

City of Oakland
Draft Bicycle Master Plan

DRAFT – March 14, 2007

Contents

List of Figures	3
Acknowledgements	5
1 Introduction and Executive Summary	7
1.1 Goals and Objectives	7
1.2 Benefits of Bicycling	8
1.3 Executive Summary	10
2 Existing Conditions	14
2.1 Opportunities and Constraints	14
2.2 Who Rides Bicycles?	16
2.3 Bicycling Rates in Oakland	17
2.4 Transit Connections	19
2.5 Bicyclist Collisions	22
2.6 Education, Encouragement, and Enforcement	29
2.7 Community Outreach	35
3 Policy Recommendations	37
3.1 Related Federal, State, and Local Policies	37
3.2 Bicycle Master Plan Policies	40
3.3 Issues for Further Discussion	46
4 Bikeways	50
4.1 Bikeway Types	50
4.2 Proposed Bikeway Network	51
4.3 Safe Routes to Transit	56
4.4 Existing Bikeways	59
4.5 Bikeway Design Guidelines	60

<i>CONTENTS</i>	<i>2</i>
5 Parking and Support Facilities	73
5.1 Facility Types	73
5.2 Existing and Proposed Facilities	74
5.3 Bicycle Parking Ordinance	75
5.4 Parking Design Guidelines	76
6 Implementation	82
6.1 Priority Projects	82
6.2 Priority Programs	84
6.3 Project Implementation	87
6.4 Other Roadway and Development Projects	93
6.5 Funding	93
6.6 Staffing and Public Participation	97
A Caltrans BTA Requirements	100
B Major Changes from the 1999 Plan	101
C Local and Regional Coordination	103
C.1 Community Outreach	103
C.2 Local Planning	105
C.3 Adjacent Jurisdictions	108
C.4 County and Regional Planning	109
D Oakland General Plan Policies	112
E Oakland Municipal Code	116
F Bikeway Descriptions	120
F.1 On-street Bikeways – Priority Projects	120
F.2 Bicycle Paths and Bridges	125
F.3 Major On-street Projects	128
F.4 Proposed Changes to Existing Bikeways	130
G Requirements for Bikeway Feasibility Studies	132
H Supplementary Documentation	137
References	138

List of Figures

2.1	Selected Bicyclist Counts	17
2.2	Mode Split for Oakland and Other California Cities	19
2.3	Residential Population Near Major Transit Stations	20
2.4	Bicyclist Mode Share at BART Stations	21
2.5	Bicyclist Collisions in Oakland and Other California Cities	23
2.6	Bicyclist Collisions by Year	24
2.7	Bicyclist Collisions by Involved Parties	24
2.8	Top Bicyclist Collision Streets by Total Number of Collisions	25
2.9	Top Bicyclist Collision Streets by Collisions per Road Mile	26
2.10	Top Intersections by Number of Bicyclist Collisions	26
2.11	Bicyclist Collisions by Month	27
2.12	Bicyclist Collisions by Time of Day	27
2.13	Collisions by Bicyclist Age	28
2.14	Top Intersections by Number of Child Bicyclist Collisions	28
2.15	Bicyclist Collisions by Race/Ethnicity	29
2.16	Primary Collision Factor by Party at Fault	30
2.17	Bicyclist Movement Preceding Collision	30
2.18	Driver Movement Preceding Collision	30
4.1	Bikeway Network Summary	52
4.2	Street Grade Analysis	53
4.3	Bikeway Cross-Sections (1 of 4)	55
4.4	Bikeway Cross-Sections (2 of 4)	56
4.5	Bikeway Cross-Sections (3 of 4)	57
4.6	Bikeway Cross-Sections (4 of 4)	58
4.7	Bus Service Types	59
4.8	Safe Routes to Transit – Priority Bikeways	60
4.9	Bicycle Facility Expenditures (1 of 3)	61
4.10	Bicycle Facility Expenditures (2 of 3)	62

