least number of driveways or cross- streets provide the best opportunity for a quality cycle track.
- Cycle tracks should be installed only on streets for which conflicts at intersections can be effectively mitigated using parking lane restrictions, bicycle markings through the intersection, or other signalized intersection treatments.
- Special consideration must be given to available space and operational speed on two-way cycle tracks proposed on streets with sustained grades due to the heightened potential for conflict between uphill and downhill bicyclists, as well as turning vehicles.
- The buffer space may be emphasized with bollards, planters, signs or other forms of physical protection.
- At transit stops along cycle tracks, special consideration should be given to manage bicyclist, pedestrian and transit operator interactions.
- Bicycle lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall meet the MUTCD guidelines for placement.
- If a two-way cycle track is configured on a one-way street, the addition of a “ONE WAY” sign (MUTCD R6-1, R6-2) with “EXCEPT BIKES” plaque is the appropriate sign treatment to shall be posted along the facility and at intersecting streets, alleys, and driveways informing motorists to expect two-way bicycle traffic.
- Special consideration should be given regarding the use of color or pavement markings to enhance locations of conflict, such as where cycle tracks cross intersections or driveways
- Features such as a two-stage turn queue box should be considered to assist bicyclists in making turns from the cycle track facility.
- When providing accessible vehicle parking spaces alongside cycle tracks, there are a number of considerations for accommodating persons with disabilities in the design of one-way and two-way protected cycle tracks.
- Driveways and minor street crossings are a unique challenge to cycle track design. The following guidance may improve safety at crossings:
    - If the cycle track is parking-protected, vehicle parking should be prohibited near the intersection to improve visibility. The desirable no-parking area is 30 feet from each side of the crossing.
    - For motor vehicles attempting to cross the cycle track from the side street or driveway, street and sidewalk furnishings and/or other features should accommodate a sight triangle of 20 feet to the cycle track from minor street crossings, and 10 feet from driveway crossing.
    - Color, yield lines, and “Yield to Bikes” signage should be used to identify the conflict area

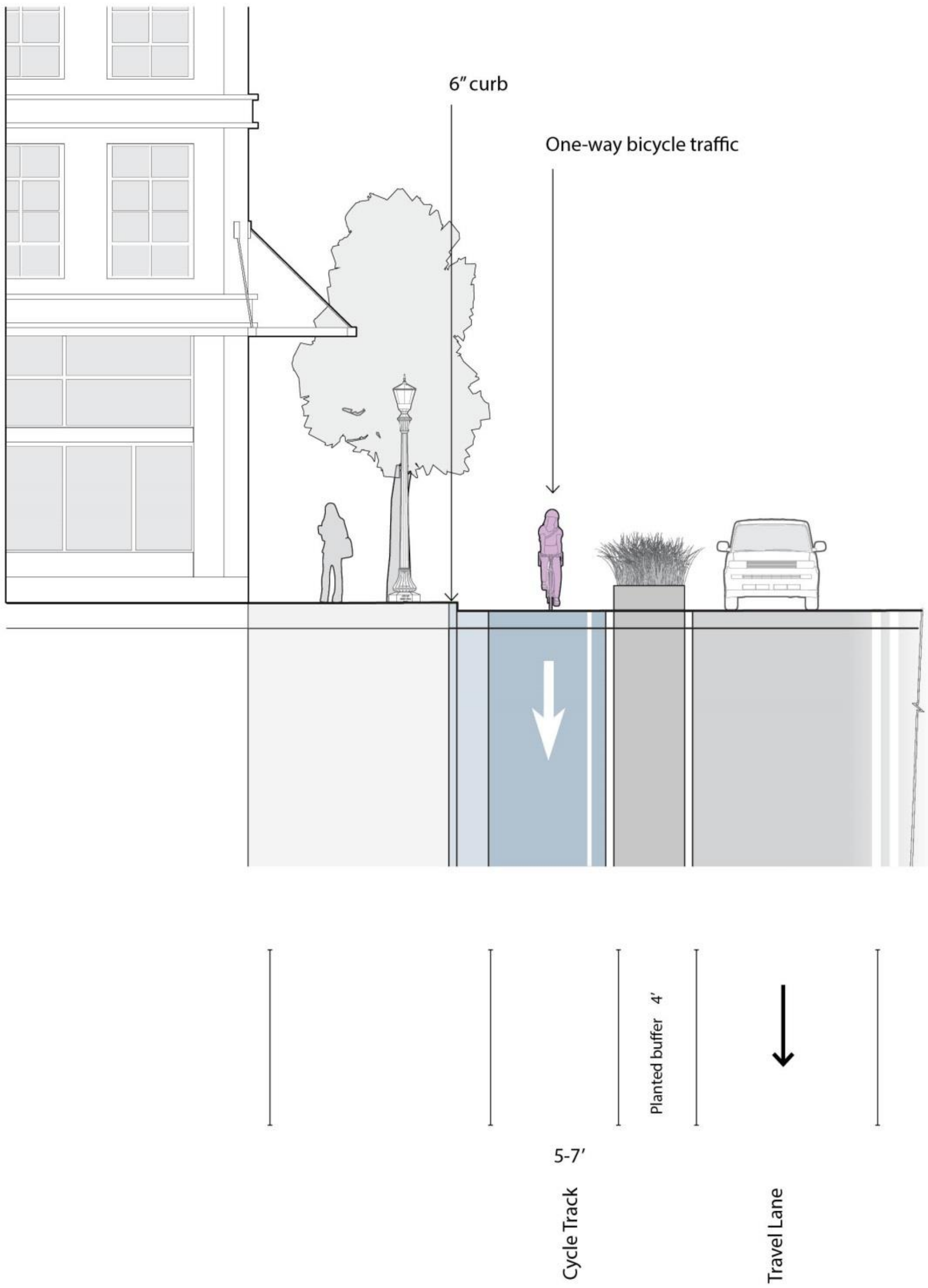
and make it clear that the cycle track users moving through the intersection have priority over entering and exiting traffic.
    - Motor vehicle traffic crossing the cycle track should be constrained or channelized to make turns at sharp angles to reduce travel speed prior to the crossing.

- For additional design guidance refer to the 2012 AASHTO Guide for the Development of Bicycle Facilities and the NACTO Urban Bikeway Design Guide.
- Maintenance must be considered when designing a cycle track.

