

# Designing Cycle Tracks for Success

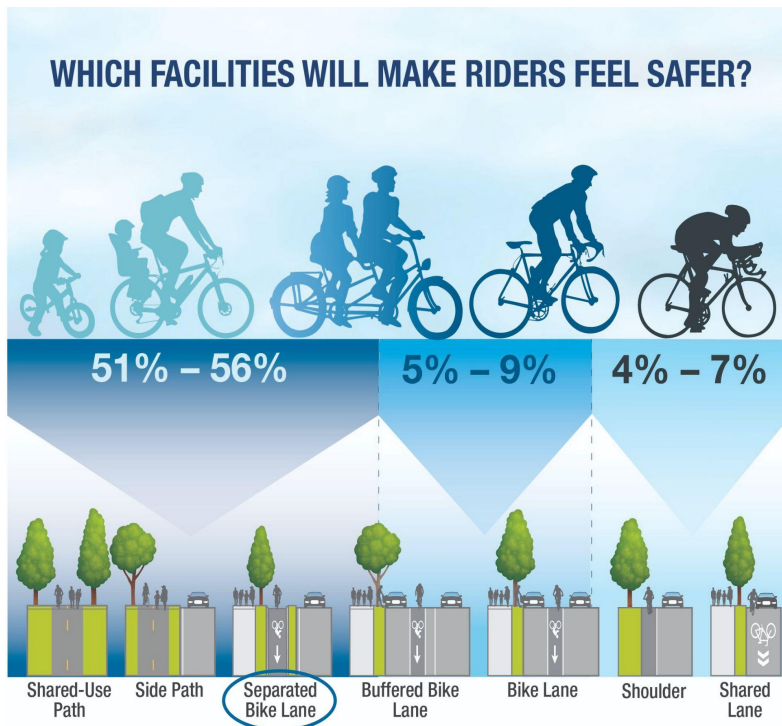
## A Cycle Track Toolkit

San Diego County Bicycle Coalition  
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### Purpose

The development process for cycling infrastructure projects often involves gathering input from the community. More specifically, the San Diego County Bicycle Coalition is often in a position to provide input on cycle track designs. The purpose of this document is to provide guidance to Coalition staff and spokespersons on how best to respond at these opportunities. This document is also a general resource for community members to structure their thinking about cycle tracks.

### Overview



Cyclists come from many walks of life and have different abilities and preferences. This infographic, based on surveys of people identifying as cyclists, illustrates a spectrum of rider types and the kinds of infrastructure they may prefer to use. Experienced cyclists are often comfortable with unprotected lanes and sharing the road with cars; usually with more miles ridden or formal bicycling education comes more skills and comfort with bicycling in traffic.

About half of riders, however, prefer some kind of physical separation from motor vehicles, and importantly, new prospective riders seek more comfort and protection from traffic before they will take up bicycling for recreation or commuting.

**Note:** Percentages represent the level of comfort people feel bicycling, according to peer-reviewed surveys as recent as 2016.

**Source:** FHWA Bikeway Selection Guide:

[https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/docs/fhwasa18077.pdf](https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf)

For more information, please visit the FHWA Bicycle and Pedestrian Program website:

[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/)



Cycle tracks can be great facilities for encouraging more bicycling. A well-designed cycle track can help reduce motor vehicle use, decrease traffic fatalities, address climate change, improve the environment, and better the health and well being of us all. Accordingly, the San Diego County Bicycle Coalition wants to encourage cycle tracks and ensure that they are safe for all riders.

Also known officially in California as *Class IV Separated Bikeways* or commonly called “*Protected Bike Lanes*”, cycle tracks can provide increased safety from mid-block collisions with motor vehicles. Perhaps more importantly, they are perceived by many as being safer and more comfortable. Many riders feel protected when there is a barrier between them and other traffic. Feeling safer makes cycling more comfortable and will likely be attractive to new riders—lessening Americans' reliance on motor vehicles. Cycle tracks have the promise of bringing the health and environmental benefits of cycling to people who have previously considered it to be too dangerous.

There are several categories of bikeways in California: Bike lanes, buffered bike lanes, multiuse or bike paths, trails, roadways, shared roadways/bike routes and separated bikeways, aka cycle tracks. Unlike other bicycle facilities, cycle tracks currently have a wide latitude in design. There is much room for innovation and interpretation in the Caltrans DIB 89-01<sup>1</sup> guidelines for separated bikeways. Their placement, size, barriers, adjacent facilities, pavement markings, signage and so on are non-standardized.

As San Diego County looks to expand its network of bikeways, and implement cycle tracks beyond the urban core setting where they are commonly found, it's important that they are used in the right places and are well designed. We don't want cycle tracks that merely *seem* safer, we want cycle tracks that *actually* are safer and thereby retain or increase bicycling safety utility.