LIST OF FIGURES

4

4.11	Bicycle Facility Expenditures (3 of 3)	63
4.12	Speed Hump Profiles	69
5.1	Bicycle Parking at Transportation Hubss	76
5.2	Placement Standards for Bicycle Racks	77
5.3	Bicycle Cage for 28 Bicycles (18' x 20')	79
5.4	Bicycle Cage for 20 Bicycles (16' x 15')	80
6.1	Priority Projects – Signing and Striping Projects	85
6.2	Priority Projects – Lane Conversion Projects	86
6.3	Priority Projects – Bicycle Path Projects	87
6.4	Transit Streets for Additional Study	91
6.5	Cost Estimates for Bikeway Projects and Programs	94
G.1	Analysis of Travel Lane Removal	135
G.2	MTS Analysis	136
G.3	Transit Streets Analysis	136
G.4	Analysis of Parking Removal	136
H.1	Map – Bicycle Mode Share by Census Tract	141
H.2	Map – Citywide Bicyclist Collisions, 2000–2004	142
H.3	Map – Proposed Bikeway Network	143
H.4	Map – Existing Bikeways	144
H.5	Map – Existing Bicycle Parking and Support Facilities	145
H.6	Map – Primary Bikeways	146
H.7	Map – County and Regional Bikeway Networks	147

Acknowledgements

Mayor and City Council

Mayor Ron Dellums	
Jane Brunner	District 1
Patricia Kernighan	District 2
Nancy Nadel	District 3
Jean Quan	District 4
Ignacio de la Fuente	District 5
Desley Brooks	District 6
Larry Reid	District 7
Henry Chang, Jr.	At-Large

Planning Commission

Douglas Boxer	Vice-Chair
Michael Colbruno	
Paul Garrison	
Suzie W. Lee	
Michael Lighty	
Anne E. Mudge	Chair
Madeleine Zayas-Mart	

Citizens Advisory Committee

Doug Johnson	District 1
Dean Morier	District 2
Jewel Jauregui	District 3
Doug Cross	District 4
Grey Kolevzon	District 5
Midori Tabata	District 6
Pam Molsick	District 7
Ron Bishop	At-Large
Maya Carson	Cycles of Change
Robert Raburn	East Bay Bicycle Coalition
Sanjiv Handa	East Bay News Service
Phil Olmstead	Urban Ecology

Special thanks to the following individuals who also contributed to this plan through the Citizens Advisory Committee: Jim Dexter, Jennifer Hosek, Barry Luck, Paul Russell, Stefan Seum, Sarah Stone-Francisco, Benjamin Van Thiel.

LIST OF FIGURES

6

Project Staff

Natalie Fay	Senior Transportation Planner (CEDA)
Philip Ho	Transportation Engineer (PWA)
Kathryn Hughes	Bicycle/Pedestrian Program Manager (PWA)
Jason Patton	Project Manager (CEDA)
Jennifer Stanley	Bicycle/Pedestrian Facilities Coordinator (PWA)
Mark Wald	Deputy City Attorney (City Attorney's Office)

Consultants

Carol Levine	Wilbur Smith Associates
Nate Chanchareon	Wilbur Smith Associates
Michelle DeRobertis	Professional Engineer
Crescentia Brown	Environmental Science Associates
Lesley Lowe	Environmental Science Associates
Jack Hutchinson	Environmental Science Associates
Louis Hexter	Moore Iacofano Goltsman

Technical Advisory Committee

Jim Allison	Capitol Corridor
Anthony Banks	Oakland Police Department
Barry Bergman	City of Alameda
Julian Carroll	Caltrans, District 4
Keith Cooke	City of San Leandro
Lauren Eisele	Port of Oakland
Francell Haskins	Alameda County Public Health Department
Lee Huo	Association of Bay Area Governments
Kevin Jackson	City of Piedmont
Brooke Kuhn	Alameda County Public Health Department
Nathan Landau	Alameda-Contra Costa Transit District (AC Transit)
Robin Little	Alameda-Contra Costa Transit District (AC Transit)
Heath Maddox	City of Berkeley
Martin Matarrese	City of Oakland, Public Works Agency
Mona Mena	Alameda County Public Health Department
Val Menotti	Bay Area Rapid Transit District (BART)
Cesar Pujol	Alameda-Contra Costa Transit District (AC Transit)
Peter Schultze-Allen	City of Emeryville
Diane Stark	Alameda County Congestion Management Agency
Diane Tannenwald	City of Oakland, Public Works Agency
Laura Timothy	Bay Area Rapid Transit District (BART)
Jim Townsend	East Bay Regional Park District
Beth Walukas	Alameda County Congestion Management Agency
Kenya Wheeler	Bay Area Rapid Transit District (BART)
Rochelle Wheeler	Alameda County Transportation Improvement Authority

