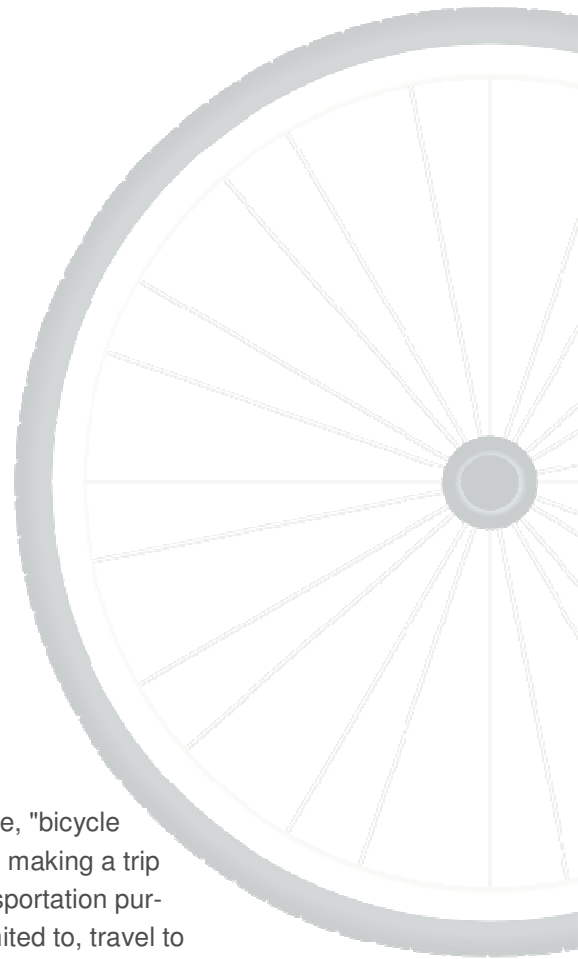




Appendix A: State Highway Code, Section 890-894.2



FULL TEXT OF STREETS AND HIGHWAYS CODE, SECTION 890-894.2

890. It is the intent of the Legislature, in enacting this article, to establish a bicycle transportation system. It is the further intent of the Legislature that this transportation system shall be designed and developed to achieve the functional commuting needs of the employee, student, business person, and shopper as the foremost consideration in route selection, to have the physical safety of the bicyclist and bicyclist's property as a major planning component, and to have the County or City to accommodate bicyclists of all ages and skills.

890.2. As used in this chapter, "bicycle" means a device upon which any person may ride, propelled exclusively by human power through a belt, chain, or gears, and having either two or three wheels in a tandem or tricycle arrangement.

890.3. As used in this article, "bicycle commuter" means a person making a trip by bicycle primarily for transportation purposes, including, but not limited to, travel to work, school, shopping, or other destination that is a center of activity, and does not include a trip by bicycle primarily for physical exercise or recreation without such a destination.

890.4. As used in this article, "bikeway" means all facilities that provide primarily for bicycle travel. For purposes of this article, bikeways shall be categorized as follows:

(a) Class I bikeways, such as a "bike path," which provide a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with cross flows by motorists minimized.

(b) Class II bikeways, such as a "bike lane," which provide a restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with vehicle parking and cross flows by pedestrians and motorists permitted.

(c) Class III bikeways, such as an on-

Appendix A: State Highway Code

street or off-street "bike route," which provide a right-of-way designated by signs or permanent markings and shared with pedestrians or motorists.

890.6. The department, in cooperation with City and County governments, shall establish minimum safety design criteria for the planning and construction of bikeways and roadways where bicycle travel is permitted. The criteria shall include, but not be limited to, the design speed of the facility, minimum widths and clearances, grade, radius of curvature, pavement surface, actuation of automatic traffic control devices, drainage, and general safety. The criteria shall be updated biennially, or more often, as needed.

890.8. The department shall establish uniform specifications and symbols for signs, markers, and traffic control devices to designate bikeways, regulate traffic, improve safety and convenience for bicyclists, and alert pedestrians and motorists of the presence of bicyclists on bikeways and on roadways where bicycle travel is permitted.

891. All County, City, regional, and other local agencies responsible for the development or operation of bikeways or roadways where bicycle travel is permitted shall utilize all minimum safety design criteria and uniform specifications and symbols for signs, markers, and traffic control devices established pursuant to Sections 890.6 and 890.8.

891.2. A County or City may prepare a bicycle transportation plan, which shall include, but not be limited to, the following elements:

(a) The estimated number of existing bicycle commuters in the plan area and the

estimated increase in the number of bicycle commuters resulting from implementation of the plan.

(b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.

(c) A map and description of existing and proposed bikeways.

(d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.

(e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.

(f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.

(g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.

(h) A description of the extent of citizen and community involvement in develop-

Appendix A: State Highway Code

ment of the plan, including, but not limited to, letters of support.

(i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.

(j) A description of the projects proposed in the plan and a listing of their priorities for implementation.

(k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.

891.4. (a) A County or City that has prepared a bicycle transportation plan pursuant to Section 891.2 may submit the plan to the County transportation commission or transportation planning agency for approval. The County or City may submit an approved plan to the department in connection with an application for funds for bikeways and related facilities which will implement the plan. If the bicycle transportation plan is prepared, and the facilities are proposed to be constructed, by a local agency other than a County or City, the County or City apply for funds on behalf of that local agency.

(b) The department may grant funds applied for pursuant to subdivision (a) on a matching basis which provides for the applicant's furnishing of funding for 10 percent of the total cost of constructing the proposed bikeways and related facilities. The funds may be used, where feasible, to apply for and match federal grants or loans.

891.5. The Sacramento Area Council of

Governments, pursuant to subdivision (d) of Section 2551, may purchase, operate, and maintain call boxes on Class I bikeways.

891.8. The governing body of a County, City, or local agency may do all of the following:

(a) Establish bikeways.

(b) Acquire, by gift, purchase, or condemnation, land, real property, easements, or rights-of-way to establish bikeways.

(c) Establish bikeways pursuant to Section 21207 of the Vehicle Code.

892. (a) Rights-of-way established for other purposes by cities, counties, or local agencies shall not be abandoned unless the governing body determines that the rights-of-way or parts thereof are not useful as a non-motorized transportation facility.

(b) No state highway right-of-way shall be abandoned until the department first consults with the local agencies having jurisdiction over the areas concerned to determine whether the right-of-way or part thereof could be developed as a non-motorized transportation facility. If an affirmative determination is made, before abandoning the right-of-way, the department shall first make the property available to local agencies for development as non-motorized transportation facilities in accordance with Sections 104.15 and 887.6 of this code and Section 14012 of the Government Code.

892.2. (a) The Bicycle Transportation Account is continued in existence in the State Transportation Fund, and, notwithstanding Section 13340 of the Government Code, the money in the account is continuously appropriated to the department for expen-

Appendix A: State Highway Code

diture for the purposes specified in Section 892.4. Unexpended moneys shall be retained in the account for use in subsequent fiscal years.

(b) Any reference in law or regulation to the Bicycle Lane Account is a reference to the Bicycle Transportation Account.

892.4. The department shall allocate and disburse moneys from the Bicycle Transportation Account according to the following priorities:

(a) To the department, the amounts necessary to administer this article, not to exceed 1 percent of the funds expended per year.

(b) To counties and cities, for bikeways and related facilities, planning, safety and education, in accordance with Section 891.4.

892.5. The Bikeway Account, created in the State Transportation Fund by Chapter 1235 of the Statutes of 1975, is continued in effect, and, notwithstanding Section 13340 of the Government Code, money in the account is hereby continuously appropriated to the department for expenditure for the purposes specified in this chapter. Unexpended money shall be retained in the account for use in subsequent fiscal years.

892.6. The Legislature finds and declares that the construction of bikeways pursuant to this article constitutes a highway purpose under Article XIX of the California Constitution and justifies the expenditure of highway funds therefore.

893. The department shall disburse the money from the Bicycle Transportation Account pursuant to Section 891.4 for projects that improve the safety and conven-

ience of bicycle commuters, including, but not limited to, any of the following:

(a) New bikeways serving major transportation corridors.

(b) New bikeways removing travel barriers to potential bicycle commuters.

(c) Secure bicycle parking at employment centers, park-and-ride lots, rail and transit terminals, and ferry docks and landings.

(d) Bicycle-carrying facilities on public transit vehicles.

(e) Installation of traffic control devices to improve the safety and efficiency of bicycle travel.

(f) Elimination of hazardous conditions on existing bikeways.

(g) Planning.

(h) Improvement and maintenance of bikeways.

In recommending projects to be funded, due consideration shall be given to the relative cost effectiveness of proposed projects.

893.2. The department shall not finance projects with the money in accounts continued in existence pursuant to this article which could be financed appropriately pursuant to Article 2 (commencing with Section 887), or fully financed with federal financial assistance.

893.4. If available funds are insufficient to finance completely any project whose eligibility is established pursuant to Section 893, the project shall retain its priority for allocations in subsequent fiscal years.

893.6. The department shall make a reasonable effort to disburse funds in general proportion to population. However, no applicant shall receive more than 25 percent of the total amounts transferred to the Bicy-

Appendix A: State Highway Code

cle Transportation Account in a single fiscal year.

894. The department may enter into an agreement with any County or City concerning the handling and accounting of the money disbursed pursuant to this article, including, but not limited to, procedures to permit prompt payment for the work accomplished.

