Table 7.2
City of San Diego Bikeway Facilities Funding Sources

Grant Source	Due Date	Agency	Annual Total	Matching Requirement	Eligible Applicants	Eligible Bikeway Projects			Comments
						Commute	Recreation	Safety/ Education	
Federal Funding									
F1. TEA-21 Surface Transportation Program (STP)	Already Programmed	San Diego Association of Governments (SANDAG), Caltrans, FHWA		11.47% non-federal match	federally certified jurisdictions	X	X		STP funds may be exchanged for local funds for non-federally certified local agencies; no match required if project improves safety
F2. TEA-21 Congestion Mitigation and Air Quality Program	Already Programmed	SANDAG, CTC		11.47% non-federal match	federally certified jurisdictions	X			Counties re-designated to attainment status for ozone may lose this source
F3. TEA-21 Transportation Enhancement Activities (TEA)	Already Programmed	FHWA, SANDAG		11.47% non-federal match	federally certified jurisdictions	X	X		Contact SANDAG
F4. TEA-21 National Recreational Trails	Already Programmed	State Dept. of Parks & Recreation		no match required	jurisdictions, special districts, non profits with management responsibilities over the land		X		For recreational trails to benefit bicyclists, pedestrians, and other users; contact State Dept. of Parks & Rec. , Statewide Trails Coordinator, (916) 653-8803
						Commute	Recreation	Safety/ Education	
State Funding									
S1. Environmental Enhancement and Mitigation (EEM) Program	Nov.	State Resources Agency		not required but favored	Local, state and federal government non-profit agencies	X	X	X	Projects that enhance or mitigate future transportation projects; contact EEM Project Manager (916) 653-5800

City of San Diego Bikeway Facilities Funding Sources (continued)									
Grant Source	Due Date	Agency	Annual Total	Matching Requirement	Eligible Applicants	Eligible Bikeway Projects			Comments
S2. Bicycle Transportation Account (BTA)	Spring 2001	Caltrans	$7.2 m annually	10%	Cities and counties	X			Contact local Caltrans district office for details
S3. Safe Routes to School (AB1475)	Varies	Caltrans	$18 m	11.5%	Government agencies, non-profit groups, schools, community groups	X	X	X	Only two years of funding currently authorized as of 2000; legislation pending to extend
						Commute	Recreation	Safety/ Education	
Local Funding									
L1. Transportation Development Act (TDA) Section 99234 (2% of total TDA)	March	SANDAG		no match required	Cities, counties; currently allocated by population	X	X	X	Contact SANDAG
L2. Transnet (1/2-cent Countywide sales tax)	March	SANDAG	Approx. $1-million for bike projects	no match required	Local agencies within San Diego County	X	X	X	
L3. State Gas Tax (local and regional share)		Allocated by State Auditor Controller		no match required	local jurisdictions	X		X	
L4. Developer Fees / Exactions (developer fee for street improvements - DFSI)		Cities, or County		no match required		X	X	X	Mitigation required during land use approval process
L5. Vehicle Registration Surcharge Fee (AB 434)		Air Quality Control District		no match required	local agencies, transit operators, others	X	X	X	Competitive program for projects that benefit air quality

City of San Diego Bikeway Facilities Funding Sources (continued)									
Grant Source	Due Date	Agency	Annual Total	Matching Requirement	Eligible Applicants	Eligible Bikeway Projects			Comments
L6. Vehicle Registration Surcharge Fee (AB 434)		Air Quality Control Dist. or Congestion Management Agency		no match required	local jurisdictions	X	X	X	Funds are distributed to communities based on population
L7. Clean Air Fund (AB 2766)	Varies by region	Air Quality Control District	$50,000-$200,000	10-15%	local jurisdictions, transit agencies	X	X	X	Consult local air quality control district for program details

DESIGN AND MAINTENANCE

This chapter provides details on the recommended design and operating standards for the City of San Diego Bikeway System.

National design standards for bikeways have been developed by the American Association of Highway and Transportation Officials (AASHTO) and the California Department of Transportation (Caltrans). **The Caltrans Highway Design Manual, Chapter 1000: Bikeway Planning and Design, serves as the official design standard for all bicycle facilities in California.** Design standards in Chapter 1000 fall into two categories, mandatory and advisory. Caltrans advises that all standards in Chapter 1000 be followed, which also provides a measure of design immunity to the cities. Not all possible design options are shown in Chapter 1000. For example, intersections, ramp entrances, rural roads, and a variety of pathway locations are not specified in the Caltrans Highway Design Manual.