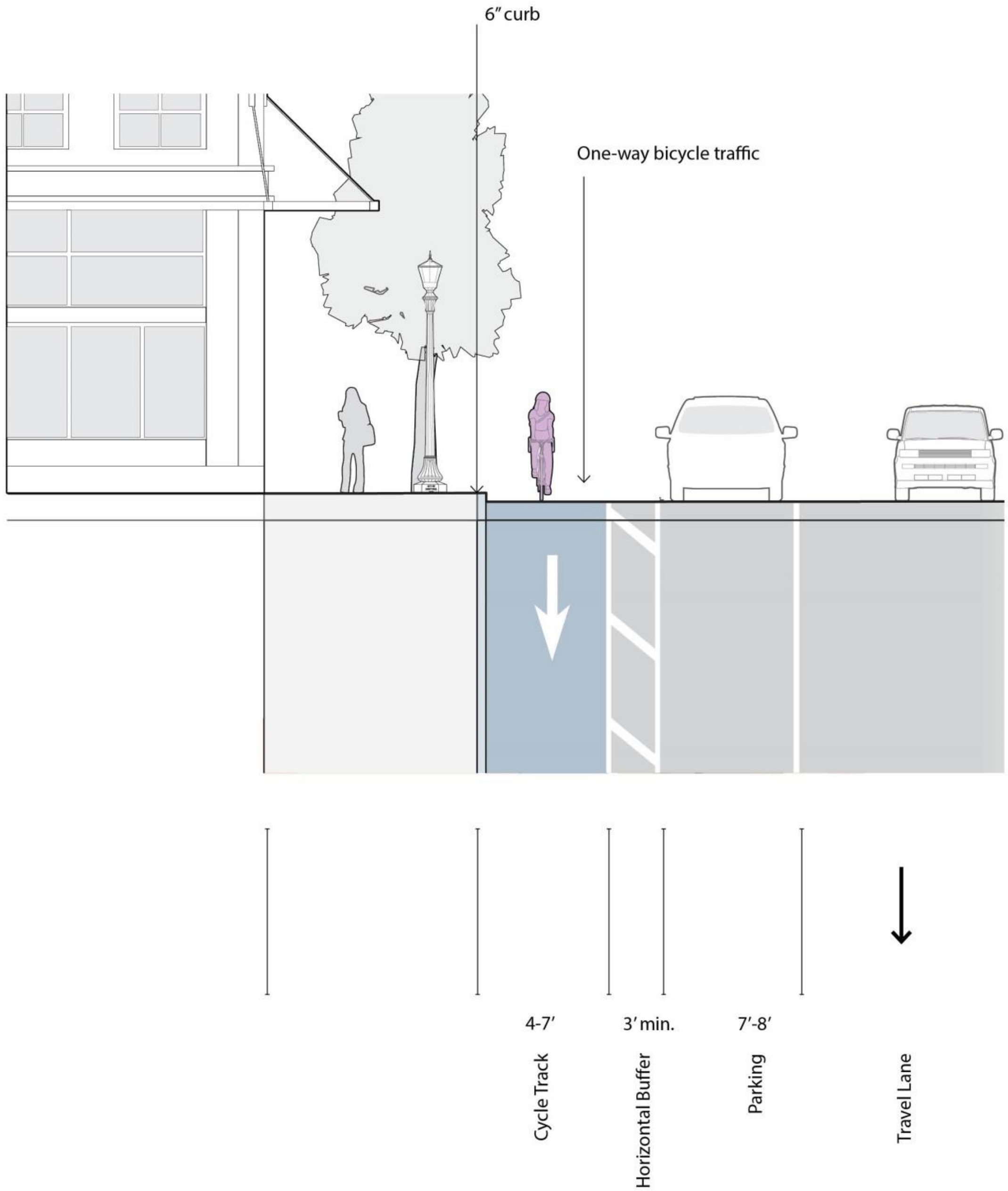
Cycle Track, two-way with horizontal buffer