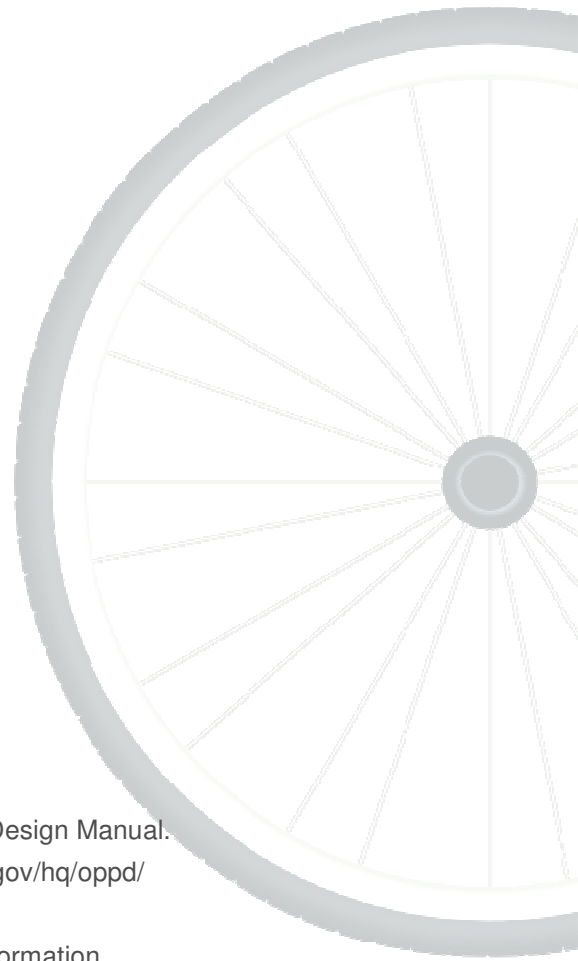
894.2. The department, in cooperation with City and County governments, shall adopt the necessary guidelines for implementing this article.





Appendix B:

Design Guidelines



GUIDANCE

This section provides a BASIC OVERVIEW for developing this bikeway system and support facilities. Specific State and Federal accepted standards / guideline documents can be located in the latest:

- California Manual of Uniform Traffic Control Devices (http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd2010.htm)
- Caltrans Highway Design Manual Chapter 1000 “Bikeway Planning and Design” guidelines. (<http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm>)
- Caltrans Policies and Directives. (<http://www.dot.ca.gov/hq/traffops/signtech/signdel/policy.htm>), including:
 - Traffic Operations Policy Directive 09-06 “Provide Bicycle and Motorcycle Detection on all new and modified approaches to traffic-actuated signals in the state of California.”
 - Caltrans Deputy Directive DD-64 “Complete Streets – Integrating the Transportation System.”
- Caltrans Highway Design Manual. (<http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm>)
- Caltrans Design Information Bulletins. (<http://www.dot.ca.gov/hq/oppd/dib/dibprg.htm>), including:
 - DIB 80-01 Roundabouts
 - DIB 82-03 Design Information Bulletin 82-03 “Pedestrian Accessibility Guidelines for Highway Projects”
- Caltrans Standard Plans. (http://www.dot.ca.gov/hq/esc/oe/project_plans/HTM/06_plans_disclaim_US.htm)
- ADA Accessibility Guidelines for Buildings and Facilities (ADAAG). (<http://www.accessboard.gov/adaag/html/adaag.htm>)
- Revised Draft Guidelines for Accessible Public Rights-of-Way, Access Board. (<http://www.accessboard.gov/prowac/draft.htm>)

Appendix B: Design Guidelines

- Guidelines for the Development of Bicycle Facilities, AASHTO. Guidelines for the Planning, Design, and Operations of Pedestrian Facilities, AASHTO. (<https://bookstore.transportation.org/home.aspx>)
- A Policy on Geometric Designs of Highways, AASHTO. (https://bookstore.transportation.org/Item_details.aspx?id=110)

This appendix is not intended to replace existing state or national mandatory or advisory standards, nor the exercise of engineering judgment by licensed professionals.

As always, all facility designs are subject to Public Works engineering design review and approval.

Bikeway Facility Classifications

According to Caltrans, the term “bikeway” encompasses all facilities that provide primarily for bicycle travel. Caltrans has defined three types of bikeways in Chapter 1000 of the Highway Design Manual:

- Class I Bikeway (or Shared-use Paths)
- Class II Bikeway (Bike Lanes)
- Class III Bikeway (Bike Routes)



CLASS 1 BIKEWAY



CLASS II BIKEWAY



CLASS III BIKEWAY

Appendix B: Design Guidelines

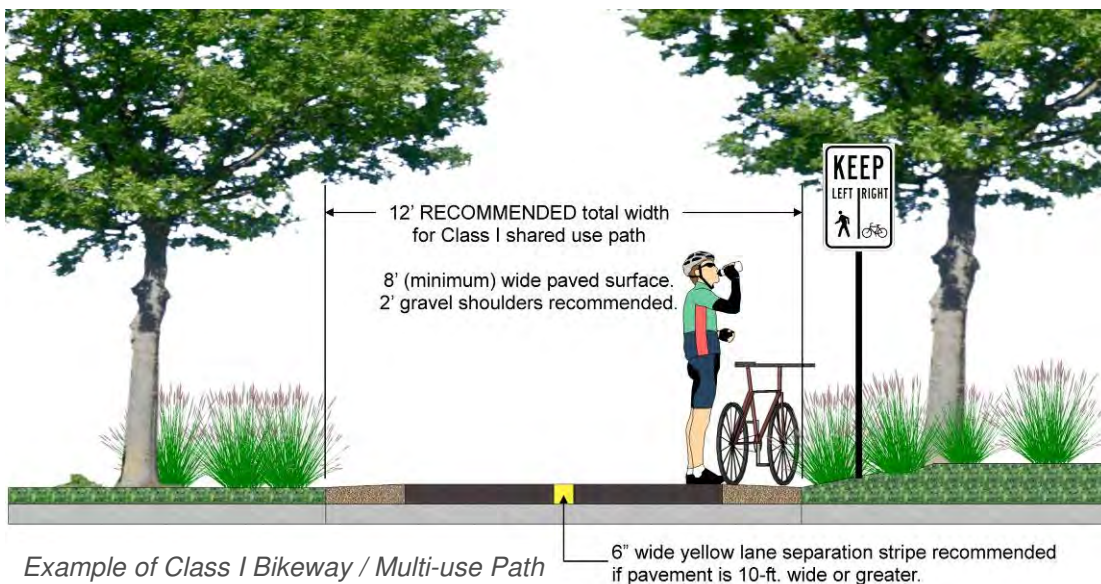
B1-a SHARED USE PATHS - General Design: Paved

A shared use path (Class I Bikeway) allows for two-way, off-street bicycle use, and may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. State of California Class I facility design standards require that the surface be paved, and can also include amenities such as lighting, signage, and fencing (where appropriate).

Minimum Standards

The recommended minimum width of a shared use path is dependent upon anticipated usage:

- 8-feet is the minimum paved width for Class I facilities, typically used for short neighborhood connector paths (generally less than one mile in length)
- 10-foot paved width is the recommended minimum for a typical two-way bicycle path. Ten-foot wide paved paths are recommended for accommodating all uses, and allow for long-term maintenance and emergency vehicle access. In order to better accommodate maintenance vehicles adequate edge support should be provided. Edge support can be either in the form of stabilized shoulders, a concrete “ribbon curb” along one or more edges of the path, or constructing additional pavement width or thickness.
- 12-feet is the preferred minimum width if more than 300 users per peak hour are anticipated, and/or if there is heavy mixed bicycle-pedestrian use.
- In all cases a minimum 2-foot wide graded area must be provided adjacent to the path to provide clearance from trees, poles, walls, guardrails, etc.
- On facilities with expected heavy use, a yellow centerline stripe is recommended to separate travel in opposite directions on paths 10-feet or wider.
- If trees are adjacent to the path, a root barrier should be installed along the path to avoid root uplift.



Appendix B: Design Guidelines

B1-b SHARED USE PATHS - General Design: Un-Paved

Un-paved Levee Road Construction

The use of existing levee roads as multi-use paths is recommended by this master plan. However, the cost to pave the many miles of facilities would be very costly. Therefore, it is recommended that in most instances (see Network Plan Exhibit) the levee roads be improved as unpaved multi-use trails.

Unpaved multi-use trails are common throughout the state and are cheaper to construct than paved trails. In many communities unpaved trails serve equestrians in addition to bicyclists and pedestrians. Unpaved trails are generally made of compacted crushed rock or class 5 aggregate and are maintained with a motor grader or with smaller trail grooming implements. Unpaved trails are more difficult to traverse when wet, (especially with road bikes) and can be dusty when dry. Maintained unpaved trails are ideal for mountain bikes, comfort bikes, BMX-bicycles, or cyclocross bikes, most children's bikes. The surface conditions typically require slower riding.

It is recommended that a 10-12-foot wide aggregate surface be maintained wherever possible and that vegetation within 2 feet of each side of the trail be mowed or trimmed as needed. A common unpaved trail would be constructed with at least 6-inches of aggregate base and would be crowned to allow for proper drainage. As trail use increases, and funding is available, unpaved trails within the county should be considered for inclusion into the 5-year CIP to be paved to meet Class 1 Standards.

As mentioned in Chapter 3.0, Pedestrian & Bikeway Network Plan, the County will need to enter into agreements with the different levee maintenance districts, in order to secure public access to levee roads.



Appendix B: Design Guidelines

B1-c SHARED USE PATHS - Support Facility Options

Trail Enhancements

Trail enhancements are not critical to the movement of people, but do enhance the experience. Trail enhancements may include kiosks, public art, trees, plantings, benches, gateways, drinking fountains, public toilets, decorative fencing, memorials, pavers, trash receptacles, and air pumps. Trail enhancements may be funded as part of a trail project but may also be funded with private dollars. Bike racks and identification/wayfinding signage are especially important enhancements that should be considered with all bicycle projects.

Trailheads

Trailheads are public places to enter and exit a trail facility. Trailheads often include informational kiosks with trail maps, identification and wayfinding signage, trash receptacles, and bicycle parking. Some trailheads should offer parking for visitors and include treatments to keep motor vehicles from entering the trail. If trails are not policed on a regular basis physical devices like bollards or curbs should be considered at trailheads to control motorized vehicle access. All trail entries should include “No Motor Vehicle” signage and violators should be issued tickets by law enforcement officers. Trailheads should be spaced to reflect the density of land use and should contain consistent design elements throughout the system.



