Chapter 1
INTRODUCTION

BACKGROUND

In January 1999, the Berkeley Bicycle Plan was adopted with the goal of creating a "model bicycle-friendly city where bicycling is a safe, attractive, easy, and convenient form of transportation and recreation for people of all ages and bicycling abilities." The citywide recommended bicycle network is depicted in Figure 1. Developing a network of seven bicycle boulevards is one of the key recommendations in the Plan that will implement this ambitious goal. Bicycle boulevards are an innovative approach to developing safe and efficient bikeways for all types of cyclists in an urban environment with limited street space.

The Plan defines a bicycle boulevard as *a roadway that has been modified as needed to enhance bicyclists' safety and convenience*. Seven bicycle boulevard streets are identified in the Bicycle Plan:

North-South:	**East-West:**
Ninth	Virginia
California/King	Channing
Milvia	Russell
Bowditch/Hillegass	

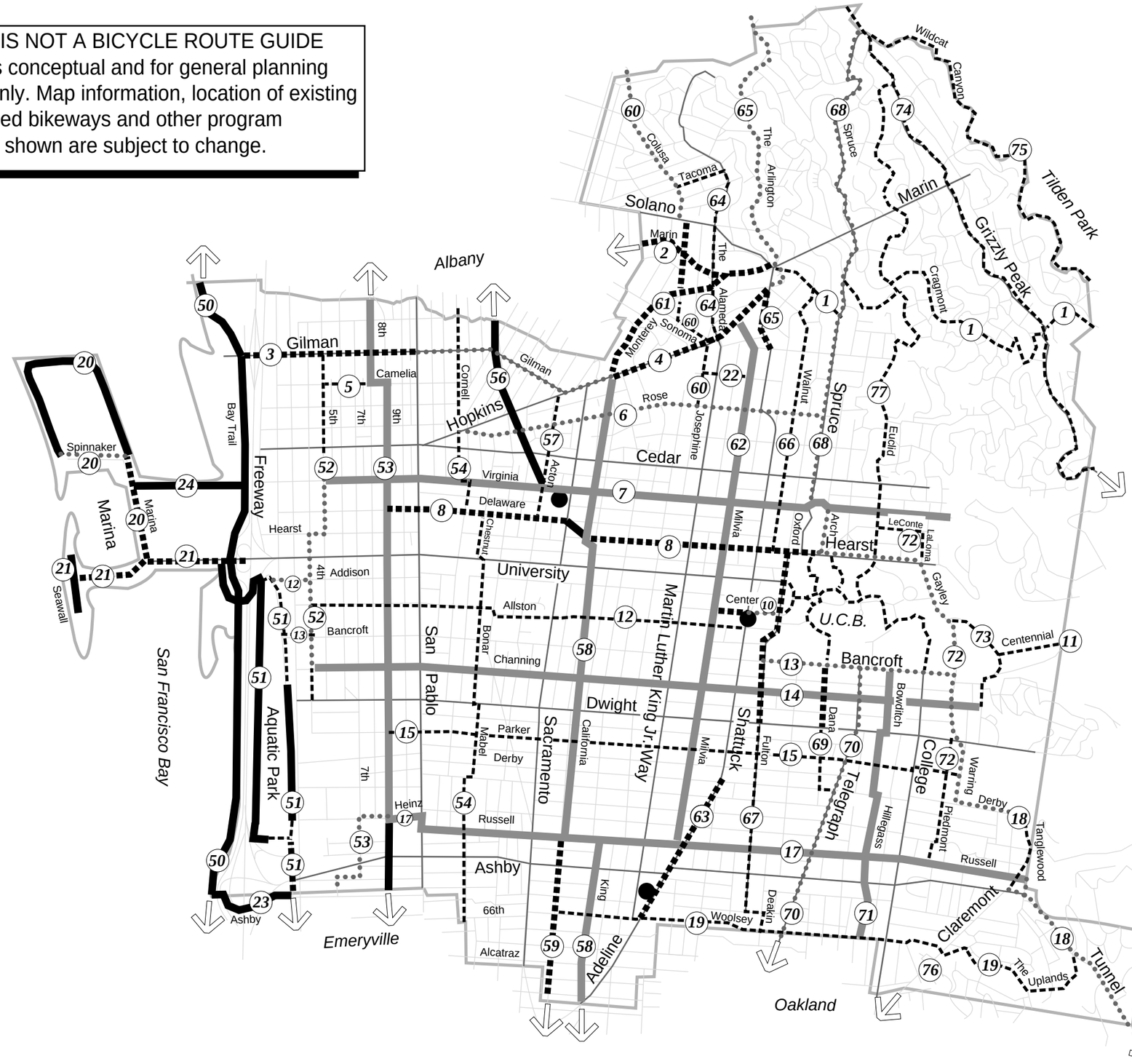
REPORT OVERVIEW

This report represents the completion of the first phase of Bicycle Boulevard implementation: the Early Design Phase. In this phase, staff and the consultants worked with the public to develop a set of basic tools to be used on all bicycle boulevard streets. These strategies will create an easily identifiable network of bicycle boulevards. A comprehensive toolbox of site-specific strategies was also developed. The City and the neighborhoods can use this toolbox to select the strategies that respond to the specific issues along each bicycle boulevard street. The toolbox and the guidelines are contained in Chapter 4.

It is anticipated that the strategies in the toolbox may need to be modified as detailed designs for each bicycle boulevard are developed in collaboration with neighboring residents and bicyclists. New strategies may also need to be added, and some strategies in the toolbox may not be used at all. This toolbox should therefore be viewed as a guideline, not a rule, for developing bicycle boulevards.

This report also identifies the existing conditions along the bicycle boulevards, based on the consultant's field review and public input, in Chapters 2 and 3. A review of the traffic impacts of various types of

THIS MAP IS NOT A BICYCLE ROUTE GUIDE
This map is conceptual and for general planning purposes only. Map information, location of existing and proposed bikeways and other program information shown are subject to change.



Berkeley Bicycle Plan

Figure 1
Recommended Bikeway Network

Legend

- ***Paths (Class 1)*** (multi-use trail; non-motorized only)
- ***Boulevards*** (bicycle priority street)
  NOTE: Exact alignment of Bicycle Boulevards to be determined during the Bicycle Boulevard planning process
- ***Lanes (Class 2)*** (striped lane for bicycles only)
- ***Class 2.5*** (upgraded bike route with targeted improvements)
- ***Routes (Class 3)*** (signed route - no special markings)
- ***Connections to Existing / Proposed Routes in other Cities***
- ***BART Station***
- ***Bikeway Network Number***

Sources:
- ***Proposed and Existing Bikeways Inventory, April 14, 1998***
- ***Wilbur Smith Associates***
- ***City of Berkeley Staff***

North

Draft for Inclusion in the General Plan 12/28/98

WILBUR SMITH ASSOCIATES
ENGINEERS • PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

traffic calming devices is contained in Chapter 5. Finally, an implementation plan for developing the bicycle boulevards is included in Chapter 6.

DEVELOPMENT OF REPORT

The Early Design Phase began in February 1999, after the adoption of the Bicycle Plan. The consultants conducted their field review of the seven bicycle boulevards and mapped the existing conditions. The Bicycle Subcommittee of the Transportation Commission has been the main citizen advisory group for this project, overseeing the progress of Bicycle Boulevard implementation. Staff, with the Bicycle Subcommittee, developed the Goals and Objectives for the design of the bicycle boulevards (included in this Chapter).

Three public workshops were held from September to November 1999. The concept of bicycle boulevards was presented, and input was gathered on the existing problems along the bicycle boulevard streets and on possible strategies to be used on the boulevards. These workshops were widely publicized, resulting in almost 200 people attending at least one workshop. The workshops included a mix of cyclists and residents on and near bicycle boulevards (many of whom also ride a bike). A summary of the public comment from the three workshops is available as an Appendix to this report.

The input from the public workshops, and from the many letters and e-mails sent to staff, has shaped the development of the toolbox and expanded the list of issues along the bicycle boulevards. As much as possible, this report responds to the comments brought up by the public regarding bicycle boulevard design. Those comments that could not be addressed during this phase of Bicycle Boulevard implementation will be examined during the upcoming detailed design and implementation phase.

PURPOSE OF A BICYCLE BOULEVARD

The purpose of a bicycle boulevard is to improve bicycle safety and circulation (compared to other streets) by having or creating one or more of the following conditions:

- low traffic volumes (or bike lanes where traffic volumes are medium);
- discouragement of non-local motor vehicle traffic;
- free-flow travel for bikes by assigning the right-of-way to the bicycle boulevard at intersections wherever possible;
- traffic control to help bicycles cross major streets (arterials); and
- a distinctive look and/or ambiance such that cyclists become aware of the existence of the bike boulevard and motorists are alerted that the roadway is a priority route for bicyclists.

GOALS AND OBJECTIVES

The Bicycle Subcommittee of the Transportation Commission developed the following goals and objectives to guide the design process for the bicycle boulevards:

Goals

1. To create a safe bicycling environment for people of all bicycling abilities. The boulevards should ideally be a place where anyone would feel safe riding.
2. To develop a network of efficient routes for bicyclists. This essentially means reducing the number of times that a cyclist must stop along the route, and improving the ability to cross major intersections.
3. To increase the visibility of bikeways in Berkeley. Residents and visitors should know about and be able to easily find these safe and efficient routes.

Objectives

1. Design the bicycle boulevards to be visually unique from surrounding streets and to invite safe, easy bicycling that is appealing to all ages and abilities.
2. Minimize changes to existing traffic patterns on bicycle boulevards and adjacent residential streets.
3. When traffic-calming devices are needed, utilize ones that do not significantly inhibit access of emergency vehicles and that also provide access for people with disabilities.
4. Where possible redesign existing barriers to allow emergency vehicle access.
5. Seek ways to improve neighborhood livability through bicycle boulevard designs.
6. Incorporate pedestrian safety elements near schools, parks, other public meeting places and other major pedestrian crossings.
7. Develop cost effective strategies for bicycle boulevards.
8. After changes are made to boulevards, continue to evaluate the bicycle boulevards to make sure they are functioning as designed and make changes as necessary.

SELECTION OF STREETS FOR BICYCLE BOULEVARDS

The 1999 Bicycle Plan identified Berkeley's seven bicycle boulevards. The following criteria were used to the select the roadways that make up the seven bicycle boulevards:

- Local street or low-volume collector.
- Not a transit or truck route.

- Very little commercial frontage.
- Within ¼ mile of a major street or a high-traffic collector street.
- Spaced between ¾ and 1½ miles from another Bicycle Boulevard, (approximately the traditional spacing of major streets).
- Reasonably continuous; (i.e., it extends over half of the cross-section of the City.)
- Few jogs with main segments at least 0.5 mile long.
- Traffic signals at major intersections, or traffic signals are potentially feasible.
- Access to major destinations.
- Connections to routes in neighboring cities.

BENEFITS OF BICYCLE BOULEVARDS

A bicycle boulevard provides benefits not only to bicyclists, but also to pedestrians and to the boulevard residents. Some of these are the general benefits of traffic calming, but others are unique to bicycle boulevards.

Benefits to Bicyclists

Safety - Bicycle boulevards improve the safety of bicyclists in the following ways:

- The low volume of traffic, compared to a collector or arterial, reduces the potential for conflicts between motorists and bicyclists. These conflicts arise from autos passing bicycles, autos turning in and out of driveways, and autos turning at intersections. These turns are a major cause of bicycle-motor vehicle collisions.
- Traffic controls that give right-of-way to the bicycle boulevard reduce the potential for conflicts with traffic entering or crossing the bicycle boulevard from side streets.
- Bicyclists can cross collectors and arterials more safely at four-way stop signs or signals than at gaps in traffic at uncontrolled crossings.
- Slower traffic, compared to a collector or arterial, makes it easier for both motorists and bicyclists to avoid collisions, and reduces their severity if they occur.

The changes in vehicle volume and speed associated with various types of traffic calming devices are discussed in Chapter 5.

These factors would be expected to reduce the frequency and severity of bicycle-motor vehicle collisions along the bicycle boulevard. Since collisions are typically infrequent on streets suitable for bicycle boulevards, this expectation is hard to verify empirically. On the original two-mile Bryant Street Bicycle Boulevard in Palo Alto, two bicycle-motor vehicle accidents were reported in 1981. While

only one such accident was reported during the demonstration period in 1982, the number of bicyclists was much higher (see Tables 1-1 and 1-2 below).

Efficiency - Bicycle boulevards also improve efficiency for bicyclists:

- The route is more continuous and direct than most local streets.
- They have fewer stops or delays than local streets, improving travel time and reducing fatigue. By reducing the number of STOP signs on a street, travel time is reduced dramatically. A typical bicycle trip of 30 minutes is increased by 33% to 40 minutes if there is a STOP sign at every block. Travel time is particularly important to bicycle commuters.
- This extra time also takes a significant amount of extra energy on the part of the bicyclist.
- Reducing fatigue increases the feasible length of a trip by bicycle, and may be especially important to bicyclists who are hauling trailers carrying children or groceries.
- Traffic controls can reduce delay when crossing collectors and arterials.

Other Benefits - Bicycle boulevards may also provide other intangible benefits to bicyclists, such as the following:

- A perceived improvement in safety (independent of actual improvements).
- A quieter, less stressful bicycling environment that is especially attractive to children and casual or inexperienced cyclists.
- Greater alertness to bicyclists on the part of motorists.
- Experience riding on the roadway, as opposed to bike paths or the sidewalk.
- Greater visibility for and promotion of bicycles as an alternative means of transportation.

All of these benefits together should lead to an increase in the number of bicyclists using the bicycle boulevard. Table 1-1 shows 12-hour bicycle counts (7 a.m. to 7 p.m. on midweek days) along Bryant Street in Palo Alto before (May 1981 and April 1982) and after (October 1982) the bicycle boulevard was installed.

Table 1-1
BICYCLE COUNTS ON BRYANT STREET BEFORE AND AFTER BICYCLE BOULEVARD INSTALLED

Location Along Bryant Street	Before*	After*
Churchill	240	473
Lowell	—	725
California	290	536
Matadero Creek Bridge	360	546

*Number of bicycles traveling through intersection between 7 AM and 7 PM, midweek.

These increases were significantly greater than those on other Palo Alto city streets during the study period. At the same time, bicycle traffic on two parallel arterials, Middlefield and Alma, declined. It appears that total bicycle traffic remained approximately the same, but bicyclists prefer to ride on Bryant Street.

Table 1-2 shows increased usage for the bicycle boulevard extension implemented in 1992.

Table 1-2
BICYCLE COUNTS ON BRYANT STREET BICYCLE BOULEVARD EXTENSION

Location Along Bryant Street	Before*	After*
Embarcadero	285	455
Between Everett and Hawthorne	160	210
*Number of bicycles traveling through intersection between 7 AM and 7 PM, midweek.		

In Berkeley, as reported in a 1990 study, afternoon peak hour bicycle traffic increased from 52 to 113 and from 73 to 109 on two blocks of Milvia Street before and after traffic calming through neckdowns, chicanes, and speed humps.

Table 1-3
BICYCLE COUNTS ON MILVIA SLOW STREET

Location Along Milvia Street	Before*	After*
Between	52	113
Between	73	109
*Number of bicycles traveling on Milvia Street in the afternoon peak hour.		

Benefits to Pedestrians

The following pedestrian benefits of bicycle boulevards stem from the reduction in motor vehicle traffic:

- A quieter, more pleasant environment for walking or sitting.
- Easier street crossings because of reduced vehicle volume and speed, or reduction of crossing distance.
- Safer crossing of major streets where new traffic control devices are installed.
- Reduction in the frequency and severity of vehicle-pedestrian collisions.

These benefits have special value near schools.

After the creation of the Milvia "slow street," afternoon peak hour pedestrian traffic increased from 63 to 93 and from 42 to 95 on two blocks of Milvia Street.

Benefits to the Neighborhood

Residents along a bicycle boulevard street also enjoy the benefits of traffic calming, as well as the ambiance of the bicycle boulevard:

- Reduced through traffic.
- Safer, quieter, and more pleasant environment.
- Possible reduction in crime based on more active street life.
- Potential to enhance neighborhood appearance and to increase green space through expanded or new landscape strips, medians, and traffic circles.
- Improved neighborhood identity and coherence.
- Potential to increase property values through improved safety and livability.

Since one of the major actions that could be taken to improve the current streets for bicycle travel is to remove unnecessary or unwarranted STOP signs, it should be noted that the use of excessive STOP signs on neighborhood streets has disadvantages for the neighborhood as well. Many of these STOP signs are considered "unwarranted" in traffic engineering parlance because they were installed for traffic calming reasons, such as speeding or cut-through traffic rather than to assign right-of-way to conflicting traffic movements. However the use of STOP signs as traffic calming devices has the following disadvantages:

1. More likely to be ignored; increased non-compliance results in increased accidents; Liability issues for accidents at unwarranted STOP signs;
2. Increased air pollution;
3. Increased noise from acceleration and deceleration;
4. Increased fuel consumption;
5. Not effective at slowing traffic mid-block, in fact may cause speeding mid-block to make up for lost time.

Chapter 2
EXISTING CONDITIONS

CONSULTANT FIELD REVIEW

At the beginning of the study, the Consultant Team conducted a thorough field review by bicycle of all seven bicycle boulevards. The existing intersection control devices were noted at every intersection along the boulevards: two-way STOP signs, four-way STOP signs, no control and traffic signals.

All existing traffic calming devices were also noted including all speed humps, diverters and barriers. The major attractors and generators along the route were noted such as commercial districts, schools and employment centers. Finally, the major impediments from the point of view of bicycle travel were noted. This field review is summarized on the following pages. The last section of this chapter presents the issues raised by the public regarding existing conditions.

All seven streets have between one and five barriers or diverters, which help to keep traffic volumes low and is compatible with both bicycle boulevard goals and the traffic calming goals. The two issues that inhibit bicycle travel in terms of efficiency and/or safety that are common to all seven streets are:

1. Excessive STOP Signs
2. Crossing major streets

In addition the idea of improving the community's and motorists' awareness that the streets are bicycle boulevards was kept in mind during the field review.

BOWDITCH/HILLEGASS BIKE BOULEVARD

This route begins at the Oakland border on Hillegass at Woolsey Street and continues along Hillegass until Dwight Way. At Dwight Way, Hillegass ends and there is a slight jog to the east where the route continues on Bowditch Street. This jog is compounded by the one-way eastbound traffic on Dwight Way, making it difficult for southbound bicyclists on Bowditch to access Hillegass. The route continues to the UC Berkeley campus where Bowditch tees into Bancroft Way. Bowditch Street has existing bike lanes for its entire length between Dwight Way and Bancroft Way. This bicycle boulevard parallels College and Telegraph Avenues.

The existing diverter at Woolsey Street essentially makes the intersection of Hillegass at Woolsey into two L-shaped intersections. Northbound traffic on Hillegass does not have a STOP sign, but southbound traffic does. The intersections of Hillegass with Woolsey Street and with Derby Street are slightly offset, but this does not cause any disruption to bicycle travel.

The Hillegass portion of the route generally has low traffic volumes consistent with the residential frontage. Bowditch has heavier traffic volumes accessing campus and the office and commercial uses in the area. The major destination served by this route is the UC campus as well as the offices and residential halls along Bowditch. It also connects with a signed bike route in Oakland that leads to the Rockridge BART station and to downtown Oakland.

Ten of the twelve intersections between Bancroft and Woolsey are controlled by STOP signs for travel on Hillegass/Bowditch. Six of these ten intersections are 4-way STOP signs; the remaining four have two-way STOP signs for Hillegass only. Two of these intersections with two-way STOP signs may present crossing problems during peak hours: Dwight and Ashby. The eleventh intersection is controlled by a traffic signal at Durant. The twelfth intersection, at Woolsey, has a full diverter, with a STOP sign for southbound traffic and no STOP control for northbound traffic. This field review is summarized in Figure 2.

Issues

The major impediments and safety concerns to bike travel along the Bowditch/Hillegass Bike Boulevard are:

1. The crossing of Ashby and Dwight Way during peak hours.
2. The jog at Dwight Way which encourages wrong-way riding due to the fact that Dwight Way is a one-way street eastbound. Northbound bicyclists can simply turn right onto Dwight and then left onto Bowditch. But southbound bicyclists that use the reverse route must currently travel a short distance (100 feet) the wrong way (westbound) on Dwight Way. A redesign of the Dwight/Hillegass/Bowditch intersection to legally provide for westbound bicyclists for this short stretch would solve this problem.
3. Bicycle travel is impeded by STOP signs at eleven of the twelve intersections along the route, approximately half of which are intersections with low to medium traffic volumes.
4. The fair to poor pavement condition on Hillegass for its entire length.
5. Poor connection to the cross-campus bike paths, exacerbated by the one-way direction of Bancroft.

CALIFORNIA/KING BIKE BOULEVARD

This bicycle boulevard begins at the Oakland city limit, between 61st and 62nd Streets on King Street. It jogs onto California Street at Russell and continues to the north until Hopkins where California street ends. California Street parallels Sacramento Street, which lies one block to the west. At Rose Street, California Street jogs slightly to the east. There is a diagonal diverter at Ada. There are three speed humps on King Street where Malcolm X Elementary School is located. While not on California or

King, there are several barriers on cross-streets just east of California, which limit east/west through traffic volumes on the cross streets between Russell and Alcatraz.

California is a wide street, with wide bike lanes and parking for almost its entire length. The bike lane stripe has worn away in some places and wavers in others, and there are only a few "Bike Lane" signs; "Bike Route" signs appear instead. The fronting land use is almost entirely residential, except near Hopkins and in the University Avenue area where there are some commercial businesses. The street provides access to North Berkeley BART, parks and several schools. At Hearst, California dead-ends for motorists, but bicyclists can proceed through Ohlone Park for a half block, where California Street resumes. King Street is a two–lane quiet residential street, with parking on both sides.

California Street/King Street has right-of-way at nine of its 37 intersections, plus two intersections are uncontrolled resulting in 11 intersections where bikes do not have to stop. There are currently two traffic signals along this route, at University/California and at Ashby/King. There are two-way STOP signs at Alcatraz/King and Dwight/California, which carry heavy traffic and are difficult to cross.

Pavement on King Street between Ashby and the Oakland city limit is rough, and needs resurfacing. This field review is summarized in Figure 3.

Issues

The major impediments and safety concerns to bike travel along the California/King Bike Boulevard are:

1. The crossings at California/Dwight and King/Alcatraz are difficult during peak hours.
2. Excessive stopping, at 26 of 37 intersections.
3. Lack of connection to a bikeway in Oakland at King Street.
4. Fair to poor pavement condition south of Ward Street.
5. Right-of-way issues pertaining to bicyclists proceeding straight through the diagonal diverters.

CHANNING WAY BIKE BOULEVARD

Channing Way extends from 4th Street at the west end of the city to Prospect Street in the east. At the west end, the intent is for this route to provide access to the new Bicycle-Pedestrian Overcrossing at the foot of Addison. The exact alignment of the Bike Boulevard to the overcrossing still needs to be determined. A likely alignment is to shift the bike boulevard to Allston west of San Pablo where there is an existing signal at Sixth Street.

This route serves as an alternative to University Avenue or Dwight Way. The speed humps between Milvia and Shattuck seem to be safe for bicyclists. There is a diagonal diverter at Roosevelt. Parking is prohibited on one side of the street to make room for bike lanes in both directions between Martin

Luther King and Piedmont. The bike lanes are not signed in accordance with the Highway Design Manual guidelines.

The Channing frontage is primarily residential in the west, but mixed east of Martin Luther King Jr. Way, including commercial development near Shattuck, Telegraph, and College, and a number of U.C. Berkeley parking garages and lots, residences, and fraternity houses. Channing also provides access to U.C. Berkeley, Downtown BART, and Berkeley High School. Traffic volumes appear to be low to moderate for the entire route, with heavier volumes on southside near Telegraph Avenue.

Channing has the right-of-way at twelve of its 36 intersections. Fourteen intersections are controlled by all-way STOP signs. Five intersections are controlled by two-way STOP signs. Bicyclists have difficulty crossing during peak hours at: Sixth Street, San Pablo, Sacramento, and Piedmont Avenues. There are existing traffic signals at Martin Luther King Jr. Way, Shattuck, Telegraph, and College. Concrete islands force automobile traffic to turn right in both directions from Channing onto Martin Luther King Jr. Way. Separate channels are provided in the median islands for through bicyclists, who can actuate the signal with an inductive loop. This arrangement seems to work well for bicyclists.

There are intermittent Bike Route signs between Martin Luther King and Acton. It is not clear on the street how far the Bike Route actually extends. This field review is summarized in Figure 4.

Issues

The major impediments and safety concerns to bike travel along the Channing Way Bike Boulevard route are:

1. The crossings at Sixth, San Pablo, Sacramento, and at Piedmont during peak hours.
2. Design of the traffic signal at Martin Luther King Jr. Way may need adjusting to maximize its effectiveness at discouraging through motor vehicle traffic.
3. The preferred route alignment needs to be identified west of San Pablo to connect with the I-80 bicycle-pedestrian overcrossing.
4. Right-of-way issues pertaining to bicyclists proceeding straight through the diagonal diverter.

MILVIA BIKE BOULEVARD

Milvia Street runs from Russell on the south to Hopkins on the north, where the street ends. It parallels Martin Luther King Jr. Way and Shattuck Avenue. There is a jog in Milvia at University. At its southern end, Milvia terminates at Russell immediately adjacent to Adeline. Milvia has a diagonal diverter at Yolo, a full diverter at Blake, and a half diverter at Cedar.

Most of the frontage is residential. Berkeley City Hall, Berkeley High School, and the U.S. Post Office are located along Milvia, and the street provides access to U.C. Berkeley, the Downtown commercial

area, and the Downtown and Ashby BART stations. Traffic volumes along Milvia are light at the two ends, but are significant in the downtown area.

Milvia has the right-of-way at eight of its 30 intersections. There are 15 all-way STOP signs. There are existing traffic signals at Allston, Center, and University in the downtown area, and Hearst just to the north.