Cycle Track, one-way with separation



Cycle Track, one-way with floating parking

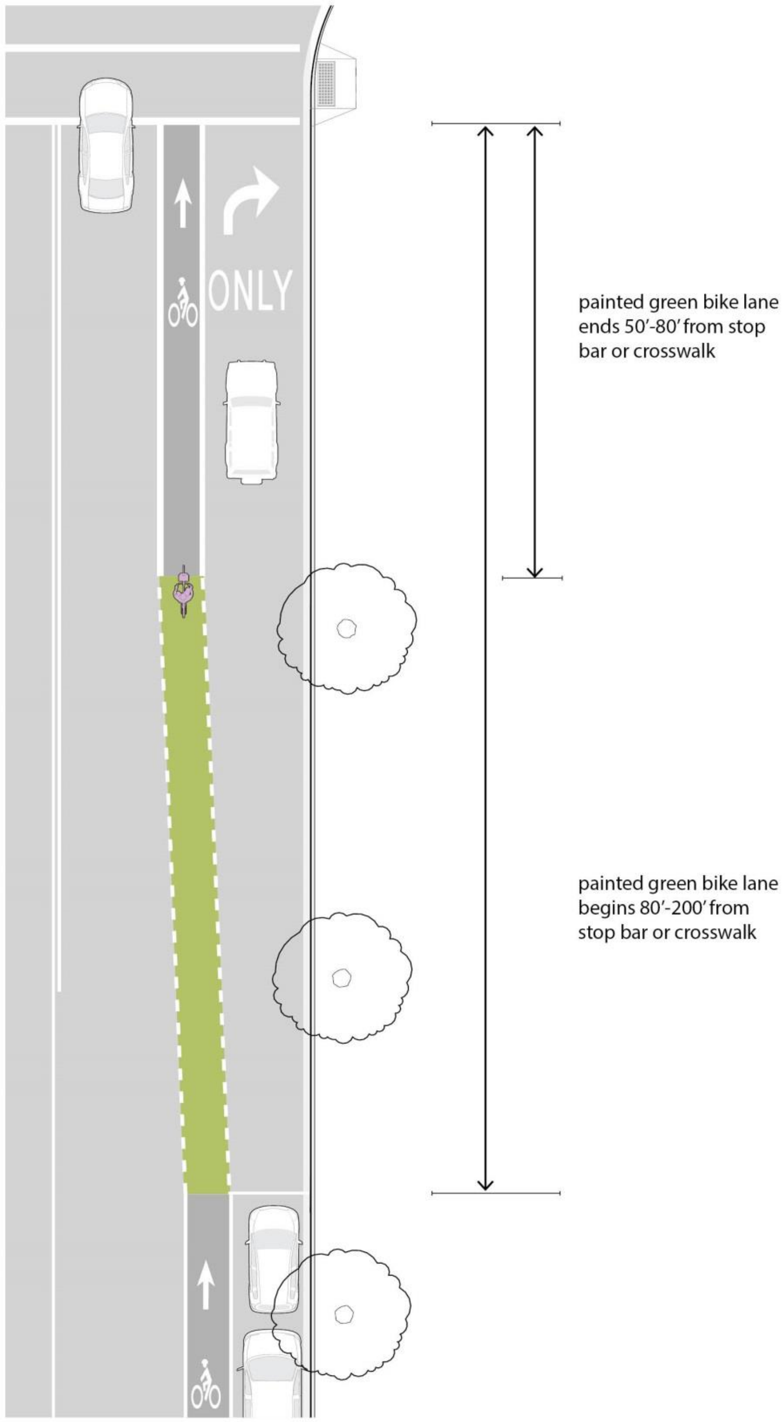


Bike Lanes at Intersections

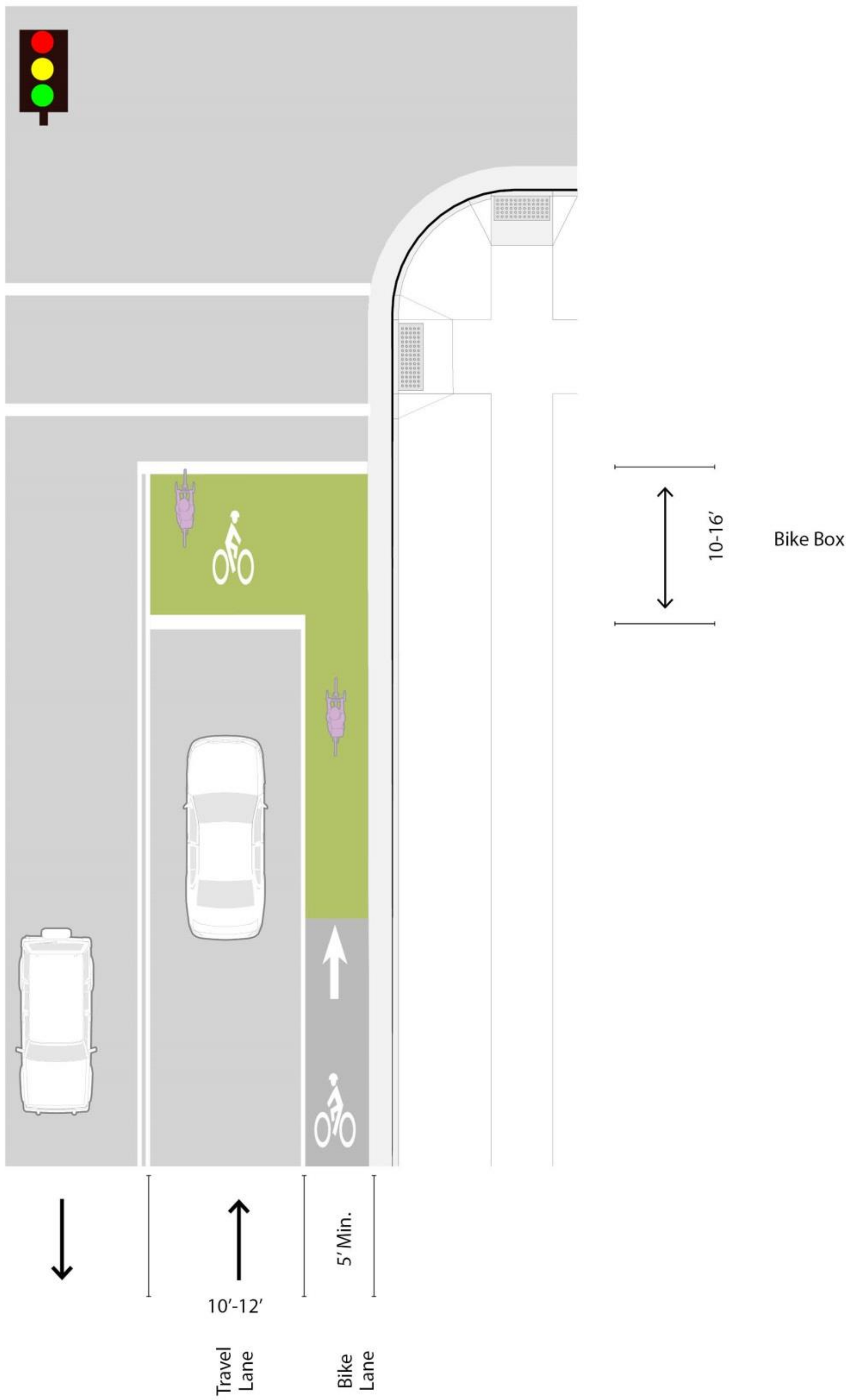
Design Considerations

- On approaches to intersections with high volumes of right turning traffic that do not have right-turn-only lanes, bike lane lines should be dashed. The dashed line is intended to provide a reminder that motorists may merge into the bicycle lane as they prepare to turn right.
- Dashed lines should begin 50 to 200 feet prior to the crosswalk or edge of intersection if no crosswalk exists.
- The bike lane line should resume with a solid line on the far side of the intersection (outside crosswalk area).
- At intersections where bike lanes must be dropped due to the addition of turn lanes or a narrowing of the roadway, the bike lane should be dropped 50-200 feet prior to the narrowing. Shared lane markings should be used to indicate the preferred positioning of through moving bicyclists.
- Where bicycle lanes are dropped to add a right turn lane, shared lane markings may be placed in the left hand portion of the right turn lane or within the right-most through lane.