The Bike Coalition seeks to lead the way to improved bicycling by offering these tools for going beyond minimal guidelines. We want facilities that increase ridership and exceed expectations for comfort, safety, and effectiveness. It is still early in U.S. cycle track design development, and an unsafe or frustrating cycle track is counterproductive in the long run. In order to keep the reputation of cycle tracks high in the public's eye, we present this toolkit. It is intended as a resource for anyone considering a cycle track as a way to improve bicycling conditions along a roadway.

## Cycle Track Principles for Plan Evaluation

Always consider the following:

1. **Evaluate Context**

*Every setting is unique. Choose the appropriate bikeway type for the location, traffic conditions, and current and anticipated bicycle usage:*

- a. What is the **overall setting**? Who will be the users? The road context classification from the FHWA Bikeway Selection Guide is useful; urban core, urban, suburban, rural town, or rural. This classification along with traffic volume and the speed difference between bikes and motor vehicles help determine which facility is most appropriate.

- b. Where are the **vehicle conflict points**? Entry and exit points for roadside businesses and attractions create conflicts similar to intersections. All conflict points, including those at intersections, need to be considered.
- c. How much **space** is available? If there is ample room, the wider, more comfortable Class I bikeway is usually preferred, especially in non-urban contexts. In some areas a wide shoulder may provide the most safety and utility.
- d. Is the cycle track **wide enough**? Adequate bikeway width for comfort, safety, and utility is context dependent, and for two-way cycle tracks must safely accommodate opposing bicycle traffic. Consider the variety of bicycle users, bicycle types, and the volumes of users. Is there sufficient adjacent pedestrian facility space to accommodate expected pedestrian travel? Or does the cycle track width need to anticipate pedestrian traffic as well as bicycle traffic?
- e. Is there a significant **downhill grade**? Cyclists coast downhill at relatively high speeds. Ensure safety with adequate maneuvering width. Be mindful of likely speeds at intersection approaches and when extended sightlines are needed.
- f. Is the **transition into and out of** the cycle track intuitive and safe? This is particularly important when the cycle track is on a different side of the road than the cyclist's direction of travel. For two-way cycle tracks, care must be taken for cyclists in the contra direction where opposing traffic is adjacent to the cycle track.

## 2. **Analyze Safety and Usage**

*Municipalities should track pre and post ridership metrics—volumes, collisions, time of day, etc.— to gauge improvement accurately.*

- a. **Did ridership increase?** Since a primary goal is to increase ridership, usage data on the facility and alternative routes may be important to justify the resources required for the project and for funding future projects.
- b. **Is it safer?** If a primary goal is to increase safety, data to demonstrate improvement after implementation should be collected. This may also require advocating for improvements in bicycle crash reporting. To be effective, data must be complete. Solo crashes, injuries, and those that do not involve a motor vehicle should also be collected. Currently, bicycle crashes in Class IV and Class I separated facilities, that do not involve motor vehicles or are not on a roadway, are not normally collected or reported to SWITRS (Statewide Integrated Traffic Records System) and TIMS (Transportation Injury Mapping System.)
- c. Crash types and contributing factors should be collected by municipalities and analyzed to better determine potential mitigations. Ideally “near miss” data should be collected.

### 3. **Require Safety Measures at Intersections**

*Physical barriers can reduce motor vehicle intrusions into cycle tracks, but cyclists and drivers still must cross each other at intersections, driveways, alleys, and other conflict points. Everyone using a roadway needs to be able to clearly see, anticipate and quickly decide how to appropriately react to each other.*

- a. Are all **conflict points** accounted for? Driveway and alley openings present uncontrolled conflict points with a cycle track. These can be as dangerous as intersections of roadways.
- b. **Which treatment** will each conflict point get? FHWA guidelines<sup>4</sup> recommend two general intersection alternatives: either (1) removal of vertical barriers prior to intersections to enable *mixing zones* where cyclists can carefully position themselves in relation to other traffic based on their intended direction of travel, or, (2) continue separation up to and through the intersection with use of a “*protected intersection*” design.
- c. Is the **right-of-way** obvious? Vehicle, bicycle and pedestrian right-of-way must be explicitly and *clearly* established at intersection conflict points in a manner consistent with California Vehicle Code. Right-of-way decisions should be as *intuitive as possible, able to be successfully performed*, and follow the California Vehicle Code (CVC). If the right-of-way is difficult to understand or ambiguous, then special signage, pavement markings or traffic controls (e.g. no right on red signs, separate traffic signals for bikes and motor vehicles) should be used.
- d. Is the **location of conflict points** clear to both drivers and riders? Can cyclists **position themselves** so they can be seen by motor vehicle drivers? Consider the use of signage and the new standard for bike lanes, dashed green pavement markings, to highlight conflict points.