Milvia between University and Cedar is a "slow street." There are six speed humps in this area, but they seem to pose no difficulty to bicyclists. The planters and bulbouts, however, may encourage motorists to drift over the curving centerline, since there is no raised center median to prevent them from straying out of their lane.

The bike lanes between Allston and Channing are not properly signed.[1] In some places these bike lanes are also substandard in width. The minimum width for an urban bike lane with a vertical curb, but no gutter, is 1.2 m (4 ft). The bike lane near Channing is only 3 feet 2 inches wide (plus 6 inches if the stripe is included). With parking permitted, the minimum width is 3.6 m (12 feet) from the curb. The bike lane at Dwight is only 10 feet 8 inches (plus 6 inches for the stripe).

There are occasional Bike Route signs between Berkeley Way and Hopkins. It is not clear on the street how far the Bike Route actually extends. This field review is summarized in Figure 5.

Issues

The major impediments and safety concerns to bike travel along the Milvia Street Bike Boulevard are:

1. Excessive stopping; Milvia has right-of-way at only eight of 30 intersections.
2. The jog in Milvia at University.
3. The high traffic volumes and narrow street width between University and Center Streets.
4. The crossing at Rose Street can be difficult during peak hours.
5. The free right-turn from Allston to southbound Milvia.
6. The striping on the "slow street" section may be confused by some for bike lanes.

NINTH STREET BIKE BOULEVARD

[1] The Highway Design Manual requires the R81 Bike Lane sign to be placed at the beginning of all bike lanes and at the far side of every arterial intersection. Berkeley seems to prefer the G93 Bike Route sign. The Highway Design Manual permits this sign along bike lanes, but primarily to provide directional and destination signing where necessary; it comments that "A proliferation of Bike Route signs along signed and striped bike lanes serves no useful purpose."

This route runs predominantly along Ninth Street, except at its two ends. At the Oakland end, the route currently ends at Heinz Avenue. To continue into Emervyille a bicyclist must jog west to 7th Street and ride south. However, the long-term goal is to continue the route straight using railroad right-of-way. (The City recently received grant funding to create a bikeway through this vacant property.) On the north side, the route jogs west at Camelia to 8th Street and continues north into Albany Village.

Major destinations along this route are the commercial areas and offices near Parker and near Gilman. The route also leads into Emeryville and into Albany.

Ninth Street has the right-of way at only two intersections, not counting the diagonal diverter at Delaware. There are 15 stops along the route: thirteen four-way STOPS and two two-way STOPS where Ninth Street must stop. The two-way stop intersection at Cedar may present crossing problems for bicyclists during peak hours. There are two traffic signals along the entire route: at University and at Gilman Street. If the route is extended south of Ashby along or near the Railroad right-of-way, the proposed signal at Ashby and Ninth Street would help cyclists cross Ashby Avenue. There is diagonal parking near Parker on the east side of Ninth Street. This field review is summarized in Figure 6.

Issues

The major impediments and safety concerns to bike travel along the Ninth Street Bike Boulevard are:

1. The crossing at Cedar may be difficult at peak hours.
2. Excessive stopping for bicycle travel. Ninth Street has right-of-way at only two of the 21 intersections.
3. The existing diverter at Delaware encourages vehicles to use Ninth Street between University and Delaware to avoid the intersection of University and San Pablo Avenues.
4. Right-of-way issues pertaining to bicyclists proceeding straight through the diagonal diverter.
5. Abandoned railroad tracks in the roadway at Parker Street.

RUSSELL STREET BIKE BOULEVARD

The Russell Street route begins at Claremont Avenue and continues west to San Pablo Avenue. At this point it is proposed that the route jog onto Heinz Street to the 9th Street Bike Boulevard.

There are two half diverters, three full diverters and one diagonal diverter along this route; all are bike passable except for the cul-de-sac style barrier east of Park Street. There are also seven speed humps.

While there are no major attractors fronting on Russell Street, there is a YMCA at California, an elementary school at Ellsworth, and several large parks west of MLK Jr. Way. This route also serves nearby destinations such as the Berkeley Bowl Marketplace, Alta Bates Hospital, the Elmwood commercial district, the Domingo Avenue commercial district, and the Claremont Hotel. It also leads

directly to Tunnel Road, a major recreational bicycle route. There is a fire station at Cherry Street, just east of College Avenue.

The many existing diverters and the predominantly residential frontage combine to keep traffic volumes quite low on the entire route. Russell Street/Heinz Street has the right-of-way at six of the 39 intersections along this route between Ninth Street and Claremont Avenue. Fifteen of these intersections have no STOP signs for any approach; these are mostly T-intersections with minor side streets but essentially allow Russell Street the right-of-way.

Travel on Russell must STOP at 18 of the 39 intersections. There are ten all-way STOP signs and one traffic signal at MLK Jr. Way (plus another traffic signal at Seventh Street and Heinz). There are seven intersections with two-way STOPS for Russell/Heinz, all at major streets/collectors which pose crossing difficulty during peak hours. This field review is summarized in Figure 7.

Issues

The major impediments and safety concerns to bike travel and safety along the Russell Street Bike Boulevard are:

1. The crossing of the seven intersections currently controlled by two-way STOP signs (San Pablo/Heinz, San Pablo/Russell, and Russell at Sacramento, Shattuck, Telegraph and Claremont Boulevard) and to a lesser extent Adeline.
2. While not excessive, there are ten all-way STOP signs.
3. Unclear assignment of right-of-way at the 15 minor three-legged intersections.
4. Right-of-way issues pertaining to bicyclists proceeding straight through the diagonal diverter.
5. Difficulty for through bike travel at cul-de-sac barrier on Russell at Park.

VIRGINIA STREET BIKE BOULEVARD

This route begins on the northside of campus at Le Roy and continues straight west to 5th Street. Although there are no jogs, the intersections at Arch and at Spruce are skewed. There are two diagonal diverters, one at Acton and one at McGee. Both are bike passable.

The entire route generally has low traffic volumes consistent with the residential frontage. The major destinations served by this route are UC Berkeley, North Berkeley BART station, and Downtown Berkeley.

Travel along Virginia Street has the right-of-way at eleven of the 35 intersections between Euclid and 5th Street. In addition, there is no control at four minor T-intersections, essentially giving Virginia the right-of-way. There are no traffic signals along this route. Twelve intersections are controlled by four-way STOP signs. There are seven intersections with two-way STOP signs for Virginia Street only. Except

for 10th Street, these are the higher volume collectors and major streets of: Oxford, Shattuck, MLK Jr. Way, Sacramento, San Pablo, and Sixth Street. These may present crossing difficulty during peak hours. This field review is summarized in Figure 8.

Issues

The major impediments and safety concerns to bike travel along the Virginia Street Bike Boulevard are:

1. The crossing of the seven major intersections currently controlled by 2-way STOP signs, particularly MLK Jr. Way, but also Oxford, Shattuck, Sacramento, San Pablo, and Sixth Street;
2. Right-of-way issues pertaining to bicyclists proceeding straight through the diagonal diverters.
3. Excessive stopping; bicycle travel is impeded by STOP signs at 20 of the 35 intersections along the route.
4. Determination of whether the bicycle boulevard should continue east of Euclid.

ADDITIONAL BICYCLE BOULEVARD ISSUES IDENTIFIED BY PUBLIC

At the three Fall 1999 bicycle boulevard public workshops, enlarged maps of the bike boulevards were posted on the walls for public review and comment. Many site specific comments were received on these maps and from the comment sheets submitted at the workshops. These will be considered during the detailed design phase. These public comments also included suggestions on how to solve the problems or issues identified. These issues and proposed solutions by the public are summarized below.

Bowditch/Hillegass Street Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
@ Bancroft	-This bike boulevard doesn't lead to an actual campus entrance. Students often must ride against traffic to get to their destination.	-Make Bancroft 2-way!
@ Dwight	-Need significant change. -Many problems because Dwight is one-way: bicyclists ride against traffic, shoot down 4 foot-wide sidewalks past pedestrians, etc.	-City of Berkeley should consider making Dwight 2-way. -Put in bike sensitive light.
@ Parker	-Big traffic problems! Excessive traffic and speeding and much double parking.	-Le Chateau would like a tree in the middle of the street. -Le Chateau pays no taxes – they are temporary residents and their wishes should be minimized.
@ Derby		-Very problematic. Make significant change. Make all traffic visible at stop. How about a choker?

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
@ Russell		-Pedestrian light! Bikes stop and use light so there should also be a bike sensor.
@ Ashby		-"Keep Clear" zone so we can see peds and get through cars. -State gov't will have to approve any controls, since Ashby is a state highway. Better get them involved ASAP.
@ Webster	-Heavy pedestrian traffic. Please keep safe for pedestrians.	
From Webster to Woolsey		-Bulb-out or round about.
South of Woolsey		-One way please!
@ Woolsey		-Stop sign important for car slowing – do not remove.

California/King Street Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
California		
@ Rose	-There's lots of traffic, bikes, and peds for Jefferson School and King School. Need extra warning for downhill traffic as 90% of cars do not stop.	-Keep 4-way stop here.
From Hopkins to Rose		-Keep barrier here. -Need stop signs – traffic cuts thru Ada and California to avoid light @ Rose and Sacramento. Need to slow them down.
@ Buena		-Wide pavement area at intersection; consider island (landscaped) to both slow traffic and improve landscaping.
@ Virginia		-No room for a traffic circle, not necessary.
From Cedar to University	-No changes are necessary, already functions very well as a BB -- except that this stretch has too many stop signs.	
@ Addison		-Design small circle/diamond with art or tree or raised center circle.
@ Allston	-This intersection needs work. Tricky crossing Allston while on Califomia, northbound. Cars drive	-There is no stop sign on Allston, there is one on Califomia-reverse it.

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
	very fast on Allston and behave in unpredictable ways once in the intersection. -Existing bollards are so wide, they divert cars into bike lanes. Can they be narrowed?	
@ Bancroft		-Smaller circles with one large tree also at Bancroft.
@ Dwight		-Need to slow/stop traffic on Dwight Way. -Intersection is offset and needs redesign, with traffic control device (bike sensored light). -Use wide California St. for landscaped median.
@ Parker		-Better enforcement needed here. Much speeding on California Street and on Parker Street, and people running all 4-way stops signs.
King		
@ Ashby	-Light too slow to change for bikes, no clear marking on street for positioning bike.	-Needs traffic light with bike sensor.
@ Tyler	-Parents double park to drop off and pick up kids here.	
@ Alcatraz		-Add 4 way stop; it's hard to cross during peak hours due to aggressive drivers
From Russell to Oakland border	-Children are able to ride bikes.	-Resurface the street.
@ Oakland Border	-What are 8 and 60 year olds supposed to do at this difficult intersection?	

General California/King comments:

- We have bike lanes on California, why is Bike Boulevard going onto King Street? Think about the connection with Oakland more! Why not California to Market, or Sacramento to Stanford to Adeline.
- King Street is excellent for bicycles, says "Ride Me".
- Parker between Grant and McGee: The dogleg here has parking, this narrows the street and is hazard for bikes and cars. Should eliminate parking there and/or slow traffic at dogleg.
- There are so many 4-way stops between University and Russell. Are there other ways to keep traffic slow but not stop bikes?
- I like this proposal for King St. as a bike blvd.

Channing Way Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
@ 4th	-Speeding cars/trucks between 4th and 6th St.	-Needs stop signs
@ 6th		-Need traffic light for cyclists.
@ 9th		-Put in traffic circle?
@ San Pablo	-Very difficult to cross here.	-Make this a landscaped entrance to Channing (for eastbound traffic) -Needs traffic signal!
@ Bonar	-There is a new stop sign here.	
@ Valley	-HUB Center for Sustainable Transport as of December 1, 1999.	
From San Pablo to Sacramento	-Problems if stop signs are removed: will attract trucks and traffic avoiding Dwight and speeders.	-Insert stop signs for cars.
@ Sacramento		-Add obvious entrance, landscaping (for westbound traffic) -Need traffic light for cyclists.
@ California		-Planting and trees, please! -Include neighborhood in design. -Convert to a circle.
@ Roosevelt		-Need to redesign barrier -can this be made into a roundabout with trees? -Convert barrier to a circle.
@ MLK Jr Way	-This bike intersection rules, but the signal is about 1-2 seconds short (i.e. begins to turn yellow before I reach the other side). Not a huge problem for me but could be for kids or slower riders. -I also really like this setup with the separate lane and loop.	
@ Shattuck	-Way too many motorists speed up to cut off bicyclists and turn right. Many, who are then slowed by traffic at the intersection, do not signal or look to see if the cyclists have caught up.	-Create bike activated light. -Need bike-first blue areas like in Holland to facilitate left turn from Shattuck to bike blvd.
From Dana to Piedmont	-Near constant illegal parking in bike lanes. Violators include shoppers, delivery trucks, utility trucks, even police cars! Worst offenders are fraternity members and their guests.	- Needs better enforcement! - Make intersections at Dana and Ellsworth 2 way stops where Channing traffic has the right of way.
From Telegraph to College	-Fairly high volume of traffic; lots of car doors opening into bike lanes. -Major fire lane here.	-Take out bike lanes?
General Channing comments: Make no lanes at all – How can this work on 2 way street? Bikers do not stop at stop signs or red lights. Disabled people live on Channing Way and should not be made second class citizens to bikers.		

Milvia Street Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
From Cedar to University ("Slow Street")	-Weird potted trees in the street randomly force bikes out directly in front of cars. – Dangerous! Can they be moved onto the sidewalk? -Signage and painted street symbols should make clear that bikes have the full roadway. Otherwise, this misunderstanding occurs.	-Remove speed bumps from bike lane and straighten out bike lanes. -Remove shoulder lines. People think they are bike lane lines. -Remove shoulder lines and add signs that clarify that they are not bike lanes.
@ University	-Cars make left turn in front of cyclists on green light. -Parked cars at northbound section block bikes and cyclists are forced to wait in polluted traffic. -Extremely dangerous intersection: left turners think they have right of way, and cut off folks going straight.	-Use colored road-bed to direct traffic thru intersection. -Re-route crosswalks from corner to corner (not perpendicular to the roadway). This will make peds more visible to autos, reducing the surprise that now exists for peds who get surprised by drivers coming around the corner. -Solution: phase the signal to separate turners (esp. left turners) from everyone else. -If left turn only light, then must have left turn pockets for traffic. Try stopping all 4 ways at once to allow bikes and peds to cross all at once.
@ Kittridge	-Conflicts with cars dropping off students at Berkeley High.	
@ Dwight		-High traffic – please warn cars with 2 way stop sign, flashing light and wide speed bumps.
@ Blake	-Blake is a wide street between MLK and Shattuck -It's important to deter high speeds on this stretch of roadway.	-Very busy intersection – 4 way stop now. The diverter at Blake street helps keep speed down. Please retain the diverter or replace with an effective circle.
@ Derby	-Potential closure of Derby between MLK and Milvia will reroute emergency vehicles onto Milvia. It's important to oppose the closure of Derby.	
General Milvia St Comments: This used to be a slow street. It needs to be returned to that status. Speed is excessive – you have to cross the double yellow line to avoid hitting parked cars.		

Ninth Street Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
@ Cedar	-This is a tough crossing for cyclists and major car thoroughfare down Cedar.	-If a stop sign is proposed, do not put one in.
@ Delaware	-Dangerous zone for bikes traveling through barrier, northbound. Auto traffic is fast west on Delaware/south on 9th in am peak. -Traffic is very bad from Delaware to Ninth because of diverter, needs an alternative. -Will Delaware still have bike lanes? -Semi-trucks, cars, garbage trucks, and buses use 9th and Delaware all day long. -Barrier is dangerous. Ninth is an extension of San Pablo, need to stop traffic from using 9th to avoid light at San Pablo/University (3000 cars/day!).	-Maintain barrier, keep traffic problem from expanding along Delaware. Put in stop signs to slow traffic around corners. -(response to above comment) No more stop signs! -Convert diverter to traffic circle. -Need to slow westbound traffic on Delaware before reaching Ninth. Stop sign at 10th and Delaware would help, or mid-block crossing between 9th and 10th. Traffic circle will only work with stop signs. Modified diverter would not work because cars would use emergency access. -To slow Delaware, move casual carpool spot that is on Sacramento.
From Delaware to Hearst	-4000 cars/day on 9th between Hearst and Delaware.	
@ Hearst	-Roundabout removed without due process and never replaced.	
@ University	- Lights are currently timed to favor University (long waits on 9th).	-Signal should detect and change for bikes, put marking on street for bikes to stop at light.
From Addison to Bancroft		-Remove speed humps for Bike Boulevard.
@ Allston	-Auto drop-off for Columbus school (on Allston) dangerous @ Am/Pm times.	
@ Channing		-Traffic Circle?
From Dwight to Anthony	-Pavement is in pretty poor condition in this stretch.	
@ Bancroft		-Replace 4 way stops with traffic circles.
@ Ashby		-Time lights on Ashby to create gaps that allow cyclists to cross Ashby easier.
South of Heinz		-Show proposed connection with Emeryville. -Do not route bike traffic off of 9th as 9th is a preferred connection to Emeryville. 7th is congested and convoluted and not very nice for

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
		bikes, either northbound or southbound. -Pave the dirt path and clean out the junk regularly.
General Ninth comments: ▪ Existing bike lane is not wide enough (still places bicyclist in the door zone). ▪ Add trees to this street. ▪ Think of narrowing the street. It doesn't need to be as wide as it is. Create a wide buffer zone with trees between sidewalk and curb. This street needs general revitalization.		

Russell Street Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
@ 9th		-This is not a good crossing, use the railroad tracks.
@ San Pablo		-Need stop and counterflow lane.
@ Park	-Requires bikes to ride on sidewalk where children play. -Too hard to get thru here.	-Do not make cyclists go onto sidewalk to get through traffic diverter.
@ Sacramento		-Needs signal or stop sign.
@ MLK Jr Way	-Light is too slow for Russell, too long for MLK.	-Speed up light changing time.
@ Shattuck	-this intersection often very difficult to cross, even getting off bike and using the pedestrian cross walk. -I agree, difficult to cross due to high volume (not high speed) of traffic.	-How about right turn only diverters? -At a minimum, paint crosswalk to be brighter, more visible. -Needs signal or stop sign.
@ Milvia	-Cars don't stop at Milvia intersection (no sign)	
From Milvia to Shattuck	-Residential, not commercial zoning.	
@ Wheeler	-Half barriers don't work that well (city-wide).	-Better enforcement needed.
@ Fulton and Ellsworth		-Use traffic circle to slow traffic. -Attractive, well landscaped circles/islands okay.
@ Telegraph	-No signal! It will only increase car traffic, like on Derby/Telegraph. Wide median on Telegraph okay. -The most difficult crossing on Russell.	-Pedestrian signal! Bikes can stop and use it. -Needs signal or stop sign.
@ Florence	-Credit Union Building parking lot empties onto Russell here. No stop sign, and plenty of cars.	- Move entrance to Telegraph.
@ Piedmont	-Dangerous uncontrolled intersection with bikes passing through barrier into turning traffic.	

General Russell comments:
- Add a bike parking lot.
- Fulton & Ashby: Everyone thinks light turns too slow for peds and bikes, but I've timed it as never longer than a minute!
- Do not make this street a car freeway with traffic signals, especially at Telegraph and Russell.

Virginia Street Bicycle Boulevard

Exact location	Concerns with existing conditions	Solutions Suggested by the Public
@ Sixth	-very bad paving at southwest corners.	
@ Seventh	-very bad paving at southwest corners. -There is a lot of crazy car activity here in the evenings (i.e., cars spinning out etc.). This could be a hazard to cyclists.	
@Kains	-Auto drop off hazardous during school am/pm start and end	
@ Sacramento	-Dangerous for pedestrians. Child was hit in this intersection last week.	-Put in a 4-way stop or traffic signal.
@ Bonita		-Desperately need a stop sign on Bonita.
From Bonita to Milvia	-Dangerous school drop-off zone.	
@ Acton		-Need police enforcement to maintain barrier. -Replace barrier with roundabout and planted median
From Acton to Sacramento	-Problem with excessive auto traffic, particularly between 7:30-9:00 am when the casual carpool forms. -Buses and many taxis turning in fast to BART.	-Prohibit U-turns here to force casual carpool users to go around block. - Accommodation for bikes – yes!
@ MLK Jr Way		-Install bike sensitive traffic light.
@ Milvia		-Eliminate stop signs on Virginia to improve flow of bike traffic.
@Arch	-Very dangerous intersection, people going up Virginia Street floor it as soon as they come through the intersection. Cyclists coming down Virginia fly through this intersection.	
From Euclid to Highland		- Should not be a bike boulevard.
General Virginia comments: ▪ No Bike lanes at all should be built. No bike Lanes. Virginia is too narrow to have bike lane; should be a "share the road" street.		

Chapter 3
ISSUES SUMMARY

The specific issues along each bicycle boulevard are summarized on the following pages. These pages present the majority of the problems and issues identified in the consultant's field review by location. The summaries also contain a partial listing of the issues raised by the public. In order to form a complete picture of the issues along each street, these tables should be used in conjunction with the information presented in Chapter 2.

The summary tables also present possible actions to address the issues and problems identified. Some of the possible actions reference the categories of tools found in the toolbox in Chapter 4. The selection of a specific tool to address each issue will be made in conjunction with local residents.

BOWDITCH/HILLEGASS			
Location		**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets			
Dwight Way ADT= Ashby Avenue ADT=		Major streets: Difficult for bikes to cross the street during peak hours.	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs			
STOP sign evaluation: Hillegass/Bowditch has ROW at none of the 12-intersections between Woolsey and Bancroft.			
Hillegass at: Parker- 4-way Derby- 4-way Stuart- 4-way Webster- 4-way Woolsey- 1-way SB	ADT*: M M M	Potentially unwarranted STOP signs virtually every block impede bicyclists travel time	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Bowditch at: Bancroft –all-way Haste – 4-way Dwight Way – 2-way	ADT*: M M H	Most likely warranted STOP sign on the bike boulevard.	Due to high traffic volume on cross street, Stop sign control may have to remain as is.
Channing Way 4-way Russell Street 2-way		Intersections with other bike boulevards	Replace all-way and 2-way STOP sign control with mini-Roundabout.
Other Bike Boulevard Issues			
Woolsey		Diagonal diverter at Woolsey with STOP sign for only SB is confusing	TBD
Jogged intersection at Dwight Way		Jogged intersection at Dwight Way combined with one-way flow on Dwight Way presents problems for southbound bicyclists accessing Hillegass from Bowditch	TBD
Hillegass at Webster		Two half barriers at /near Webster creates very little cross traffic	TBD
Bicycle Accident History* - 9 accidents			
Hillegass/Parker Bowditch/Channing		2 bike accidents 3 bike accidents	TBD
School Zones		none	
ADT = Average Daily Traffic Volume, (ADT) L, M ,H = Relative estimate of ADT by City staff : L=<500, M=500-1000, H=>1000. Actual counts to be conducted in the near future. *City of Berkeley, January 1995 - June 1998			

CALIFORNIA/KING STREET			
Location		**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets			
Alcatraz Ashby Dwight		Major streets: difficult to cross during peak hours	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs			
STOP sign evaluation: California Street has ROW at 11 of the 36 intersections between the Oakland city limit and Hopkins.			
California at: Addision-4-way Allston-2-way Bancroft – 4-way Blake – 4-way Parker– 4-way Derby -4-way Ward – 4-way Oregon – 4-way Russell– 4-way King at: Russell– 3-way Prince– 4-way Woolsey– 4-way Fairview– 4-way Harmon – 4-way	ADT*: M - M L L L L M M M M - L	Potentially unwarranted Stop signs impede bicyclists' travel time.	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Hopkins-4-way Rose -4-way Cedar-4-way Hearst-4-way; ADT=4500		Most likely warranted Stop sign on the bike boulevard	Due to medium to high traffic volume on cross street, Stop sign control may have to remain as is.
Virginia 2-way Channing 4-way Russell – 4-way		Intersections with other bike boulevards	Replace all-way and 2-way STOP sign control with mini- Roundabout
Other Bike Boulevard Issues			
Hearst and Delaware		Caution needed exiting Ohlone Greenway	TBD
Diagonal diverter at Ada		Motorists do not yield when turning. Spaces between bollards are narrow; bicyclists can reach high speeds traveling north (downhill).	TBD
Oakland border			Work with City of Oakland to continue route
Between Russell and Buena		Bike lanes not signed	Install Bike Lane signs
Allston		Existing bollard.	Redesign.
Bicycle Accident History* - 12 accidents			
California at University California at Alcatraz		2 bike accidents 3 bike accidents	TBD
School Zones		Malcolm X Elementary at King and Tyler	TBD
ADT = Average Daily Traffic Volume (ADT) L, M ,H = Relative estimate of ADT by City staff: L = <500, M = 500-1000, H = >1000. Actual counts to be conducted in the near future. *City of Berkeley, January 1995 - June 1998			

CHANNING WAY			
Location		**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets			
Sixth		Traffic approaches from Dwight Crescent at high speed, poor sight lines	Help crossing needed, see Category E options.
San Pablo Sacramento Piedmont		Major streets: difficult to cross During peak hours.	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs			
STOP sign evaluation: Channing Way has ROW at 12 of the 36 intersections between Fourth and Prospect.			
Cross street: Prospect Dana Ellsworth Fulton Acton Browning Curtis Tenth St. Eighth St. Seventh St. Fourth St.	ADT*: M M M M L L L L L L	Potentially unwarranted Stop signs impede bicyclists' travel time.	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Bowditch 4-way Milvia 4-way		Most likely warranted STOP sign on the bike boulevard.	Due to high traffic volume on cross street, Stop sign control may have to remain as is.
California 4-way Ninth Street 4-way		Intersections with other bike boulevards	Replace all-way STOP sign control with mini- Roundabout.
Other Bike Boulevard Issues			
Diagonal diverter at Roosevelt Other issues:		Motorists do not yield when turning. Spaces between bollards are narrow. Sign at MLK, "Bicyclists position bike over loop in street to get green light," faces MLK instead of Milvia Bike lanes not signed	TBD Reposition sign Install signs
Bicycle Accident History* - 25 accidents			
Channing at Piedmont Channing at Bowditch Channing at Milvia Channing at Fulton Channing at Shattuck		3 bike accidents 3 bike accidents 2 bike accidents 2 bike accidents 2 bike accidents	TBD
School Zones		None	
ADT = Average Daily Traffic Volume, (ADT) Actual counts to be conducted in the near future. *City of Berkeley, January 1995 - June 1998		L, M, H = Relative estimate of ADT by City staff: L = <500, M = 500-1000, H = >1000.	