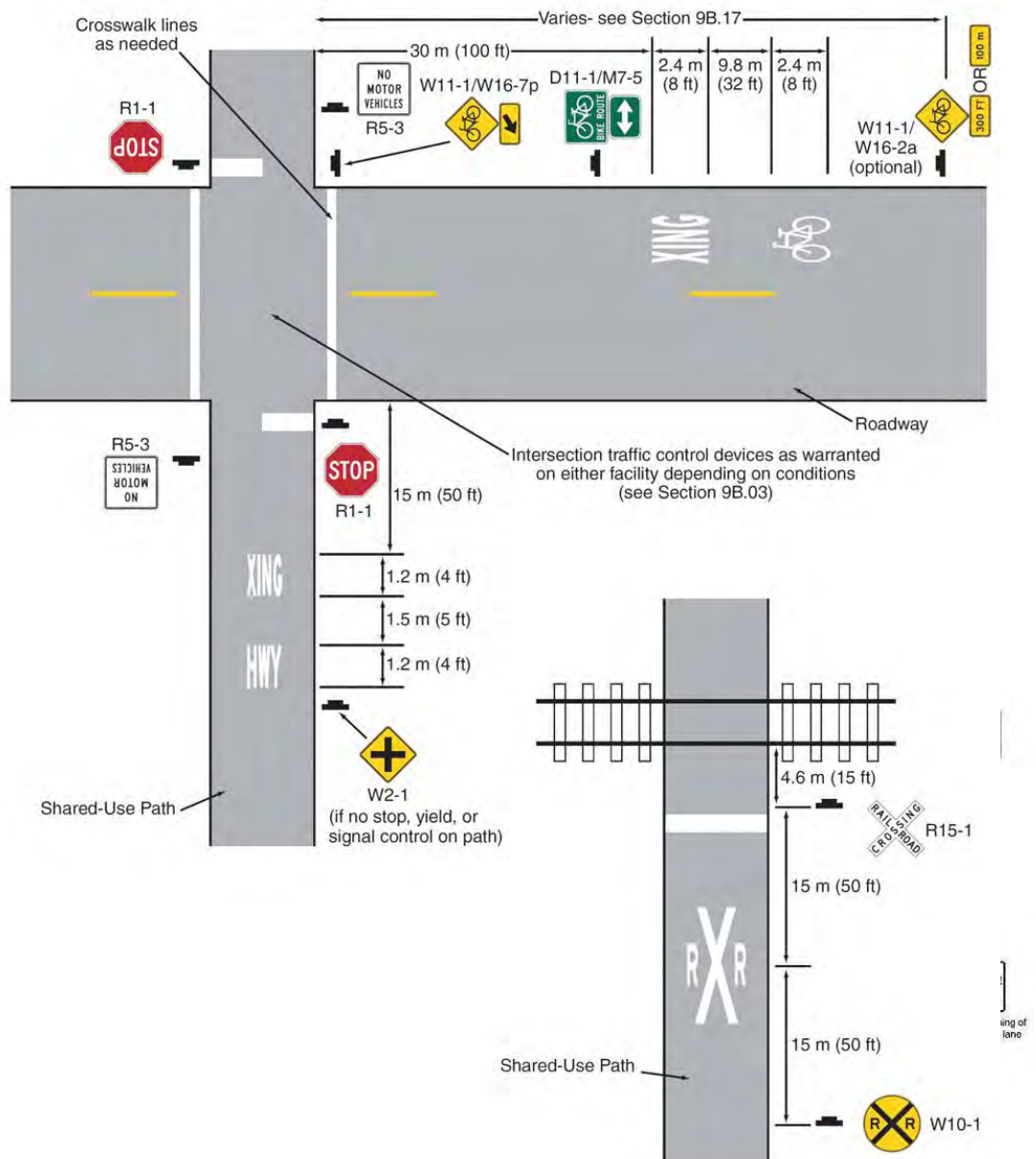
Appendix B: Design Guidelines

B1-d SHARED USE PATHS - At Grade Road Crossings

At-Grade Intersection

When shared-use paths cross streets or railroad tracks, proper design should be developed on the pathway as well as on the roadway to alert bicyclists and motorists of the crossing. Sometimes on larger streets, at mid-block pathway crossing locations, an actuated signal is necessary. A signal allows bicyclists a clear crossing of a multi-lane roadway. If a signal is or is not needed, appropriate signage and pavement markings should be installed, including stop signs and bike crossing pavement markings. The following diagram from the California MUTCD depicts examples of signing and markings associated with shared path crossings.

Figure 9B-7. Examples of Signing and Markings for Shared-Use Paths



Appendix B: Design Guidelines

B2-a ON-STREET BIKE FACILITIES - Class II Bikeway

Standard Variations

Often referred to as a “bike lane,” a Class II bikeway provides a striped and stenciled lane for one-way travel on either side of a street or highway. To provide bike lanes along corridors where insufficient space is currently available, extra room can be provided by removing a traffic lane, narrowing traffic lanes, or prohibiting parking. The width of the bike lanes vary according to parking and street conditions. The following **general** guidelines / standards are extracted from the California MUTCD, and where indicated, define the figure illustration number.

Road Lane Markings: Longitudinal pavement markings should be used to define bicycle lanes. Pavement markings designate that portion of the roadway for preferential use by bicyclists. Markings inform all road users of the restricted nature of the bicycle lane.

Examples of bicycle lane markings at right-turn lanes are viewed in the CA MUTCD Figures 9C-1, 9C-3, and 9C-4. Examples of pavement markings for bicycle lanes on a two-way street are shown in Figure 9C-5. Pavement symbols and markings for bicycle lanes are shown in Figure 9C-6.

Standard:

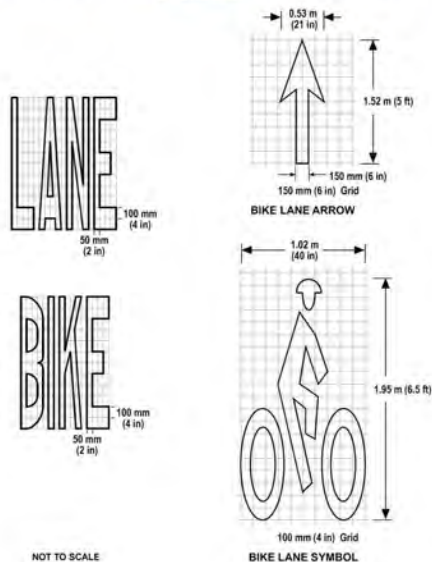
If used, the bicycle lane symbol marking (see Figure 9C-6) shall be placed immediately after an intersection and at other locations as needed. The bicycle lane symbol marking shall be white. If the bicycle lane symbol marking is used in conjunction with other word or symbol messages, it shall precede them. If the word or symbol pavement markings shown in Figure 9C-6 are used, Bicycle Lane signs (see Section 9B.04) shall also be used, but the signs need not be adjacent to every symbol to avoid overuse of the signs.

On the following pages, illustrations depict typical bike lane configurations and dimensional standards.



R81 (CA)

Figure 9C-6 (CA). Example of Optional Word and Symbol Pavement Markings for Bicycle Lanes



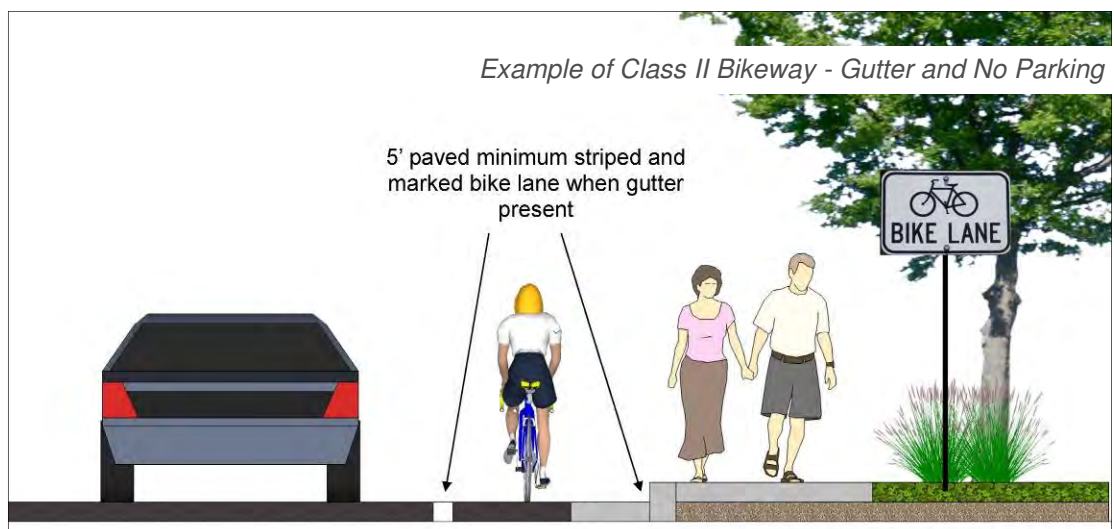
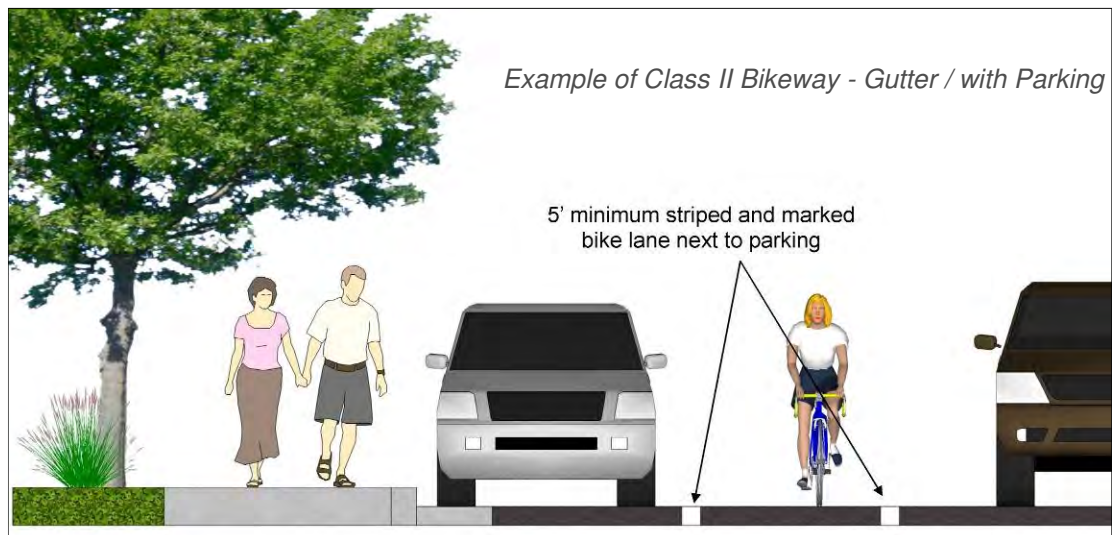
Appendix B: Design Guidelines

