

EXECUTIVE SUMMARY

Walking and bicycling are important transportation alternatives because they can help improve the quality of our neighborhoods and business districts, extend the range and usefulness of public transit, help reduce motor vehicle trips, and promote the health of the community.

In accordance with the 2002 General Plan, the Town of Moraga is obligated to complete a Pedestrian, Bicycle, & Trails Master Plan (PBTMP) by the end of this calendar year. General Plan provision IP-K2 requires the following: review, update and expand upon the Town's 'Trails Master Plan' to provide a comprehensive plan for addressing pedestrian and bicycle circulation issues as well as recreational trail use. The updated and expanded Plan should:

- Actively involve the public in the review and update process.
- Designate trails according to their intended use, by pedestrians, bicycles and/or equestrians.
- Establish annual priorities for trail construction as well as pedestrian and bicycle improvements, and identify the resources to build them.
- Review pedestrian circulation issues to identify constraints to walking, develop improvement plans at constrained locations, and incorporate pedestrian enhancement projects into the Town's Annual Budget, with particular attention to pedestrian connections between residential areas, commercial areas, and community facilities such as schools.
- Address bicycle circulation issues in compliance with the thirteen elements outlined in the California Bicycle Lane Account (BLA) to open the opportunity for state funding of local and regional bicycle transportation improvements. Elements of the plan should include design standards for bicycle facilities; bicycle education and outreach; and bicycle enhancement projects for the Town's Annual Budget.

MORAGA BICYCLE AND PEDESTRIAN PLAN

This first MBPP is intended to outline bicycle and pedestrian needs for Moraga; refine the Town's goals and strategies as they apply to bicycling and walking; encourage town wide efforts to improve the environment for bicycling and walking in the communities of Moraga; and spur greater interest in and support for bicycling and walking, generally.

Goals and Policies

To support the long-term vision of the General Plan and serve as the foundation for improving the safety and attractiveness of bicycling and walking in Moraga, the MBPP establishes five goals:

1. Expand, improve, and maintain facilities for bicycling and walking
2. Improve safety for bicyclists and pedestrians
3. Encourage more people to bicycle and walk
4. Support local efforts to encourage walking and bicycling
5. Plan for the needs of bicyclists and pedestrians

For each goal, the MBPP outlines policies and actions to achieve these goals. The Authority will use the goals, policies, and actions, as well as the other material in the MBPP, in its efforts to support bicycling and walking in Moraga.

These goals, policies, and actions focus on achieving many of the objectives established in recent State, federal and County plans and policies. The Regional Bicycle Plan adopted by the Metropolitan Transportation Commission, for example, emphasizes the importance of bicycling and its role in the well-being of the region. The Association of Bay Area Government's regional Smart Growth Strategy/Regional Livability Footprint Project and the Shaping Our Future effort in Contra Costa both focus on creating communities that are, among other things, more walkable and bicycle-friendly. Policies adopted by the U.S. Department of Transportation and Caltrans confirm the vital role that walking and bicycling play in our transportation system and recommend positive actions to incorporate those modes of travel into all transportation planning.

Background

Three important factors help shape the bicycling and walking environment in Moraga. First, the Town's topography and land use patterns present both obstacles and opportunities for walking and bicycling. The hills are significant obstacles to bicyclists wanting to journey North to South on either side of the Moraga Road and Canyon Road. Many parts of the Town, however, are

relatively level with a fairly benign environment which could encourage walking and bicycling. Much of the Town was built over the past 50 years, often without sidewalks or room for bicycles. These existing development patterns can make it difficult to retrofit existing streets and roads.

Second, commuting statistics provide insight into who bicycles and walks to work now and who may do so in the future. The 2000 Census reported that 13 Moraga residents bicycle to



work, or about one-fifth of one percent of all commute trips. About twenty-five times as many people walk to work, about 4.4 percent of all commute trips. People who walk or bicycle to transit or carpools, however, are not included in this estimates, somewhat undervaluing the importance of these two modes in the daily commute. Walking and bicycling are more important for other

trips, especially for doing errands, going to school, and making recreational trips. Using the ratio of pedestrians and bicyclers that is provided by the 2001 US Department of Housing and Urban Development 'American Housing Survey' it is found that if the nationwide ratio of bicycle and pedestrian traffic to motor vehicle traffic is used in Moraga, then it is projected that there are 423 Moraga citizens who ride a bike or walk instead of using a car. Other studies indicate that anywhere from between 423 and 1,176 Moraga citizens either walk or bike to work daily, saving anywhere from 8,495 and 30,240 vehicle miles daily.

Third, safety, or the lack of it, can dissuade people from walking and bicycling. Generally, pedestrians and bicyclists have greater probability of being in an accident than people in cars. Data can identify where pedestrians and bicyclists are involved in collisions in Moraga, but additional analysis is needed to understand the factors that contribute to them.



BIKEWAY NETWORK

Bicycling as a means of transportation has been growing in popularity as many communities work to create more balanced transportation systems and make streets more bicycle-friendly. A key reason for creating the MBPP is to define a functional network of countywide bikeways which will help local jurisdictions integrate their bikeway systems to the countywide and neighboring networks.

A bicycle-friendly environment requires more than just bike lanes. A mix of bikeways—shared use paths, bike lanes, and bike routes—as well as parking, signage, and changing facilities eliminates some of the inconvenience that could discourage some from bicycling more. Bike racks on buses, bike lanes as part of new subdivision developments, and some important regional trails are good signs that conditions are improving for bicyclists. Bicycling between and within cities, however, continues to be a challenge, safe bicycle parking is in great demand, and shower and changing facilities for bicycle commuters are limited.

The recommended town-wide bikeway network consists of over 32.6 miles of on- and off-street facilities. Of these on- and off-street bikeways, about 12.5 miles, or almost 38%, remains unbuilt. The projects needed to complete the network were ranked according to destinations they served, feasibility, degree of connectivity, safety, and input from the public, and this resulted in 11 priority corridors across the Town (not listed in order of priority):

- **A. Palos Colorados.** Several trails and scenic vista points are planned. Any Master Plan of Trails should reflect those in the proposed Palos Colorados plan and final agreement. The Palos Colorados General Development Plan currently includes both bicycle and pedestrian trails with a combined total of 4 ½ miles of trail. A trail running parallel to the northern Town boundary, passes through the proposed Palos Colorados development. This trail will begin from Moraga Road and run east to eventually join with the Lafayette/Moraga Trail. The trail will run through the property that is part of the City of Lafayette and will require negotiations to acquire the connecting easement.
- **B1. Bike/Jogging Trail.** A trail will follow Rheem Boulevard. A portion of this already exists where the road is widened. It is already a popular east-west connector. It will be made wider and safer, and/or a trail parallel to Rheem Boulevard considered if development occurs along Rheem Blvd.
- **B2. Hiking Trail from Rheem Blvd.** A paved EBMUD access road from Rheem Boulevard heads up to Fayhill Reservoir. This is a grassland area with rolling hills, as well as steep hills and potential for slides. The back western side of the Reservoir appears to be flat along

a minor ridgeline and a trail will link over to the Palos Colorados trails to a point near the end of Buckingham Drive.

- **B3. From Moraga Road.** A trail runs just to the south and parallel to Buckingham Drive. This trail will continue southeast, and potentially join up with the trails proposed by Rancho Laguna through the development.
- **C1. Bollinger Canyon Road** is an existing paved road that is currently not developed. It is steep and narrow in some areas. A trail is proposed to follow Bollinger Canyon Road. If development is to occur along the road, the developer should be encouraged to make the road wider and safer or preferably, provide a separate trail. This trail could extend to the East Bay Regional Park District Las Trampas Wilderness. EBRPD has this on their Master Plan of Trails and it is an obvious access route to the largest designated wilderness area in the Bay area. This area is Oak woodlands
- **D. St. Mary's Road to the Utah Easement.** Starting behind the Moraga library on St. Mary's Road, this proposed trail will follow the PG&E power lines uphill to the Old Moraga Ranch Trail. There are old walnut orchards in this area. The main function of this trail is to connect the Moraga Commons to the Old Moraga Ranch Trail. Other possible spur connections to the end of these roads will give further ease of access to the Moraga Commons via this trail. (Alta Mesa, Country Club Drive, Del Rio Court). This proposed trail from the Moraga Library to Country Club Drive is a very steep climb.
- **E. Indian Ridge.** From Valle Vista Staging Area, a trail follows along Canyon Road heading towards the Town of Moraga on the EBRP Lafayette/Moraga Trail. At the foot of Indian Ridge, a proposed trail will cut North/East to the top of the ridge. The proposed trail will follow the ridge overlooking the Moraga Country Club and cross to the Orinda city limits. This proposed trail will connect with trails developed by Orinda in the proposed Gateway Valley Development and continue to the Gateway Boulevard exit on Route 24. (Ultimately, the trail in Orinda could continue through Siesta Valley to Tilden Regional Park.) A spur trail off of the ridge will lead down the hill to Augusta Way. Hikers could then follow Augusta Drive, to Westchester which loops back to the EBRPD Lafayette/Moraga trail. Currently Augusta to Westchester are developed paved roads.
- **F. Indian Valley.** Starting at the Valley Vista Staging Area, this trail will cross Canyon Road and extend the Lafayette/Moraga Trail further west towards Canyon. The trail continues north up to the fence line, through Indian Valley, and continues along the ridgeline to the town boundary. This trail will meet with Indian Ridge Trail and then continue into Orinda to Huckleberry Botanical Regional Preserve.

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- **H. Heritage Trail.** From the Moraga Library, a proposed bridge will cross the stream into the Moraga Commons, and a trail will continue around the backside of the Park, past the Frisbee golf, and join the paved portion of the trail along Moraga Road
- **I. Los Encinos Trail.** As proposed by the developer, these trails will begin from the end of Baitx and then traverse through the grassy hillsides behind Larch Avenue, connecting on the other side to the Old Moraga Ranch Trail.
- **J. Rheem Reservoir Trail.** This trail will run from either behind the old Fire Station or Carroll Ranch, starting at the end of Hanson Court, and go to the top of the Campolindo Ridge paralleling Rheem Blvd. The trail follows the ridge to the Rheem Reservoir water tank and connects with the EBMUD Rim Trail that leads over to the Lafayette Reservoir. We propose spur trails running down the ridge to Zander Drive and LaSalle. In Orinda, surface streets such as Zander to Alice to Goodfellow (in Moraga) will connect with the Mulholland Ridge Trail (G1). A trail running down LaSalle Drive and/or behind Campolindo High School will connect with the Rheem Boulevard trail (B1).

PEDESTRIAN NETWORK

At some point in each day, most of us are pedestrians. Whether strolling through a park, using a wheelchair from BART to work, skateboarding to school, or walking to the post office, we all want functional pedestrian facilities. A number of elements are needed to achieve walkable places. In addition to continuous sidewalk systems, safe roadway crossings, curb ramps, lighting, and attractive streetscapes all enhance walking conditions. Traffic calming techniques can be applied to lessen the negative effects of automobiles in neighborhoods and provide better conditions for walking.

Developing a continuous pedestrian network throughout Moraga will take a tremendous and concerted effort, but even small improvements that the local jurisdictions implement can make a big difference. Local agencies are encouraged to consider pedestrian needs in all transportation and land use planning activities and when developing related policies. The MBPP also identifies two priority pedestrian programs:



1. Designating and developing pedestrian districts; and
2. Improving mobility for people of all abilities consistent with the Americans with Disabilities Act (ADA) improvements.

LINKS TO TRANSIT

Improving links to transit can make bicycling and walking a larger part of daily life, enhance transit, and enrich communities. Transit can increase the range of travel for pedestrians and bicyclists by overcoming barriers and hilly terrain, addressing personal security concerns, and enabling travel at nighttime and during poor weather. Providing convenient transit services for bicyclists and pedestrians can attract new riders, expand weekend ridership with recreational bicyclists, and lessen demand for automobile parking spaces. Making it easier to walk or bicycle to transit benefits communities by reducing air pollution, energy consumption, and traffic congestion with relatively low cost investments.

Bicycle-to-transit and pedestrian-to-transit users have various needs that can influence ridership. Secure bike parking, connections to trails, and directional signage are just a few helpful facilities. An analysis of the transit operators in the county and existing station and transit center amenities showed many improvements over the past few years, particularly the provision of racks on buses and increased bike parking. However, improvements at bus stops, access to transit centers, and inadequate bike parking at some transit centers all need to be addressed. Transit agencies and local jurisdictions are encouraged to work together to identify barriers and achieve solutions.

SAFETY AND SUPPORT

Education, marketing, and law enforcement programs help make the general public aware of bicycling and pedestrian issues. Targeted campaigns are beneficial to reach out to specific segments of the population such as children for rules-of-the-road courses, transportation planners and engineers for bicycle- and pedestrian-friendly design strategies, commuters for encouragement and incentive campaigns, and the general traveling public for safety awareness campaigns.

Supporting bicyclists and pedestrians can be achieved in many ways and several programs are recommended to help local agencies in this role. First, signing and stenciling increases motorist awareness of bicyclists and pedestrians and provides direction and information. Second, providing ample bicycle parking, both lockers and racks, is a necessary amenity for bicyclists. Third, safe routes to schools programs can be used to educate children on safe bicycling and walking practices, and to improve infrastructure in such a way that children are

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more likely to bicycle or walk to school. Finally, improving existing substandard pathways and maintaining the bicycle and pedestrian infrastructure in place will invite more use from these investments.

IMPLEMENTATION

Achieving the goals and carrying out the policies of this MBPP will require concerted efforts from many groups, agencies, and individuals. The Town will have to balance the demands for bike lanes, sidewalks and crosswalks, and safe routes to school with demands to maintain our streets and roads, enhance transit service, increase commute alternatives, manage congestion and others equally compelling needs.

APPENDICES

Several appendices are attached that contain supportive information for parts of this MBPP. Appendix A includes planning and design recommendations for bicycle facilities, including on- and off-street bikeways, parking, intersection design, and signing. Appendix B pertains to pedestrian facilities with particular emphasis on ADA requirements and recommendations. Appendix C is a description of the bicycle demand model which calculates a more accurate estimate of the number of daily bicyclists and a predicted number of bicyclists as a result of improvements. Appendix D is a summary of various funding sources, contacts, eligible applicants, and eligible projects. Appendix E contains both the US DOT policy statement and the Caltrans Deputy Directive (DD-44) for integrating bicycling and walking into the transportation infrastructure. Appendix F lists projects that are being pursued throughout Contra Costa County by other local jurisdictions and agencies in addition to those projects listed within the Plan.

Table E-1 Implementing Actions

Local Actions

- Identify projects, assess their feasibility, design, and seek funding
- Review and revise local plans and policies to incorporate policies that promote development patterns that improve the safety and convenience of walking and bicycling safer and more attractive
- Develop local bicycle and pedestrian plans
- Modify local ordinances, development standards and guidelines

CHAPTER 1

INTRODUCTION

This chapter highlights the numerous roles of the MBPP, from setting priorities and providing funding opportunities to increasing bicycle and pedestrian awareness, and describes how the MBPP was developed and how it will be updated.



Purpose of the Plan

The overall purpose of the MBPP is to assess the needs of bicyclists and pedestrians in Moraga, and identify a set of town-wide improvements and implementation strategies that will encourage more people to walk and bicycle. More specifically, the MBPP is intended to:

- Outline bicycle and pedestrian needs for Moraga to help in planning and programming, including in the renewal of Measure C
- Identify a town-wide system of bikeways and pedestrian districts and needed projects and programs to encourage bicycling and walking
- Establish criteria for allocating town-wide funding and set priorities for bicycle and pedestrian improvements using those criteria
- Provide local agencies that adopt the MBPP with eligibility for various funding programs, including the State Bicycle Transportation Account (BTA)
- Act as a resource and coordinating document for local actions

IDENTIFYING BICYCLE AND PEDESTRIAN NEEDS

To encourage walking or bicycling, people need safe, direct and clearly demarcated sidewalks, trails, and bicycle facilities, as well as support programs and urban design and a mix of land uses that brings people and their destinations closer together. The MBPP outlines a broad range of actions to meet this goal, from the completion of specific bikeway segments to increased safety education. The chapters on bikeways, pedestrian needs, safety and security, and transit access list important projects or programs that support those areas of concerns; the

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implementation chapter gives a rough estimate of the costs of carrying out those projects and programs. The estimated cost, however, far outstrips our current funding ability, especially given other competing mobility needs.

One potential new source of funding for bicycle and pedestrian projects is the renewal of Measure C. The original measure, approved by Moraga voters in 1988, established a half-cent sales tax to fund transportation improvements and growth management programs. The Contra Costa Transportation Authority (CCCTA) is charged with implementing Measure C and is currently developing an Expenditure Plan for the extension of Measure C, which it hopes to put on the November 2004 ballot. The MBPP can help the CCCTA put together the proposed Expenditure Plan by estimating the costs of bicycle and pedestrian facilities for the next 25 years within Moraga.

The current Measure C set aside about half a percent of expected sales tax revenues to fund regional trail and bicycle facilities. The recently renewed Measure B in Alameda County allocated over five percent of expected revenues for bicycle and pedestrian projects and programs, which could total \$100 million over 20 years or about \$5 million annually. Measure B, approved by Santa Clara County voters in 1996, will allocate \$12 million towards projects identified in the town-wide bicycle plan. The CCCTA is currently considering three alternative Expenditure Plans that allocate between zero and five percent for bicycle and pedestrian facilities. (The estimate of potential funding in the Implementation chapter assumes this range.)

IDENTIFYING A TOWN-WIDE SYSTEM

A key purpose of the MBPP is to identify a functional town-wide network of important bikeways. This network would help tie together the communities and regions of Moraga, with functional connections to pedestrian districts, schools, shopping areas, job centers), transit hubs, and other destinations. Completion of facilities on the town-wide bikeway network and improvement of pedestrian access to and within pedestrian districts and transit centers would go a long way toward making bicycling and walking more attractive to more people.

This town-wide network, however, will need to be supported by an expanded system of local connections to facilitate bicycle and pedestrian movement. A link between regional bikeways and transit stations, for example—such as, the connection between the East Bay Regional Park Moraga-Lafayette Trail and the Orinda and Lafayette BART stations—would significantly enhance mobility for both bicyclists and transit users, whether they use the designated town-wide system or not.

While the plan identifies preliminary locations for unconstructed parts of the town-wide bikeway network, much work is needed to define their final alignments. The Town will need to work with local citizens and businesses to define alignments that both are feasible and meet the needs of bicyclists and pedestrians, neighborhoods and businesses. The ultimate alignments of these “missing links”, especially given the difficulties of developing them, may follow other streets, roads and trails than are shown on the Town-wide Bikeway Network.

SETTING PRIORITIES

A basic purpose for any plan is to formulate priorities to ensure that the plan's goals and policies are achieved most effectively, especially when considering how best to allocate limited funding. The CCCTA hopes to use the priorities for bicycle and pedestrian projects established in the MBPP when considering allocations of funding under its control.

EXPANDING FUNDING ELIGIBILITY

By creating a plan that establishes project priorities, the CCCTA can help the Town of Moraga to improve its chances to compete for various funding programs. By showing that a project meets the criteria established in the MBPP, or is on or supports the Town-wide Bikeway Network, a project's sponsor may improve the chances that that project will receive funding.

Caltrans Section 891.2 Requirement	Addressed on Pages
Number of existing and future bicycle commuters	26-31
Land use and settlement patterns	26-31
Existing and proposed bikeways	33-49
Existing and proposed end-of-trip bicycle parking facilities	37-38, 39-47, 72-74
Existing and proposed connections to other transportation modes	39-47, 60-65
Facilities for changing and storing clothes and equipment	27-28
Bicycle safety and education programs	66-79
Extent of citizen and community involvement	12
Coordination and consistent with other local or regional transportation, air quality, or energy conservation plans	10-12
Projects proposed in the plan and their priority for implementation	38-47, 69-79
Past expenditures for bicycle facilities and future financial needs	83-92

One of the key reasons for preparing the MBPP is to provide the Town of Moraga with eligibility for funding through the Bicycle Transportation Account (BTA). (Caltrans has allocated about \$7.2 million statewide each year through this program.) This funding program, which is administered by Caltrans, supports projects that improve the safety and mobility of bicycle commuters. For a city or county to be eligible for BTA funds, the jurisdiction must have an adopted Bicycle Transportation Plan that meets the requirements set forth in Section 891.2 of the California Streets and Highways Code. These requirements, and where in the plan they are addressed, are listed above.

In addition to helping local jurisdictions establish eligibility for BTA funds, the MBPP will help identify needs and set priorities for other funds. Currently, the CCCTA has set aside funds from the State Transportation Improvement Program for bicycle and pedestrian projects and the

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MBPP will define the criteria for allocating that funding. Identification of projects in the MBPP can help jurisdictions within Moraga obtain funding from other sources as well. These include California's Safe Routes to Schools program (which was recently extended to 2005) to provide money for construction projects that enhance bicycle and pedestrian safety in the vicinity of schools, and Metropolitan Transportation Commission (MTC) regional discretionary funds that may be applied towards bicycle and pedestrian projects.

LOCAL MOMENTUM

The CCCTA is responsible for distributing transportation funds and serving as the Congestion Management Agency (CMA) for the entire county. One of the goals of this MBPP is to take input from the public and other interested groups, and to provide resources and tools for the Town to adopt more bicycle- and pedestrian-friendly policies and practices. The recommended policies, implementation strategies, design standards, and other items illustrated in this Plan can make this task easier for decision makers.

UPDATING THE MBPP

To provide continuing eligibility for BTA funds, as well as to reflect changing conditions within Moraga, the Town intends to update the MBPP regularly, consistent with the Caltrans requirements for these funds. The plan calls for the Town to work with its citizens, landowners, businesses, local agencies and with local bicyclists and pedestrians to review the MBPP periodically and to refine it to reflect changing needs, the completion of projects, the identification of new projects, and other changes in funding, costs, supporting facilities and the like.

We hope that Moragans continue to take an interest in the MBPP and help the Town to improve the environment for bicycling and walking within its borders.

CHAPTER 2

GOALS AND POLICIES

The goals of the published in the *2002 Moraga General Plan* for the Pedestrian, Bicycle, & Trails Master Plan embodies the Town's fundamental aims for travel and movement within its borders. In the goals and action plan outlined in the *2002 General Plan* the Town recognizes that promoting biking and walking as viable modes of transportation will be essential in realizing the General Plan's vision for the Pedestrian, Bicycle & Trails Master Plan. The goals and policies established in this chapter will delineate a more detailed approach to making walking and bicycling safer, more convenient and more attractive for more people in Moraga.

Goals and Policies

To support the long-term vision of the *2002 General Plan* and serve as the foundation for improving the safety and attractiveness of bicycling and walking in Town, the *Moraga Bicycle and Pedestrian Plan* (MBPP) establishes five goals. For each goal, policies and action strategies outline steps that can be used to achieve these goals. The Town of Moraga will use the goals, polices and actions, as well as the other material in the MBPP, in its efforts to support bicycling and walking in the Town.

GOAL 1

Expand, Improve and Maintain Facilities for Bicycling and Walking

While a number of important bicycle and pedestrian facilities exist in Moraga, many that are currently in place have significant gaps and major barriers—such as streams and topography—that further inhibit movement. Bike lanes and sidewalks alone do not provide a good bicycle and pedestrian network. Other improvements—such as signs, maps, curb ramps, and traffic signals—complement the basic infrastructure and improve its functioning and usefulness. The following policies are recommendations for providing a truly comprehensive and functional network. The

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following policies will guide the development of a connected countywide bicycle network, provide missing links in the pedestrian system, and encourage bicycle and pedestrian provisions in development.

Policy 1.1 Describe a system of bicycle facilities and key attractors of bicycle and pedestrian traffic, including:

- Existing and future bicycle facilities of town-wide importance
- More local bicycle facilities that interconnect with and support the Countywide Bicycle Network as depicted in the Countywide Bicycle and Pedestrian Plan (CBPP)
- Programmatic needs for improving pedestrian and bicycle access to and within transit stations and centers, schools, job centers, and other activity centers and facilities

Policy 1.2 Identify gaps in the Town-wide Bicycle Network, and needed improvements to and within pedestrian districts and key activity centers, and define priorities for eliminating these gaps and making needed improvements.

Policy 1.3 Determine funding needs for expanding and improving bicycle and pedestrian facilities, and support local efforts to find, apply for, and receive funding to meet those needs.

Policy 1.4 Use the Town-wide Bicycle and Pedestrian Plan to guide how best to allocate funding under the control of the CCCTA for Town-wide bicycle and pedestrian projects and programs.

Policy 1.5 Encourage routine maintenance of bikeway and walkway network facilities, as funding and priorities allow, including regular sweeping of bikeways and shared use pathways. Programs to support these maintenance efforts could include:

- Sidewalk repair programs, which could include incentives to property owners to improve adjoining sidewalks beyond any required maintenance
- On-line forms for the general public to report problems
- "Adopt a Trail" programs that involve volunteers for trail clean-up and other minor maintenance
- Enforce sweeping requirement of towing companies after automobile accidents to clean the roadway of glass and other debris that might damage bicycle tires

Policy 1.6 Include the costs of major maintenance needs of bicycle and pedestrian facilities when calculating the maintenance needs of streets and roadways generally.

GOAL 2

Improve Safety for Bicyclists and Pedestrians

Concern for one's safety deters many people from walking and bicycling, and with good cause. For example, of the 3,753 people killed in traffic accidents in California in the year 2000, almost 18 percent were pedestrians, far above their share of trips. Motorists need to recognize the rights of bicyclists and pedestrians, and pedestrians and bicyclists need to understand and obey the rules; generally, greater consideration of and respect for other users of the street and trail system will contribute to safer conditions.

In addition to improving and expanding facilities for bicycling and walking, implementation of the following policies will help gauge safety and offer methods to improve everyone's safety.

Policy 2.1 Monitor and evaluate information on collisions involving bicyclists and pedestrians and use this information to assist in remedying existing problem locations.

Policy 2.2 Work with Contra Costa County on a countywide collision data analysis program that will generate collision rates useful for planning purposes.

Policy 2.3 Support the development and implementation of effective programs to educate drivers, bicyclists, and pedestrians as to their rights and responsibilities, and adult and youth pedestrian and bicycle education and safety programs, including:

- Enforcement of pedestrian and bicycle related laws by local police departments
- Teaching of bicycle and pedestrian safety to school children and drivers
- Informing interested agencies and organizations about available educational materials and assistance such as those programs included with the National Bicycle Safety Network

GOAL 3

Encourage More People to Bicycle and Walk

In addition to providing safe, direct facilities, agencies can help encourage more people to make walking and bicycling an everyday activity through information, training, and even persuasion. Maps can help people find safe, direct routes, for example, and training on how to ride safely can give people more confidence. These policies address techniques that could encourage more people to walk or bicycle beyond their current levels.

Policy 3.1 Work with local bodies, citizens, landowners and businesses to develop useful and cost-effective programs to encourage more people to walk and bicycle. These programs could include:

- Providing maps, trip planning services, and other “way finding” methods
- Supporting programs, such as “safe routes to school” maps and “bike trains” or “walking school buses” for elementary students, that would encourage more students to walk or bicycle to school
- Continuing the encouragement of bicycling and walking as part of transportation demand management and commute alternatives programs
- Providing information on the rights and responsibilities of all users of the transportation system

Policy 3.2 Encourage traffic calming, intersection improvements, or other similar actions that improve safety for pedestrians and bicyclists.

GOAL 4

Support Local Efforts to Encourage Walking and Bicycling

An ideal transportation system would include safe and clearly marked sidewalks, bike facilities and trails that connect neighborhoods, shopping, work and school. These facilities would provide mobility for pedestrians and bicyclists both within each city or town and throughout the county. Building such a system will require the concerted efforts of the Town to work with neighboring municipalities to coordinate the development of bicycling and walking between Moraga and Lafayette and Orinda. Furthermore, building this system will also require the Town's

bodies, citizens, landowners and business to work together to coordinate the development of bicycling and walking in the Town.

Policy 4.1 Work with local landowners, citizens and businesses to develop a coordinated countywide approach to signage. This system could include:

- Directional and destination signs along bikeways and shared use trails
- Location maps in downtown areas and other major pedestrian districts
- A route identification system and common set of signs for the Town-wide Bicycle Network

Policy 4.2 Provide a forum for local citizens, landowners, businesses, town bodies and town agencies to discuss and help resolve bicycle and pedestrian issues of mutual concern and to develop town-wide or subregional approaches that could help overcome obstacles standing in the way of achieving the goals of this plan. This work could include:

- Organizing Town-wide training workshops for local engineers and planners to learn about recent recommendations, methods to expand the bikeway and pedestrian system, and funding opportunities
- Sponsoring or supporting efforts to identify, define and implement multi-jurisdictional projects and programs

Policy 4.3 Work with a committee of local agency staff and bicyclists and pedestrians to develop, update and help implement the *Town-wide Bicycle and Pedestrian Plan*. The MBPP will be updated at least as often as necessary to maintain eligibility for BTA funding. As part of the periodic update of the MBPP, the committee will:

- Review, assess, and recommend, where necessary, refinements to the goals, policies, and actions
- Review and reevaluate the Town-wide Bicycle Network, identified pedestrian districts, and priorities for completing and improving the network and districts
- Update information on projects, routes, and other actions
- Identify new or remaining issues that could be resolved through countywide efforts

Policy 4.4 Support efforts to refine development standards to require the construction of bicycle and pedestrian facilities, where warranted, as a condition of approval of new development or

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major redevelopment projects. This support could include providing information useful to local agencies in planning, designing, and implementing improvements to the bicycle and pedestrian network, including, but not limited to:

- Available funding programs
- Model zoning and subdivision ordinance language
- Guidelines and standards for bicycle and pedestrian facilities
- Monitoring of bicycle and pedestrian related collision levels

GOAL 5

Plan for the Needs of Bicyclists and Pedestrians

As noted in the FHWA's Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure, "ongoing investment in the Nation's transportation infrastructure is still more likely to overlook rather than integrate bicyclists and pedestrians." When the needs of bicyclists and pedestrians are overlooked, improvements designed to benefit automobiles, trucks or transit may worsen travel for bicyclists and pedestrians. Considering, and making accommodations for, bicycle and pedestrian mobility and safety in the planning and designing of new or improved transportation facilities can help benefit all modes of travel.

The goal is that all new construction and reconstruction projects incorporate bicycle and pedestrian ways. That, however, is not always possible. Roadways where bicyclists and pedestrians are prohibited, for example, need not include sidewalks or bike lanes. On the other hand, their design or construction should not cut off existing or planned bicycle or pedestrian facilities. Where demand for bicycling or walking is low, or where the cost to provide them is excessive, agencies may need to find alternative ways of accommodating their needs. Finally, most agencies in the Town must deal with existing roadways with limited right-of-way and established land uses adjoining them. "Retrofitting" sidewalks, bike lanes and other such facilities while accommodating vehicular movement can be a major challenge, involving significant compromises.

Policy 5.1 Accommodate, and encourage other agencies to accommodate, the needs for mobility, accessibility, and safety of bicyclists and pedestrians when planning, designing, and developing transportation improvements. Such accommodation could include:

- **Reviewing capital improvement projects to make sure that needs of non-motorized travelers (including pedestrians, bicyclists, and persons with disabilities) are considered in programming, planning, maintenance, construction, operations, and project development activities and products**
- **Incorporating sidewalks, bike paths, bike lanes, crosswalks, pedestrian cut-throughs, or other bicycle and pedestrian improvements into new projects**
- **Providing safe and convenient alternatives when bicycle or pedestrian facilities are removed**
- **Accommodating bicyclists and pedestrians as well as for vehicles during construction of transportation improvements and other development projects**

Policy 5.2 Support the incorporation of bicycle and pedestrian facilities into other capital improvement projects, where appropriate, to expand bicycle-pedestrian facilities, harmonize the needs of all travel modes, and achieve economies of scale

Relationship to Other Plans and Policies

The MBPP will build upon local plans and policies, including local General Plans and specific bicycle or pedestrian plans and Federal, State, and regional plans, policies, and programs. The Town-wide effort also coordinates with regional efforts such as the EBRPD's Master Plan and MTC's Regional Bicycle Plan. Other bikeway plans such as the East Contra Costa County Bikeway Plan were developed to qualify the local jurisdictions for Caltrans' Bicycle Transportation Account (BTA) funds. The general plans of most jurisdictions also address bicycling and walking issues in their circulation elements.

By supporting walkable communities and the greater use of bicycling and transit—two of the key "smart growth" objectives—the MBPP would also support two "smart growth" projects currently under development. "Shaping Our Future" is a planning effort of Contra Costa County and its 19 jurisdictions to help manage future growth through efficient land use, preserving neighborhoods, reducing traffic congestion, improving transit, preserving open spaces, and re-developing depressed business districts. The "Smart Growth Strategy/Regional Livability Footprint Project" is a planning effort of the Association of Bay Area Governments, Metropolitan Transportation Commission, Bay Area Air Quality Management District, Bay Conservation and Development Commission, Regional Water Quality Control Board, and the Bay Area Alliance for Sustainable Development. The goals of this Project will address smart growth policies and incentives for the Bay Area.

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REGIONAL PLANS

Contra Costa County Bicycle and Pedestrian Plan (2003)

The *2000 Update to the Contra Costa Countywide Comprehensive Transportation Plan*, adopted by the Contra Costa Transportation Authority (CCTA) in July of 2000, recognized the importance of bicycling and walking in Goal 3—expand safe, convenient and affordable alternatives to the single-occupant automobile—and in the implementation chapter, which called for the development of a countywide bicycle plan. In Spring 2001, the Authority began work on the *Contra Costa Countywide Bicycle and Pedestrian Plan (CBPP)* to carry out the Authority's goals and visions and to support biking and walking in Contra Costa. The overall purpose of the CBPP is to assess the needs of bicyclists and pedestrians in Contra Costa, and identify a set of countywide improvements and implementation strategies that will encourage more people to walk and bicycle. More specifically, the CBPP is intended to:

- Outline bicycle and pedestrian needs for Contra Costa to help in planning and programming, including in the renewal of Measure C
- Identify a countywide system of bikeways and pedestrian districts and needed projects and programs to encourage bicycling and walking
- Establish criteria for allocating countywide funding and set priorities for bicycle and pedestrian improvements using those criteria
- Provide local agencies that adopt the CBPP with eligibility for various funding programs, including the State Bicycle Transportation Account (BTA)
- Act as a resource and coordinating document for local actions

MTC Regional Bicycle Plan (2001)

The Metropolitan Transportation Commission (MTC) sponsored the first bicycle plan for the entire nine-county San Francisco Bay Area. The regional bicycle network and lists of priority projects were derived through adopted county plans. Because Contra Costa was the only county not to have an adopted plan, a placeholder was added until the County plan was adopted. This plan will be updated every three years in relation to the Regional Transportation Plan.

San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard (2001)

Although the San Francisco Bay Area has made noteworthy progress towards reducing emissions, the area failed to meet the EPA criteria for one-hour ozone standards in 1999 and 2000. This 2001 plan amends the 1999 plan by revising elements that EPA disapproves and adding

control measures to increase the chances of meeting the one-hour ozone standard in the future. Once the plan is approved, it will become part of the California State Implementation Plan.

This update includes five additional transportation control measures (TCMs). Among these is TCM B, the Bicycle/Pedestrian Program, which is the funding of high priority projects listed in countywide bicycle plans. This TCM will be implemented after MTC allocates \$15 million in TDA Article 3 funding.

East Bay Regional Park District Master Plan (1997)

Costa County does not have a countywide park and trails agency, so EBRPD functions in that role. The District has an adopted 1997 Master Plan with existing and proposed regional parks and trails. The trails are designed to connect parks and communities and use publicly owned rights-of-way in cooperation with other agencies in order to develop a system of trail networks which serve both non-motorized transportation and recreation opportunities.

The Bay Trail Plan (1989)

The Bay Trail Plan proposes the development of a paved regional hiking and bicycling trail around the perimeter of San Francisco and San Pablo Bays. Approximately one-half of the 400-mile trail has been constructed, either hiking and bicycling paths or as on-street bicycle lanes or routes. The Bay Trail designated a "spine" for a continuous through-route around the Bay and "spurs" for shorter routes to Bay resources. The goals of the Plan include providing connections to existing park and recreation facilities, creating links to existing and proposed transportation facilities, and preserving the ecological integrity of the Bays and their wetlands. The bicycle network in this plan will ensure connectivity to the Bay Trail.

Bay Area Ridge Trail (1987)

The Bay Area Ridge Trail is a 400-mile multi-use trail, mostly unpaved, connecting parks and open spaces along the ridgelines surrounding the San Francisco Bay. Over 215 miles of the trail have been completed. Six trails in Contra Costa are planned to complete the Ridge Trail in the county: Mission Peak to Vargas Plateau, Vargas Plateau to Garin/Dry Creek Pioneer, Garin/Dry Creek Pioneer to Chabot, Kennedy Grove to Sobrante Ridge, Sobrante Ridge to Carquinez Strait, and Briones to Martinez Shoreline.

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FEDERAL AND STATE POLICIES

US DOT's Accommodating Bicycle and Pedestrian Travel

"Accommodating Bicycle and Pedestrian Travel: A Recommended Approach" is a policy statement that was adopted by the U.S. Department of Transportation (USDOT) in response to TEA-21. USDOT encourages public agencies, professional organizations, advocacy groups, and any other groups involved in transportation issues to adopt this policy to further promote bicycling and walking as viable components of the transportation system. The four directives issued in this policy statement address measures to improve bicycle and pedestrian access, convenience, and safety in transportation projects.

The policy statement notes that, "the challenge for transportation planners, highway engineers and bicycle and pedestrian user groups, therefore, is to balance their competing interest in a limited amount of right-of-way, and to develop a transportation infrastructure that provides access for all, a real choice of modes, and safety in equal measure for each mode of travel." The policy can be found in its entirety in Appendix E.

Caltrans DD-64

Caltrans recently adopted a policy directive—Deputy Directive 64 (DD-64)—related to non-motorized travel that reads:

"The Department fully considers the needs of non-motorized travelers (including pedestrians, bicyclists and persons with disabilities) in all programming, planning, maintenance, construction, operations and project development activities and products. This includes incorporation of the best available standards in all the Department's practices. The Department adopts the best practice concepts in the US DOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure."

It is not clear what the effect of these policy directives will be on the planning, design, and funding of new transportation facilities. Although the USDOT policy *encourages* agencies and organizations to adopt this position, it does not state the possible repercussions if it is not embraced. Similarly, it is not certain how the Caltrans policy directive would apply to local jurisdictions or to streets that are not classified as "highways." Nonetheless, these policies reflect the growing concern that public agencies have shown to accommodate the needs of pedestrians and bicyclists in the design and operation of the transportation system. The policy can be found in its entirety in Appendix E.

Assembly Concurrent Resolution No. 211 (ACR 211)

California's cities and counties have even more reason to pay attention to the two aforementioned policies. ACR 211 (Nation) "Integrating walking and biking into transportation infrastructure" became effective in August 2002, and encourages all cities and counties to implement the policies of DD-64 and the USDOT design guidance document when building local transportation infrastructure.

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FEDERAL AND STATE POLICIES

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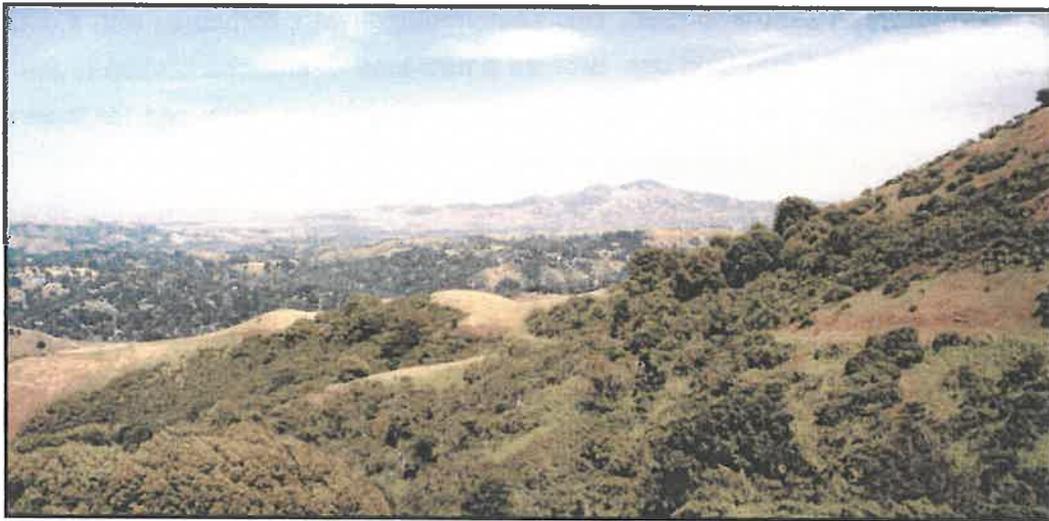
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CHAPTER 3

BACKGROUND

THIS CHAPTER EXAMINES THREE IMPORTANT factors that help shape the walking and bicycling environment in Moraga. First, patterns of topography and land use illustrate why some areas are more favorable for walking and bicycling, and show the difficulties of retrofitting older facilities. Second, commuting statistics provide insight into who bikes and walks to work now and who may do so in the future. Third, collision data for pedestrians and bicyclists illustrates patterns of collisions in Moraga and what factors contribute to them.



Physical Attributes

Setting

Moraga's diverse landscape both accommodates and presents obstacles to biking and walking. The East Bay Hills punctuate and divide the Town into generally recognized geographic areas, making interregional bicycle travel challenging.

Patterns of Development

Land use and development trends greatly influence how often people bicycle or walk. In dense, mixed-use developments, for instance, where uses are varied and closer together, people may find driving unnecessary, while in more typical suburban subdivisions, they will need to use an automobile to reach most destinations.

The coming of the electric trolley and railroads in the late 1890s allowed the first wave of “suburbanization,” where people commute from primarily residential neighborhoods to jobs in predominantly commercial areas in the same or another city. Suburbanization during the first half of the 20th century led to an increasing segregation of land uses, especially of jobs from housing, and a shift towards the streetcar and, later, the private automobile as the primary modes of travel. These two shifts led to a decrease in walking as a mode of travel. The design of neighborhoods, however, still most often included sidewalks (the key pedestrian facility), a walkable scale, and neighborhood shopping. Many areas of El Cerrito, San Pablo, and Richmond were developed during this period.