MILVIA STREET			
Location		**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets			
Adeline (for bicyclists continuing east on Russell or north on Adeline at south end of Milvia Hopkins (north end of Milvia)		Major streets: difficult to cross during peak hours Turns could be difficult at peak hours	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs			
STOP sign evaluation: Milvia Street has ROW at 8 of the 30 intersections between Russell and Hopkins.			
Milvia at: Vine Street Addison Kittredge Haste Dwight Blake Parker Carleton Derby Stuart Oregon	ADT*: M M M M M M L M M M M	Potentially unwarranted Stop signs impede bicyclists' travel time.	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Berryman – 4-way L Rose – 2-way ADT=5700 Cedar – 4-way		Most likely warranted STOP sign on the bike boulevard.	Due to high traffic volume on cross street, Stop sign control may have to remain as is.
Virginia –4-way Channing – 4-way Russell 1-way		Intersections with other bike boulevards	Replace all-way STOP sign control with mini- roundabout
Other Bike Boulevard Issues			
Diagonal diverter at Yolo Other issues:		Motorists do not yield when turning. Spaces between bollards are narrow. Bike lanes not signed	TBD Install signs
Bicycle Accident History* - 29 accidents			
Milvia at Dwight Milvia at University		4 bike accidents 3 bike accidents	TBD
School Zones		Arts Magnet Elementary School at Virginia Berkeley High School	
ADT= Average Daily Traffic Volume, (ADT) L, M, H=Relative estimate of ADT by City staff : L=<500, M=500-1000, H=>1000. Actual counts to be conducted in the near future. * City of Berkeley, January 1995- June 1998			

NINTH STREET			
Location		**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets			
Cedar Ave.		Major streets: Difficult for bikes to cross the street during peak hours.	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs			
STOP sign evaluation: Travel on Ninth Street only has ROW at 2 of the 22 intersections of the entire route between Heinz St. and the Albany border.			
Eighth at: Harrison – 4-way Camelia –2-way Ninth at: Camelia -4-way Addison 4-way Allston 4-way Bancroft 4-way Parker 4-way Carleton 4-way Pardee 4-way Grayson 4-way	ADT*: M M M M M M L	Potentially unwarranted Stop signs impede bicyclists travel time.	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Hearst 4-way M Dwight Way 4-way ADT=8700		Most likely warranted STOP sign for the bike boulevard	Due to high traffic volume on cross street, Stop sign control may have to remain as is.
Virginia 2-way ADT=1300 Channing Way 4-way M Heinz 4-way M		Intersections with other bike boulevards	Replace all-way and 2-way STOP sign control with mini-Roundabout
Other Bike Boulevard Issues			
Diagonal diverter at 9th Street and Delaware		Diagonal diverter presents conflict for through bike traffic on Ninth Street and turning auto traffic. Diverter is oriented such that MV traffic can use Ninth St. and Delaware to go to and from northside to I-880/University Ave. interchange.	Consider stop signs for westbound traffic on Delaware. Modify diverter so that through bike travel is facilitated as much as possible.
Bicycle Accident History* - 4 accidents			
No multiple accident locations			TBD
School Zones		Columbus School at Allston French-American School at Heinz	TBD
ADT = Average Daily Traffic Volume, (ADT) Actual counts to be conducted in the near future. *City of Berkeley, January 1995- June 1998		L, M, H = Relative estimate of ADT by City staff : L = <500, M = 500-1000, H = >1000.	

RUSSELL STREET		
Location	**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets		
San Pablo Sacramento Adeline Shattuck Telegraph Claremont	Major streets: Difficult for bikes to cross the street during peak hours.	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs		
STOP sign evaluation: Travel on Russell Street has ROW at six of the 39 intersections between Claremont and 7th Street and defacto ROW at another 15 for a total of 21.		
Russell at: ADT* Benvenue–4-way M Regent –4-way M Ellsworth –4-way M Fulton –4-way M Matthews –4-way L	Potentially unwarranted Stop signs impede bicyclists travel time.	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Pine Lorina Kelley Newberry Piedmont Harper (diverter) Ellis Cherry Wallace Florence Tenth Deakin Eighth Wheeler	T-intersections with minor side streets which have no STOP signs for any approach, but essentially allow Russell Street the right-of-way	Install STOP sign for side streets
College Ave – 4-way	Most likely warranted STOP sign for the bike boulevard	Due to high traffic volume on cross street, STOP sign control may have to remain as is.
Hillegass -2way stop for Hil. Milvia- uncontrolled California –4-way M King- 4-way M Ninth Street 4-way M	Intersections with other bike boulevards	Replace all-way and 2-way STOP sign control with mini-Roundabout.
Other Bike Boulevard Issues		
Barrier at Park St.	Not bike passable	Retrofit with curb ramps and/or cut through to make bike passable.
Other issues:	Plenty of existing impediments to auto travel	None.
Bicycle Accident History* - 10 accidents		
Russell at Shattuck	2 bike accidents	TBD
School Zones	Le Conte School at Ellsworth	TBD

ADT = Average Daily Traffic Volume, (ADT)
L, M, H = Relative estimate of ADT by City staff : L = <500, M = 500-1000, H = >1000.
Actual counts to be conducted in the near future.
* City of Berkeley, January 1995- June 1998

VIRGINIA STREET			
Location		**Issues/Problem Areas to Resolve**	**Possible Actions**
Crossing Major Streets			
Oxford - ADT =10,000 Shattuck MLK Sacramento San Pablo Tenth St. - ADT =1,400 Sixth St. – ADT=8,000		Major streets: Difficult for bikes to cross the street during peak hours.	Help crossing needed, see Category E options.
Travel Impeded by STOP Signs			
STOP sign evaluation: Travel on Virginia Street has ROW at 11 of the 35 intersections between Le Roy and 4th Street .			
Virginia at: Scenic – 4-way Chestnut -4-way Curtis -4-way Stannage -3-way Eighth St-4-way Seventh St-4-way	ADT*: M L M L L	Potentially unwarranted Stop signs impede bicyclists travel time.	If remove STOP signs for bicycle boulevard, replace with Category C or D options.
Euclid 2-way-M Spruce – 4-way Fourth Street – 4-way M		Most likely warranted STOP sign for the bike boulevard	Due to high traffic volume on cross street, STOP sign control may have to remain as is.
Milvia: 4-way STOP California: Virginia has ROW Ninth Street: 2-way STOP Virginia has ROW		Intersections with other bike boulevards	Replace all-way and 2-way STOP sign control with mini-Roundabout.
Other Bike Boulevard Issues			
Diagonal diverter at McGee (no STOP signs)		Lack of STOP signs presents conflicts between turning vehicles and straight – through bicycles on Virginia Street. Diverter is ugly but bike passable.	Install STOP signs for cross-streets.
Diagonal diverter at Acton - 4-way STOP		4-way STOP makes it safer for bikes but subject to STOP sign delays. Diverter is ugly but bike passable.	TBD
Bicycle Accident History* - 8 accidents			
Virginia at Euclid		2 bike accidents	TBD
School Zones		Franklin Elementary at Stannage Arts Magnet Elementary School at Milvia	

ADT = Average Daily Traffic Volume, (ADT) Actual counts to be conducted in the near future. *City of Berkeley, January 1995 - June 1998	L, M, H = Relative estimate of ADT by City staff: L = <500, M = 500-1000, H = >1000.

Chapter 4
TOOLBOX AND SAMPLE BIKE BOULEVARD LAYOUT

OVERVIEW

This chapter describes a cohesive set of strategies to create a bicycle boulevard, namely to make streets safer and more efficient for bicycle transportation. A variety of measures are included in the toolbox that are compatible with bicycling and with neighborhood traffic management goals. Enough choices are retained in the toolbox so that each neighborhood has flexibility in designing a boulevard that meets the needs and issues of a particular location.

Based on the field review and the goals for developing the bike boulevard (see Chapter 1), five general issues that should be addressed during bike boulevard implementation were identified. See Table 4-1. The strategies in the toolbox were chosen because they address one or more of these general issues. Each strategy page in this chapter indicates which general issue is addressed.

Table 4-1
GENERAL ISSUES TO ADDRESS DURING BICYCLE BOULEVARD IMPLEMENTATION

Issue	Abbreviation
1. Create the look and feel of a bicycle boulevard.	1. Look and feel
2. Slow traffic and discourage diversion of traffic to the bike boulevard when unwarranted STOP signs are removed. Unwarranted STOP signs cause excessive stopping and delay for bicyclists. They also increase noise and air pollution, increase fuel consumption and non-compliance compromises safety for all. They often increase speeds mid-block as well.	2. Traffic Calming
3. Address school or pedestrian related safety issues.	3. Ped Safety
4. Help bicyclists cross major streets.	4. Help Crossing
5. Prevent diversion of motor vehicle traffic to the bicycle boulevard.	5. Diversion

The strategies are grouped into two categories as to where and how they would be placed on a bicycle boulevard. The first category is called **Basic Tools**. These strategies are recommended for all bicycle boulevards. These include:

- Signage
- Unique pavement
- Pavement legends

- Landscaping/street trees

The second category is called **Site Specific Tools.** These would only be used to address a site specific issue. Which specific tool to be used would be determined in collaboration with local residents. Examples of site specific tools are:

- Traffic circles
- Bulbouts
- Traffic signals
- High-visibility crosswalks

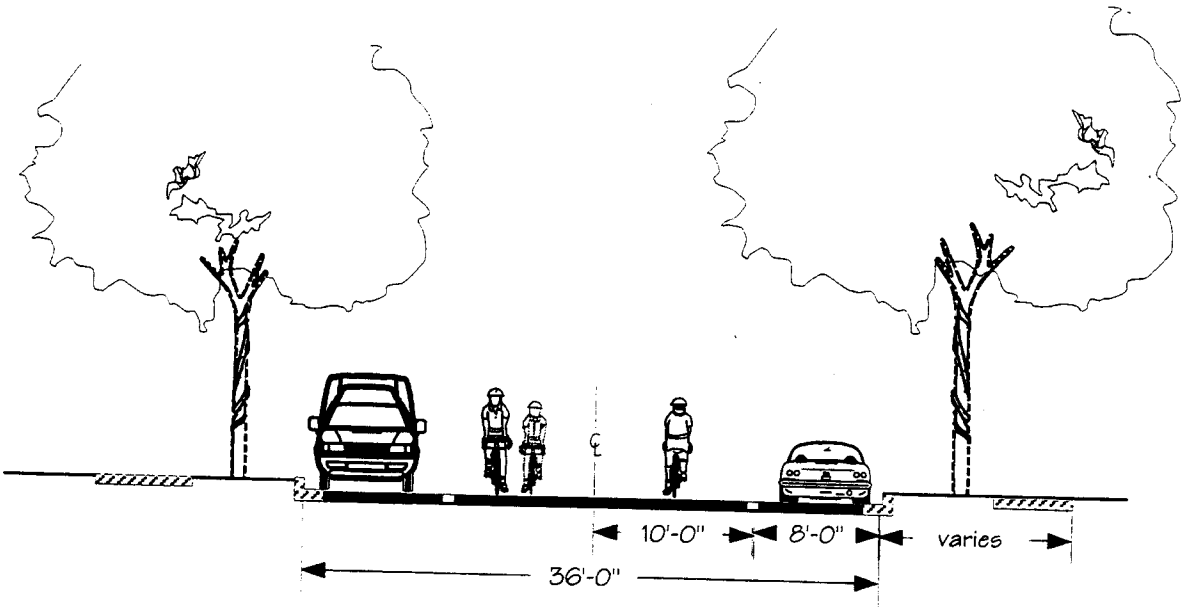
A summary of the toolbox is presented in Table 4-2. The entire toolbox presenting guidelines for applying each individual tool is presented at the end of this chapter.

It should be noted that these tools are not meant to be used individually. The concept is to combine several tools so that the cumulative effect will create a look and feel that will tell both motorists and bicyclists that this street is special: it is not a speedway, but rather a place where people live and where many people ride their bikes.

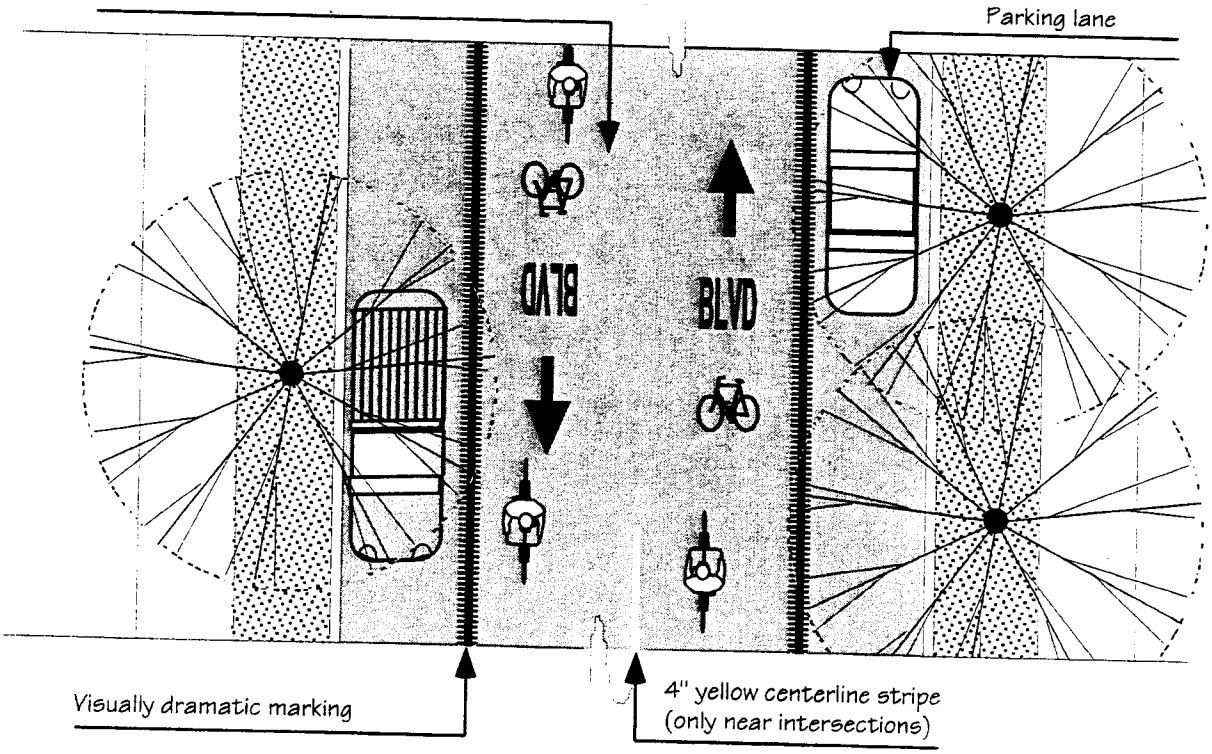
Figures 9 through 13 illustrate several possible ways to combine these tools on streets of different widths, some with existing bike lanes and some without. These drawings are not meant to represent any street in particular, but rather to show the cumulative effect of combining several strategies. A sample layout of several blocks is presented in Appendix A to illustrate conceptually how the various strategies can be combined to create a bicycle boulevard. Again, this layout is meant to be illustrative and does not present specific recommendations for a specific location.

Bicycle Boulevards where concept could be applied:

- Camelia
- California (sections)
- Milvia (sections)
- Hillegass
- Virginia
- Channing (sections)
- Russell



Section



Plan

Typical Treatment
36' Wide Street - No Bike Lanes

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS - PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

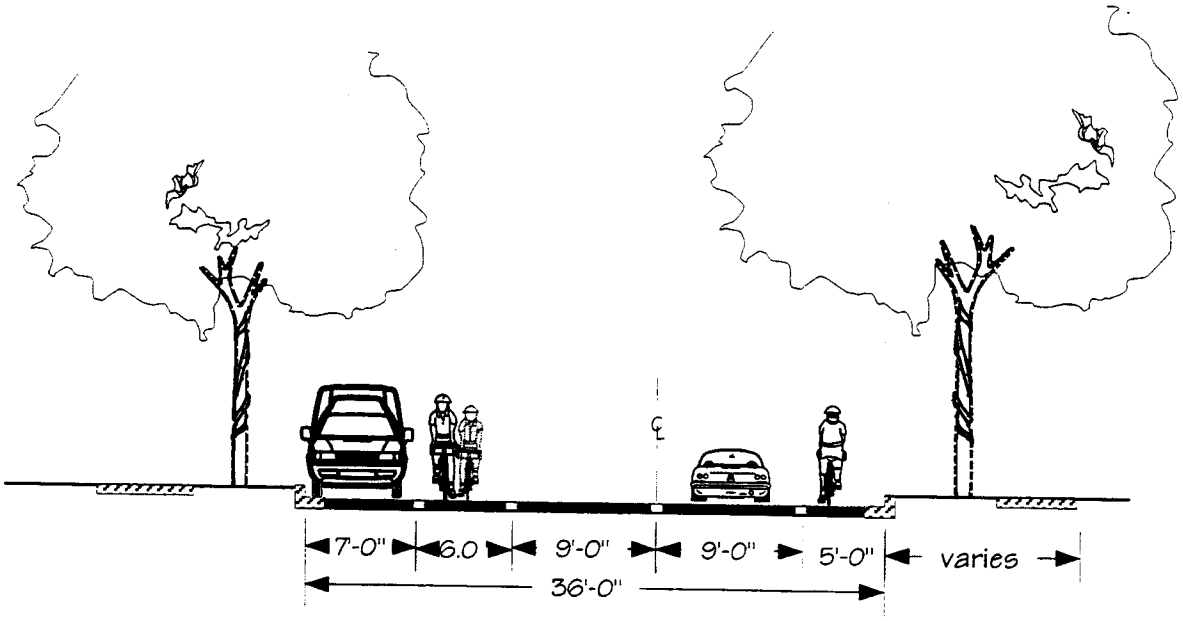
This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

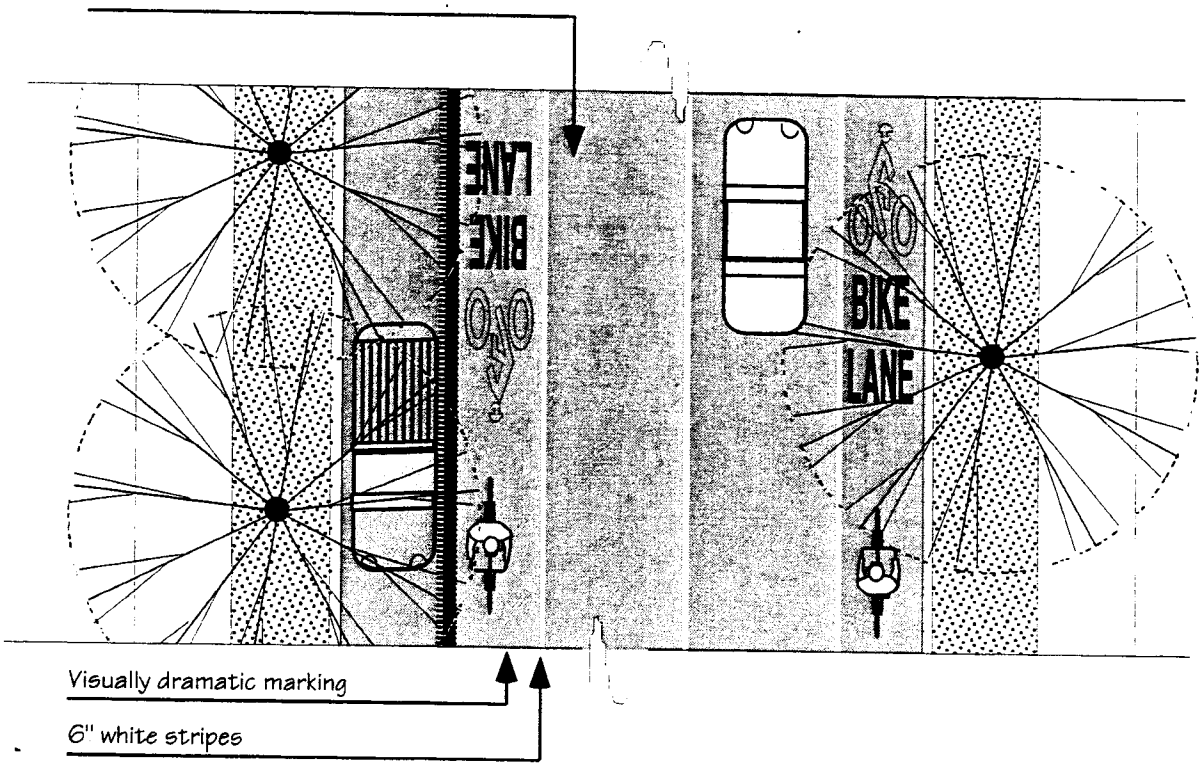
Figure 9

Bicycle Boulevards where concept could be applied:

- California (sections)
- Milvia (sections)
- Bowditch
- Channing (sections)



Section



Plan

Typical Treatment
36' Wide Street - Existing Bike Lanes

Berkeley Bicycle Plan: Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

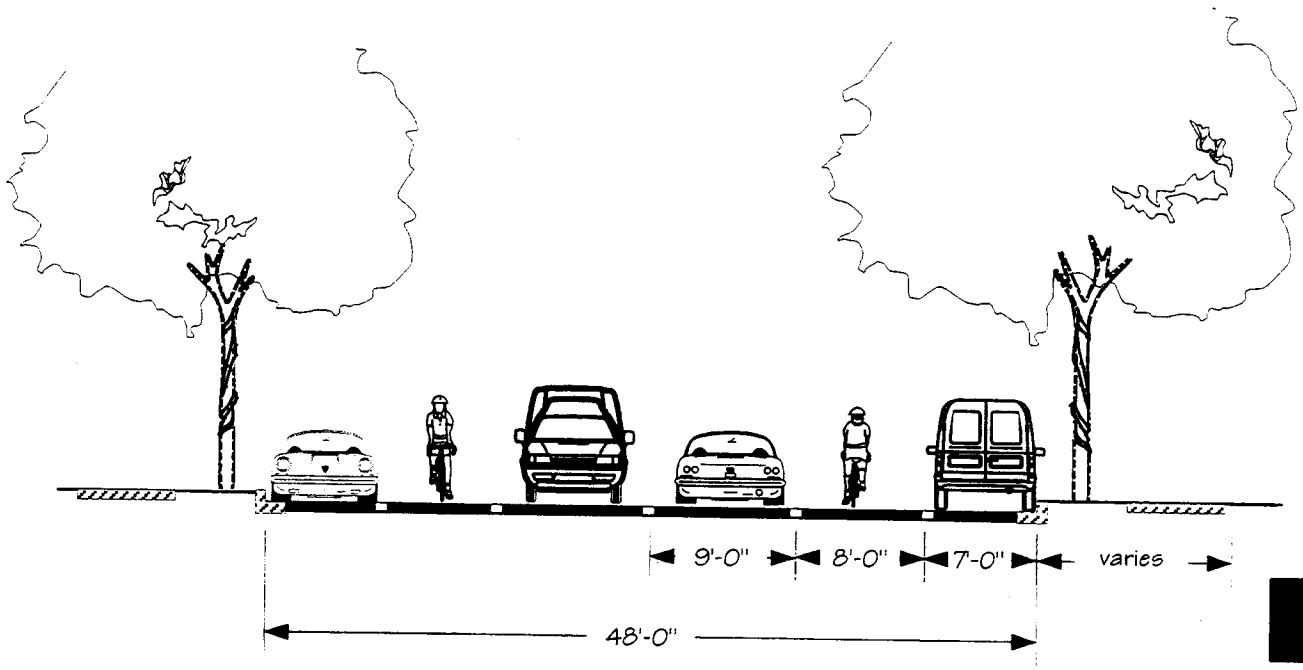
This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

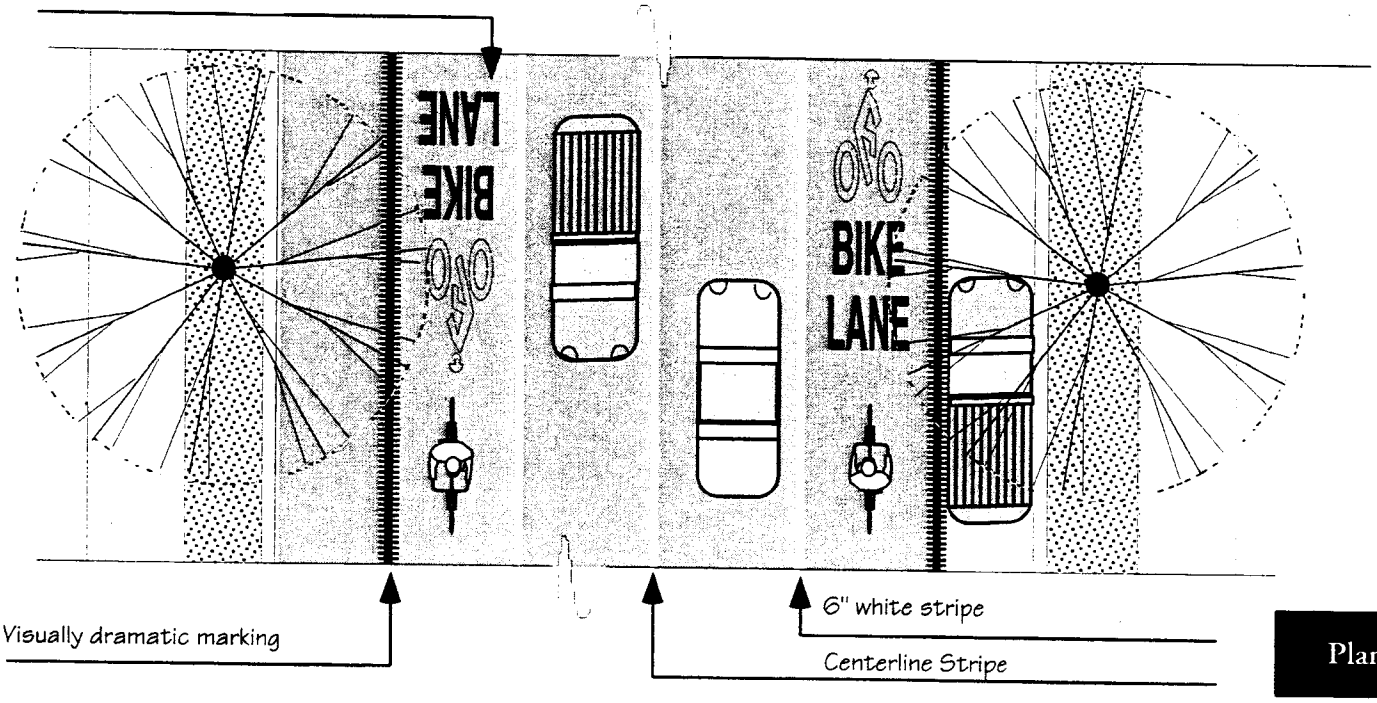
Figure 10

Bicycle Boulevards where concept could be applied:

- 9th
- California (sections)



Section



Plan

Typical Treatment
48' Wide Street - Existing Bike Lanes

Berkeley Bicycle Plan: Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

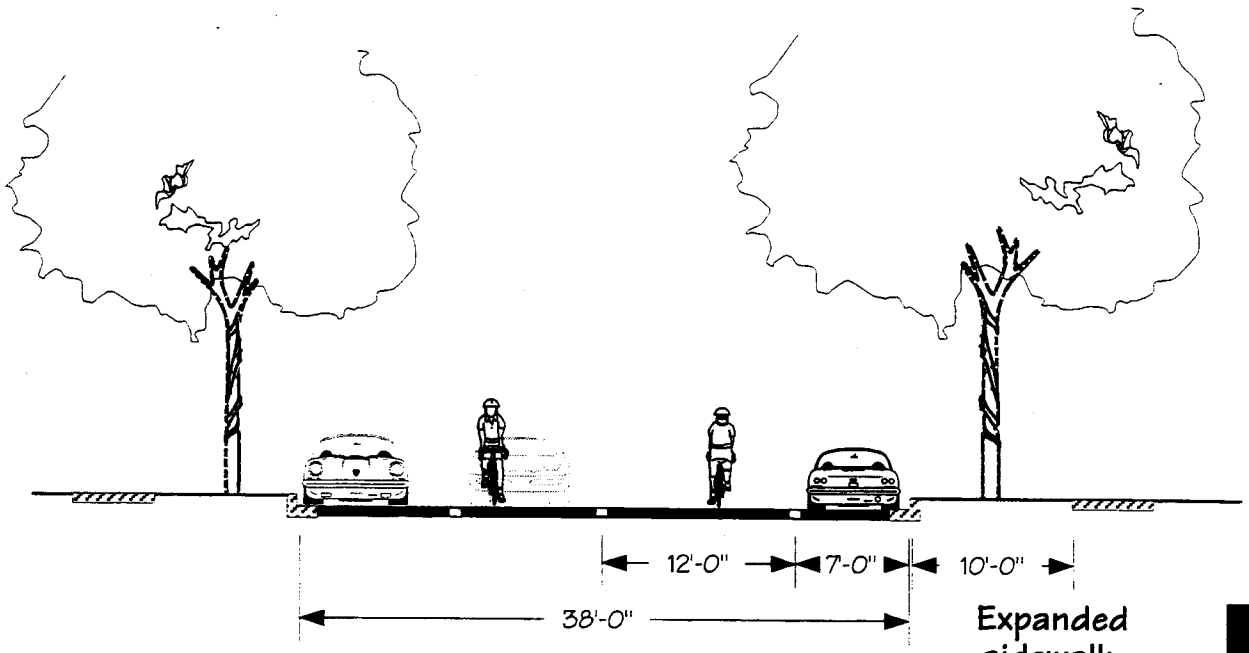
This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

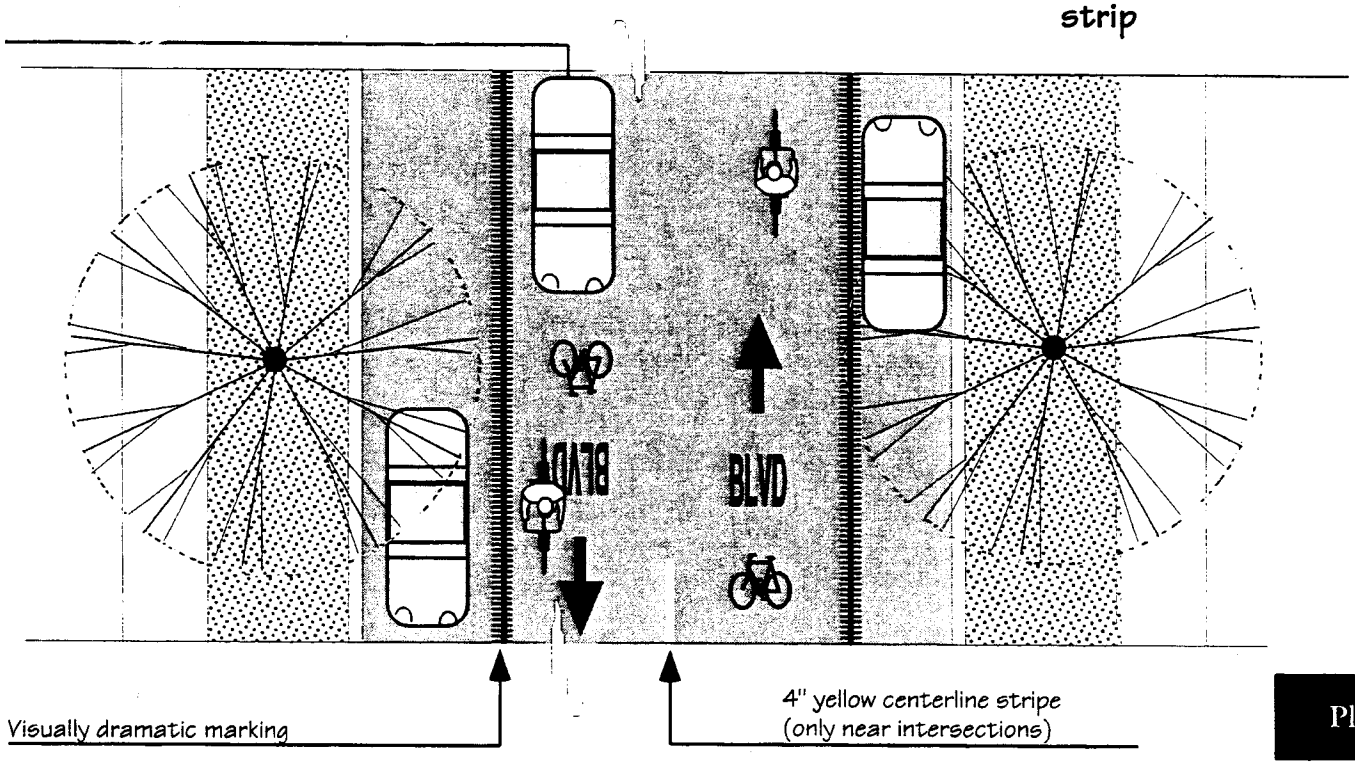
Figure 11

Bicycle Boulevards where concept could be applied:

- 9th
- California (sections)



Section



Plan

Typical Treatment 48' Wide Street Expanded Planting Strip

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS - PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

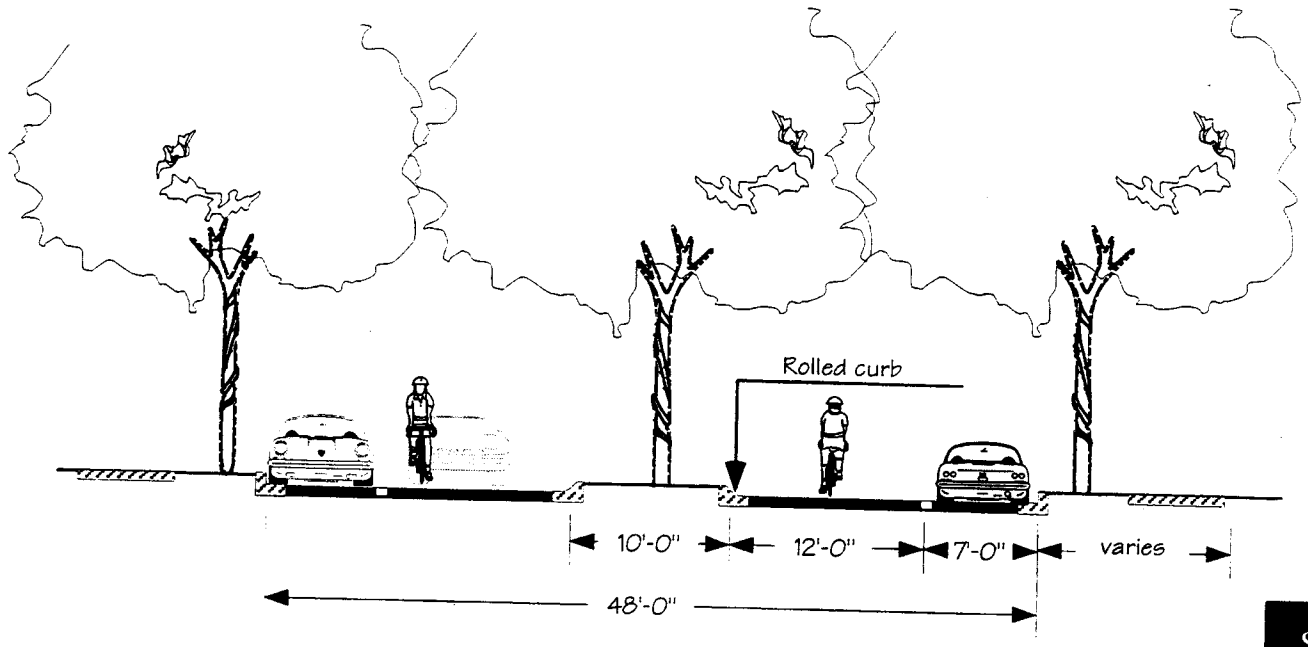
This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

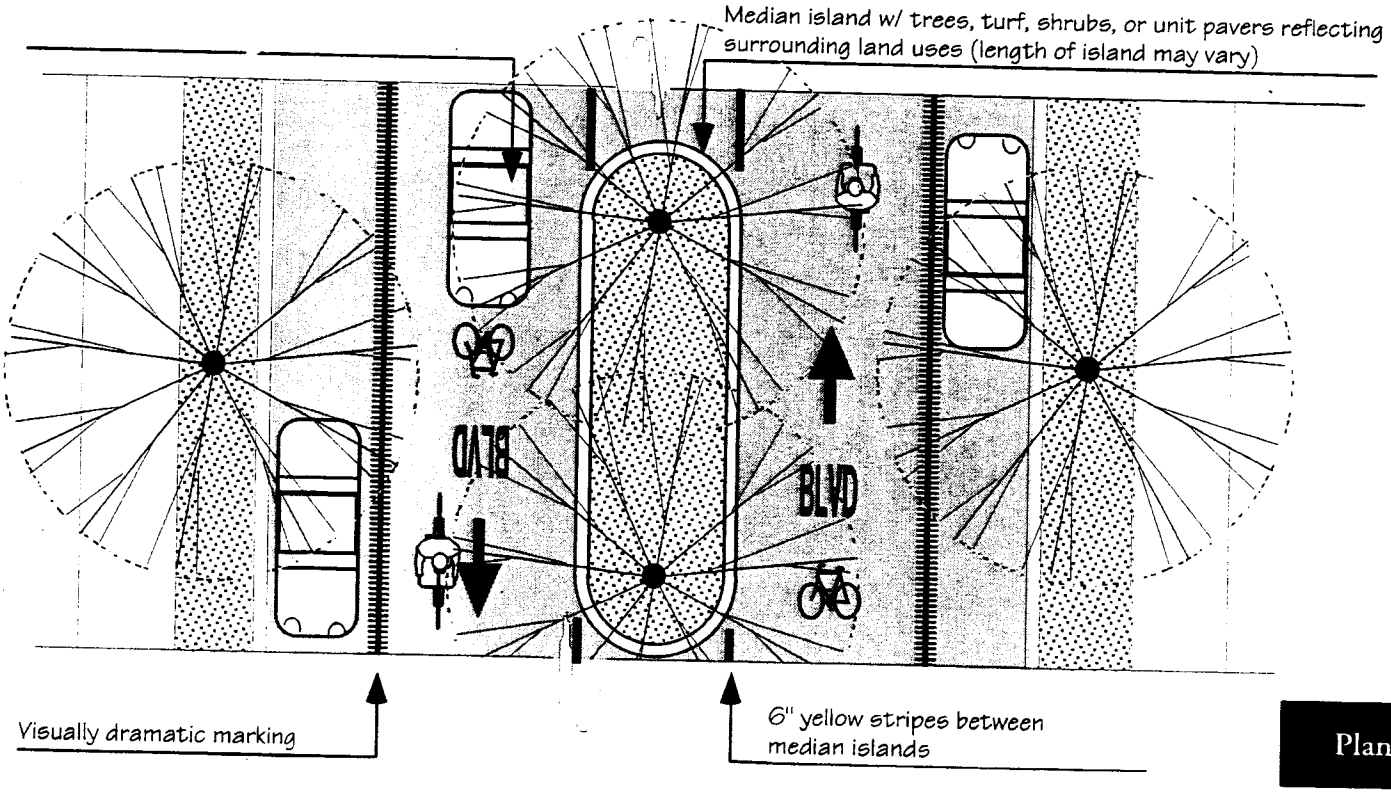
Figure 12

Bicycle Boulevards where concept could be applied:

- 9th
- California (sections)



Section



Plan

Typical Treatment
48' Wide Street - Median Island

Berkeley Bicycle Plan: Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

Figure 13

This page intentionally left blank.

Table 4-2 TOOLBOX SUMMARY
BASIC TOOLS **(recommended for all bike boulevards)**
A. Signage
1. Identity signs
2. Special street sign design - at all intersections
3. Special advance street sign design at major streets
4. Continuous signage along Bicycle Blvd
5. Other signs to be used as needed for site-specific applications
B. Throughout the Street
1. Visually dramatic markings
2. Unique Pavement Treatment for roadway or lanes
3. Planter Strip Landscaping/Street Trees
4. Bicycle Boulevard Pavement Legend
SITE SPECIFIC TOOLS **(to be used only where needed and in consultation with local residents)**
C. Midblock
1. High Visibility Crosswalks
2. Bulb-Outs – midblock
3. One lane slow point
4. Mid-block median islands
5. Lightly patterned pavement surface
D. At Intersections
1. Traffic Circles
2. Bulb-Outs at Intersections
3. High Visibility crosswalks
4. Special design/logo within intersections
5. Redesign existing diverters to be bike and emergency vehicle accessible
E. To Enable or Help Bicyclists Cross Collectors or High Traffic Streets
1. Four-way STOP sign
2. Median refuge on major street
3. Traffic Signal - with turn restrictions for motor vehicles
4. Traffic Signal - with detection for bikes only
5. Traffic Signal - standard design

Strategy A-1

IDENTITY SIGNAGE

Basic Element: Signage

Issues Addressed:

- Look and Feel

Typical Application:

All bicycle boulevards to inform all roadway users that the street they are on is a bicycle boulevard.

Implementation Guidelines:

At major street crossings:
Install sign on bike boulevard at intersections with major streets

Design Suggestions:

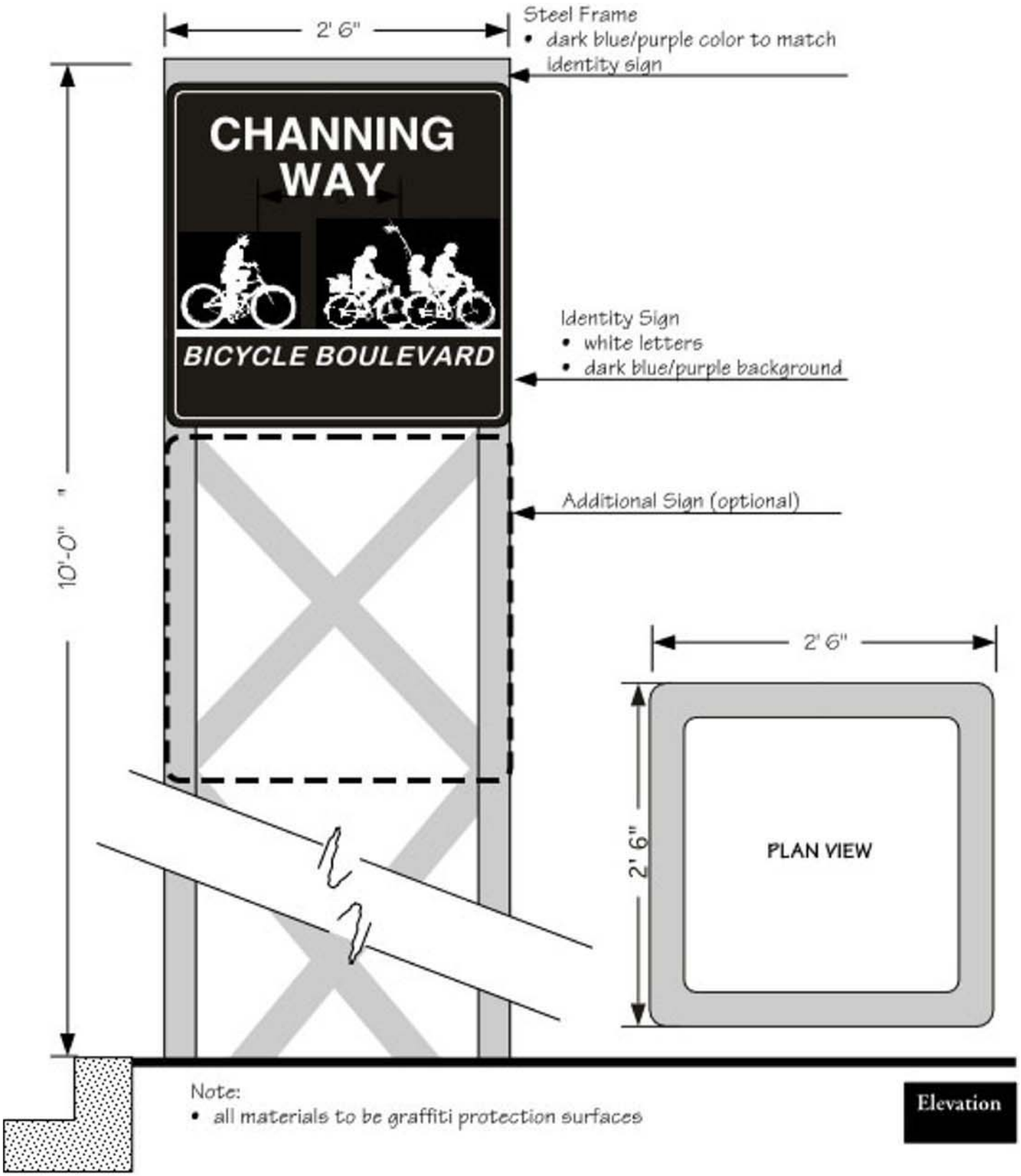
Blue/purple color
Retro-reflective
Graffiti proof

Cost:

$ 200 for sign and sign structure
$50 for sign only

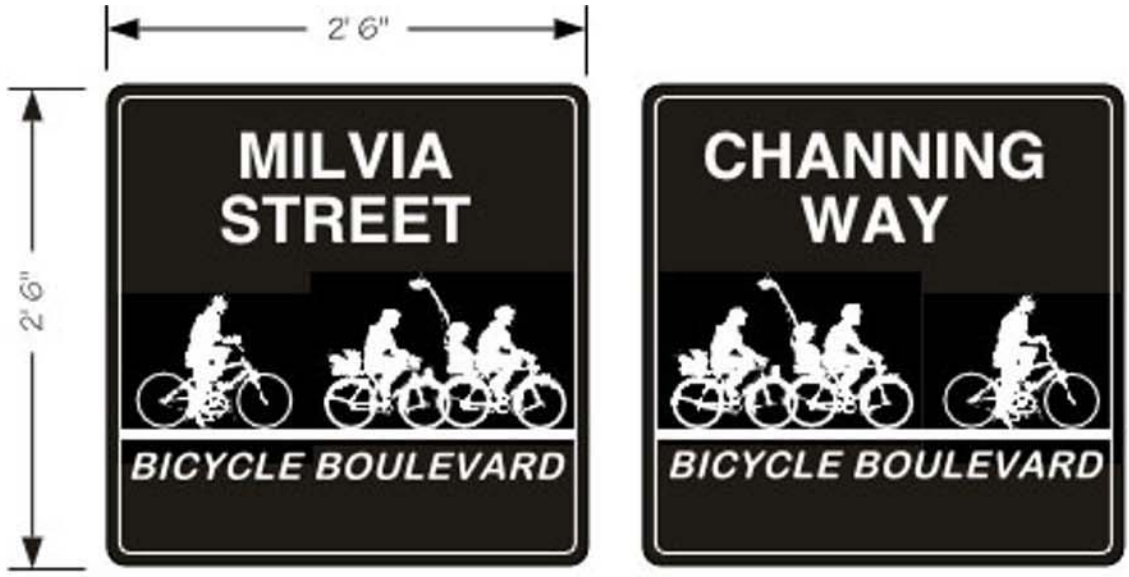
Illustration:

See facing and following pages for typical sketches.



Bicycle Boulevard Identity Sign

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
in associations with:
2M Associates, Landscape Architects
HPV Transportation Consulting



Color: White letters on dark blue/purple background

AT MAJOR STREET INTERSECTIONS

Strategy A-2

SPECIAL STREET SIGN DESIGN

Basic Element: Signage

Issues Addressed:

- Look and Feel

Typical Application:

At all intersections along bicycle boulevard

Implementation Guidelines:

Corner street signs: every corner: 6" X 28"
Replaces existing signs.

Design Suggestions:

Blue/purple color
Retro-reflective
Graffiti proof

Cost:

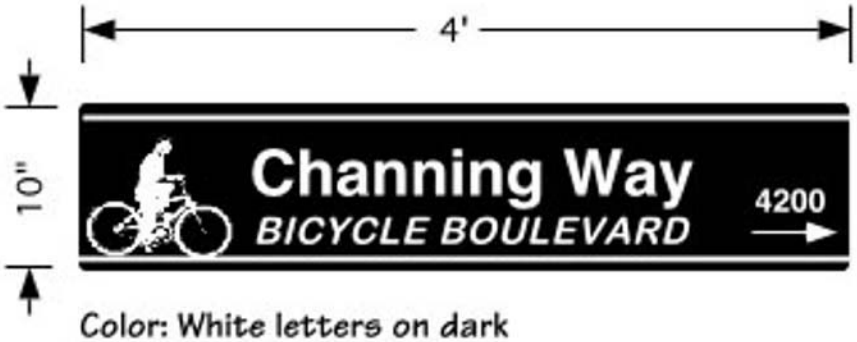
$150 - new sign and pole
$50 - new sign installed on existing pole

Illustration:

See following page for typical sketches.

Color: White letters on dark blue/purple background

A.2: CORNER STREET SIGN



Color: White letters on dark blue/purple background

A.3: ADVANCE STREET SIGN

Strategy A-3

SPECIAL ADVANCE STREET SIGN DESIGN AT MAJOR STREETS

Basic Element: Signage

Issues Addressed:

- Look and Feel

Typical Application:

At bicycle boulevard intersections with major streets

Implementation Guidelines:

Advance signs: install on major streets
10" X 48"
Replaces existing signs

Design Suggestions:

Blue/purple color
Retro-reflective
Graffiti proof

Cost:

$150 - new sign and pole
$50 - new sign installed on existing pole

Illustration:

See facing page for typical sketches.

Strategy A-4

MIDBLOCK SIGNS ALONG BICYCLE BOULEVARD

Basic Element: Signage

Issues Addressed:

- Look and Feel

Typical Application:

All bicycle boulevards at midblock

Implementation Guidelines:

Midblock information signs (A.4.1): install as needed to direct cyclists to major destination.

Midblock safety signs (A.4.2): alternate "Share the Road" and "Slow" signs so that each sign is installed every other block.

Design Suggestions:

Both:
Retro-reflective
Graffiti proof

Information signs (A.4.1): blue/purple (Actual color to be selected in conjunction with the Bicycle Subcommittee, the goal of the specific color choice will be to have a distinctive color that will not be confused with other standard sign colors.)

Safety signs (A.4.2): fluorescent yellow-green

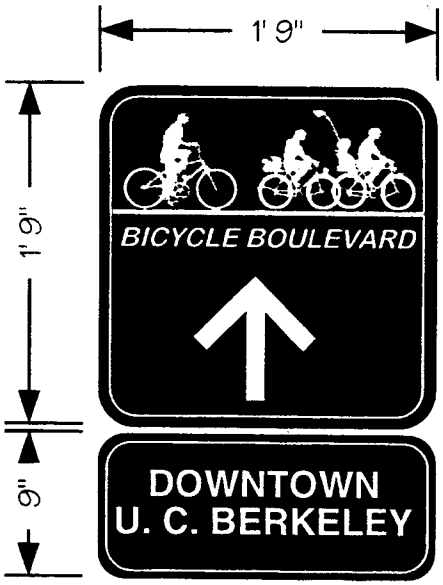
(Note: - final design of the A.4.2 Share the Road Sign to be determined in conjunction with the Bicycle Subcommittee prior to installation).

Cost:

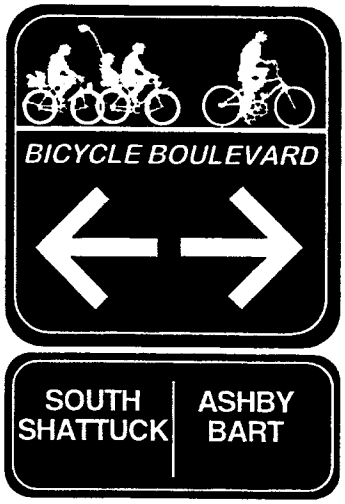
$150 - new sign and pole
$50 - new sign installed on existing pole

Illustration:

See facing page for typical sketches.