B2-b ON-STREET BIKE FACILITIES - Class II Bikeway

When Curb, Gutter and Parking Present

- 5-foot minimum width from curb face; or 3-feet more measured than gutter pan width, if gutter pan is greater than 2-feet
- 6-feet recommended where right-of-way allows
- 5-foot minimum width when parking stalls are marked
- 12-foot minimum width for shared parking/bike lane adjacent to a curb face
- 11-foot minimum width for a shared bike/parking lane where parking is permitted but not marked on streets or without curbs

See CA MUTCD for marking and signing standards.



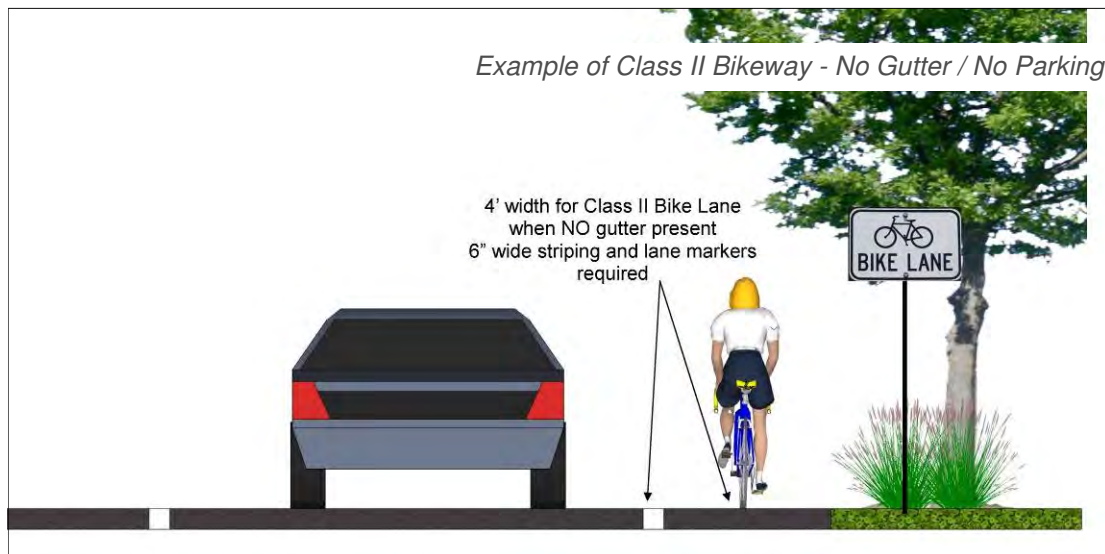
Appendix B: Design Guidelines

B2-c ON-STREET BIKE FACILITIES - Class II Bikeway

When No Gutter Present (rural roads)

- 4-foot minimum width from fog line (no gutters)
- 6-foot preferred where right of way allows

See CA MUTCD for marking and signing standards.



Appendix B: Design Guidelines

B2-d ON-STREET BIKE FACILITIES - Class II Bike Lanes

Class II Bikeway Intersection Design-Signalized Intersections

Intersections represent a primary collision point for bicyclists. Small intersections with few lanes are relatively easy to manage. However, large, multi-lane intersections are more difficult for bicyclists to travel through than smaller, two-lane intersections. Challenges and potential solutions for bicyclists' at large signalized intersections include:

- Signals may not be timed to allow slower-moving bicyclists to travel across the intersection. Solution: Bicycle adaptive signal timing.
- Loop detectors or video detection that is used to actuate the signal may not be calibrated to detect bicyclists. Solution: Design standard of bike loop use.
- Bicyclists may not know how to actuate the signal using loop detectors, even if it is calibrated. Solution: Use of bike loop detector symbol.
- Bicyclists who are traveling straight may have to merge across motor vehicle traffic that is turning right from a right-turn lane. Solution: Bike lane pockets at intersections, between through and right turn lanes.

Design treatments can help bicyclists travel through intersections and alert motorists of bicyclists' presence. Good intersection design alerts motorists to bicyclists, indicates to motorists and bicyclists where bicyclists may ride, and guides bicyclists through intersections. This treatment provides a design for where a roadway with Class II bike lanes intersects with a road at a signalized intersection.

Bicycle Actuated Signals & Adaptive Signal Timing

Making intersections more "friendly" to bicyclists, involves modifying how they operate. Improved signal timing, calibrating loop detectors to detect bicyclists, and camera detection makes intersections easier for bicyclists to cross intersections. Loop detectors are installed within the roadway to allow the metal of a motor vehicle to trigger a change in the traffic signal. Many standard motor vehicle loop detectors can be calibrated to detect bicycles. This allows the bicyclist to stay within the lane of travel and avoid maneuvering to the side of the road to trigger a push button. Signals can be configured so that if a bicycle is detected, an extended green time can be provided.

Right-Turn Only Lanes

Right-turn only lanes can present challenges for bicyclists traveling through an intersection. Bicyclists must merge to the left to position themselves in the through travel lane. Jurisdictions will sometimes stripe bike lanes on the right-side of right-turn only lanes, which places the through-cyclist in direct conflict with a right-turning vehicle. The appropriate treatment for right-turn only lanes is to either drop the bike lane entirely approaching the right-turn lane, or to place a bike lane pocket between the right-turn lane and the right-most through lane.

Appendix B: Design Guidelines

B2-e ON-STREET BIKE FACILITIES - Class III Bike Routes

Class III Bikeway Design

Generally referred to as a “bike route,” a Class III bikeway provides routes through areas not served by Class I, where frequency of riders do not justify bike lanes, or where right-of-way is not available to include Class II facilities. Class III facilities are shared with motorists on roadways and are identified in most cases only by signing. There are no recommended minimum widths for Class III facilities, but when encouraging bicyclists to travel along selected routes, traffic speed and volume, parking, traffic control devices, and surface quality should be acceptable for bicycle travel.

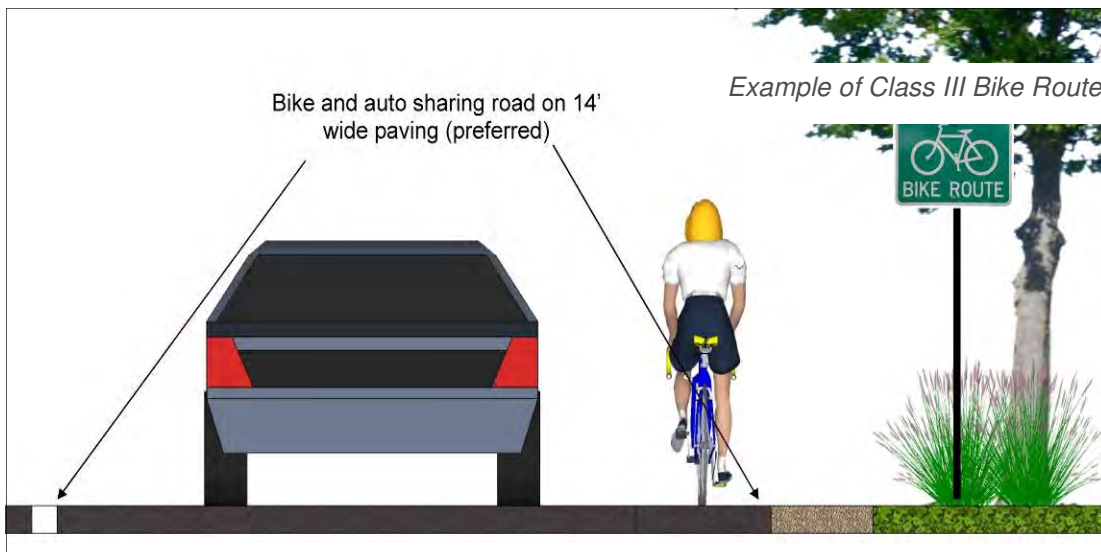


Although it is not a requirement, a wide outside traffic lane (14 feet) is typically preferable to enable cars to safely pass bicyclists without crossing the centerline. Caltrans Highway Design Manual Chapter 1000 provides details regarding the design requirements for placement and spacing of bicycle route signage.



Share the Road signs are recommended along Class III Bike Ways with narrow paving / lack of shoulder to remind motorists and bicyclists to be aware of one another’s right-of-way.

See CAMUTCD for marking and signing standards.



Appendix B: Design Guidelines

B3-a BIKE PARKING - Short and Long Term Facilities

Short Term Bike Parking

Bicycle racks provide support for the bicycle but do not have locking mechanisms. Racks are relatively low-cost devices that typically hold between two and eight bicycles, allow bicyclists to securely lock their frames and wheels, are secured to the ground, and should be located in highly visible areas, preferably at the front of a building.