The following section summarizes key operating and design definitions:

- Bicycle: 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 tandem or tricycle arrangement.
- Class I Bike Path: Provides for bicycle travel on a paved right-of-way completely separated from any street or highway. Other users may also be found on this type of facility, including pedestrians and in-line skaters.
- Class II Bike Lane: Referred to as a bike lane. Provides a striped lane for one-way travel on a street or highway.
- Class III Bike Route: Referred to as a bike route. Provides for shared use with pedestrian or motor vehicle traffic.

The following guidelines present the recommended minimum design standards and other recommended ancillary support items for Class I bike paths, Class II bike lanes, and Class III bike routes. All bikeways should meet minimum Caltrans standards as spelled out in the California Highway Design Manual, Chapter 1000. Where possible, it may be desirable to exceed the minimum standards for bike paths or bike lane widths, signage, lighting and traffic signal detectors.

Class I Bike Path Facilities Design Recommendations

1. All Class I bike paths should generally conform to the design recommendation by Caltrans.

2. Multi-purpose trails and unpaved facilities that serve primarily a recreation rather than a transportation function may not need to be designed to Caltrans standards.

3. Class I bike path crossings of roadways require preliminary design review. Generally speaking, bike paths that cross roadways with Average Daily Trips (ADTs) over 20,000 vehicles will require signalization or grade separation.

4. Landscaping should generally be low water consuming native vegetation and should have the least amount of debris.

5. Lighting should be provided where the bike path will likely be used by commuters in the evenings.

6. Barriers at bike path entrances should be clearly marked with reflectors and ADA accessible (minimum five feet clearance). See Figure 8.1 for the design of a bollard entrance treatment.

7. Bike path construction should take into consideration maintenance and emergency vehicles but minimize their impacts on bike path width, shoulders, and vertical clearance requirements.

8. Provide two feet wide unpaved shoulders for pedestrians/runners, or a separate tread way where feasible. Direct pedestrians to right side of pathway with signing and/or stenciling.

9. Where paths are heavily used, consideration should be made to install emergency phone service.

10. In the design of bike paths, attention should be paid to preventing illegal use of the bike path by motor vehicles.

11. Where bike path design occurs in environmentally sensitive areas, design exceptions should be pursued to minimize environmental impacts.

Caltrans Highway Design Manual Section 1003.1 provides more detailed standards for the design of Class I bike paths.

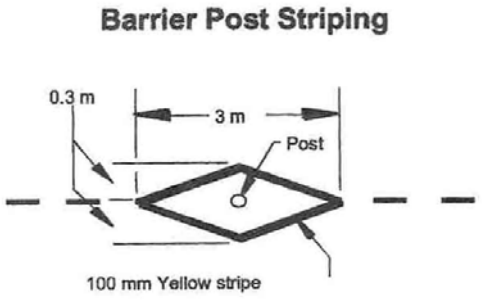


Figure 8.1 Class I Bike Path Entrance Treatment (from the Caltrans Highway Design Manual, Chapter 1000)

Class II Bike Lane Facilities Design Recommendations

1. All Class II bike lanes should generally conform to the minimum design recommendations stated in Chapter 1000 of the Caltrans Highway Design Manual. These call for minimum bike lane width of 5 feet in most cases. Please see Figure 1003.2A of the Caltrans Highway Design Manual. Striping of Class II facilities is found in Figure 8.2 on page 157 taken from the Caltrans Highway Design Manual Chapter 1000.

2. Intersection and interchange treatment. Caltrans provides recommended intersection treatments in Chapter 1000 including bike lane 'pockets' and signal loop detectors. Please see Figure 8.3 taken from Chapter 1000 of the Caltrans Highway Design Manual and Figure 1003.2E of the HDM.

3. Signal loop detectors that sense bicycles should be considered for all arterial/arterial, arterial/collector, and collector/collector intersections. The location of the detectors

should be identified by a stencil of a bicycle in accordance with Figure 1003.2D of the HDM.

4. When loop detectors are installed, traffic signalization should be set to accommodate bicycle speeds.

5. Bicycle-sensitive loop detectors are preferred over a signalized button specifically designed for bicyclists.

6. Bike lane pockets in Figure 8.3 (minimum 4 feet wide) between right turn lanes and through lanes should be provided wherever available width allows, and right turn volumes exceed 150 motor vehicles/hour.

7. Where bottlenecks preclude continuous bike lanes, they should be linked with Class III route treatments.

Caltrans Highway Design Manual Section 1003.2 provides more detailed standards for the design of Class II bike lane facilities.