Green Bike Lanes



Green Bike Box

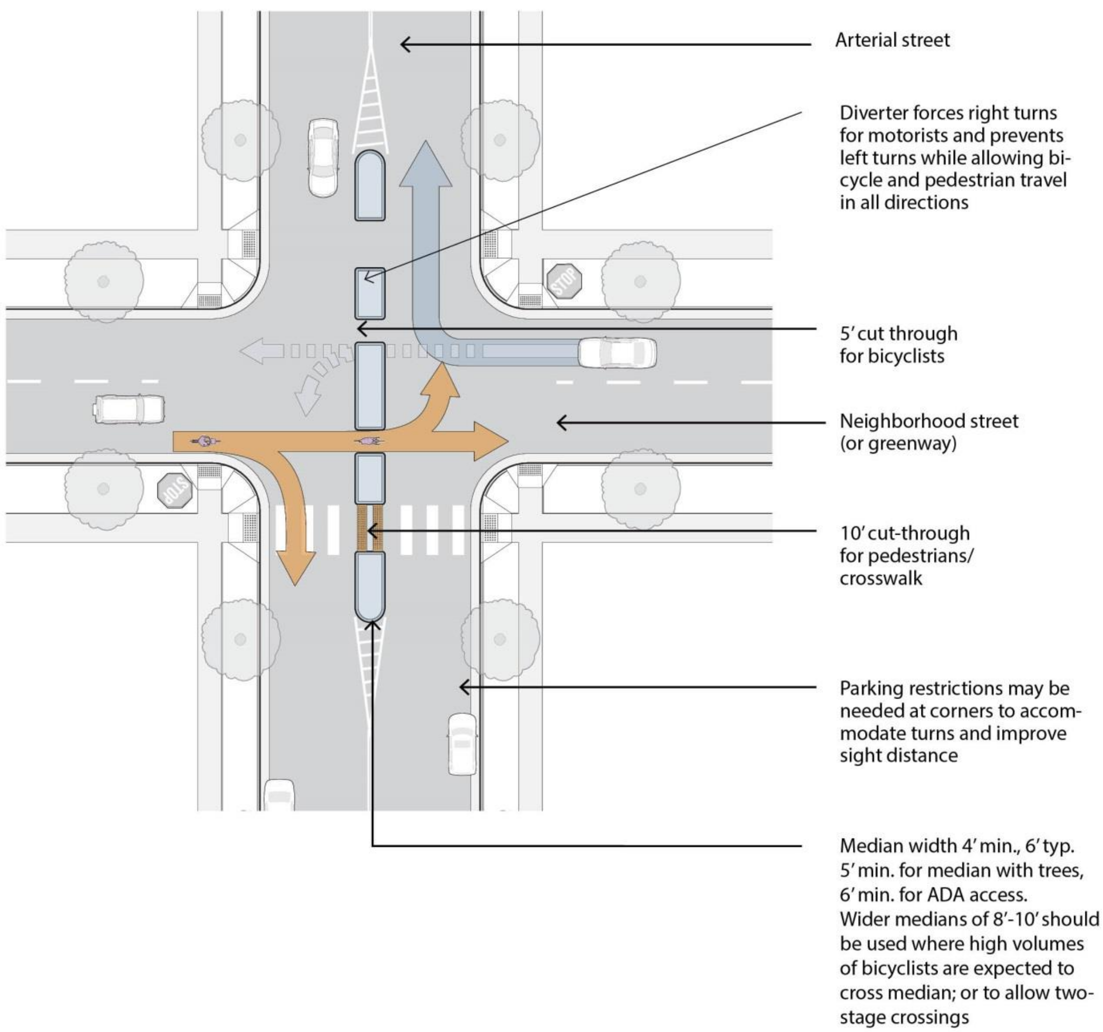


Intersection Median Barrier

Design Considerations

- The intersection median barrier must be a minimum 6 feet wide (8 to 10 feet preferred on primary bicycling routes) to provide sufficient area for multiple pedestrians and bicyclists waiting to cross the street, and for longer bicycles, or bicycle combinations (e.g., a bike with trailer is approximately 9 feet in length).
- Alternatively, separate cut-through/crossing areas may be provided for bicycles and pedestrians. Pedestrian crossing areas should align with crosswalk while the bicycle cut-through may be placed in line with vehicle travel lanes.
- At unsignalized locations pedestrian/bicycle crossing warning signs may be placed within the intersection median barrier, as well as on each side of the street. Other crossing enhancements may be considered as well.
- The street must be wide enough to accommodate a median. Excessive lane shifting to fit a median barrier is not desired. In addition, there must be enough lane width to accommodate truck and emergency vehicular turning movements.

Traffic Diversion: Diverter Medians



Corner Curb Radius

Design Considerations

The effective turning radius (rather than the actual curb radius), should always be used to determine the ability of vehicles to negotiate a turn. Determination of the design vehicle should consider and balance the needs of the various users of a street - from pedestrians and bicyclists to emergency vehicles and large trucks - considering the volume and frequency of these various users.

The design vehicle should be selected according to the types of vehicles using the intersection with considerations to relative volumes and frequencies. The designer should distinguish between "designing for" and "accommodating" the needs of large vehicles, which may not require design modifications.

A typical curb radius of 20 feet or less should be used wherever possible including where:

- There are higher pedestrian volumes
- There are low volumes of large vehicles
- Bicycle and parking lanes create a large effective radius

Factors that may affect the curb radii must be taken into consideration:

- The street type
- The angle of the intersection
- Curb bulbs
- The number and width of receiving lanes
- Large vehicles
- Effective turning radius

Where there are high volumes of large vehicles making turns inadequate curb radii could cause large vehicles to regularly travel across the curb and into the pedestrian waiting area.

See the table below for guidance on the location and design vehicle for different street types.

Vehicle Type	Location	Design Vehicle	Potentially Allowable Exceptions
Transit Vehicles[1]	Corners with turning buses on bus routes or where buses start run or return to base. In locations where traffic volumes influence effective turning radii with lane encroachment.	CITY-BUS or WB-40 A-BUS, articulated bus	Turn partially from adjacent lane
	Corners with potential occasional turning buses due to detours	CITY-BUS or WB-40	Turn partially from adjacent lane
Emergency[2] Vehicles	All intersections	Fire Vehicle Hook and Ladder with Outriggers	Turn partially from adjacent lane; turn fully from adjacent lane, turn from opposite lane, turn into opposite lane
Freight Vehicles[3]	Per Comprehensive Plan	WB-50	Turn partially from adjacent lane

[1] On corners along bus routes, where buses may have to make occasional detours, turns should

accommodate a transit vehicle using the entire roadway, similar to an emergency vehicle. Other transit vehicles, such as articulated buses may have a larger design vehicle.