- Bicycle racks should be a design that is intuitive and easy to use.
- Bicycle racks should be securely anchored to a surface or structure.
- The rack element (part of the rack that supports the bicycle) should keep the bicycle upright by supporting the frame in two places without the bicycle frame touching the rack. The rack should allow one or both wheels to be secured.
- Avoid use of multiple-capacity “wave” style racks. Users commonly misunderstand how to correctly park at wave racks, placing their bikes parallel to the rack and limiting capacity to 1 or 2 bikes.
- Position racks so there is enough room between parked bicycles. Racks should be situated on 36” minimum centers.
- A five-foot aisle for bicycle maneuvering should be provided and maintained beside or between each row of bicycle racks.
- Empty racks should not pose a tripping hazard for visually impaired pedestrians. Position racks out of the walkway’s clear zone.
- For sidewalks with heavy pedestrian traffic, at least seven feet of unobstructed right-of-way is required.
- Racks should be located close to a main building entrance, in a lighted, high-visibility area protected from the elements.

Long Term Bicycle Parking

Long-term bicycle parking facilities accommodate employees, students, residents, commuters, and others that typically expect to park for more than two hours. These parking facilities should be provided in a secure, weather protected manner and location.







- Long-term parking should always be protected and in a secure area.
- Bicycle lockers should be a design that is intuitive and easy to use.
- Bicycle lockers should be securely anchored to a surface or structure.
- Bicycle lockers should be constructed to provide protection from theft, vandalism and weather.
- A five-foot aisle for bicycle maneuvering should be provided and maintained beside or between each row of bicycle lockers.
- Lockers should be located close to a main building entrance, in a lighted, high-visibility area protected from the elements.
- Long-term parking should always be protected from the weather.

A recommended reference guide is the *Pedestrian and Bicycle Professionals Bicycle Parking Guidelines 1st and 2nd edition*, (<http://www.apbp.org/?page=Publications>)








Appendix C: Bike Survey

1. What general area of Sutter County do you reside?




		Response Percent	Response Count
Yuba City		76.0%	19
Live Oak		8.0%	2
Sutter		8.0%	2
Meridian		0.0%	0
Nicolaus		0.0%	0
Robbins		0.0%	0
I do not live in Sutter County		8.0%	2
answered question			25
skipped question			0

2. What is your bike riding frequency?






		Response Percent	Response Count
Daily		8.0%	2
1-6 times a week		48.0%	12
1-4 times a month		8.0%	2
A few times a year		20.0%	5
I do not ride a bike		16.0%	4
answered question			25
skipped question			0

Appendix C: Bike Survey

3. How would you rank the current bicycle lane/route/path facilities in the unincorporated parts of Sutter County?









		Response Percent	Response Count
Excellent		0.0%	0
Adequate		12.5%	3
Minmally Adequate		25.0%	6
Poor		62.5%	15
answered question			24
skipped question			1

4. What typically is the purpose for riding a bicycle (please check all that apply)?

		Response Percent	Response Count
I do not ride a bike		12.0%	3
Pleasure / recreation / fitness		88.0%	22
I belong to a cycling club		20.0%	5
Commute to school		0.0%	0
Commute to work		32.0%	8
Commute to transit		0.0%	0
Shopping / errands		12.0%	3
answered question			25
skipped question			0







Appendix C: Bike Survey

5. What prevents you from bicycling more in the County of Sutter? (please check all that apply)





		Response Percent	Response Count
Weather conditions		12.5%	3
Poor road / bikeway conditions		75.0%	18
Too many cars / cars drive too fast		66.7%	16
Destinations too far from home		12.5%	3
I typically travel with small children		4.2%	1
Insufficient lighting for night time travel		29.2%	7
I need daily access to a car for work		25.0%	6
Other (please specify)		12.5%	3
		answered question	24
		skipped question	1

Appendix C: Bike Survey

6. What are your favorite places to ride a bike in Sutter County? (check all that apply)

		Response Percent	Response Count
Roads with designated bike lanes		60.9%	14
Rural roads with low traffic volumes		52.2%	12
Levee access roads		34.8%	8
Designated off-street bike paths		47.8%	11
I do not ride a bike in Sutter County		21.7%	5
Other (please specify)		13.0%	3
		answered question	23
		skipped question	2

7. Specifically, what bike routes in Sutter County would you like to see created or improved?

		Response Percent	Response Count
1		100.0%	19
2		94.7%	18
3		57.9%	11
4		21.1%	4
		answered question	19
		skipped question	6

Appendix C: Bike Survey

8. In the space provided, please identify bike facility related improvements that would influence you to bike more often in the County of Sutter.

		Response Count
		18
answered question		18
skipped question		7

Q5. What prevents you from bicycling more in the County of Sutter? (please check all that apply)

1	Defined routes fear of getting lost	Feb 1, 2011 1:51 PM
2	lazy	Feb 2, 2011 9:01 AM
3	Rurual roads sometimes have agressive drivers who feel they can be dangerous toward the cyclist out of the public eye.	Feb 14, 2011 7:46 PM

Q6. What are your favorite places to ride a bike in Sutter County? (check all that apply)

1	the bike path to Sutter is a great asset to the community	Feb 7, 2011 11:13 AM
2	Bike lanes aren't necessary, but increased signage is vital!	Feb 14, 2011 7:46 PM
3	pass road thru the buttes	Feb 26, 2011 11:59 AM

Appendix C: Bike Survey

Q7. Specifically, what bike routes in Sutter County would you like to see created or improved?

1

1	Along Sutter Bypass Levee	Feb 1, 2011 1:51 PM
2	Roads around the Buttes (e.g., Pass Road)	Feb 7, 2011 11:13 AM
3	level bike path opened behind B st to provide a continous path between north and south Yuba city	Feb 7, 2011 4:48 PM
4	Better connections to Yuba City bike route/lane system	Feb 8, 2011 9:44 AM
5	Sanborn Road	Feb 8, 2011 11:24 AM
6	Bogue road, Next to city limits	Feb 8, 2011 9:03 PM
7	safe way to cross HWY 20 when trying to get to the bike trail that goes out to Sutter	Feb 10, 2011 12:31 PM
8	any new roads should have minimum shoulder width	Feb 14, 2011 7:46 PM
9	Continuous, safe north-south and east-west bike routes in Yuba City.	Feb 23, 2011 3:18 PM
10	levee routes	Feb 24, 2011 9:08 AM
11	further pavement of the feather river levee south of shanhi bend all the way to th hwy 99 bridge	Feb 26, 2011 11:59 AM
12	Butte Hiuse Road	Feb 28, 2011 5:36 PM
13	get the bikes off Second Street and off levees on	Mar 1, 2011 8:27 PM
14	Walton/stabler rd	Mar 1, 2011 9:25 PM
15	from so yuba city to marysville	Mar 1, 2011 10:29 PM
16	I would like to see more signs warning traffic that bikes are about and that they have a right to be on the road.	Mar 2, 2011 8:28 AM
17	Create new bike routes throughout Yuba City	Mar 2, 2011 4:19 PM
18	throughout community of Live Oak	Mar 7, 2011 3:31 PM
19	Live Oak to Yuba City on levee	Mar 23, 2011 3:03 PM

2

1	Along Feather River Levee	Feb 1, 2011 1:51 PM
2	Do not let the condition of the bike path to Sutter deteriorate	Feb 7, 2011 11:13 AM
3	old railroad site opened for bike paths	Feb 7, 2011 4:48 PM
4	Continue rails to trails projects (east/west & north/south)	Feb 8, 2011 9:44 AM
5	Tierra Buena Road	Feb 8, 2011 11:24 AM
6	Sandborn Road	Feb 8, 2011 9:03 PM

Appendix C: Bike Survey

Q7. Specifically, what bike routes in Sutter County would you like to see created or improved?		
7	bike lane on Franklin Road as a way to get to Sutter	Feb 10, 2011 12:31 PM
8	popular ride roads such as Pass Rd., round the Buttes and So. Butte road	Feb 14, 2011 7:46 PM
9	Levee bike path from Live Oak to Yuba City.	Feb 23, 2011 3:18 PM
10	around Buttes	Feb 24, 2011 9:08 AM
11	connect the current bike path in yuba city behind sutter street	Feb 26, 2011 11:59 AM
12	Larkin Road YC to LO	Feb 28, 2011 5:36 PM
13	Second Street. Homeowners need their privacy	Mar 1, 2011 8:27 PM
14	Garden highway	Mar 1, 2011 9:25 PM
15	access to shopping centers; raleys, bel aire, mall, etc.	Mar 1, 2011 10:29 PM
16	more dedicated bike lanes in general that are well marked on the road and with signs.	Mar 2, 2011 8:28 AM
18	between Live Oak and Yuba City	Mar 7, 2011 3:31 PM
19	Live Oak to Sutter (around Buttes) to Yuba City	Mar 23, 2011 3:03 PM
3		
1	Connections between Live Oak and Yuba City	Feb 1, 2011 1:51 PM
2	Pave levee paths to the north and south of YC	Feb 7, 2011 11:13 AM
4	More levee top access	Feb 8, 2011 9:44 AM
5	Butte House Road	Feb 8, 2011 11:24 AM
6	Lincoln Road	Feb 8, 2011 9:03 PM
7	bike lane to Live Oak via Larkin	Feb 10, 2011 12:31 PM
8	Sutter out to Pass Rd.	Feb 14, 2011 7:46 PM
11	pave the feather river levee north of northgate to live oak and beyond	Feb 26, 2011 11:59 AM
13	like everyone else in this City.	Mar 1, 2011 8:27 PM
14	Bike lanes over the bridges	Mar 1, 2011 9:25 PM
18	along the Feather River	Mar 7, 2011 3:31 PM
4		
4	Highlight & clearly mark the scenic route around the Buttes	Feb 8, 2011 9:44 AM
6	Franklin Road	Feb 8, 2011 9:03 PM
8	Signage on levee road that goes to Sutter.	Feb 14, 2011 7:46 PM

Appendix C: Bike Survey

Q7. Specifically, what bike routes in Sutter County would you like to see created or improved?

11	improve the pavement thru and around the buttes particularly pass road	Feb 26, 2011 11:59 AM
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Q8. In the space provided, please identify bike facility related improvements that would influence you to bike more often in the County of Sutter.