Class III Bike Route Facilities Design Recommendations

Class III bike routes have been typically designated as simply signed routes as indicated in Section 1003.3 of the Highway Design Manual. With proper route signage, design, and maintenance, Class III bike routes can be effective in guiding bicyclists along a route that is more suited for bicycle riding without having enough roadway space to provide a Class II bike lane. Class III routes can become more useful when coupled with such techniques as:

- route, directional, and distance signage
- wide curb lanes
- accelerated pavement maintenance schedules
- traffic signals timed for cyclists
- traffic calming

In addition to those identified by Caltrans, there are a variety of improvements that will enhance the safety and attraction of streets for bicyclists. Figures 8.4 and 8.5 show signage and stencils used on Class III Bike Routes.

Riding on Sidewalks

The use of sidewalks as bicycle facilities is not encouraged by Caltrans, even as a Class III bike route. There are exceptions to this rule. The California Vehicle Code states: 'Local authorities may adopt rules and regulations by ordinance or resolution regarding the...operation of bicycles...on the public sidewalks.' (CA VC 21100, Subdiv. H). Caltrans adds in Chapter 1000: 'In residential areas, sidewalk riding by young children too inexperienced to ride in the street is common. With lower bicycle speeds and lower auto speeds, potential conflicts are somewhat lessened, but still exist. But it is inappropriate to sign these facilities as bikeways. Bicyclists should not be encouraged (through signing) to ride facilities that are not designed to accommodate bicycle travel.

Signage

All bikeway signing in San Diego should conform to the signing identified in the Caltrans Traffic Manual and/or the Manual on Uniform Traffic Control Devices (MUTCD). These documents give specific information on the type and location of signing for the primary bike system. A list of bikeway signs from Caltrans and the MUTCD are shown in Table 8.1 (Bikeway Signing and Marking Standards).

Stencils can also be included on Class III bicycle facilities, to help cyclists and motorists more easily identify the bike route. Stencils currently under examination for approval should be used (see Figure 8.5).

Bicycle Parking

Bicycle Parking is not standardized by any codes. However, there are preferable types of secure bicycle furnishing available on the market. When bicycle parking is being considered the types of bicycle lockers and racks in Figures 8.6 through 8.14 are recommended. More specific guidelines to determine bicycle parking capacity and location can be found in San Diego Municipal Code Sections 142.0525, 142.0530, and 142.0560.

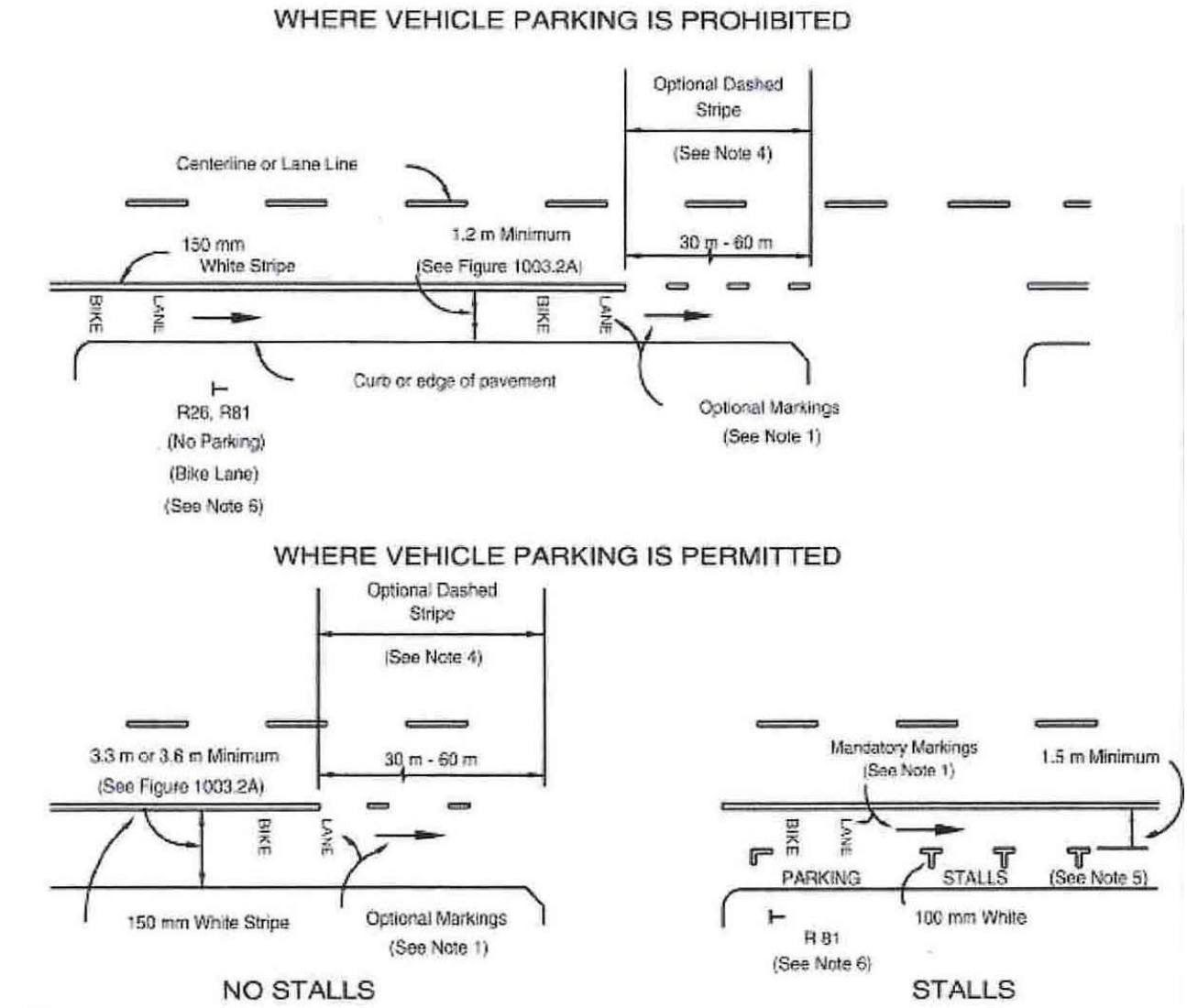
A bicycle-parking program is recommended as a high priority project for San Diego. Specific bicycle parking guidelines should be developed to help city staff, developers and commercial districts determine the types of furnishings and location of bicycle parking.