Between 1940 and 1950, the population of Contra Costa County tripled in size, and tripled once again between 1950 and 1990. This tremendous growth, combined with a confluence of changes in development and land use, brought a new kind of suburbanization to the County and to Moraga. Automobile ownership shot up and new lending practices and tax laws spurred the development of new neighborhoods, composed primarily of single-family homes. The new development standards that guided the design of these new residential neighborhoods assumed that residents would depend more and more on the private automobile. In addition, the increased size and scale and changing design of new retail and commercial areas also assumed primary access by automobile. In response, increasingly more developments, both residential and commercial, were built without sidewalks. In addition, residential streets were designed to decrease cut-through traffic using a curvilinear design and cul-de-sacs and few entryways into the subdivision via arterial or collector streets making bicycle and pedestrian movement more difficult and time-consuming. Arterial streets were primarily designed to move rising volumes of motor vehicles with little accommodation for bicyclists and pedestrians.

While all of these patterns present specific difficulties, they share one thing: the challenge of retrofitting existing streets and roads with bicycle or pedestrian facilities. Right-of-way is a scarce commodity in developed urban areas and right-of-way is often needed when adding bicycle lanes, new sidewalks, or other facilities. In some cases, a street has light enough traffic to remove a travel lane or wide enough lanes to add bicycle lanes without removing lanes. Some neighborhoods may be opposed to sidewalks for various reasons, such as extra mainte-

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nance they impose or the wish to maintain a more “rural” ambiance. More frequently, however, hard decisions are necessary to accommodate pedestrians and bicyclists on existing streets.

Bicycle and Pedestrian Travel

The focus of the MBPP is on encouraging bicycling and walking as transportation, whether for commuting, shopping, or other purposes. Changes in land use and development, and the increasing distance between destinations that have resulted from those changes, have made walking and bicycling less practical for a growing number of people. Bicycle trips are generally shorter than automobile trips, typically less than two miles, while the average walking distance is about a half mile. This statistic suggests that focusing first on facilities that serve these shorter trips might have the greatest “payoffs” in increasing walking and bicycling. And access to transit can help extend the commute range of bicyclists and pedestrians, and respond to those changes in land use patterns. (Transit systems, however, also face an increasingly dispersed live-work pattern that is difficult to serve.)

Table 2 County-Level Home-to-Work Trips
County-Level Home-to-Work Trips

	2000 Census	Commute Profile 2000 ¹	Low Income Survey ²
Drive Alone	70.2%	65.0%	24.6%
Carpooled	13.5%	16.3%	13.0%
Transit	9.0%	15.6%	38.0%
Walk	1.5%	1.5%	11.5%
Bicycle	0.5%	0.5%	1.7%
Other	5.3%	1.4%	11.2%
Total	100%	100%	100%

¹ The Bay Area’s rideshare agency, RIDES, sponsors the annual Commute Profile survey, which focuses on adults over the age of 18 years old who are full-time employees outside the home.

² The CalWORKs survey was given to participants in the Contra Costa County Employment and Human Services Department (EHSD) career opportunities program titled CalWORKs, which is geared towards finding work for welfare recipients.

Table 3

MEANS OF TRANSPORTATION TO WORK FOR WORKERS 16 YEARS AND OVER IN MORAGA

Total	7,427	100.00%
Car, truck, or van:	5,570	75.00%
Drove alone	4,783	64.40%
Carpooled	787	10.60%
Public transportation	928	12.50%
Bus or trolley bus	48	0.60%
Streetcar or trolley car	4	0.10%
Subway or elevated	820	11.00%
Railroad	45	0.60%
Ferryboat	5	0.10%
Taxicab	6	0.10%
Motorcycle	14	0.20%
Bicycle	13	0.20%
Walked	330	4.40%
Other means	76	1.00%
Worked at home	496	6.70%

CURRENT COMMUTING STATISTICS

The transportation mode splits shown in Table 3 reveals that the automobile is the primary mode of transportation in Moraga. The 2000 U.S. Census found that 75% of commuters drive an automobile to work in Moraga). Carpool riders made up almost 11 % of commuters and transit riders total another nine percent. Non-motorized transportation comprised the smallest percentage of commuters, with walking accounting for 4.4% and 0.2% bicycling. This data, however, does not count the occasional bicycle commuter or people who bicycle or walk to transit or carpools regularly. The Bay Area's rideshare agency, RIDES for Bay Area Commuters, found that similar percentages of commuters walk or bicycle to work. A CalWORKs survey, which focused on low-income county residents, showed that they were more apt to bicycle (1.7 percent) and walk (11.5 percent) from home to work compared to the average commuter. Table 2 compares the findings of these three surveys.

A 1995 transportation survey called the Nationwide Personal Transportation Survey (NPTS) suggests that a person's income is strongly correlated with how she or he travels to work (see Table 3). Households with annual incomes of \$15,000 or less have higher rates of bicycling (1.6 percent) and walking (12.8 percent) compared to households with annual incomes of

simply an order-of-magnitude estimate, based on available data. Depending on the methodology used, in Moraga it is calculated that a total of between 22 and 116 persons use bikes daily in Moraga to transit to school or work. Additionally, it is estimated that between 151 and 1,060 Moragans walk to work or school daily. It is also estimated that a total of between 2,371 to 8,441 pedestrian or bicycling trips are made daily to, from and within Moraga, saving anywhere from 4,232.01 to 15,068.87 vehicle miles daily. A detailed description of this table can be found in Appendix C.

Table 5 Estimated Current Countywide Bicycle Demand, 2000

Population Group	Estimated Totals
Bicycle Commuters	2,085
School Children Commuting by Bike	6,665
College Students Commuting by Bike	3,099
Bike-Transit Users ¹	204
Utilitarian Trips	9,376
Total Estimated Daily Bicycle Ridership	21,429
Reduced Vehicle Trips	28,620
Reduced Vehicle Miles	76,386

¹From *Statistical Summary of Bay Area Transit Operators*, MTC, 1998.

Source: ALTA Planning + Design

FUTURE COMMUTING POTENTIAL

The consultants for the County Bicycle and Pedestrian Plan also estimated future bicycle demand assuming completion of the countywide bicycle system outlined in the CBPP. The projections are derived from studies conducted around the nation on increased bicycle ridership and the National Bicycling and Walking Study, which found a correlation between the number of bicycle commuters and bikeways per capita. Table 6 on the following page estimates the number of non-recreational bicyclists that corresponds to this correlation if the entire bicycle system were to be completed. The resulting reduction in automobile trips is also estimated.

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\$80,000 or more (0.5 percent and 5.0 percent, respectively). This reflects several facts: lower income households own fewer automobiles, they are thus more dependent on transit, walking and bicycling, and often have a younger average population than higher income households. Using the ratio of households that bike and walk to work from the 1995 NPTS study it is calculated that a total of 959 working age Moragans walk to work each day and that a total of 105 working age Moragans bike to work each day.

Lower-income households tend to have shorter average trip lengths (about seven miles per day) compared to higher-income households (around 11 miles per day). Lower-income households also make fewer trips (3.4 trips per day per person) compared to higher-income households (4.6 trips per day per person). This indicates a high potential demand for bicycle and walking improvements in lower income areas.

Table 4 National Transportation Mode Splits for Urban Trips¹

	Annual Income	
	\$15,000 or Less	\$80,000 or More
Drive Car	35.1%	42.9%
Carpool Rider	40.7%	48.1%
Transit	6.8%	1.2%
Walk	12.8%	5.0%
Bicycle	1.6%	0.5%
Other	3.0%	2.3%
Total	100.0%	100.0%

¹ The Nationwide Personal Transportation survey (1995) focuses on urban trips less than 75 miles long. It excludes military personnel living on base, college students living on campus dormitories, prisoners, and residents of group quarters.

A more county-specific estimate of daily non-recreational bike trips has been achieved with a bicycle demand model. It uses available studies from around the country to help define other daily bicyclists, in addition to U.S. Census statistics on bicycle commuters. According to these studies, other daily bicyclists include:

- Five percent of school aged children (ages 6–14) bicycle to school,
- Five percent of college students bicycle to campus,
- Approximately one percent of transit commuters also use bicycles, and
- 1.74 utilitarian bicycle trips are made for every one work or school trip.

As shown on the next page in Table 5, an estimated 21,429 trips are taken in Contra Costa daily on bicycle, saving over 76,386 vehicle miles daily. It is important to note that this is

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Table 6 Projected Countywide Bicycle Demand

	Current	Estimated Future ¹	Change
Total Daily Bicycle Commuters²	11,849	33,026	21,177
Total Daily Bicycle Trips³	42,858	119,449	76,591
Reduced Vehicle Trips	28,620	79,767	51,147
Reduced Vehicle Miles	76,386	212,898	136,512

* 1 Assuming completion of the countywide bicycle system and supporting facilities.

2 Includes both commuters to work and commuters to school and college.

3 Includes bike-to-transit and utilitarian trips.

Collision Analysis

Data on collisions involving pedestrians and bicyclists can help decision makers identify specific areas where policies, planning, and other interventions can be focused. The collision data used in the following analysis comes from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS), a database of collisions as reported to and collected by local police departments and other law enforcement agencies. Since this database consists of reports taken by officers in the field, these incidents are only a portion of all collisions involving pedestrians and bicyclists. Minor collisions especially are likely to go unreported since the parties involved are unlikely to go through the time-consuming process of reporting incidents to a police officer. The collisions reported in SWITRS are thus more likely to be serious.

PEDESTRIAN COLLISIONS

Nearly three thousand pedestrian collisions were reported in Contra Costa between 1990 and 2000. Table 7 shows the actions pedestrians were taking at the time of the reported collision with an automobile. In the majority of all reported pedestrian collisions, the pedestrian was in the roadway (93.3 percent), either crossing in an intersection crosswalk, crossing the street outside of a crosswalk, or they were in the road or the road's shoulder.

Most of the intersections with a high number of pedestrian collisions are near significant pedestrian generators—shopping centers, office buildings, BART stations, and schools—as well as along major arterial streets. In addition, many of the clusters of collisions are found in locations such as intersections where people come into direct conflicts with motor vehicles.

While automobile collision data is typically defined as a rate of collisions against a base set of data (such as millions of vehicles miles traveled), comparable comparative data is not available for bicycles and pedestrian travel, making the data difficult to interpret. The information that is available suggests that walking and bicycling are more dangerous than driving. In 2001, for example, 14 of the 57 fatalities in Contra Costa, about 25 percent of the total, were pedestrians, while MTC estimates that pedestrians made only around nine percent of all daily trips. Similarly, Surface Transportation Policy Project, in their latest assessment, ranks Contra Costa as the fourth dangerous county for pedestrians in California. Although these estimates should be taken with a grain of salt, they do suggest that a great need for pedestrian safety improvements exists.

Table 7 Pedestrian Action at Time of Collision: 1990-2000

	Frequency	Percent
Crossing not in crosswalk	1,041	34.7
Crossing in crosswalk at intersection	1,039	34.6
In road, including shoulder	616	20.5
Not in road	195	6.5
Crossing in crosswalk not at intersection	104	3.5
Not stated	4	0.1
Approaching/leaving school bus	4	0.1
Total	3,003	100.0

Source: California Highway Patrol, SWITRS, 1990-2000.

BICYCLE COLLISIONS

During the years between 1990 and 2000, 3,291 collisions involved bicyclists. And in the year 2000, about five percent of those injured in traffic accidents were bicyclists, about double the percentage of trips made on bicycle. A large proportion of bicycle collisions occurred on major roadways. Many potential bicycle commuters cite traffic as their main objection to riding on urban streets.

Many concerns about bicycling's level of danger, however, are based on the misconception that most bicycle crashes involve an automobile. In fact, a majority of bicycle crashes do not involve a motor vehicle; rather, studies of hospital data have shown that the vast majority of bicycle injuries involve falls or collisions with stationary objects, other cyclists, or pedestrians. This

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points to the need to educate bicyclists as well as motorists, enforce existing laws, and encourage safe bicycling techniques.

CHAPTER 4

BIKEWAY NETWORK

THROUGHOUT THE UNITED STATES, more communities have become interested in encouraging bicycling as part of a more balanced, multi-modal transportation system, one that refashions our streets and roads to accommodate all means of travel. This chapter briefly summarizes the needs of bicyclists, the current state of bicycling facilities throughout Moraga, and the recommended countywide bikeway network. The chapter ends with a description of the top priority bikeway segments for Moraga. The Safety and Support chapter discusses additional important issues such as bike parking, education, and outreach, while Appendix A provides bicycle facility planning and design standards and recommendations.

Bicyclist Needs

Providing a safe, well-connected system of bicycle facilities can significantly increase levels of bicycling. More important than actual mileage, however, is how well connected those facilities are. Gaps in the system of bikeways; obstacles such as freeways, railroad tracks, rivers, canals, and narrow bridges; and the consequent need to detour around these gaps and obstacles can make bicycling much less attractive.

Often the roads that provide bicyclists the most direct routes are also the most unpleasant and perilous, even for experienced bicyclists. Adding bicycle lanes to existing streets, or including them in new streets, is usually the preferred way of improving roadways for bicycle use. Bicycle lanes provide a clearly demarcated space that is understandable for both bicyclists and drivers. Unfortunately, some bike lanes become *de facto* automobile parking spaces, so signage and parking re-



A sign denoting the 1-80 bikeway in Hercules

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strictions may be necessary to maintain the integrity of bike lanes.

Bicycle lanes, however, are not always possible, especially in established districts. One alternative to marked bicycle lanes is sign the roadway as a bicycle route and to stencil a picture of a bike on a wide outside lane in conjunction with bicycle route signs, thereby legitimizing its use by bicycles. Where narrow lanes prevent comfortable lane sharing, posting "Share the Road" signs may help encourage motorists to make room for bicyclists who use the road. Rather than designating narrow streets with high traffic volumes as a bike route, an alternate parallel route along quieter roadways may be the best solution. Traffic signal timing should consider the needs of bicyclists along those roadways with bike lanes and routes. Improving existing trail facilities by widening the pavement, better separating bicyclists and pedestrians, and improving signage and intersection controls also may encourage and accommodate greater use of trails for transportation.

Aside from the actual on-street and off-street bikeways, other facilities can assist bicyclists along their routes and at their destinations. First, signage helps to direct bicyclists to suitable bikeways and can point out important destinations along the way. Signs also alert motorists of the possible presence of bicyclists. Second, a secure and safe place to park the bicycle once at a destination is always desirable. For lengthy stays, bike lockers are the best choice while bike racks are sufficient where a visit may be shorter, such as shopping centers. Third, for bicyclists who commute longer distances to work, changing and shower facilities are much appreciated.

Existing Bicycle Facilities

EXISTING BIKEWAYS

Moraga has established a significant number of bicycle lanes and routes in town, and has included many others in its adopted plans. There are now approximately 3.8 miles of Class I off-street bikeways, another 9.1 miles of existing off road pedestrian and bike trails, as well as 7.2 miles of Class II on-street bikeways within the Town's existing trail network. Additionally, another 12.5 miles are proposed in various bikeway, trail, and general plans.

Bicycles are allowed on all paved public roadways in Contra Costa except those freeways where Caltrans explicitly prohibits bicycles. Bicyclists are allowed on freeways when no other route is available, as is the case of State Route 4 between Port Chicago Highway and Willow Pass Road and State Route 24 between Fish Ranch Road and the Orinda exit. Some high-

way bridges do not allow bicycle access, resulting in gaps between Contra Costa and adjacent counties. Currently, bicycles are not allowed on the Richmond-San Rafael Bridge; bicyclists must use Golden Gate Transit's Route 40 or 42 to make this connection. Bicyclists are currently allowed on the Antioch Bridge and the recently completed Carquinez Bridge. Bicycles will be allowed on the Benicia-Martinez (I-680) Bridge when the new span is completed in late 2004.

Some "regional" bikeways have been signed as designated bikeway corridors. The State Route 4 Bikeway, for example, is an east-west corridor between Pacheco, North Concord, Bay Point, Pittsburg, and Antioch. It begins at the intersection of Pacheco Boulevard and Blum Road in Pacheco, follows Blum Road, Imhoff Drive, Arnold Industrial Drive, State Route 4 between Port Chicago and Willow Pass Road, and along the Delta de Anza Trail following SR 4 to Bay Point, Pittsburg and beyond. A spur follows Port Chicago Highway to the North Concord BART station. The I-80 Bikeway Corridor is a north-south route through Contra Costa connecting Solano County and Alameda County. It begins at the El Cerrito del Norte BART station, along the Ohlone Trail to Key Boulevard, Clinton Avenue, Amador Street, San Pablo Dam Road, Appian Way, back to San Pablo Avenue, and eventually to the Carquinez Bridge. Most of the State Route 24 Bikeway, a corridor linking Alameda County to Walnut Creek, is in place in Lafayette and Walnut Creek.

Contra Costa may be best known for the extensive system of "regional" off-street trails. Over 130 miles of paved shared use pathways include the Lafayette-Moraga Trail (8 miles, 3.8 miles of which are within the Town of Moraga), which is under the jurisdiction of the East Bay Regional Park District.

CALTRANS BIKEWAY CLASSIFICATIONS

Class I: Typically called a "bike path," a Class I bikeway provides bicycle travel on a paved right-of-way completely separated from nearby streets or highways. They are intended to provide opportunities not available streets and roads, including recreation or high-speed bicycle commuting.

Class II: Often referred to as a "bike lane," a Class II bikeway provides a striped and stenciled lane for one-way bicycle travel on a street or highway. Bike lanes delineate separate rights-of-way for bicycles and vehicles to provide more predictable movement for both.

Class III: Usually referred to as "bike routes," Class III bikeways are facilities shared with motor vehicles but which provide, through signage, design, and connection to other facilities, advantages to bicyclists not available on other streets or roadways.

SIGNAGE

A well-planned, attractive, and effective system of network signing can greatly enhance bikeway facilities. First, by making motorists aware of the presence and rights of bicyclists, signs can improve safety and reconcile the needs of bicyclists and motorists. Second, by identifying bike-ways and destinations, signs can help bicyclists take better advantage of existing facilities and thus encourage more people to bicycle.

The Town of Moraga generally uses MUTCD or Caltrans approved signage to designate on-street bikeways such as bike routes or bike lanes. The East Bay Regional Park District (EBRPD) has its own standard signs for its regional and internal trails. EBRPD also posts trail signs that include information on trail type and trail restrictions/rules.

In local surveys, respondents have recommended directional signage as a significant help and encouragement for bicycling in Moraga. Similar to the freeway signs for motor vehicles, directional signs would let bicyclists know which route to take to reach various destinations, thereby increasing their sense of comfort and security. While some directional signage can be found around Moraga, it is limited primarily to EBRPD facilities and is not coordinated throughout the Town. A system such as San Francisco's existing signs or the planned county-wide system in Alameda County could be adapted to meet the specific needs of Contra Costa.



An EBRPD stop sign

PARKING

Just as parking for motor vehicles is designed to accommodate trips made by cars, adequate, well-designed bicycle parking can accommodate and encourage more trips by bicycle. Whether long-term parking at transit stations and work sites or short-term parking at shopping centers and similar sites, support and encourage bicycling. Because bicycles left unattended

are more exposed to weather and theft, bicyclists have a significant need for secure and protected parking.

Many cities have developed ordinances that require bicycle parking. Some specify the number of parking spaces while others simply require “adequate” amounts (see Table 7 for examples of parking requirements in various Contra Costa cities).

Table 7 Examples of Bicycle Parking Requirements in Contra Costa

City	Ordinance
Antioch	<p>Required bike parking by use:</p> <ul style="list-style-type: none"> Office: 1 parking space for every 15 off-street vehicle parking spaces Commercial, retail, wholesale, industrial: 1 space for every 25 off-street vehicle parking spaces Restaurant: 1 bike parking space for every 50 off-street vehicle parking spaces Fast Food Restaurant: 5 spaces per establishment Hospital: 1 bike space for every 50 off-street vehicle parking spaces
Brentwood	All parking lots developed within commercial districts and any public or semi-public facilities must have bike parking. Parking lots must have at least 4 parking spaces with total spaces equivalent to 5% of the total vehicle parking spaces in the lot.
Lafayette	Require adequate bicycle parking in new commercial developments, and at the BART station. Encourage adequate bicycle parking in commercial areas.
Pinole	Require adequate bike parking facilities at transportation centers, public parks and buildings, recreational facilities, commercial centers and large multi-family residential projects.
Pleasant Hill	Bicycle parking is required in all public and semipublic use and commercial use classifications. The number of parking spaces for public and semipublic uses will be specified by the use permit. In commercial uses, each development must provide at least one bicycle space plus the equivalent of 2% of the requirement for automobile parking spaces.
San Ramon	Require developers to provide bicycle parking, racks, storage, and other support facilities as part of any development.
Walnut Creek	Bike parking is required for all Commercial and Community Facility Use Classifications and must be provided at the time of new construction or major alteration. Bike parking spaces are 10 percent of the requirement for automobile parking spaces, or 1 parking space, whichever is greater.

One of the greatest demands for parking is at transit stops. BART recently increased its stock of bike racks and lockers, greatly improving the parking situation at its stations. The Antioch Amtrak depot is the only train station without bicycle parking. Bike parking can be found at some park and ride lots, including the new Hercules transit center, which has both racks and

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lockers. Bike racks at other bus stops were not found, although bicycles were sometimes seen locked to other immobile objects such as trees and signs.

Some downtown districts, especially those with lively downtown centers, have bicycle parking scattered around the area, including Martinez, Walnut Creek, Brentwood, Lafayette, and Pleasant Hill. Major shopping malls and many strip centers also provide bicycle parking, although older strip centers lack adequate parking.

Schools often provide bicycle racks for schoolchildren, many in caged areas safe from vandalism. Colleges tend to provide short-term parking rather than lockers.

A survey of large employers in the county found that although some bicycle parking was provided, they were usually racks and not lockers for long-term parking. A few bike racks were located in parking garages to shield bicycles from the elements and two employers said that bike racks were located near the security guard. Some employees felt it was safer to store their bicycles in their cubicles.

Public parks often lack bike racks. Neighborhood parks are popular bicycling destinations for families to enjoy the playground or picnicking, but designated parking is commonly missing.

The Contra Costa Commute Alternative Network (CCCAN) has helped to significantly increase the amount of bicycle parking throughout Contra Costa. It's Countywide Bicycle Locker and Rack Project, partially funded by the Transportation Fund for Clean Air (TFCA) from the Bay Area Air Quality Management District, has helped to purchase 165 bike racks, 149 bike lockers, and one bike cage.

Providing supervised bicycle parking at special events may encourage more people to



Bicycle lockers and racks at the Bay Point/Pittsburg BART station.

bicycle, which can decrease traffic congestion around sites. The East Bay Bicycle Coalition, for example, provides valet bicycle parking during events at the Concord Pavilion.

SHOWERS AND CHANGING FACILITIES

A final need for some potential commuting bicyclists are showers, lockers, and changing rooms at trip destinations. For those longer distances, or bicycle during wet or hot weather, these facilities can be as critical as bicycle storage.

A survey of 23 major employers in the Contra Costa found that over half (15) of the locations had shower and changing facilities for their employees. Showers and changing facilities were usually provided in large office parks, large office buildings, and buildings with fitness centers.

Proposed Bicycle Network

The proposed countywide bicycle network consists of a comprehensive system of utilitarian bikeways—both on-street and off-street—connecting residential neighborhoods in Contra Costa with work, schools, parks, transit hubs, community centers, downtowns, and other destinations. The network focuses on a primary system of corridors connecting all cities, towns, and major regional connections, using a combination of paths, lanes, and routes. While the countywide network is expected to serve an important function, it is not necessarily more important or a higher priority than the local or secondary systems created by local jurisdictions.

The proposed Town-wide bicycle network is intended to be a planning tool that allows the Town to focus and prioritize implementation efforts where it will provide the greatest community benefit.

CREATING A TOWN-WIDE BIKEWAY SYSTEM

A bikeway “system” is a network of bicycle routes that, for a variety of reasons including safety and convenience, provide a superior level of service for bicyclists. It is important to state that, by law, bicyclists are allowed on all streets and roads (except those freeways where Caltrans specifically prohibits bicycles) regardless of whether they are part of the bikeway system.

One of the major objectives of the Moraga Bicycle and Pedestrian Plan (MBPP) is to build on local bikeways already built or planned. Other important criteria are input from the local bicycling community and local staff familiar with the best routes and existing constraints and opportunities. The following are criteria for designating the Moraga Bikeway Network.

1. Existing bicycling patterns based on public input
2. Roadway conditions (speeds, volumes)
3. General connectivity and directness of route



Many post and loop bike racks are found in downtown Marti-

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4. Number of destinations served (schools, parks, employment centers)
5. Topography and gradients
6. Integration into the regional system
7. Presence of reasonable alternatives for bicyclists of various skill levels
8. Collision and safety data

SYSTEM DESCRIPTION

The map on the following page depicts the Town-wide bikeway system. The recommended system includes 32.6 miles of proposed and existing bikeways. Of this total, 12.9 miles are existing off-street bikeways and pedestrian paths, 7.2 miles are existing on-street bikeways, and 12.5 miles are proposed on-street and off-street bikeways. These numbers will change as local agencies further define the alignment of proposed on- and off-street facilities, and complete these gaps in the system.

The proposed Town-wide bikeway system projects in Moraga are composed of key unifying features, as described below.

A. Palos Colorados

Proposed Trail

A trail running parallel to the northern Town boundary, passes through the proposed Palos Colorados development. This trail will begin from Moraga Road and run east to eventually join with the Lafayette/Moraga Trail. The trail will run through the property that is part of the City of Lafayette and will require negotiations to acquire the connecting easement.

Several trails and scenic vista points are planned. Any Master Plan of Trails should reflect those in the proposed Palos Colorados plan and final agreement. The Palos Colorados General Development Plan currently includes both bicycle and pedestrian trails with a combined total of 4 ½ miles of trail.

B. Rheem Boulevard

Proposed Trail

(Moraga Road to St. Mary's Road.)

B1. Bike/Jogging Trail: A trail will follow Rheem Boulevard. A portion of this already exists where the road is widened. It is already a popular east-west connector. It will be made wider and safer, and/or a trail parallel to Rheem Boulevard considered if development occurs along Rheem Blvd. **(Existing Regional Trail)**

B2. Hiking Trail from Rheem Blvd: A paved EBMUD access road from Rheem Boulevard heads up to Fayhill Reservoir. This is a grassland area with rolling hills, as well as steep hills and potential for slides. The back western side of the Reservoir appears to be

flat along a minor ridgeline and a trail will link over to the Palos Colorados trails to a point near the end of Buckingham Drive. **(Existing Regional Trail)**

B3. From Moraga Road A trail runs just to the south and parallel to Buckingham Drive. This trail will continue southeast, and potentially join up with the trails proposed by Rancho Laguna through the development.

C. Bollinger Canyon

Proposed Route

C1. Bollinger Canyon Road is an existing paved road that is currently not developed. It is steep and narrow in some areas. A trail is proposed to follow Bollinger Canyon Road. If development is to occur along the road, the developer should be encouraged to make the road wider and safer or preferably, provide a separate trail. This trail could extend to the East Bay Regional Park District Las Trampas Wilderness. EBRPD has this on their Master Plan of Trails and it is an obvious access route to the largest designated wilderness area in the Bay area. This area is Oak woodlands.

C2. EBRPD "OLD MORAGA RANCH TRAIL" A trail off of Bollinger Canyon Road heads west and is designated Old Moraga Ranch Trail. The trail entrance is 0.2 miles past the private entrance, mailboxes, and "no trespass" signs that belong to the Bollinger Canyon residents. This hilly route crosses behind St. Mary's College, then heads south, crossing the creek on 3 separate bridges, then eventually joins up with Sanders Ranch Road, and then to Camino Pablo, where it connects to the rocky Ridge Trail. The trail along Sanders Ranch Road has been paved and made wider due to the development in this area. A spur could be easily added that would connect with Sanders Drive.

D. St. Mary's Road to the Utah Easement

Proposed Trail

Starting behind the Moraga library on St. Mary's Road, this proposed trail will follow the PG&E power lines uphill to the Old Moraga Ranch Trail. There are old walnut orchards in this area. The main function of this trail is to connect the Moraga Commons to the Old Moraga Ranch Trail. Other possible spur connections to the end of these roads will give further ease of access to the Moraga Commons via this trail. (Alta Mesa, Country Club Drive, Del Rio Court). This proposed trail from the Moraga Library to Country Club Drive is a very steep climb.

E. Indian Ridge

Proposed Trail

From Valle Vista Staging Area, a trail follows along Canyon Road heading towards the Town of Moraga on the EBRP Lafayette/Moraga Trail. At the foot of Indian Ridge, a

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proposed trail will cut North/East to the top of the ridge. The proposed trail will follow the ridge overlooking the Moraga Country Club and cross to the Orinda city limits. This proposed trail will connect with trails developed by Orinda in the proposed Gateway Valley Development and continue to the Gateway Boulevard exit on Route 24. (Ultimately, the trail in Orinda could continue through Siesta Valley to Tilden Regional Park.) A spur trail off of the ridge will lead down the hill to Augusta Way. Hikers could then follow Augusta Drive, to Westchester which loops back to the EBRPD Lafayette/Moraga trail. Currently Augusta to Westchester are developed paved roads.

F. Indian Valley Proposed Trail

Starting at the Valley Vista Staging Area, this trail will cross Canyon Road and extend the Lafayette/Moraga Trail further west towards Canyon. The trail continues north up to the fence line, through Indian Valley, and continues along the ridgeline to the town boundary. This trail will meet with Indian Ridge Trail and then continue into Orinda to Huckleberry Botanical Regional Preserve.

G. Mulholland Ridge Open Space Preserve

This 250-acre parcel of land includes both sides of the upper portion of the old paved portion of Donald Drive. The Mulholland Committee had recommended a series of trails, phased in over a period of time. Several trails now exist through the property.

- G1.** Lower Donald Drive serves as one of the entrance roads to the Mulholland Ridge Preserve. The trail along Donald Drive will be made wider and safer if development occurs in this area. A path is proposed off of this portion of road, with a gate at the backside of the Hacienda de las Flores. The trail will connect with the Cindy Waxman amphitheater and path, and pass through the Hacienda grounds.
- G2.** Upper Old Donald Drive, past the proposed entrance gate, is not open to motorized vehicles. This path retains some of the old pavement, and starting at the gate, follows the main ridgeline up through the Mulholland Ridge Preserve, ending at the Orinda Oaks Open Space Preserve.
- G3.** A grave road from the Mulholland Ridge follows the ridgeline over to the EBMUD Mulholland Reservoir.
- G4.** A dirt fire road starting from the paved portion of old Donald Drive, heads north and then down the ridge to connect with Laird Drive across from the Rheem Elementary School.

G5. A dirt fire road starting from the paved portion of old Donald Drive, heads north and then down the ridgeline to join up with Ascot Drive, one of the entrance roads to the Mulholland Ridge Preserve.

H. Heritage Trail

Proposed Trail

From the Moraga Library, a proposed bridge will cross the stream into the Moraga Commons, and a trail will continue around the backside of the Park, past the frisbee golf, and join the paved portion of the trail along Moraga Road.

I. Los Encinos Trail

Proposed Trail

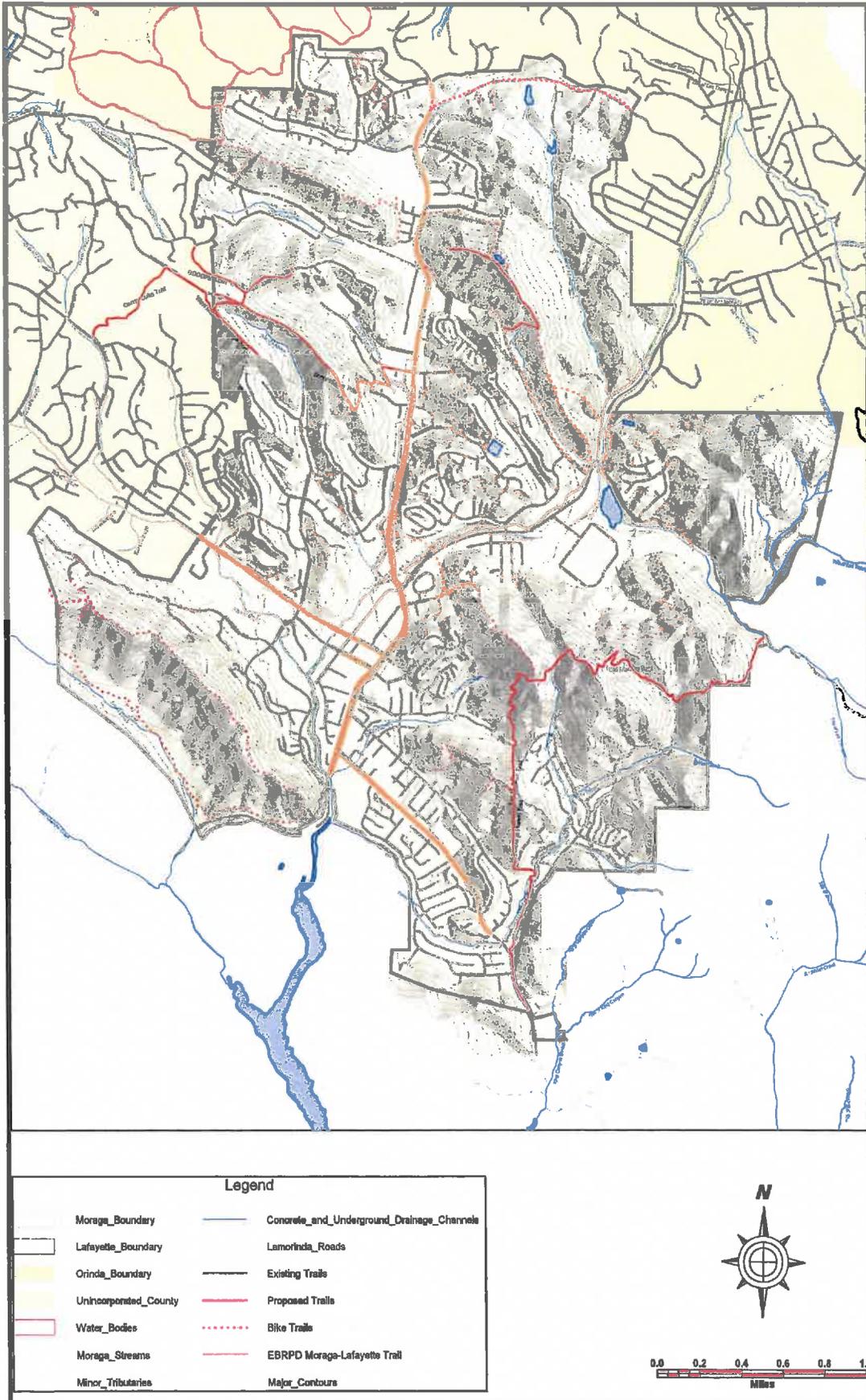
As proposed by the developer, these trails will begin from the end of Baitx and then traverse through the grassy hillsides behind Larch Avenue, connecting on the other side to the Old Moraga Ranch Trail (C2 description above).

J. Rheem Reservoir Trail

Proposed Trail

This trail will run from either behind the old Fire Station or Carroll Ranch, starting at the end of Hanson Court, and go to the top of the Campolindo Ridge paralleling Rheem Blvd. The trail follows the ridge to the Rheem Reservoir water tank and connects with the EBMUD Rim Trail that leads over to the Lafayette Reservoir. We propose spur trails running down the ridge to Zander Drive and LaSalle. In Orinda, surface streets such as Zander to Alice to Goodfellow (in Moraga) will connect with the Mulholland Ridge Trail (G1). A trail running down LaSalle Drive and/or behind Campolindo High School will connect with the Rheem Boulevard trail (B1).

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BIKEWAY LIST

Table 8 lists the recommended but unbuilt segments of the proposed Town-wide bikeway network. These bikeway segments represent the gaps in the proposed countywide network whose completion would join together existing bikeways and trails in a comprehensive system of facilities. The segments listed and shown as proposed on the recommended bikeway network illustrate the recommended *connection* not necessarily the recommended alignment. While the proposed bikeway connection may be shown on a particular roadway, the final alignment may end up using different streets and paths. Local jurisdictions and agencies will need to work closely with adjoining jurisdictions, and affected citizens and businesses, to determine the most effective and appropriate design and alignment for the connection. Many of these connections, especially where traffic volumes are high and right-of-way limited, must overcome significant obstacles before they can or should be built.

These are not the only bikeway facilities, however, needed to achieve the goals and policies of the MBPP. The Town is pursuing many other on- and off-street bikeways to address specific local safety and access concerns and to create the well-connected network of facilities needed to encourage more bicycling. This broader network will provide access to the countywide network or transit and other key destinations could gain higher priority than those on this list when funding is allocated. (Appendix F contains more detailed descriptions of the unbuilt segments listed in Table 8 as well as examples of bikeway projects being actively pursued by local jurisdictions and agencies.)

A column for Comprehensive Transportation Project List (CTPL) numbers has been included in Table 8. The CTPL is maintained by the Town and includes projects and programs designed to carry out the strategies of the 2002 General Plan.

Name	Class	Length (mi.)	CTPL#
Lamorinda Linkages (Countywide Project)	III	3.9	
Palos Colorados Trails	--	1.0	A
Rheem Bike + Jogging Trail	III	1.3	B1
Rheem Hiking Trail	--	2.1	B2
Buckingham Trail from Moraga Rd.	--	0.4	B3
Bollinger Canyon Road	--	0.3	C1
Utah Easement Trail	--	1.1	D
Indian Ridge Trail	--	2.1	E
Indian Valley Trail	--	1.6	F
Heritage Trail	--	0.2	H
Los Encinos Trail	--	0.8	I
Rheem Reservoir Trail	--	1.4	J
TOTAL	--	16.2	--

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END OF TRIP FACILITIES

Although no specific locations are identified in Moraga to date for changing and shower facilities, the Town is encouraged to modify current ordinances to require these accommodations in appropriate new development.

PRIORITY CORRIDORS

The previous map illustrated the proposed Town bikeway network, with nearly 11.2 miles of on- and off-street bikeways not yet on the ground. While all of them would benefit bicyclists, segments need to be ranked to determine where best to focus efforts. (Identifying priorities in an adopted bikeway plan is a specific requirement for BTA funding.) Priority bikeways selected for this CBPP were based on the planning criteria described below. The Authority will use the same basic criteria to review applications for funding for bicycle projects.

Destinations Served The actual number of schools, employment centers, parks, commercial centers, and transit centers served within a reasonable distance of the project. Larger facilities, such as regional parks, were given two points.

User Groups Bikeways that would attract a broader array of user groups, including school children, families, less experienced bicyclists, and pedestrians, received higher scores.

Feasibility Projects that have preliminary design completed or appear to have relatively few feasibility constraints received higher scores.

Safety Projects that addressed safety concerns, especially on busy streets, received higher scores.

Connectivity Projects that provide new connectivity or close major gaps and do not duplicate other nearby facilities, received higher scores. (Connectivity to the regional system will be a consideration for local bikeways on funding applications.)

Public Input Projects that were identified as priorities by the public received higher scores. The top bikeway corridors are listed in Table 8 and described on the previous pages. They are not in priority order. Another project, Rural Road Improvement Project, has also been included to encourage those agencies with jurisdiction over rural-type roadways to consider bicycle-friendly concepts, including pullouts, shoulders, and signing, to improve bicycle safety along these routes. Finally, a project focusing on completing major regional trails is added to emphasize its importance to not only the county but the region, as well.

It is also important to note that all of the priority corridors are “gap closures”, that is, they would fill a missing link on the Town-wide Bicycle Network. Although these priorities focus on these gaps in the Moraga system, the Town should also consider other projects that would im-

prove the environment for bicyclists. When allocating funding for bicycle projects, the MBPP recommends that the Town consider improvements to existing facilities on that system and other safety improvements and local connections as well as gap closures on the countywide system. Using the preceding criteria, these other improvements could score as high as, or higher than, gap closures on the countywide system.

All proposed bikeways on the recommended countywide network will need to go through a feasibility process locally. Based on this analysis, the ultimate alignment may be altered as well as local priorities.

BIKEWAY IMPROVEMENT CORRIDOR

Lamorinda Linkages

Agency(ies) ..Lafayette, Moraga

Type Class II/III

Miles 3.9 (unbuilt portions)

Next Steps Feasibility Analysis, Design, Local Adoption

The Lamorinda area, comprised of the communities of Lafayette, Moraga, and Orinda, can be a challenging place to bicycle due to the hilly terrain and narrow, windy roads. Two of the most traveled roadways in Lamorinda are Moraga Way and Moraga Road. Moraga Way links the Orinda BART station to downtown Moraga, while Moraga Road joins the downtowns of Lafayette and Moraga.

Moraga Road also has bike lanes from the intersection with Moraga Way to the Lafayette boundary. Within Lafayette, the street is windy while climbing up and down hills and has little to no shoulder area for bicyclists. A Class III bike route is recommended between School Street and Old Jonas Hill Road to alert motorists of bicyclists.

Moraga Way is a Class II facility along the entire corridor but sidewalks are scarce, forcing pedestrians to share bike lanes with the bicyclists. Improvements should be made within the corridor to provide better walking conditions.

One alternative to both of these busy roadways is a bike route along the Acalanes Road-Glorietta Boulevard corridor through primarily residential areas. Acalanes Road would connect to existing bike routes on El Nido Rand Road and Mt. Diablo Boulevard. Glorietta Boulevard proceeds to Moraga Way, which has existing bike lanes. Rheem Boulevard would be added to

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this project to connect the route on Glorietta Boulevard to the existing bike route on Rheem Boulevard in Moraga that leads to Moraga Road.



Narrow shoulders with steep drop-offs are perilous to the bicyclists riding along Moraga Road.