1	Clearly defined routes with signage directing riders to destinations	Feb 1, 2011 1:51 PM
2	the rural roads have no shoulders which makes bicycle riding dangerous	Feb 7, 2011 11:13 AM
3	- bicycle sensors on stop lights - better maintenance/paving of existing class II bike lanes - more connectivity to Yuba City bike lane/route system - better education of drivers - keep your distance	Feb 8, 2011 9:44 AM
4	Bike racks to lock bikes, Shade along the bicycle paths.	Feb 8, 2011 11:24 AM
5	Continues bike lanes in and near Yuba City limits, Most of us live in Yuba City or near it. It would be nice for county and City to work together and creat bike lanes near the city so more of us can use it.	Feb 8, 2011 9:03 PM
6	Bike paths in the beautiful unincorporated areas of Sutter County would be wonderful for our community!	Feb 9, 2011 1:29 PM
7	easy to read map of bike lanes in Sutter County, make home owners in the country aware of bike riders and their responsibilites related to safety issues such as dogs not in fenced areas	Feb 10, 2011 12:31 PM
8	More signage, larger shoulders, sharrows, speed limit signs that reminds motorists to no speed and signs to remind motorists to pass when safe.	Feb 14, 2011 7:46 PM
9	Safe, connected bike routes throughout Yuba City area.	Feb 23, 2011 3:18 PM
10	Class	Feb 24, 2011 9:08 AM
11	rural signal light crossings of hwy 20 and 99 that recognize cyclists when they approach. bike path connection behind Sutter street in Yuba City. paved crossings of hwy 20 west of yuba city where you can get over or under the hwy without stopping.	Feb 26, 2011 11:59 AM
12	Bike lockers	Feb 28, 2011 5:36 PM
13	create a different route other than Second Street for the bikers to travel	Mar 1, 2011 8:27 PM
14	See above. More bike lanes	Mar 1, 2011 9:25 PM
15	a safer way to cross the river to Marysville.	Mar 1, 2011 10:29 PM
16	More bike routes and paths designated for bikers to bike through the City.	Mar 2, 2011 4:19 PM
17	More bike lanes and off-street facilities. If not, wider shoulders on roads unmarked with bicycle-specific lanes.	Mar 7, 2011 3:31 PM
18	A safe shoulder on rural roads	Mar 23, 2011 3:03 PM




Appendix D: Caltrans Policy Directive 09-06

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

POLICY DIRECTIVE

TR-0011 (REV 9/2006)

<p>TRAFFIC OPERATIONS POLICY DIRECTIVE</p> <p>ROBERT COPP, DIVISION CHIEF (Signature)</p> 	<p>NUMBER: 09-06</p> <p>DATE ISSUED: August 27, 2009</p>	<p>PAGE: 1 of 9</p> <p>EFFECTIVE DATE: September 10, 2009</p>
<p>SUBJECT: Provide Bicycle and Motorcycle Detection on all new and modified approaches to traffic-actuated signals in the state of California.</p>	<p>DISTRIBUTION</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> All District Directors <input checked="" type="checkbox"/> All Deputy District Directors - Traffic Operations <input checked="" type="checkbox"/> All Deputy District Directors - Maintenance <input checked="" type="checkbox"/> All Deputy District Directors - Construction <input checked="" type="checkbox"/> All Deputy District Directors - Design <input type="checkbox"/> All Deputy District Directors - Transportation Planning <input checked="" type="checkbox"/> Chief, Division of Engineering Services <input type="checkbox"/> Chief Counsel, Legal Division <input checked="" type="checkbox"/> Publications (California MUTCD Website) www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd.htm <input type="checkbox"/> Headquarters Division Chiefs for: 	
<p>DOES THIS DIRECTIVE AFFECT OR SUPERSEDE ANOTHER DOCUMENT? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>IF YES, DESCRIBE</p> <p>Amends Chapter 4D of the California MUTCD</p>	
<p>WILL THIS DIRECTIVE BE INCORPORATED IN THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>IF YES, DESCRIBE</p> <p>Chapter 4D - Section 4D.105, Chapter 4A – Section 4A.02 (CA), Figure 4D-111 (CA) & add Table 4D-109 (CA)</p>	
<p><u>DIRECTIVE</u></p> <p>Pursuant to the authority granted to the California Department of Transportation (Department) in Section 21400 and 21401 of the California Vehicle Code (CVC), Sections 4A.02, 4D.105 (CA) and Figure 4D-111 (CA) shall be revised and a new Table 4D-109 (CA) added to the California Manual on Uniform Traffic Control Devices (MUTCD) dated September 26, 2006 to provide Bicycle and Motorcycle Detection on all approaches to traffic-actuated signals in the State of California. This Directive is effective September 10, 2009.</p>		

Appendix D: Caltrans Policy Directive 09-06

IMPLEMENTATION

In this section, for purposes of clarity, strikethrough text is used to denote text in the California MUTCD that is being deleted and italic text is used to denote text that is being added to the California MUTCD. All other formatting as defined under the Definitions section of this Policy Directive is still applicable.

The following shall be incorporated in the California MUTCD:

Section 4A.02 Definitions Relating to Highway Traffic Signals

15. Detector – a device used for determining the presence or passage of vehicles (*including motorcycles*), *bicycles* or pedestrians.

29A. Limit Line Detection Zone – *a Referenced Bicycle-Rider must be detected in a 6 ft x 6 ft area immediately behind the limit line, centered either in a normal width lane or if the lane is more than 12ft wide, centered 6 ft from the left lane line. For a lane of 20 ft or greater, two minimum 6 ft x6 ft areas shall constitute the Limit Line Detection Zone.*

50A. Reference Bicycle-Rider – *a minimum 4 ft tall person, weighing minimum 90 lb, riding on an unmodified minimum 16-inch wheel bicycle with non-ferromagnetic frame, non-ferromagnetic fork and cranks, aluminum rims, stainless steel spokes, and headlight.*

~~Section 4D.105(CA) Bicycle Detectors~~

~~Option:~~

~~Bicycle detectors may be required at traffic actuated signal installations.~~

~~The loop detector logo shown on Department of Transportation's Standard Plan A24C may be used to show a bicyclist where to stop in a bike lane or traffic lane to be detected.~~

~~Support:~~

~~See Figure 4D-111(CA) for suggested locations of bicycle detectors and Department of Transportation's Standard Plans for typical bike lane pavement markings.~~

~~Efforts need to be made to ensure that signal detection devices are capable of detecting a bicycle. Detectors for traffic-actuated signals need to be located in the bicyclist's expected path, including left turn lanes and shoulders. Marking the road surface to indicate the optimum location for bicycle detection is helpful to the bicyclist. Video detection is an effective alternate technique to loop detection.~~

Section 4D.105(CA) Bicycle/Motorcycle Detection

Standard:

All new limit line detector installations and modifications to the existing limit line detection on a public or private road or driveway intersecting a public road (see Section 1A.13 for definitions) shall either provide a Limit Line Detection Zone in which the Reference Bicycle-Rider is detected or be placed on permanent recall or fixed time operation. Refer to CVC 21450.5.

All new and modified bike path approaches to a signalized intersection shall be equipped with either a Limit Line Detection Zone or a bicyclist pushbutton, or else the phase serving the bike path shall be placed on permanent recall or fixed time operation. A bicyclist pushbutton, if used, shall be located on the right side of the bike path and where it can be reached from the bike path. See Section 9B.10 for bicycle regulatory signs.

At new signalized intersections or when the advance detection is being replaced at existing signalized intersections, phases with advance detection only shall be placed on permanent recall.

Support:

The requirement to detect the Reference Bicycle-Rider in the Limit Line Detection Zone is technology-neutral.

Option:

The detection zone in a bike lane may be narrower than 6 ft. See Figure 4D-111(CA).

A Bicycle Detector Symbol may be used. See Sections 9B.12 and 9C.05.

A bicyclist pushbutton may be used to supplement the required limit line detection.

Appendix D: Caltrans Policy Directive 09-06

IMPLEMENTATION (Continued)

Support:

See Section 9B.10 for bicycle regulatory signs.

Guidance:

If more than 50% of the limit line detectors need to be replaced at a signalized intersection, then the entire intersection should be upgraded so that every lane has a Limit Line Detection Zone.

The Reference Bicycle-Rider or the equivalent should be used to confirm bicycle detection under the following situations:

- A. A new detection system has been installed; or*
- B. The detection configuration has been modified.*

Support:

CVC Section 21202(a) requires bicyclists traveling “at a speed less than the normal speed of traffic” to ride “as close as practicable to the right-hand curb or edge of the roadway” with exceptions, including when the bicyclist is “approaching a place where a right turn is authorized.” This exception was intended to provide the bicyclist the flexibility to avoid having to ride against the right hand curb or edge of the road where a potential conflict would be created with a right turning motorist.

A Limit Line Detection Zone provides for the detection of both bicycles and vehicles, including motorcycles.

Guidance:

Where a Limit Line Detection Zone that detects the Reference Bicycle-Rider has been provided, minimum bicycle timing should be provided as follows:

For all phases, the sum of the minimum green, plus the yellow change interval, plus any red clearance interval should be sufficient to allow a bicyclist riding a bicycle 6 ft long to clear the last conflicting lane at a speed of 14.7 ft/sec plus an additional effective start-up time of 6 seconds, according the formula $G_{min} + Y + R_{clear} \geq 6 \text{ sec} + (W+6 \text{ ft})/14.7 \text{ ft/sec}$, where

G_{min} = Length of minimum green interval (sec)

Y = Length of yellow interval (sec)

R_{clear} = Length of red clearance interval (sec)

W = Distance from limit line to far side of last conflicting lane (ft)

Support:

Bicyclist crossing times are shown in Table 4D-109(CA). The speed of 14.7 ft/sec represents the final crossing speed and the effective start-up time of 6 seconds represents the time lost in reacting to the green light and then accelerating to full speed.