Traffic Calming

Traffic calming includes any effort to moderate or reduce vehicle speeds and/or volumes on streets where that traffic has a negative impact on bicycle or pedestrian movement. Because these efforts may impact traffic outside the immediate corridor, study of traffic impacts is typically required. For example, the City of Berkeley instituted traffic calming techniques by blocking access into residential streets. The impact was less traffic on local streets, and more traffic on arterials and collectors. Other techniques include installing traffic circles, intersection islands, partial street closings, 'bulb-out' curbs, pavement treatments, lower speed, signal timing, and narrowing travel lanes.

The City of San Diego already has a relatively continuous street system with some filtering of through traffic into residential neighborhoods. Traffic circles, roundabouts, and other measures may be considered for residential collector streets where there is a desire to control travel speeds and traffic volumes but not to install numerous stop signs or traffic signals.

Traffic calming alternatives should be considered where traffic speeds are exceedingly high, and when safety is an issue.



NOTES:

1. The Bike Lane pavement markings shall be placed on the far side of each intersection, and may be placed at other locations as desired.
2. The use of the bicycle symbol pavement marking to supplement the word message is optional.
3. The G93 Bike Route sign may be placed intermittently along the bike lane if desired.
4. Where motorist right turns are permitted, the solid bike lane line shall either be dropped entirely, or dashed as shown, beginning at a point between 30 m and 60 m in advance of the intersection. Refer to Detail 39A in the Traffic Manual for striping pattern dimensions.
5. In areas where parking stalls are not necessary (because parking is light), it is permissible to paint a 100 mm solid white stripe to fully delineate the bike lane. This may be advisable where there is concern that motorists may misconstrue the bike lane to be a traffic lane.
6. The R81 bike lane sign shall be placed at the beginning of all bike lanes, on the far side of every arterial street intersection, at all major changes in direction, and at maximum 0.8 km intervals.

Figure 8.2
Class II Bike Lane Striping
(from the Caltrans Highway Design Manual Chapter 1000)