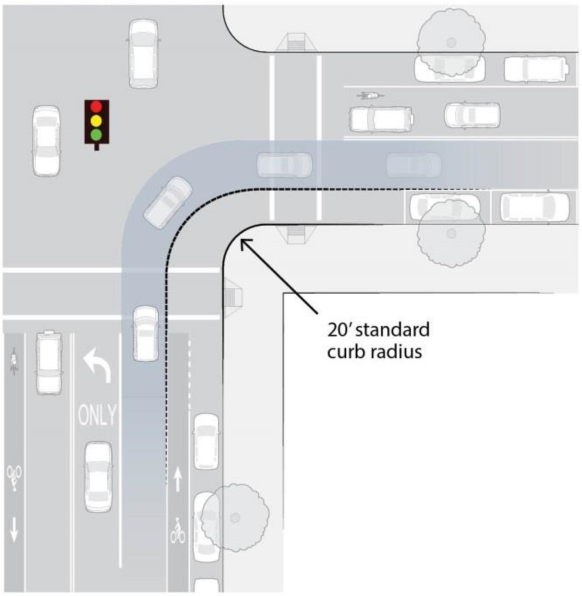
[2] Because emergency vehicles have sirens and flashing lights and other vehicles must pull over, they can typically use the full right-of-way without encountering opposing vehicles. On busier streets, the ability of emergency vehicles to swing wide may be limited by queued traffic which may not be able to pull over.

[3] Freight corridors are streets that are designated on page T-11a in the Transportation Chapter of the Comprehensive Plan. Freight corridors should be designed for WB-50 trucks. Larger WB-60 trucks may also be present on City streets, particularly on designated state highways, truck routes and in industrial areas. These may need to be accommodated in certain instances, though they are not practical in most of Bellingham.

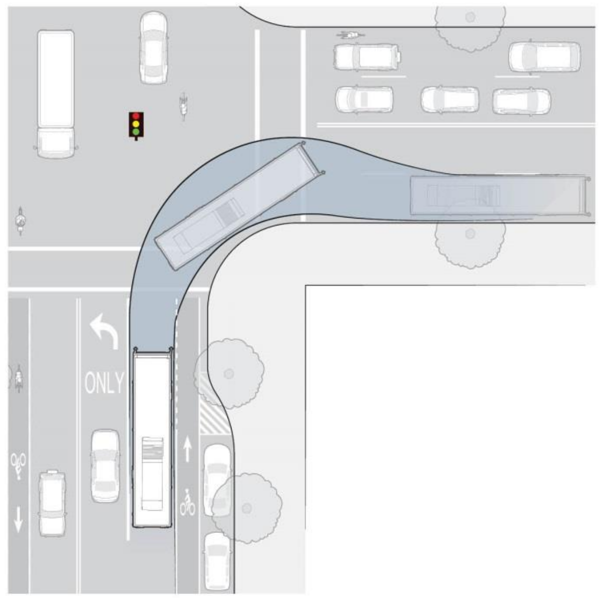
A variety of strategies can be used to maximize pedestrian safety while accommodating large vehicles including:

- Adding parking and/or bicycle lanes to increase the effective radius of the corner
- Varying the actual curb radius (i.e. compound curb radii) over the length of the turn so that the radius is smaller as vehicles approach a crosswalk and larger when making the turn. Compound radii effectively shorten crossing distances and make pedestrians visible while accommodating larger vehicle turns; because they allow more sweeping turns and they do not slow turning vehicles.
- Painting a median: Where there is sufficient lane width on the destination street, a painted median can enable a large vehicle to complete a turn without turning into opposing traffic.
- Restricting access: Where there is a desire to keep curb radii small, restrictions on large vehicles making the turn may be considered. This should be considered in light of the overall street network.
- Installing advance stop lines on the destination street to increase the space available for large vehicles to make a turn by enabling them to swing into opposing lanes on the destination street while opposing traffic is stopped.

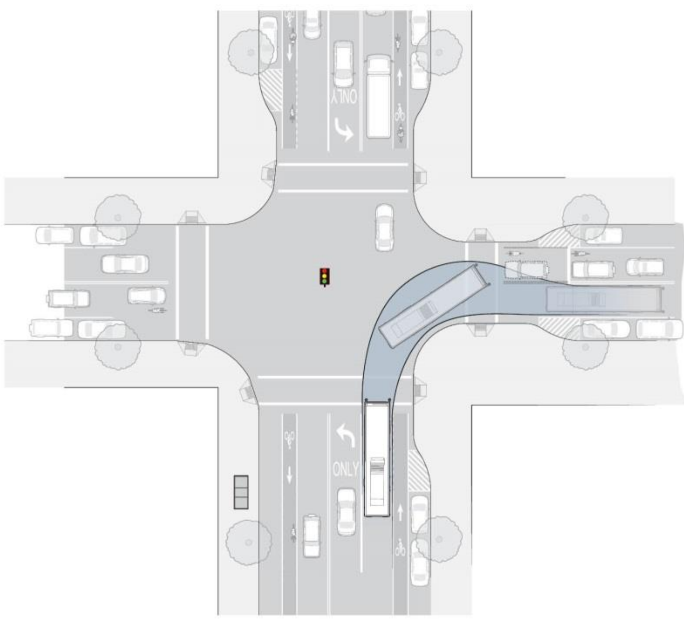
Curb Radius



Typical curb radius at signalized intersection



4-lane signalized intersection
Bus turns into inside lane



2-lane signalized intersection
recessed stop bar accommodates bus right-turn movements

Roundabouts

Design Considerations

Roundabouts should feature the following elements:

- Splitter islands at all ingress and egress points that provide a crossing island for pedestrians, breaking up the crossing into two separate movements. Splitter islands should have a minimum width of 6 feet, and preferably 8 feet from curb face to curb face.
- Marked crosswalk through the center of the splitter island set back one car length (20 to 25 feet) from the entry point into the roundabout, allowing motorists to focus on yielding to pedestrians in crosswalk before negotiating entry into roundabout traffic while also not forcing pedestrians too far out of direction. Sight distances should be maintained to the left as the motorist enters the roundabout so that motorists are aware of vehicles and bicycles in the roundabout, as well as to the right as motorists are exiting the roundabout so they can see pedestrians in the marked crosswalk.
- Deflection that encourages slow traffic speeds, but allows for movement of larger vehicles.
- A landscaped visual obstruction in the central island, which obscures the driver's view of the road ahead, to discourage users from entering the roundabout at high speeds.