1. Introduction and Executive Summary

Vision Statement: *Oakland will be a city where bicycling is fully integrated into daily life, providing transportation and recreation that are both safe and convenient.*

To realize this vision of a bicycle-friendly community, the City of Oakland will promote the routine accommodation of bicyclists in its projects and programs. The ongoing development of the City's bikeway network, including Safe Routes to Transit and the associated support facilities, will provide the infrastructure for making Oakland more accessible by bicycle. Programs will educate cyclists and drivers on road safety while encouraging people to bicycle for both physical activity and utilitarian trips. The benefits of bicycling will help the city meet its policy goals regarding transportation, sustainability, public health, equity, and quality of life.

The *Bicycle Master Plan* is the citywide, long-range policy document for promoting bicycling in Oakland over the next twenty years. Policy T4.5 of *Envision Oakland* (1998), the Land Use and Transportation Element of the Oakland General Plan, recommended the creation of a *Bicycle Master Plan* to promote alternatives to the private automobile. To be eligible for funding from the State's Bicycle Transportation Account, local jurisdictions must complete bicycle transportation plans and then update or reaffirm those plans every five years (Streets and Highways Code 890-894.2). Oakland's original plan was completed in 1999 and reaffirmed by City Council in 2005. This document is the first update to Oakland's *Bicycle Master Plan* and it is adopted as part of the General Plan. Appendix A provides a brief overview of how this plan meets the requirements of the California Bicycle Transportation Act.

1.1 Goals and Objectives

To develop Oakland as a bicycle-friendly community, the Bicycle Master Plan identifies the following goals:

Goal 1: Infrastructure — Develop the physical accommodations, including a network of bikeways and support facilities, to provide for safe and convenient access by bicycle.

Goal 2: Education — Improve the safety of bicyclists and promote bicycling skills through education, encouragement, and community outreach.

Goal 3: Coordination — Provide a policy framework and implementation plan for the routine accommodation of bicyclists in Oakland's projects and programs.

To measure progress towards these goals, the Bicycle Master Plan specifies the following overarching objective: *Publicly strive to become a Bicycle Friendly Community by 2012, as recognized by the League of American Bicyclists.*

The Bicycle Friendly Community Campaign is a national program to evaluate and award municipalities for actively promoting bicycling.¹ The evaluation is based on a holistic consideration of a city's accomplishments to date as well as outstanding needs. It follows a five E's approach that considers the coordinated efforts of engineering, education, encouragement, evaluation and planning, and enforcement. Applications are reviewed by an independent committee that makes awards decisions and provides constructive feedback on how municipalities can better achieve their bicycle-friendly goals. To measure progress towards these goals, the City of Oakland will publicly strive to become a Bicycle Friendly Community by 2012 when this plan will again be updated or reaffirmed.

1.2 Benefits of Bicycling

Bicycling is a healthy, non-polluting, low-cost, and quiet form of transportation that is ideal for many trips. Improving safety and access for cyclists supports the City's efforts to become more environmentally, economically, and socially sustainable.

Transportation — Bicycles are ideal transportation for shorter trips within urban areas. In Oakland, in-fill projects and residential development in the downtown are creating land uses that are well-served by bicycle. In the United States, 40% of all trips are under two miles in length (Federal Highway Administration 1999). In Oakland, 85% of residents live within two miles of a BART station (Figure 2.3). This two-mile distance equates to an easy 12-minute bicycle ride. Forty percent of American adults identified that they would sometimes commute or commute more often by bicycle if there were safe bikeways serving their trips (Parkwood Research Associates 1995). As the population of Oakland and the Bay Area continues to grow, the transportation system faces increasing demands on its crowded infrastructure. Compared to automobiles, bicycles are a very efficient use of roadway capacity and parking space.