ALONG ROUTE



APPROACHING INTERSECTION WITH ANOTHER BICYCLE BOULEVARD

Color: White letters on dark blue/purple background

A.4.1: MID-BLOCK INFORMATION SIGNS

Color: Black letters on standard florescent yellow-green background

A.4.2: MID-BLOCK SAFETY SIGNS

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS - PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

Strategy A-5

SITE SPECIFIC SIGNS

Basic Element: Signage

Issues Addressed:

- Look and Feel

Typical Application:

All bicycle boulevards as needed

Implementation Guidelines:

15 MPH- install in school zones;
Bicycle Boulevard: Cross Traffic Does Not Stop: install for side street traffic where stop signs are removed on the bicycle boulevard;
Traffic Circle warning sign- install in advance of traffic circles;
YIELD to Pedestrians and Bicyclists – install where appropriate such as midblock crossings, channelized right turn lanes, etc.
No Right Turn on Red- install where moderate to heavy right-turn volumes conflict with the safety of pedestrians and bicyclists;
Do Not Enter Bicycles Excepted- install on diverters and other locations where motor vehicle traffic is prohibited.

Design Suggestions:

All:
Retro-reflective
Graffiti proof
Color -as indicated in sketch
Size – in accordance with the Caltrans Traffic Manual and as specified by the City Traffic Engineer

Cost:

$150 - new sign and pole
$50 - new sign installed on existing pole

Illustration:

See facing page for typical sketches.

Color: Black letters on white background

Color: White letters on red background

Color: Black letters on white background

Note: Signs used in combination

Color: Black letters on standard florescent yellow-green background

Color: Black letters on white background

Site-Specific Signs

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
2M Associates, Landscape Architects
HPV Transportation Consulting

Strategy B-1

VISUALLY DRAMATIC MARKINGS

Basic Element: Lane Striping & Width

Issues Addressed:

- Look and Feel
- Traffic Calming

Description:

This strategy includes both the design of the stripe (color, size and pattern) as well as where stripes are placed to narrow the width of a travel lane or parking lane.

Typical Application:

- Narrow travel lanes (10 feet or less) (only applicable on sections with centerlines): generally where ADTs > 2,000 VPD
- Parking lane striping: roadways with on-street parking

Implementation Guidelines:

Narrow travel lanes: Stripe a travel lane of 9 or 10 feet. Use where centerline is striped, generally where ADTs > 2,000 VPD and one of the following is also present:

- Sections with Bike Lanes
- Commercial Areas
- School Zones

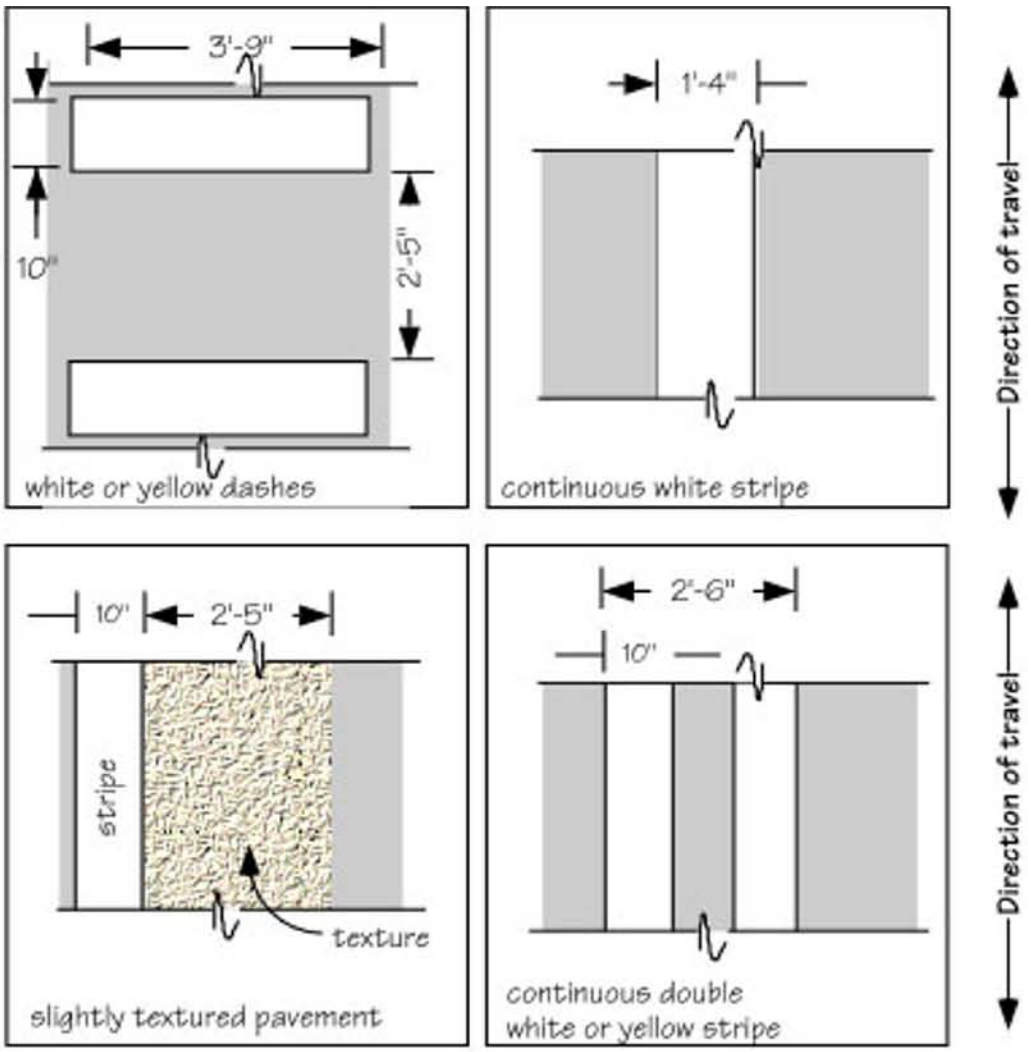
Parking lane stripe – all parking lane lines

Design Suggestions:

- Center Line Stripe: Standard Yellow 4 inch
- Parking Lane Stripe: 12" wide placed 7 feet from curb face
- Bike Lane Stripe: 6 inch white
- Marking materials: Type 1 tape or thermoplastic (with 10 % crushed glass to increase co-efficient of friction)

Cost:

Type 1 tape:
$1.50 per linear foot-4 inch stripe
$4.50 per linear foot – 12 inch stripe
Thermoplastic:
$0.65 per linear foot-4 inch stripe
$1.00 per linear foot – 12 inch stripe



Plan

Berkeley Bicycle Plan: Bicycle Boulevards

Visually Dramatic Marking Options

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
In association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.
12/29/99

Strategy
B.1

Strategy B-2

UNIQUE PAVEMENT FOR ROADWAY OR LANES

Basic Element: Throughout the Street

Issues Addressed:

- Look and Feel
- Traffic Calming

Typical Application:

All bicycle boulevards

Implementation Guidelines:

Exact treatment still to be determined. One option is an integral colored pavement, however, this option needs further study. If coloring is used, it should be done in conjunction with scheduled repaving. Depending on available funding and maintenance issues, apply color either to the entire street or to the travel and bike lanes only and not parking lanes.

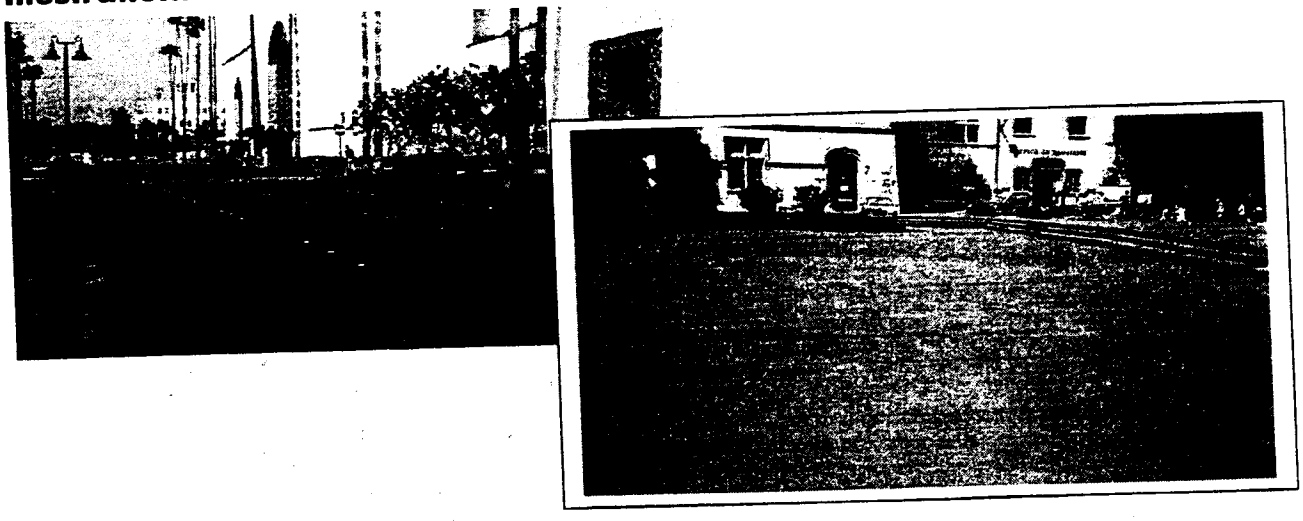
Design Suggestions:

If colored asphalt is used:
Color: Brick red
Typical vendor: Aspha-color

Cost:

For colored paving option only:
Marginal cost in conjunction with repaving projects:
$140,000 per mile (36 foot wide street) entire street curb to curb;
$200,000 per mile (48 foot wide street) for travel and bike lanes only, not parking lanes.

Illustration:



Strategy B-3

LANDSCAPING/STREET TREES

Basic Element: Throughout The Street

Issues Addressed:

- Look and Feel

Typical Application:

Planting strips
Traffic Circles
Diverters

Implementation Guidelines:

General guidance: add new green space where possible and include landscaping in new traffic calming devices;
Street trees: 3 foot minimum width planting strip
Medians: five foot minimum width

Design Suggestions:

- Low maintenance.
- Able to withstand urban conditions.
- In intersections, landscaping should be less than two feet in height or canopy above eight feet.
- Option: Use seven different trees species for a distinct look for each bicycle boulevard.

Cost:

$125 per 15 gallon tree
Planting strips: $ 3,000- 5,000 per block face (irrigation not included)
Medians, traffic circles, diverters: $5,000 - $7,500 (including irrigation)
Cost included in the cost of traffic circle and diverter design

Strategy B-4

PAVEMENT LEGENDS

Basic Element: Throughout the Street

Issues Addressed:

- Look and Feel
- Traffic Calming

Typical Application:

Bicycle boulevard sections without bike lanes

Implementation Guidelines:

With on-street parking: place 12 feet from curb face (measured to center of legend)
Without on-street parking: place in center of travel lane.
Place at beginning of block and midblock approx. 200 feet from first legend on the block.

Design Suggestions:

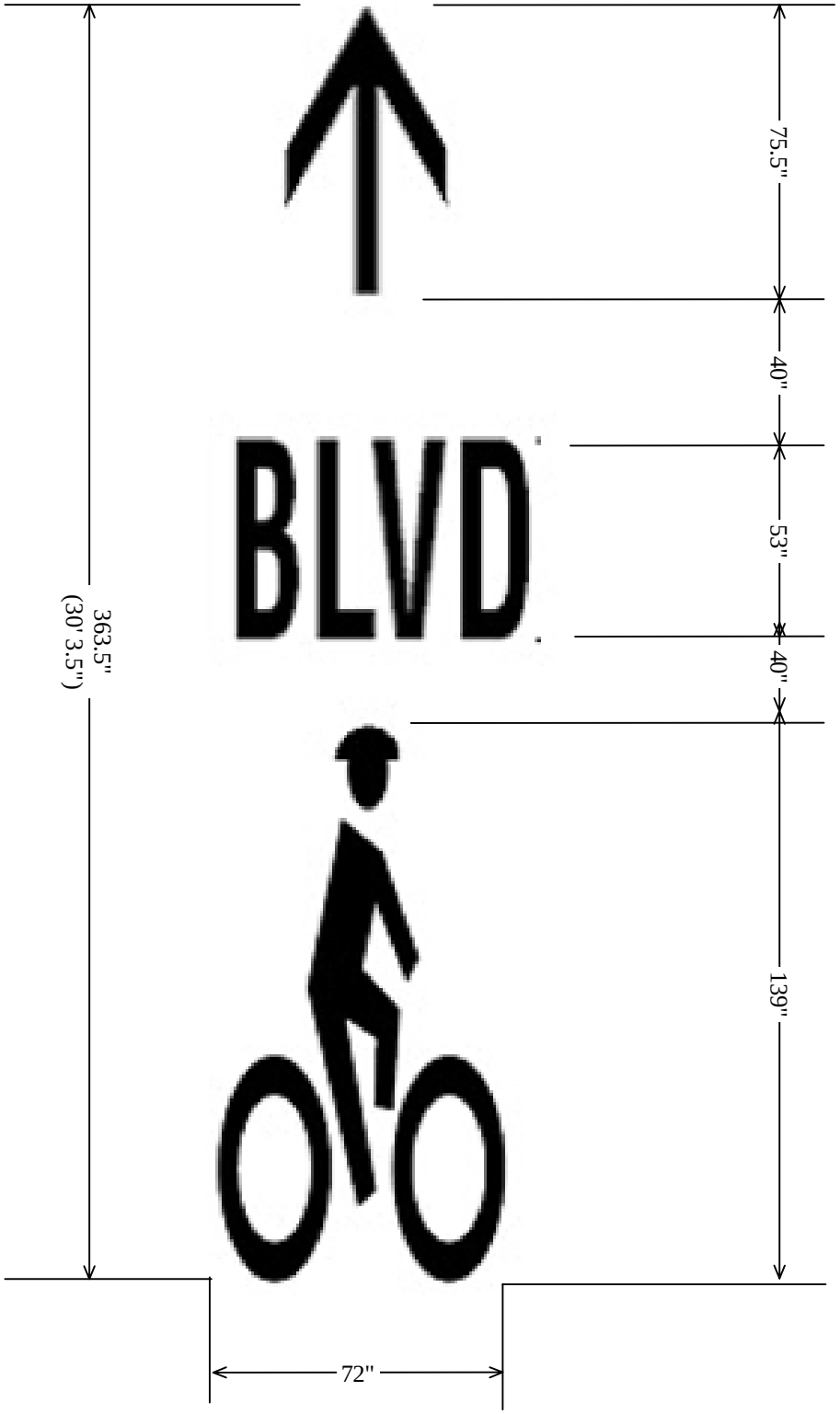
Color: white legend
Material: Type I tape, preferred
Typical vendor: 3M
Alternate material: thermoplastic modified with 10 % crushed glass to increase coefficient of friction.

Cost:

Type 1 tape: $500 each
Thermoplastic: $150 each

Illustration:

See facing page for typical sketch.



Plan

Pavement Legends

Berkeley Bicycle Plan: Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.
12/28/99

Strategy
B.4

Strategy C-1

HIGH VISIBILITY CROSSWALKS

Site Specific Element: Midblock

Issues Addressed:

- Traffic Calming
- Pedestrian Safety

Typical Application:

At schools, parks or community centers with high volumes of pedestrians.

Implementation Guidelines:

Crosswalk width will vary:
10 feet to 20 feet

Use at locations with existing high volumes of pedestrians: 100 + per peak hour

Design Suggestions:

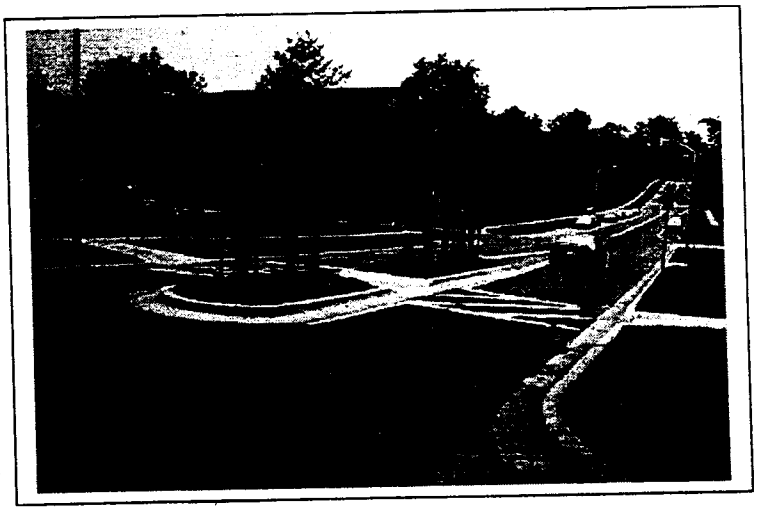
- Use in conjunction with bulb-outs or center median.
- Color/patterns: use colored pavers or patterned/colored asphalt to increase visibility
- Option: Create pattern in crosswalk

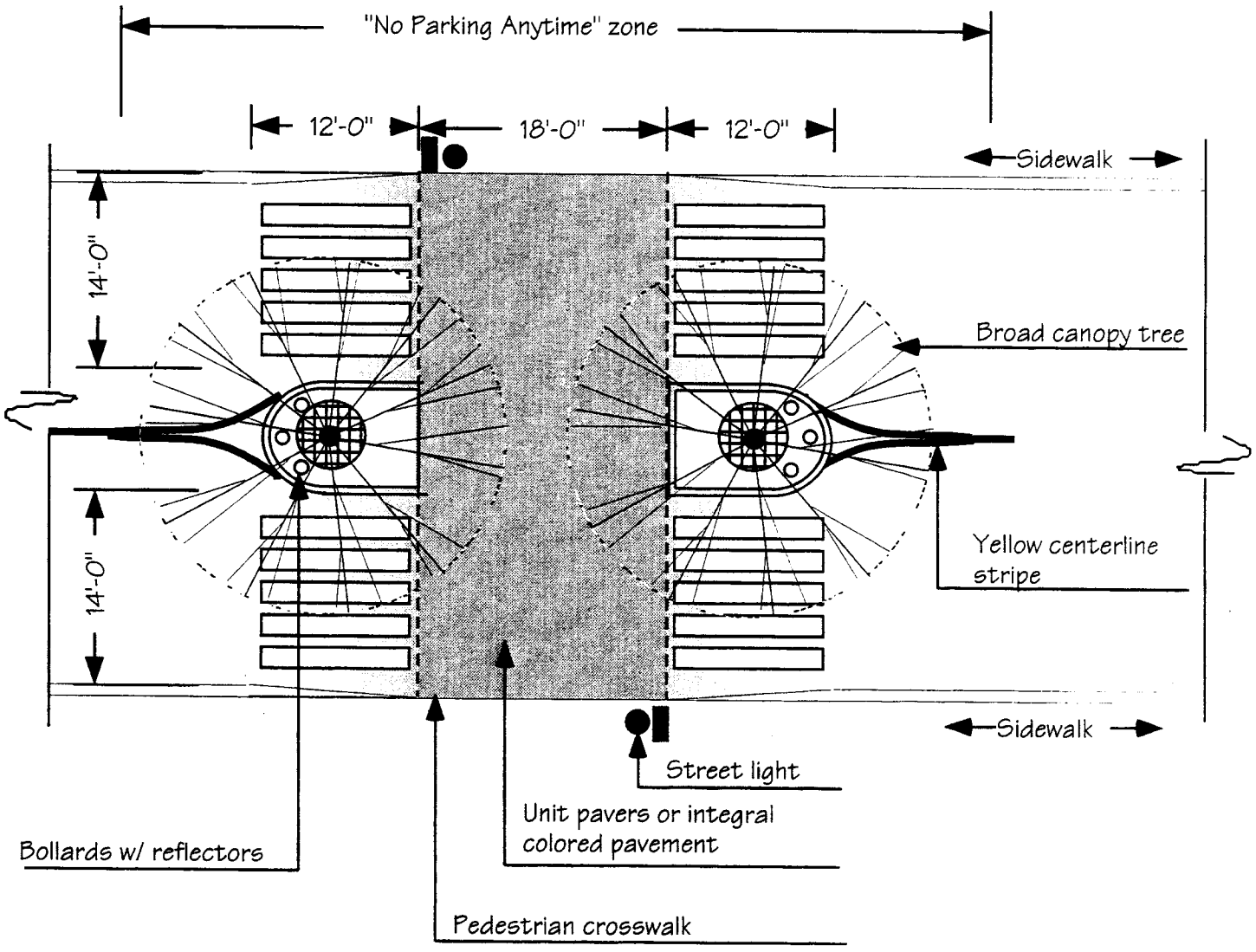
Cost:

Varies: $5,000 to $15,000 depending on how many other strategies are used in combination.

Illustration:

See facing page for typical sketch.





Note: Use only where pedestrian crossing is warranted such as at schools or parks

Plan

Berkeley Bicycle Plan: Bicycle Boulevards

High Visibility Crosswalk

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.
3/7/00

Strategy C.1

Strategy C-2

BULB-OUTS: MIDBLOCK

Site Specific Element: Midblock

Issues Addressed:

- Traffic Calming
- Pedestrian Safety

Typical Application:

Can be used alone as a traffic calming device to slow traffic midblock or in conjunction with high visibility crosswalk (Strategy C-1).

Implementation Guidelines:

Used where loss of approx. two parking spaces is acceptable.

Bulb-outs should protrude only as far out as parking lane, generally seven feet.

Design Suggestions:

Landscaping should be kept low - less than 2 feet high.

Cost:

$5,000 - $10,000

Illustration:

Strategy C-3

ONE-LANE SLOW POINT

Site Specific Element: Midblock

Issues Addressed:

- Traffic Calming

Typical Application:

Used on low volume sections < 1000 vpd.

Implementation Guidelines:

Used where loss of approximately two parking spaces is acceptable.

Design Suggestions:

- Can create cut-through for bikes to travel straight
- Need motorist transition area using signs and pavement markings

Cost:

$5,000 - $10,000

Illustration:

Strategy C-4

MIDBLOCK MEDIAN ISLANDS

Site Specific Element: Midblock

Issues Addressed:

- Traffic Calming
- Pedestrian Safety

Typical Application:

Generally used in conjunction with high visibility crosswalk (Strategy C-1) but can be used alone as traffic calming.

Implementation Guidelines:

On streets <44', used where loss of approximately two to four parking spaces is acceptable.

Design Suggestions:

- Utilize landscaping in conjunction with local input
- Option: non-raised median created with pavement markings and stanchions.
- Length and width of median will vary based on street width and site specific considerations.

Cost:

$5,000-$10,000

Illustration:

Strategy C-5

LIGHTLY PATTERNED PAVEMENT

Site Specific Element: Midblock

Issues Addressed:

- Traffic Calming
- Pedestrian Safety

Typical Application:

Used in school zones or high pedestrian volume locations.

Implementation Guidelines:

Used in conjunction with other tools to heighten awareness of school zone to create an more park-like ambiance - pedestrian zone where cars are permitted but not overbearing.

Design Suggestions:

Three options:

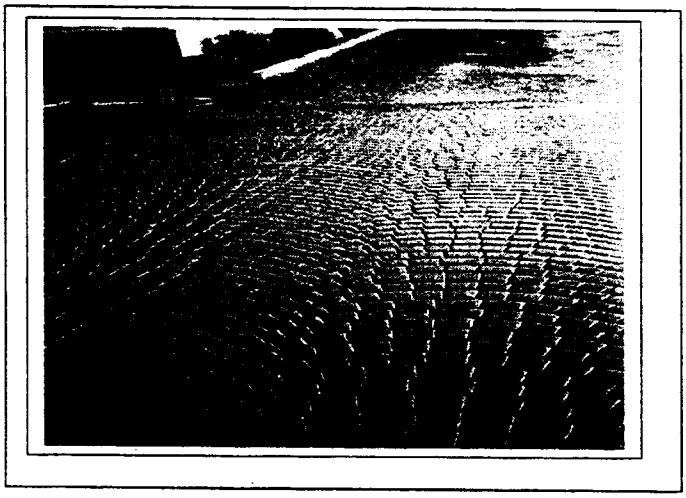
- Colored concrete pavers
- Imprinted asphalt (e.g. Street Print TM)
- Hot applied polymer modified synthetic bitumen based compound (e.g. Imprint TM)

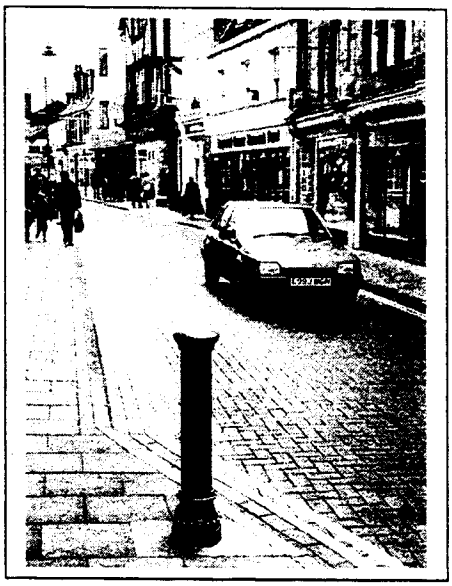
Note: the materials and/or treatment for asphalt pavement surface to add patterned effect results in shallow depressions which would not affect bike travel and in fact could be less slippery than new asphalt.

Cost:

Concrete pavers - $15 / square foot and $216,000 per city block (36 feet by 400 feet)
Imprint - $100/ square yard and $160,000 per city block (36 feet by 400 feet)

Illustration:





Strategy D-1

TRAFFIC CIRCLES

Site Specific Elements: At Intersections

Issues Addressed:

- Look and Feel
- Traffic Calming
- Pedestrian Safety

Typical Application:

- At intersections on bicycle boulevards with less than 2000 vehicles per day; and where bicycle boulevard traffic currently has STOP sign.
- At intersections with minor streets: place STOP sign on minor street only (D.1.1)
- At intersection of two bicycle boulevards: all traffic yields (D.1.2)

Implementation Guidelines:

- Use in consultation with local residents when STOP signs are removed on the bicycle boulevard.
- Use at consecutive intersections will improve the traffic calming effect.
- Place where unwarranted four -way
- STOP signs are removed.
- Place where neighborhood supports additional traffic calming.