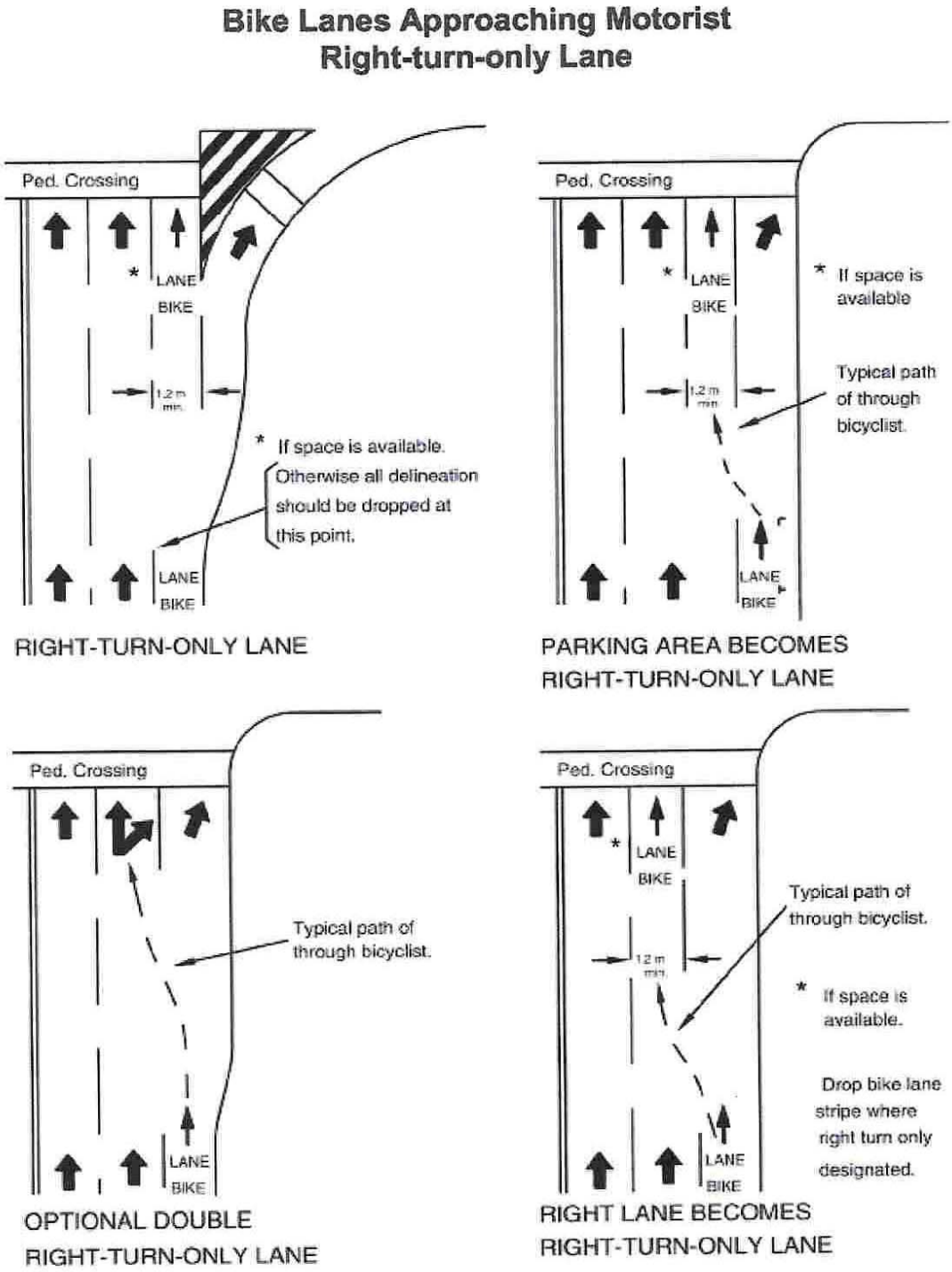


Figure 8.3
Bike Lanes Approaching Right Turn Lane(s)
(from the Caltrans Highway Design Manual Chapter 1000)