Rural Road Improvements

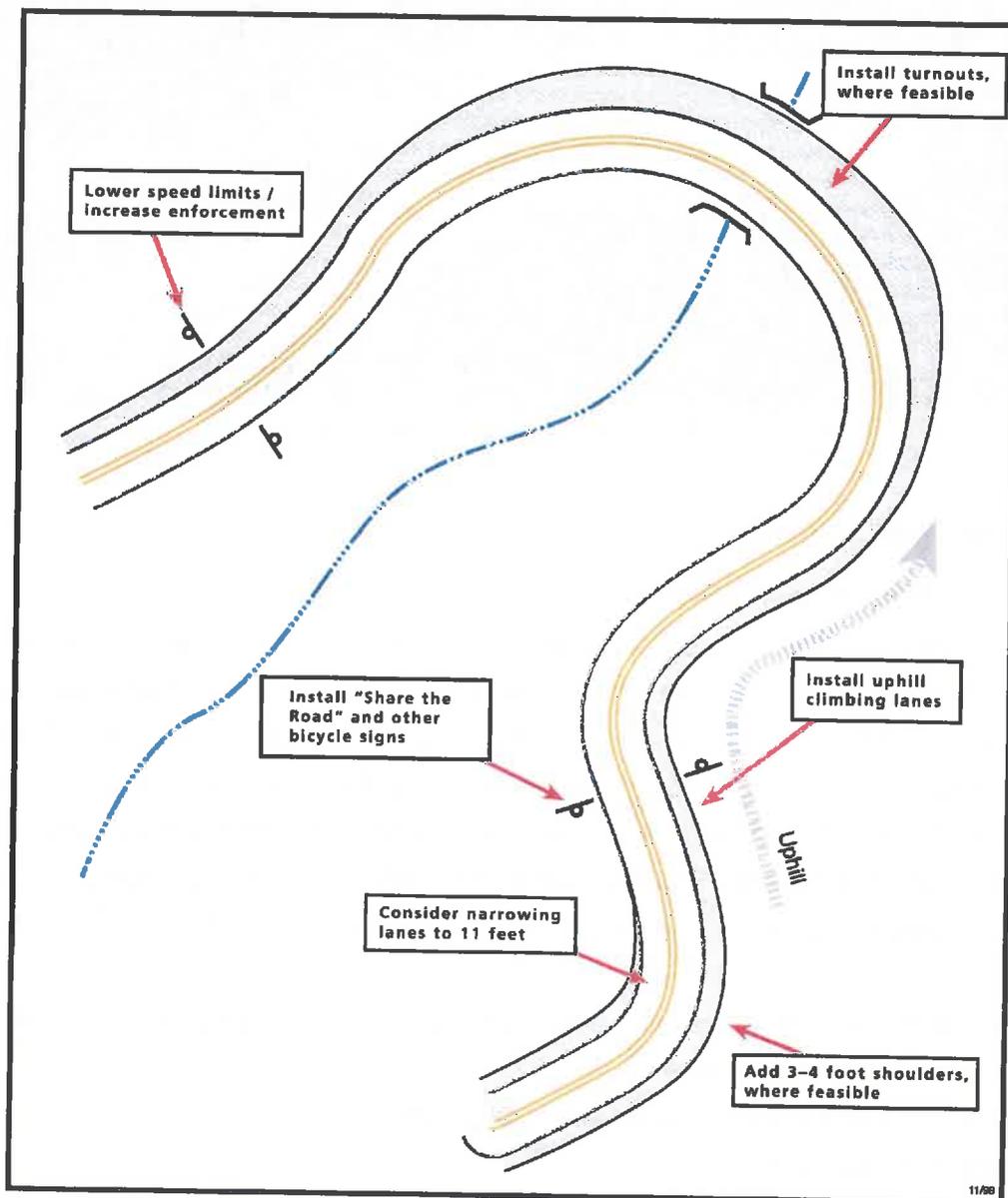
Agency(ies) .. County, local jurisdictions, Caltrans

A “rural road” is considered any unimproved roadway with no (or limited) curbs, gutters, or sidewalks. While such roadways are often located in more rural areas, many may be found within the incorporated boundaries of Contra Costa cities. Rural roadways in undeveloped areas are often popular routes for recreational bicyclists, such as Pinehurst Road in the Canyon area.

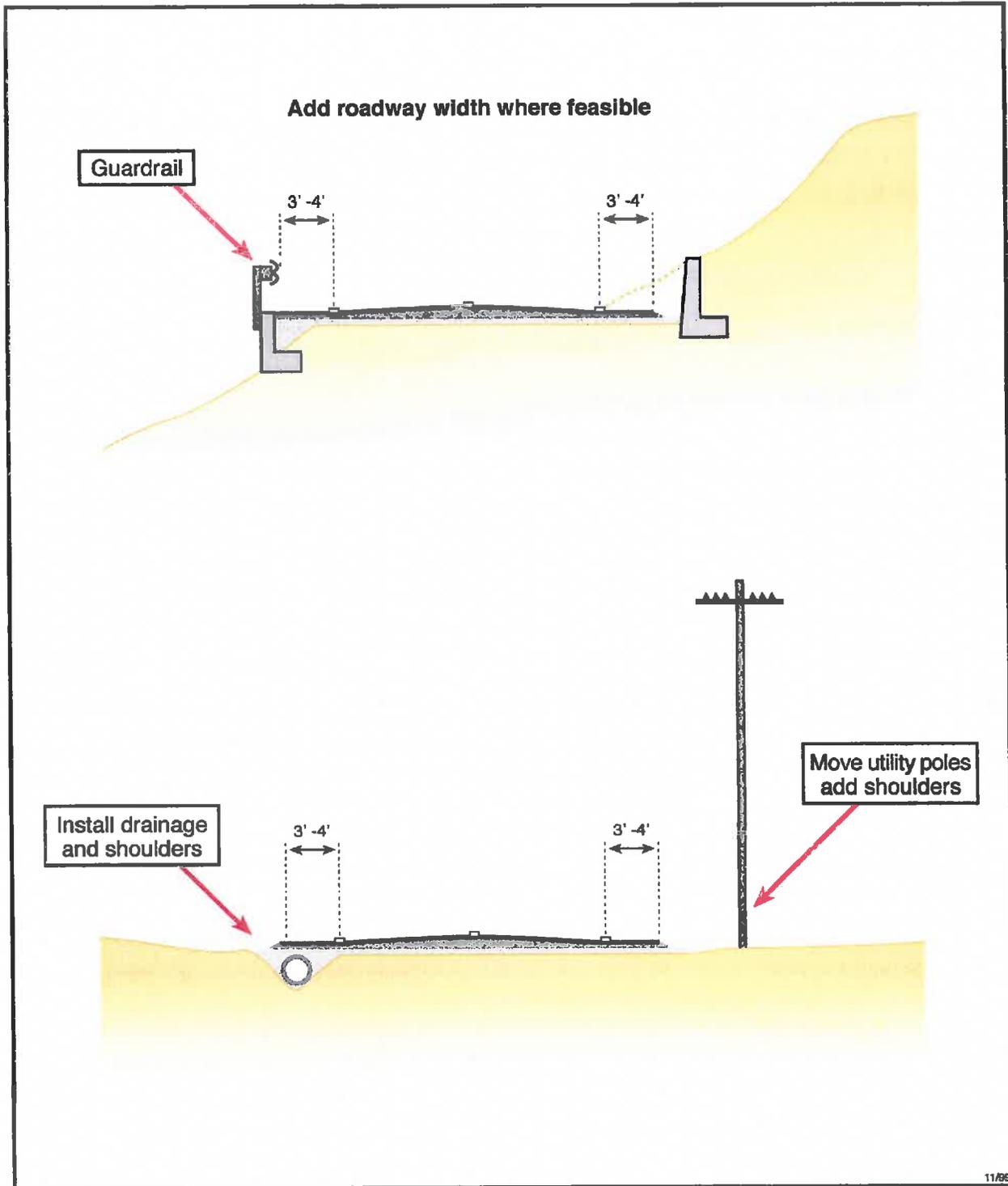
The improvements outlined in this project are designed to address the various problems on rural roads identified during public outreach on the CBPP. The Town of Moraga could use a combination of any of the following mechanisms (see Figures 9 and 10 on following pages for illustrations):

1. Advisory and warning signs, including, where appropriate, “Watch for Bicyclist” signs
2. Shoulder widening or new shoulders
3. Travel lane re-striping where sufficient width is available
4. New or improved turnouts
5. Enhanced roadway surface maintenance

Striping of lane edges and bike lanes, although not common in rural areas, may be desirable in many parts of the county. Contra Costa is somewhat unusual in that major urban areas are separated undeveloped and rural hills, and many of the connections between these areas are two-lane roads built to rural road standards. These roads, because they connect these urban areas, often carry higher traffic volumes and, because they run through hills, often have limited sight distance at curves. The County is currently planning to create a number of Class II facilities planned in these rural areas. A good example of a roadway on the countywide network within the Town of Moraga includes Canyon Road.



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CHAPTER 5

PEDESTRIAN NETWORK

WE ARE ALL PEDESTRIANS AT SOME TIME, whether strolling through a park, using a wheelchair from BART to work, skateboarding to school, or walking to the post office. This chapter introduces the elements and actions that are needed to create a safe, well-designed system of pedestrian facilities. Recommended countywide pedestrian projects are described at the conclusion of this chapter.

Pedestrian Needs

A well-designed and well-maintained system of pedestrian facilities—one that includes well-marked crosswalks, sidewalks and pathways of adequate width, and frequent connections—can encourage more people to walk. Sidewalks and pathways, the most basic elements, need to form a connected network. They need to be wide enough to comfortably accommodate the expected pedestrian volume. Surfaces should be kept as level as possible. Intersections should have well-designed curb ramps on all corners. Crosswalks should be well marked and visible. Traffic signal phasing should allow adequate time for pedestrians to cross. Streetlights may be needed in some locations to improve visibility of nighttime crossings. Finally, the connected network must provide access to destinations that attract pedestrian travel, such as schools and parks, neighborhood shopping, transit stops, libraries, post offices, and other public facilities.

AMERICANS WITH DISABILITIES ACT OF 1990

Persons with disabilities are particularly aware of design features that contribute to improved walking or rolling conditions. The Americans with Disabilities Act (ADA) of 1990 made the country realize the particular needs of physically and mentally impaired individuals. This civil rights act prohibits public entities from designing new facilities or altering existing facilities that are not accessible to people with disabilities. As a result of ADA, curb ramps are a basic component of all sidewalk construction.

Sidewalk construction, curb ramp design, and other accessibility standards have been developed on a federal level in two documents, the Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG). States are given the option to adhere to one of these, but may also adopt more stringent standards than

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the Federal minimum guidelines. Caltrans conforms to the policies of UFAS and Title 24 of the California Code of Regulations. Title 24, developed by the Division of the State Architect, has some stricter accessibility requirements than UFAS. In 2001, the Federal Highway Administration released *Designing Sidewalks and Trails for Access, Part II, Best Practices Design Guide* to provide the most up-to-date guidance on the design and construction of accessible pedestrian facilities.

Designing pedestrian facilities to accommodate persons with disabilities improves the walking experience for all users. Curb ramps are helpful to parents pushing strollers, delivery persons pulling dollies or carts, and small children on bicycles. Wide sidewalks invite people to stroll side-by-side and enable wheelchairs, bicycles, strollers, and scooters to pass one another. Smooth surfaces reduce the risk of elderly pedestrians and small children tripping. Therefore, whenever one is analyzing, planning, or designing pedestrian facilities, accommodating persons with disabilities must be of utmost concern.

Existing Pedestrian Facilities

The state of pedestrian facilities in Moraga is extremely variable. Some places have good facilities and some places do not. Many older—and, encouragingly, some newer—neighborhoods and downtowns have extensive, well-connected and well-maintained sidewalks, paths, and crosswalks. Many commercial projects and residential subdivisions developed over the last 50 years, however, were built without sidewalks. These developments were designed for motor vehicle access and sidewalks were seen as unnecessary. Other areas were developed without sidewalks in an attempt to preserve a “country living” quality at a time when Moraga was less populated. National standards often suggested doing without them to reduce the cost of development. In some places, sidewalks were developed only on one side of the street or in a non-continuous, disjointed fashion.

In many neighborhoods, especially neighborhoods that were not developed as part of more formal subdivisions, sidewalks are missing altogether. These more incrementally developed areas are often served by narrow roadways with neither shoulders nor sidewalks. Adding sidewalks after the fact is difficult: adequate right-of-way is often unavailable or difficult to develop. Residents have often “adopted” undeveloped right-of-way and have incorporated it into their front yards. Many residents feel that sidewalks would not be in keeping with the area’s “semi-rural” character. Parking on sidewalks is another problem in some areas, especially where the roadway is bordered by a “rolled curb,” which allows motorists to easily drive their ve-

hicles onto the sidewalks. Parking along shoulders is also problematic when there is no alternative location for pedestrians to walk.

Older retail areas, especially older downtowns such as Martinez, often have well-developed pedestrian systems with wide sidewalks, clearly marked crosswalks, and slower vehicle speeds. Many areas, such as downtown Brentwood, have incorporated pedestrian-friendly features such as “bulb-outs,” which reduce the distance pedestrians must cross at an intersection, and improved intersection lighting. However, commercial areas built after World War II often have narrow or discontinuous sidewalks or none at all. Many of these areas were developed along wide arterial streets to accommodate automobile access. The width of these streets requires considerable time for pedestrians to cross, especially younger and older citizens. In some cases, sidewalks are built directly adjacent to the traveled way with no separation between pedestrians and adjoining high speed traffic, as found along Willow Pass Road in Concord and San Pablo Avenue.

Most major arterial streets within Contra Costa have sidewalks. While some streets have sidewalks built directly adjacent to travel lanes, most notably Treat Boulevard, others separate sidewalks from adjoining travel lanes by a planting strip. While some areas, such as the intersection of Treat with Oak Grove and Bancroft, are served by sidewalks along the streets themselves but are not always connected to adjoining land uses with other sidewalks or paths.

Recommended Improvements

The following actions can help create the safe, direct, and well-connected system of facilities needed to encourage more Moragans to walk. More detailed design guidelines and recommendations can be found in Appendix B.

IMPROVE SIDEWALKS

The sidewalk is the most obvious element of the pedestrian network. The sidewalk must have a clear path wide enough to accommodate the widest wheelchair, baby carriage or similar device as well as the expected volume of pedestrian traffic. This “clear zone” must be free of street furniture, signposts, sandwich boards, and any other obstructions. In most residential neighborhoods in Moraga, a five-foot sidewalk would provide enough space for two people to walk side by side. Sidewalks along arterial or major streets should have wider sidewalks, especially if the sidewalk abuts the curb, to provide increased distance between pedestrians and vehicles. Where adjoining businesses or other destinations would attract more pedestrians, the sidewalks should be about seven feet wide to accommodate wheelchairs traveling side-by-side, or two

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people walking together while passing a third. Where even higher pedestrian use is expected, such as in downtowns, on shared-use paths, or around schools, community centers, and parks, 10 to 12 feet is preferable.

IMPROVE PEDESTRIAN CROSSINGS

Safe and clearly marked street crossings are critical parts of a pedestrian network. The most challenging aspect of pedestrian travel are crossings, where nearly all pedestrian-motorist collisions occur.

One method to reduce pedestrian-motorist conflicts is to shorten the crossing distance. Pedestrian refuge islands, curb extensions, reducing curb return radii, and eliminating a travel lane are popular measures used to reduce the width of the intersection. A good example can be found along Contra Costa Boulevard in downtown Pleasant Hill where pedestrian islands are also equipped with pedestrian push buttons if one cannot cross the entire roadway during one cycle.

Another way to increase pedestrian safety is by using devices to warn motorists of the presence of pedestrians, such as signs, signals, and lights. Removing sight obstructions, such as parked cars, trees, and signs, also improves visibility.

Traffic signal timing is an important aspect of pedestrian crossing safety. Some pedestrians, especially people with mobility impairments and the elderly, need additional crossing time. Longer crossing times should be considered in areas expected to serve slower pedestrians, such as near retirement homes. Agencies must balance the need for adequate pedestrian crossing times with traffic flow. When crossing times are too long, motorists can experience extra delay at the intersection. When traffic cycles are too long, pedestrians can grow impatient and cross during gaps in traffic. Pedestrian actuated signals are an option to respond to pedestrian crossing demand.

Some conditions may require more extreme treatments. For instance, pedestrians are restricted from crossing some intersections due to the complexity of the turning movements or poor visibility. A special bicycle-pedestrian overcrossing or undercrossing may be constructed to overcome such restrictions or to cross a large barrier, such as an interstate highway or major arterial roadway. However, these treatments are generally reserved for unusual situations as they are very expensive.

On long blocks in pedestrian districts or at schools, a mid-block crossing may be justified. These crossings must be well designed and highly visible to avoid conflicts.

PROVIDE SIDEWALK BUFFERS

The level of comfort a pedestrian experiences while walking on a sidewalk can be enhanced with a planting strip or a buffer zone. Extra space between the sidewalk and the curb protects pedestrians from being hit by opening car doors or splashed by water accumulated at the side of the roadway. It also increases the sense of safety while walking beside heavy or fast traffic. This buffer space can be used for streetscape improvements, further enhancing the attractiveness of a corridor for all users, or as space for other corridor amenities such as poles and signs. Buffers should be two to four feet along residential streets and four to six feet along arterial or major streets.

ENSURE CONNECTIVITY

Modern developments, whether commercial and industrial projects or residential subdivisions, have often created connectivity challenges for pedestrians. They are commonly separated from neighboring land uses by barriers like walls, and are typically planned with limited access points. For instance, people must often walk hundreds of feet out of their way to a collector street to reach the entrance of a neighboring subdivision. By including short, direct pedestrian connections between adjoining land uses, jurisdictions can make walking (and bicycling) more attractive. These connections between adjacent land uses along access easements provide “short-cuts” not available to motorists.

IMPROVE THE STREETScape

In some areas, a higher level of attention to the details of the pedestrian environment is justified by expected high pedestrian use and to encourage pedestrian activity. Streets where the elements are scaled to human size rather than vehicle size are attractive to pedestrians. Streetscape improvements such as public art, benches, drinking fountains, trash receptacles, special transit shelters, and pedestrian-scaled lighting fixtures are examples of amenities that help balance the pedestrian-motorist environment.

Alternative Sidewalk Materials

To meet ADA requirements, a walkway must be firm, stable, and slip-resistant. Portland cement concrete is the most widely used sidewalk material for its versatility and durability. When properly maintained, it can last one hundred years. Asphalt is an alternative to concrete that is usually less expensive, but requires more maintenance and lasts only about 40 years.

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Brick, aggregate, and cobblestone are other materials that are used, often for their decorative properties. These are more costly and may not be as smooth or slip resistant. However, they are quite visually appealing and are a good choice for sidewalk borders or buffer zones.

Unpaved trails can still meet ADA requirements with materials like decomposed granite, packed soil, and other natural surfaces with proper base material preparation. Soil stabilizers can also be applied to bind soil or aggregates into a hardened, durable surface.

Illumination

Good lighting can help improve pedestrian safety, especially at intersections. Lighting pedestrian facilities also increases the comfort and perception of personal security, thereby influencing route choice and their decision whether or not to walk. In commercial areas, local businesses can help by keeping front windows lit, which not only provides lighting to passersby but also encourages after-hours window shopping. Walnut Creek has a lamppost adoption program that grew out of the Downtown Enhancement and Street Lighting Project. Individual contributions help to fund the replacement cobra-style streetlights with “old town” decorative pedestrian lighting. However, in residential areas, the brightness and style must be tailored to the neighborhood experience.

Lighting off-street pathways can create some controversy. While some people may feel more secure on a lit pathway at night, opponents are concerned that this could create attractive places for undesirable activity, invades privacy, and causes light intrusion on neighboring property. Jurisdictions and other agencies will need to work with adjoining businesses and residents to decide whether and how to add lighting.

Landscaping and Street Trees

Landscaping and street trees enhance the walking experience and provide shade. However, vegetation must be carefully selected to minimize future maintenance and safety issues. Upward branching trees and low growing shrubs are ideal selections to provide shade without blocking visibility. Care must be given to selecting trees with root structures that will not damage sidewalks. Also, trees and shrubs must be trimmed to avoid creating hazards for the visually impaired and to provide adequate sight distance.

Adjoining Design

Pedestrian facilities can attract greater use where they are adjoining by buildings and spaces that provide pleasing and interesting views. In downtown areas, vibrant, changing window dis-

plays instead of blank walls and covered windows or parking lots creates a more engaging, and thus more attractive, environment. Sidewalks that are bordered by a “streetwall” of welcoming storefronts can persuade people to walk from place to place, creating both more pedestrian and economic activity. Limiting the amount of parking along sidewalks or providing buffers between parking and sidewalks can also help define the pedestrian sphere.

APPLY TRAFFIC CALMING

Over the past several years, “traffic calming” has grown in popularity as a technique to improve both bicycle and pedestrian movement, especially in residential areas. Traffic calming devices are installed to slow motorists, increase awareness of bicyclists and pedestrians around them, reduce cut-through traffic, and reduce the frequency of higher speed collisions.

Common traffic calming devices include:

- **Traffic circles** force motorists approaching an intersection from all directions to slow down. This allows more opportunity for pedestrians to cross the street.
- **Curb bulb-outs, chockers, and neckdowns** reduce the width of the street, thus decreasing the crossing distance for pedestrians and slow motor vehicular traffic.
- **Diagonal diverters** prohibit through traffic by forcing motorists to turn at intersections. The diverter is typically designed to allow bicycle and pedestrian through movement. A partial diverter can limit traffic access in one direction but allow through traffic in the opposite direction. Partial diverters also narrow the crossing distance for pedestrians. Street closures are a form of a traffic diverter that should only be utilized in extreme cases.
- **Speed humps** are raised asphalt devices that force automobiles to slow down. Well-designed humps work well for bicyclists. Raised intersections and raised crosswalks serve a similar purpose while boosting driver awareness of pedestrians.
- **Raised crosswalks**, like speeds humps, are raised devices (often using brick or other “special” paving to distinguish it from the street) designed to slow automobiles and to emphasize pedestrian movement. The crosswalks are usually at the same level as the adjoining sidewalks and are most often, but not exclusively, used for mid-block crossings in commercial or higher-density residential areas.
- **Narrower streets** affect motorist behavior in a psychological manner. If the driving space is perceived as narrow, motorists will react by driving more carefully. Narrowing the street—or making it appear so to motorists—can be achieved in a number of ways, including street

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trees, striping (bike lanes), contrasting pavement or texture on the roadway edges, and on-street parking.

Many cities around the country have created neighborhood traffic plans. These involve residents and city staff working together to find solutions to cut-through traffic, speeding vehicles, and neighborhood safety problems. Traffic calming devices typically are used to accomplish these goals.

IDENTIFY AND IMPROVE PEDESTRIAN DISTRICTS

Pedestrian districts are areas of mixed or dense land use and intense or potentially intense pedestrian activity. Generally, these areas:

1. Contain a dense mix of residential and commercial uses and discourage more auto-oriented uses,
2. Have convenient and frequent transit connections,
3. Be right-sized (that is, not too small and not too large),
4. Have visually interesting and pedestrian-scaled buildings,
5. Include a safe and well-connected set of pedestrian facilities, and
6. Have parking lots that are separated from pedestrians.

The MBPP recommends that the Town identify pedestrian districts where the number of people walking is already significant or where increasing the number of pedestrians would support local goals for the district. As part of this designation, the Town would establish policies and guidelines for these districts to create a well-functioning pedestrian system and supporting land uses. These design standards and guidelines for these districts would emphasize the mobility needs of pedestrians at least as needs for the movement of vehicles. The 2002 General Plan would provide the basic policy direction and the designation of each district, while specific plans or redevelopment plans can outline detailed improvements to the pedestrian environment as well as improvements that support the health and viability of the businesses and neighborhoods within the district. Changes to Town zoning and subdivision standards could be made to provide alternative development standards within pedestrian districts. Finally, the Town can use these plans and policies, as well as surveys of streets within its control, to identify improvements and include them within capital improvement programs. Downtowns, neighborhood retail hubs, transit-oriented developments, college campuses and surrounding areas, mixed-use develop-

ments, office parks, and even strip retail centers could all be developed as pedestrian districts. **Pedestrian Improvement Projects**

Pedestrian trips average less than one-half mile. Highly localized improvements such as curb ramps or sidewalk linkages to transit are more important than a regional pedestrian network. Therefore, recommended pedestrian projects and programs consist of improvement packages that can be implemented in specific areas or on specific corridors by local agencies. In some cases, projects listed as bikeway improvements, such as bike paths or shared use trails, serve pedestrian needs as well. Two basic pedestrian enhancement types are presented in this plan: Americans with Disabilities Act (ADA) Improvements and Pedestrian Districts. Appendix F also includes pedestrian-related projects that local jurisdictions and agencies are actively pursuing.

PEDESTRIAN IMPROVEMENT PROJECTS

Pedestrian Districts

Next Steps Modify General Plan Transportation Elements, Master Plans, Streetscape Plans, Adoption

Improving the pedestrian environment in the Town's commercial areas, employment areas, and downtowns may establish a "pedestrian district." Designating these districts would allow for more innovative treatments of the public right-of-way, focus improvements in targeted areas, and promote walking as the primary mode of transportation.

Identifying pedestrian districts can occur during the General Plan process, perhaps as part of the Circulation Element, and identified on land use maps. Other possible methods to enhance or create pedestrian districts include:

- Subdivision requirements** for new developments may call for mixed uses, narrower streets, shorter blocks, and additional emphasis on the pedestrian environment.
- Overlay districts** place requirements and regulations in addition to the base zoning requirements in specific areas to achieve goals. Pedestrian overlay districts could be applied to downtowns, areas surrounding college campuses, and transit centers to require additional pedestrian amenities and encourage pedestrian activity.
- Specific Plans** provide an overall and detailed plan for land uses and development within a more circumscribed part of a community. The specific plan lays out design guidelines and

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improvements within the public right-of-way, including pedestrian improvements and can be the basis for assessment districts used to finance these improvements.

- **Design guidelines** can be created to ensure new public and private development meets certain design standards and provide necessary pedestrian amenities.
- **Assessment districts** require property owners to pay a fee to cover special improvements such as landscaping, ornamental lighting, or sweeping.

To delineate a pedestrian district, jurisdictions should locate areas that meet, or could meet, most of the following characteristics:

- **Land Use** is the most critical aspect of a successful pedestrian district. The area should be zoned to encourage a dense mix of residential and commercial uses and discourage more auto-oriented uses such as fast food restaurants with drive-up windows and auto dealerships or repair shops. This strategy makes it more convenient to walk to many destinations for work, leisure, or running daily errands within a relatively small area. A mix of uses can also instigate round-the-clock activity.
- **Convenient and frequent Transit Connections** provide attractive alternatives to driving and broaden the realm one can travel without a vehicle. Similarly, a pedestrian district should welcome bicycles by providing ample bicycle parking and bikeways throughout the district to encourage non-motorized movement.
- **The District** must be large enough to promote a relatively substantial amount of development and land use mix but not so large that people may feel compelled to drive to reach destinations within the district. The Portland Pedestrian Plan recommends an area no less than 600 feet and no more than one mile in any direction.
- **The visual interest of Building Facades** is important for pedestrians. Every effort should go into avoiding blank walls, plated glass, vacant lots, etc. and encouraging window displays, sidewalk cafes, art work, and interesting architectural design elements that help create a sense of place and welcoming environment.
- **All Roadways** within the district should contain well-designed, convenient and connected facilities so that pedestrians feel welcomed. Wide, unobstructed sidewalks should be built on both sides of each street, and curb extensions, street trees, lighting, and improved crosswalks should be provided. Traffic calming devices, lower speed limits, narrowed travel lanes, traffic signals timed to walking speeds, and similar improvements lessen the conflicts between pedestrians and automobiles.

- **Parking Lots** should not dominate views from the sidewalk. Surface parking should be screened from the right-of-way by walls or fences and landscaping. However, for security reasons, the screening should be at a height (3 to 4 feet) that permits visibility from the sidewalk. When possible, parking garages should have commercial uses on the ground level for continuity of the district. Parking should be allowed on the street to provide more protection for pedestrians from traffic and to serve as a form of traffic calming. Direct pedestrian connections should be provided to parking lots and walking routes should be well-lit when passing between buildings and along pathways within parking lots.

PEDESTRIAN IMPROVEMENT PROJECTS

Americans With Disabilities Act (ADA) Improvements

Agency(ies) .. Local public works, planning, and recreation departments, East Bay Regional Parks District, transit agencies

Next Steps Design standards, assessment/transition plans

Title II of the Americans with Disabilities Act (ADA) and the U.S. Access Board have developed guidelines for constructing new and altered “accessible” infrastructure for persons of all abilities. Local agencies that plan and construct pedestrian facilities should be kept informed of the latest recommendations.

Several projects and programs can address accessibility needs. First, agencies are advised to analyze current design standards and policies to ensure they meet or exceed current recommended standards. Sidewalk width, ramp construction (including coloration, tactile warning, and placement), crosswalk markings, pavement materials, driveway approaches, pedestrian signals (including audible signals), and signal timing are among the most basic elements that directly affect pedestrian and wheelchair mobility.

Second, local agencies should prepare assessments of the pedestrian facilities in their jurisdiction and develop a plan to correct deficient facilities. Locations to receive priority for improvements include institutions that serve people with disabilities, hospitals, senior centers, nursing homes and assisted living centers, downtowns, civic centers, public buildings, parks, community facilities, and transit routes and stations.

Some cities have developed programs that serve individual requests. For instance, if a child in a wheelchair cannot easily travel to school, gaps in the sidewalk system are closed and curb ramps installed. This demands a great deal of commitment by local jurisdictions but is in-

CHAPTER 7

SAFETY AND SUPPORT

EDUCATION, PROMOTION AND LAW ENFORCEMENT programs help make the general public aware of bicycling and pedestrian issues. Targeted campaigns are beneficial to reach out to specific segments of the population such as children for rules-of-the-road courses, transportation planners and engineers for bicycle- and pedestrian-friendly design strategies, commuters for encouragement and incentive campaigns, and the general traveling public for safety awareness campaigns. Law enforcement programs help ensure that all road users are abiding by the rules. Safety education classes for violators could target all road violators not only bicyclists and pedestrians.

Existing Programs

Promotion, education, and law enforcement are essential to achieve the goal of encouraging more bicycling and walking. This section presents some programs that local agencies, community organizations, and even individuals can initiate to improve the safety and recognition of bicycling and walking in their area.

EDUCATIONAL PROGRAMS

The school districts and police and city staff have a long history of trying to improve safety conditions for bicyclists and pedestrians. Although some police departments and school districts offer courses to children on basic bicycle and pedestrian etiquette and safety, especially on the importance of helmet use by bicyclists, safety training in Contra Costa is sporadic and lacks a consistent curriculum. The various curricula are usually derived from established programs developed by groups such as the California State Automobile Association, the NHTSA or the California Department of Health Services. The Contra Costa Office of the Sheriff does host police safety fairs and bike rodeos in some locations to educate children on safe cycling skills. The East Bay Regional Park District sponsors Bicycle Bell Give-Away programs, which involve trail education and the distribution of educational pamphlets. The Injury Prevention section of the Contra Costa County Health Department has published "Safe Cycling in Contra Costa," a booklet explaining equipment, traffic rules, off-street bicycling, and provides a list of resources in the county.

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velopment for the Richmond, El Cerrito Del Norte, Pleasant Hill, and Bay Point/Pittsburg stations.

Other transit agencies should follow suit. For example, small improvements at bus stops can make a difference, whether it be a bus pad or bike racks at locations where bicycles are often locked to other fixed objects. Even regular maintenance of transit centers and bus stops can make transit users more comfortable while awaiting their ride.

ACCESS IMPROVEMENT PROJECTS

Transit Access Projects

Agency(ies)..... Local agencies, community groups , transit agencies

Next Step..... Access studies

Transit agencies rely heavily on pedestrians and bicyclists as their core ridership base. For that reason, transit agencies have an interest in working with local jurisdictions to ensure that transit stops and stations are accessible to bicyclists and pedestrians. For example, a conventional bikeway network will involve minimal access to transit stops from a limited number of directions. In reality, bicyclists and pedestrians converge at stops from all possible directions, demanding a dense network of access.

Similar to Safe Routes to Schools programs, the Town would devise plans for a dense network of bikeways, sidewalks, and trails leading directly to transit stations, transfer points, and bus stops. This planning process would involve cooperation with the transit agencies, especially to build on access studies, neighborhoods and interest groups with particular consideration towards the elderly and people with disabilities. Improvements that may result from access studies include:

- Curb ramps and sidewalk gap closure
- Bikeway signage from all roadways and trails
- Bus pads for wheelchair lift deployment
- Intersection and signal modifications
- Direct access from nearby trails and neighborhoods
- Compliance with BART station access plans (Richmond, Pleasant Hill, El Cerrito del Norte, and Bay Point/Pittsburg station studies currently under development)
- Convenient and safe circulation to and through station area and to parking locations

TABLE 11 Transit On-Board Bicycle Policy Summary

AGENCY	BIKE CAPACITY	COMMENTS
AC Transit	2 on rack	No racks on Route G, routes using small vans, Transbay Express
Amtrak	2 per car	
County Connection	2 on rack	2 bikes allowed inside if no wheelchair passengers
Golden Gate Transit (Route 40)	2 on rack, 2 inside	
Tri Delta Transit	2 on rack	Racks for daytime use only, bikes on-board at night
Western Contra Costa Transportation Authority (WestCAT)	2 on rack	
Bay Area Rapid Transit (BART)	12 per car	Bikes prohibited during certain peak commute times; folded bikes always welcome

Recommended Improvements

Enhancing the link between bicycling and walking with transit is sometimes a gray area between the local jurisdiction and transit agencies. Many access improvements are the responsibility of the local jurisdiction. When cities update their General Plans or develop bicycle and pedestrian plans, a sincere effort should be placed on transit access.

Whenever feasible, bicycle and pedestrian "short cuts" to and from adjacent areas should be provided. Trail and sidewalk connections leading directly to a station makes the journey to transit easier and thus more attractive.

Adequate bicycle parking is a common concern for bicycle commuters. Satisfying the demand for bike lockers is recommended, especially for BART users. Because bicycles are not allowed during commute hours, some bicycle commuters rent two lockers, one locker at the station nearest home, another at the destination station holding another bicycle to finish the journey to work.

Moraga should consider developing transit access projects (see following description). Funding may be available in the future through MTC and could be supported in the Measure C reauthorization. Additional transit related projects being proposed by local jurisdictions and transit agencies are listed in Appendix F.

Meanwhile, transit agencies can take the initiative to improve certain conditions for bicyclists and pedestrians. For instance, in May 2000, the BART Board adopted an "Access Management and Improvement Policy" to address access issues at existing stations. The policy addresses expanding parking options (including bicycle parking), meeting ADA compliance, and working with local jurisdictions to plan and implement access improvements. Access plans designed to improve accessibility for all transportation modes at stations are currently under de-

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WestCAT (Western Contra Costa Transportation Authority) provides bus service to and from the El Cerrito del Norte BART station in the cities of Pinole and Hercules and the neighboring communities of Western Contra Costa. An express route serves Martinez.

BART (Bay Area Rapid Transit) has ten rail stations in Contra Costa extending to Richmond in the west and as far east as Pittsburg/Bay Point. Rapid population growth in the eastern portion of the county may lead to expanded BART service to the east.

BIKE PARKING AND STORAGE

Safe bicycle parking is a concern to many bicycle-to-transit commuters. Table 10 shows the bike parking capacity at Contra Costa rail stations and major transfer centers. Some bicyclists may need to bring their bikes with them to finish their trip from the stop or station. Table 11 shows bicycle capacity and restrictions for the seven transit operators.

TABLE 10 Bicycle Parking at Rail Stations and Transit Centers*

TRANSIT AGENCY	BICYCLE CAPACITY		TOTAL
	BIKE RACKS	BIKE LOCKERS	
Orinda BART Station	26	28	54
Lafayette BART Station	84	30	114
Walnut Creek BART Station	91	56	147
Pleasant Hill BART Station	308	90	398
Concord BART Station	126	40	166
N. Concord/Martinez BART Station	60	16	76
Pittsburg/Bay Point BART Station	24	19	43
El Cerrito Plaza BART Station	124	29	153
El Cerrito del Norte BART Station	154	27	181
Richmond BART & Amtrak Station	21	2	23
Richmond Transit Center	0	0	0
Martinez Amtrak Station	0	20	20
Antioch Amtrak Station	0	0	0
San Ramon Transit Center	25	12	37
Hercules Transit Center	2	6	8
TOTAL	1045	375	1420

* As of Summer 2002.

In addition, buses and transit providers can help riders by providing clear destination signage both on the buses and at stops. Real-time travel information has been implemented successfully in other parts of the country to help inform riders of the arrival and destination of buses. These systems, however, will require significant financial investments—at stops, on buses, and at centers of operation—that must compete for funding with day-to-day operations and maintenance needs.

The Americans with Disabilities Act of 1990 (ADA) requires all public transit operators to provide a special service to persons whose disabilities prevent them from using regular public transit along fixed routes. The ADA established criteria to determine which passengers are eligible for door-to-door paratransit service. Many other people with disabilities are able to ride fixed-route buses provided wheelchair lifts are available. “Kneeling”, the feature that allows the steps to be lowered several inches, and low-floor buses help people with limited range of motion embark and disembark from the vehicle.

Current State of Transit Links

Operators

Seven transit agencies operate in Contra Costa. A brief description of their service areas is described below.

AC Transit provides bus service to the western Contra Costa County cities of San Pablo, Richmond, and El Cerrito and to the unincorporated areas of El Sobrante and Kensington, in addition to Alameda County.

Capitol Corridor service provides intercity and commuter rail service from San José to Sacramento with stops in Contra Costa at the Richmond and Martinez stations.

Amtrak operates two rail lines through Contra Costa. The San Joaquin service is provided between Oakland and Bakersfield with stops at the Richmond, Martinez, and Antioch stations while the Coast Starlight provides service from Los Angeles north to Seattle with stops at the Richmond and Martinez stations.

County Connection (Central Contra Costa Transit Authority or CCCTA) operates 35 routes in the cities of Clayton, Concord, Danville, Lafayette, Martinez, Moraga, Orinda, Pleasant Hill, San Ramon, and Walnut Creek as well as the unincorporated areas in Central County. Also, an express bus operates between the Walnut Creek BART station and the Hillcrest Park and Ride in Antioch during commute hours.

Golden Gate Transit, although it primarily serves Sonoma, Marin, and San Francisco counties, does provide service between the San Rafael Transit Center and the El Cerrito del Norte BART station via Route 40 and to the Richmond BART/Amtrak station via Route 42.

Tri Delta Transit (Eastern Contra Costa Transit Authority or ECCTA) provides local service in Antioch, Bethel Island, Brentwood, Pittsburg, Oakley, Shore Acres, and Bay Point with express bus service to Martinez and the Pittsburg/Bay Point BART station. A luxury express bus operates between Antioch and Livermore during the week.

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- Pedestrian and bicycle-friendly transit vehicles

SAFE ROUTES TO AND FROM TRANSIT

Access to and from transit stops and stations can be challenging. Bikeways end before reaching the station, sidewalks may not lead directly to a stop, and street crossings may be inconvenient or challenging. A dense network of walkways and bikeways around transit stations, with provisions made for the physically disabled, is necessary. This includes signage to direct people to stations, curb ramps for wheelchair access, and bus pads for stops at unpaved locations. To provide these facilities, transit agencies must work together with the local jurisdictions.

STATION AND STOP AMENITIES

Various design elements and amenities at transit stations or stops can improve connections to transit and encourage transit ridership:

- Bicycle parking, both racks and lockers, as well as attended parking
- Well-lit and signed stations and stops
- All-weather paved waiting areas and/or shelters
- Pedestrian crossings at safe locations
- Trash receptacles to help keep the space clean
- Benches for long waiting periods and for the elderly and people with disabilities
- Space free of obstacles so pedestrians and bicyclists can easily locate the stop, bus drivers can quickly detect waiting passengers, and waiting passengers have an increased sense of security
- Clearly defined spaces for bicyclists and pedestrians using pavement with color, striping, texture, or other methods to help identify spaces that are exclusively for bicycle and pedestrian use such as bike lanes, crosswalks, and raised intersections; and designs that separate pedestrians from automobiles with features such as planter boxes, street trees, furnishings, or other design techniques

PEDESTRIAN AND BICYCLE-FRIENDLY TRANSIT VEHICLES

The ability to transport bicycles on buses and trains is perhaps the key ingredient to encourage bicyclists to extend travel distances. Both BART and Amtrak allow bicycles aboard cars, although BART restricts this during peak commute periods. Fortunately, most buses serving Contra Costa have front-loading bike racks. However, with storage for only two bicycles, racks often fill and force other bicyclists to wait for the next bus with no guarantee that it will have space, either. Some transit operators will allow bicycles on board, usually during off-peak times. Bicycle parking at stations and bus stops is an important solution to the on-transit capacity constraint.

CHAPTER 6

LINKS TO TRANSIT

IMPROVING LINKS TO TRANSIT CAN MAKE bicycling and walking a larger part of daily life, enhance transit, and enrich communities. Transit use can increase the range of travel for pedestrians and bicyclists by overcoming barriers such as the bridge on Canyon Road that crosses over San Pablo Creek at the Town's southern boundary, personal security concerns, nighttime travel, poor weather, and hilly terrain. Providing convenient transit services for bicyclists and pedestrians can attract new riders, expand weekend ridership with recreational bicyclists, and lessen demand for automobile parking spaces. Combining walking and bicycling with transit trips benefits communities by reducing taxpayer costs, air pollution, demand for park-and-ride land, energy consumption, and traffic congestion with relatively low cost investments. According to the 2000 Census, 12.5 percent of Moraga residents took some form of public transportation to work, and nearly all of them either walk, roll, or bike to and from transit stops.

This chapter addresses the ways bicyclists and pedestrians view and utilize public transportation. The varying needs of bicycle/transit and pedestrian/transit users are highlighted to show how design and facilities influence ridership. A summary of the various transit operators and existing station and transit center amenities show the current state of transit in the town and throughout Contra Costa County. Finally, recommended improvements to the transit system are presented that can potentially encourage people to consider integrating walking, bicycling, and transit trips more often.

Transit Rider Needs

Several factors can contribute to one's unwillingness or inability to utilize transit. The potential conflicts between the buses, cars, bicyclists, and pedestrians that converge on transit stations can make them difficult places to walk or bicycle. Once at the station, bicyclists may become further discouraged if bicycle parking is inadequate and bicycle access on buses and trains is restricted or prohibited. Pedestrians, especially those with disabilities, may find deficiencies in the pedestrian network that limit their ability to use transit. To reach transit and increase usage, bicyclists and pedestrians have three primary needs:

- A dense system of well-designed routes to and from transit
- Station and stop amenities

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valuable to the public. Cities may identify a lump sum amount in their capital improvement program (CIP) to address these special requests.