Design Suggestions:

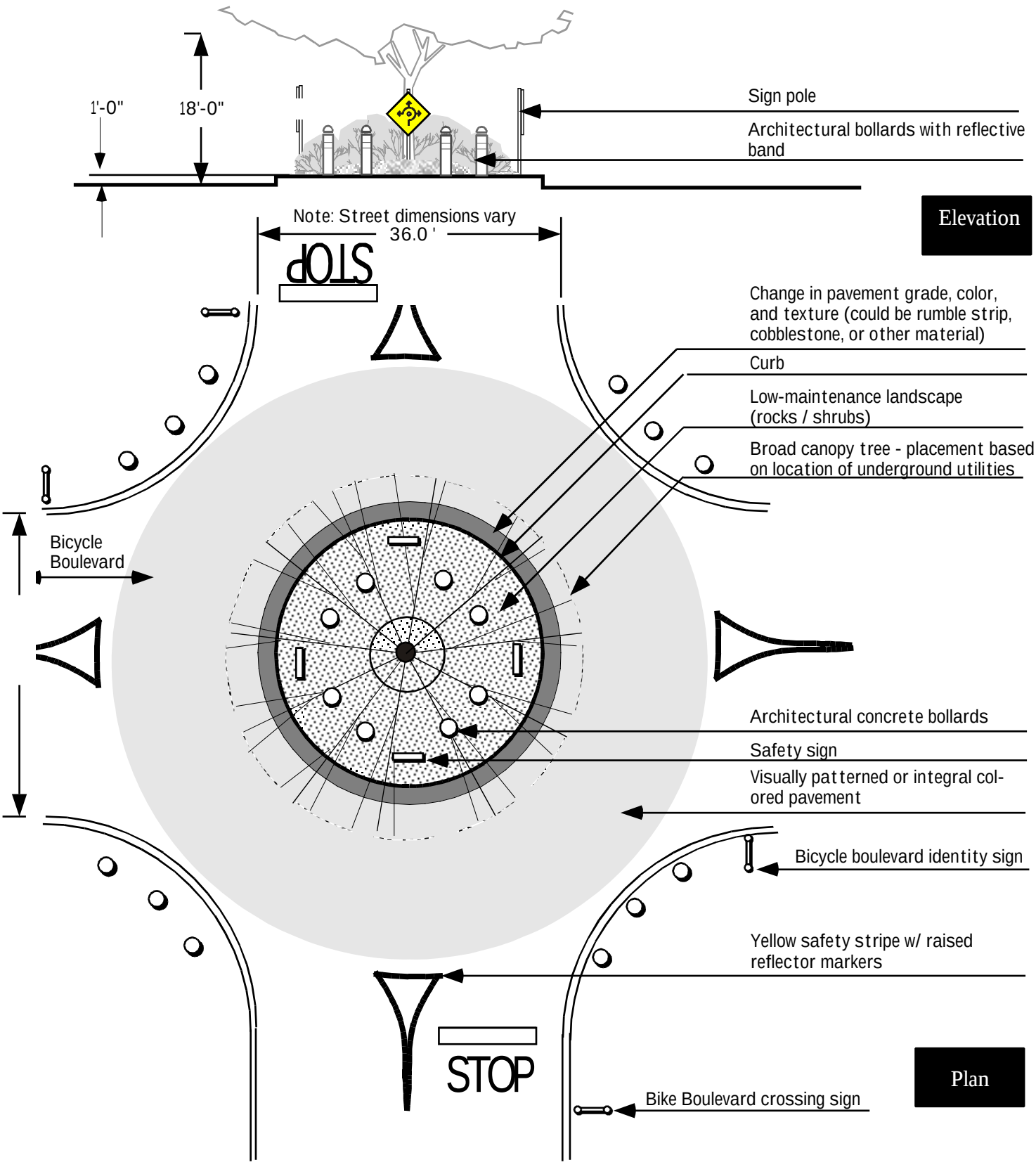
- Splitter islands on approaches
- Landscaping or patterned pavement to add visual interest
- Landscaping less than two feet in height or canopy above eight feet.
- Maintain adequate curb to curb width for emergency vehicles through the use of aprons/alternative pavement materials on edge of traffic circle.

Cost:

$20,000

Illustration:

See facing and following pages for typical sketches.



Intersection of Bicycle Boulevard and Minor Street

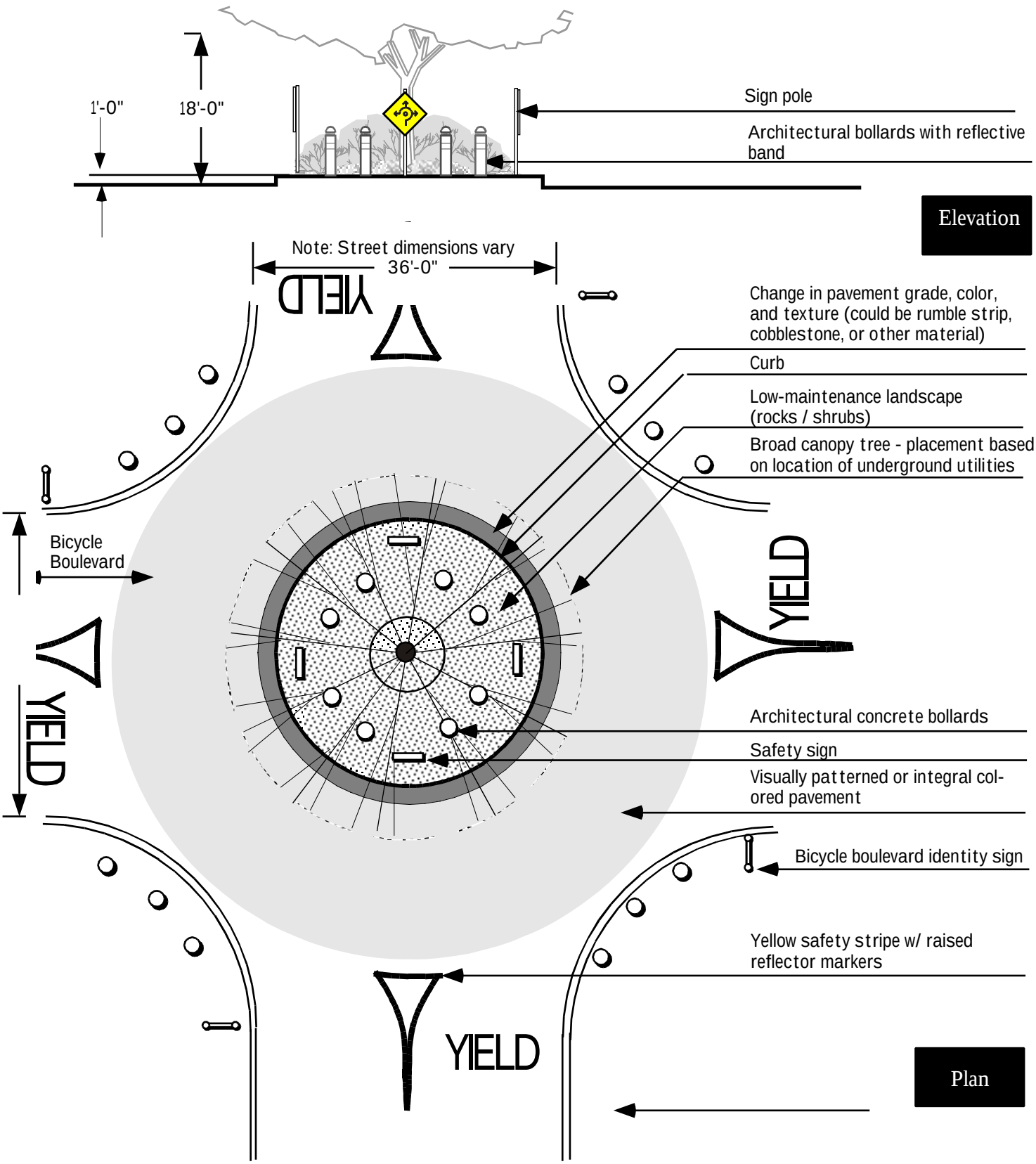
Berkeley Bicycle Plan: Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS • PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

Strategy
D.1.1



Intersection of Two Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS • PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.
12/29/99

Strategy
D.1.2

This page intentionally left blank.

Strategy D-2

BULB-OUTS

Site Specific Elements: At Intersections

Issues Addressed:

- Traffic Calming
- Pedestrian Safety

Typical Application:

- High visibility crosswalk.
- Intersection with major street.

Implementation Guidelines:

Generally bulb-outs at intersections do not result in loss of parking, but design will need to be sensitive to parking impacts in areas with heavy parking demand.

Bulb-outs should protrude only as far out as parking lane, generally seven feet.

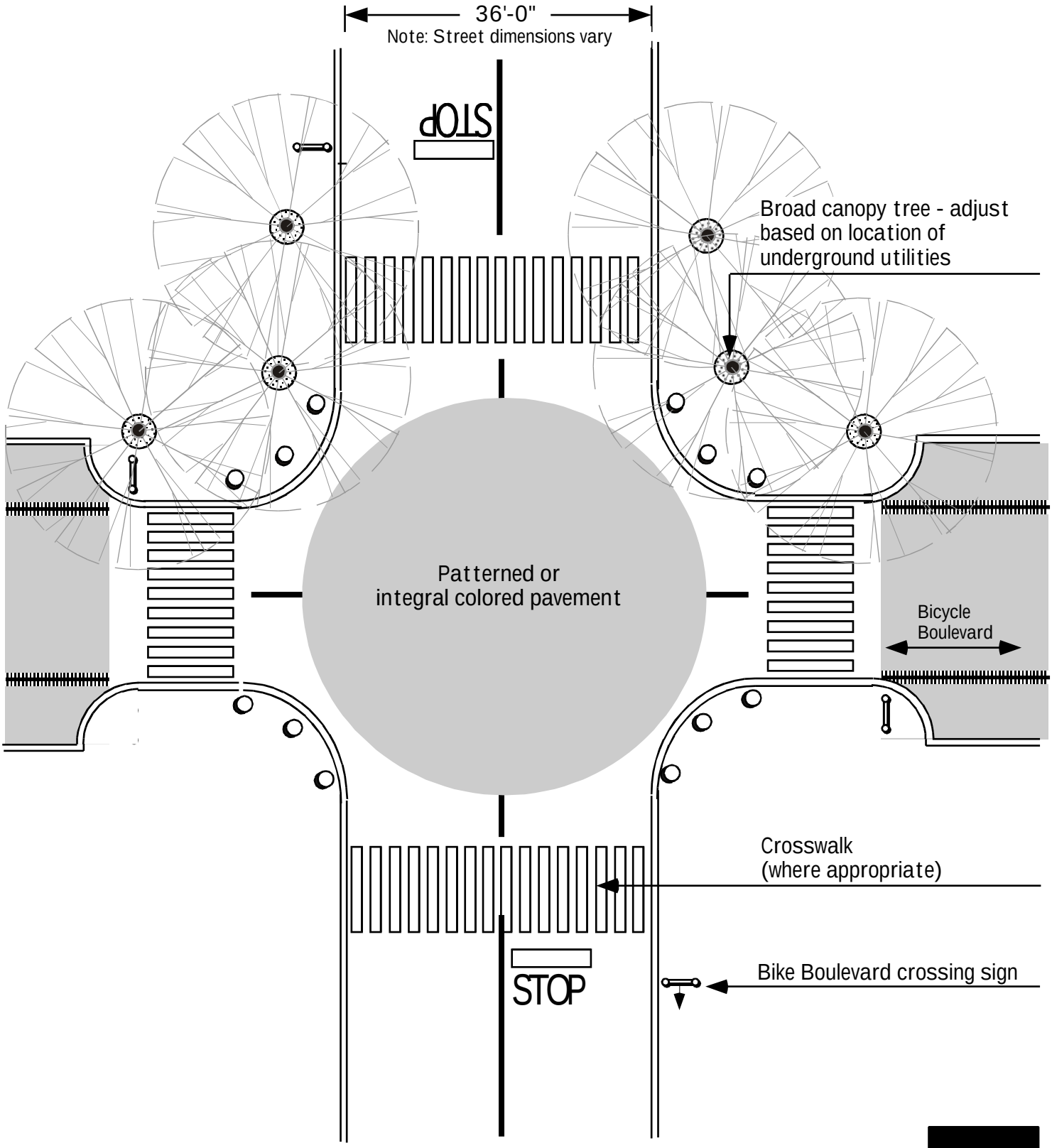
Design Suggestions:

Cost:

$5,000-$15,000

Illustration:

See typical sketch on facing page.



Plan

Bulb-Out: Bicycle Boulevard Intersection

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS • PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

This guideline is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to modification. Application of the design guidelines for specific street designs will be developed in coordination with affected local neighborhoods.

12/29/99

Strategy
D.2
D.4

Strategy D-3

HIGH VISIBILITY CROSSWALKS

Site Specific Elements: At Intersections

Issues Addressed:

- Pedestrian Safety

Typical Application:

Intersections near major pedestrian generators or at major streets.

Implementation Guidelines:

Crosswalk width will vary:
12 feet to 20 feet

Use at locations with existing high volumes of pedestrians: 100 + per peak hour

Design Suggestions:

- Use in conjunction with bulb-outs or center median.
- Color/patterns: use colored pavers or patterned/colored asphalt to increase visibility
- Option: Create pattern in crosswalk

Cost:

$5,000 - $20,000

Illustration:

Strategy D-4

SPECIAL DESIGN/LOGO WITHIN INTERSECTIONS

Site Specific Elements: At Intersections

Issues Addressed:

- Look and Feel
- Traffic Calming

Implementation Guidelines:

Can be used:

- Where, for whatever reason, a traffic circle is not desired; or
- Where a decorative paved intersection is desired to mark or commemorate something such as entrance to a school zone, a historical event, or a neighborhood entrance.

Typical Application:

On all bicycle boulevards where particular emphasis or attention is desired.

Design Suggestions:

Three options:

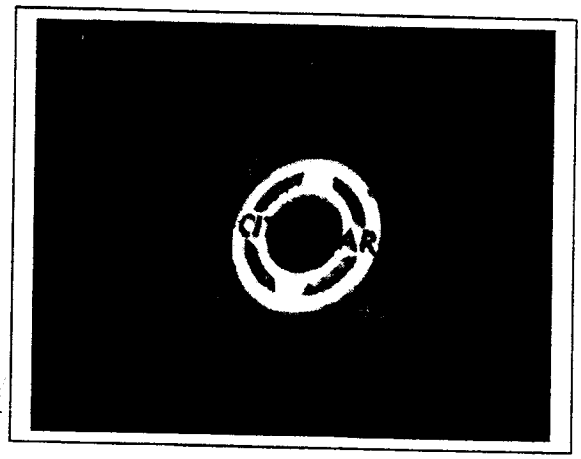
- Colored concrete pavers
- Imprinted asphalt (e.g. Street Print TM)
- Hot applied polymer modified synthetic bitumen based compound (e.g. Imprint TM)

Note: the materials and/or treatment for asphalt pavement surface to add patterned effect results in shallow depressions which would not affect bike travel and in fact could be less slippery than new asphalt.

Cost:

Concrete pavers - $15 / square foot
Imprint - $100/ square yard

Illustration:



Strategy D-5

REDESIGNED EXISTING DIAGONAL DIVERTER

Site Specific Elements: At Intersections

Issues Addressed:

- Traffic Calming

Typical Application:

Replace existing non-landscaped diagonal diverters

Implementation Guidelines:

- Develop final design in consultation with emergency vehicle operators.
- Design should allow easy through bike access, and emergency vehicle access.

Design Suggestions:

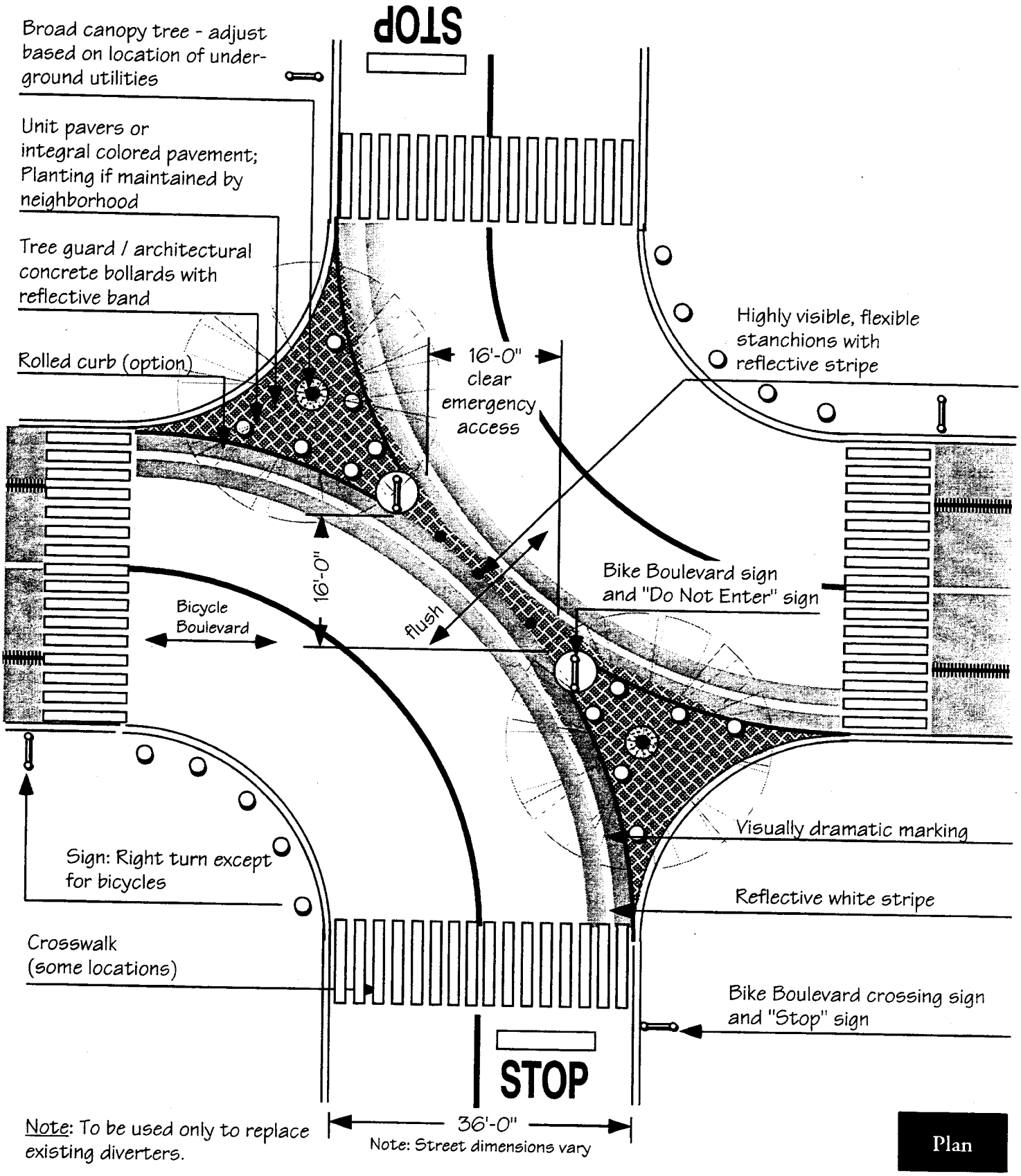
- Use landscaping and/or colored concrete pavers.

Cost:

$20,000

Illustration:

See facing page for typical sketch.



Note: To be used only to replace existing diverters.

Plan

Redesigned Existing Diagonal Diverter

Berkeley Bicycle Plan: Bicycle Boulevards

City of Berkeley
WILBUR SMITH ASSOCIATES
ENGINEERS · PLANNERS
in association with:
2M Associates, Landscape Architects
HPV Transportation Consulting

12/29/99

Strategy **D.5**

Strategy E-1

FOUR-WAY STOP CONTROL

Site Specific Elements: To Enable Or Help Bicyclists Cross Streets

Issues Addressed:

- Help crossing

Typical Application:

Intersections that are currently controlled by two-way STOP for the Bicycle Boulevard where ADT on the cross street is more than 4,000 and less than 10,000.

Implementation Guidelines:

STOP sign installation should only be used where it does not conflict with emergency response needs.

Design Suggestions:

Standard R1 STOP signs per Caltrans and City of Berkeley, with "ALL WAY" plates below.

Cost:

$600 (two signs plus STOP bar legends)

Illustration:

Strategy E-2

RAISED MEDIAN REFUGE ON MAJOR STREET

Site Specific Elements: To Enable Or Help Bicyclists Cross Major Street

Issues Addressed:

- Pedestrian Safety
- Help crossing

Implementation Guidelines:

- Median break allows cars across intersections as well as bicycles (example: Adeline Street)

Cost:

$10,000

Illustration:

Typical Application:

Intersection of bicycle boulevard with major street where existing traffic control is STOP signs for the bike boulevard and major street has adequate width for at least 8' wide median.

Design Suggestions:

- Minimum width of 8 feet
- Advance warning sign of "bike crossing"

Strategy E-3

TRAFFIC SIGNAL WITH TURN RESTRICTIONS FOR MOTOR VEHICLES

Site Specific Elements: To Enable Or Help Bicyclists Cross Major Street

Issues Addressed:

- Pedestrian Safety
- Help crossing
- Diversion

Description:

A traffic signal would be installed, but in conjunction with a turn-restriction for motor vehicles. An existing installation is Channing at MLK Jr. Way depicted below. Bicycles may proceed straight and a loop detector detects bicycles. Autos must turn right. A variation is to install a median across the major street which would not only force motorists to turn right but would also prevent left-turns from entering.

Implementation Guidelines:

Use where help crossing is needed and:

- where there is neighborhood concern that there will be traffic diversion to use the new signal to cross the major street and
- where forced right-turns are acceptable to the local residents

Cost:

$120,000

Typical Application:

Intersection of Bicycle Boulevard with Major Street where existing traffic control is STOP signs for the bike boulevard.

Design Suggestions:

- Provide minimum green phase of 8 seconds for bicyclists plus additional time for wide streets.
- Provide responsive timing: signal should change within 60 seconds of receiving detection. Where possible, consider more immediate response at non-peak hours.
- Provide separate pedestrian push-button with timing for pedestrian speeds. Where possible, add audible signals.

Illustration:

Strategy E-4

TRAFFIC SIGNAL: DETECTION FOR BICYCLES BUT NOT MOTOR VEHICLES

Site Specific Element: To Enable Or Help Bicyclists Cross Major Street

Issues Addressed:

- Pedestrian Safety
- Help crossing
- Diversion

Description:

A traffic signal would be installed, but it would only detect bicycles and pedestrians, most likely via the use of a conveniently located pushbutton, but innovative technologies could be pursued. The net effect is that access for cars does not change; they would still be able to cross but would be subject to delays in peak hours as they currently are. Cars would never activate a green light on their own. However, the signal would be activated as needed by bikes and pedestrians to cross the street. If there is a gap in traffic the bike/peds would not need to activate the signal, they would merely cross as they currently do under existing 2-way STOP control.

Implementation Guidelines:

Use where help crossing is needed and:

- where there is neighborhood concern that there will be traffic diversion to use the new signal to cross the major street and
- where access is desired to remain as is

Cost:

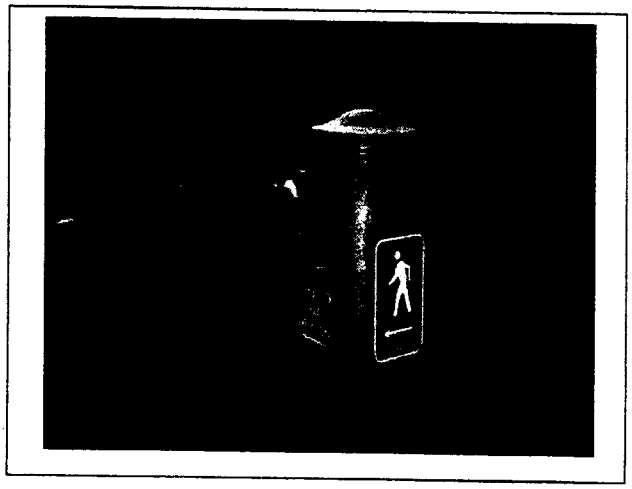
$120,000

Typical Application:

Intersection of Bicycle Boulevard with Major Street where existing traffic control is STOP signs for the bike boulevard.

Design Suggestions:

1. Recommended signal operation:
   - flashing red for bike blvd
   - flashing yellow for major street
   - when bicycle boulevard gets "green" signal, major street is "red."
2. Provide minimum green phase of 8 seconds for bicycles plus additional time for wide streets.
3. Provide responsive timing: signal should change within 60 seconds of receiving detection. Where possible, consider more immediate response at non-peak hours.
4. Provide separate pedestrian push-button with timing for pedestrian speeds
5. Where possible, add audible signals.
6. Use advance warning signs on major streets.



Strategy E-5

STANDARD TRAFFIC SIGNAL

Site Specific Elements: To Enable Or Help Bicyclist Cross Major Street

Issues Addressed:

- Pedestrian Safety
- Help crossing
- Diversion

Implementation Guidelines:

Use where help crossing is needed and local residents support a standard traffic signal.

Typical Application:

Intersection of Bicycle Boulevard with Major Street where existing traffic control is STOP signs for the bike boulevard.

Design Suggestions:

- Provide minimum green phase of 8 seconds for bicycles plus additional time for wide streets.
- Provide responsive timing: signal should change within 60 seconds of receiving detection. Where possible, consider more immediate response at non-peak hours.
- Provide separate pedestrian push-button with timing for pedestrian speeds.
- Where possible, add audible signals.
- Install bicycle detector loops at intersection.