Table 8.1
Recommended Signing and Marking

Item	Location	Color	Caltrans Designation	MUTCD Designation
No Motor Vehicles	Entrances to trail	B on W	R44A	R5-3
Use Ped Signal/Yield to Peds	At crosswalks; where sidewalks are being used	B on W	N/A	R9-5 R9-6
Bike Lane Ahead: Right Lane Bikes Only	At beginning of bike lanes	B on W	N/A	R3-16 R3-17
STOP, YIELD	At trail intersections with roads and Coastal Bikeways	W on R	R1-2	R1-1 R1-2
Bicycle Crossing	For motorists at trail crossings	B on Y	W79	W11-1
Bike Lane	At the far side of all arterial intersections	B on W	R81	D11-1
Hazardous Condition	Slippery or rough pavement	B on Y	W42	W8-10
Turns and Curves	At turns and curves which exceed 20 mph design specifications	B on Y	W1,2,3 W4,5,6,14 W56,57	W1-1,2 W1-4,5 W1-6
Trail Intersections	At trail intersections where no STOP or YIELD required, or sight lines limited	B on Y	W7,8,9	W2-1, W2-2 W2-3, W2-3 W2-4, W2-5
STOP Ahead	Where STOP sign is obscured	B,R on Y	W17	W3-1
Signal Ahead	Where signal is obscured	B,R,G	YW41	W3-3
Bikeway Narrows	Where bikeway width narrows or is below 8'	B on Y	W15	W5-4
Downgrade	Where sustained bikeway gradient is above 5%	B on Y	W29	W7-5
Pedestrian Crossing	Where pedestrian walkway crosses trail	B on Y	W54	W11A-2
Restricted Vertical Clearance	Where vertical clearance is less than 8'6"	B on Y	W47	W11A-2
Railroad Crossing	Where trail crosses railway tracks at grade	B on Y	W47	W10-1
Directional Signs (i.e. Cal State LB, Downtown, Train Station, etc.	At intersections where access to major destinations is available	W on G	G7 G8	D1-1b(r/l) D1-1c
Right Lane Must Turn Right; Begin Right Turn Here, Yield to Bikes	Where bike lanes end before intersection	B on W	R18	R3-7 R4-4
Trail Regulations	All trail entrances	B on W	n/a	n/a
Multi-purpose Trail: Bikes Yield to Pedestrians	All trail entrances	n/a	n/a	n/a
Bikes Reduce Speed & Call Out Before Passing	Every 2,000 feet	B on W	n/a	n/a
Please Stay On Trail	In environmentally-sensitive areas	n/a	n/a	n/a
Caution: Storm Damaged Trail	Storm damaged locations	B on Y	n/a	n/a
Trail Closed: No Entry Until Made Accessible & Safe for Public Use	Where trail or access points closed due to hazardous conditions	n/a	n/a	n/a
Speed Limit Signs	Near trail entrances: where speed limits should be reduced from 20 mph	B on W	n/a	n/a
Trail Curfew 10PM - 5AM	Based on local ordinance	R on W	n/a	n/a

Figure 8.4
Bike Route Sign
(from the Caltrans Highway Design Manual Chapter 1000)

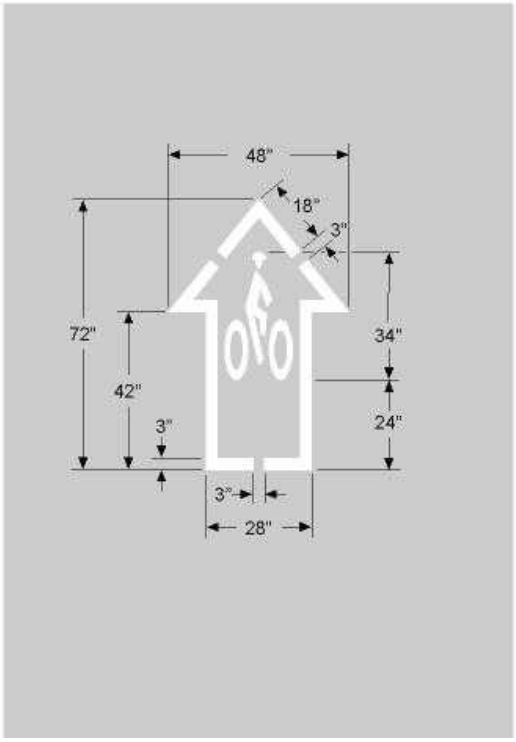


Figure 8.5
Schematic of Class III Bike Route Pavement Stencil in use in San Francisco and Denver

Bike Hitch Racks

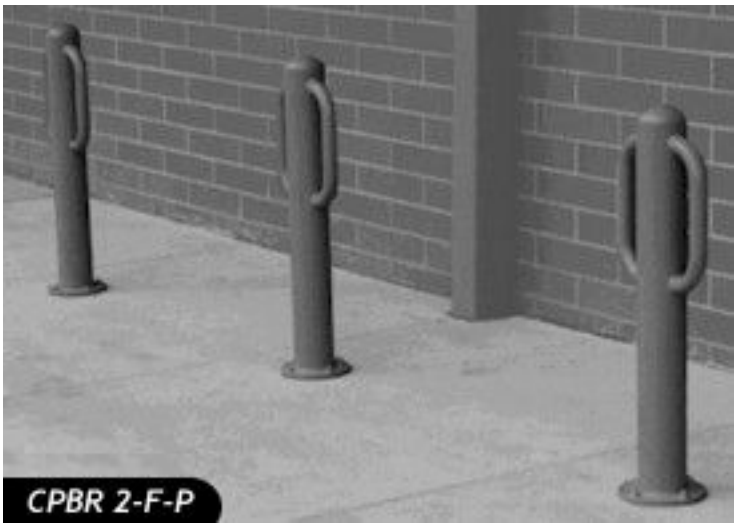
The Bike Hitch is an attractive and space efficient bike rack. The Bike Hitch was specifically designed for sidewalks and other narrow space applications. It is also an ideal rack to coordinate with parking meters. A 7-foot sidewalk width is the minimum requirement per ADA standards if bicycles are parked parallel to the curb. The Bike Hitch uses thick tube construction and the full radius bend of the ring makes it almost impossible to cut with a pipe cutter. It allows for the wheels and the frame to be secured using a u-style bike lock.