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Bicycle and pedestrian education for adults is less common. The League of American Bicyclists and the Effective Cycling Program do offer cycling education programs for adults, and the Delta Pedalers Bicycle Club in East County promotes bicycle safety and education through training, beginner, and family rides. Contra Costa County's Community Wellness & prevention Program funded a bicycle education pamphlet titled *Safe Cycling in Contra Costa* that outlines basic bicycle rules.

Some programs exist that help teach safe bicycling as well as help people get into the habit of bicycling. Bicyclists interested in bicycle commuting can contact RIDES for Bay Area Commuters, which provides potential bicycle commuters with a listing of experienced bicyclists that they may contact for advice. In Pleasant Hill, the Contra Costa Centre offered a Bicycle Access Program in 2001 to encourage more bicycle commuting to the Pleasant Hill BART station and Shadelands Office Park. Instructors were recruited from RIDES to conduct bicycle commuting safety and maintenance workshops, and a Bicycle Buddy Program and guaranteed ride home program were established for added incentive.

PROMOTION

Promoting biking and walking requires easily accessible information and activities that encourage novices to give it a try. For example, people who are interested in biking more may not be familiar with the best routes to take. Maps that provide information on bikeways and supporting facilities may be all that is needed to convince this person to bike. Agencies may wish to support the East Bay Bicycle Coalition's efforts to develop accurate bike maps for the county.

Walk-to-School Day in October is one way schools can encourage children and their parents that walking and biking can be a fun form of exercise and transportation. Some schools around the country have established Walk/Bike/Scooter-to-School Days on a monthly or even weekly basis to promote healthy commutes to school.

For adults, Bike-to-Work Day in May gives people the opportunity to give biking a try. RIDES for Bay Area Commuters promotes this event throughout the Bay Area with give-aways and prizes to encourage participation. Employers may encourage employees to try bicycling or walking to work by sponsoring bike fairs and races, providing lockers and shower facilities, providing convenient and safe bicycle parking for employees and customers, and offering incentives to employees who commute by bicycle or walking by allowing for more flexible arrival and departure times. Local agencies may offer incentives to employers to institute these improvements through air quality credits, lowered parking requirements, reduced traffic mitigation fees, or other means. "Walk to Lunch Days" could be a joint promotional activity with the local Chamber of Commerce to encourage walking.

To encourage increased bicycling and walking, interest groups are well positioned to capitalize on the growing interest in on-road and off-road bicycle and walking races and criterions. Events would need to be sponsored by local businesses, and involve some promotion, insurance, and development of adequate circuits for all levels of riders. It is not unusual for these events to draw up to 1,000 riders and walkers, which could bring some additional expenditures into the area.

Moraga can assist in developing these events by acting as a co-sponsor, and expediting and possibly underwriting some of the expense of, for example, police time. Efforts should also encourage these events to have races and tours that appeal to the less experienced cyclist. For example, in exchange for the Town agreeing to underwrite part of the costs of a race, the event promoters could hold a bicycle repair and maintenance workshop for kids, short fun races for kids, and/or a tour of the route lead by experienced cyclists who could show less experienced riders how to safely negotiate streets.

LAW ENFORCEMENT

Providing a safe environment for walking and biking requires law enforcement. Throughout the Town of Moraga, the police department enforces the rules of the road. The lack of helmet use by bicycle riders under the age of 18, riding against traffic and other violations of the vehicle code, and the absence of after-hours bike lights are common enforcement issues.

The East Bay Regional Park District's Regional Park Police and volunteer trail patrol enforce rules on the trails, most commonly illegal night bicycle riding and riding bicycles in prohibited areas. The EBRPD's volunteer trail patrols also provide informal trail etiquette information to trail users and act as liaisons between the user and the police.

Motorist education on the rights of bicyclists and pedestrians is virtually non-existent and is often limited to reading the drivers' manual at the DMV. Some motorists mistakenly believe, for example, that bicyclists do not have a right to ride in travel lanes and that they should be riding on sidewalks. Many motorists apparently do not understand the concept of "sharing the road" with bicyclists, or why a bicyclist may need to ride in a travel lane if there is no shoulder or it is full of gravel, glass, or potholes.

Law enforcement programs help ensure that all road users are abiding by the rules. Safety education classes for violators called traffic diversion programs could target all road violators, not only bicyclists and pedestrians. The Walnut Creek Police Department has developed a Bicycle Safety Course to decrease bicycle related incidents in the City. If a motorist or bicyclist has been stopped for a bicycle-related infraction and has previously been issued a warning citation, the bicyclist has the option of either going to traffic court or attending the two-hour safety course. The cities of Pleasant Hill and Martinez plan to adopt this program as well, and other cities may want to consider comparable programs. Walnut Creek PD is also developing a similar course for pedestrians.

Projects

This chapter has focused on ways to improve bicycling and walking through educational and promotional programs. Projects in the bikeway, pedestrian, and transit chapters focused on specific bikeways and general pedestrian facilities. However, the entire non-motorized system also depends upon other amenities to make it work. Six additional projects are recommended for local agencies to provide safer bicycling and walking conditions.

Bicycle parking and signage programs are recommended to encourage more bicycling and improve upon the functionality of the bikeway network. Other recommended projects apply

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to both pedestrians and bicyclists to improve access to particular sites. A safe routes to school program is described to both improve walking and bicycling conditions to elementary and middle schools and to promote these modes.

Two maintenance programs are presented that can maintain the integrity of existing bicycle and pedestrian facilities. One program specifically addresses the need to rehabilitate pathways and improve the amenities along the path. The other program recommends (1) a specific maintenance fund set aside for improvements such as sidewalk repair, bike lane and crosswalk restriping, and street sweeping that are safety provisions and (2) moneys set aside to improve upon existing facilities, such as installing loop detectors along bikeways.

Finally, options for a number of educational programs are offered to encourage more widespread design, awareness, and knowledge of safe walking and bicycling. These actions must be undertaken by a variety of groups for effective results.

SAFETY AND SUPPORT PROJECTS

Signing & Stenciling

Agency(ies) ..Local jurisdiction staff, recreation agencies, Caltrans

Next Steps Sign Plan, approvals, installation

This project addresses one of the most common concerns expressed in surveys and workshops: the lack of directional signage for bicyclists and pedestrians, and signs warning and advising motorists of bicycles and pedestrians on and crossing the roadway. Signing and stenciling are good examples of countywide projects that can be implemented by a single agency or by multiple agencies. This type of project lends itself to multi-jurisdictional cooperation, since sign and stencil consistency throughout the county is beneficial to the users—and cost effective for local agencies.

The project would consist of the following specific elements, all of which are (or will be) approved by Caltrans:

1. **Bikeway Logo Signs:** posted along the countywide corridors, this sign would help direct inter-city bicycle travel using a customized logo for the County. These signs can provide a numbered or named route designation as well.
2. **Bike Route and Bike Lane Signs:** where existing or new bikeway conform with specific Caltrans standards, these signs will help advise motorists to expect bicycles and provide assurance to cyclists that they can expect a consistent type of bikeway (see next page for illustrations). This type of sign is typically used in developed areas, and may be as close as every 500 feet.

3. **In rural areas, fewer signs are often needed or desirable:** Signs should be located in advance of very constrained sections where motorists and bicyclists will be sharing the roadway, typically with no shoulders and limited visibility.
4. **Share the Road signs:** Recently approved by Caltrans, the Share the Road sign is a simple but effective sign that should be used judiciously to maintain visual impact on motorists. It should be placed where there is a known regular flow of bicycles that are forced to share narrow travel lanes with motor vehicles, and especially where there is limited visibility and higher traffic volumes and/or speeds.
5. **Bikeway Stencils:** While bike lanes include pavement stencil markings, a new stencil type being tested in San Francisco to mark bike routes may be more effective on motorists and may help avoid visual pollution of too many signs. This stencil has an arrow with a bicycle symbol in it, and helps to educate motorists that bicycles are using this route and will be sharing travel lanes.

The criteria for the placement and number of signs and stencils is at least partially covered by four sources: the Caltrans *Highway Design Manual*, the Caltrans *Traffic Manual*, AASHTO's *Guide for the Development of Bicycle Facilities*, and the *Manual of Uniform Traffic Control Devices (MUTCD)*. Note that in California, all bikeway improvements must conform to Caltrans standards, and that other standards provide detailed information on the physical requirements for both signs and stencils. The exact placement and location of "Share the Road" and "Bike Route" signs, while officially approved by Caltrans, are not provided. Sound planning and engineering practice would indicate the following criteria:

1. On the approved bikeway system for each community only
2. At major intersections or changes in directions
3. Leaving villages or neighborhoods and entering a long stretch of narrow roadway
4. Preceding constrained areas, especially where there is (1) a narrow roadway, (2) very limited line of sight, and/or (3) a documented pattern of bicycle collisions.

The number of signs should be limited to locations where the need is greatest, in order to avoid visual pollution and diminishment of the impact of the signs. Signs may be requested by local neighborhoods and individuals, but the actual provision of signs would require review and approval by County engineering staff to determine whether signing is appropriate.

SAFETY AND SUPPORT PROJECTS

Bicycle Parking

Agency(ies) ..Local jurisdiction staff

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Next Steps....Field studies, Master plan

Bicycle parking is more common than ever, but there is room for improvement. Five recommendations are presented to build upon the parking inventory. Individual or groups of local agencies in Contra Costa could seek funding to purchase and implement bicycle parking in their communities. The bicycle parking could be strictly on public property, or also available to private entities on an at-cost basis. Sample comprehensive bicycle parking requirements for zoning ordinances is located in Appendix A.

Recommendation #1: Include bike parking as part of the development of new community facilities, such as libraries, parks, schools, village centers, and transit stations.

All bicycle parking should be in a secure, well lighted or highly visible, covered area, if possible. Bicycle parking on sidewalks in commercial areas should be provided according to specific design criteria, reviewed by merchants and the public, and installed as demand warrants. Generally, "U" type racks bolted or embedded into the sidewalk are preferred on downtown sidewalks, to be located intermittently and/or at specific bicycle destinations (such as bike shops).

The concept of electronic lockers (e-lockers) has received interest from the bicycling community. One key fob could offer a bicyclist secure bicycle storage wherever e-lockers are found. Ideal locations for e-lockers would be places where long-term parking is needed, such as major transit centers, park and ride lots, and public parking garages. The forthcoming Bicycle Garage at the El Cerrito Plaza BART station will use a precursor of this technology.

Recommendation #2: Require all new commercial development or redevelopment to provide approved bicycle racks. The number of bicycle spaces should be determined by each local jurisdiction. See Table 7 for examples and Table A-2 for guidelines.

Again, bicycle racks should be located in secure, covered and highly visible areas, be anchored to the ground, and allow bicycles to lock both frame and wheels. Bike lockers will generally not be located in unsupervised public areas.

Recommendation #3: Retrofit existing non-residential uses with bike parking. This retrofitting could be implemented through a combination of methods including:

- Require existing non-residential uses as part of the building permit process to provide bicycle parking consistent with local requirements.
- Subsidize the cost of bicycle parking through small advertisements on the racks themselves and/or through grants from public or private sources.

Note: There may need to be zoning ordinance changes to achieve Recommendations #2 and #3.

Recommendation #4: Develop a new program to provide closed-in secure bicycle corrals at all major special events and schools, to encourage residents and visitors to bicycle rather than attempt to drive, subject to funding availability.

A corral is a fenced-in area at a major destination, such as a school or an event, that is secured either through lock or by an attendant, where bicycles can be securely parked. These simple enclosed facilities are locked from the beginning to the end of school or during the event, and address the theft and vandalism concerns of bicycle riders.

Recommendation #5: Build attended bike parking or other support facilities at key transit centers in Contra Costa, encouraging people to “bike to transit.”

Improving the ability to combine bicycling with transit can increase usage of both modes.

SAFETY AND SUPPORT PROJECTS

Safe Routes to Schools Projects

Agency(ies) ..Local agencies, school districts, community groups

School commute improvements were a major focus of public comments, partially out of concerns about current safety and impacts of school-related traffic, and partially because of new State funding opportunities.

School commute projects are usually developed in a traditional planning process that includes (a) school administrators and teachers, (b) local PTAs and other groups, (c) neighborhood groups and the public, (d) police departments, and (e) local public agencies staff such as planning, engineering, and public works departments. The planning process can be accomplished by these groups using the step-by-step process outlined in the adjoining sidebar, or by enlisting professional services. A professional School Commute Safety Study typically costs between \$5,000 and \$40,000, depending on the size of the community.

There are 141 elementary schools and 88 middle schools in Contra Costa, a total of 179 schools that could benefit from a safe routes to school study. The amount and cost of improvements will vary immensely depending upon current conditions, extent of improvements, and available financial support.

PREPARING A SCHOOL COMMUTE SAFETY STUDY

1. Form a School Commute Task Force composed of representatives from the school district, city staff and law enforcement agencies, the local neighborhood, parent-teachers or other similar group, and the school itself.
2. Set objectives and a reasonable schedule for this Task Force to accomplish its goals.

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3. Determine the preferred basic school commute routes to the school based on (a) parent and student input, (b) a survey of parent and student community patterns, (c) city staff and law enforcement input, and (d) observations of actual commuting patterns.
4. Are there any existing efforts to guide students who wish to walk or bicycle to school? Does the school provide a map of recommended routes?
5. Does the school wish to encourage more students to walk or bicycle to school? While there is a perception of safety being a concern, statistics suggest that walking and bicycling are just as safe as driving. Yet many parents insist on driving their children even a few blocks to school, thus contributing to the traffic congestion.
6. Study the parking lot and drop off areas of the school. Is there a pattern where students are walking between cars or through parking lots or drop off areas to reach the school? Are there management efforts to get parents to follow any specific drop-off protocol?
7. Are there adequate walkways and bikeways on the streets directly serving the school? Are there Class I facilities that lead directly to the school? Are there school access points which encourage students to cross mid-block or at other less desirable locations? Are there gaps in the walking or biking routes?
8. Where are the first major street crossings on the main school commute routes? How many accidents occur at these intersections? What traffic controls are in place? If they are signalized, is the signal timing adequate even for younger students? Are there crossing guards?
9. Are there any locations where students are crossing major or minor streets at mid-block or unprotected locations, (i.e., no stop signs or signals)? Because children are sometimes hard to see and have difficulty in gauging vehicle speed, these locations can be the focus of improvements.
10. Are students forced to cross intersections that have very wide turning radii, where vehicles can accelerate and merge while turning? These are problematic because drivers are focused to their left at merging traffic rather than in front at crosswalks.
11. Do pedestrian crossings along the most heavily-traveled streets have properly designed crosswalks? The crosswalks should be located so that students can wait safely on the sidewalk prior to seeing if they can cross. Is there adequate visibility and lighting given the speed of traffic? Are there adequate warning signs in advance of the crosswalk?
12. What are the 85th percentile speeds of traffic on the major school commute corridors? Are they significantly above or below the posted speed limits? When was the last speed survey conducted? What is the level of police enforcement, and does it occur only at the beginning of the school year? It is possible to lower speed limits near schools. In other locations, it may be necessary to make physical changes, such as narrowing travel lanes or using other

traffic calming devices, to slow traffic. It may also be preferable to accept slightly more congestion on a two-lane street, and have slower speeds, than have free flowing high-speed traffic on a four-lane street.

13. School Commute Projects involve numerous, often small, incremental changes to sidewalks and roadways, such as adjustments to signal timing, new signing, or lighting. In other cases, innovative lighted crosswalk treatments or even grade separation may be warranted. Working with the Task Force will help a school determine the best mix of improvements suitable for each corridor, and compatible with local traffic conditions.
14. A more detailed evaluation methodology, which rates improvements and corridors according to objective criteria, has been developed and is available for use by local schools. However, it may require the services of specialists who understand traffic safety and engineering.
15. Once the improvements have been identified, a preliminary design or plan must be completed which describes the project and its cost. For example, a crosswalk improvement would need to be designed so that it can be reviewed and approved by the appropriate agency. Again, a professional may be engaged for this effort.
16. With a plan and cost estimate, the project still needs a sponsor. Typically this would be the jurisdiction, which is best connected to available funding sources and familiar with the State and federal procedures necessary to obtain funding. The project sponsor will need an official authorization and confirmation that (a) the right-of-way is publicly owned, (b) staff have reviewed and approved the project, and (c) no negative impacts have been identified. With this in hand, the project sponsor can seek funding, which may require a 10% or greater matching amount.
17. Programs that may be implemented include a "Walking School Bus Program," which involves parents taking turns walking (or bicycling) with groups of children to school.
18. Curriculum programs implemented in the schools can teach children the basics regarding pedestrian and bicycle safety on the roads.

SAFETY AND SUPPORT PROJECTS

Pathway Rehabilitation

Agency(ies) .. Town Staff, East Bay Regional Park District

Many comments gathered while developing the County Bicycle and Pedestrian Plan that are also valid for the Town's Bicycle and Pedestrian Plan focused on better trail surface mainte-

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nance, and the need for additional amenities or better trail management between various user groups on the existing multi-use pathways. This project would consist of a variety of improvements listed below, with each pathway and section requiring different improvements.

MAINTENANCE

1. Repaving as needed to provide a consistent smooth surface. Many Class I facilities average 25 years and need major rehabilitation and repaving.
2. Providing centerline striping where pathway volumes are high.
3. Providing a more compacted and consistent unpaved surface on one or both sides of the pathway for runners and walkers.
4. Maintaining the integrity of all bicycle and pedestrian amenities.

IMPROVEMENTS

1. Evaluation of roadway crossings and improvements as needed such as additional advisory and warning signs, longer signal times, striping treatments, flashing beacons, trail user signal activation, full signalization etc.
2. Widening a narrow section to a minimum of 10 feet, as recommended by AASHTO, to provide additional capacity, subject to environmental, visual, and community review. Pathways at widths of 12-14 feet may be more appropriate to accommodate higher use, a range of users (bicycles, pedestrians, joggers, skaters, strollers), and maintenance vehicles.
3. Providing consistent pathway management signing advising users about maximum speed limits (20 mph), overtaking protocol, slower traffic staying to the right, leash requirements and dog etiquette, and any applicable enforcement codes.
4. Pathway enhancements such as benches, trash receptacles, historic markers, gateways, and/or landscaping as appropriate to make the pathway a more functional and enjoyable transportation facility.
5. Exploration of innovative techniques such as colored pavement demarking user groups, possibly through a demonstration project. Colored bikeways have proven effective in Portland, Oregon, especially where the paths cross busy roadways.
6. Raising the pathway elevation to reduce or eliminate the impacts of flooding or tidal action.
7. Improving existing bridges as needed.

SAFETY AND SUPPORT PROJECTS

Bicycle and Pedestrian Facilities Maintenance & Development

Agency(ies) ..Town Staff

A common concern expressed by agency staff responsible for building and maintaining infrastructure is the lack of consistent and adequate funds for maintenance. Capital funding for the projects identified in this Plan may be available through Federal and State sources, but maintenance funds are not included. This implementation project would seek to establish a regular source of maintenance funds for roadways and multi-use pathways. Recommended minimum maintenance activities and practices to be funded under this project are presented below.

Many of Moraga's paths need maintenance attention, such as repairing deteriorating asphalt and clearing plant overgrowth. Bike lanes need regular sweeping to clear debris. The total annual maintenance cost of the bike path system for the entire county is estimated to be \$4.5 million per year when it is fully implemented. The annual cost to maintain Class I bike paths is estimated to be \$18,000 per mile each year (East Bay Regional Park District 2000 estimate). This amount covers labor, supplies, and amortized equipment costs for weekly trash removal; monthly sweeping, weed abatement, and mowing; and bi-annual crack sealing and repair patrols. The cost for major maintenance, which includes asphalt resurfacing, is estimated to be about \$150,000 per mile. Other maintenance costs include bike lane line and crosswalk restriping, replacing stencils, sweeping debris, and tuning signals for bicycle and pedestrian sensitivity. Although these latter aspects are generally associated with routine roadway maintenance, special attention to bikeway and walkway safety and usability is important and can mean additional costs are incurred.

On-going Class I bike path maintenance includes cleaning and crack sealing the surface, restriping and restenciling, repairs to crossings, cleaning drainage systems, trash removal, and landscaping. Underbrush and weed abatement should be performed once in early spring and again in mid-summer. Major maintenance involves repaving and pathway rehabilitation.

Recommendation #1: Develop a countywide funding source for bicycle and pedestrian maintenance program

This would be similar to a Joint Powers Agreement. The funding could be used to develop a bicycle and pedestrian maintenance request system, similar to those in Seattle, Portland, and other cities.

Recommendation #2: Install bicycle traffic detection technology at signalized intersections, especially along designated bikeways, that is responsive to bicycles, or set signal timing at intersections along designated bikeways to ensure adequate crossing times for bicyclists.

New signal detectors that can detect bicycles and yet not be influenced by motor vehicles on the roadway should be installed where appropriate. Signal detectors and stencils identi-

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fyng where bicyclists should place their bicycles to trigger signals should be reviewed and approved by the appropriate jurisdictional staff prior to implementation. Specific implementation criteria may include: sensitivity, impact of overlay projects, cost, and need. Possible alternatives to signal detectors may be the use of push buttons that are convenient for bicyclists to use or microwave or video detection.

Recommendation #3: Consider bicycles and pedestrians in performing maintenance and repair work:

- Provide suitable construction warning signs and install detour signs before work begins.
- Where necessary and feasible, provide detour routes around areas undergoing construction. Such routes may need to be on-street (for trails) and determined with local jurisdictions..
- Adopt specific construction zone performance standards including signing, access, smoothness, and detours.

SAFETY AND SUPPORT PROJECTS

Bicycle And Pedestrian Education Programs

Agency(ies) ..Local jurisdiction staff, police department, advocacy groups

Education is vital to teach cooperation between motorists, bicyclists, and pedestrians and to build the confidence needed to encourage people to bicycle and walk more often. Six types of educational programs are outlined below that local agencies, jurisdictions, or community organizations can adopt as education projects.

1: Expand Current Education Programs

Educating children is vital to teach them safe bicycling and walking habits now and influence their likelihood of becoming future bicycle and walking commuters. Existing school educational programs should be expanded in a cooperative effort between Moraga and the Town's school districts, and supported by a secure, regular funding source. A Joint Town/School District Safety Committee could be formed consisting of appointed parents, teachers, student representatives, administrators, police, active bicyclists, health department or injury prevention staff, and city staff whose task it is to identify problems and solutions, ensure implementation, and submit recommendations to the School Board or the Town Council.

2: Develop New Educational Program Materials and Curriculum

Education materials should be expanded to promote the benefits of bicycling and walking, the need for education and safety improvements, the most recent educational tools available in the country (including the use of low-cost safety videos), and directives to parents on the proper

school drop-off procedure for their children. Educational pamphlets for children should be made more readable, including developing pamphlets in other languages, especially Spanish. Incentive programs to reward good behavior could be developed. Educational programs teaching on-bike and on-street pedestrian training, as well as careful scooter and skateboard use, could be expanded to more grades and for more hours per year. Education curriculum could, at a minimum, cover the following lessons:

- On-bike training or bicycle “rodeos”
- Riding in urban settings
- Use and importance of bicycle helmets
- How to adjust and maintain a bicycle
- Night riding and walking (clothes, lights)
- Rules of the road
- Riding on sidewalks
- How to negotiate intersections
- Riding and walking defensively
- Use of hand signals

A standard safety handbook format could be developed incorporating the best elements of those currently in use, and made available to each school in digital format so they may be customized as needed. Schools could develop a circulation map of the campus and immediate environs to include in the handbooks, clearly showing the preferred circulation and parking patterns and explaining in text the reason behind the recommendations. This circulation map could also be a permanent feature in all school newsletters. Bicycle helmet subsidy-programs are available in California, and should be used to provide low-cost approved helmets for all cycling school children.

3: Develop an Adult Education Program

Establish an adult bicycle education program through bicycling organizations such as the Delta Pedalers or the East Bay Bicycle Coalition, in cooperation with the Parks and Recreation Department and/or other County departments. This program should (a) teach adults how to ride defensively, (b) teach adults how to ride on a variety of streets, (c) encourage adults to feel more confident to ride to work or for utilitarian and recreational trips, and (d) review bicycle laws. Work with local bicycling groups who could provide the training expertise, and possibly lead organized bicycle-training sessions, tours, and rides. An outreach program to non-English speaking residents should be developed to teach proper riding skills.

4: Educate Motorists

Educate motorists about the rights and characteristics of bicyclists and pedestrians through a variety of means including:

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- Making bicycle and pedestrian safety a part of traffic school curriculum;
- Producing a brochure on bicycle and pedestrian safety and laws for public distribution;
- Enforcing existing traffic laws for both motorists and pedestrians and bicyclists;
- Working to improve the DMV manual's treatment of bicyclists and pedestrians;
- Sending an official letter to the Department of Motor Vehicles recommending the inclusion of bicycle and pedestrian laws in the drivers license exam; and
- Installing signs that read "Share the Road" with a bicycle symbol at least every 1,000 feet along all routes of the proposed primary system where bike lanes are not feasible, travel lanes are under 14 feet wide, and average daily traffic volumes exceed 10,000.

5: Educate Town Staff

As the Town's departments work to implement this Plan and their own plans, they may find that staff are often unfamiliar with standard pedestrian and bikeway standards and recommended guidelines. As part of the Regional Bicycle Plan, MTC proposes to sponsor an ongoing series of training sessions about useful topics and support participation in existing training courses offered by the Association of Pedestrian and Bicycle Professionals, the University of California at Berkeley, and others.

MTC and the Regional Bicycle Working Group (RBWG) will gather and share technical resources, such as information about transportation systems like video detection, automatic lane reconfigurations, and advanced traffic information systems. The RBWG will disseminate information to local agencies to keep everyone informed on bicycle issues in the Bay Area.

6: Mapping

Maps are essential education tools that need to be accessible and up-to-date. Several organizations and agencies have developed wonderful maps that need financial support to make them more widely available and kept current. For example, East Bay Bicycle Coalition (EBBC) has developed bicycle transportation maps that show recommended bike routes for different skill levels, elevation, major destinations, and warnings that bicyclists unfamiliar with the area can use to travel with confidence. Moraga and other interested organizations could work with EBBC to update these maps and distribute them. Moraga could develop and periodically update similar maps of their jurisdiction to encourage local bicycling and hiking. Map kiosks in downtown areas help pedestrians access points of interest without wandering unnecessarily.

CHAPTER 8

IMPLEMENTATION

The preceding chapters have outlined the background on bicycling and walking conditions in Moraga, the goals and policies that will guide efforts to encourage more walking and bicycling, and needs and suggested improvements to encourage bicycle and pedestrian travel.

Many groups, agencies and individuals will need to work together to achieve these goals and policies. The following chapter outlines the key implementation steps needed to bring the *Moraga Bicycle and Pedestrian Plan (MBPP)* to fruition and the responsibilities for taking those steps. Caltrans, the Metropolitan Transportation Commission (MTC), Bay Area Air Quality Management District (BAAQMD), and transit agencies all offer functions that complement the CBPP. The chapter ends with cost estimates and funding sources for the bikeway network and programs.

Implementation Tasks

LOCAL ACTIONS

The CBPP encourages and supports local actions—from the planning and design of facilities to their funding and development—that would help create and maintain a system of safe, direct, and attractive bicycle and pedestrian facilities. To achieve this, the Authority encourages local agencies to consider taking a number of actions, including:

Identify and design projects, assess their feasibility, and seek funding. Local jurisdictions and agencies are the “front line” in the development of the projects needed to bring the CBPP to fruition. Each specific project to fill gaps in the bikeway network or to improve pedestrian crosswalks will require detailed design and engineering, environmental review, consultation with adjoining landowners, and the difficult process of finding funding for the project. MTC’s Transportation for Livable Communities program and ABAG’s Bay Trail Grants are two sources for feasibility studies but more are needed.

Review and revise local plans to incorporate policies that promote development patterns that improve the safety and convenience of walking and bicycling. A great deal of work has been done, and is continuing, on ways to make our cities and towns friendlier to bicyclists and pedestrians. To apply this research, each jurisdiction will need to review the specific conditions it confronts—from the existing built environment and community goals to available

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financing and other transportation demands—to determine what combination of approaches and specific standards should be used. Jurisdictions could consider:

- Increasing densities and mixing land uses* to reduce the distance to destinations and thus encourage more walking and bicycling
- Reducing the scale of buildings and roadways*, where feasible, to bring more destinations within walking and bicycling distance and to create safer, slower and quieter roadways.
- Maintaining or increasing linkages in the transportation system* to provide bicyclists and pedestrians safe and direct access by filling gaps in sidewalks or bikeways, requiring shorter blocks or pedestrian paths, and other similar actions.
- Emphasizing walking and bicycling within residential and shopping districts* through local standards and traffic calming.
- Identifying pedestrian districts* in which the jurisdiction establishes design standards and guidelines for both the transportation system and land use and development that improve conditions for pedestrians.

Develop local bicycle and pedestrian plans that:

- Meet Caltrans requirements to make projects eligible for State and regional funding,
- Improve safety,
- Connect the jurisdiction's system to adjacent systems,
- Fill gaps and remove barriers for people who walk or bicycle,
- Provide ample facilities within high activity centers, especially commercial centers, and clear connections to transit centers, schools and mixed-use hubs,
- Serve both transportation and recreational needs, and
- Support education of both automobile drivers and pedestrians and bicyclists of their rights and responsibilities.

These plans could include:

- Specific plans for pedestrian districts to provide guidelines for high-quality design and give pedestrian movement equal or greater priority compared to other travel modes in the design and planning.
- Trail and bikeway plans that outline a detailed bikeway system within the jurisdiction, supporting programs and actions to carry them out.
- Capital improvement programs for developing and enhancing pedestrian and bicycle facilities within the jurisdiction.

Modify local ordinances, development standards and guidelines, including zoning and subdivision ordinances, to require that new developments, major redevelopment projects, and new or expanded transportation projects incorporate bicycle and pedestrian facilities. Important changes could include:

- Providing secure, adequate and convenient bicycle parking as part of new development or major redevelopment projects
- Requiring sidewalks and other pedestrian facilities within neighborhoods, commercial districts and other areas to provide safe and adequate space for people to walk.
- Incorporating space within roadway standards for bicyclists and pedestrians.
- Identifying traffic calming measures that work within local neighborhoods and districts.
- Incorporate bicycle and pedestrian facilities into transportation improvements in both their planning and design where appropriate and feasible.

Plan Cost Estimates

Cost estimates have been developed for the countywide bicycle and pedestrian facilities and programs. Tables 12 and 13 list the unit costs used to estimate the cost of all bicycle and pedestrian improvements recommended in this plan (Table 14). Since individual projects can vary widely, the estimates presented are for planning purposes only. The total cost over 20 years is estimated at approximately \$276.8 million. Of the total project cost over 20 years, it is projected that local agencies will be responsible for about 13 percent of the costs. It is important to note that while many of the projects can be funded with federal, State, and regional transportation, safety, and/or air quality grants, others are recreational in nature and must be funded by local or private sources.

Table 13 shows the planning level cost estimates for the entire recommended countywide bicycle and pedestrian system and programs. The estimates are divided into four categories. The Short- and Mid-Term Bikeway Projects are those identified as priorities in the bikeway chapter. The second section includes the remaining proposed on- and off-street bikeway projects to complete the bikeway network. The next section provides approximate costs of pedestrian, transit, and safety projects described in those chapters. Finally, on-going maintenance and support program expenditures are included because these programs are instrumental in coordinating this plan, building momentum for local projects, and providing information to the general public.

The candidate projects listed in the previous chapters are recommended to be implemented over the next ten years, or as funding is available. It also presents a *best case* scenario for Contra Costa and cities, providing a network of bicycle and pedestrian facilities and programs within the short-term. Some of the more expensive projects may take longer to implement. Also, local projects may be needed to address specific local issues and take precedence over the identified projects in this CBPP. These projects are not included in this cost estimate.

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It is important to note that many of the funding sources are highly competitive, and therefore impossible to determine exactly which projects will be funded by which funding sources. Timing of projects is also difficult to pinpoint exactly, due to dependence on competitive funding sources, timing of roadway and development projects, and the overall economy.

Funding

There are a variety of potential funding sources from local, state, regional, and federal funding programs that can be used to construct the proposed bicycle and pedestrian improvements. Most federal, state, and regional programs are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. Local funding for bicycle and pedestrian projects typically comes from Transportation Development Act (TDA) funding, which is prorated to each county based on return of gasoline taxes. Funding for many of the programs would need to be funded either with TDA; general fund (staff time); and regional, state, and federal sources.

Contra Costa has historically invested approximately \$4 million annually in bicycle and pedestrian facilities. This money is derived from a variety of sources: TEA-21 programs, Bicycle Transportation Account (BTA), Office of Traffic Safety Program, Community Development Block Grants (CDBG), impact fees, sales tax revenue, etc. Most of the sidewalk and bikeway investments have been in the form of simultaneous roadway construction and improvement projects, while additional bike parking has increased as a result of new development.

Proposed improvements and programs to be developed over the next 20 years in Contra Costa have been analyzed to determine the annual financing requirements, and to allow the county to budget its resources and target funding applications. It is important to note that the majority of funding for bicycle projects is expected to be derived from Federal sources. These funding sources are extremely competitive, and require a combination of sound applications, local support, and lobbying on the regional and state level.

Several funding sources are described in this section. Appendix D lists additional funding sources and contact information.

FEDERAL

TEA-21

Federal funding through the TEA-21 (Transportation Equity Act for the 21st Century) program will provide much of the funding. TEA-21 currently contains three major programs, STP (Surface Transportation Program), TEA (Transportation Enhancement Activities), and CMAQ (Congestion Mitigation and Air Quality Improvement) along with other programs such as the National Recreational Trails Program, Section 402 (Safety) funds, Scenic Byways funds, and Federal Lands Highway funds.

TEA-21 funding is administered through the state (Caltrans or Resources Agency) and regional governments (Authority). Most, but not all, of the funding programs are transportation versus recreational oriented, with an emphasis on (a) reducing auto trips and (b) providing an

intermodal connection. Funding criteria often includes completion and adoption of a bicycle/pedestrian master plan, quantification of the costs and benefits of the system (such as saved vehicle trips and reduced air pollution), proof of public involvement and support, CEQA compliance, and commitment of some local resources. In most cases, TEA-21 provides matching grants of 80 to 90 percent, but prefers to leverage other moneys at a lower rate.

All TEA-21 funds have been programmed. The successor legislation, presently called TEA-3, will be a future source of funds. This new legislation, scheduled for renewal in 2003, may come with additional categories of funding and guidelines.

Transportation for Livable Communities (TLC)

MTC allocates nearly \$4.5 million of Transportation Enhancement funds and \$18.5 million in CMAQ funds annually to its Transportation for Livable Communities (TLC) program. This program funds projects that promote compact developments that encourage transit and non-motorized transportation. Bicycle and pedestrian improvements may be eligible for this competitive program.

STATE

TDA Article III (SB 821)

Transportation Development Act (TDA) Article III funds are awarded annually to local jurisdictions for bicycle and pedestrian projects in California. These funds originate from the state gasoline tax and are distributed through a competitive "call for projects" administered by the Authority on a yearly basis to local jurisdictions.

Bicycle Transportation Account

The State Bicycle Transportation Account (BTA) is an annual statewide discretionary program that is available through the Caltrans Bicycle Facilities Unit for funding bicycle projects. Available as grants to local jurisdictions, the emphasis is on projects that benefit bicycling for commuting purposes. Funding that is available on a statewide basis amounts to \$7.2 million annually beginning FY 2001.

Safe Routes to School (SB 10)

The Safe Routes to School program, recently extended to January 1, 2005, is a State program using federal transportation funds. This program is meant to improve school commute routes through construction of bicycle and pedestrian safety and traffic calming projects. A local match of 11.5% is required for this competitive program, which will allocate \$18 million annually. Since it is a *construction* program, planning grants are not available through this program. Programs or activities related to education, enforcement, or encouragement may be eligible for reimbursement if they are related to the construction improvement.

Transportation Fund for Clean Air (TFCA)

TFCA funds are generated by a \$4 surcharge on automobile registration in the nine counties that make up the Bay Area Air Quality Management District (BAAQMD). This collection funds two programs that can finance projects such as bicycle facility improvement projects and smart growth development projects. One program is the Regional Fund, a regional competitive fund appropriated by the BAAQMD. In FY 2002/03, approximately \$10 million was available in the Regional Fund, with grants ranging from \$10,000 to \$1 million per project.

The second program, the Program Manager Fund (40% Fund), results from the return of 40% of funds collected in each county to be appropriated by its' CMA or Transportation Authority. As the Program Manager in Contra Costa, the Authority maintains four roles:

- Adopt allocation criteria for TFCA funds
- Approve Contra Costa's expenditure plan for TFCA funds
- Review and approve TFCA project reports annually
- Approve allocation process and procedures

In April, the Authority must submit an "Expenditure Plan" to BAAQMD indicating which projects are to be funded in the upcoming year.

LOCAL FUNDING

Direct Local Jurisdiction Funding

The Town of Moraga can fund bicycle and pedestrian projects using a variety of sources. A city's general funds are often earmarked for non-motorized transportation projects, especially sidewalk and ADA improvements. Eighteen percent of Measure C money is given to local jurisdictions that comply with growth policies that can be used for maintenance and improvements.

Future road widening and construction projects are one means of providing bike lanes and sidewalks. To ensure that roadway construction projects provide these facilities where needed, appropriate, and feasible, it is important that an effective review process is in place so that new roads meet the standards and guidelines presented in this Plan.

Impact Fees

Another potential local source of funding is developer impact fees, typically tied to trip generation rates and traffic impacts produced by a proposed project. A developer may reduce the number of trips (and hence impacts and cost) by paying for on- and off-site pedestrian and bikeway improvements, which will encourage residents to walk and bicycle rather than drive. In-lieu parking fees may be used to help construct new or improved bicycle parking. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

Special Taxing Districts

Special taxing districts, such as redevelopment districts, can be good instruments to finance new infrastructure – including shared use trails and sidewalks - within specified areas. New facilities are funded by assessments placed on those that are directly benefited by the improvements rather than the general public. In a “tax increment financing (TIF) district, taxes are collected on property value increases above the base year assessed property value. This money can then be utilized for capital improvements within the district. TIFs are especially beneficial in downtown redevelopment districts.

These districts are established by a petition from landowners to a local government. The districts can operate independently from the local government and some are established for single purposes, such as roadway construction.

Other

Local sales taxes, fees, and permits may be implemented, requiring a local election. Parking meter revenues may be used according to local ordinance. Volunteer programs may substantially reduce the cost of implementing some of the proposed pathways. Use of groups such as the California Conservation Corp (who offer low-cost assistance) will be effective at reducing project costs. Local schools or community groups may use the bikeway or pedestrian project as a project for the year, possibly working with a local designer or engineer. Work parties may be formed to help clear the right of way where needed. A local construction company may donate or discount services. A challenge grant program with local businesses may be a good source of local funding, where corporations “adopt” a bikeway and help construct and maintain the facility.

Other opportunities for implementation will appear over time, which may be used to implement the system.

Table 15 presents low and high estimates of funding expected countywide over the next 20 years. Determining funding estimates is very difficult as funding sources change, revenues rise and fall over time, and increasing numbers of projects begin to compete for limited money. While Table 15 includes the most significant sources of funding, it in no way includes all potential funding sources.

This table illustrates the need for the Authority and its partner jurisdictions and agencies to support new funding for bicycle and pedestrian facilities, and for supporting programs, to help achieve the goals of this plan. While the extension of Measure C could help reduce the deficit shown in Table 15, it must also help fund other serious transportation needs within Contra Costa.

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Table 12 Bikeway Unit Cost Estimates Per Mile

Improvement	Unit	Unit Cost	Cost Per Mile
Shared Use Pathway			
Clearing and Grubbing	LF	\$3	\$130,000
Earth / Excavation	CY	\$10 - \$50	\$10,000 - \$88,000
Asphalt Concrete Pavement	SF	\$2.75	\$174,000
Signing	LF	\$3	\$15,840
Striping	LF	\$2	\$10,560
Lighting	Each	\$1,000	\$26,400
Fencing	LF	\$15	\$79,200
TOTAL	1 mile		\$524,000
Bike Lane			
Bike Lane Stripe (both sides)	LF	\$2	\$10,560
Pavement Markings	20 / mile	\$50	\$1,000
Traffic Signing	LF	\$3	\$15,840
Traffic Control	LF	\$0.50	\$2,640
TOTAL	1 mile		\$30,040
Bike Route			
Traffic Signing	LF	\$3	\$15,840
Traffic Control	LF	\$0.50	\$2,640
TOTAL	1 mile		\$18,480
Miscellaneous Items			
Intersection Loop Detectors	each	\$1,000	\$1,000
Bridge (12' x 100')	SF	\$175	\$210,000
Shoulder Widening	LF	\$25	\$132,000
Feasibility & Design Study (trail, roadway corridor, tunnel)	each		\$50,000 - \$100,000
Parking: bike racks	each	\$500	\$500
Parking: lockers	each	\$1000	\$1000

Table 13 Pedestrian Unit Cost Estimates

Improvement	Type	Unit	Cost ¹
Sidewalks	Concrete	SF	\$11
	Asphalt	SF	\$6
	Brick	SF	\$22
Curb Ramps		Each	\$800 - \$1,500
Crosswalks	Striped	Each	\$1,000
	Ladder	Each	\$3,000
	Patterned Concrete	Each	\$30,000

Table 13 Pedestrian Unit Cost Estimates

Improvement	Type	Unit	Cost ¹
Traffic Calming	Chokers	Pair	\$5,000 - \$20,000
	Crossing Island	Each	\$4,000 - \$30,000
	Curb Extension	Each	\$2,000 - \$20,000
	Curb Radius Reduction	Corner	\$2,000 - \$20,000
	Raised Crosswalks	Each	\$2,000 - \$15,000
	Speed Humps	Each	\$1,000
	Traffic Circle	Each	\$6,000 - \$12,000
Signals	Pedestrian Signals	Each	\$20,000 - \$40,000
	Modify Pedestrian Signal Timing		Minimal
	Traffic Signal Enhancements	Each	\$5,000
Signing	Advisory, directional	Each	\$50 - \$200
Landscaping	Trees, plants, irrigation	Block	\$20,000 ²
Street Furniture	Includes benches, trash receptacles, bike racks, light fixtures	Block	\$32,200 ²
Studies	Neighborhood Traffic/Parking Study	Each	\$5,000 - \$25,000 ³
	Specific Plan	Each	\$20,000 - \$80,000 ³
	Corridor Improvement Plan	Each	\$20,000 - \$150,000 ³
	ADA Transition Plan	Each	\$40,000 - \$200,000 ³
Projects	Type	Unit	Average Cost
Safe Routes to School	Study	Each	\$7,500
	Physical Inputs – including sidewalks, crosswalks, bike racks, etc.	Each School	\$55,000
	Program Inputs – includes school safety training courses	Each School	\$5,000
	TOTAL	Each	\$67,500
Pedestrian District	Planning and Design	Block	\$5,400
	Street Furniture	Block	\$32,200
	Landscaping	Block	\$20,000
	Curb Ramps	8/blk	\$8,000
	Crosswalks	4/blk	\$12,000
	Curb extensions	8/blk	\$84,000
	Special Signage	4/blk	\$2,400
	Pedestrian Signal	1/blk	\$30,000
TOTAL	Block	\$119,000	
TOTAL	District	\$3,781,000	

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Table 13 Pedestrian Unit Cost Estimates

Improvement Type	Unit	Cost ¹
¹ Unless otherwise noted, costs are based upon those presented in <i>Pedestrian Facilities Users Guide – Providing Safety and Mobility</i> , FHWA, March 2002. ² Will vary greatly depending upon requirements outlined in plan and design documents and available funding. Based upon a projected average cost per block. ³ Range of costs for recent projects in the Bay Area. Costs will vary with size of project and degree of desired detail. ⁴ A survey of existing areas that would be similar to the pedestrian district definition was compared to that city's population. This revealed approximately one block of a pedestrian district to every 1,670 residents; this would equate to 587 blocks for the entire county. For cost estimating purposes, approximately 30 pedestrian districts would be established; 19 blocks in each.		