Cost:

$120,000

Chapter 5
REVIEW OF IMPACTS OF TRAFFIC CALMING DEVICES

This Chapter reviews the impacts of selected traffic calming devices on traffic speed and volume, and also on collisions. The data in this Chapter comes from three sources: the recently published *Traffic Calming: State of the Practice* (1999) by Reid Ewing; the results of the Palo Alto Bryant Street Bicycle Boulevard project; and Berkeley's own Milvia Slow Street project.

The Chapter focuses on those strategies that are included in the toolbox in Chapter 4. In general, the traffic calming devices that are included in the bicycle boulevard toolbox are likely to have a small impact on traffic speeds and volumes on and near bicycle boulevards. This is in keeping with the design objective #2 from Chapter 1, which is to "minimize changes to existing traffic patterns on bicycle boulevards and adjacent residential streets." It should be noted that all of the seven bicycle boulevards now have at least one traffic diverter or barrier, and most also have speed humps. For this reason, traffic speeds and volumes were generally not identified as a high priority issue for improving bicycling conditions along most of the bicycle boulevards.

During the next phase of bicycle boulevard implementation, the City will work with neighborhoods to determine which strategies are desired for specific locations. At that time, more detailed studies will be conducted of the local impacts, if any, of the devices chosen for specific sites.

During the public workshops, some bicyclists and Bicycle Boulevard residents expressed a desire for traffic calming devices that would have more significant impacts on traffic speeds and volumes. Residents of bicycle boulevard streets, like all residents of Berkeley, may request new traffic calming devices for their streets, or alterations to existing devices. There are established procedures for some devices (such as new diverters). The procedure for requesting and installing other types of devices is being developed as the City develops a city-wide traffic calming program. Currently, the Traffic Engineering Division in the Public Works Department handles requests as they are submitted.

IMPACTS ON SPEED

Traffic calming impacts are highly variable, but it is possible to offer some generalizations, based on the Institute of Transportation Engineers' publication *Traffic Calming: State of the Practice* (1999), by Reid Ewing. According to Ewing, "speed impacts of traffic calming measures depend primarily on geometrics and spacing. Geometrics determine the speeds at which motorists travel through slow points. Spacing determines the extent to which motorists speed up between slow points." Table 5-1 shows the average speed changes associated with some of the measures that are included in the bicycle boulevard toolbox.

Table 5-1
85TH-PERCENTILE SPEED:
IMPACTS DOWNSTREAM OF TRAFFIC CALMING MEASURES

Measure	Sample Size	Average Speed (mph)	Average Change (mph)	Percentage Change (%)
Traffic circles	45	30.3	-3.9	-11
Narrowings	7	32.3	-2.6	-4

Note that these are rough estimates: standard deviations may be large, measurement methods and locations are largely uncontrolled, and some measures have small sample sizes.

Palo Alto found no significant changes in vehicle speed at four locations on its bicycle boulevard extension. Along this one and a half mile section, one full diverter was installed and forced-right turns were installed at a major street.

IMPACTS ON VOLUME

Volume impacts are even more complex and case-specific than speed impacts because they depend not only on local traffic calming, but also on the entire nearby street network, including the availability of alternative routes and the application of area-wide calming, and on the split between local and through traffic. Traffic calming measures are unlikely to affect local traffic unless they are extremely restrictive or severe. They can, however, reroute non-local traffic, either by preventing it (barriers), permitting but discouraging it (speed humps), or slowing it but causing minimal diversion (traffic circles).

Bicycle boulevards are generally associated with linear rather than area-wide traffic calming, so care must be taken not to divert excessive traffic to nearby streets. Diversion can be minimized by the proper choice of traffic calming measures, and by choosing bicycle boulevard streets near arterials that can serve vehicular traffic, as was done in Berkeley.

Table 5-2 shows the average volume changes associated with selected traffic calming measures. These should be interpreted with the same caution as the speed data.

Table 5-2
MOTOR VEHICLE TRAFFIC VOLUME:
IMPACTS OF TRAFFIC CALMING MEASURES

Measure	Sample Size	Average Change in Volume (Vehicles/Day)	Average Change in Volume (%)
Traffic circles	49	-293	-5
Narrowings	11	-263	-10

Street closures and diverters are the most effective methods of reducing volumes, but are not included in the toolbox. These restrictive devices can reduce traffic volumes by 35 to 45%. Street narrowings appear to have some effect in diverting traffic, while traffic circles reduce speed, but have minimal diverting effect.

Palo Alto found that traffic volume on its original bicycle boulevard remained fairly constant, except in the vicinity of two barriers, where it declined from 953 to 457 and from 481 to 170 vehicles per day. The traffic that formerly used this section was distributed among several nearby parallel streets each of which recorded increases of up to approximately 100 vehicles per day.

Berkeley reported decreases in vehicle volume from 540 to 441 and from 500 to 399 in two blocks of Milvia after traffic calming.

IMPACTS ON COLLISION RATES

Table 5-3 shows the impact of one traffic calming device, the traffic circle, on collision frequency as reported in *"Traffic Calming: State of the Practice."* These figures should again be viewed with caution.

Table 5-3
AVERAGE ANNUAL COLLISION FREQUENCY:
IMPACTS OF TRAFFIC CALMING MEASURES

Measure	Sample Size	Before Calming*	After Calming*	Percentage Change
Traffic circles (without Seattle)	17	5.89	4.24	-28
Traffic circles (with Seattle)	130	2.19	0.64	-71

* Average number of collisions per year.

Ewing reports that excluding the Seattle circles, collisions decreased after traffic calming devices were installed by about 25 percent. However, when the data is adjusted to account for the reduction in traffic volume along the streets, collisions declined only 4 percent. This indicates that the reduction in the number of vehicles on a street is what is primarily responsible for reducing collisions. Ewing also states that, "As for individual traffic calming measures, all reduce the average number of collisions on treated streets, but only 22-foot (speed) tables and traffic circles produce differences that are statistically significant. Including Seattle data, circles are by far the best performers."

Chapter 6
PRELIMINARY IMPLEMENTATION PLAN

OVERVIEW

This report represents the completion of the first phase of Bicycle Boulevard Implementation: the Early Design Phase. With the issues identified along the boulevards, and a toolbox of strategies for use on the boulevards, the next phase of implementation, the Detailed Design Phase, can take place. This phase will involve developing specific designs for the boulevards in conjunction with neighborhoods and bicyclists. As these designs are completed, or simultaneously as they are developed, the City will need to find funding to pay for the planned improvements. Specific design changes that affect how the street works will need to be approved by the City Council. This chapter outlines this implementation process. As the Bicycle Boulevard project moves forward, changes to this approach may be required.

IMPLEMENTATION APPROACH

Two broad strategies have been suggested for implementing the bicycle boulevard system. The first is a city-wide approach and the second is a neighborhood-based approach.

Approach 1 - City-wide

- Install signs and pavement legends along all Bicycle Boulevards.
- Install devices to help cross all major streets (would need a large grant to do all simultaneously or would need to develop a prioritization scheme).
- Install unique pavement treatment with scheduled repaving program.
- Remove selected STOP signs and replace one by one with alternate traffic calming (would need to develop a prioritization scheme).

Approach 2 - Neighborhood Based

Work with one neighborhood at a time, looking at all of the bicycle boulevard segments in that neighborhood. Address all the elements and issues along the bicycle boulevards in that neighborhood:

- Install signage and pavement legends.
- Install devices to help bikes and pedestrians cross all major streets.
- Install unique pavement treatment with or without scheduled repaving program.
- Remove selected STOP signs and replace one by one with other traffic calming devices.

Suggested Approach

Based on what was heard at the public workshops and the input of the Bicycle Subcommittee, it is recommended to take elements of both approaches. First, a citywide signing and awareness program is recommended. This citywide awareness program would consist primarily of signing and pavement legends.

The second step is addressing the most difficult streets to cross. The number of intersections that can be addressed will depend on the type of treatment needed and funding availability from local and grant sources. This process should involve local residents to select a compatible tool from Category E.

Finally, it is recommended to implement the remaining elements on one boulevard at a time, working closely with local residents. The remaining elements include: unique pavement treatment, and STOP sign removal and replacement with appropriate traffic calming devices. It would be most cost-effective to work with neighborhoods in the order that their streets are scheduled for repaving. This phase should also incorporate other neighborhood traffic issues as feasible.

PRIORITY RECOMMENDATIONS

The following recommendations are in priority order, following the suggested approach detailed above.

1. Install Signing and Pavement Legends on All Bicycle Boulevards

Preferred Strategy: Use city funds to get grant to install signs and legends citywide.

- Most likely funding source: city funds as local match to TFCA or TDA funds.

2. Devices to Help Cross Major Streets

Preferred Strategy: Obtain large grant to cover all signals needed.

- Most likely funding source: Safe Routes to School-Hazard Elimination

Alternate Strategy: Prioritize major intersections according to volume of ADT and volume of bike traffic.

- Most likely funding source: city funds as local match to BLA Account

3. Install Unique Pavement Treatment in Conjunction with Scheduled Repaving - See Table 6-1

Strategy: In conjunction with scheduled repaving for those scheduled within the next five years.

- Most likely funding source: city funds, TDA, TFCA

Strategy: Seek Grant funding for those scheduled for beyond the next five years.

- Most likely funding source: grant funding e.g. TLC

4. Remove Unwarranted STOP Signs and Replace as Needed with Traffic Calming Devices

Preferred Strategy: Work with neighborhoods when street is scheduled for repaving.

- Most likely funding source: grant funding e.g. TLC

5. School Area Safety Improvements and Improved Awareness

Strategy: Implement demonstration project on non-bicycle boulevard street; fine tune design details to be compatible with bicycle boulevard concept.

- Most likely funding source: Safe Routes to School-Hazard Elimination

RECOMMENDED PHASING PLAN

The total cost to implement the bicycle boulevards will depend on exactly which strategies are selected. These will not be determined until neighborhood-based meetings are held. However, the total cost of basic elements, i.e. signage and unique pavement treatment, which are applicable to all bicycle boulevards, can be estimated. The cost of traffic calming devices has also been estimated for each individual device, but the total city-wide cost will depend on how many and which devices are selected.

To help the city plan and program funds, including applying for grant funds, the cost to implement the basic elements *city-wide* is presented below along with the costs for devices to help cross major streets and a range of costs for implementing traffic calming. Cost estimates for individual strategies are presented in Chapter 4. These cost estimates were developed in conjunction with City Public Works staff to reflect the actual costs of recent projects.

- Signing and pavement legends: $600,000
- Colored pavement (one of the unique pavement options): $3,100,000
- Crossing major streets: $2,900,000

The cost of additional traffic calming could vary from $500,000 to $3,000,000 depending on the device and how school zones are treated. See the strategy sheets in Chapter 4 for estimates for individual strategies.

The cost per bicycle boulevard of just the basic elements, signage, pavement legends and colored pavement (one of the unique pavement options), is presented below along with the total cost (which includes site specific elements):

	Cost of Basic Elements $	Total Cost $
Bowditch/Hillegass	250,000	1,000,000
California/King	800,000	1,800,000
Channing Way	470,000	1,400,000
Milvia Street	530,000	1,400,000
Ninth Street	500,000	1,300,000
Russell Street	600,000	1,700,000
Virginia Street	560,000	2,100,000

Given the unlikelihood of being able to implement everything at once, a phasing plan for the next five years was developed. This phasing plan is partially based on the City's scheduled repaving/reconstruction program for city streets. Five of the seven bicycle boulevards, (all but Milvia and Channing), are scheduled to be reconstructed for some or most of their length in the next five years. The 1999 paving plan for the bicycle boulevards is presented in Table 6-1.

Table 6-1
SCHEDULED PAVING PROGRAM (ADOPTED 1999)

Street	Limits	Fiscal Year	Treatment
Hillegass	Woolsey to Ashby	unscheduled	-
Hillegass	From: Dwight Way To: Ashby Avenue	1999/ 2000	R
Bowditch		unscheduled	-
California	From: Hopkins St To: Cedar	2003/4	R
California	Cedar to Russell	unscheduled	-
King	From: Russell To: Ashby	2000/01	R
King	From: Ashby To: city limits	2001/02	R
Eighth	From: N. City limit To: Camelia	2000/01	R
Ninth		unscheduled	-
Russell	From: College Ave To: Claremont Blvd	2002/03	O
Virginia	From: 6th Street To: San Pablo Ave	2000/01	O
Virginia	From: San Pablo Ave To MLK Jr. Way	unscheduled	-

Virginia	From: MLK Jr Way To: eastern end	2000/01	R/S/O
Treatment: R= reconstruct; O=Overlay; S=Slurry; C=Concrete			

The following table outlines a recommended phasing plan to begin to implement the bicycle boulevards.

Table 6-2
RECOMMENDED FIVE YEAR PHASING PLAN

Fiscal Year	Actions	Responsible Agency	Cost $
Year 1 – 1999/2000			
	Finalize design and placement of signage and pavement legends	PW	Staff time
	Apply for grant to install city wide signing and pavement legends	AP	Staff time
	Apply for grant to install traffic signals to help cross major streets	AP	Staff time
	Apply for grant to do neighborhood wide traffic calming in conjunction with STOP sign removal	AP	Staff time
	Begin planning with lst neighborhood group	AP	Staff time
	Install signage and legends, with Hillegass repaving project in consultation with neighborhood group	PW	$30,000
	Conduct ADTs	PW	Staff time
	Conduct bike counts	BFBC/UC	Volunteer time
		Total Cost	**$30,000**
Year 2 – 2000/2001			
After receive grant	Install city wide signing and pavement legends	PW	$150,000*
After receive grant	Install traffic signals to help cross major streets	PW	$1,500,000*
After receive grant	Remove STOP signs and install traffic calming devices as needed	PW	$1,000,000*
Scheduled repaving program	Install unique pavement treatment with Eighth St. repaving project in consultation with neighborhood group	PW	$30,000**

Table 6-2
RECOMMENDED FIVE YEAR PHASING PLAN

Fiscal Year	Actions	Responsible Agency	Cost $
Scheduled repaving program	Install unique pavement treatment with King St repaving project in consultation with neighborhood group	PW	$135,000**
Scheduled repaving program	Install unique pavement treatment with Virginia repaving project in consultation with neighborhood group	PW	$230,000**
		Total Cost	**$2,700,000****
Years 3-5 – 2001/2004			
After receive grant	Continue to install traffic signals to help cross major streets	PW	$1,400,000*
After receive grant	Continue to remove STOP signs and install traffic calming devices as needed	PW	$2,000,000*
Scheduled repaving program	Install unique pavement treatment with Russell repaving project in consultation with neighborhood group	PW	$80,000**
Scheduled repaving program	Install unique pavement treatment with California repaving project in consultation with neighborhood group	PW	$75,000**
		Total Cost	**$3,555,000****

* Depending on grant funding.
** Costs for unique pavement treatment are based on colored asphalt costs, one of the possible pavement treatment options.
AP = Advance Planning, Planning & Development Department
PW = Public Works Department
BFBC = Bicycle-Friendly Berkeley Coalition
UC = University of California Students

OUTSTANDING ISSUES RAISED BY THE PUBLIC

Many issues were raised during the public process that could not be addressed in this document, either because they were outside the narrow scope of this study and/or they involved more time than was allocated for this study. These issues are important and should be addressed during the detailed design phase. Some issues may be the subject of a future detailed study. Some of these issues include:

- Improved street lighting for bike safety
- School area traffic congestion and safety issues

- Local traffic problems e.g. casual carpooling
- Desire for new full or half-diverters
- Coordination with other projects e.g. East Bay Greenway Project

COORDINATION WITH OTHER PROJECTS

There are many planned or potential projects that will affect the bicycle boulevards in the next five years. To be cost-effective and to optimize financing opportunities as well as to ensure that the bicycle boulevards help as many constituencies as possible, the next phase of the bicycle boulevard design plan should coordinate wherever possible with these projects. At a minimum, all interested stakeholders of these projects should be invited to all meetings and workshops and should be included all the mailings related to bicycle boulevard planning.

Planned or Potential Projects

- Bowditch/Hillegass
  - Alta Bates Neighborhood Quality of Life Study;
  - Repaving of Hillegass 1999/2000
  - UC Underhill Project (Channing to Haste)
- California /King-
  - East Bay Greenway – regional route Richmond to Hayward or even further south
  - Council-funded traffic circles at California/Channing and at California/Allston
  - Repaving
- Channing
  - Council-funded traffic circle at Channing/California
- Milvia
  - Civic Center project will add bike lanes in front of City Hall from Allston to Center.
- Ninth Street
  - Project underway for extending bike path from Heinz to Emeryville border. (mostly if not all funded)
- Russell
  - Repaving
- Virginia
  - Repaving
  - EBMUD water line to be installed.
  - Repaving

School Area Studies

In addition, there are many schools located on the bicycle boulevards, each of which could justify a detailed traffic study of its own. The next phase of the bicycle boulevard design plan should attempt to

coordinate with and consider school traffic issues. A list of all public schools is included below; this list also includes some private schools:

Schools Located along Bicycle Boulevards

- **Bowditch/Hillegass**
  - University of California (at Bancroft)
  - Willard Junior High (between Derby and Stuart)
- **California/King**
  - Longfellow Elementary School (between Derby and Ward)
  - Malcolm X School (between Ashby and Prince)
- **Channing**
  - Berkeley High School (between Milvia and MLK Jr Way)
- **Milvia**
  - Private School: St. Mary Magdalene School (at Berryman)
  - Arts Magnet Elementary School (between Milvia and Shattuck)
  - Berkeley High School (between Allston and Channing)
- **Ninth**
  - Columbus Elementary School (between Allston and Bancroft)
  - French American School (at Tenth and Grayson)
- **Russell**
  - Le Conte Elementary School (between Fulton and Ellsworth)
- **Virginia**
  - Franklin Elementary School (between San Pablo and Curtis)
  - Arts Magnet Elementary School (between Milvia and Shattuck)
  - Private School (at Milvia)

MAINTENANCE OF BICYCLE BOULEVARDS

The seven bicycle boulevards will need maintenance of their many components. However maintenance costs can be reduced in some areas by the careful selection of materials and practices. These often incur a higher initial capital cost, but are cost-effective in that they reduce maintenance costs. Therefore, wherever the tradeoff can be made, the design guidelines in Chapter 4 have suggested methods that reduce maintenance costs. For example, pavement marking tape has been shown to last as long as the pavement itself, about fifteen to twenty years. It also is the least slippery material. For these reasons, it has been selected as the first choice, and paint, which usually lasts only two years, is not recommended. Also, only colored asphalt integral to the pavement has been recommended rather than surface sealers which would need reapplication every few years depending on traffic levels. Other components such as signs, thermoplastic pavement markings, and traffic signals would need to be maintained through the city's existing maintenance programs.

MONITORING PHASE

After the installation of the bicycle boulevard strategies described above, an evaluation of the impacts will need to be made. Especially when STOP signs are removed, traffic volumes and speeds should be monitored to ensure that the street has not become significantly more attractive as a through route for motorists. The following strategies could be used if desired by the neighborhoods after the evaluation phase, to address any potential impacts, including to prevent diversion if necessary:

- Turn restrictions from major street.
- Diagonal Diverters (bikes exempted).
- Forced Right-Turns (bikes exempted).

Summary of Comment Sheets Asking:

"Do You Have a Comment?"

General Concept of Bicycle Boulevards

- Solve the real problems first and foremost. For example, the very hazardous intersection of Milvia/University. Do not expend 90% of everyone's effort on 10% of the problems.
- Vision of bicycle boulevard is good idea; cyclists can use them without fear of traffic.
- Flow of traffic should be continuos for bike riders; Interruptions in flow are o.k. only at intersections with major motor- priority streets, i.e. Ninth and University
- I like the idea of thorough fares that are designed for bike travel.
- Empower cyclists and get folks out of their cars and onto bikes.
- Montreal was voted most bicycle friendly city in N. America by bicycling Magazine; contact them for info on both design and plans.
- BART needs to be brought on board early. They changed their 'casual commute' policy 18 months ago and now the changes severely impact Virginia, between Sacramento and Acton. To date, neither BART nor the city has responded to this problem. Involve BART in this project because it has potential.
- Would bicycle throughway be a possible name?

Safety Considerations

- Do not confuse bicycle planning with pedestrian planning. Sometimes the two groups' interests coincide, but often they conflict; in Berkeley's recent experience, several pedestrian-oriented features (sidewalk bulb-outs) have created obstructions and significant new hazards for cyclists. Other features that narrow lanes and/or intersections could intensify conflicts between cyclists and motorists, or cyclists and pedestrians. There is no automatic harmony between bikes and pedestrians – please keep this process "top-down" and focused on its original mission of planning for cyclists' safety and convenience.
- Education and enforcement is important. Put out a brochure on obeying the rules of the road as a cyclist.
- All vehicles must obey the same set of traffic rules. Stop signs that are not obeyed by everyone are useless.
- I would be happier if everybody is enforced.

- Many children walk to school on Virginia just east of San Pablo and Kenney Park – they need to be considered.
- 9th St. "as is", between Delaware and Hearst, is not a safe environment for cyclists or pedestrians. Also, 9th between Delaware and Hearst is not low volume.

Specific Design Suggestions – Share the Lane Concept

- I like sharing the road concept and I would even support allowing two- abreast cycling if possible.
- YES! Bike lanes next to parked cars is dangerous.
- Share the lane idea…Dangerous!
- More education for cyclists, drivers, and pedestrians on sharing road and obeying law.
- Cars should move at bike speed on bike boulevards. Bikes should be able to ride in the middle of the street.

Specific Design Suggestions – Traffic Calming Concepts

- Montreal-style 2-way bike lanes, safely separated from vehicle traffic by car parking.
- Should not use too much signage.
- Traffic circles may be the best option for slowing both bicycle and auto traffic.
- Plantings in middle of road make street more beautiful.
- Bulb outs and large planting at intersections are typically hazardous to all users. (See what they did wrong on Solano and Albany).
- No striping or roadway coloring that designates the area of the roadway that bicycles are allowed to travel on. There are many road hazards (i.e. glass, parked cars, etc.) that require cyclists to use other parts of the roadway. If there is coloring, cars will be less likely to expect you to move to their part of the roadway and will overtake you without giving enough clearance.
- Traffic diverters in Berkeley are extremely dangerous and should all be re-designed, perhaps with traffic circles.
- Any increase in plantings must build in funding for long term maintenance.
- Mid block crossings, are you nuts?
- Signage: put it on pavement, edge of row at curb, across the street, and banners to begin a bicycle boulevard.
- Night lighting for bikers, especially at intersections.
- King St. would be an excellent addition to the bicycle boulevard network.
- Bike lanes need to be cleaned too (glass, trash, etc).
- No lanes, bikes go too slow, run red lights all the time
- Do not experiment, or rather continue to experiment, with alterations to Public facilities which are causing damage to humans. A variety of vertical deflection devices have caused injury to a variety of disabled and able-bodied people. Experiments should be undertaken, and quantified, by professionals on 'test facilities' not on public rights of way.

- I am very concerned about removing stop signs….all should stop. Kids, elderly and walkers would be endangered by bikes speeding through neighborhoods.
- No on Speed Tables.
- Channing Way bike lane at MLK is terribly designed, the biker must veer into the center of the lane to cross. Drivers must veer to the right. Conflicts are not managed.
- Removing stop signs does not seem consistent with pedestrian safety goals.
- Bulb outs are best for pedestrians to get across streets onto buses. They block bikes into traffic- or, if they are designed to let bikes pass through, conflicts with pedestrians are likely. Plus, how do you deal with ADA regulations if you design a channel for bike wheels though the bulb out?
- In Boulder, Co, there used to be four lane streets where the outside lanes were for bike riders. Motorists did not respect this and the city turned the outside lanes into shared lanes.
- I like the idea of more stop signs and reduced speed limits.
- Don't repeat mistakes of earlier traffic calming, do not forget enforcement, do not let other neighborhoods suffer.
- A modified Diverter would not work without stop signs. Currently, cars drive on the sidewalk to get around diverters.
- I like the idea of colored pavements for BB's to distinguish where cars and bikes belong.
- In our group (3) an interesting idea came up…cares have a single lane in the center, with a 5 foot wide "rumble strip" which they would straddle (when there is no oncoming traffic). For oncoming traffic, they could have space to go to their right, but when the rumble under one set of wheels would discourage them from staying there long, thus leaving side space usually available for bikes.
- In all places possible, I would like bike lanes.
- I prefer very a slight rise over street than a rumble strip which is hard on bicycles
- What about using turtles and Bott's Dots to slow cars down in mid block, as an alternative to speed bumps.
- If Public Works will be implementing any of this change- keep it simple…signs and paint only. These people are essentially unskilled. If the SACTO media is a model of their work, I don't want any of it. Poor design, maintenance.
- Traffic circles may be best way to slow traffic.
- More signs to inform the people.
- Instead of removing stop signs on BB's, simply add a yellow sign below, BIKE YIELD.
- Get Green Machine or bigger one to pick up glass at least on designated bike lanes and in gutters. This will in turn encourage more cyclists to use their bikes.
- In Woodland, CA, on the bike paths they have a 4 foot pole next to the curb at intersections with traffic lights. The bicyclist does not have to dismount or get on the sidewalk to activate the light. Could we have these in Berkeley?
- Remove vertical Deflection Devices from the tool kit.
- Extend reflector in pavement for night "notification".