Sustainability — Bicycling is the most energy efficient form of transportation and it has no emissions. In Oakland, transportation is responsible for 47% of the city's greenhouse gas emissions (ICLEI 2006, p. 7). Smarter land uses that foster nonmotorized transportation

¹www.bicyclefriendlycommunity.org

is a key strategy for slowing human-created climate change as well as for preserving open space throughout the region. The use of bicycles for short trips reduces the number of short trips by automobile. These are high-polluting trips because of the car's cold start and the associated inefficient operation of the engine's catalytic converter. In fact, up to 70% of the pollution from a ten-mile car trip is generated in the first mile because of the cold start.² By extending human-powered travel beyond walking distance, bicycles are especially effective for linking neighborhoods to major transit stations and thereby eliminating short, high-polluting car trips.

Public Health — Bicycling is healthy transportation. Physical inactivity and poor nutrition are the root causes of the obesity epidemic in the United States. In the Oakland Unified School District, 20% of students are physically unfit and 36% of students are overweight or obese (California Department of Education 2005). Over 40% of the leading causes of death in Oakland including heart disease, cancer, stroke, and diabetes (type 2) are related to physical inactivity. These deaths contribute to a lifespan that is 2.5 years shorter than that of Alameda County residents as a whole. Oakland's African Americans have a lifespan that is five years shorter than the citywide average (Alameda County Public Health Department 2004). Thirty minutes of moderate physical activity per day is an effective prevention measure against these leading causes of death (US Department of Health and Human Services 2005). Building physical activity into people's daily lives is one of the most sustainable interventions to promote healthy lifestyles. Bicycling for recreation is an aerobic and low-impact form of exercise. Bicycling for transportation is an ideal means for integrating physical activity into daily life.

Equity — Bicycling is an inexpensive and broadly accessible form of transportation. The average annual cost of operating a car is \$5,000 to \$12,000 versus \$120 per year for operating a bicycle (American Automobile Association 2006).³ Bicycling is affordable transportation for the urban poor who—because of the correlation between wealth and race in the United States—are disproportionately people of color. Bicycles provide added freedom and independence for youth and parents (who are otherwise shuttling their children) as well as for some people who cannot drive and those who have chosen not to drive.

Quality of Life — Bicycling is a means for improving the livability of Oakland's neighborhoods. Bicycle improvements are mutually reinforcing with traffic calming efforts on residential streets. Bicycling helps connect residents with their community by exposing them to sights, sounds, and social interactions that are otherwise muted by traffic. The lives of parents are simplified when their children can ride safely and confidently to school and

²<http://www.baaqmd.gov/pio/triplinking.htm>

³<http://www.bicyclinginfo.org/pp/benefits/econoben/index.htm>

their activities. Through bicycling, children gain independence, stay active, and develop an enriched understanding of their communities.

1.3 Executive Summary

In the following chapters, the *Bicycle Master Plan* describes existing conditions, policy recommendations, proposed bikeways, support facilities, and an implementation program. The policies were developed from the existing conditions and they in turn guide the recommendations for “Bikeways” and “Parking and Support Facilities.” Taken as a whole, the plan provides a framework for achieving the vision, goals, and objectives by improving bicyclist safety and access. The specific recommendations reflect consensus amongst stakeholders on how best to achieve this overarching vision.

Chapter 2: Existing Conditions

Chapter 2 provides a comprehensive description of bicycling in Oakland based on available data, fieldwork, and an extensive community process. It identifies the opportunities for and constraints to bicycling, and characterizes the user groups that are common in Oakland. The chapter reviews the available data on bicyclist mode share (with an emphasis on bicycling to transit) and bicyclist-involved collisions. It also summarizes bicycle-related programs in Oakland and provides an overview of the community process through which the *Bicycle Master Plan* was developed. In assessing the existing conditions, these quantitative data were complemented by a community outreach process that included meetings with neighborhood groups and merchants associations throughout Oakland.