Table 14 Bikeway & Pedestrian System Cost Estimates

Segment	Type	Units/Miles	Cost
PRIORITY BIKEWAY PROJECTS (Short-/Mid-Term (Years 1-10))			
BART Connector Bikeway - includes loop detectors	Class II / III	4.0	\$96,000
San Pablo Avenue Bikeway: South – includes feasibility study, intersection improvements	Class III	3.8	\$342,000
Central I-80 Bikeway – includes intersection improvements	Class II / III	4.4	\$121,000
Crockett / Martinez Connector	Class III	9.5	\$176,000
Contra Costa-Main St Bikeway – includes feasibility study, intersection improvements	Class II / III	5.5	\$168,000
Central Pleasant Hill Bikeway	Class II / III	1.6	\$32,000
Contra Costa Canal – includes feasibility and design study, underpass improvement at SR 4	Class I	3.6	\$2,801,000
Concord-Clayton Bikeway	Class III	6.0	\$362,000
Concord-Pleasant Hill Bikeway	Class II / III	4.8	\$126,000
Brentwood-Oakley Bikeway – includes shoulder widening	Class II	5.5	\$891,000
O'Hara/Minnesota bikeway – includes shoulder widening	Class II	4.0	\$648,000
Pittsburg Loop Bikeway	Class II / III	4.4	\$115,000
Buchanan Road Bikeway – includes widening roadway	Class II	2.6	\$144,000
State Route 24 Bikeway – includes tunnel feasibility study (but NOT construction of a tunnel)	Class I / II / III	6.7	\$3,858,000
Lamorinda Linkages (1.7 miles not built)	Class III	3.9	\$72,000

Table 14 Bikeway & Pedestrian System Cost Estimates

Segment	Type	Units/Miles	Cost
Rural Road Improvement Project - signage, some roadway shoulders	Varies	75.3	\$7,530,000
Regional Trail Completion (includes some bridges)	Class I	76.5	\$45,877,000
Priority Bikeway Projects Total		222.1	\$63,359,000
PROJECTS NEEDED TO COMPLETE THE COUNTYWIDE BIKEWAY SYSTEM			
New Off-Street Trails – includes Richmond Greenway (\$8 million)	Class I	15.8	\$16,279,000
New On-Street Bikeways	Class II / III	115.9	\$3,482,000
Remaining Bikeway System Total		134.9	\$19,761,000
PEDESTRIAN, TRANSIT, SAFETY & SUPPORT PROJECTS			
Pedestrian Districts – preparation of studies outlining proposed improvements to the pedestrian circulation system within pedestrian districts as well as generalized cost estimates for improvements	Studies and general improvements	20 districts	\$75,620,000
ADA Improvements ¹	Agencies	20	\$4,000,000
Transit Access ²	Studies	20	\$200,000
Safe Routes to School Project	Studies, improvements, training	179 schools	\$12,083,000
County Signing/Stenciling Program ³	Signs/stencils	595 mi.	\$934,000
Bicycle Parking Project	Bike racks Bike lockers BART pavilions	350 100 3	\$725,000
Pathway Rehabilitation ⁴	Infrastructure	300/100 mi.	\$4,800,000
Bicycle & Pedestrian Maintenance ⁵			\$9,500,000
Bicycle and Pedestrian Education Programs	20		\$620,000
Safety Grants	20	\$10,000	
Safety Materials	4	\$5,000	
Promotional Materials	20	\$2,500	
Bike/Pedestrian Facility Training	20	\$10,000	
Community Adoption Program	20	\$2,500	
Employer Incentives	20	\$2,500	
Bike/Walk to Work Days	20	\$2,500	
Pedestrian, Transit, Safety & Support Projects Total			\$108,482,000
ON-GOING SUPPORT			
	Time	Unit Cost	Cost
Expanded Bike/Pedestrian Coordinator	Annually	\$50,000	\$1,000,000
On-Going Support Total			\$1,000,000

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Table 14 Bikeway & Pedestrian System Cost Estimates

Segment	Type	Units/Miles	Cost
20-YEAR ESTIMATE OF ALL IMPROVEMENTS			
TOTAL Estimate of improvements	20 years		\$192,602,000
20% contingency			\$38,520,000
TOTAL estimate plus 20% contingency	2003/2023		\$231,122,000
TOTAL estimated annual cost	Annually		\$11,556,000

¹ Assumes \$200,000 spent by each of the 19 cities and the County.

² Assumes \$10,000 per study for the 20 BART stations, Amtrak stations, and major transit centers. Actual cost of improvements will vary widely. Some improvements could be made as part of the development of pedestrian districts.

³ Assumes 2 signs per mile (\$500) and 2 stencils per mile (\$285) for entire countywide system.

⁴ Assumes \$18,000/mile for pathway improvements, \$2,000/mile signage, \$10,000/mile miscellaneous improvements (i.e. landscaping)

⁵ Based upon allotments in area countywide plans.

Table 15 Estimated Funding Sources and Amounts

Funding Source	Estimated Total Allotment (20 years)	
	Low	High
Transportation Fund for Clean Air ¹	\$9,153,000	\$11,187,000
Bicycle Transportation Account ¹	\$2,421,000	\$2,959,000
Transportation Development Act Article 3 Funds	\$19,530,000	\$23,870,000
Transportation Enhancement Activities ¹	\$3,330,000	\$4,070,000
Transportation for Livable Communities / Housing Incentive Program ²	\$22,680,000	\$27,720,000
STIP ³	\$24,000,000	\$32,000,000
New Measure C Funds ⁴	\$0	\$80,000,000
Miscellaneous Funding Sources ⁵	\$20,000,000	\$40,000,000
TOTAL FUNDING	\$101,114,000	\$197,806,000
Est. Total of Countywide Projects	\$231,122,000	\$231,122,000
ESTIMATED DEFICIT	\$130,008,000	\$33,316,000

¹ Source: Table 5.2, *Regional Bicycle Plan*, MTC, 2001; ±10% of estimate based on historical allocations.

² The 2001RTP allocated \$337.5 million to TLC/HIP for next 25 years. Contra Costa has historically received 14% of available funding. Estimate reflects ±10% of 14% of total regional allocation over 20 years.

³ Proposition 42, passed in March 2002, will substantially contribute to the STIP. Figures used for this table are from estimated county allocations in a study commissioned by the League of California Cities.

⁴ The high and low amounts of potential funding are taken from the high and low amounts (five and zero percent, respectively) in the three alternative Expenditure Plans being considered by the Authority as part of the development of the Measure C extension. The final Expenditure Plan, which the Authority hopes to take to the voters in November 2004 for their approval, will likely contain a final amount for bicycle and pedestrian facilities somewhere between those high and low amounts.

⁵ Estimate that may include Safe Routes to School, private donations, impact fees, CDBG, Recreational Trails Program, etc.

APPENDIX A

BIKEWAY PLANNING AND DESIGN

This appendix provides the most basic bikeway planning and design requirements and recommendations. A list of additional resources and contacts are provided at the end of this appendix.

Bikeway Classification Descriptions

According to Caltrans, the term “bikeway” encompasses all facilities that provide primarily for bicycle travel. Caltrans has defined three types of bikeways in Chapter 1000 of the *Highway Design Manual*. Descriptions and general design guidelines are presented below. The sources used for these design recommendations was Caltrans’ *Highway Design Manual* and AASHTO’s *Guide for the Development of Bicycle Facilities*.

CLASS I BIKEWAY

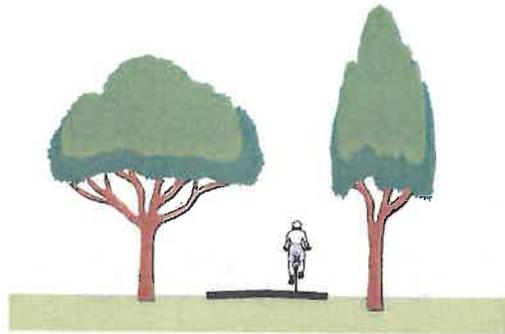
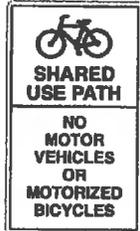
Typically called a “bike path” or “shared use path,” a Class I bikeway provides bicycle travel on a paved right-of-way completely separated from any street or highway. The recommended width of a shared use path is dependent upon anticipated usage:

- 8 feet (2.4 m) is the minimum width, most applicable to unpaved and/or rural facilities
- 8 feet (2.4 m) may be used for short neighborhood connector paths (generally less than one mile in length) due to low anticipated volumes of use
- 10 feet (3.0 m) is the recommended minimum width for a two-way bicycle path
- 12 feet (3.6 m) is the preferred minimum width if more than 300 users per peak hour are anticipated, or if there is heavy mixed bicycle and pedestrian use

A minimum 2-foot (0.6 m) wide graded area must be provided adjacent to the path to provide clearance from trees, poles, walls, guardrails, etc. A yellow centerline stripe is recommended to separate travel in opposite directions.

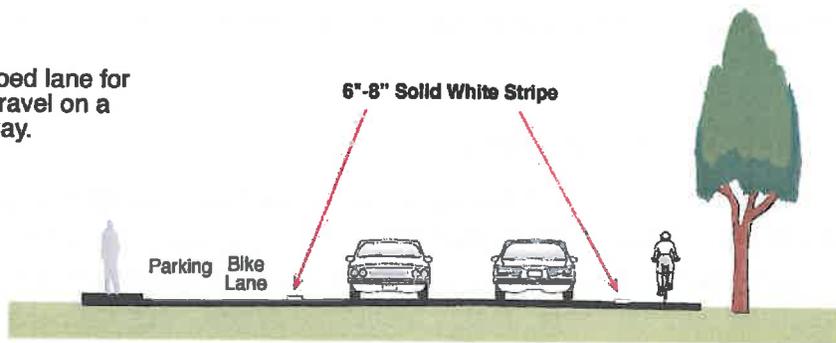
Shared Use Path

Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow minimized.



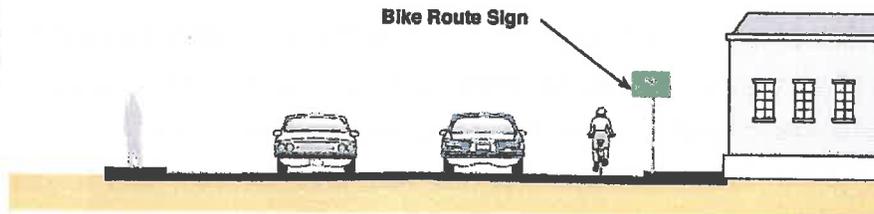
Bike Lane

Provides a striped lane for one-way bike travel on a street or highway.



Bike Route Signed Shared Roadway

Provides for shared use with pedestrian or motor vehicle traffic, typically on lower volume roadways.



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FIGURE

GENERAL BIKEWAY CLASSIFICATIONS



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Additional Design Recommendations

1. Shared use trails and unpaved facilities that serve primarily a recreation rather than a transportation function and will not be funded with federal transportation dollars may not need to be designed to Caltrans standards. However, state and national guidelines have been created with user safety in mind and should be followed as appropriate. Wherever any trail facility intersects with a street, roadway, or railway, standard traffic controls should always be used.
2. Class I bike path crossings of roadways require preliminary design review. Generally speaking, bike paths that cross roadways with average daily trips over 20,000 vehicles will require signalization or grade separation.
3. Landscaping should generally be low water consuming native vegetation and should have the least amount of debris.
4. Lighting should be provided where commuters will use the bike path in the evenings.
5. Barriers at pathway entrances should be clearly marked with reflectors and be ADA accessible (minimum five feet clearance).
6. Bike path construction should take into account impacts of maintenance and emergency vehicles on shoulders and vertical and structural requirements. Paths should be constructed with adequate sub grade compaction to minimize cracking and sinking.
7. All structures should be designed to accommodate appropriate loadings. The width of structures should be the same as the approaching trail width, plus minimum two-foot wide clear areas.
8. Where feasible, provide two-foot wide unpaved shoulders for pedestrians/runners, or a separate tread way.
9. Direct pedestrians to the right side of pathway with signing and/or stenciling.
10. Provide adequate trailhead parking and other facilities such as restrooms and drinking fountains at appropriate locations.

CLASS II BIKEWAY

Often referred to as a "bike lane," a Class II bikeway provides a striped and stenciled lane for one-way travel on either side of a street or highway. To provide bike lanes along corridors where insufficient space is currently available, extra room can be provided by removing a traffic lane, narrowing traffic lanes, or prohibiting parking. The width of the bike lanes vary according to parking and street conditions:

- 5 feet (1.5 m) minimum when parking stalls are marked

- 11 feet (3.3 m) minimum for a shared bike/parking lane where parking is permitted but not marked on streets without curbs; or 12 feet (3.6 m) for a shared lane adjacent to a curb face
- 4 feet (1.2 m) minimum if no gutter exists, measured from edge of pavement
 - 5 feet (1.5 m) minimum with normal gutter, measured from curb face; or 3 feet (0.9 m) measured from the gutter pan seam



Additional Design Recommendations

1. Whenever possible, the Department of Public Works should recommend that wider bike lanes beyond the minimum standard be installed.
2. Intersection and interchange treatment: Caltrans provides recommended intersection treatments in Chapter 1000 including bike lane “pockets” and signal loop detectors. The Department of Public Works should develop a protocol for the application of these recommendations, so that improvements can be funded and made as part of regular improvement projects.
3. Signal loop detectors, which sense bicycles, should be considered for all arterial/arterial, arterial/collector, and collector/collector intersections. A stencil of a bicycle and the words “Bicycle Loop” should identify the location of the detectors.
4. When loop detectors are installed, traffic signalization should be set to accommodate bicycle speeds.
5. Bicycle-sensitive loop detectors are preferred over a signalized button specifically designed for bicyclists.
6. Bike lane pockets (min. 4 feet wide) between right turn lanes and through lanes should be provided wherever available width allows, and right turn volumes exceed 150 motor vehicles/hour.
7. Where bottlenecks preclude continuous bike lanes, they should be linked with Class III route treatments.
8. A bike lane should be delineated from motor vehicle travel lanes with a solid 6-inch white line, per MUTCD. An 8-inch line width may be used for added distinction.
9. Word and symbol pavement stencils should be used to identify bicycle lanes, as per Caltrans and MUTCD specifications.

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Installing bike lanes may require more attention to continuous maintenance issues. Bike lanes tend to collect debris as vehicles disperse gravel, trash, and glass fragments from traffic lanes to the edges of the roadway. Striping and stenciling will need periodic replacing.

CLASS III BIKEWAY

Generally referred to as a “bike route,” a Class III bikeway provides routes through areas not served by Class I or II facilities or to connect discontinuous segments of a bikeway.

Class III facilities can be shared with either motorists on roadways or pedestrians on a sidewalk (not advisable) and is identified only by signing. There are no recommended minimum widths for Class III facilities, but when encouraging bicyclists to travel along selected routes, traffic speed and volume, parking, traffic control devices, and surface quality should be acceptable for bicycle travel. A wide outside traffic lane (14 feet) is preferable to enable cars to safely pass bicyclists without crossing the centerline.

BIKE BOULEVARDS

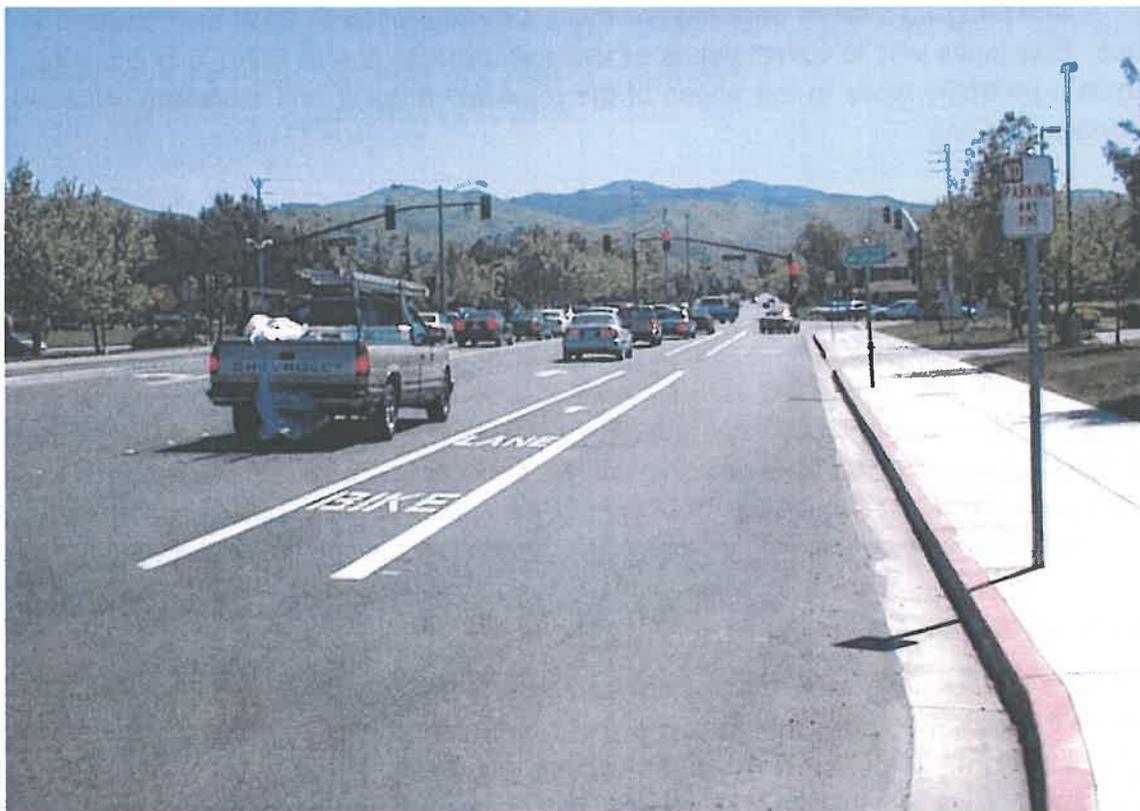
One type of Class III facility that is gaining interest is the bike boulevard. Palo Alto pioneered the concept, which, in that city, is a street directly parallel to a major commercial corridor designed to promote bicycle movement and discourage through vehicle traffic. This is achieved by installing various traffic calming devices and providing situations that favor bicyclists, such as a bikeway through a street closure. In addition, wider curb lanes and frequent signing as a “Bicycle Boulevard” helps increase the motorists’ awareness.

Intersection Considerations

Intersections represent one of the primary collision points for bicyclists. Generally, the larger the intersection, the more difficult it is for bicyclists to cross. On-coming vehicles from multiple directions and increased turning movements make it difficult for motorists to see non-motorized travelers.

Most intersections do not provide a designated place for bicyclists. Bike lanes and pavement markings often end before intersections, causing confusion for bicyclists. Loop and other detectors, such as video, often do not detect bicycles.

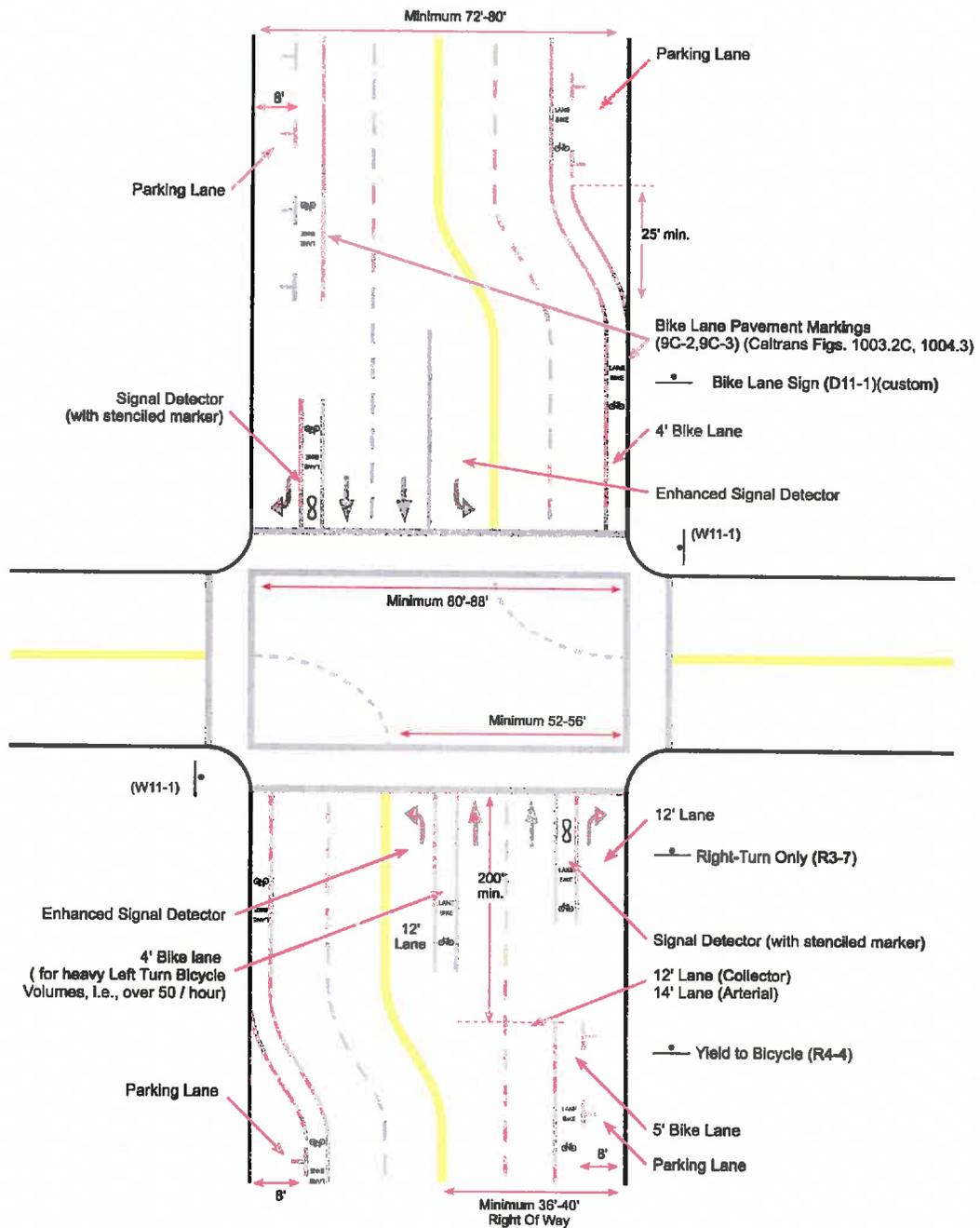
Bicyclists wanting to make left turns can face quite a challenge. Bicyclists must either choose to behave like motorists by crossing travel lanes and seeking refuge in a left-turn lane, or they act as pedestrians and dismount their bikes, push the pedestrian walk button located on the sidewalk, and then cross the street in the crosswalk. Bicyclists traveling straight also have difficulty maneuvering from the far right lane, across a right turn lane, to a through lane of travel. Furthermore, motorists often do not know which bicyclist movement to expect. Figure A-2 is an example of an intersection that provides bike lanes at critical locations at intersections.



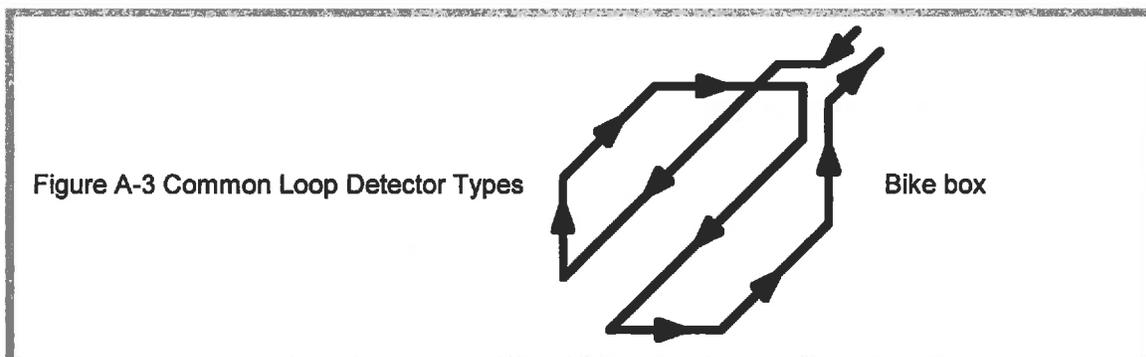
Changing how intersections operate also can help make them more “friendly” to bicyclists. Improved signal timings for bicyclists, bicycle-activated loop detectors (Figure A-3), and camera detection make it easier and safer for cyclists to cross intersections. The purpose of bicycle loops is to give cyclists extra green time (e.g. five seconds) before the light turns yellow to make it through the light. Current and future loops that are sensitive enough to detect bicycles should have pavement markings to instruct cyclists how to trip them.

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Figure A-2 Bike Lanes Intersection Design



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A bike box is a relatively new innovation to improve turning movements for bicyclists without requiring cyclists to merge into traffic to reach the turn lane or use crosswalks as a pedestrian. The bike box is formed by pulling the stop line for vehicles back from the intersection, and adding a stop line for bicyclists immediately behind the crosswalk. When a traffic signal is red, a bicyclist can move into this “box” ahead of the cars to make himself more visible, or to move into a more comfortable position to make a turn. Bike boxes have been used in Cambridge, MA; Eugene, OR; and European cities.

TRAIL / ROADWAY INTERSECTIONS

Safety is a critical issue where trails cross roadways, which are often at mid-block locations where motorists are less likely to expect bicyclists and pedestrians. The success of a trail can be largely determined by quality of trail/roadway crossings. *The Contra Costa County Trail Design Resource Handbook* provides numerous options for signage, pavement markings, and traffic control treatments at on-street trail crossings. Local engineers and trail designers should use this reference in conjunction with Chapter 1000 of the *Caltrans Highway Design Manual* to design intersections that meet or exceed minimum recommended standards for Class I facilities. Signage

Implementing a well-planned and attractive system of signing can greatly enhance bikeway facilities by signaling their presence and location to both motorists and existing and potential bicycle users. By leading people to city bikeways and the safe and efficient transportation they offer to local residents and visitors to the county, effective signage can encourage more people to bicycle.

All bikeway signing should conform to the signing identified in the *Caltrans Traffic Manual* and/or the *Manual on Uniform Traffic Control Devices* (MUTCD). These documents give specific information on the type and location of signing for the primary bike system. A list of bikeway signs from Caltrans and the MUTCD is shown in Table A-1.

In general, the sizes of signs used on bicycle paths are smaller than those used on roadways. Table 9B-1 of the MUTCD lists minimum sign sizes for both path and roadway bicycle facilities. If the sign applies to drivers and bicyclists, than the larger size used for conventional roads shall apply.

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OTHER SIGNAGE

Innovative signing is often developed to increase bicycle awareness and improve visibility. Signs to be installed on public roadways in California must be approved by Caltrans' California Traffic Control Devices Committee. New designs can be utilized on an experimental basis with Caltrans approval.

San Francisco was the first city in California to use the approved customized bike route logo sign. Jurisdictions may choose a graphic of their choice for the upper third portion of the sign and a numbering system, similar to the highway numbering system, can be used in the lower third.

The new "Share the Road" sign, adopted by the California Traffic Control Devices Committee in 1999, is designed to advise motorists that bicyclists need to share narrow roadways with motor vehicles. This sign has been installed throughout Marin County.

Interest has been generated over the "Bikes Allowed Use of Full Lane" sign. These words, taken directly from the California Vehicle Code (CVC 21202), remind motorists of the rights of bicyclists on the roadway. Cities may consider using this sign as an experiment as it has not yet been approved by the California Traffic Control Devices Committee.

Table A-1 Recommended Signing and Marking

Item	Location	Color	Caltrans Designation	MUTCD Designation
No Motor Vehicles	Entrances to trail	B on W	R44A	R5-3
Use Ped Signal / Yield to Peds	At crosswalks; where sidewalks are being used	B on W	N/A	R9-5, R9-6
Bike Lane Ahead: Right Lane Bikes Only	At beginning of bike lanes	B on W	N/A	R3-16, R3-17
STOP, YIELD	At trail intersections with roads	W on R	R1-2	R1-1, R1-2
Bicycle Crossing	For motorists at trail crossings	B on Y	W70	W11-1
Bike Lane	At the far side of all arterial intersections	B on W	R81	D11-1
Hazardous Condition	Slippery or rough pavement	B on Y	W42	W8-10
Turns and Curves	At turns and curves which exceed 20- mph design specifications	B on Y	W1, 2, 3, 4, 5, 6, 14, 56, 57	W1-1, W1-2, W1-4, W1-5, W1-6
Trail Intersections	At trail intersections where no STOP or YIELD required, or sight lines limited	B on Y	W7, 8, 9	W2-1, W2-2, W2-3, W2-4, W2-5
STOP Ahead	Where STOP sign is obscured	B, R on Y	W17	W3-1
Signal Ahead	Where signal is obscured	B, R, G	W41	W3-2
Bikeway Narrows	Where bikeway width narrows or is below 8'	B on Y	W15	W5-4
Downgrade	Where sustained bikeway gradient is above 5%	B on Y	W29	W7-5
Pedestrian Crossing	Where pedestrian walkway crosses trail	B on Y	W54	W11A-2

Table A-1 Recommended Signing and Marking

Item	Location	Color	Caltrans Designation	MUTCD Designation
Restricted Clearance	Vertical Where vertical clearance is less than 8'6"	B on Y	W47	W11A-2
Railroad Crossing	Where trail crosses railway tracks at grade	B on Y	W47	W10-1
Directional Signs	At intersections where access to major destinations is available	W on G	G7, G8	D1-1b(F), D1-1-c
Right Lane Must Turn Right; Begin Right Turn Here; Yield to Bikes	Where bike lanes end before intersection	B on W	R18	R3-7, R4-4
Trail Regulations	All trail entrances	B on W	N/A	N/A
Multi-purpose Trail: Bikes Yield to Pedestrians	All trail entrances	N/A	N/A	N/A
Bikes Reduce Speed & Call Out Before Passing	Every 2,000 feet	B on W	N/A	N/A
Please Stay on Trail	In environmentally-sensitive areas	N/A	N/A	N/A
Caution: Storm Damaged Trail	Storm damaged locations	B on Y	N/A	N/A
Trail Closed: No Entry Until Made Accessible & Safe for Public Use	Where trail or access points closed due to hazardous conditions	N/A	N/A	N/A
Speed Limit Signs	Near trail entrances; where speed limits should be reduced from 20 mph	B on W	N/A	N/A
Trail Curfew 10PM – 5 AM	Based on local ordinance	R on W	N/A	N/A

Pavement Markings

The Manual on Uniform Traffic Control Devices (MUTCD) provides guidance for lane delineation, intersection treatments, and general application of pavement wording and symbols for on-road bicycle facilities and off-road paths. In addition to those presented in the MUTCD, the following experimental pavement markings may be considered.

BIKE STENCIL ROUTE

San Francisco is testing a bicycle stencil for use on Class III facilities where lanes are too narrow for sharing. The stencil can serve a number of purposes, such as making motorists aware of bicycles potentially in their lane, showing bicyclists the direction of travel, and, with proper placement, reminding bicyclists to bike further from parked cars to prevent “dooring” collisions. The City of Denver has effectively used this treatment for several years and the City of San Francisco has recently begun a study of its effectiveness.

Bike route stencil from Denver



BLUE BIKE LANES

European countries have used colored pavement—red, blue, yellow, and green—in bike lanes that tend to have a higher likelihood for vehicle conflicts. Examples of such locations are freeway on- and off-ramps and where a motorist may cross a bike lane to move into a right turn pocket. In the United States, the City of Portland has experimented with blue bike lanes and supportive signing with favorable results. Studies after implementation showed more motorists slowing or stopping at the blue lanes and more motorists using their turn signals near the blue lanes.

This blue bike lane in Portland, Oregon is used to warn motorists approaching the on-ramp that bicyclists have a through lane



Parking

As more bikeways are constructed and bicycle usage grows, the need for bike parking will climb. Long-term bicycle parking at transit stations and work sites, as well as short-term parking at shopping centers and similar sites, both can support bicycling. Bicyclists have a significant need for secure long-term parking because bicycles parked for longer periods are more exposed to weather and theft, although adequate long-term parking rarely meets demand.

When choosing bike racks, there are a number of things to keep in mind:

- The rack element (part of the rack that supports the bike) should keep the bike upright by supporting the frame in two places without the bicycle frame touching the rack. The rack should allow one or both wheels to be secured.
- Position racks so there is enough room between adjacent parked bicycles. If it becomes too difficult for a bicyclist to easily lock their bicycle, they may park it elsewhere and the bicycle capacity is lowered. A row of inverted “U” racks should be situated on 30-inch minimum centers.
- Empty racks should not pose a tripping hazard for visually impaired pedestrians. Position racks out of the walkway’s clear zone.
- When possible, racks should be in a lighted, high visibility, covered area protected from the elements. Long-term parking should always be protected.

The table below provides basic guidelines on the ideal locations for parking at several key activity centers as well as an optimum number of parking spaces.

ATTENDED BICYCLE PARKING FACILITIES

Attended bike parking is analogous to a coat check—your bike is securely stored until you need it in a supervised location. An organization called The Bikestation[□] Coalition is promoting enhanced attended parking at transit stations.

The Bikestation[□] concept is now in use in Palo Alto and Berkeley in the Bay Area. Bikestations[□] offer secured valet bicycle parking near transit centers. What makes Bikestations[□] distinctive are the other amenities that may be offered at the location – bicycle repair, cafes, showers and changing facilities, bicycle rentals, licensing, etc. Bikestations[□] become a virtual one-stop-shop for bicycle commuters.

Attended bicycle parking can be offered at some special events. For example, the Marin County Bicycle Coalition sponsors valet parking at many festivals in the county, the Sonoma County Bicycle Coalition sponsors valley parking at the downtown Santa Rosa Farmers Market, and secured bicycle parking is offered at Pac Bell Park in San Francisco.

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Table A-2 Recommended Guidelines for Bicycle Parking Locations and Quantities

Land Use or Location	Physical Location	Bicycle Capacity
City Park	Adjacent to restrooms, picnic areas, fields, and other attractions	8 bicycles per acre
City Schools	Near office entrance with good visibility	8 bicycles per 40 students
Public Facilities (city hall, libraries, community centers)	Near main entrance with good visibility	8 bicycles per location
Commercial, retail and industrial developments over 10,000 gross square feet	Near main entrance with good visibility	1 bicycle per 15 employees or 8 bicycles per 10,000 gross square feet
Shopping Centers over 10,000 gross square feet	Near main entrance with good visibility	8 bicycles per 10,000 gross square feet
Commercial Districts	Near main entrance with good visibility; not to obstruct auto or pedestrian movement	2 bicycles every 200 feet
Transit Stations	Near platform or security guard	1 bicycle per 30 parking spaces

Maintenance

Most of the maintenance costs for bikeway facilities are associated with the proposed off-road bike paths, as bike lanes and routes are assumed to be maintained as part of routine roadway maintenance. However, as bicycle lanes do require occasional restriping and other maintenance, approximately \$2,000 per mile annually can be expected based on experience in other cities. This includes costs like sweeping, replacing signs and markings, and street repair. Utility trenches are often dug within roadways today, especially for fiber optic cables. Care must be given to patch these trenches smoothly and without any seams within bike lanes or along bike routes. Class I bike path maintenance costs are based on \$18,000 per mile (EBRPD estimate) which includes cleaning, repairs to crossings, cleaning drainage systems, trash removal, and landscaping. Underbrush and weed abatement should be performed once in the late spring and again in mid-summer. Major rehabilitation such as pavement resurfacing can be as much as \$125,000 or more per mile (EBRPD).

In addition, these same maintenance treatments should be performed on Class II and Class III facilities. These facilities should be prioritized to include an accelerated maintenance plan that is already a part of on-going street maintenance. A maintenance schedule and checklist is provided in Table A-3.

Table A-3 Bikeway Maintenance Check List and Schedule

Item	Frequency
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Table A-3 Bikeway Maintenance Check List and Schedule

Item	Frequency
Sign replacement / repair	1–3 years
Pavement marking replacement	1–3 years
Tree, shrub & grass trimming / fertilizing	5 months–1 year
Pavement sealing / potholes	5–15 years
Clean drainage system	1 year
Pavement sweeping	Weekly–monthly / as needed
Shoulder and grass mowing	Weekly or as needed
Trash disposal	Weekly or as needed
Lighting replacement / repair	1 year
Graffiti removal	Weekly – monthly / as needed
Maintain furniture	1 year
Fountain / restroom cleaning / repair	Weekly – monthly / as needed
Pruning	1 – 4 years
Bridge / tunnel inspection	1 year
Remove fallen trees	As needed
Weed control	Monthly / as needed
Maintain emergency telephones, CCTV	1 year
Maintain irrigation lines	1 year
Irrigate / water plants	Weekly – monthly / as needed

Liability

Liability is a major concern for all local governments. Liability for local agencies implementing and operating new bikeways and pedestrian facilities should be no different than the liability for new roads, parks, or schools. Local agencies should adhere to the following guidelines to minimize their liability.

1. Use of Design Standards

The designers, builders, and inspectors of a facility should adhere to widely accepted standards governing the design and construction of the trail. A standard of conduct includes adherence to published documents such as safety codes, standards, or guidelines that are sponsored or issued by government agencies or voluntary associations, even though such documents lack the force and effect of law. Provisions of state laws related to transportation facilities, if mandatory, may provide the basis for a finding of negligence per se.

Applicable California standards include the Uniform Building Code, and Caltrans Design Manual for Class I and II Bikeways. Other available design standards include

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AASHTO's *Guide for the Development of Bicycle Facilities*; Florida Department of Transportation's *Trail Intersection Design Guidelines*, Island Press's *Greenways: A Guide to Planning, Design, and Development*, Americans with Disabilities Act (ADA), and the Rail-to-Trails Conservancy's *Trails for the 21st Century: A Planning, Design, and Management Manual for Multi-Use Trails*.

Note that Caltrans requirements and guidelines are legally binding for all bike-ways in California: deviations to these standards must go through the design exception process. Careful compliance with applicable laws, regulations, route selection criteria, and design standards should greatly reduce the risk of injury to bicyclists using the bike-way, and also provide strong evidence that the agency used reasonable care. A detailed Project Feasibility Report is specifically designed to address existing standards.

2. Traffic Signals and Warning Devices

Caltrans has adopted a Traffic Design Manual, which defines the circumstances under which traffic signals and warning devices are required. While California law limits the liability of public entities for failure to install regulatory traffic signals, signage and markings, non-regulatory warning signs must be installed where necessary to warn of dangerous condition, such as an intersection. All signals and warning devices must be adequately maintained, so as not to invite reliance on a defective warning device.

3. Usage of Professionals

Facilities that have been reviewed and approved by unregistered or unlicensed professionals may increase liability exposure.

4. Adhere to Maintenance Standards

Maintenance practices should be consistent along the entire facility and conform to recognized maintenance practices. The responsible maintaining agency(ies) should have a written procedure to follow to maintain all portions of the facility, including pre-existing conditions such as drain grates.

5. Monitor Conditions

The responsible agency(ies) should have an internal mechanism to monitor and respond to actual operating conditions on the facility. This is typically done through the maintenance procedures, a record of field observations and public comments, and an annual accident analysis. Accidents should be reviewed to determine if physical conditions on the bikeway were a contributing cause.

6. Keep Written Records

To track written records of all maintenance activities and procedures, responses to reports of safety hazards, and correspondence with other jurisdictions, it may make sense to have one contact persons/department responsible for the entire facility, rather than risk confusion by incidents being reported to the wrong jurisdiction. Mileposts on the route may also help maintenance and enforcement personnel respond to problems.

7. Correct Hazards

Trail managers should correct all hazards known by public officials in a timely fashion.

8. Warn of Known Hazards

Trail users should be warned in advance of all hazards that cannot not be removed or corrected. The MUTCD offers a variety of yellow Hazardous Conditions signs intended for use where roadway or bicycle trail conditions are likely to cause a bicyclist to lose control of his bicycle. In addition, trail users should be made aware of upcoming intersections with roadways, and if the trail is adjacent to an active railroad corridor, warned to use caution when crossing tracks.

9. Insurance

Proper insurance coverage or budgeting for self-insurance to cover potential liability will do much to alleviate concerns.

10. Be Careful With the Word “Safe”

Do not make any verbal or written comments that the facility is safe or safer than a non-designated route. For example, a Project Feasibility Report should not make any blanket claims that the facility is safe or safer than comparable routes.

11. Do Not Rush to Settle

Fear that juries will award a plaintiff large sums for damages has made many attorneys eager to settle cases before they come to court. Lawsuits related to bikeways and walkways may be settled more quickly than other types of lawsuits due to the misconception that walking or bicycling are inherently unsafe activities.