Inverted U Racks

The U Bike Racks are some of the most often used for their simple design and effective use of space. The U Rack can be typically used as part of sidewalk parking programs where bicycle parking for small businesses is accommodated. The bicycle makes contact with the rack in two places for additional stability and security. Simple, attractive, economical, and space-saving design is ideal for city sidewalks. Optional center crossbars are available to make the racks more ADA-friendly and to provide greater stability. The minimum sidewalk width per ADA requirements is 7 feet.

Figures 8.6, 8.7, 8.8, and 8.9
Recommended Bicycle Racks

Bollard Rack



The Bollard Bike Rack provides an attractive parking device for sidewalk areas or plazas. They could be used in coordination with sidewalk or street bollards. These racks can be placed so that bicycles are parked parallel to the curb on sidewalks in order to minimize sidewalk obstruction and adhere to ADA standards for sidewalk access.

Alley Rack/Hoop Rack

These racks are intended for use in high-density locations where space is limited. Such locations as Centre City or the beach areas are suitable for these types of parking devices. The Alley Racks allow bikes to be parked at an angle of 45 to 90 degrees against a wall. Required width for an alley with these racks in use is 15 feet to allow for alley traffic. When not in use, these racks can be folded against the wall to eliminate conflicts and storage problems.

Figures 8.10 and 8.11
Recommended Bicycle Racks

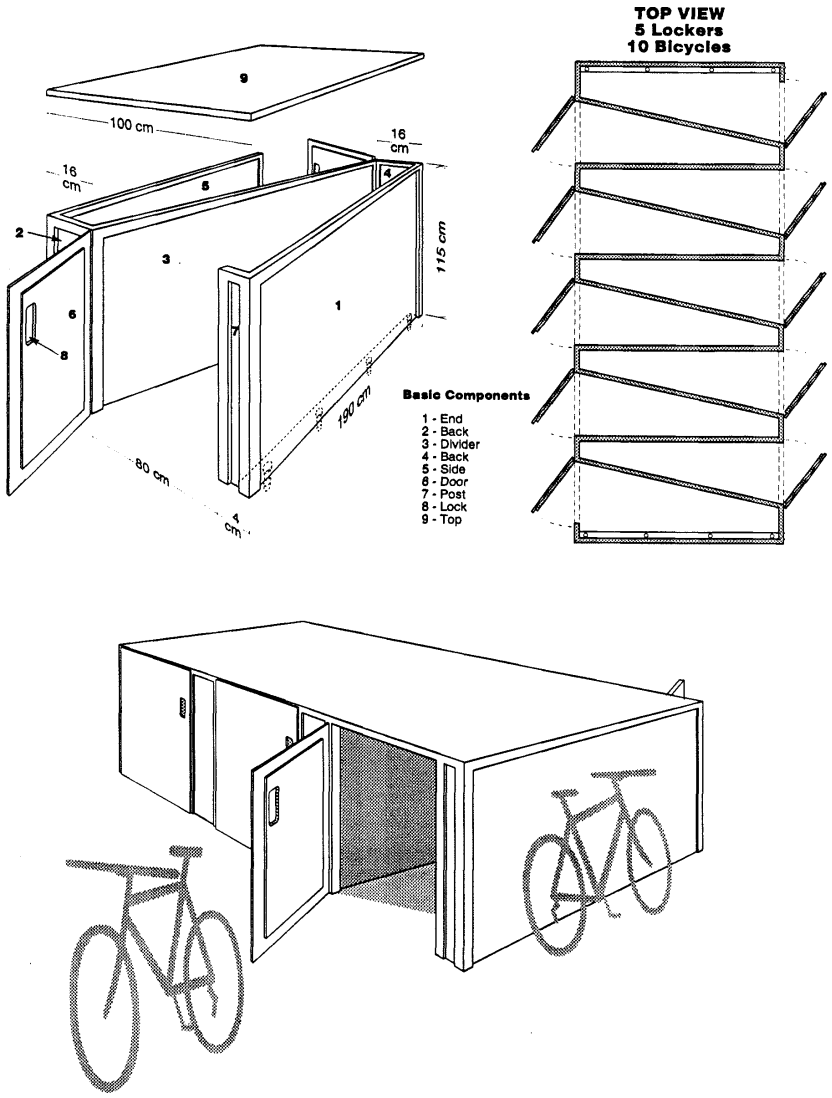


Figure 8.12
Bicycle Lockers

Figures 8.13 and 8.14
Bicycle "eLockers"