Oakland’s mild climate and varied topography are highly suited for both commuter and recreational cycling. In fact, Oakland has the third highest cycling rate of all California cities with populations over 150,000 (US Census 2000). However, busy streets and high motor vehicle speeds create real and perceived barriers to more people cycling. On average, a bicyclist-involved collision occurs every other day in Oakland. Ninety-seven percent of these collisions involve motor vehicles and youth cyclists are disproportionately represented in these collisions (based on their share of the population). However, considering both the number of cyclists and number of collisions, Oakland is a comparatively safe place for bicycling: the fourth safest city in California with a population over 60,000 (Jacobsen 2003).

Chapter 3: Policy Recommendations

Based on the existing conditions, Chapter 3 provides policy recommendations for each of the Plan's three goals: Infrastructure, Education, and Coordination. These policies address the Bikeway Network, Routine Accommodation, Safe Routes to Transit, Parking and Support Facilities, Education, Enforcement, Resources, Project Development, and Public Review. In particular, the policy on routine accommodation states that bicycle safety and access be addressed, as a matter of course, in the design and maintenance of all streets. The chapter contextualizes these recommendations with related policies at the federal, state, regional, and municipal levels. An inventory of all related Oakland General Plan policies and actions are compiled in Appendix D.

The United States Department of Transportation's Policy Statement on Walking and Bicycling specifies that "bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist." Similarly, the California Department of Transportation's Deputy Directive 64 requires that Caltrans fully consider the needs of bicyclists in all of its activities. California Assembly Concurrent Resolution No. 211 encourages all cities to implement these USDOT and Caltrans policies. The Metropolitan Transportation Commission's policy on routine accommodation requires that all projects using regional funds consider bicyclist access. Oakland's *Bicycle Master Plan* follows this guidance through the policy on Routine Accommodation: that bicycle safety and access be addressed in the design and maintenance of all streets. Another key policy direction, Safe Routes to Transit, promotes bicycle facilities serving major transit hubs, thereby extending the reach of bicyclists while simultaneously increasing transit ridership. These policy recommendations are applied in Chapter 4, "Bikeways," and Chapter 5, "Parking and Support Facilities."

Chapter 4: Bikeways

Chapter 4 describes the various bikeway types and explains the rationales for the proposed bikeway network. It also applies the Safe Routes to Transit policy to the bikeway network by specifying bikeways to each of the major transit stations. The chapter concludes with bikeway design guidelines to help project managers, consultants, and the public understand the basic design issues for accommodating bicyclists.

Oakland's proposed bikeway network consists of bicycle paths (Class 1), bicycle lanes (Class 2), bicycle routes (Class 3), arterial bicycle routes (Class 3A), and bicycle boulevards (Class 3B). The network reflects incremental modifications and improvements to the network identified in the 1999 *Bicycle Master Plan*. All proposals were evaluated through

a citywide feasibility analysis that considered street grades, available right-of-way, street capacity, and bicycle/bus interactions. The network emphasizes Safe Routes to Transit by including bikeways from four directions to each transit station. The bikeway design guidelines summarize the basic parameters required by the Caltrans Highway Design Manual and the Manual on Uniform Traffic Control Devices. This section also explains additional treatments that address issues commonly found in Oakland.

Chapter 5: Parking and Support Facilities

The bicycle is a viable means of transportation when physical accommodations ensure that people's trips are safe and convenient and that their property is secure. These facilities include various types of bicycle parking as well as restrooms, showers, and lockers. Chapter 5 explains the basic types of bicycle parking and identifies the existing and proposed facilities for each type. The chapter describes Oakland's bicycle parking ordinance and provides design guidelines for selecting and locating bicycle parking facilities. The provision of high-quality bicycle parking is critical because people's decisions to bicycle are affected by security concerns over their property.