Attorneys may feel that a local government has an extra responsibility on designated bikeways or walkways – more than it does for motor vehicles on roadways, for example – to prevent incidents. In fact, there is no evidence that bicycling or walking is inherently more or less safe than other transportation modes such as driving, flying, or other recreational activities such as swimming or playing soccer. The same public who should be educated about proper bicycling and walking behavior probably shares this

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misconception. The same exceptions for user responsibility and facility condition that apply to driving should apply to bicycling or walking. Since bicyclists and pedestrians are allowed, by law, on all roadways except where expressly prohibited, and roadway conditions vary widely, a public agency incurs no additional liability by identifying the route on a map or a plan. The net effect of prematurely settling a case is to incrementally reduce the types of improvements that can be offered by local government. In other cases, settling cases prematurely may simply encourage legal actions by others.

Resources

Caltrans Bicycle Facilities Unit: Ken McGuire (916-653-2750) and David Priebe (916) 653-0036
— www.dot.ca.gov/hq/tpp/offices/bike/bicycle_prgm.htm

DESIGN AND ENGINEERING STANDARDS

Manual on Uniform Traffic Control Devices, “Part 9 – Traffic Controls for Bicycle Facilities.”

mutcd.fhwa.dot.gov/pdfs/millennium/06.14.01/9ndi.pdf

Caltrans Highway Design Manual, “Chapter 1000: Bikeway Planning and Design.”

www.dot.ca.gov/hq/oppd/hdm/pdf/chp1000.pdf

Caltrans Traffic Manual, Chapter 4 – Signs

www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/TM_Ch4.pdf

GENERAL PLANNING RESOURCES

Guide for the Development of Bicycle Facilities, 1999, Contact: American Association of State Highway and Transportation Officials (AASHTO), P.O. Box 96716, Washington, DC, 20090-6716.

Implementing Bicycle Improvements at the Local Level, 1998, FHWA.

http://www.bikefed.org/bike_guide_online.htm

Bicycle Facilities Planning, 1995, Pinsof & Musser, American Planning Association, Planning Advisory Service Report #459. Contact: American Planning Association, 122 S. Michigan Ave., Suite 1600, Chicago, IL 60603.

Florida Bicycle Facilities Planning and Design Handbook, 1999, Florida Department of Transportation.

http://www11.myflorida.com/safety/ped_bike/ped_bike_standards.htm#Florida%20Bike%20Handbook

The Guide to Bicycle Project and Program Funding in California (2nd Edition), 2002, Gail Payne.

<http://www.calbike.org/pdfs/guide2.pdf>

POLICIES

“Accommodating Bicycle and Pedestrian Travel: A Recommended Approach,” A USDOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure, 2001.

<http://www.fhwa.dot.gov/environment/bikeped/design.htm>

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Caltrans Deputy Directive 64 (DD-64) "Accommodating Non-Motorized Travel."

<http://www.calbike.org/pdfs/caltransdir.pdf>

TRAIL PLANNING

Contra Costa County Trail Design Resource Handbook, May 2001

http://www.co.contra-costa.ca.us/depart/cd/transportation/trl_rvw/tdrh.pdf

Trails for the 21st Century, 1993. Contact: Rails-to-Trails Conservancy, 1100 17th Street NW, 10th Floor, Washington, DC 20036. (202) 331-9696.

Greenways: A Guide to Planning, Design, and Development, 1993. Contact: The Conservation Fund, Island Press, 1718 Connecticut Avenue NW, Suite 300, Washington, DC 20009.

Trail Intersection Design Guidelines, 1996. Contact: Florida Department of Transportation, 605 Suwannee Street, MS-82, Tallahassee, FL 32399-0450.

INNOVATIVE DESIGNS AND IDEAS

Portland's Blue Bike Lanes www.trans.ci.portland.or.us/bicycles/bluebike.htm

Bikestation® Coalition <http://www.bikestation.org/>

BICYCLE-RELATED PROGRAMS

Bicycle Head Injury Prevention Program of the Epidemiology and Prevention for Injury Control Branch of the California Department of Health Services

<http://www.dhs.cahwnet.gov/epic/html/bhipp.html>

National Bicycle Safety Network sponsored by the Centers for Disease Control and Prevention.

<http://www.cdc.gov/ncipc/bike/>

ORGANIZATIONS

Pedestrian and Bicycle Information Center, a program of the University of North Carolina Highway Safety Research Center in cooperation with the Association of Pedestrian and Bicycle Professionals (APBP) <http://www.bicyclinginfo.org/>

East Bay Bicycle Coalition <http://www.ebbc.org/>

California Bicycle Coalition

<http://www.calbike.org/>

Model Bicycle Ordinance

The following text has been included as sample ordinance language for consideration of adoption by jurisdictions in the San Francisco metropolitan area. Modifications should be made to reflect local conditions and issues. Included are regulations concerning bicycle parking (location, design, and quantity), commuter facilities, accessways, and paths.

Meaning of Specific Words and Terms

Accessway. Dedicated easement or right-of-way intended to allow pedestrians and bicyclists convenient linkages to streets, residential areas, neighborhood activity centers, industrial or commercial centers, transit facilities, parks, schools, open space, or trails and paths where no public street access exists.

Bicycle Parking Space. A space for one standard bicycle within a lighted and secure bicycle rack, placed in a paved area.

Bicycle or Bike Lane. A portion of the roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicycles.

Bikeway. Any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Shared-Use Path. A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within a public, non-road right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users.

Sidewalk. The portion of a street or highway right-of-way designated for preferential or exclusive use by pedestrians.

Site Plan Review: Information Requirements

A Site Plan shall contain all the elements necessary to demonstrate that requirements of this Code are being fulfilled and shall include but not be limited to the following:

- A. Parking Plan demonstrating compliance with the standards of this Code.
 - 1. Location, dimensions and number of typical, compact and disabled parking spaces; including aisles, landscaped areas, wheel bumpers, directional signs and striping.

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2. On-site vehicular and pedestrian circulation.
3. Access to streets, alleys and properties to be served, including the location and dimensions of existing and proposed curb cuts.
4. Grading, drainage, surfacing and subgrading details.
5. Exterior lighting: including the type, height and area of illumination.
6. Location, type, and number of bicycle racks, and total resulting bicycle parking spaces.

Site Plan Review: Parking Area Improvement Standards

The number of bicycle parking spaces shall be provided for specified uses as set forth in Articles X.1, and shall meet the standards set forth in Article X.2. Bicycle parking provided in parking lots to meet these requirements shall be visible and accessible, and not impede on-site pedestrian circulation.

X.1 BICYCLE PARKING STANDARDS

(1) Purpose

Bicycle parking is required in most base zones and for most uses to encourage the use of bicycles by providing safe and convenient places to park and store bicycles. The required number of spaces is lower for uses that do not tend to attract bicycle riders and higher for those that do. For some uses, bicycle parking requirements have been increased because of the opportunities to encourage more employee, student and customer-related bicycle use.

The main purpose of these design standards is to ensure that bicycle parking is conveniently located and provides sufficient security from theft and damage. Long-term bicycle parking space requirements are intended to accommodate employees, commuters, students, residents and others who expect to leave their bicycles for more than two hours. Short-term bicycle parking spaces accommodate visitors, customers, messengers, and others expected to depart within approximately two hours.

(2) Bicycle Parking Standards

- a. The minimum number of bicycle parking spaces for each principal use on the site is four spaces. Specific requirements for all uses are contained in Article X.2. Additional bicycle parking spaces may be required at (common use areas). Fractional numbers of spaces shall be rounded up to the next whole space.

- b. Each bicycle parking space shall be at least 2 feet by 6 feet with an overhead clearance of 7 feet, and with a 5 feet access aisle beside or between each row of bicycle parking, and between parked bicycles and a wall or structure. The dimensions of commonly used bicycle racks are illustrated in Figure X.2 (2)(b). Bicycles may be tipped vertically for storage but not hung above the floor.
- c. All required long-term bicycle parking spaces shall be sheltered from precipitation by means of a roof, canopy, building overhang or other method. Short-term bicycle parking is not required to be sheltered.
- d. Direct access from the bicycle parking to the public right-of-way shall be provided by means of access ramps, if necessary, and pedestrian access from the bicycle parking area to the building entrance shall also be provided.

(3) Bicycle Parking Location and Security

- a. Bicycle parking shall consist of a securely-fixed structure that supports the bicycle frame in a stable position without damage to wheels, frame or other components and that allow the frame and both wheels to be locked to the rack with the bicyclist's own locking device. Each required bicycle parking space shall be accessible without removing another bicycle.
- b. Bicycle parking shall be provided within a convenient distance of, and clearly visible from, the main entrance to the building as determined by the City, but it shall not be further than the closest automobile parking space excluding disabled parking. Bicycle parking racks, shelters or lockers must be securely anchored to the ground or to a structure.
- c. Bicycle parking shall be separated from motor vehicle parking by a barrier, curb or sufficient distance to prevent damage to parked bicycles by moving vehicles.
- d. Where bicycle parking facilities are not directly visible and obvious from the public right(s)-of-way, sign(s) shall be provided to direct bicyclists to the parking. Directions to sheltered facilities inside a structure may be posted or distributed by the employer, as appropriate.
- e. Bicycle parking may be located inside a building on a floor which has an outdoor entrance open for use and floor location which does not require stairs to access the space; exceptions may be made for parking on upper stories within multi-story residential buildings. Bicycle parking shall be provided on the ground floor of the structure unless an elevator is easily accessible to an approved bicycle storage area.

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- f. Bicycle parking and bicycle racks shall be located to avoid conflict with pedestrian movement and access. Bicycle parking may be located on the public sidewalk or within the public right-of-way where this still leaves a minimum of 5 feet between the parked bicycle and the storefront and does not conflict with pedestrian accessibility.

X.2 BICYCLE PARKING NUMERICAL STANDARDS

The minimum number of required bicycle parking spaces is presented in Table 31.220. In all cases, the minimum number of parking spaces is four except where otherwise indicated.

X.3 BICYCLE COMMUTER FACILITIES

Changing rooms and showers shall be provided in all new construction or reconstruction of buildings with 25 or more employees and which require the provision of long-term bicycle parking per X.2.

X.4 PEDESTRIAN/BICYCLE ACCESSWAYS

1. Pedestrian/Bicycle Accessways - Purpose
 - a. Accessways are intended to link the following uses: A residential area, neighborhood activity center, an industrial or commercial center, a transit facility, a park, a school, open space, or a trail facility.
 - b. Public street connections for cars, pedestrians and bicycle circulation are preferable to accessways. Accessways should only be used to ensure connectivity to nearby activities in areas where no other public street options are available.
 - c. Off-street bicycle paths in excess of 400 feet in length are not considered accessways.
2. Criteria: Accessways shall be provided in the following situations:
 - a. Bicycle and pedestrian connections are required between discontinuous street rights-of-way, where a new street is not feasible; through excessively long blocks; or wherever the lack of street continuity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.
 - b. Pedestrian and bicycle access shall be provided as follows for all development:

1. To provide direct access to nearby pedestrian/bicycle destination, transit streets or transit facilities to connect with all existing or approved accessways that abut the development site.
 2. To provide direct connection of cul-de-sacs and dead end streets to the nearest available street or pedestrian/bicycle destinations.
 3. To provide connections from local or cul-de-sac streets to collector or arterial streets.
 4. Spacing between full street or accessway connections shall be no more than 330 feet for residential and mixed-use development, and no more than 530 feet for commercial and industrial development.
3. Accessway Type and Purpose. When required, one of the following accessway types will be deemed appropriate by the Manager during development review:
- a. Neighborhood Accessway: Provides neighborhood connections through blocks, links various uses, and promotes direct non-motorized travel.
 - b. Public/Private Integrated Accessway: Provides dual purpose as part of a private, on-site circulation pattern; with a public easement to link proximate streets, uses, and activities.
 - c. Park/Natural Area Accessway: Provides neighborhood access to park and natural areas.
4. An exception may be made when the Manager determines that construction of a separate accessway is not feasible due to physical or jurisdictional constraints. Such evidence may include, but is not limited to:
- a. Other Federal, State, or Local requirements prevent construction of an accessway;
 - b. The nature of abutting existing development makes construction of an accessway impractical;
 - c. The accessway would cross an area affected by a special purpose district overlay and the accessway is incompatible with the purposes of the special purpose district;
 - d. The accessway would cross topography where slopes exceed 30%; or
 - e. The accessway would terminate at the urban growth boundary and extension to another public right-of-way is not part of an adopted plan.
5. Street Entry: Except at the end of a cul-de-sac, entry points shall align where possible with safe pedestrian crossing points along adjacent streets and with adjacent street intersections.
6. Accessways are subject to the following Design Standards:

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- a. All rights-of-way for pedestrian and bicycle accessways shall be dedicated to the City for public use or may be approved as public access easements on private property. Accessways shall be maintained as part of the public right-of-way, or by the underlying landowner if constructed as public easements over private land.
- b. **Width**
 - 1. The width of right-of-way or easements shall be 10 to 12 feet.
 - 2. The Manager may approve accessways exceeding 200 feet in length, with adequate right-of-way or easement width to provide for safe pedestrian and bicycle travel.
 - 3. A minimum 15-foot width is required for accessways that also provide for public utility corridors. If an accessway also provides secondary fire access, a minimum 20-foot width is required.
 - 4. Approved easement accessways for public/private integrated use may be reduced to a minimum 8-foot width.
- a. A clear-vision triangle, the same as for a Residential Driveway, shall be provided at the ends of all accessways. Accessways shall be straight enough to allow both ends of the accessway to be seen from the adjacent public streets. On-street parking shall be prohibited within 15 feet of the intersection of an accessway and a public street to preserve safe sight distance.
- b. Accessways shall be lighted by pedestrian-scale lighting with a maximum standard height of 12 feet along the accessway unless existing on-site lighting or adjacent street lighting provides adequate accessway illumination as approved by the Manager. Lighting shall not shine into adjacent residences.
- c. The construction of stairways shall be avoided whenever possible. Where the path grade would exceed 12% slope, an accessway will be constructed as stairs for pedestrians. Based on local conditions, the Manager may approve alternatives to stairs, including the use of switchbacks and alternative materials. If stairways are needed, they shall be at least 5 feet wide with handrails on both sides.
- d. **Fencing & Screening:** When required for buffering, accessways shall be fenced and screened along adjacent property lines. The area between the pathway and fences shall be planted with a combination of ground cover or low growing shrubs that will reach no more than 2 feet at maturity.
- e. Accessways shall be designed to prohibit motorized traffic.
- f. Accessway surfaces shall be designed to drain stormwater run-off to the side or sides of the accessway. Maximum cross slope shall be 2%.

- g. Pavement width shall generally be 10 to 12 feet. The Manager may approve an accessway of minimum 8-foot width based on specific site constraints. Park/natural area accessways may be hard or soft surface, based on natural area constraints and anticipated level of use.
- h. Accessways shall be constructed in accordance with the City's Public Works Standard Drawings.

X.5 BIKEWAY AND PEDESTRIAN TRAILS

- 1. Developments abutting existing or proposed bikeways identified in the Transportation Plan shall include provisions for the future extension of these facilities through the dedication of easements or rights of way. The developer shall bear the cost of bikeway improvements except when other property owners are benefited, other equitable means of cost distribution may be approved by the City. Minimum width for striped on-street bike lanes shall be 5 feet. Independent shared-use paths shall have a minimum width of 12 feet for two-way traffic.
- 2. Developments abutting existing or proposed pedestrian trails identified in the adopted Park and Recreation District Comprehensive Plan shall provide for the future extension of such pedestrian trails through the dedication of easements or right of way. The developer shall be responsible for trail surfacing, as approved by the Parks and Recreation District or the City, as appropriate. Trails shall be constructed to allow for adequate drainage and erosion control.
- 3. In dedicating an easement or right-of-way for public trails, the owner shall demonstrate compliance with the following criteria:
 - a. Trail easements or rights of way shall be 25 feet. This standard may be reduced if the Director finds this standard to be impractical due to physical constraints. In all cases the adopted easement or right of way must accommodate trails built to the standards adopted by the City.
 - b. Trail easements or rights of way shall allow for future construction of trails in accordance with specifications as to width and surfacing as contained in the Cal-Trans Bicycle and Pedestrian Plan.
 - c. Trail easements or rights-of-way shall be located within a site in such a manner as to allow the trail to be buffered (by means of fences, landscaping, berms, etc.) from existing and proposed dwellings on the site and on adjacent properties, and to maintain the maximum feasible privacy for residents.

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- d. Trail easements or rights-of-way shall be located within a site so that future trails construction will avoid parking and driveway areas and other activity areas which might conflict with pedestrian movements.
- e. Site area included within a trail easement or right-of-way shall be counted as a portion of the landscaped and open space area required for the proposed development.

X.6 TENTATIVE PLAN DRAFTING REQUIREMENTS

- 1. The location and widths of all existing and proposed sidewalks, including the location, size and type of plantings and street trees in any required planter strip; accessways; pedestrian trails; and shared-use paths.
- 2. The location, design, and number of required bicycle parking spaces.
- 3. The following additional information shall be submitted with the Tentative Plan:
[additional required information to reflect jurisdiction's policies]

X.7 TENTATIVE PLAN CRITERIA FOR APPROVAL

The Director shall approve, approve with conditions or deny the request, based upon the following criteria:

- 1. The zoning is consistent with the Plan diagram and/or applicable refinement plan diagrams.
 - 2. Development of any remainder of the property under the same ownership can be accomplished in accordance with the provisions of this Code.
 - 3. Adjacent land can be developed or is provided access that will allow its development in accordance with the provisions of this Code.
 - 4. The request as conditioned fully conforms with the requirements of this Code pertaining to: lot size and dimensions, the efficient provision of public facilities and services, safe and efficient motor vehicle, bicycle and pedestrian movement, and consideration of natural features.
-

APPENDIX B

PEDESTRIAN PLANNING AND DESIGN

This appendix is a brief summary of pedestrian facility design requirements and recommendations. Much of the material presented here is focused upon accommodating people with disabilities, a large group of people that rely on well-designed facilities for mobility. If facilities are planned for these people in mind, it is consequently improved for all users, especially the elderly.

Accessibility Guidelines

The Architectural and Transportation Barriers Compliance Board (Access Board) is a Federal agency formed in 1973 to improve accessibility for people with disabilities. The Access Board's primary duties are to develop and maintain accessibility requirements, provide technical assistance and training, and enforce accessibility standards on facilities funded by the federal government. The ADA Accessibility Guidelines (ADAAG) were developed by the Access Board and serve as the lawful design standards as cited in Title V of ADA. These standards are minimum requirements, and therefore, are not to be considered best practices. Jurisdictions can elect to use either ADAAG or Uniform Federal Accessibility Standards (UFAS) until final rulemaking for the proposed ADAAG is complete, after which point state and local jurisdictions must use standards that meet or exceed ADAAG.

ADAAG does not address every situation. It is an evolving document that will be periodically updated; the first major revision is currently nearing completion.¹ Even if

¹ The Access Board had proposed to add special applications sections to ADAAG in 1992, one of which was Public Rights-of-Way. After it was released in 1994, it met widespread opposition and the final rule was not published. In 1999, the Access Board voted to reinstate rulemaking on accessible pedestrian facilities in public rights of way. The Public Rights-of-Way Access Advisory Committee (PROWAAC) was established to develop these standards. Their ensuing report, *Building a True Community*, was presented to the Access Board in January 2001. Access Board members have reviewed this report in detail and released a draft Guidelines for Accessible Public Rights-of-Way on June 17, 2002, that incorporates PROWAAC rec-

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ADAAG does not cover a specific issue, entities are still required to provide accessibility under Title II. Many of the design recommendations in this appendix are based on ADAAG.

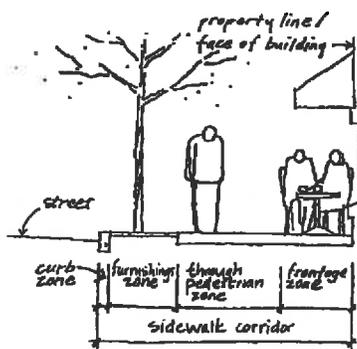
Sidewalks

The functions of sidewalks and street rights-of-way influence how they should be designed. The City of Portland developed a sidewalk corridor zone system to describe the functions of the sidewalk (Figure B-1). With these four zones in mind, city staff can successfully design sidewalks that comfortably meet the needs of everyone that uses it.

The zone adjacent to the street, the **CURB ZONE**, serves many purposes: it prevents vehicles from driving on the sidewalk, assists street sweepers in picking up debris, and keeps street runoff water off the sidewalk. Curbs also provide guidance for pedestrians with visual impairments who use canes.

Adjacent to the curb is the **FURNISHINGS ZONE**, a buffer space that provides a location for objects that are important to a streetscape but should be kept out of the walkway. The types of amenities placed in this zone are street trees, parking meters, poles, hydrants, landscaping, etc. This buffer increases pedestrian comfort while walking beside traffic and protects pedestrians from opening car doors and splashing water from passing automobiles. The *Pedestrian Facilities Users Guide* recommends 2–4-foot (.6–1.2 m) buffers along local and collector streets and 4–6-foot (1.2–1.8 m) buffers along arterial or major streets.

Figure B-1: Sidewalk corridor zones in commercial areas. Source: *Portland Pedestrian Design Guide*, 1998.



ommendations and highlights those amendments to the PROWAAC report. The draft guidelines were open to public review and comment until October 28, 2002. The Access Board is now addressing the key issues that were raised from the public and will release a revised set of guidelines for public comment.

One disadvantage to buffers is that bus stops may not be fully accessible. Paved surfaces should abut the curb at stops to provide a landing for wheelchair lifts and eliminate potential tripping hazards and muddy conditions when embarking/ disembarking from the bus.

The space reserved only for walking, the through pedestrian zone, must be kept clear of any obstructions. Sidewalk widths should vary according to the number of pedestrians anticipated to use the sidewalk. Naturally, a sidewalk along a residential street will be narrower than a sidewalk in a busy downtown. For two people to comfortably walk side-by-side, a five-foot sidewalk is sufficient, which is the recommended minimum width according to a number of pedestrian facility resources. The current ADAAG specifies an absolute minimum clear space of 36 inches (width of most wheelchairs), however, the draft update to the ADAAG is recommending a minimum of 48 inches (1220 mm). The Pedestrian Facilities Users Guide advises the following minimum unobstructed widths:

Local or collector streets: 5 ft (1.5 m)

Arterial or major streets: 6–8 ft (1.8–2.4 m)

Central business districts: 8–12 ft (2.4–3.7 m) (8-ft (2.4-m) minimum in commercial areas with a planter strip, 12-ft (3.7-m) minimum in commercial areas with no planter strip)

Along parks, schools, and other major pedestrian generators: 8–10 ft (2.4–3.0 m)

The fourth zone, the **FRONTAGE ZONE**, lies between the pedestrian zone and property line, which may be a building, fence, or wall. People tend to not walk too close to these types of structures, so this zone provides for some clear space. It is also protects passersby from opening doors and objects protruding from buildings (window sills, rain spouts, flags, etc.). If a wide frontage zone is attainable, this space is perfect for sidewalk cafes.

GRADE & CROSS SLOPE

Grade

The grade, or steepness, of a sidewalk can prevent some people from using a particular walkway. Sidewalks adjacent to an existing roadway may follow the running grade of the roadway (with some exceptions). For grades less than 5 percent, the pedestrian grade may be steeper than the roadway adjacent to the path, while parallel facilities located outside the right-of-way with grades greater than 5 percent are considered ramps and are subject to proposed ADAAG ramp guidelines.

Ramps and grades can be designed using a combination of short grades and rest areas for steep locations. Grades allowable under ADAAG may reach a maximum of 8.3 percent for a distance of no greater than 30 feet. At the end of these grades, flat space for rest should be provided, including occasional installation of benches. In addi-

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tion, provision of handrails and signs indicating grade provide additional support and information to users.

Cross-slopes

A *cross-slope* is the slope perpendicular to the direction of travel. Cross-slopes should be no greater than 2 percent because cross-slopes greater than 2 percent can easily cause people in wheelchairs to veer off the sidewalk and increases the potential to tip over. People using crutches may be forced to turn sideways to keep their base of support at a manageable angle. Such slopes are also problematic for the visually impaired who may veer into the street unless some tactile boundary cue is in place.

Likewise, cross-slopes of sidewalks crossing driveways must not exceed the 2 percent standard. Any sidewalk driveway crossing exceeding the ADAAG standard should be in the transition plan and ultimately replaced. Figure B-2 illustrates several acceptable driveway approaches and sidewalk crossings. Solutions that maintain a level travel path for the pedestrian are preferred.

SURFACE MATERIAL

ADAAG requires that surface material for pedestrian facilities be hard and stable (such as concrete and asphalt) and slip resistant. Such surfaces should be designed so that water and ice do not collect on them. FHWA also recommends that surfaces be as free of jointed surfaces and as visually uniform as possible, although expansion and contraction joints are permissible if they do not create a level change of more than ¼ inch.

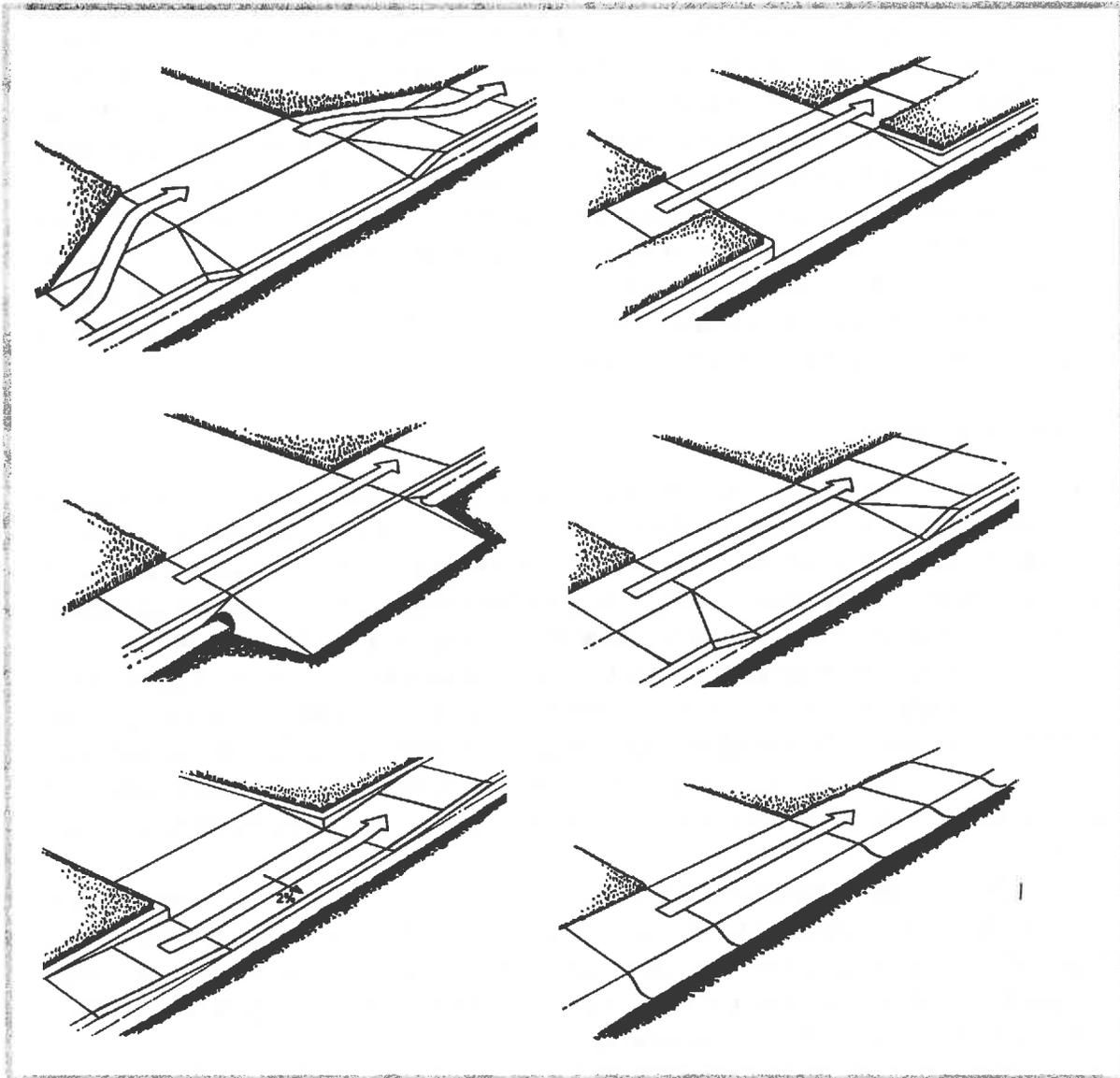
While the use of pavers such as brick and cobblestone is a popular design treatment, these materials can create more difficult travel conditions for people with a variety of disabilities, especially wheelchair users who experience painful vibration while traveling over these uneven surfaces. Creative alternatives include use of concrete paths with brick or stone trim or use of colored asphalt or concrete lightly stamped to resemble brick.

Similarly, the pedestrian zone should be free of utility covers and grates. As with other surfaces, maintenance to preclude accumulation of snow, water, and ice is very important. In any case, grates must be installed at the same level as the sidewalk. Existing grates should be examined to ensure that gaps in the grate facing do not exceed ½ inch, as these can trap wheels and cane tips.

While railroad crossings also involve significant gaps in the pedestrian surface, such gaps should not exceed 2.5 inches with a 3-inch exception for freight lines (½ inch is preferable but not always possible on rail lines that carry large loads). Detectable warnings (truncated domes) should be installed at all locations where rail lines cross pedestrian facilities that are not shared with vehicular ways.

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Figure B-2: Illustrations of five sidewalk and driveway/alleyway connections that maintain minimum sidewalk widths and maximum allowable cross-slopes. Source: "Designing Sidewalks and Trails for Access, Part II," U.D. Department of Transportation, September 2001, pp 5-4 and 5-5.



Properly designed intersections are crucial for safe pedestrian travel. They are the locations for most vehicle-pedestrian collisions and pose the greatest challenge for people with mobility impairments. Ramps, crosswalks, and signals all require careful consideration to accommodate persons of all abilities.

RAMPS

The implementing regulations under Title II of the ADA specifically require curb ramps for existing facilities, as well as for all new construction. Priorities for curb ramp installation on existing facilities should include access to government facilities, transportation, public accommodations, and for employees to use to their place of employment. Facilities without curb ramps are considered out of compliance with ADA and must have a program for their installation, and be included in any transition plan required under the ADA.

Figure B-3: Perpendicular curb ramp. Source: *Draft Guidelines for Accessible Public Rights-of-Way, 2002.*

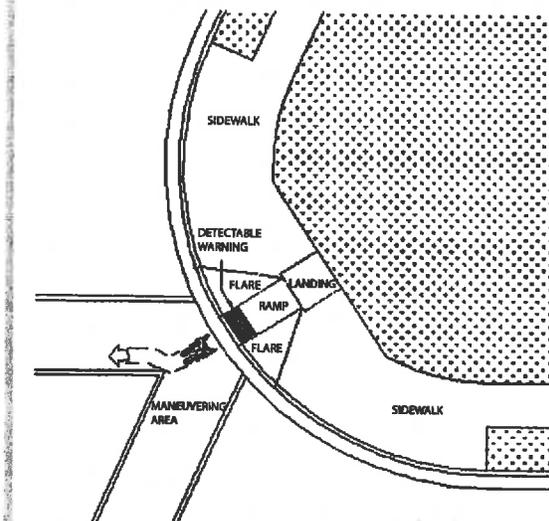
[perpendicular.jpg]

Ramp Types

Curb ramps are usually categorized by their structural design and how they are positioned relative to the sidewalk or street. Among the types of common curb ramps in use are the following designs:

PERPENDICULAR CURB RAMPS, the most common ramp type, are those that are aligned so that the ramp is located perpendicular to the curb. This design is favored because it directs pedestrians to walk perpendicular to the traffic flow, which is especially beneficial for the blind. In addition, this design can be positioned within the area of the crosswalks on small radius corners and are located at the expected crossing location for all pedestrians. On large radius corners, however, the perpendicular ramp is pushed away from the expected crossing point and away from a straight line of travel.

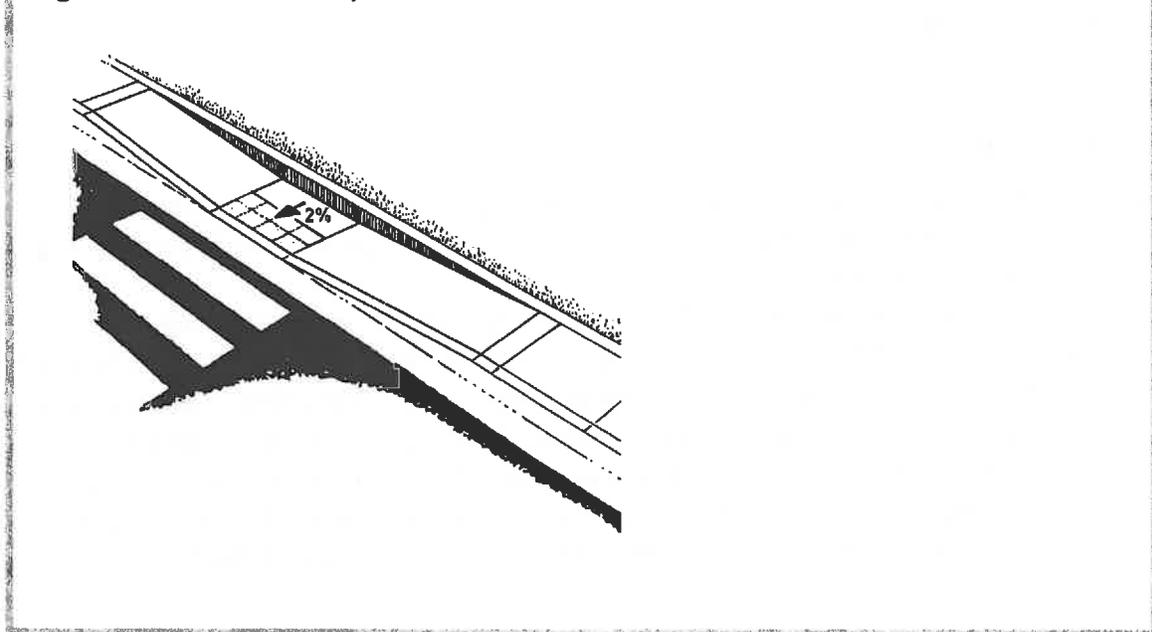
Figure B-4: Shared ramp. Source: *Building a True Community, PROWAAC, 2001.*



SHARED CURB RAMPS are single curb ramps located at the apex of a corner at an intersection. On small radius corners such designs force the user into the center of the intersection without a level landing outside the lanes of traffic. Such ramps are outside the usual line of travel, causing difficulties for those with both visual and mobility impairments.

These disadvantages are weighed against the lower cost of installing only one ramp per corner and the reduced cost of making alterations to a smaller number of ramps. These ramps are sometimes favored by those with visual impairments, as they retain a curb edge at the normal line of travel across an intersection.

Figure B-5: Transition ramp. Source: *Building a True Community*, PROWAAC, 2001.



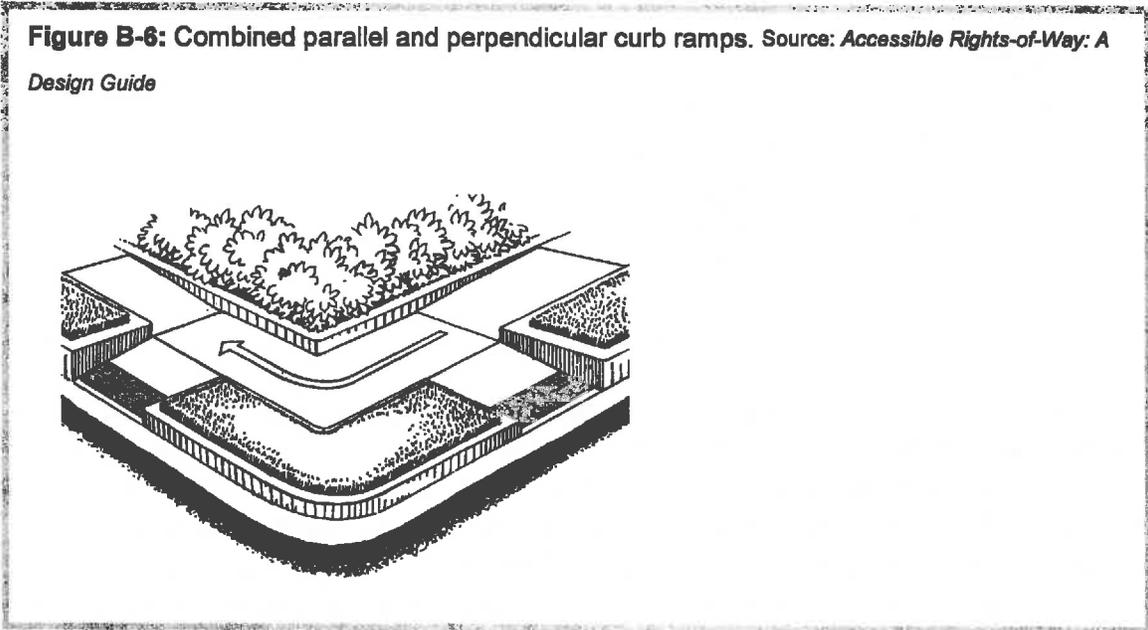
TRANSITION CURB RAMPS have two ramps leading to a lower level landing in the center. Such ramps have a direction of travel for the user that is both parallel to the vehicular traffic on the adjacent street and parallel to the traffic on the sidewalk. Main advantages of transition ramps is that they require minimal right-of-way, do not require turning for maneuvering on the ramp, and that they allow ramps to be extended to accommodate reduced grades. Other advantages include having the connection to the street located within the sidewalk and the provision of clear delineation between the ramp and the street for those with visual impairments.

Disadvantages of the design include the tendency to accumulate water and debris at the bottom of the ramp and the requirement that users continue along the sidewalk to negotiate grades.

COMBINED PARALLEL AND PERPENDICULAR CURB RAMPS use the concept of the parallel ramp to lower the elevation of the landing and then uses a perpendicular ramp to complete the remaining elevation gap between the landing and the street. This design is particularly useful in situations where sidewalks are narrow and

have either a steep grade or high curb to negotiate. Such ramps do not require turning or maneuvering on the ramp surface, and provides a connection to the street within the normal location of the crosswalk. These designs allow for proper alignment with the desired crossing direction, have their level landing areas at the top and bottom of the ramps, and provide adequate drainage to keep debris and water from accumulating on the facility.

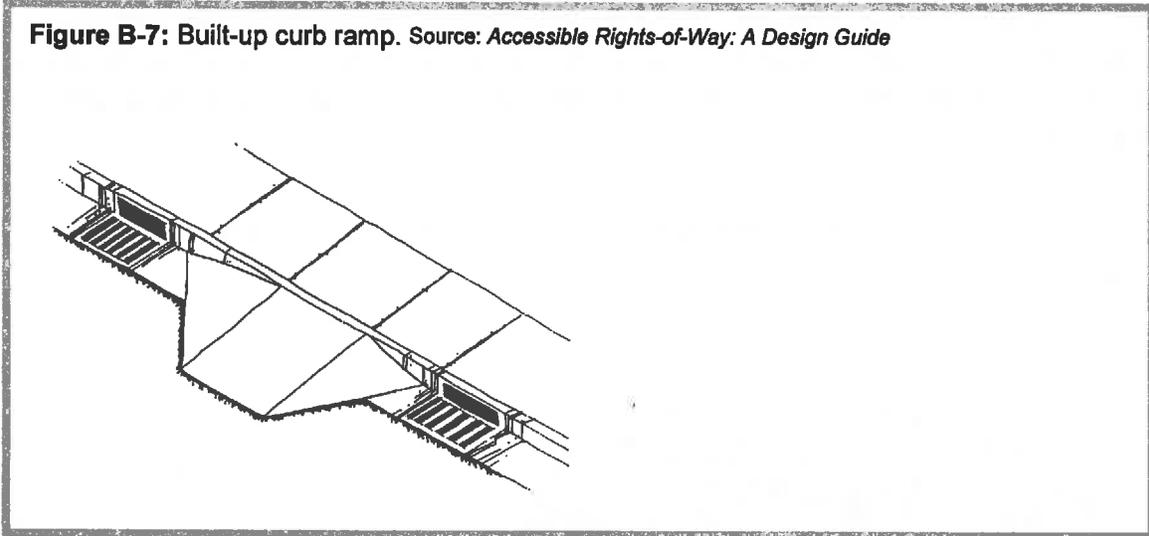
Figure B-6: Combined parallel and perpendicular curb ramps. Source: *Accessible Rights-of-Way: A Design Guide*



Disadvantages include the requirement for more right-of-way than parallel curb ramps and require more extensive alterations in retrofit situations. The design also forces users continuing in the direction of the sidewalk to negotiate the parallel ramps.

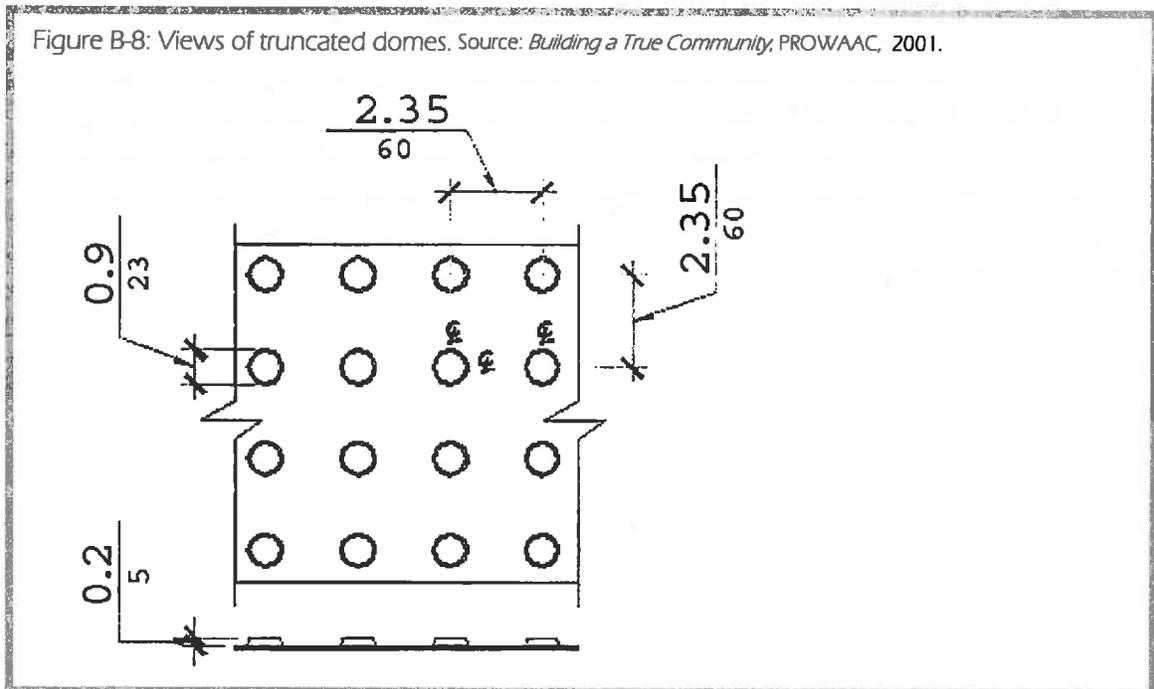
BUILT-UP CURB RAMPS are ramps that project from the curb into the gutter and street. Usually oriented in the same direction as perpendicular ramps, they are not commonly installed in streets but are often found in parking lots. While often it is not practical to place whole built-up ramps in the street, partial ramps can occasionally be used utilizing curb extensions.