Roundabouts can be more complex than standard intersections for persons with disabilities, particularly the visually impaired. There are several treatments that should be incorporated to mitigate these challenges, including:

- The draft PROWAG (not adopted) requires detectable warning strips at all entry and exit points, including splitter island refuges.
- Setting sidewalks back from the edge of the circular roadway by at least 5 feet so that visually impaired can more clearly identify and follow designated crossing points.
- Building the roundabout to a design speed of 20 mph or less.
- The draft PROWAG requires accessible pedestrian signals to be installed at all crosswalks across any roundabout approach with two or more lanes in one direction. The PROWAG requirement does not specify the type of signal except that it must be accessible, including a locator tone at the pushbutton, with audible and vibrotactile indications of the pedestrian walk interval.
- Signage indicating the presence of the pedestrian crossing should be used to remind drivers that while they are only required to yield to traffic within the roundabout, they are required to stop for pedestrians that are in the crosswalk.

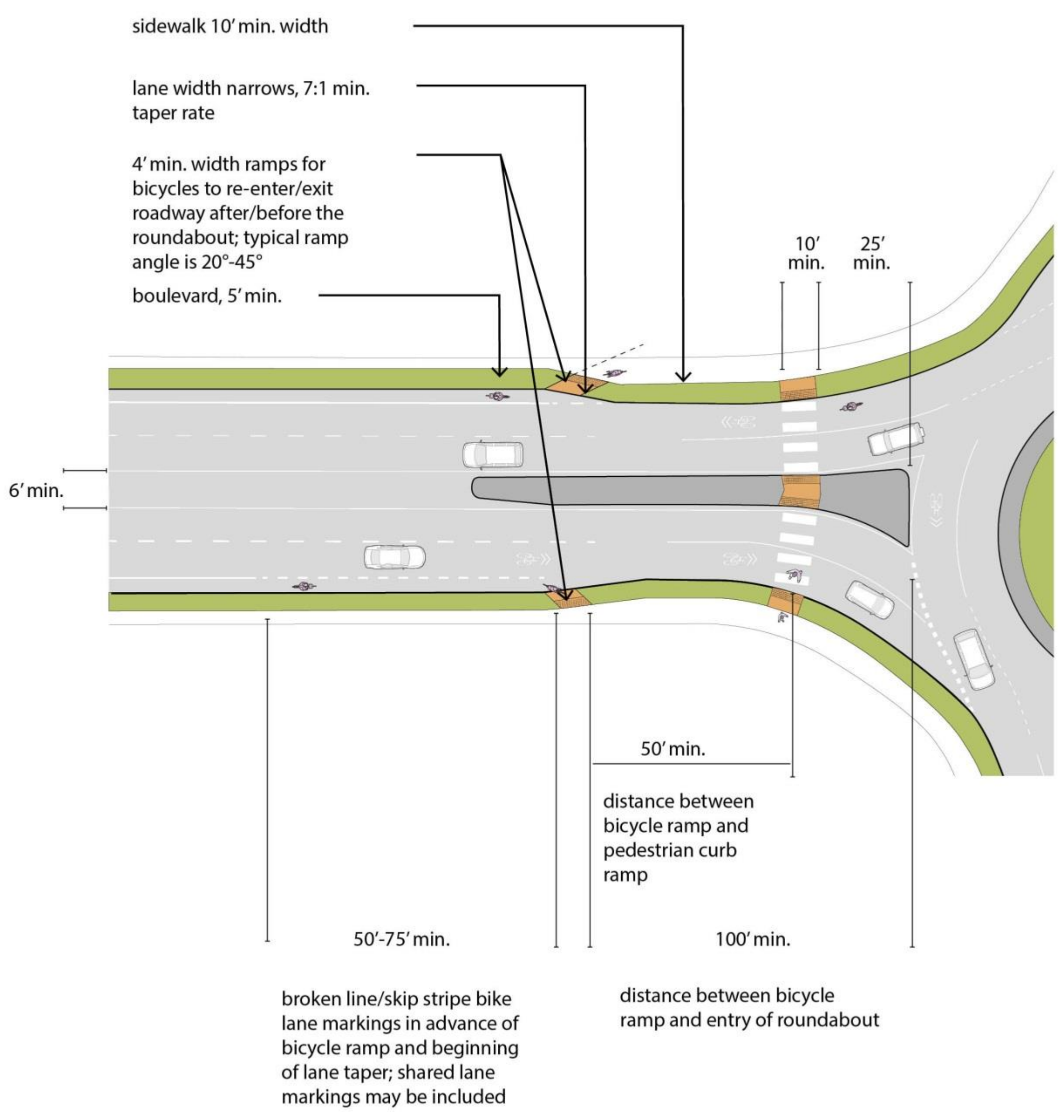
Other Design Considerations

- Continuing bicycle lanes through roundabouts has not been shown to improve safety. Rather, bicycle lanes should terminate in advance of crosswalks at roundabouts, providing sufficient space for bicyclists to merge with motor vehicles. Alternatively, bicycles may be accommodated on sidewalks. The AASHTO *Guide for the Development of Bicycle Facilities* provides detailed design guidance for both options.
- Ramps, angled between 20 and 45 degrees, should be provided 50 feet before and 50 after the pedestrian crossing of the splitter island, allowing bicyclist to exit before or reenter the roadway after the roundabout.
- Broken line bicycle lane markings should be provided 50 to 75 feet in advance of the ramps; shared lane markings should also be included. Signage to warn pedestrians that bikes may be joining them on the sidewalk may be needed.
- For a typical single-lane roundabout at a four-way intersection the center island will more or less

be a circle that can vary in size from 12 feet to 90 feet to fit a wide range of intersections, achieve desired deflection, and accommodate through movements and different turn movements by various design vehicles. For intersections with an odd number of approaches or offset approaches the shape of the center island should be modified to achieve appropriate deflection.