- Check with bicyclists in areas that have traffic circles. They are bad for bikes. For more information on a failed test in Santa Cruz, please call: People Power @ 831-425-0665

Relationship to Neighborhood Conditions

- Need to take into consideration input of neighbors on street, feelings and opinions
- Major traffic flow changes must be coordinated with the neighborhood. Parking concerns are very important to neighborhoods.
- Don't want convenience of cyclists to interfere with the convenience of residents on bike boulevards.
- Big streets need same attention as little streets.
- Do not reduce parking
- Stop signs must be obeyed by everybody! (AND Enforced)
- I am specifically concerned about heavy traffic at 9th and Delaware. Our street is dangerous and has become an extension of San Pablo; this is wrong for a residential neighborhood.
- Please do not make a bad parking situation even worse.
- My main concern is the intersection of 9th and Delaware. It is very dangerous, especially from 7 to 9am and 4 to 6pm, this intersection will become even more dangerous with increased bike traffic.
- WestBound Delaware and Northbound 9th need to be slowed. Currently, cars turn the corner at high speeds and cross the center line very often. This is very dangerous to cyclists and pedestrians. Delaware is a major pedestrian access st. going to 4th st.
- Concern that if the bike lane is separate, might not be wide enough to accommodate the opening of car doors.
- Leave street alone, keep all parking.
- 1300's block of Channing have these problems:-truck and car traffic from clogged Dwight.
- After struggling for years to get stop signs, we finally have some improvement and we do not want our signs removed.
- Have you tracked the amount of Bicycle use currently on the proposed bicycle boulevards? Will you measure the increase? How, and at what intervals? What will you do with this info? For example, Milvia is used less now because of the speed bumps.
- More bike safety between Hearst and Delaware on 9th St.
- Presence of 2 churches, 9th and Hearst, greatly affect traffic on Sundays.
- Any major traffic flow changes must be coordinated with the neighborhood, not city wide meetings.
- Make all vehicular movements customary, uniform and conforming to the same vehicular code.
- If bike boulevards add more trees and landscaping and do not delete too much parking, I will be pleased.

- Consider mid-block controls will slow down traffic, such as Annie's Oak.
- Should involve neighborhoods by creating contracts where the neighbors are in agreement.
- Make changes on Cedar/San Pablo and University/68th, too much traffic.
- Neighborhood needs to participate to make the idea work.
- Trees in middle of street, create medians with trees

Other

- Respect the access needs of all members of Berkeley's Disabled community.
- Insure that consultants and subcontractors treat disabled participants in public meetings in the same respect as all other participants.

Summary of Comment Sheets Asking:

"Do You Have a Comment?"

General Concept of Bicycle Boulevards

- The name bike boulevard has a built-in bias. It explicitly says not for motorized vehicles. Is that the hidden agenda? If not, change the name.
- Please provide evidence, if there is any, that bike boulevards increase cycling. If there isn't any, consider canceling the project.
- Adherence to existing traffic laws by drivers and cyclists would greatly improve safety for pedestrians and cyclists.
- Bike boulevards are a terrific concept – if we can make them work.
- Strongly support bicycle boulevard and other improvements to support safe, convenient bicycle use.
- Bike boulevards should enhance the neighborhood to promote the feel of a community where people have concern for pedestrians and cyclists.
- Bike boulevards should be made attractive to cyclists because they are faster and safer. If the streets are colored and signed, but they aren't any faster/safer, bicyclists won't use them. People in cars don't use Ashby because it has State 13 highway signs, they use it because it has lights at major intersections and no stop signs. Bikes will use bike boulevards if they provide real advantages.
- Try to stop being "planners" and be a bicyclist. Real bicyclists are overwhelming concerned about crossing arterials and avoiding stop signs. Only when specifically dragged toward "bulb-outs" and "textured pavement" do people start having opinions in these areas.
- Need to maintain existing parking.
- Need to maintain idea of shared use and also lower speed limit for cars.
- I love the bike boulevard concept. I think public awareness and good identification of these boulevards is key for safety.
- Please do not take neighborhood parking away.
- Bike boulevards are a great idea, so long as it is made clear that folks aren't made to think that bikes won't be present on other streets.
- I think it's critical that the bike boulevards be very distinct – both visually and functionally – from other streets so this effort will be worth something. And so Berkeley can set a strong example for the rest of the country. We have an incredible and exciting opportunity here. Thank you.

- Anything that slows or calms traffic would make the neighborhood nicer and safer for residents, bikes, pedestrians and children.
- I think the most important things that can be done to make biking safer and more convenient are making it easier to cross major arterials by adding lights or stop signs, and taking out stop signs along the boulevards.
- I don't think educating drivers to "share the road" is that important – for the most part, I think people are already very considerate! A lot of the signage and paving ideas look very expensive. I think for the most part, traffic calming ideas should be considered only as a compensation to prevent increased traffic when stop signs are removed. The best and easiest way to d this is probably barriers – and many of the bike boulevards already have them. Traffic circles and some of the pavement ideas look like they would slow cyclists down – not the point! And I definitely want to ride faster than 15 mph; I don't think we need to lower the speed limit. Overall, I think we would do well to follow the example of Bryant St in Palo Alto.
- I like the idea of bicycle and motor vehicle traffic using the same lane, however, I do not enjoy being made to sit in motor traffic that I do not cause. It is unhealthful and reduces the time saving benefits or riding. Further, motorist must be taught that bicyclists do not disappear after they are passed.
- Bicycle boulevards are generally good.

Site Specific Comments

- If there are traffic circles at Channing/Allston along California street, cars will be tempted to speed up in between, especially at Bancroft and California St. If the stop sign at California and Bancroft is removed, we need another traffic circle at Bancroft and California as well – so the traffic stays slow.
- I frequently ride uphill on Channing, and would love to see some of the four-way stops removed. Not all though, because otherwise Channing would prove a bit too much of an attractive alternative to Dwight.
- A grade-level bike only crossing of railroad at Heinz into Aquatic Park and bike path to parking lot would improve access to Emeryville.
- My main concern is Russell Street, especially between Shattuck and Telegraph. I have two children and soon they will have to cross both major streets to get to Willard JHS and Berkeley High. I would like for them to be able to ride their bikes there, which will necessitate bike friendly signals. Let's get creative – I like the idea of signal lights that stay red for cars but go green for bicycles and pedestrians. Maybe they should be motion/bike pressure-detected so they only change when needed. But most importantly, let's do everything – texture, colors, signage, traffic circles, stanchions, speed limits, bulb ins and outs, etc – to slow and deter traffic on Russell.
- Extend 9th St on rail right of way across Ashby into Emeryville.
- Parking is very difficult on Russell in back of Berkeley Bowl, traffic need calming around Russell, Adeline, Ellsworth, Shattuck and Telegraph.
- Please correct spelling of Newbury Street located between Russell and Ashby.
- As a resident on Channing, I will oppose any move to remove stop signs.

- We are concerned about any removal of parking, especially along one whole side of the street.
- Concerned about more signage on Channing St.
- Should consider oblong circles on California St.
- Virginia from MLK to the diverter at McGee currently has no stop signs and so traffic currently travels very fast.
- I like circle at Woolsey/Regent for int. calming.
- Traffic island at Buena and California to slow traffic and define pathways.
- Milvia cost $450,000 for something like six blocks. There simply isn't enough money to repave every street in six colors with bulb outs and signs and traffic circles. These are planner favorites which are rarely of interest to cyclists. We get enormously expensive "demonstration" projects which have no regional impact.
- Bowmanite is tough to ride a bike on.
- Telegraph and Russell – Telegraph should have an 8-foot median. This shouldn't encourage additional auto traffic but will make bike crossing 5 times easier.
- There is a real problem at Virginia and McGee with diverter – not safe for bikes or pedestrians.
- Anxiety that Russell will become a freeway for motorists with signals at intersections. Please do not make it easy for motorists to use Russell as an Ashby alternative.
- Convert at least some of the one-way streets that intersect Bowditch-Hillegass to two-way. Bicyclists chronically go the wrong way on one-way streets: dangerous to pedestrians and cyclists and unnerving to motorists. For law-abiding cyclists, one-way streets require inconvenient detours.

Variations/Comments on Existing Concepts in Toolbox

- No raised intersections, speed tables or speed humps.
- Has anyone explored the idea of putting bike lane in the middle of the street with nice wide striping on both sides?
- Traffic circles, colored pavement, striping and signing would all help. More street trees would also create a quieter neighborhood feel.
- Are non-warranted stop sign removal permitted by state vehicle code?
- Circles would be appreciated.
- No texture on the pavement (uncomfortable and low-traction).
- Bike only yield signs can be useful on boulevards.
- I encourage strongly the treatments that make it obvious that cyclists are supposed to be in the street (not against the curbs or car doors).
- I think it's a great idea to add circles in place of stop signs, and bike/ped lights with right turn only for cars at busy intersections, especially Russell and Telegraph, and Russell and Shattuck.
- I like slow speed limit (15 mph).
- Putting circles/bollards, etc. in the middle of Berkeley's intersections can aggravate car/bike conflicts. I remember the cursed one that used to be at Hillegass/Parker, for example.

- Include in the toolbox the selective use of diverters and especially, semi-diverters. For instance, consider installing semi-diverters on Hillegass at Parker and at Stuart and Russell.
- The following are important in a bike boulevard: no stop signs, bike actuated signal for crossing major intersections, smooth pavement, slow auto traffic.
- Textured pavement dangerous for bicycles. Subtle raised bumps (like at edge of BART platforms) might be okay, but examples shown on slides (grooves in pavement) are bad.
- Thoughtful, aesthetically pleasing design will improve neighborhood, i.e. street trees, improved look of diverters, nice asphalt color (subtle, yet distinct), a good looking bike boulevard sign (like the scenic highway California poppy sign, for example).
- I worry that special bike boulevard signs will suggest that special road sharing rules apply on these streets only but not other streets.
- Financial cost of landscaping and maintenance of landscaping to be done by whom? Same questions about upkeep of colored pavement and signs.
- Unwarranted stop signs for bikes must be removed if the bike boulevards are to work properly. Otherwise, some bikers will avoid the bike boulevards and most others will continue to run the stop signs just as happens now. Resolving this dilemma – by finding appropriate alternative traffic calming measures – is the central challenge of designing the bike boulevards. Making motor traffic move at a steady but slow speed is better for the environment too.
- Lighting and reflective aids to help with night riding.
- Favorable to colored pavement and lane separation.
- Landscaping to promote traffic calming.
- Concerned that with no stripe bikes will head into traffic on shared streets. Still need to maintain lanes!
- Signals need to be bicycle friendly such that bicyclists do not have to dismount to push buttons, sensors should be bicycle sensitive, bicycle sensitive areas be clearly marked, need early bicycle sensor at 1/8-1/4 block in advance of signals, on non-synchronized signals early sensors should give bicycle a green when intersection is reached, and early sensors should ignore cars.
- Improve signal timing city-wide to encourage cars to use arterials and stay off residential streets and bicycle boulevards.
- Improving street lighting – attractive, pedestrian scale lights – on bike boulevards has a threefold benefit: better for cyclists, better for pedestrians and it would be an important "carrot" to offer neighborhoods for safety, in tandem with bike specific improvements.
- On streets without bike lanes, bulb-outs are good, particularly in ped-intensive places (i.e. LeConte School).
- Colored pavement is a good general idea. Raising prominence, visibility of bike boulevards is good not only for the use of existing bicyclists but also for encouraging more widespread bicycle use. Much of the discussion this evening has centered around the problems of frustrated car drivers (i.e. can't find parking at the Berkeley

Bowl), but on one really addressed the essential problem: too many people are using cars.
- Signage on boulevards should be placed mid-block, not at intersections where other signage already exists. Cluttering of signage can be confusing. At intersections pavement differentiation should be striking enough to remind motorists.
- Where 4-way stops are removed to accommodate bike flow, circles need to be inserted.
- As often as possible, landscaping/plantings should be incorporated to enhance the overall beauty of the boulevard and neighborhoods.

New Concepts (not in the toolbox)

- Berkeley High School students have requested/suggested that bikeways be physically separated from cars (the way sidewalks are). This seems especially worthy of consideration in high-traffic areas, e.g. Milvia and Channing downtown. This strategy has the following advantages: cars can't hit bikes, bicyclists feel safer, drivers may feel safer from unpredictable cyclists, and cars can't park in bike lanes.
- Explore sandwich islands at 4 way stop signs just devoted to a bike.
- You have clearly not considered a big proposal from the Sept 16 meeting, namely a circle with bicycle passage through its center and diversion of motorized traffic around.
- What about gradual speed bumps? They could be really useful like in Oakland on 63rd St.
- We need on-street bike parking throughout the city like on Center St near Oxford. One on every block!
- How about a set of tire-popping spikes that emerge from the roadway when a car exceeds 35 mph?

Comments on the Workshop

- Workshops should be more "top-down". Should start by reviewing public comments made at past meetings so that information doesn't evaporate. Problems identified on the bike boulevards should drive the solutions, not vice versa.
- The male consultant should either learn to run workshops more productively and less confrontationally, or allow a city staff person to run them.
- Please do not try to dictate the scope of meetings/"toolbox" or to discourage the public from suggesting new ideas.
- Please do not convey a general tone of hostility, defensiveness and unreceptiveness. Public input is the whole point of these meetings – not a problem to be prevented.
- Use of telegraph post for important notices of meetings is very ineffective! Notices should be mailed to neighborhood groups.
- Personal opinion of staff and consultants should not scuttle popular citizen ideas.
- I have concerns about the way the meeting was conducted. A variety of technical traffic engineering concepts were presented and people were led to comment on these

concepts. At no point were any cost estimates presented. This is like asking BART riders if they would like 24 hour service with 3 minute headways. Of course, everyone will say yes if cost isn't mentioned. Leading people toward extremely expensive traffic engineering solutions allows planners to claim that people want their pet methods, but unless cost is discussed, realistic discussion is impossible.

- We are at risk of wasting a lot of money and wasting many people's civic energy and coming up with something that does not actually result in increased bicycle trip share.
- The synopsis of the "group opinion" ignored the spontaneous discussion of intersections and discussed planner issues as if they were mainly what people are interested in. I strongly disagree with the synopsis.

Summary of Comment Sheets Asking:

"Do You Have a Comment?"

General Concept of Bicycle Boulevards

- I am very supportive of bike blvds, lanes etc. My only concern is that parking not be removed from my neighborhood – specifically. We are so impacted by limited parking because of our proximity to major bus lines and shopping areas. Also, several houses (including mine) were built before cars and driveways so there are none. Our only parking is on the street.
- Bike blvds require vehicular traffic for neighborhood/residential parking only where possible. Only allow neighborhood traffic in for parking.
- Schools must be more seriously considered. On Virginia St – Arts/Magneta and EBSA have so many drop off and pick ups that bicyclists may actually be endangered.
- I strongly support the concept of bicycle blvds. Safety is a primary concern, although bicycles should be excepted from stop signs on bike blvds. Trees shouldn't block street lights (eg. Addison/McKinley). I believe real estate values on bike blvds will improve. I love the graphics of bike blvd proposals – I am not that picky as long as it serves the purpose of making the blvd noticeable to both cars and cyclists. Foliage in the curb (between sidewalk and street) shouldn't be permitted to block bike lanes/blvds.
- I prefer the simpler Palo Alto style design wherever possible.
- Great activity, wonderful goals for the City. I live on the corner of California and Harmon – the part of California currently slated to continue as a bike lane, rather than as a bike blvd. As a homeowner, I like the idea of living on a bike-transited thoroughfare, and indeed as a non-car-owner, I depend on my bike for getting around.
- As a resident living right on Virginia St, I don't care for any changes. No bicycle blvds please. I was a student at UCB and I rode my bike around Berkeley quite a bit but I never had problems getting around Berkeley. Now, I drive more and parking is my biggest concern. There are enough quiet streets in Berkeley for bicyclists to get around the town. I think we need to work on getting the bicyclist going across the major intersections such as Sacramento, Shattuck and San Pablo safely and not making long stretches of streets into bike boulevards.
- I have a strong preference for the bike blvds to include bike lanes. You show these in drawing numbers 2 and 3. They would be much safer than streets where the street is shared.

- Shared lanes sound like a good idea but unfortunately bicyclists in Berkeley are rude and arrogant and drivers, who are rude and arrogant, retaliate so – the bikes will hog the streets, drivers will be angry at not getting around, and a very dangerous situation exists.
- Traffic enforcement is non-existent in Berkeley now. This big plan is going to be a typical Berkeley mess unless some funds are allocated for enforcement.
- It would help immensely if cyclists were somehow more considerate of pedestrians and cars (which really are here to stay!) and had to follow the already established laws.
- I wonder if there are any numbers on how many cyclists are primarily going to and from the university. I imagine it's a huge percentage. Are we putting out all this money without any help from UC, who are primarily to blame for the terrible traffic problems we have in Berkeley?
- I dislike the "share the lane" concept because I'll have to slow to bicycle speeds if a cyclist doesn't have the courtesy to pull right. If you do this, it needs to include an ordnance to require cyclists to pull over if they are slowing cars down – just like the slow vehicle rule for highways.
- Regarding your comment that on some streets it is not possible to double-line bike lanes because their widths would then be too narrow – this is crazy – if the point of bike blvds is to make biking attractive and safe, then no bike blvds should be designed in a way that is not absolutely safe (i.e. for streets where car doors currently open into bike lanes, "conversion" to a bike blvd has to include redesign that will make biking on that street safe for everyone).
- How can you go through this process without widening the emotional gap between motorists and cyclists?
- Incorporate signage/displays that help teach/remind cyclists and motorists how to coexist on normal streets. E.G. why and how to signal turns and lane changes; why and how to look back before moving; why and how to yield to each other.
- I'd hate to think of bicycle route improvements as being made in the dark. Integrating progress, funding, community input and planning with other efforts such as disabled access, school traffic and neighborhood plans is a must. Though I haven't attended other meetings, I am curious about the idea of a toolbox. I hope that the ideas stewing in the toolbox formulate into more articulated plans. Bringing a toolbox to later stages of the process seems to be weak and to open up opportunities to replace more progressive ideas with weaker ones that are also in the toolbox.
- It is important to consider the use of trailers, trikes, and cargo-bikes in this plan. The space between traffic barriers needs to be wide enough for these vehicles to easily pass in between.

Site Specific Comments

- Milvia between Rose and Berryman: How about narrow bike lanes between curbs and parking lane or wide streets such as Milvia. Is there room?

- I'd like to add to my previous comments a request that a stop sign be added on Piedmont of the Russell corner (northside of Russell). I bicycle down Russell every day and there are frequently cars speeding around that corner onto Russell towards College. I've also seen cars go through the barrier (over a stantion) to the left onto Russell. I think a stop sign there would help. Currently it's pretty dangerous for cyclists. Thank you.
- East Bay Greenway Proposal: Utilize bicycle blvd to extend Ohlone Greenway south through Oakland; use California/King through Berkeley with parts of Santa Fe R-O-W; upgrade California blvd to higher level of green amenities to become "greenway" without being full Class 1 bikeway; utilize interpretive exhibits, artworks, native plantings to express the diverse history of East Bay. Ohlone Natural and Cultural History Greenway Project in North Berkeley is developing this concept with cities of Berkeley, Oakland, and Rails to Trails Conservancy.
- Virginia is too congested a street between MLK Jr. Way and Shattuck to be a bicycle blvd. Also down by Franklin. I'm sure that if there are bicyclists hurt – or children hurt a bicycle lane will be installed at the expense of parking. Parking is already very short. I am strongly opposed to using Virginia.
- I would prefer to see the bike blvd extended on California to the Oakland border, rather than on King St. This would also avoid the flow problems around Malcolm X school on King Street. In any case, the bike lane on California needs work – lots of broken and uneven pavement, and I worry that the focus on blvds will take away from lanes. Any signage which helps create a bit of order on my corner (California/Harmon) is welcome, as is landscaping, etc.
- I would like to see King St become a bike blvd. Ashby at King continuing down King to Alcatraz Ave. Ashby and King has a traffic signal already installed making it easy to cross Ashby.
- Our neighborhood (Hillegass area) has vehicle circulation problems. These problems affect the safety and circulation of pedestrians, especially residents. We want a comprehensive approach to solving our circulation problems. What we don't want is a fragmented approach to solving "problems" defined by special interest groups (e.g., cyclists, residents who want to block more streets).
- It's okay (actually great!) to designate streets as primarily oriented for bicycle use. But in our neighborhood (Hillegass area), we want intersections designated "Primarily Oriented for Pedestrians".
- Do not make (or propose to make) changes on Hillegass which affect circulation without first assessing what the consequences are for all concerned.
- The Bateman, Willard and Fairview Park (in Oakland) neighborhoods have joined together in a year long evaluation of quality of life in our neighborhoods and how it can be enhanced. Our final recommendation will be available in a few weeks. One will be to evaluate circulation in our neighborhoods and accommodate all interests in a comprehensive traffic and circulation plan. How will you participate and support this effort?
- Traffic light at San Pablo and Channing; no left turn southbound on San Pablo. Signal light in the same style as MLK and Channing. Byron St should be made one-way southbound to eliminate through traffic from Dwight to San Pablo via Byron.

- It did not sound as if you are aware of the excessive traffic on the 2500 and 2600 blocks of Hillegass, as well as on Parker which crosses between those 2 blocks. Since this is heavy student use area there are severe parking problems and much double parking. Should you not put counters down on the streets so your have a valid count of the traffic before you design the blvds and intersections?
- Double parking on Channing is a problem (especially between Milvia and College Ave.).
- Many cyclists will still use major streets such as Shattuck Ave. These streets should have "share the road" reminder for motorists.

Variations/Comments on Existing Concepts in Toolbox

- I think it's a great idea to have some marking on the pavement reminding cyclists and drivers that bikes are supposed to ride in the lane. Also, I think it will be very important where there is no integral color on the street (since a stripe separating the parking lane from the street could be misconstrued as a marking to set apart a bike lane from the car lanes).
- Re: Bulb-outs. Please avoid the physics of Milvia where bikes are continually going around objects and ending up in the path of following vehicles. Cars end up cutting close to the object the bikes have to go around. While I don't personally know of people getting hit because of this, it is a natural problem when you put bikes in the path of a car (especially moving in and out of that path).
- I have yet to see a convincing argument for bulb-outs and street narrowing, particularly on these low-traffic streets. I believe these tools were envisioned for Milvia, once a high-traffic street, and where it's quite clear that overkill with traffic-calming has made the street unfriendly to everyone. I note with concern that these tow issues, once noted as engendering strong concerns, are now listed as engendering mixed opinions. Considering the absolute lack of support and considerable criticism at the workshops, I hope you reconsider your decision to put these extremely ungainly tools in the tool box.
- If you're going to do traffic circles, please landscape them and do not put 4 signs on them (people aren't that dumb) which only invite graffiti (look at the beautiful design of traffic circle on Woolsey, marred only by the ugly signs). Paint on pavement instead. Always consider smoothest path for cyclists (i.e., avoid bulb-outs that would block or divert though-way for bikes). Bulb-outs can create real problems. Pavement changes good idea to clearly demarcate boulevards.
- Speed table should not be in the toolbox. They delay emergency response services (fire, ambulance). They are a barrier to some disabled and elderly people who need to use cars to access doctors, hospitals, pharmacies, etc. They are not recognized or approved at the state or federal level as valid traffic control devices.
- I like the reflectors on roadway/bikeway at intersections or along bike paths/boulevards.
- I am very concerned that too much additional lighting may be added to these boulevards which would negatively effect residential neighborhoods. Please add lighting to the list of things to be considered from the resident's point of view.

- It's pretty clear where parking is as differentiated from the rest of the street. Why color the pavement for something so obvious?
- Please, no bright lighting.
- Painted traffic circles – just a magnet for "doughnuts" – ugly in the imagination – might work if there were also barriers, but that wouldn't solve ugliness.
- Additional lighting – street lights already make it difficult to darken a room for sleeping or seeing stars – if lights must be added, please consider partly shaded bulbs, with shading facing towards houses.
- If you add lights, could they be set to turn off after a certain time? For example, people are much more likely to commute before 9 PM. People who want to ride late at night should have (and should have to have) good lights on their own bikes. Adding lots of late-night lights will annoy residents, waste lots of energy and money, to the benefit of relatively few bikers.
- Aren't there speed-bumbs you can design to get traffic to slow down but not get in the way of bicyclists?
- Will bike blvds get priority for paving?
- Reflectiveness for signs, pavement, and signs on pavement.
- The sorting of previously-discussed tools into the "basic" versus "site-specific" categories seems to be well thought-out.
- Almost all of the tools in the "basic" category seem appropriate and desirable.
- There is a problem with "chunking" of items in toolbox for presentation to transportation commission. In 3 cases, pairs of tools are jammed together that I think it would be more productive to present separately, because they are very different tools with very different impacts:
    B.4. Planter Strip Landscaping is separate from Street Trees
    C.1. High Visibility Crosswalks is separate from Speed Tables
    D.1. "Traffic Circles" (bollards) is separate from …in series at many intersections.
- Deal with the intersections at major arterials first.
- All routes should have school signs so that kids will be encouraged to ride.
- I like the bike blvd signs, like IZA! They should be very colorful and well lighted.
- No buttons, please! It is such a pain to stop at an intersection and have to push a button to trigger a light. Please have them be triggered like the light at Channing/MLK where the signal is triggered automatically.

Comments on Wall Diagrams

- Bikes in the center of the street seems safer and establishes the priority of bikes visually and physically (refer to Guideline B.1.1).
- Confusing to have bikes go outside of parked cars into mid-street on one side and on the inside on the other side (refer to Guideline B.1.2)
- Regarding bike signs, I suggest keeping things simple (refer to Guideline B.5)
- I'd like to see SF-style bike stencils on bike routes in general. Option 2.5 seems like it might detract from a bike blvd. Maybe good @ intersections with a turning arrow?

But they would support the cyclist taking the lane and that is important (refer to Guideline B.5).

- Option 2 is the best (refer to Guideline B.5).
- "Lane Bike" and this "Belong Bicycles" have always confused me…bicyclists are higher up than motorists and I suspect they read normally (top down) rather than crashing into each word (refer to Guideline B.5).
- Option 142: Bicycles Everywhere (refer to Guideline B.5).
- Why change color? Everyone knows what direction they are going on a grid street system (refer to Guideline A.1.1).
- I like the directional signs very much (refer to Guideline A.1.1).
- Very nice! (refer to Guideline A.2).
- Good destination alerts (refer to Guideline A.4).
- Not OK, it looks like the car is running over the cyclist (refer to Guideline A.4).
- Precariously balanced cyclist is bad (refer to Guideline A.4).
- Bike parking rack integrated into sign (refer to Guideline A.1.2).

New Concepts (not in the toolbox)

- The area where car traffic needs to be slowed, such as at a school, changing the street surface was mentioned (i.e. bricks). There is concern about this slowing bicyclists. What about having a paved strip within the brick area for cyclists to continue through while cars would feel the texture of the brick surface and slow in the school zone?
- How about signs that caution motorists to use caution and look for bicyclists as they open their car doors (or some other means of keeping drivers aware of cyclists when opening their doors)?