Figure B-7: Built-up curb ramp. Source: *Accessible Rights-of-Way: A Design Guide*



Built-up curb ramps have many maintenance, design, and pedestrian safety problems and should be used only when other applications will not work. Users of these ramps tend to be more exposed to the roadway, and—as no clear boundary exists between the sidewalk and the street—requires that parking lane space be used to provide a protective buffer around the installation. Without careful design, these ramps can intrude on space used by bicyclists, and can in any circumstance pose special maintenance problems through the accumulation of dirt, water, and debris.

Figure B-8: Views of truncated domes. Source: *Building a True Community*, PROWAAC, 2001.



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Each of the types of curb ramps described above contain combinations of the following design features:

- **TRANSITION DETECTION** (Truncated Domes) People with vision impairments sometimes have difficulty detecting the transition between curb ramps and the street. The best means to accommodate all types of users is to place a 24-inch strip of raised truncated domes across the entire width of the ramp approximately six to eight inches from the bottom of all curb ramps at the boundary between the ramp and the street. The domes should be aligned in a row (not diagonally) to facilitate movement by wheelchairs. The domes are now *required* by ADAAG as a recent suspension of the requirement was removed as of July 26, 2001.

Truncated domes constitute the *STANDARD* detectable warning because of their unique design. Other surfaces such as grooves and aggregate are not as easily detectable because they are found in other environmental features.

- **RAMP GRADE** Proposed ADAAG regulations permit a grade of 8.3 percent (1:12) on any portion of a curb ramp. Recommended practice, however, is to specify a maximum of 7.1 percent to accommodate construction tolerances. Accordingly, a 7.1 percent grade will require a longer ramp than does 8.3 percent.
- **RAMP CROSS-SLOPE** People with mobility impairments often have a difficult time negotiating a grade and cross-slope simultaneously. Since the grade of the ramp is usually significant, the cross-slope should be minimized. In any circumstance, the cross-slope should not exceed 2 percent (1:48).
- **RAMP LENGTH** As stated above, the greater the change in elevation, the longer the ramp will have to be in order to meet recommended grade specification. Ramp length can be calculated using the following formula:

$$\text{Ramp Length} = \frac{\text{curb height}}{\text{ramp slope} - \text{sidewalk corridor slope}}$$

In no case is it required that a ramp slope exceed 15 feet in length.

- **RAMP WIDTH** Generally, the minimum clear width of a curb ramp is 48 inches (1.22 m). In practice, the minimum width should be the same as the width of the pedestrian zone, which itself is never less than 36 inches given the mobility requirements of those using assistive devices such as wheelchairs and crutches.

- **GUTTER SLOPE** The drainage slope of the gutter is the slope parallel to the curb and roadway. This gutter slope represents a cross slope to the pedestrian, and should not exceed 2 percent (1:48).
- **LANDING DIMENSION AND SLOPE** All landings of ramps should be a 60-inch circle or square, with a maximum of two percent cross slope in any direction. Such landings may serve multiple ramps or overlap with other landings.

The bottom landing of a ramp *must* be within a crosswalk and have a minimum of 48 x 48 inches of maneuvering space outside of the parallel direction of travel. This is not possible to achieve on corners with tight curb radii using diagonal ramps.

- **RETURNED CURBS AND FLARES** The flares adjacent to the curb ramp are not considered part of the access route, but shall be included in all ramps located where pedestrians may walk. Return curbs may be used instead of flares on ramps located where pedestrians would not normally travel (planting strips). Flares shall have a slope of 1:10 measured at the face of the curb.
- **CURB RAMP SURFACES** Gratings, access covers, or other similar surfaces shall not be located on curb ramps, landings, transition ramps, or adjacent gutter pans. Smooth, stable and slip resistant surfaces should be used for curb ramps and landings as smooth surfaces make the detection of truncated domes easier.
- **LOCATION AT INTERSECTIONS** The optimal installation involves a pair of perpendicular ramps placed at 90-degree angles to one another. A single diagonal ramp located at the apex of a corner creates a variety of problems because the user is directed to the center of the intersection. If sidewalk width is limited, however, a single parallel curb ramp or a diagonal ramp may be acceptable.

CROSSWALKS

A pedestrian crossing is defined as any location where the pedestrian leaves the sidewalk and enters the roadway. Pedestrians are at risk whenever they cross the roadway. The degree of risk depends upon the complexity of vehicular and pedestrian traffic patterns and the effectiveness of supplementary information provided about the crossing location, duration, and direction.

At street intersections, turning vehicles and the speed at which they travel pose the greatest threat to pedestrians because the motorists attention is focused primarily on other motorists. Compounding the threat is the occasional presence of movement barriers—anything that restricts an individual's ability to physically move along or within the crosswalk or sidewalk. "Information barriers" restrict an individual's ability to utilize information contained within the sidewalk environment.

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The maximum slope of the crosswalk (which is the road grade) shall be a maximum of two percent, while the running grade (road crown or super elevation) shall be a maximum of five percent. Crosswalk markings are required at signalized intersections, while the minimum crosswalk width is eight feet.

Crosswalk crossing time calculations should be based upon a reasonable pedestrian walking speed of 4 feet/second, and should include a standard definition of the length of the crosswalk and one curb ramp.



Crosswalk Markings

Crosswalk markings are used to define the pedestrian path of travel across the roadway and to alert drivers to the crosswalk location. All marked crosswalks should be designed in conformance with Manual of Uniform Traffic Control Devices (MUTCD).

Although the MUTCD provides for crosswalk design options, research indicates that the continental (ladder) design is the most visible to drivers and to pedestrians with low vision and cognitive impairments. The continental (ladder) design consists of white longitudinal lines perpendicular to the line of the crosswalk, 12 to 24 inches wide and spaced 12 to 24 inches apart. The use of a crosswalk design that is consistent in all applications is strongly encouraged, otherwise the impact of less visible markings may be weakened by comparison.

To further assist the visually impaired, a strip of truncated domes should be used on either side of the crosswalk in those instances where the pedestrian way crosses a vehicular way. These detectable warnings should *not* be used at unsignalized crossings. The location of detectable warnings at intersections with slip lanes is critical. In such situations, an audible or tactile cue must be provided to locate the pedestrian crossing, while that crossing must be provided with a pedestrian-activated traffic signal.

Crosswalk Design Considerations

1. Enhance crossings that combine highly visible markings (ladder striping) with additional pedestrian treatments, such as medians, traffic calming, and shorter crossing distances.
2. Design crosswalks and curb ramps so that all pedestrians can travel within the marked area through the entire crossing.
3. Maintain crosswalk markings and consider additional treatments whenever a street is resurfaced.
4. Do not install crosswalks on multi-lane roadways with high traffic without also including additional treatments such as traffic calming and signing.
5. Consider flashing signals and lights and advanced warning signs to increase the visibility of the crosswalk.
6. Install traffic calming measures to reduce vehicle speeds.
7. Increase crossing times so that people who walk slowly will have sufficient time to cross before the signal indication changes.
8. Increase the crossing times so that people who delay the start of their crossing to confirm the WALK signal will have sufficient time to cross before the signal indication changes.
9. Install a center median to provide a refuge for pedestrians on multi-lane roads.
10. Restrict or limit right turns on red.

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11. Provide pedestrian lead time and an accessible pedestrian signal so pedestrians, including those with vision impairments, can assert themselves in the crosswalk before motorists start making left or right turns.
12. Provide signalized mid-block crossings where blocks are long or where pedestrian traffic typically crosses mid-block.
13. Provide cues to people with visual disabilities of the opportunity to cross mid-block with a guidance strip.
14. Design corners with a smaller turning radii.
15. Provide generous sight distances and unobstructed sightlines between vehicles and pedestrians.
16. Ensure that mid-block crossings will be detectable by and accessible to pedestrians with vision impairments.
17. Provide curb extensions to decrease pedestrian crossing distances and increase pedestrian visibility.
18. Consider raised crosswalks with detectable warnings at both ends.
19. Reduce traffic speed.

SIGNALS

The Caltrans *Traffic Manual* warrants a pedestrian signal based primarily upon pedestrian volumes and gaps in the traffic stream. The total crossing time includes the WALK interval, at least four seconds long, and the clearance phase based on a walking rate of 1.2 meters (4 feet) per second. Signals in areas with a high concentration of elderly and children may be best timed at a slower rate.

More familiar pedestrian activated signals require the user to push a button to activate a signal indicator and initiate a walk interval. The use of pushbutton systems may also lengthen a crossing interval to provide adequate crossing time.

Pushbutton locations should be consistent with MUTCD practice, and be located within five feet of the crosswalk lines and within 10 feet of the curb (unless the curb ramp is more than ten feet long). Multiple pushbuttons at the same intersection should be separated by ten feet. Maximum mounting height of APS buttons is 42 inches and should be located as close as possible to the curb ramp without intruding on the clear space. Buttons should be at least 2 inches in diameter and have an actuation force of no more than 3.5 pounds—enough to be operable with a closed fist.

Also important to consider is that the button should be operable from the level segment of the sidewalk rather than the curb ramp, and that the face of the button panel run parallel to the direction of the marked crosswalk it serves.

Accessible Pedestrian Signals (APS) provide crossing information in formats that assist persons with visual or cognitive impairments. These APS systems range from au-

dible fixed time signals (signal indicators with automated signal phasing), pedestrian activated devices, and signals which transmit from the vicinity of the signal to a personal receiver.

The most common type of audible APS is the “cuckoo” or “chirp” signal that alerts pedestrians to the changing WALK signal. Some models use one tone to indicate a north/south crossing phase and another to indicate east/west—although some confusion is reported even in areas with standardized directional sound signals. Caltrans recommends using the “cuckoo” sound for north-south directions and a “peep-peep” for east-west movement.

Other systems have a quiet, slowly repeating tone or ticking sound that remains constant during the WALK interval. A locator tone informs the pedestrian that they need to activate the signal to request a WALK interval and the sound itself guides users to the location of the button.

A vibrotactile component most frequently installed on APS signals is a raised arrow indicating the direction of travel governed by the pushbutton. The arrow begins to vibrate when the signal changes, allowing those with hearing disabilities to get the same information as would be received from the ticking sound during DON'T WALK and Clearance intervals described above. One advantage of this technology is that no noise is emitted.

Infrared or LED transmitters can transmit speech messages to personal receivers carried by some persons with vision impediments, and usually give standardized information about the status of the signal cycle—WALK or WAIT. Speech messages can also give information about the pedestrian's location, direction of travel, name of the street being crossed, or other priority areas, such as transit stops. Only people using the system hear the transmitted messages.

According to Section 9-04.8 of the Caltrans *Traffic Manual*, audible pedestrian signals may be installed when the following minimum conditions have been met:

- Proposed intersection crosswalk must be signalized,
- Audible devices should be retrofittable to the existing traffic signal hardware,
- Signalized intersection should be equipped with pedestrian push buttons,
- Crosswalk must be suitable for the installation of audible signals, in terms of surrounding land use and traffic patterns,
- Must be a demonstrated need for the audible signals in the form of a request from an individual or group that would use the audible signal, and
- The requesting individual or group should agree to train the visually impaired users.

OTHER INTERSECTION IMPROVEMENTS

Street crossings can be improved with more than marked crosswalks and pedestrian signals. Measures to shorten the crossing distance, enhance the visibility of pedestrians

in the crosswalk, and other devices can contribute to more motorists yielding to pedestrians and pedestrians feeling more secure while crossing. A summary of these techniques is presented in Table B-1.

Streetscape

LIGHTING

Good street lighting is one key to pedestrian and bicyclist safety. Both personal security and safety with respect to traffic are improved when proper lighting is provided. Good lighting of pedestrian facilities also increases the comfort and perception of personal safety of pedestrians, and these factors can influence their choice of route or their decision whether or not to walk.

Street lighting that provides these benefits for pedestrians has several key attributes. Appropriate lighting levels should be provided, particularly at corners and intersections and at key crossing locations such as transit stops. Generally, industry standards call for lighting levels for pedestrian facilities to be between 0.5 and 2.0 footcandles using the lowest level that is appropriate to the conditions.

At crosswalks or trail intersections with local streets, the source of the illumination should not be directly above the crosswalk, where it can “wash out” a crossing pedestrian, but rather at least twenty-five feet before or after the crossing, or both, in order to provide the greatest conspicuity of a crossing pedestrian to a motorist.

Lighting should be provided on sidewalks, not just roadways. Glare and uplighting should be minimized. The light source should show colors well at night. The latter property is measured as the value of the Color Rendering Index (CRI) for any given type of lamp. Typical CRI values range from 20 for high-pressure sodium lamps to 100 for incandescent lamps. Generally, for pedestrian safety, the CRI should be at least 50, and lamps in the blue range (such as metal halide) provide better color rendition than lamps in the orange-yellow range.²

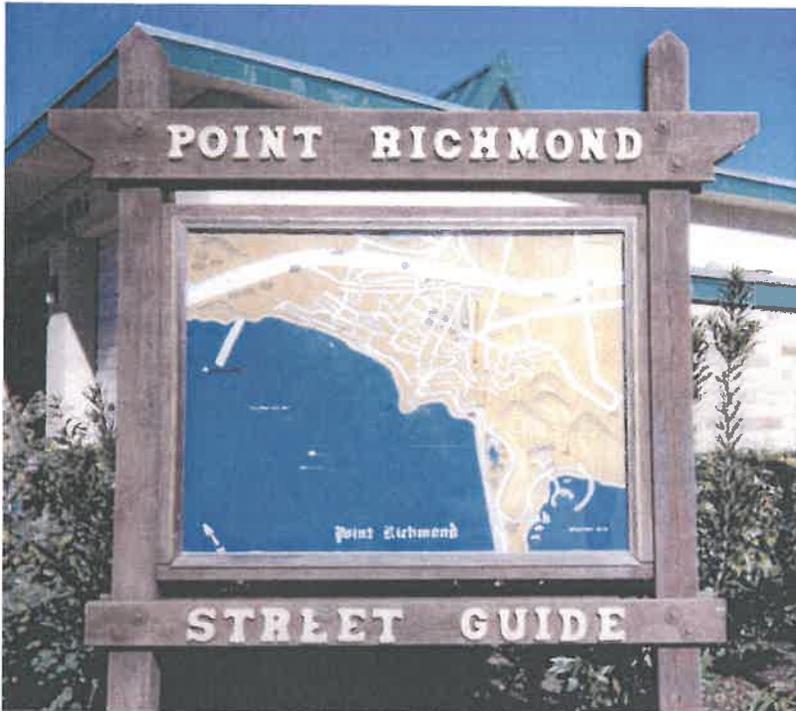
PEDESTRIAN SIGNS

Pedestrians require information that is specifically directed to their own needs because their sightlines, viewpoints, and travel speeds are substantially different from that of motorists. Most pedestrians use visual cues to obtain information about traveling safely, including traffic signals and street signs, as well as from traffic itself.

To a degree, redundancy and multiplicity in signage helps pedestrians assimilate information in a number of ways. This increases the likelihood that all users, including people with visual and cognitive impairments and children, will be able to make safe, informed traveling decisions.

Highly visible signs that adhere to format and location standards enable people with both low vision and cognitive impairments to locate and identify the information. Format and location standards should be established, preferably at the state level, but locally at a minimum.

Maps, such as this one in downtown Point Richmond, help make pedestrians feel more secure about walking in an unfamiliar environment.



Maintenance

Changes in level are vertical elevation differences between adjacent surfaces—curb ramps, landings, the street surface, and the gutter. Changes in sidewalk level are common and are often caused by tree roots pushing up from beneath the pavement; heaving and settling; uneven transitions between streets, curbs, gutters and curb ramps; as well as through poor maintenance.

Pedestrian zone changes in level must be compliant with proposed ADAAG Section 302—no more than $\frac{1}{4}$ inch vertical rise or $\frac{1}{2}$ inch beveled rise is permitted, with the beveled slope no greater than 1:2. Level changes greater than those permitted by ADAAG cause several problems for pedestrians. Ambulatory pedestrians may have trouble lifting feet and may be tripped, while those with vision difficulties may not detect changes and trip. Similarly, persons using wheeled devices may catch their wheels in

level changes and be tossed forward, and may even have a difficult time moving their wheelchair past a level change of no greater than ½ inch.

Corrective measures include ramping or removing any level change greater than ½ inch, while attempting to eliminate the cause of the change in level. This may include routing the path around raised roots and replacing heaved sidewalk or buckled brick walkways. Another type of corrective action involves clearly defining sidewalk edges to provide pedestrians with visual impairments the means to navigate. Increasing the visual contrast between the sidewalk, ramp, and street provides navigation clues for people with low vision.

Other hazards that protrude into the sidewalk corridor higher than 80 inches are generally not a problem for people with visual impairments, while objects on the sidewalk that extend below 27 inches are usually detectable by people using white canes to navigate. Twenty-seven inches is also the height necessary to allow a wheelchair to roll under drinking fountains.

Objects in the middle (between 27 and 80 inches) that protrude into the pedestrian corridor must be moved, raised, or lowered, depending upon the situation, such as protruding tree branches. Wall mounted and post mounted objects within this undetectable height should protrude no more than four inches outward.

Resources

DESIGN AND ENGINEERING AND GUIDELINES

ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), The Access Board, 1998.

<http://www.access-board.gov/adaag/html/adaag.htm>

Accessible Pedestrian Signals by Accessible Design for the Blind with support from the U.S. Access Board, 1998. [http://www.access-](http://www.access-board.gov/research&training/pedsignals/pedestrian.htm)

[board.gov/research&training/pedsignals/pedestrian.htm](http://www.access-board.gov/research&training/pedsignals/pedestrian.htm)

Accessible Rights-of-Way: A Design Guide, Architectural and Transportation Barriers Compliance Board, 1999. <http://www.access-board.gov/publications/PROW%20Guide/PROWGuide.htm>

Building a True Community, Public Rights-of-Way Access Advisory Committee (PROWAAC), 2001. <http://www.access-board.gov/prowac/commrept/index.htm>

Caltrans *Highway Design Manual*, Chapter 100—Basic Design Policies, Topic 105: Pedestrian Facilities. <http://www.dot.ca.gov/hq/oppd/hdm/pdf/chp0100.pdf>

Caltrans *Traffic Manual*, Chapter 9 – Traffic Signals and Lighting

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/chp9/chap9.htm>

Caltrans *Traffic Manual*, Chapter 10 – School Area Pedestrian Safety.

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/chp10/chap10.htm>

Manual on Uniform Traffic Control Devices, Chapter 6D. Pedestrian and Worker Safety.

<http://mutcd.fhwa.dot.gov/pdfs/millennium/06.14.01/6ndi.pdf>

Manual on Uniform Traffic Control Devices, Part 7: Traffic Controls for School Areas

<http://mutcd.fhwa.dot.gov/pdfs/millennium/06.14.01/7ndi.pdf>

Pedestrian Access to Modern Roundabouts: Design and Operational Issues for Pedestrians who are Blind. The Access Board, 2003. [http://www.access-](http://www.access-board.gov/publications/roundabouts/bulletin.htm)

[board.gov/publications/roundabouts/bulletin.htm](http://www.access-board.gov/publications/roundabouts/bulletin.htm)

GENERAL PLANNING RESOURCES

Alternative Treatments for At-Grade Pedestrian Crossings, Nazir Lalani & the ITE Pedestrian and Bicycle Task Force, 2001.

Institute of Transportation Engineers (ITE) "Electronic Toolbox for Making Intersections More Accessible for Pedestrians Who are Blind or Visually Impaired." <http://www.ite.org/>

Pedestrian- and Transit-Friendly Design, 1996, Florida Department of Transportation,

http://www11.myflorida.com/planning/systems/sm/los/pdfs/ped_tran.pdf

Pedestrian Facilities Users Guide – Providing Safety and Mobility, 2002, FHWA.

<http://www.walkinginfo.org/pdf/peduserguide/covertableintro.pdf>

Pedestrian Facilities Guidebook, 1997, Washington State Department of Transportation.

<http://www.wsdot.wa.gov/TA/PAandI/Bike-Ped/PedFacilityGB.pdf>

Pedestrian Safety Toolkit Resource Catalog, 2000, National Highway Traffic Safety Administration, <http://www.fhwa.dot.gov/safety/fourthlevel/pdf/G014-031ResourceCatalog.pdf>

Portland Pedestrian Design Guide, 1998, City of Portland Pedestrian Transportation Program.

<http://www.trans.ci.portland.or.us/DesignReferences/Pedestrian/default.htm>

POLICIES

"Accommodating Bicycle and Pedestrian Travel: A Recommended Approach," A USDOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure, 2001.

<http://www.fhwa.dot.gov/environment/bikeped/design.htm>

Caltrans Deputy Directive 64 (DD-64) "Accommodating Non-Motorized Travel."

<http://www.calbike.org/pdfs/caltransdir.pdf>

INNOVATIVE TREATMENTS

Pedestrian Intelligent Transportation Systems (ITS)

<http://www.walkinginfo.org/pedsmart/home.htm>

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

TRAFFIC CALMING

Institute of Transportation Engineers (ITE) Traffic Calming Web site

<http://www.ite.org/traffic/index.html>

Federal Highway Administration Traffic Calming Web site

<http://www.fhwa.dot.gov/environment/tcalm/>

Traffic Calming: State of the Practice, ITE / FHWA, August 1999.

<http://www.ite.org/traffic/tcstate.htm#tcsop>

PROGRAMS

California Safe Routes to Schools Web site sponsored by the California Department of Health Services. <http://www.dhs.cahwnet.gov/routes2school/>

ORGANIZATIONS

Access Board <http://www.access-board.gov/>

America Walks, a national coalition of local advocacy groups dedicated to walkable communities.

<http://www.americawalks.org/>

Bay Peds, San Francisco Bay Area pedestrian education group

<http://www.baypeds.org/index1.html>

Pedestrian and Bicycle Information Center, a program of the University of North Carolina Highway Safety Research Center in cooperation with the Association of Pedestrian and Bicycle Professionals (APBP) <http://www.bicyclinginfo.org/>

Walkability Checklist <http://www.walkinginfo.org/pdf/walkingchecklist.pdf>

APPENDIX B · PEDESTRIAN PLANNING AND DESIGN

Table B-1 TYPES OF PEDESTRIAN CROSSING IMPROVEMENTS

<i>Improvement</i>	<i>Purpose</i>	<i>Where To Use</i>	<i>Considerations</i>
SHORTEN CROSSING DISTANCE			
Pedestrian Ref- uge Island	To minimize pedestrian exposure during crossing by shortening crossing distance and increasing the number of gaps available for crossing.	Appropriate where roadway crossing is greater than 15 m (50 ft) or more than three lanes; can be used anywhere to increase number of gaps. Can be used at unsignalized or signalized crosswalks.	At signalized locations with pedestrian actuation, provide push buttons at refuge. At right-turn slip lanes, provide pedestrian signalization or crosswalk signage if unsignalized.
Curb Extensions	To minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing.	Appropriate for any crosswalk where there is a parking lane adjacent to the curb. Sometimes used to accommodate bus stops, with bus stopping in travel lane.	Curb extensions can be a problem for bicycle travel and truck or bus turning movements unless there is a parking lane.
Four Lane to Three Lane Conversion	To reduce the number of travel lanes to cross and provide space for pedestrian refuges.	Where a facility with four travel lanes has significant left-turn activity, a three-lane configuration can perform as well or better.	The conversion may permit adding bicycle lanes or curb extensions if there are none at present.
Reduced Curb Radii	To reduce crossing distance, increase queuing area for pedestrians waiting to cross, and slow vehicles as they travel through the intersection.	Where pedestrian use is high and truck and bus turning movements are low. Very short radii (1.5 m or 5 ft) can be used where a parking lane or bike lane provides an "effective turning radius" that is larger than the curb return, or on one-way streets where there are no turning movements possible.	Balance the needs of pedestrians with the need to accommodate the types of vehicles that turn at the intersection.
IMPROVE VISIBILITY			
Raised Crosswalk	To eliminate grade changes from the pedestrian route and give pedestrians greater prominence as they cross the street.	In business districts, near schools and other areas with significant pedestrian travel.	Provide tactile warnings to alert blind pedestrians when they are leaving the sidewalk and entering the roadway.

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Table B-1 TYPES OF PEDESTRIAN CROSSING IMPROVEMENTS

<i>Improvement</i>	<i>Purpose</i>	<i>Where To Use</i>	<i>Considerations</i>
Flashing Beacons or In-Roadway Lights	To alert motorists to the presence of pedestrians in a crosswalk.	Used to warn road users that they are approaching a condition on or adjacent to the roadway that might not be readily apparent and might require the road users to slow down and/or come to a stop. Use only at marked crosswalks with no traffic control devices.	Most successful when the flashing corresponds closely to actual pedestrian use which calls for best available pedestrian detection.
Signal or Pedestrian Signal	To allocate relative time at an intersection to conflicting vehicular and pedestrian movements.	MUTCD gives warrants for installing signals based on relatively high pedestrian volumes. Consideration can be given to installing signals in locations where a demonstrated need for crossing cannot be safely accommodated with other design elements.	Recommended that the time allocated to pedestrian crossing be calculated using a design walking speed of 3.5 feet per second. Recommended that all pedestrian-actuated signals be accessible with audible and tactile information provided.
Illumination	To ensure that pedestrians can be seen as they cross the street.	On collectors and arterial streets, with particular emphasis on crosswalks.	Streetlight should not "wash" the crosswalk but should be located at least 25 feet on either side to best illuminate or backlight a crossing pedestrian. The spectrum of light ideally should render colors well (high-pressure sodium does not).
Traffic Calming	To slow the speed of traffic as it approaches the crosswalk.	Where to use varies with types of traffic calming measures. Some examples include mini-traffic circles, slow points, traffic diverters, chicanes, etc.	Vertical and horizontal deflection devices can slow emergency response vehicles and cause pain to people with spinal injuries (as passengers in paratransit vehicles, for example).
Parking Control	To improve visibility in the vicinity of a crosswalk.	"No Parking" may be signed for some distance back from the intersection to improve visibility.	State law prohibits parking within intersections and crosswalks unless specifically signed.

APPENDIX B · PEDESTRIAN PLANNING AND DESIGN

Table B-1 TYPES OF PEDESTRIAN CROSSING IMPROVEMENTS

<i>Improvement</i>	<i>Purpose</i>	<i>Where To Use</i>	<i>Considerations</i>
MISCELLANEOUS TREATMENTS			
Mid-block Cross-walk	To provide a crossing opportunity where there is no nearby intersection.	Use where there is a demand for crossing and there is no nearby crossing. Consider using when protected intersections are spaced greater than 600 feet. For streets above 12,000 ADT, marked mid-block crosswalks should be augmented with other crossing treatments.	When crosswalk markings are used at mid-block, it is recommended that advance stop bars be placed 30 ft prior to crosswalk to reduce "multiple threat".
Grade-separated Crossing Structure	To provide a crossing opportunity in which the pedestrian is completely separated from traffic.	Use only where it is not feasible to provide an at-grade pedestrian crosswalk (such as at an interstate highway, expressway, or very wide busy major arterial).	A high cost option. Recommended that all grade-separated crossing structures be accessible with elevator access, not just ramps. Excessive added travel distance will discourage pedestrians who want to take a more direct route.
No Pedestrian Crossing	To avoid conflicts between pedestrians and traffic in situations that are particularly dangerous.	Prohibiting crossing should be considered only in very limited circumstances, such as where it would be dangerous for pedestrians to cross because visibility is obstructed, or where there are unique considerations at an intersection.	Prohibiting crossing can significantly reduce pedestrian level of service and mobility. Careful consideration should be given to pedestrian travel patterns and other solutions to improve safety before this measure is implemented.

APPENDIX C

BICYCLE DEMAND FORECASTING MODEL

While many of the assumptions used in this model are based on limited surveys or sample sizes, the model does attempt to provide the same basic methodology to project bicycle use as is common practice in projecting motor vehicle trip generation. As the number of before and after counts become available, the statistical significance of this model will improve. In its current state, this model presents the best available approach to gauge future demand or usage, and is preferable to other techniques that rely on purely theoretical assumptions.

Undercounting

This model does not address some characteristics that influence bicycle ridership. Rising bicycle usage are sometimes attributed to qualitative factors that cannot be easily measured. Examples of these factors are:

- Livability* such as the compactness of neighborhood, traffic calming, and incentives to bike
- Improved safety* on bicycle facilities
- Health* especially the health benefits of regular exercise
- Age or income levels* that deter from driving or simply not wanting to drive

Improvements to the bicycling infrastructure and awareness also contribute to bicycle ridership. Such improvements that can cause higher levels of riding include bicycle parking, bike-transit improvements, changing facilities, education and marketing programs, security, and land use practices.

The U.S. Census collects “journey to work” data to provide insight into the number of people choosing various modes of transportation. The U.S. Census also undercounts bicycle commuters for the following reasons:

The census only includes employed adults ages 16 and over in the modal analysis. This deletes the biggest group of bicyclists—students—who by bicycling are in many cases still saving a vehicle trip.

- Bicyclists who ride to transit or commuter rail service may, in many cases, identify themselves as a transit user since the overall non-bicycling mileage is probably much higher.
- An unknown number of bicycle commuters are thought to be lower income and/or members of a minority group who are traditionally undercounted in the Census.
- Utilitarian bicycle trips for shopping and other reasons are not reflected in the U.S. Census figures, even though these trips were the highest trip purpose cited in the *National Bicycling and Walking Study*.

Improving Demand Estimates

A more accurate assessment of the number of daily non-recreational bike trips has been achieved with this model. It uses available studies from around the country to help define additional bicyclists.

The U.S. Census statistics are supplemented by the inclusion of school children. The total school aged population (ages 6–14) from the U.S. Census is factored by the estimated percent of school children who currently bicycle as their primary mode of transportation to school. In most communities, this will vary between 5 percent and 20 percent percent of all students.

College students are also identified in the 1990 U.S. Census. Local college transportation surveys or a conservative estimate of the assumed mode split should be used. For most communities, this will be between 5 and 20 percent, with the *National Bicycling and Walking Study Case Study No. 1* (FHWA, 1995) showing an average college student bicycle commute rate of 40 percent and overall employed adult bicycle commute rate of 10 percent.

Bicycle commuters who connect with bus or rail transit also represent a pool of undercounted commuters. The Regional Transportation District of Denver completed a bike-and-ride survey in 1999 that showed 1.4 percent of total boardings being bike passengers. Of those people, 63 percent represent new bicycle commuters. This will translate into additional daily bicycle commuters once all of the buses and trains in your community either carry bicycles or provide adequate bicycle parking at all stations.

Utilitarian trips are also included in the baseline ridership figures. *The National Bicycling and Walking Study Case Study No. 1* (FHWA, 1995, page 17), using data from seven different sources, identified utilitarian trips being made by 26.1 percent of active bicyclists versus 15 percent for work/school trip making. It is assumed then that for every bicycle trip to work or school, there are approximately 1.74 utilitarian trips.

In addition to calculating ridership levels, this model also estimates the reduction of vehicle trips and miles. The percent of bicycle trips that actually replace existing vehicle trips is based on survey results, and should be supplemented with additional national and local research. Available surveys indicate that, for worker and college student bicycle commute trips, 73 percent replace a vehicle trip (65 percent drove and one half of 17

percent shared a ride, or 65 percent + 8 percent=73 percent). For bicycle trips by children to school, 53 percent replaced vehicle trips (48 percent drive and one third of 15 percent rideshare, 48 percent + 5 percent = 53 percent). Using these assumptions, it is possible to estimate the bicycle commuters who are currently replacing vehicle trips and vehicle miles.

Table C-1 calculates an estimate for current bicycle usage and reduction in vehicle miles and trips for Contra Costa.

Bikeway Investments and Usage

Before and after studies of bicycle usage on corridors that have had bikeway improvements offer the best empirical link between bikeway investments and usage. A nationwide search for this data was conducted as part of this research, with summary findings described below.

City of Portland The City of Portland is widely recognized as being one of the most progressive large cities in the United States in terms of promoting bicycle commuting and developing bikeways. The research and findings support the contention that the investment in bikeways contributes to an increase in bicycle commuting and ridership.

An explanation and analysis is included in the appendix of this report. The main conclusion of the research is that, even considering background factors such as density, configuration of the downtown, and weather, the investment in bikeways has resulted in a substantial increase (over 500 percent) in ridership. A consistent increase in bicycle ridership occurred on eight selected corridor locations after bike lanes were installed.

City of San Francisco An increase in bicycle ridership was also witnessed at eight locations in San Francisco after bike lanes were installed, ranging from 23 percent to 83 percent increases. The consistency of these increases appears to support the connection between the improvements and increases in usage.

City of Seattle Research conducted by Stuart Goldsmith as part of the National Bicycle & Walking Study (Case Study No. 1) and also published in the FHWA document Guidebook on Methods to Estimate Non-Motorized Travel are based on extensive preference surveys and other research tools, designed to establish the potential bicycle ridership for specific corridor improvements. According to Goldsmith's projections, the potential bicycle commuter mode share in Seattle for areas within reasonable distance of a regional bikeway system was about 8 percent. This is used as another independent source for this section of analysis.

Before and after bicycle counts offer relatively solid evidence that improvements do increase bicycle usage. The use of empirical bicycle counts and preference surveys offers a unique opportunity to (a) establish real connections between bikeway improvements and (b) compare those increases between three different cities to verify if there is a general pattern. For example, there was a 137 percent average increase in bicycle ridership before and after bike lanes were constructed in Portland, at eight locations.

APPENDIX C · BICYCLE DEMAND FORECASTING

The percent completion of each of the above mentioned bikeway systems is shown in the Table C-2. For example, Portland's system is about 50 percent complete. The adjusted increase in ridership assuming the bikeway system was 100 percent completed in each city is shown in the final column. For example, the usage of bicycles in Portland is expected to increase proportionately to the completion of the entire regional bikeway system. This assumes that the increases counted at the selected locations in Portland, for example, are limited by the fact that many of the existing bikeways are disconnected or separated by gaps in the system.

The average increase in ridership based on full completion of a bikeway system is estimated to be 279 percent, which represents the average of the three case study cities.

This connection between system completion and ridership has been cross-checked in the *National Bicycling & Walking Study, Case Study No. 1*. Studies of five (5) university communities (Davis, Madison, Gainesville, Boulder, and Eugene) showed a link between the quality of a bikeway system and ridership. For example, Davis has the most extensive bikeway system per capita and also the highest bicycle commute share. "There are still three times more commuter cyclists in cities with higher proportions of bike lanes," according to the *National Bicycling and Walking Study* (p. 41).

Using the assumptions identified previously, an estimate of future bicycle ridership in Contra Costa can be made assuming full build-out of a regional bikeway system (Table C-2).

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Table C-1 Estimate of Existing Bicycle Transportation Usage

<i>Category</i>	<i>Input</i>	<i>Calculated Totals</i>
Employed Adults, 16 Years and Older		
2000 Population /1	948,816	
2000 Employed Persons /1	442,008	
Bicycle Commute Share /2	0.47%	
Travel Time Less Than 9 Minutes /2	46,853	
2000 est. Bicycle Commuters		2,085
School Children		
2000 School Enrollment, Ages 6-14 /1	133,295	
1990 Bicycle Commute Share /3	5.0%	
2000 est. Bicycle School Commuters /4		6,665
College		
2000 College Population /1	61,975	
1990 Bicycle Commute Share /5	5.0%	
2000 est. Bicycle College Commuters /6		3,099
Bike-Transit Users		
Average Daily Transit/Rail Boardings /7	23,140	
Potential Bike-Transit Boardings /8	1.4%	
New Bicycle Commuters /9	63%	204
Utilitarian (non-work or school) Trips		
Percent of Work/School Bicycle Trips /10	174%	
Est. Bicycle Utility Riders /11		9,376
Total Estimated Daily Bicycle Ridership (excl. recreation)		21,429
Average Two-Way Travel Length (miles)		
Adults/College Students /12	8	
School Children /13	1	
Percentage of Vehicle Trips Replaced		
Adults /14	73%	
Students /15	53%	
Reduced Vehicle Trips /16		28,620
Reduced Vehicle Miles /17		76,386

Notes and Sources:

/1 2000 U.S. Census

/2 2000 Census figure not yet available; estimates based on 1990 percentages

/3 Lamorinda School Commute Study (Fehr & Peers Associates, 1995) and San Diego County School Commute Study (1990).

/4 Estimated school children who commute by bicycle, as of 1990

/5 Estimated college students who commute by bicycle based on school children estimates.

APPENDIX C · BICYCLE DEMAND FORECASTING

/6 Estimated college students who commute by bicycle, as of 1990.

/7 ABAG estimate

/8 RD (Denver) Bike-n-Ride Survey, December 1999 (1.4% of total boardings).

/9 Ibid. (63% of bike boardings represent new bike commuters)

/10 *National Bicycling & Walking Study*, Case Study No. 1, p. 16

/11 Total work, college, and transit bicycle users times 174 percent

/12 Based on survey results from 10 California cities conducted by Alta between 1990 and 1999, L.A. Countywide Policy Document survey (1995), and *National Bicycling & Walking Study*, FHWA, 1995.

/13 Ibid.

/14 Ibid.

/15 Ibid.

/16 Assumes two trips for each bicycle ride and percentage replacement of vehicle trips stated above.

/17 Assumes two trips for each bicycle ride, average mileage per trip, and percentage replacement of vehicle trips stated above.

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Table C-2 Estimate of System Completion and User Increases

Studies of Other Cities

Study Cities	Corridor creases	In- System Completion	Adjusted Increase
Portland /1	137%	50%	274%
San Francisco /2	61%	20%	305%
Seattle /3	90%	35%	257%
Average			279%

Projected Increase in Contra Costa

	Current (2000)	Buildout	Increment
Bicycle Commute Mode Share /4	0.47%	1.31%	0.84%
Total Daily Bicycle Commuters /5	21,429	59,724	38,296
Total Daily Bicycle Trips /6	42,857	119,449	76,592
Reduced Daily Vehicle Trips /7	28,620	79,767	51,148
Reduced Daily Vehicle Miles /8	76,386	212,898	136,512

Notes and Sources:

/1 Before and after bicycle counts conducted by the City of Portland

/2 Before and after bicycle counts conducted by the City of San Francisco

/3 Based on preference survey study conducted by Stuart Goldsmith for the City of Seattle

/1-3 "Corridor increases" refers to the average increase in bicycling in the corridors in each city, before and after bikeways were installed. System completion refers to the percent completion of the bikeway network in each city. Adjusted increase reflects the projected amount of bicycling that will occur when the system is completed, based on studies of communities with completed or nearly completed bikeway systems (*National Bicycling & Walking Study, Study No. 1, 1995*). This translates into an average 279% increase upon system completion.

/4 Current bicycle commute mode share from U.S. Census for LA County (.63%), adjusted to potential mode share when system is 100% complete (1.76%), and the increment (1.13%)

/5 Same as above except that it shows total bicycle commuters (school and college students)

/6 Total commuters from previous line times 2 (each commuter makes 2 trips)

/7 Total reduced trips by category (adult employed, students), times 279% increase (see notes 11-15)

/8 Total reduced vehicle miles by category (adult employed, students), times 279% increase (see notes 11-15)

APPENDIX C · BICYCLE DEMAND FORECASTING

Table C-5 ESTIMATE OF TOTAL BIKE & PEDESTRIAN TRIPS IN MORAGA USING THE NPTS METHOD TO DETERMINE TOTAL AMOUNT OF PERSONS WALKING OR BIKING TO WORK & USING THE INSTITUTION OF TRANSPORTATION ENGINEERS TRIP GENERATION DATA TO DETERMINE THE TOTAL AMOUNT OF BICYCLE AND PEDESTRIAN TRIPS IN THE TOWN OF MORAGA. THE TABLE ON THE BOTTOM RIGHT OF THIS FIGURE USES DATA BASED OFF THE PERCENTAGE OF BICYCLE AND PEDESTRIAN MODES OF TRANSPORTATION USED FOR COMMUTING TO WORK FROM THE US DEPARTMENT OF HOUSING & ECONOMIC DEVELOPMENT "AMERICAN HOUSING SURVEY: 2001" TO DETERMINE THE TOTAL AMOUNT OF BICYCLISTS AND PEDESTRIANS IN THE TOWN OF MORAGA. BOTH SETS OF DATA SHOW ALTERNATIVE TRIP GENERATION COUNTS BASED OFF OF THE COUNTY MODEL WHICH ESTIMATES 1.74 ADDITIONAL UTILITARIAN TRIPS PER COMMUTE TRIP.