Chapter 6: Implementation

Chapter 6 prioritizes projects and programs for implementing the plan's recommendations. In particular, priority bikeways were identified based on evaluation criteria to determine and rank their relative benefit. The chapter discusses the process for project implementation, including the need for further study. It then describes the relationship between proposed bikeways and other roadway and development projects that may affect the network. Most bikeway projects are implemented with some form of grant funding and the chapter provides a brief summary of the most common grant sources. Lastly, the chapter addresses staffing and public participation, with an emphasis on Oakland's Bicycle and Pedestrian Advisory Committee.

Appendices

The following appendices provide greater detail and additional documentation to augment the preceding chapters. Appendix A, "Caltrans BTA Requirements," is a quick reference guide on how this document meets the state requirements for a bicycle transportation plan. Appendix B, "Major Changes from the 1999 Plan," provides a policy-level discussion of how bicycle planning and engineering in Oakland have evolved over the past eight years.

Appendix C, “Local and Regional Coordination,” documents the community outreach process for this plan and summarizes other plans at the local, county, and regional levels that intersect with Oakland’s *Bicycle Master Plan*. Appendix D, “Oakland General Plan Policies,” inventories the bicycle-related policies and actions in all elements of Oakland’s General Plan. Similarly, Appendix E, “Oakland Municipal Code,” documents all references to bicycles in this code. Appendix F, “Bikeway Descriptions,” provides descriptions of priority projects, bicycle paths and bridges, major on-street projects, and proposed changes to existing bikeways. Appendix G, “Requirements for Bikeway Feasibility Studies,” specifies the additional analysis that will be necessary prior to implementing proposed bikeways. Lastly, Appendix H, “Supplementary Documentation” includes the data and evaluation for the approximately 700 bikeway segments that were evaluated in the development of the proposed bikeway network. All maps are collected at this end of this document.

2. Existing Conditions

The San Francisco Bay Area's mild climate is exceptionally well-suited for cycling. Oakland's flatlands provide many possibilities for bicycling to work, school, shops, and transit whereas improvements along the waterfront and Lake Merritt are creating new recreational opportunities. Similarly, the Oakland Hills are known throughout the region for their challenging and rewarding cycling routes. However, busy streets with many cars are widely recognized as barriers to more people bicycling in Oakland. This chapter explores these opportunities and constraints through the available data on bicyclist mode share and bicyclist-involved collisions. Both of these analyses are contextualized by data from other California cities, including other cities in the East Bay plus cities of comparable size throughout the state. The chapter also summarizes past and current educational programs along with the community outreach effort associated with this plan.

2.1 Opportunities and Constraints

Oakland has many of the basic characteristics of a bicycle-friendly community, more so than many major metropolitan areas in the United States. However, there are significant barriers to bicycling becoming a viable and everyday form of transportation. Many of these constraints can be constructively addressed through policy, planning, design, education, and enforcement.

Opportunities

- Oakland's climate allows for year-round bicycling.
- The downtown and many mixed-use neighborhoods put homes, jobs, shops, and services in close proximity to each other.
- BART, AC Transit, Capitol Corridor, and the Alameda/Oakland Ferry provide bicycle-accessible public transportation throughout the region.
- The vast majority of Oakland residents live within bicycling distance of a transit station.
- Transit village development at Oakland's BART stations is creating opportunities to improve bicycle access and parking accommodations.

- Many of Oakland's major streets were developed in the streetcar era, providing direct and level connections between neighborhoods and the downtown.
- Lake Merritt is a popular destination for recreational cyclists of all abilities who will benefit from the significant investments currently underway.
- The Oakland Hills provide premier routes for experienced recreational cyclists.
- The San Francisco Bay Trail is providing scenic and practical connections along Oakland's waterfront for both recreational and commuter bicyclists.
- The bicycling community in Oakland and the greater East Bay is an active constituency supporting improved bicycle facilities.
- Oakland has many bicycle shops—local businesses that provide services, create jobs, and generate tax revenue.