- Including a truck apron (a paved, load-bearing area) around the edge of the central island is the typical approach for accommodating larger design vehicles. The truck apron is often paved with a fairly rough texture, and raised enough to discourage encroachment by smaller high-speed passenger cars and achieve desired deflection. The truck apron should have a three inch high rolled curb.
- Restricting or not accommodating turn movements by trucks and articulated busses may allow the construction of a smaller roundabout without the acquisition of right-of-way and with all the benefits of roundabouts at the cost of forcing the occasional large truck to take an alternative route. Roundabouts may be constructed to accommodate through movements by large trucks, and restrict turn movements by these vehicles while accommodating turn movements by single unit trucks and transit vehicles.
- Signing and marking of roundabouts should be in compliance with the current version of the MUTCD, however roundabouts should be designed so their design and function are self-explanatory, and the need for signing is minimal. NCHRP Report 672, Roundabouts: An Informational Guide, Second Edition 2010 provides detailed design guidance on roundabouts.
- If traffic analysis determines that the capacity of a proposed single-lane roundabout is exceeded during one or two short periods during the day, consideration should be given to metering the roundabout rather than constructing a larger multi-lane roundabout. The result is a smaller, slower roundabout that is more appropriate for all users for most of the day.
- The area at the base of the ramp closest to the curb may not get swept very well by street sweepers and may require supplemental sweeping.

Bicycle and Pedestrian Accommodation at Roundabouts



Rectangular Rapid Flashing Beacons (RRFB)

Design Considerations

- RRFBs should be accompanied by pedestrian crossing signs both at the signal and in advance of the crosswalk location. The assembly approaching the crossing should include a plaque that says AHEAD. The assembly at the location should include a downward arrow plaque placed at the crosswalk location.
- A STOP HERE FOR PEDESTRIANS sign with advanced stop bars should be placed a minimum 50 ft. from the crosswalk and should be considered where RRFBs are installed. A Pedestrian Crossing sign with an AHEAD or a distance supplemental plaque may be used in conjunction with and in advance of a MUTCD R1-5b/R1-5c sign.
- Beacons must be placed on either side of roadway and visible from both directions of traffic. If a median exists at the crossing location, a third beacon may be placed in the median, which studies show, significantly increases motorist yield rates.
- In order to encourage pedestrians to enter crosswalk while the RRFB is active, passive or active actuation should trigger an immediate response.

HAWK Signal

Design Considerations

HAWK signals must be accompanied by the following crossing treatments:

- High-visibility crosswalk
- Advanced stop bar placed 50 feet from crosswalk
- MUTCD R10-23 "Crosswalk Stop on Red" signs mounted both on the mast arm and the supporting pole.

The HAWK Signal indicates a preferred crossing location and thus does not improve crossing at all quadrants of an intersection as a signalized intersection would. It does not improve movement through the intersection for cyclists in on-street lanes as they are subject to motor vehicle indications.

Bicycle Activated Signal Push Button

Signals specifically intended for pedestrian and bicycle street crossings such as midblock or HAWK signals may require special activation. Bicycle activated push buttons are a separate pushbutton located along the curb or location easily accessed by bicyclists. Bicycle activated pushbuttons allow bicyclists to activate the signal without having to change their course of travel, dismount or detour onto the sidewalk to use a pedestrian pushbutton. This improves compliance and efficacy of the signal. The disadvantage of push buttons is that they require bicyclists to come to a full stop. They also make it challenging for bicyclists wanting to make a left turn. The following design considerations should be taken into account:

Signals specifically intended for pedestrian and bicycle street crossings such as midblock or HAWK signals may require push buttons if passive detection is not possible. When a signal is activated by push buttons, separate push buttons should be provided for bicyclists. Bicycle activated push buttons should be located along the curb or location easily accessed by bicyclists. Bicycle activated push buttons allow bicyclists to activate the signal without having to change their course of travel, dismount or detour onto the sidewalk to use a pedestrian push button. This improves compliance and efficacy of the signal. Push buttons can present challenges to bicyclists wanting to make a left turn. The following design considerations should be taken into account:

- Place push button within reach of the curb but with appropriate setbacks to avoid being hit by passing motor vehicles.
- Push buttons work well on streets without parking or where there are parking restrictions at the intersection
- Use a large button for easy actuation by bicyclists
- Placement of the pushbutton assembly and bicycle queuing should take right turning motor vehicles into consideration.

Bicycle Parking

Design Considerations

- Bicycle racks must support the bicycle in at least two places to prevent it from falling over and allow locking of the frame and one or both wheels with a standard U-lock.
- Racks must be securely anchored to the ground and resist cutting, rusting and bending or deformation.
- A minimum 2 feet of clearance around the rack should be provided to allow users to access and securely lock the bicycle from the side. Adequate end clearance should also be provided to allow users to enter and exit the rack area.
- Bicycle racks must not interfere with bus loading/unloading areas.
- Generally, bicycle racks should be placed within the furniture or building frontage zones, where there is adequate room for a bicycle to be locked up without protruding into the pedestrian zone or the clear zone behind the curb.
- Bicycle racks should be placed on concrete or other similarly paved surface. Racks should not be placed on a soft surface planting strip.
- In-street bicycle parking (i.e. corrals) may be considered where there is on-street parking and high bicycle parking demand and limited other locations for public and private bike parking.
- In-street bicycle corrals require special consideration for street sweeping and snow removal and storage. Maintenance agreements may be required for in-street bicycle parking facilities to

ensure they are cleared of snow and debris. Bus stops, fire hydrants, turning bus movements, utility covers and sewer valves, parking meters, stormwater drainage, and adjacent landscaping obstacles should be considered when identifying a location for an in-street bicycle corral.

- Further guidance on bicycle parking can be found in the APBP Bicycle Parking Guidelines.

Travel Lanes

Design Considerations

Considerations Regarding Lane Widths

- Narrowing lane widths and reclaiming space once dedicated for automobile traffic is an important tool in equitably dividing roadway space. Studies show that narrower lane widths have no measurable impact on capacity; however they may result in a reduction of average travel speeds by 1-3 mph. In response to specific conditions on a given roadway, lane widths different from those prescribed below may be required.
- During reconstruction projects, space reallocated from vehicle lanes can be used to widen sidewalks, create curb extensions, plant street trees or greenscape elements, install street furniture, implement bicycle lanes or cycle tracks, or provide on-street parking lanes through a lane diet.
- During resurfacing or restriping projects, installing minimum lane widths can provide additional space to install bicycle lanes or cycle tracks. On roadways with on-street parking, it is advantageous to provide additional width to either the parking lane or the bicycle lane, particularly in areas with high parking turnover, to reduce the likelihood that a bicyclist will be struck by a motorist opening a car door.
- A capacity analysis is often necessary to evaluate the impacts of a proposed design on the operation of the roadway or the adjacent road network.