Nation Transportation Engineer (NTE) Trip Generation Method For Moraga Commute Trips						
	# of Units	Weekday Trips (per unit)	Saturday Trips (per unit)	Sunday Trips (per unit)	TOTAL TRIPS	TOTAL TRIPS
Total Single Family Residences	3,927	9.55	10.19	9.78	283,863.44	35,552
Total Apartments	413	6.47	8.2	5.49	13,189.52	2,598
Total Condos / Townhouses	1,163	5.98	5.87	4.84	45,279.13	6,811
GRAND Total	5,502.00				334,331.99	47,762
AVG Trips per Person*		6.62	8.94	7.70	60.76	9

*Weighted by Housing Type

	TOTAL TRIPS	TOTAL TRIPS (DAILY AVG)
TOTAL PEDESTRIAN & BICYCLE (NTE Method / 6.51% walking / 7.1% biking)	29,276.45	4,192.35
Total Bike trips for Transit Users and School Commuters**	9,247.14	1,321
GRAND TOTAL (using NTE methodology for commute trips and County Method for school bike trips)	38,523.59	5,503.37
Reduced Vehicle Miles		9,824.81
GRAND TOTAL using only the County's Total Trip methodology	59,085.84	8,440.83
Reduced Vehicle Miles		15,068.87
Total # of citizens using Bikes or # Using Bikes (NTE ratio)		234 to 1,176
		29 to 116

*These numbers are based on the Contra Costa Non-Recreational Bike Trips and exclude weekend work or school trips. They are also weighted from 2000 census figures to reflect the current 2004 population.

US Dept. HUD ratio of Bicycle and Pedestrian	
Method	Ratio
Bicyclists (%)	0.35%
Pedestrians	2.80%
TOTAL	3.15%
TOTAL #	423
TOTAL PED	378
TOTAL BIKES	47

(*) Interpolated from US Dept. HUD data and from 2000 census data to determine ratio of bicyclists to motorcyclists since the HUD data combines the two methods of transportation.

	TOTAL TRIPS	TOTAL TRIPS (DAILY AVG)
TOTAL PEDESTRIAN & BICYCLE* (US Dept. HUD Ratio: .35% bike / 2.8% walking)	10,531	1,504
Total Bike trips for Transit Users & School Commuters**	9,247	1,321
GRAND TOTAL (using NTE methodology for commute trips and County Method for school bike trips)	19,779	2,828
Reduced Vehicle Miles		5,044.20
GRAND TOTAL using only the County Method	16,584	2,371
Reduced Vehicle Miles		4,232.01
Total # of citizens using Bikes or Walking Daily (HUD ratio)		173 to 423
# Using Bikes (HUD ratio)		22 to 47

*This number is based off the percentage of bicycle and pedestrian modes of transportation used for commuting to work from the US Dept. of Housing & Economic Development "American Housing Survey: 2001" (.7% bike/motorcycle and 2.8% pedestrian).

Weighting of Trips by Land Classification			
Percentage SFR	71%	710.11	628.61
Percentage Apartment	8%	48.52	41.21
Percentage Condo	21%	123.80	102.25
AVERAGE		8.82	7.70

County Methodology for Determining Non-Recreational Bike Trips	
Five percent of school aged children (ages 6-14) bicycle to school.....	97
Five percent of college students bicycle to campus.....	112
Approximately one percent of transit commuters also use bicycles.....	8
1.74 utilitarian bicycle trips are made for every one work or school trip.....	1,321

15 years and younger	3,273
16 years and over	13,428

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Table C-4 Estimate of Total Bike & Pedestrian Users in Moraga

Total Population 2004	16,701	100%
HOUSEHOLDS BY TYPE		
Total households	5,908	100%
Family households (families)	4,471	76%
Married-couple family	3,960	68%
Female householder, no husband present	390	6%
Nonfamily households	1,437	24%
Average household size	3	(X)
Total Households earning \$15K or less	217	
Total Persons in <\$15K households (less those under 16 yrs)	515	
Total < \$15K persons that bike to work	8	
Total < \$15K persons that walk to work	68	
Total Households earning \$80K or more	4,309	
Total Persons in >\$80K households (less those under 16 yrs)	10,214	
Total > \$80K persons that bike to work	52	
Total > \$80K persons that walk to work	524	
Total Households earning < \$80K >\$15K	2,166	
Total Persons in < \$80K >\$15K households (less those under 16 yrs)	5,135	
Total < \$80K >\$15K persons that bike to work	55	
Total < \$80K >\$15K persons that walk to work	469	
TOTAL WALKING	1,060	6.51%
TOTAL BIKING	116	0.71%
*Data is extrapolated from the 1995 Nationwide Personal Transportation Survey (NPTS)		

01 (17% bike/motorcycle and 2.8% pedestrian)

Weighting of Trips by Land Classification				
Percentage SFR	71%	712.11	727.25	658.81
Percentage Apartment	8%	48.88	48.24	41.31
Percentage Condo	21%	123.85	119.79	102.39
	AVERAGE	8.62	8.94	7.70

County Methodology for Determining Non-Recreational Bike Trips	
Five percent of school aged children (ages 5-14) bicycle to school	17
Five percent of college students bicycle to campus	112
Approximately one percent of transit commuters also use bicycles	9
1.74 utilization bicycle trips are made for every one work or school trip	1,321
15 years and younger	1,373
16 years and over	13,422



APPENDIX D

FUNDING SOURCES

There are a variety of potential funding sources including local, state, regional, and federal funding programs that can be used to construct the proposed bicycle and pedestrian improvements. Most federal, state, and regional programs are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. Local funding for bicycle and pedestrian projects typically comes from Transportation Development Act (TDA) funding, which is prorated to each County based on return of gasoline taxes. Funding for many of the programs would need to be funded either with TDA, general fund (staff time), and regional, state, and federal sources.

Table D-1 Primary Funding Sources for Bicycle and Pedestrian Projects and Programs

Federal Funding		
Congestion Mitigation and Air Quality Improvement Program (CMAQ)		
Federal block grant program for projects in Clean Air Act non-attainment areas that will help attain the national ambient air quality standards stated in the 1990 Clean Air Act amendments. www.dot.ca.gov/hq/transprog/reports/Official_CMAQ_Web_Page.htm		
<i>Eligible Applicants</i>	Cities, counties, transit operators, Caltrans, MPOs, non-profits and private entities.	
<i>Project Examples</i>	County: Iron Horse Trail/Treat Blvd	\$75,000
	EBRPD: Iron Horse Trail/Willow Pass Rd	\$62,325
Land and Water Conservation Fund (LWCF)		
LWCF grants may be used for statewide recreational planning and for acquiring and developing recreational parks and facilities, especially in urban areas. The funds are limited to outdoor recreation projects such as the acquisition of wetland habitat and the development of recreation facilities. www.parks.ca.gov/grants/lwcf/lwcf.htm		
<i>Eligible Applicants</i>	Federal and state agencies, cities, counties, recreation and park districts and special districts.	
<i>Project Examples</i>	Contra Costa Water District: Los Vaqueros Trails Development	\$152,850
	EBRPD: Point Wilson Trail	\$114,300
Recreational Trails Program (RTP)		
RTP annually provides monies for recreational trails and trail-related projects. www.parks.ca.gov/grants/index.htm		
<i>Eligible Applicants</i>	Cities, counties, districts, state agencies and non-profit organizations.	
<i>Project Examples</i>	Danville: Freitas Rd Trail Bridge	\$39,000
	San Pablo: Wildcat Creek Trail	\$25,000
	County: Rodeo Creek Trail	\$129,000
	EBRPD: Bay Trail	\$80,000
	EBRPD: Iron Horse Trail	\$100,000
	EBRPD: Delta de Anza Trail	\$100,000
Regional Surface Transportation Program (RSTP)		
Federal block grant program for a variety of transportation projects including bike parking facilities at terminals, bike racks on buses, bicycle transportation facilities, pedestrian walkways, bike-activated traffic lights and preservation of abandoned railway corridors for pedestrian and bicycle trails. www.dot.ca.gov/hq/transprog/reports/Official_RSTP_Web_Page.htm		
<i>Eligible Applicants</i>	Cities, counties, transit operators, Caltrans, MPOs, non-profits and private entities.	
<i>Project Examples</i>	Antioch: Delta de Anza Trail	\$386,000
	Clayton: Marsh Creek Rd	\$667,000
	Lafayette: Happy Valley Rd Improvements	\$270,000
	Martinez: Pacheco Blvd Bike Lane/Roadway Rehabilitation	\$1,593,540

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Table D-1 Primary Funding Sources for Bicycle and Pedestrian Projects and Programs

Transportation Enhancement Activities (TEA)

The TEA program funds transportation projects that help enhance the travel experience. The 12 eligible TEA categories include three that are bicycle-oriented: bicycle and pedestrian facilities, bicycle and pedestrian educational activities and preservation of abandoned railway corridors for bicycle and pedestrian use. The funds are dispersed to the following TEA programs: Regional, Conservation Lands, Caltrans and Statewide Transportation Enhancement (STE). www.dot.ca.gov/hq/TransEnhAct

<i>Eligible Applicants</i>	Local, state and federal agencies. Private organizations must partner with a public qualified entity.	
<i>Project Examples</i>	EBRPD: Iron Horse Trail/Walnut Creek Ext.	\$770,000
	EBRPD: Miller-Knox Ferry Point Bike Path	\$376,000
	EBRPD: Point Isabel to Marina Bay Trail	\$69,000
	El Cerrito/BART: El Cerrito Plaza BART Bike Garage	\$117,000

State Funding

Bicycle Transportation Account (BTA)

BTA provides state funds for city and county projects that improve the safety and convenience of bicycle commuters. Eligible projects include new bikeways that serve major transportation corridors, secure bicycle parking, bicycle-carrying facilities on transit vehicles, installation of traffic control devices, planning, bikeway improvements, maintenance and hazard eliminations. www.dot.ca.gov/hq/LocalPrograms/

<i>Eligible Applicants</i>	Cities or counties.
<i>Project Examples</i>	No jurisdiction in Contra Costa County qualifies because the local agencies have not developed Caltrans-approved bicycle plans. East Contra Costa County is in the process of qualifying their bicycle plan so that local jurisdictions within East County may apply for BTA funds.

CA Conservation Corps (CCC)

The CCC program provides emergency assistance and public service conservation work.

<i>Eligible Applicants</i>	City, county, state, federal and non-profit organizations
<i>Project Examples</i>	Richmond/San Pablo: Wildcat Creek Trail between the San Francisco Bay Trail and Davis Park in the City of San Pablo

Environmental Enhancement and Mitigation Program (EEMP)

The EEMP funds projects that offset environmental impacts of modified or new public transportation facilities such as streets, Park & Ride facilities and transit stations. www.dot.ca.gov/hq/LandArch/eem/eemframe.htm

<i>Eligible Applicants</i>	Non-profit agencies, and local, state and federal governments
<i>Project Examples</i>	None in 2000/2001.

Habitat Conservation Fund (HCF)

The HCF program provides a competitive grant program. Trail projects, land acquisition and wildlife corridor restoration qualify for the trails/programs/urban access category. <http://parks.ca.gov/grants/hcf/hcf.htm>

<i>Eligible Applicants</i>	Cities, counties and eligible districts	
<i>Project Examples</i>	Lafayette: Sessions Rd Trail	\$10,000
	San Pablo: Wildcat Creek Trail	\$43,000

Table D-1 Primary Funding Sources for Bicycle and Pedestrian Projects and Programs

Office of Traffic Safety (OTS) Program		
The primary objective of the program is to reduce motor vehicle fatalities and injuries. A bicycle and pedestrian safety program should include the following three components: education, enforcement and engineering. www.ots.ca.gov		
<i>Eligible Applicants</i>	State, city and county agencies and non-profit and community-based organizations.	
<i>Project Examples</i>	None in 1999/2000 or in 2000/2001.	
Petroleum Violation Escrow Account (PVEA)		
The PVEA Program funds projects that conserve energy and that benefit, directly or indirectly, consumers of petroleum products within the state.		
<i>Eligible Applicants</i>	Cities, counties, transit operators and Caltrans.	
<i>Project Examples</i>	No information.	
Proposition 12 – ABAG Bay Trail Funds		
In June 2000, Governor Davis approved a \$7.5 million allocation from the Parks and Open Space Bond to the State Coastal Conservancy for planning and construction of the planned 400-mile Bay Trail. A portion of the money funds projects through a competitive grant program managed by the Bay Trail Project, a non-profit organization administered by the Association of Bay Area Governments. www.abag.ca.gov/bayarea/baytrail/grants.html		
<i>Eligible Applicants</i>	Cities and counties	
<i>Project Examples</i>	El Cerrito – Cerrito Creek Connector	\$100,000
	Richmond – New Access to Shipyard III	\$70,000
	San Pablo – Wildcat Creek Trail	\$17,000
	EBRPD: West County Wastewater District Segment	\$40,000
	EBRPD: Edgewater Tech. Park to Point Pinole Reg'l Shoreline	\$85,000
	EBRPD: Point Pinole to Point Wilson	\$75,000
	County – Carquinez Scenic Bicycle Path	\$75,000
Regional Improvement Program (RIP)		
State funding for a variety of transportation projects such as carpool lanes, transit stations, bicycle and pedestrian facilities.		
<i>Eligible Applicants</i>	Cities, counties, transit operators, Caltrans	
<i>Project Examples</i>	Richmond: Richmond Parkway Bike Lanes	\$30,000

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Table D-1 Primary Funding Sources for Bicycle and Pedestrian Projects and Programs

Safe Routes to School Program (SR2S)

The SR2S program funds projects that improve the safety of pedestrian and bicycle routes to/from schools. www.dot.ca.gov/hq/LocalPrograms/

<i>Eligible Applicants</i>	Cities or counties	
<i>Project Examples</i>	Antioch: Bike/Ped Improvements	\$212,400
	County: Sheldon Elementary School	\$202,638
	Richmond: West Contra Costa USD	\$190,000

Local Funding

Developer Impact Fees

Local government agencies charge developers a developer impact fee to offset the public costs required to accommodate new development with public infrastructure. Developer fees generally are used for local rather than regional improvements.

<i>Eligible Applicants</i>	Local jurisdictions
<i>Project Examples</i>	No information.

Transportation for Clean Air Funds (TFCA)

Various state legislation have authorized air districts in California to impose a two to four dollar motor vehicle registration fee to provide funds for air districts to meet responsibilities mandated under the California Clean Air Act (CCAA). The funds can be used to support programs and projects that reduce air pollution from motor vehicles. www.baaqmd.gov/planning/plntrms/tfcapage.htm

<i>Eligible Applicants</i>	Local jurisdictions in participating Air Districts	
<i>Project Examples</i>	Brentwood: Marsh Creek Trail	\$25,000
	County: I-80 Bikeway	\$99,000
	Orinda: St. Stephens Trail	\$159,918
	Pinole: Bay Trail	\$100,000
	Pittsburg: Loveridge Rd	\$180,000

Local Sales Tax

Voters in Contra Costa County approved Measure C, which is a one-half cent sales tax to fund transportation projects.

<i>Eligible Applicants</i>	Local jurisdictions
<i>Project Examples</i>	

Bicycle Registration

In cities, counties or on college campuses where high concentrations of bicyclists exist, this source accumulates enough monies to fund bicycle-related programs and projects.

<i>Eligible Applicants</i>	Local jurisdictions
<i>Project Examples</i>	Not applicable.

Table D-1 Primary Funding Sources for Bicycle and Pedestrian Projects and Programs

Transportation Development Act (TDA)

TDA Article 3 states that one quarter cent of retail sales tax is returned to the county of origin for the purpose of funding transportation improvements in that county such as bicycle and pedestrian facilities, safety programs and planning projects in that county.

<i>Eligible Applicants</i>	Local jurisdictions	
<i>Project Examples</i>	County Health Services: Contra Costa Bicycle Safety Project	\$28,990
	El Cerrito: Plaza BART Bicycle Parking	\$107,700
	Lafayette: Reliez Valley Road Walkway	\$120,000
	Antioch: W. 18 th St. Ped/Bike Facility	\$50,000

APPENDIX E

U.S. DOT POLICY STATEMENT AND CALTRANS' DEPUTY DIRECTIVE 64

Two policy statements—the federal Department of Transportation's recommended approach to accommodating bicycle and pedestrian travel and Caltrans' Deputy Directive DD-64 on accommodating non-motorized travel—could encourage significant changes in how transportation projects are planned, designed and constructed. Both these policy statement encourage transportation agencies to consider the needs of bicyclists and pedestrians in the design of all transportation facilities. In its statement, the federal DOT calls for incorporating bicycle and pedestrian facilities in all new transportation facilities, with few exceptions. In DD-64, Caltrans establishes the policy that it “fully considers the needs of non-motorized travelers (including pedestrians, bicyclists and persons with disabilities) in all programming, planning, maintenance, construction, operations and project development activities and products.”

Accommodating Bicycle and Pedestrian Travel: a Recommended Approach

A U.S. DOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure

PURPOSE

Accommodating Bicycle and Pedestrian Travel: A Recommended Approach is a policy statement adopted by the United States Department of Transportation. U.S. DOT hopes that public agencies, professional associations, advocacy groups, and others adopt this approach as a way of committing themselves to integrating bicycling and walking into the transportation mainstream.

The Design Guidance incorporates three key principles:

- a) A policy statement that *bicycling and walking facilities will be incorporated into all transportation projects* unless exceptional circumstances exist;
- b) An approach to achieving this policy that has already worked in State and local agencies; and
- c) A series of action items that a public agency, professional association, or advocacy group can take to achieve the overriding goal of improving conditions for bicycling and walking.

The Policy Statement was drafted by the U.S. Department of Transportation in response to Section 1202 (b) of the Transportation Equity Act for the 21st Century (TEA-21) with the input and assistance of public agencies, professional associations and advocacy groups.

INTRODUCTION

Bicycling and walking issues have grown in significance throughout the 1990s. As the new millennium dawns public agencies and public interest groups alike are striving to define the most appropriate way in which to accommodate the two modes within the overall transportation system so that those who walk or ride bicycles can safely, conveniently, and comfortably access every destination within a community.

Public support and advocacy for improved conditions for bicycling and walking has created a widespread acceptance that more should be done to enhance the safety, comfort, and convenience of the nonmotorized traveler. Public opinion surveys throughout the 1990s have demonstrated strong support for increased planning, funding and implementation of shared use paths, sidewalks and on-street facilities.

At the same time, public agencies have become considerably better equipped to respond to this demand. Research and practical experience in designing facilities for bicyclists and pedestrians has generated numerous national, State and local design manuals and resources. An increasing number of professional planners and engineers are familiar with this material and are applying this knowledge in towns and cities across the country.

The 1990 Americans with Disabilities Act, building on an earlier law requiring curb ramps in new, altered, and existing sidewalks, added impetus to improving conditions for sidewalk users. People with disabilities rely on the pedestrian and transit infrastructure, and the links between them, for access and mobility.

Congress and many State legislatures have made it considerably easier in recent years to fund nonmotorized projects and programs (for example, the Intermodal Surface Transportation Efficiency Act and the Transportation Equity Act for the 21st Century), and a number of laws and regulations now mandate certain planning activities and design standards to guarantee the inclusion of bicyclists and pedestrians.

Despite these many advances, injury and fatality numbers for bicyclists and pedestrians remain stubbornly high, levels of bicycling and walking remain frustratingly low, and most communities continue to grow in ways that make travel by means other than the pri-

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vate automobile quite challenging. Failure to provide an accessible pedestrian network for people with disabilities often requires the provision of costly paratransit service. Ongoing investment in the Nation's transportation infrastructure is still more likely to overlook rather than integrate bicyclists and pedestrians.

In response to demands from user groups that every transportation project include a bicycle and pedestrian element, Congress asked the Federal Highway Administration (FHWA) to study various approaches to accommodating the two modes. The Transportation Equity Act for the 21st Century (TEA-21) instructs the Secretary to work with professional groups such as AASHTO, ITE, and other interested parties to recommend policies and standards that might achieve the overall goal of fully integrating bicyclists and pedestrians into the transportation system.

TEA-21 also says that, "Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation projects, except where bicycle and pedestrian use are not permitted." (Section 1202)

In August 1998, FHWA convened a Task Force comprising representatives from FHWA, AASHTO, ITE, bicycle and pedestrian user groups, State and local agencies, the U.S. Access Board and representatives of disability organizations to seek advice on how to proceed with developing this guidance. The Task Force reviewed existing and proposed information on the planning and technical design of facilities for bicyclists and pedestrians and concluded that these made creation of another design manual unnecessary. For example, AASHTO published a bicycle design manual in 1999 and is working on a pedestrian facility manual.

The area where information and guidance was most lacking was in determining when to include designated or special facilities for bicyclists and pedestrians in transportation projects. There can also be uncertainty about the type of facility to provide, and the design elements that are required to ensure accessibility.

For example, when a new suburban arterial road is planned and designed, what facilities for bicyclists and pedestrians should be provided? The task force felt that once the decision to provide a particular facility was made, the specific information on designing that facility is generally available. However, the decision on whether to provide sidewalks on neither, one or both sides of the road, or a shoulder, striped bike lane, wide outside lane or separate trail for bicyclists is usually made with little guidance or help.

After a second meeting with the Task Force in January 1999, FHWA agreed to develop a *Policy Statement on Accommodating Bicyclists and Pedestrians in Transportation Projects* to guide State and local agencies in answering these questions. Task Force members recommended against trying to create specific warrants for different facilities (warrants leave little room for engineering judgment and have often been used to avoid providing facilities for bicycling and walking). Instead, the purpose of the Policy Statement is to provide a recommended approach to the accommodation of bicyclists and pedestrians that can be adopted by State and local agencies (as well as professional societies and associations, advocacy groups, and Federal agencies) as a commitment to developing a transportation in-

frastructure that is safe, convenient, accessible, and attractive to motorized *and* nonmotorized users alike. The Policy Statement has four elements:

- a) An acknowledgment of the issues associated with balancing the competing interests of motorized and nonmotorized users;
- b) A recommended policy approach to accommodating bicyclists and pedestrians (including people with disabilities) that can be adopted by an agency or organizations as a statement of policy to be implemented or a target to be reached in the future;
- c) A list of recommended actions that can be taken to implement the solutions and approaches described above; and
- d) Further information and resources on the planning, design, operation, and maintenance of facilities for bicyclists and pedestrians.

THE CHALLENGE: BALANCING COMPETING INTERESTS

For most of the second half of the 20th Century, the transportation, traffic engineering and highway professions in the United States were synonymous. They shared a singular purpose: building a transportation system that promoted the safety, convenience and comfort of motor vehicles. The post-war boom in car and home ownership, the growth of suburban America, the challenge of completing the Interstate System, and the continued availability of cheap gasoline all fueled the development of a transportation infrastructure focused almost exclusively on the private motor car and commercial truck.

Initially, there were few constraints on the traffic engineer and highway designer. Starting at the centerline, highways were developed according to the number of motor vehicle travel lanes that were needed well into the future, as well as providing space for breakdowns. Beyond that, facilities for bicyclists and pedestrians, environmental mitigation, accessibility, community preservation, and aesthetics were at best an afterthought, often simply overlooked, and, at worst, rejected as unnecessary, costly, and regressive. Many States passed laws preventing the use of State gas tax funds on anything other than motor vehicle lanes and facilities. The resulting highway environment discourages bicycling and walking and has made the two modes more dangerous. Further, the ability of pedestrians with disabilities to travel independently and safely has been compromised, especially for those with vision impairments.

Over time, the task of designing and building highways has become more complex and challenging. Traffic engineers now have to integrate accessibility, utilities, landscaping, community preservation, wetland mitigation, historic preservation, and a host of other concerns into their plans and designs—and yet they often have less space and resources within which to operate and traffic volumes continue to grow.

The additional “burden” of having to find space for pedestrians and bicyclists was rejected as impossible in many communities because of space and funding constraints and a perceived lack of demand. There was also anxiety about encouraging an activity that many

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felt to be dangerous and fraught with liability issues. Designers continued to design from the centerline out and often simply ran out of space before bike lanes, paved shoulders, sidewalks and other "amenities" could be included.

By contrast, bicycle and pedestrian user groups argue the roadway designer should design highways from the right-of-way limits in, rather than the centerline out. They advocate beginning the design of a highway with the sidewalk and/or trail, including a buffer before the paved shoulder or bike lane, and then allocating the remaining space for motor vehicles. Through this approach, walking and bicycling are positively encouraged, made safer, and included as a critical element in every transportation project rather than as an afterthought in a handful of unconnected and arbitrary locations within a community.

Retrofitting the built environment often provides even more challenges than building new roads and communities: space is at a premium and there is a perception that providing better conditions for bicyclists and pedestrians will necessarily take away space or convenience from motor vehicles.

During the 1990s, Congress spearheaded a movement towards a transportation system that favors people and goods over motor vehicles with passage of the Intermodal Surface Transportation Efficiency Act (1991) and the Transportation Equity Act for the 21st Century (1998). The call for more walkable, livable, and accessible communities, has seen bicycling and walking emerge as an "indicator species" for the health and well-being of a community. People want to live and work in places where they can safely and conveniently walk and/or bicycle and not always have to deal with worsening traffic congestion, road rage and the fight for a parking space. Vice President Gore launched a Livability Initiative in 1999 with the ironic statement that "a gallon of gas can be used up just driving to get a gallon of milk."

The challenge for transportation planners, highway engineers and bicycle and pedestrian user groups, therefore, is to balance their competing interest in a limited amount of right-of-way, and to develop a transportation infrastructure that provides access for all, a real choice of modes, and safety in equal measure for each mode of travel.

This task is made more challenging by the widely divergent character of our nation's highways and byways. Traffic speeds and volumes, topography, land use, the mix of road users, and many other factors mean that a four-lane highway in rural North Carolina cannot be designed in the same way as a four-lane highway in New York City, a dirt road in Utah or an Interstate highway in Southern California. In addition, many different agencies are responsible for the development, management, and operation of the transportation system.

In a recent memorandum transmitting Program Guidance on bicycle and pedestrian issues to FHWA Division Offices, the Federal Highway Administrator wrote that "We expect every transportation agency to make accommodation for bicycling and walking a routine part of their planning, design, construction, operations and maintenance activities." The Program Guidance itself makes a number of clear statements of intent:

- Congress clearly intends for bicyclists and pedestrians to have safe, convenient access to the transportation system and sees every transportation improvement as an opportunity to enhance the safety and convenience of the two modes.
- “Due consideration” of bicycle and pedestrian needs should include, at a minimum, a presumption that bicyclists and pedestrians will be accommodated in the design of new and improved transportation facilities.
- To varying extents, bicyclists and pedestrians will be present on all highways and transportation facilities where they are permitted and it is clearly the intent of TEA-21 that all new and improved transportation facilities be planned, designed and constructed with this fact in mind.
- The decision not to accommodate [bicyclists and pedestrians] should be the exception rather than the rule. There must be exceptional circumstances for denying bicycle and pedestrian access either by prohibition or by designing highways that are incompatible with safe, convenient walking and bicycling.

The Program Guidance defers a suggested definition of what constitutes “exceptional circumstances” until this Policy Statement is completed. However, it does offer interim guidance that includes controlled access highways and projects where the cost of accommodating bicyclists and pedestrians is high in relation to the overall project costs and likely level of use by nonmotorized travelers.

Providing access for people with disabilities is a civil rights mandate that is not subject to limitation by project costs, levels of use, or “exceptional circumstances”. While the Americans with Disabilities Act doesn’t require pedestrian facilities in the absence of a pedestrian route, it does require that pedestrian facilities, when newly constructed or altered, be accessible.

POLICY STATEMENT

1. Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:
 - Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.
 - The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.
 - Where sparsity of population or other factors indicate an absence of need. For example, the Portland Pedestrian Guide requires “all construction of new public streets” to

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include sidewalk improvements on both sides, unless the street is a cul-de-sac with four or fewer dwellings or the street has severe topographic or natural resource constraints.

2. In rural areas, paved shoulders should be included in all new construction and reconstruction projects on roadways used by more than 1,000 vehicles per day, as in States such as Wisconsin. Paved shoulders have safety and operational advantages for all road users in addition to providing a place for bicyclists and pedestrians to operate.

Rumble strips are not recommended where shoulders are used by bicyclists unless there is a minimum clear path of four feet in which a bicycle may safely operate.

3. Sidewalks, shared use paths, street crossings (including over- and undercrossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated and maintained so that all pedestrians, including people with disabilities, can travel safely and independently.
4. The design and development of the transportation infrastructure shall improve conditions for bicycling and walking through the following additional steps:
 - Planning projects for the long-term. Transportation facilities are long-term investments that remain in place for many years. The design and construction of new facilities that meet the criteria in item 1) above should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements. For example, a bridge that is likely to remain in place for 50 years, might be built with sufficient width for safe bicycle and pedestrian use in anticipation that facilities will be available at either end of the bridge even if that is not currently the case.
 - Addressing the need for bicyclists and pedestrians to cross corridors as well as travel along them. Even where bicyclists and pedestrians may not commonly use a particular travel corridor that is being improved or constructed, they will likely need to be able to cross that corridor safely and conveniently. Therefore, the design of intersections and interchanges shall accommodate bicyclists and pedestrians in a manner that is safe, accessible and convenient.
 - Getting exceptions approved at a senior level. Exceptions for the non-inclusion of bikeways and walkways shall be approved by a senior manager and be documented with supporting data that indicates the basis for the decision.

- Designing facilities to the best currently available standards and guidelines. The design of facilities for bicyclists and pedestrians should follow design guidelines and standards that are commonly used, such as the AASHTO *Guide for the Development of Bicycle Facilities*, AASHTO's *A Policy on Geometric Design of Highways and Streets*, and the ITE Recommended Practice "*Design and Safety of Pedestrian Facilities*".

POLICY APPROACH

"Rewrite the Manuals" Approach

Manuals that are commonly used by highway designers covering roadway geometrics, roadside safety, and bridges should incorporate design information that integrates safe and convenient facilities for bicyclists and pedestrians—including people with disabilities—into all new highway construction and reconstruction projects.

In addition to incorporating detailed design information—such as the installation of safe and accessible crossing facilities for pedestrians, or intersections that are safe and convenient for bicyclists - these manuals should also be amended to provide flexibility to the highway designer to develop facilities that are in keeping with transportation needs, accessibility, community values, and aesthetics. For example, the Portland Pedestrian Design Guide (June 1998) applies to every project that is designed and built in the city, but the Guide also notes that:

"Site conditions and circumstances often make applying a specific solution difficult. The Pedestrian Design Guide should reduce the need for ad hoc decision by providing a published set of guidelines that are applicable to most situations. Throughout the guidelines, however, care has been taken to provide flexibility to the designer so she or he can tailor the standards to unique circumstances. Even when the specific guideline cannot be met, the designer should attempt to find the solution that best meets the pedestrian design principles described [on the previous page]."

In the interim, these manuals may be supplemented by stand-alone bicycle and pedestrian facility manuals that provide detailed design information addressing on-street bicycle facilities, fully accessible sidewalks, crosswalks, and shared use paths, and other improvements.

Examples: Florida DOT has integrated bicycle and pedestrian facility design information into its standard highway design manuals and New Jersey DOT is in the process of doing so. Many States and localities have developed their own bicycle and pedestrian facility design manuals, some of which are listed in the final section of this document.

Applying Engineering Judgment to Roadway Design

In rewriting manuals and developing standards for the accommodation of bicyclists and pedestrians, there is a temptation to adopt “typical sections” that are applied to roadways without regard to travel speeds, lane widths, vehicle mix, adjacent land uses, traffic volumes and other critical factors. This approach can lead to inadequate provision on major roads (e.g. a four foot bike lane or four foot sidewalk on a six lane high-speed urban arterial) and the over-design of local and neighborhood streets (e.g. striping bike lanes on low volume residential roads) , and leaves little room for engineering judgment.

After adopting the policy that bicyclists and pedestrians (including people with disabilities) will be fully integrated into the transportation system, State and local governments should encourage engineering judgment in the application of the range of available treatments.

For example:

- Collector and arterial streets shall typically have a minimum of a four foot wide striped bicycle lane, however wider lanes are often necessary in locations with parking, curb and gutter, heavier and/or faster traffic.
- Collector and arterial streets shall typically have a minimum of a five foot sidewalk on both sides of the street, however wider sidewalks and landscaped buffers are necessary in locations with higher pedestrian or traffic volumes, and/or higher vehicle speeds. At intersections, sidewalks may need to be wider to accommodate accessible curb ramps.
- Rural arterials shall typically have a minimum of a four foot paved shoulder, however wider shoulders (or marked bike lanes) and accessible sidewalks and crosswalks are necessary within rural communities and where traffic volumes and speeds increase.

This approach also allows the highway engineer to achieve the performance goal of providing safe, convenient, and comfortable travel for bicyclists and pedestrians by other means. For example, if it would be inappropriate to add width to an existing roadway to stripe a bike lane or widen a sidewalk, traffic calming measures can be employed to reduce motor vehicle speeds to levels more compatible with bicycling and walking.

ACTIONS

The United States Department of Transportation encourages States, local governments, professional associations, other government agencies and community organizations to adopt this Policy Statement as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. By so doing, the organization or agency should explicitly adopt one, all, or a combination of the various approaches described above *and* should be committed to taking some or all of the actions listed below as appropriate for their situation.

- a) Define the exceptional circumstances in which facilities for bicyclists and pedestrians will *not* be required in all transportation projects.
- b) Adopt new manuals, or amend existing manuals, covering the geometric design of streets, the development of roadside safety facilities, and design of bridges and their approaches so that they comprehensively address the development of bicycle and pedestrian facilities as an integral element of the design of all new and reconstructed roadways.
- c) Adopt stand-alone bicycle and pedestrian facility design manuals as an interim step towards the adoption of new typical sections or manuals covering the design of streets and highways.
- d) Initiate an intensive re-tooling and re-education of transportation planners and engineers to make them conversant with the new information required to accommodate bicyclists and pedestrians. Training should be made available for, if not required of, agency traffic engineers and consultants who perform work in this field.

CONCLUSION

There is no question that conditions for bicycling and walking need to be improved in every community in the United States; it is no longer acceptable that 6,000 bicyclists and pedestrians are killed in traffic every year, that people with disabilities cannot travel without encountering barriers, and that two desirable and efficient modes of travel have been made difficult and uncomfortable.

Every transportation agency has the responsibility and the opportunity to make a difference to the bicycle-friendliness and walkability of our communities. The design information to accommodate bicyclists and pedestrians is available, as is the funding. The United States Department of Transportation is committed to doing all it can to improve conditions for bicycling and walking and to make them safer ways to travel.

California Department of Transportation

Deputy Directive Number: DD-64

Effective Date: 3-26-01

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

Supersedes: New

Title: Accommodating Non-Motorized Travel

POLICY

The Department fully considers the needs of non-motorized travelers (including pedestrian bicyclists and persons with disabilities) in all programming, planning, maintenance, construction, operations and project development activities and products. This includes incorporation of the best available standards in all of the Department's practices. The Department adopts the best practice concepts in the U.S. DOT Policy Statement on "Integrating Bicycling and Walking into Transportation Infrastructure."

Definition / Background

The planning and project development process seeks to provide the people of California with a degree of mobility that is in balance with other values. They must ensure that economic, social and environmental effects are fully considered along with technical issues, so that the best interest of the public is served. This includes all users of California's facilities and roadways.

Attention must be given to many issues including, but not limited to, the following:

- Safe and efficient transportation for all users of the transportation system
- Provision of alternatives for non-motorized travel
- Support of the Americans With Disabilities Act (ADA)
- Attainment of community goals and objectives
- Transportation needs of low-mobility, disadvantaged groups
- Support of the state's economic development
- Elimination or minimization of adverse effects on the environment, natural resources, public services, aesthetic features and the community
- Realistic financial estimates
- Cost effectiveness

Individual projects are selected for construction on the basis of overall multimodal system benefits as well as community goals, plans and values. Decisions place emphasis on making different transportation modes work together safely and effectively. Implicit in these objectives is the need to accommodate non-motorized travelers as an important consideration in improving the transportation system.

Responsibilities

Deputy Director, Planning and Modal Programs:

- Ensures that the needs of non-motorized travelers are incorporated into the program element of Transportation Planning and the modal elements of the statewide strategy for mobility.
- Ensures that liaison exists with non-motorized advocates to incorporate non-motorized needs into all program areas including project and system planning.
- Ensures that the needs of the non-motorized travelers are incorporated in personal movement strategies.

Deputy Director, Project Delivery:

- Ensures that projects incorporate best practices for non-motorized travel in the design and construction of capital projects.

Deputy Director, Maintenance and Operations:

- Ensures that the transportation system is maintained and operated in a safe and efficient manner with the recognition that non-motorized travel is a vital element of the transportation system.
- Ensures that the needs of non-motorized travelers are met in maintenance work zones.

District Directors:

- Ensure that best practices for non-motorized travel are included in all district projects and project planning.
- Ensure that best practices for non-motorized travel are implemented in maintenance and travel operations practices.

Chief, Division of Design

- Ensures that project delivery procedures and design guidance include the needs of non-motorized travelers as a regular part of doing business.
- Ensures that all project delivery staff is trained and consider the needs of the non-motorized traveler while developing and designing transportation projects.

Chief, Division of Planning:

- Ensures incorporation of non-motorized travel elements in transportation plans, programs and studies prepared by Transportation Planning.

CONTRA COSTA COUNTYWIDE BICYCLE AND PEDESTRIAN PLAN

- Ensures planning staff understand and are trained in the principles and design guidelines, non-motorized funding sources and the planning elements of non-motorized transportation.
- Coordinates Caltrans projects with non-motorized interest groups.
- Ensures incorporation of non-motorized travel elements in Corridor Studies prepared by Transportation Planning.

Chief, Division of Environmental Analysis:

- Ensures that non-motorized travel groups potentially affected by Caltrans projects are identified and have the opportunity to be involved in the project development process.
- Advocates effectively for all reasonable project-specific best practices that support or promote non-motorized travel.

Chief, Division of Maintenance:

- Ensures State-owned facilities are maintained consistent with the needs of motorized and non-motorized travelers.
- Provides guidance and training to those maintaining roadways to be aware of and sensitive to the needs of non-motorized travel.

Chief, Division of Traffic Operations:

- Ensures that the transportation system is operated in accordance with the needs of all travelers including non-motorized travel.
- Provides training and guidance on the operation of the transportation facility consistent with providing mobility for all users.
- Recommends safety measures in consideration of non-motorized travel on California's transportation system.

Chief, Division of Local Assistance:

- Ensures that Local Assistance staff, local agencies and interest groups are familiar with funding programs that are available for non-motorized travelers.
- Ensures that program coordinators responsible for non-motorized travel modes are familiar with non-motorized issues and advocate on behalf of non-motorized travelers.

Applicability

All Caltrans employees who are involved in the planning, design, construction, maintenance and operations of the transportation system.

APPENDIX F

LOCAL PROJECTS

Completion of the Moraga-Wide Bikeway Network would create a web of bikeways that connects communities and improves access for Moragans to major destinations. Those projects that will fill in the web of bikeways with a denser set of connections to work, school, shopping and transit will have a large impact on encouraging more people to walk or bicycle. Pedestrians especially are sensitive to distance and a system of sidewalks and crosswalks that expands and extends the trails that are part of the Town-Wide Bikeway Network can make walking significantly more attractive. Projects, both bicycle and pedestrian, that improve access to schools are a good example of projects that can build on the Countywide Bikeway Network.

Moraga has an impressive number of bicycle- and pedestrian-oriented projects planned. The following local projects were compiled from the Town-Wide Transportation Project List (MTPL); proposed bikeways, shared use pathways, and pedestrian improvements; and other bicycle and pedestrian programs conducted by various agencies. Cost estimates, when available, are given as proof of the commitment to non-motorized transportation present in Moraga.

This appendix also includes a map of bikeways within Moraga. Both the list of projects and the map are “living documents” and will be updated as the Town of Moraga receives new information from local agencies and project sponsors.

APPENDIX G

LOCAL ADOPTION OF PLAN

One of the key purposes for developing the *Countywide Bicycle and Pedestrian Plan* (CBPP) is to help local jurisdictions become eligible for State Bicycle Transportation Account (BTA) funds. According to Chapter 21 of Caltrans' Local Assistance Guidelines, "to be eligible for BTA funds, a local agency must have an adopted Bicycle Transportation Plan (BTP) that complies with Section 891.2 of the Streets and Highways Code." The Authority believes that the CBPP complies with these State requirements. Local agencies, however, will *not* automatically meet Caltrans requirements when the Authority adopts the *Countywide Bicycle and Pedestrian Plan*.

How can jurisdictions use the *countywide* plan to provide *local* eligibility? There are two basic methods:

- 1. Adopt the CBPP with Any Changes Listed in the Adopting Ordinance.** In this approach, the jurisdiction would simply adopt the *Countywide Bicycle and Pedestrian Plan* but with specific caveats in the adoption language to make it more relevant to that community. Those changes, if not extensive, could be listed in the resolution. If the changes are more extensive, they could be listed in an attachment to the resolution. (See below for recommended local additions.)
- 2. Use the CBPP As a Template for the Local Plan.** In the second approach, the jurisdiction would create their own local Bicycle Master Plan using the CBPP as the starting point. The Authority will make an electronic copy of the CBPP available to jurisdictions so that they create their plan from it.

In either approach, a jurisdiction would adopt some version of the countywide plan. We have been careful to design the CBPP so that it meets the 11 requirements in State law for a bicycle plan. (Those requirements are listed in the Introduction of the CBPP.) A plan that doesn't meet those requirements would not get Caltrans approval and those would not provide eligibility for BTA funding.

In addition, Caltrans will be looking for additional detail from each jurisdiction submitting an application. This information could be included as part of their adoption or adaptation

of the CBPP. The steps to customizing or supplementing the Countywide Plan for Caltrans are actually quite simple and are outlined below.

1. **Land use map.** Include the most recent copy of your land use map from your General Plan in your application.
2. **Existing and proposed bicycle transport and parking facilities in connection with other modes.** The Countywide Plan does provide a countywide summary of both of these items. Local jurisdictions should supplement this with a paragraph describing the general extent of bicycle parking in the community and the presence of any multi-modal terminals (but excluding bus stops except where they are transfer points).
3. **Existing and proposed facilities for changing clothes.** Caltrans defines this as any school, park, or other public location where bicyclists may be able to change their clothes and possibly shower. Caltrans did not intend it to include private showering or changing facilities. Local jurisdictions may wish to write a paragraph describing existing parks, schools, or other public facilities that have changing or shower facilities.
4. **Past expenditures.** Agencies should provide a simple estimate of the past annual amounts spent on bicycle facilities in your community, including TDA, regional, state, and federal grants.
5. **Projects.** Local jurisdictions may need to modify the list of recommended projects according to local priorities.

Review of Local Bicycle Plans

After a jurisdiction adopts its own bicycle plan (using either approach outlined above), it must get approval first from the Authority and then from the Caltrans Bicycle Facilities Unit. (The CBPP will need to be approved by the Metropolitan Transportation Commission and Caltrans.) To qualify for BTA funds, the plan must be adopted no earlier than four years prior to the beginning of the State fiscal year.