Constraints

- In some neighborhoods, Oakland's irregular street grid provides cross-town connections on a limited number of streets, creating conflicts between cars, buses, trucks, and bicycles.
- Many of Oakland's major streets lack bicycle facilities and have motor vehicle volumes and speeds that create undesirable conditions.
- Freeways, interchanges, and the Oakland Estuary are significant obstacles to bicycle travel.
- In neighborhoods like Montclair, Maxwell Park, and Peralta Heights, steep hills limit bicycle travel and options for designating bikeways.
- Uneven street surfaces caused by railroad tracks, utility covers, drainage grates, rough pavement, and debris are hazardous to bicyclists.
- Diagonal parking as well as double-parked cars and trucks can create difficult situations for bicyclists.
- Concerns over personal security deter some people from riding on residential streets in neighborhoods that are perceived as unsafe.
- Bicycle theft and a lack of secure parking deter people from leaving their bicycles unattended and from using high quality bikes for utilitarian trips.

- BART's commute-time bicycle restrictions limit bicycle commuting.
- Many drivers and bicyclists are unaware of the rights and responsibilities of cyclists on city streets.

2.2 Who Rides Bicycles?

The *Bicycle Master Plan* addresses commuters and recreationists as two basic categories of on-street bicyclists. Depending on their skill level, bicyclists may be further differentiated as either experienced or casual. The purpose of the *Bicycle Master Plan* is to improve conditions for experienced cyclists, encourage casual cyclists to ride more often and more skillfully, and attract new people to cycling for both transportation and recreation.

Commuters: Commuter bicycling includes all utilitarian trips—to work, school, stores, or restaurants—and is often linked with transit trips. Secure bicycle parking is a paramount concern for all commuters.

- *Experienced commuters* seek the quickest and most direct routes, making full use of arterial streets that require as few stops as possible. Experienced bicyclists negotiate streets like motor vehicles, for example, by merging across traffic to make left turns.
- *Casual commuters* generally ride shorter distances and may be unfamiliar with the rules of the road. They may believe—incorrectly—that riding on the sidewalk is safer than riding in the street. Casual cyclists may prefer local streets even if they are slower. Regardless of skill level, commuters may choose major streets over quiet streets because of personal safety concerns.

Recreationists: For recreationists, routes with low or no traffic and appealing scenery are generally more important than direct routes. Recreationists may drive to their starting point in some cases because of traffic barriers in bicycling to the staging area.

- *Experienced recreationists* seek physically challenging routes, riding at high speeds over long distances that may include significant hills. They will often avoid bicycle paths because of uneven surfaces, conflicts with pedestrians, and limited visibility or maneuverability at high speeds. Recreational rides are typically loop routes that return to the ride's starting point. Regional transit allows cyclists to take one-way rides and reach rural areas without the use of a car.

Intersections without Bikeways	Earlier Count (Date)	Later Count (Date)	Percent Change
Lakeshore Ave / Foothill Blvd	18 (Jul 2001)	29 (Oct 2002)	61%
Martin Luther King Jr Way / 14th St	15 (Aug 1999)	30 (Feb 2001)	100%
Telegraph Ave / 27th St	18 (May 1999)	52 (May 2002)	189%
TOTAL	51	111	118%

Streets with Bicycle Lane Projects	Pre-project Count (Date)	Post-project Count (Date)	Percent Change
3rd St (Mandela Pkwy to Brush St)	8 (Jun 2003)	17 (Apr 2006)	113%
73rd Ave (Bancroft Ave to International Blvd)	12 (Aug 2005)	7 (Apr 2006)	-42%
Embarcadero (Oak St to Kennedy St)	39 (May 2002)	60 (Apr 2006)	54%
Fruitvale Ave (E 12th St to Alameda Ave)	41 (Aug 2002)	93 (Apr 2006)	127%
Grand Ave (Market St to El Embarcadero)	58 (Jun 2000)	121 (Oct 2001)	109%
MacArthur Blvd (Lakeshore Ave to Park Blvd)	4 (Apr 2002)	20 (Apr 2006)	400%
Market St (Aileen St to MacArthur Blvd)	23 (Jul 2005)	23 (May 2006)	0%
TOTAL	185	341	84%

Figure 2.1: *Selected Bicyclist Counts*. All counts were taken during the PM peak hour (Tuesday through Thursday).