Multiple Minimums

The cumulative relationship between lanes and the sidewalk must be taken into account when selecting lane width. In general, multiple minimums should be avoided (e.g. minimum curb lane, bike lane and parking lane). The lane accommodating the most vulnerable mode should not be minimized.

Bus Lane

- A wider bus lane (14 – 16 feet) is preferred for shared bus and bicycle lane in order to allow for passing while staying in lane and to maximize bicyclists' comfort and safety.

Travel Lanes

- Wider lanes (11-12 feet) are appropriate in locations with high volumes of heavy vehicles (> 8%) or designated transit routes.
- Travel lanes immediately adjacent to on-street parking should provide a minimum combined parking and travel lane width of 18 feet.

Bicycle Lanes

- The preferred width for bicycle lanes is 6 ft. in areas with high volumes of vehicles.
- Wider bicycle lanes (6 -7 feet) are preferred in locations with heavy parking turnover.
- Bicycle lanes 4 feet in width may be considered on roadways when not adjacent to on-street

parking, or where no vertical curb is present.

Parking Lanes

- In areas of low parking turnover a 7 feet parking lane may be appropriate. In areas with high parking turnover and high volumes of bicyclists, an 8 or 9 ft. parking lane may be appropriate.
- For lanes with peak hour parking restrictions, 12 feet is the minimum width to accommodate shared use by parked vehicle and bicycles during off-peak times.

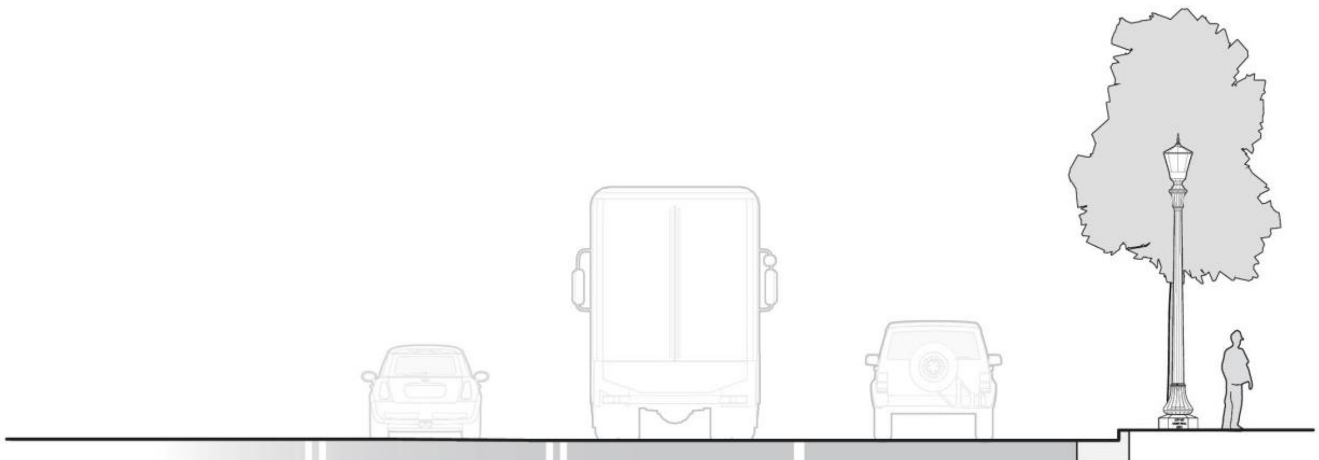
One-way vs. two-way streets

One-way streets are configured to allow for one direction of travel while two-way streets allow for two directions of travel. One-way streets may be configured to allow for the contra flow of certain vehicles; usually transit or bicycles. One-way and two-way streets each provide advantages and disadvantages in terms of traffic operations, access, and pedestrian safety. In some cases existing one-way or two-way configurations may be reevaluated as part of an overall strategy to optimize street space and better accommodate all travel modes.

In terms of pedestrian safety, there are benefits of both one-way and two-way streets so the decision to convert a one-way street to two-way (or vice versa) is context- sensitive. Studies have shown that converting two-way streets to one-way generally results in fewer crashes involving pedestrians because there are fewer turning movements. However, one-way streets tend to encourage higher motor vehicle speeds, and may increase vehicular traffic if motorists are required to circle around to access destinations in a dense, urban environment. Two-way streets may reduce vehicle speeds due to increased turning movements and increased perceived friction along the roadway. In addition, many one-way streets have multiple lanes, which may create a multiple-threat crash condition for pedestrians crossing the road.

Converting one-way streets to two-way streets may be an effective strategy for managing traffic patterns, reducing motor vehicle speeds, improving access to businesses and changing the character of a neighborhood from being a ‘pass through’ to a ‘destination’ for motorists. Many communities have found that local businesses benefit from on-way to two-way conversions because access is improved and motorists are more likely to stop and patronize businesses. Conversely, conversion of a two way street to a one-way street may improve traffic operations while providing space for other street zone elements. If a street is converted to a one-way, it should be evaluated to see if additional changes should be made. Potential changes include lane diets, road diets, curb bulbs, turning radius reductions and signal timing that discourages higher vehicle speeds. Traffic circulation in the surrounding area must be carefully considered before converting streets to one-way or two-way.

Travel Lane General Guidance



	Center Turn Lane	Inside Lane	Curb Lane*
RANGE	10′ - 12′	10′ -12′	10′- 13′
BASELINE	11′	11′	11′
CONDITIONS FOR WIDENING			
Bus route	✓		✓
Bus route + bike lane			✓
Truck route	✓		✓
Frequent left turns	✓		
Adjacent to bike lane			✓
Absence of inside lane	✓		✓
Two-way roadway			✓
CONDITIONS FOR NARROWING			
Manage speeds	✓	✓	✓
ADT below 12,000	✓	✓	✓
Infrequent left turns	✓		

REGARDING RANGES

The cumulative relationship between lanes must be taken into account when selecting land width.
In general, multiple minimums should be avoided (i.e. min. center turn lane, inside lane and curb lane).

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*Curb Lane does not include gutter pan

Parking Lane
RANGE width 7′ - 8′
BASELINE width 8′ (includes gutter pan)
CONDITION for 8′- Commerical street with high turnover
CONDITION for 7′- Residential street with low turnover

One-Way/Two-Way Conversions
Directional Conversions