Option:

A limit line detection system that can discriminate between bicyclists and vehicles may be used to extend the length of the minimum green.

Appendix D: Caltrans Policy Directive 09-06

DELEGATION

No new delegations of authority are created under this policy.

BACKGROUND

The purpose of this directive is to implement AB 1581 (Fuller), which was signed by the Governor on October 8, 2007, and became law on January 1, 2008. It added Section 21450.5 to the California Vehicle Code, as follows:

- (a) A traffic-actuated signal is an official traffic control signal, as specified in Section 445, that displays one or more of its indications in response to the presence of traffic detected by mechanical, visual, electrical, or other means.
- (b) Upon the first placement of a traffic-actuated signal or replacement of the loop detector of a traffic-actuated signal, the traffic-actuated signal shall, to the extent feasible and in conformance with professional traffic engineering practice, be installed and maintained so as to detect lawful bicycle or motorcycle traffic on the roadway.
- (c) Cities, counties, and cities and counties shall not be required to comply with the provisions contained in subdivision (b) until the Department of Transportation, in consultation with these entities, has established uniform standards, specifications, and guidelines for the detection of bicycles and motorcycles by traffic-actuated signals and related signal timing.
- (d) This section shall remain in effect only until January 1, 2018, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2018, deletes or extends that date.

The Department, pursuant to CVC Section 21400; must conduct public hearings before it can revise existing traffic control device policies. The California Traffic Control Devices Committee (CTCDC) is the forum used to satisfy this requirement.

On January 31, 2008, the CTCDC directed the Department to form an AB 1581 Subcommittee to develop recommendations for uniform standards, specifications, and guidelines for the detection of bicycles and motorcycles by traffic actuated signals and related signal timing for the California MUTCD. The AB 1581 Subcommittee, over the course of several meetings, conducted extensive investigation into motorcycle and bicycle detection (see item 08-8 of the May 14, 2009, agenda packet: <<http://www.dot.ca.gov/hq/traffops/signtech/newtech/agenda/Agenda051409-amended.pdf>>).

On May 14, 2009, the AB 1581 Subcommittee submitted its recommendations to the CTCDC. The CTCDC adopted a motion to forward the Subcommittee's recommendation to the Department with revisions, as reflected in the Implementation section of this document.

The performance standard for the detection of motorcycles and bicycles is technology-neutral in order to accommodate current as well as future detection technologies. The performance standard establishes new definitions for the Reference Bicycle-Rider and the Limit Line Detection Zone, and requires that a Limit Line Detection Zone be provided in each travel lane of a new or modified traffic actuated signal. A motorcycle will be detected wherever the Reference Bicycle-Rider is detected. It is left up to the jurisdiction to ensure that the detection technology meets the performance standard.

A Limit Line Detection Zone is required in each travel lane because bicyclists are not necessarily required to ride as far to the right as practicable. CVC 21202(a) states that a bicyclist traveling "at a speed less than the normal speed of traffic moving in the same direction at that time shall ride as close as practicable to the right-hand curb or edge of the roadway" but provides several exceptions, including when the bicyclist is "approaching a place where a right turn is authorized." The same exception is provided for bike lanes in CVC 21208. And of course, motorcyclists need to be detected in each travel lane regardless.

The AB 1581 Subcommittee determined that at least one practical method of providing a Limit Line Detection Zone is the diagonal quadrupole inductive loop, one example of which is the Type D loop (see Standard Plan ES-5B). Another example is the quadracircle, as used in Palo Alto and some other California cities. The diagonal conductors of a diagonal quadrupole loop provide a horizontal component to the magnetic field everywhere within the loop, which is necessary to detect the vertical metal rims of a bicycle.

The AB 1581 Subcommittee also determined that video detection might also be a practical method of providing the performance standard. Other existing or future detection technologies that meet the performance standard are also acceptable.

The characteristics of the Reference Bicycle-Rider were selected to ensure that (1) most bicycles and riders were included and (2) its selection allowed for a wide variety of existing or future detection technologies.

Appendix D: Caltrans Policy Directive 09-06

The signal timing guidance basically follows the pedestrian signal timing guidance in Section 4E.10 of the California MUTCD. As with the pedestrian crossing time guidance, bicyclist-crossing time is a guidance statement and not a standard.

Several sources were used in determining a formula for the time that will allow most bicyclists to cross an intersection of a given width, including the 1983 edition of the *Traffic Control Devices Handbook*, the article *Signal Clearance Timing for Bicycles* from the 1995 ITE Journal, the current *San Francisco Bicycle Plan*, and an ongoing research project being performed for the Department by PATH (Partners for Advance Transportation and Highway) at UC Berkeley. Based on these sources, the guidance is that the final crossing speed for the design bicyclist is 10 mph (14.7 ft/sec) and the additional time needed for a standing start be 6 sec.

Using this formula results in longer minimum green times than are commonly used, but the PATH research team found that the increased minimum green times would have a minimal effect on traffic congestion because during periods of congestion the side street green times are usually longer than the minimum green times anyway. Also, the time needed to serve pedestrian calls has a much bigger impact on congestion. Still, the CTCDC was concerned about the negative impact the bicycle signal timing guidance would have on existing signal operation, so it recommended that the guidance only apply to new and modified traffic actuated signals with more than 50% of the limit line detectors to be replaced.

The Federal Highway Administration has reviewed the proposed modifications to the California MUTCD and has determined that they are in substantial conformance with the MUTCD.

This directive will be retired when it is incorporated in the next revision of the California MUTCD.

DEFINITIONS

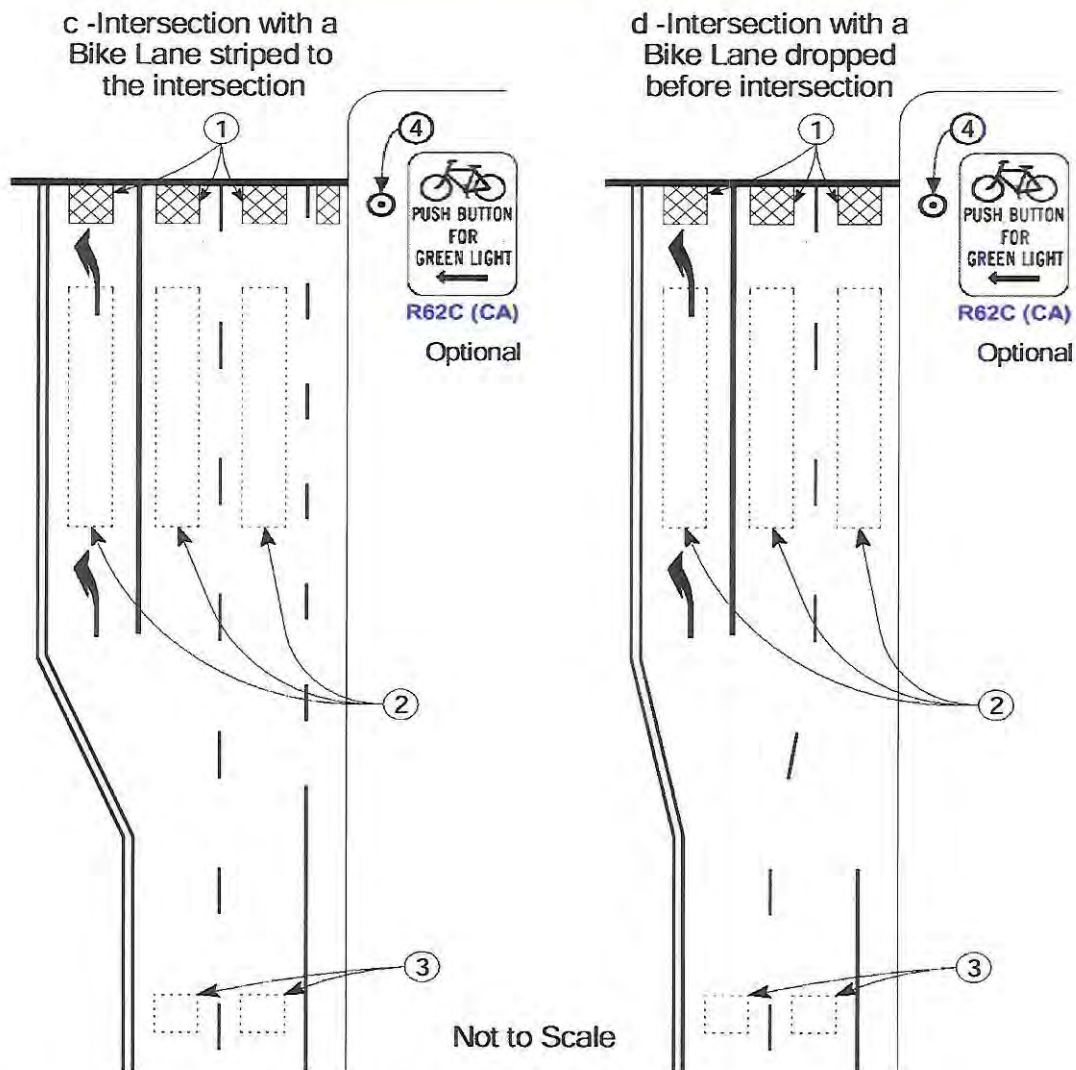
When used in this Traffic Operations Policy Directive, the text shall be defined as follows:

- 1) **Standard** – a statement of required, mandatory or specifically prohibited practice. All standards text appears in **bold** type. The verb **shall** is typically used. Standards are sometimes modified by Options.
- 2) Guidance – a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements text appears in underline type. The verb should is typically used. Guidance statements are sometime modified by Options.
- 3) Option – a statement of practice that is a permissive condition and carries no requirement or recommendation. Options may contain allowable modifications to a Standard or Guidance. All Option statements text appears in normal type. The verb may is typically used.
- 4) Support – an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements text appears in normal type. The verbs shall, should and may are not used in Support statements.