The eLocker bicycle locker is a new innovative parking and storage device that can be used without an often-burdensome key administration program. Functional characteristics long desired by both cyclists and facilities managers such as keyless on-demand parking, pay-parking, usage monitoring, unattended bicycle rental, and a wide range of other options can now be provided at a reasonable cost by the multi-faceted eLocker. The eLocker bicycle locker can also offer traditional assigned-key parking that can be easily upgraded to on-demand, or other modes.

Maintenance

The City should establish street maintenance schedules for the regular sweeping of streets, including bike lanes and Class I bike paths. Resurfacing specifications should be maintained as the City performs street improvements or when companies require the trenching of certain streets for a period of time. Compaction standards should also be adhered to in order to ensure that the settlement of pavement does not occur, especially within zones that have been trenched for some purpose. The inspection of roadways after construction activities have been completed should also be a required component of roadway work.

Maintenance requirements for all roadways in the City are outlined in the City of San Diego's Standard Drawings. Maintenance access on Class I bike paths should be achieved using standard City pick-up trucks on the pathway itself. Sections with narrow widths or other clearance restrictions should be clearly marked. Class I bike path maintenance includes cleaning, resurfacing and restriping the asphalt path, repairs to crossings, cleaning drainage systems, trash removal, and landscaping. Underbrush and weed abatement should be performed once in the late spring and again in mid-summer. In addition, these same maintenance treatments should be performed on Class II and Class III facilities. These facilities should be prioritized to include an accelerated maintenance plan that is already a part of the City's ongoing street maintenance. A maintenance schedule and checklist is provided in Table 8.2.

Trenching has become a major issue regarding roadway and bikeway maintenance in the City of San Diego. Trenching most often occurs in the bicyclists' path of a street and/or in the bike lane on those streets that have these facilities. The typical construction location in the roadway makes trenching a major maintenance issue for bicyclists. Field inspection should be increased to ensure that the condition of post-construction roadway surfaces is the same or better than the surface condition before construction commenced.

Utility and fiber-optic company trenching should be coordinated so that the number of trenching activities is minimized. Construction treatments for bicyclists are discussed in the Appendix.

When streets are resurfaced, the City's Street Division should coordinate with the Traffic Engineering Division to determine the best striping plan for streets when they are restriped after resurfacing projects. If a segment of roadway slated to be resurfaced is identified as a proposed bikeway in the Bicycle Plan, efforts should be made to provide space for bicycle travel either as a Class II bike lane or a Class III bike route with a widened curb lane.

An effort should be made to improve the maintenance of existing roadways that are regularly traveled by bicyclists regardless of whether a specific bikeway designation exists on those roadways.

Table 8.2
Bikeway Maintenance Check List and Schedule

Item	Frequency
Sign Replacement/Repair	1 - 3 years
Pavement Marking Replacement	1 - 3 years
Tree, Shrub & grass trimming/fert.	5 months - 1 year
Pavement sealing/potholes	5 - 15 years[1]
Clean drainage system	1 year
Pavement sweeping	Weekly-Monthly/As needed
Shoulder and grass mowing	Weekly/As needed
Trash disposal	Weekly/As needed
Lighting Replacement/Repair	1 year
Graffiti removal	Weekly-Monthly/As needed
Maintain Furniture	1 year
Fountain/restroom cleaning/repair	Weekly-Monthly/As needed
Pruning	1 - 4 years
Bridge/Tunnel Inspection	1 year
Remove fallen trees	As needed
Weed control	Monthly/As needed
Remove snow and ice	Weekly/As needed
Maintain emergency telephones, CCTV	1 year
Maintain irrigation lines	1 year
Irrigate/water plants	Weekly-Monthly/As needed

Security

Security may be an issue along portions of the Class I bike paths. The following actions are recommended to address these concerns.

Enforcement of applicable laws on the bike path should be performed by the San Diego Police Department, using both bicycles and vehicles. Enforcement of vehicle statutes relating to bicycle operation should be enforced on Class II and Class III bikeways as part of the Department's normal operations. No additional manpower or equipment is anticipated for Class II or III segments.