### 4. **Anticipate Temporary Obstructions**

*Slower or wrong-way cyclists, debris, and pedestrians can easily constrain movements, add hazards, or block a cycle track.*

- a. Can a cyclist **avoid an obstruction**? The cycle track should be wide enough for anticipated user types and volumes to comfortably pass each other.
- b. Can the cycle track be **maintained**? The cycle track must be kept smooth and free from pavement breaks, potholes, and debris. Special, narrower, mechanized cleaning vehicles, and frequent cleaning, on the same or higher frequency as the rest of the roadway, may be required. (Luckily in most of California, snow and ice are not a problem, but where these occur, adequate preparation for clearing should be in place.)
- c. Do **pedestrians** have a place to walk without affecting cycle traffic? Ideally pedestrians will have a separate, dedicated facility/sidewalk and crosswalk,

especially in high volume areas. Otherwise, even when pedestrian use will be minimal, the design should accommodate expected pedestrians with extra width, signs, pavement markings, crosswalks, and/or traffic controls.

- d. Will the cycle track be subject to **flooding**? Edges and depressions of roads often accumulate rainwater. Adequate drainage for rain should be provided.

## 5. **Consider Barrier Safety**

*The vertical separation can present a crash hazard in itself for cyclists, but good design can minimize the danger.*

- a. Is there a **buffer** space between cyclists and the barrier? There should be buffer width between the traveled area of the cycle track and the vertical barriers on each side of the cycle track to minimize the chance of a bicyclist striking the separation barrier or curb. If parked cars are the barrier, then there should be a passenger exit door zone space. The standard minimum operating width for a *single* bicyclist is usually considered to be 4 feet. AASHTO recommends 5 feet.
- b. Could the barrier snag the bicycle **handlebar or divert the front wheel**? Consider the potential crash consequences of a handlebar or front wheel striking the barrier causing loss of bicycle control and a fall.
- c. Is a curb too **sharp, abrupt or steep**? Angled contact with low but raised barriers and linear cracks, such as gutter seams, wheel-stops, or curbs can deflect a bicyclist's front wheel causing a "diversionary" fall. The raised barrier design, location, and spacing should not present an unreasonable or hidden fall hazard to the cyclist.
- d. Can cyclists **freely move in and out of the cycle track**? Vertical barriers should allow a bicyclist to leave and enter the cycle track. Bicyclists may need to make necessary and lawful turning movements or avoid temporary obstructions. When intermittent vertical barriers are used, exit/entrance could be achieved by sufficiently wide spacing of the posts. For curbed barriers, rolled curbs may be more appropriate than abrupt rises to allow cyclists to roll up to get in or out of the cycle track safely.
- e. Is the **barrier visible**? For a flex post barrier design, the posts should be high enough to provide visibility to motorists, especially at night, yet low enough so that a standard height bicycle handlebar does not become deflected causing a crash. Other types of barriers should be conspicuous, especially in poor lighting.

## 6. **Design for All Riders**

*In order to encourage more people to choose to use bicycles, cycle tracks should expand and improve bicycling movement choices. "Complete Streets" concepts should be followed so that all users are served.*

- a. Are we **anticipating the desired future** of bicycling volumes and participation? Consider all types of active transportation users who may lawfully be traveling

the route. This should include e-bike users and experienced bicyclists who can easily travel over 20 mph. The growing population of e-bicyclists, the operating characteristics of e-bikes, and the desire by experienced bicyclists to keep trip times short should be factored into cycle track and adjacent roadway lane designs. Accommodating faster e-bike and commuters concerned with travel times may be provided by using Shared Lane Markings (sharrows) on travel lanes adjacent to a cycle track.

- b. How will **current cyclists** be affected? When the route already has regular bicycle usage, adding Class II bike lanes or Shared Lane Markings (sharrows) and Bikes May Use Full Lane (BMUFL) signage adjacent to the cycle track helps to expand, rather than decrease, bicyclist choices for where to ride. Sharrows and BMUFL signs serve to inform *everyone* that bicycling should be accommodated in travel lanes.
- c. Do people **know what to do** when cycle tracks or other bikeway types are introduced? Public education should be used to prepare users for the changed travel environments and encourage compliance. A public education outreach program should accompany the introduction of new facilities. The program should educate bicyclists, motorists, and pedestrians of best practices, especially at intersections, and inform traffic law enforcement staff about lawful and expected behaviors.

## Glossary

California Department of Transportation's Bikeway Classification:

- Class I Bikeway – a bike path or shared use path that is apart from the roadway
- Class II Bikeway – a bike lane designated by pavement striping on a street
- Class III Bikeway – a bike route or bike boulevard on a low traffic street
- Class IV Bikeway – a separated bikeway, aka a cycle track

FHWA: Federal Highway Administration, a division of the Department of Transportation

AASHTO: American Association of State Highway and Transportation Officials, a standards body

NACTO: National Association of City Transportation Officials, a coalition of about 80 Departments of Transportation in North American cities

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