Appendix D: Caltrans Policy Directive 09-06

ATTACHMENTS (Continued)

Figure 4D-111(CA) Examples of Detection Systems (Sheet 2 of 3)



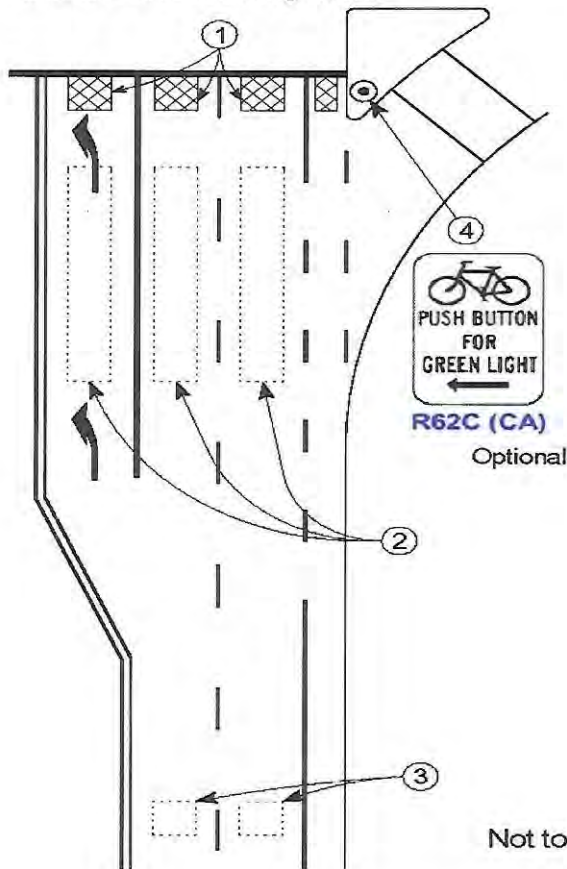
1. Typical technology-neutral limit line detection locations. See Section 4D.105(CA).
2. Typical presence detection locations. See Section 4D.103(CA).
3. Typical advance detection locations.
4. A bicyclist pushbutton may be used to activate a traffic signal to supplement the required limit line detection. A pushbutton should be located so it is convenient to use by bicyclists. See Section 9B.10 for bicycle regulatory signs.

Appendix D: Caltrans Policy Directive 09-06

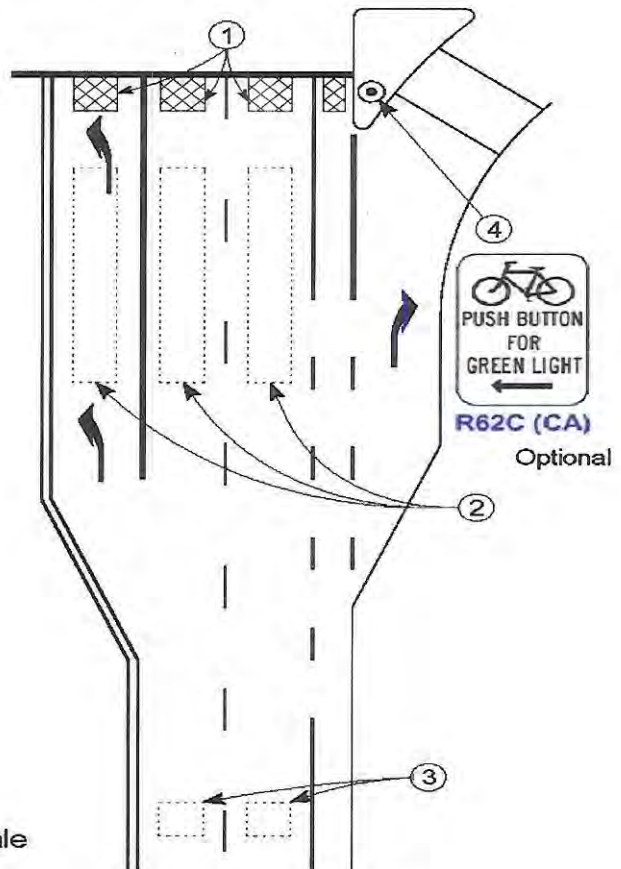
ATTACHMENTS (Continued)

Figure 4D-111(CA) Examples of Detection Systems (Sheet 3 of 3)

e - Intersection with a bike lane, a shared right/through lane and channelizing island



f - Intersection with a channelized right-turn lane



Not to Scale

1. Typical technology-neutral limit line detection locations. See Section 4D.105(CA).
2. Typical presence detection locations. See Section 4D.103(CA).
3. Typical advance detection locations.
4. A bicyclist pushbutton may be used to activate a traffic signal to supplement the required limit line detection. A pushbutton should be located so it is convenient to use by bicyclists. See Section 9B.10 for bicycle regulatory signs.

Appendix D: Caltrans Policy Directive 09-06

ATTACHMENTS (Continued)

Table 4D-109(CA) Signal Operations - Minimum Bicycle Timing (English Units)

$G_{\min} + Y + R_{\text{clear}} \geq 6 \text{ sec} + (w+6 \text{ ft})/14.7 \text{ ft/sec}$, where
 G_{\min} = Length of minimum green interval (sec)
 Y = Length of yellow interval (sec)
 R_{clear} = Length of red clearance interval (sec)
 W = Distance from limit line to far side of last conflicting lane (ft)

Distance from limit line to far side of last conflicting lane	Minimum phase length (minimum green plus yellow plus red clearance)
Feet	Seconds
40	9.1
50	9.8
60	10.5
70	11.2
80	11.9
90	12.5
100	13.2
110	13.9
120	14.6
130	15.3
140	15.9
150	16.6
160	17.3
170	18.0
180	18.7



Appendix E: Basis for Construction Cost Estimates

Basis for Bikeway Cost Estimates						
Type of Facility	Typical Work	Unit	Unit Cost	Quantity	Total Cost Per Mile	Notes
Shared Use Pathway (Class I)	Clearing and Grubbing	SF	\$0.75	12' x 5280' = 63,360 SF	\$47,520	
	Earth/Excavation	CY	\$20	(5280 ft x 12 ft x 1 ft)/27 cu ft/cy = 21,120 cy	\$46,933	assumes earth excavation of one foot below 12 foot wide area
	0.2' thick Asphalt Concrete Pavement	SF	\$7	5280' x 10' = 63,360 SF	\$369,600	assumes 10 foot wide paved area
	10' paved width; 2' shoulders Decomposed Granite Shoulders	SF	\$3	5280' x 2' = 10,560 SF	\$42,240	assumes one foot paved shoulder on either side of pathway
	Bike Path Signing	Mi	\$1,500	1	\$1,500	
	Stripe	LF	\$1	5280 LF	\$5,280	
TOTAL PER MILE					\$513,073	
Bike Lane (Class II)	Bike Lane Stripe	LF	\$2	5280'	\$10,560	
	Pavement Markings	each	\$50	20 per mile	\$1,000	
	Traffic Signing	mile	\$2,000	1	\$2,000	
	Traffic Control	mile	\$500.00		\$500	
	TOTAL PER MILE					\$14,060
Bike Lane (Class II) with shoulder widening	Bike Lane Stripe	LF	\$2	5280'	\$10,560	
	Pavement Markings	each	\$50	20 per mile	\$1,000	
	Traffic Signing	mile	\$1,500	1	\$1,500	
	Traffic Control	mile	\$500.00		\$500	
	Earth/Excavation	CY	\$15	782	\$11,730	assumes two feet additional asphalt on each side
	Asphalt Concrete Pavement	SF	\$7.00	5280	\$147,840	assumes two feet additional asphalt on each side
	TOTAL PER MILE					\$173,130
Bike Route (Class III)	Traffic Signing	mi	\$1,500	1	\$1,500	
	TOTAL PER MILE					\$1,500
Bike Route (Class III with Shared Roadway Bicycle Markings)	Traffic Signing	mile	\$2,000	1	\$2,000	
	Traffic Control	mile	\$500.00	1	\$500	
	Pavement Markings	each	\$50	20 per mile	\$1,000	
	TOTAL PER MILE					\$3,500
Bike Route (Class III) Rural Roads Improvement Proj Minor Periodic shoulder paving/repair	Traffic Signing	mile	\$1,500	1	\$1,500	
	Traffic Control	mile	\$500.00		\$500	
	Earth/Excavation	CY	\$15	391	\$5,865	assumes average two feet additional asphalt on each side, periodically equal to 50% of total roadway length
	Asphalt Concrete Pavement	SF	\$7.00	2640	\$73,920	assumes average two feet additional asphalt on each side, periodically equal to 50% of total roadway length
TOTAL PER MILE					\$81,785	
Bike Route (Class III) Rural Roads Improvements Proj Major periodic shoulder widening incl grading and drainage	Traffic Signing	mile	\$1,500	1	\$1,500	
	Traffic Control	mile	\$500.00		\$500	
	Earth/Excavation	CY	\$25	587	\$14,663	assumes average two feet additional asphalt on each side, periodically equal to 75% of total roadway length
	Asphalt Concrete Pavement	SF	\$7.00	3960	\$110,880	assumes average two feet additional asphalt on each side, periodically equal to 75% of total roadway length
TOTAL PER MILE					\$127,543	
Estimated Costs Total						
Type of Facility	Total per mile cost	Bare Cost	Survey/Design (10%)	contingency (5-10%)	Admin (5%)	
Class I	\$641,342	\$513,073	\$51,307.30	\$51,307	\$25,654	
Class II	\$17,575	\$14,060	\$1,406.00	\$1,406	\$703	
Class III	\$1,800	\$1,500	\$150.00	\$75	\$75	
Sharrows	\$4,375	\$3,500	\$350.00	\$350	\$175	
Class II with widening	\$216,413	\$173,130	\$17,313.00	\$17,313	\$8,657	
RR Imp Minor	\$102,231	\$81,785	\$8,178.50	\$8,179	\$4,089	
RR Imp Major	\$159,428	\$127,543	\$12,754.30	\$12,754	\$6,377	

Prepared by



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