- *Casual recreationists* include families with children who seek out quiet streets or bicycle paths in park-like settings (like the Bay Trail or the Lake Merritt Path). Because they travel at lower speeds, casual recreationists mix more easily with pedestrians on shared-use paths than do experienced recreationists riding at higher speeds.

The U.S. Department of Transportation provides thresholds for traffic volumes, vehicle speeds, and lane widths for cyclists of different experience levels. For example, on an arterial street with traffic moving between 30 and 40 miles per hour, less experienced bicyclists require bicycle lanes to separate themselves from motor vehicle traffic. In contrast, more experienced bicyclists may be comfortable sharing a wide curb lane with motor vehicles (Wilkinson III et al. 1994; Hunter et al. 1999).

2.3 Bicycling Rates in Oakland

Bicycling rates have been increasing in Oakland in conjunction with the growing interest in cycling at the regional and national levels as well as the construction of more bicycle facilities at the local level. Three sources of data are available for characterizing these bicycling rates: bicycle counts conducted by the City of Oakland, US Census Journey to Work data, and the San Francisco Bay Area Travel Survey administered by the Metropolitan Transportation Commission.

Figure 2.1 provides selected bicyclist counts collected in Oakland. The first three entries compare two sets of bicyclist counts taken at least a year apart for three different intersections without bicycle facilities. The lower half of the table then compares bicyclist counts

taken before and after the installation of recent bicycle lane projects.

The US Census Journey to Work data provide the primary mode of travel that people take to work. According to the 2000 Census, 1.2% of Oaklanders bicycled to work versus 1.1% in the 1990 Census. At a finer level of detail, cycling rates vary significantly between census tracts in Oakland. Some neighborhoods have cycling rates over 5% while other areas report no residents cycling to work as their primary transportation mode. (See the map of “Bicycle Mode Share by Census Tract” on page 141.)

Figure 2.2 compares the mode split for selected California cities as reported in the US Census Journey to Work data. Of the 24 California cities with populations over 150,000, Oakland had the third highest cycling rate (tied with Anaheim at 1.2%), following San Francisco (2.0%) and Sacramento (1.4%).

These census data are widely considered to undercount cycling rates for three reasons:

1. The Census does not capture people cycling to work one or two times per week.
2. The Census does not count cycling trips linked with transit (or carpooling) in that the transit trip is generally considered the primary mode and only one mode is counted.
3. Many cycling trips are not work-related and thus are not counted.

This under-reporting of bicycle trips is corroborated by the San Francisco Bay Area Travel Survey 2000 (BATS2000). This survey provides mode share data at the county level based on a sampling of households that completed activity diaries of all transportation trips. For work trips in Alameda County, the US Census 2000 reports a 1.3% bicycle mode share while BATS2000 reports the bicycle mode share at 2.2%. For all trips originating in Alameda County, bicycles accounted for 2.1% of weekday trips, 2.0% of Saturday trips, and 1.7% of Sunday trips (Metropolitan Transportation Commission 2004, pp. 197–180, E115, F115).

Cycling rates are likely to increase with the implementation of Oakland’s Bicycle Master Plan. In particular, research suggests that the number of bicycle commuters in a given city is positively correlated with the prevalence of bikeways in that area. Nelson and Allen (1997) found that each new mile of bicycle lane or bicycle path per 100,000 people correlates with a 0.069% increase in the bicycle mode share for work trips. Similarly, Dill and Carr (2003) found that each additional mile of bicycle lane per square mile correlates with a 1% increase in this mode share for cities over 250,000 people. Based on these models, Oakland’s bicycle journey-to-work mode share may increase from 1.2% (US Census 2000) to between 4% and 5% upon completion of the bikeway network described in Chapter 4.

City	Total Workers	Bicycle	Walk	Transit	Carpool	Drive Alone	Other
Oakland	170,503	1.2%	3.7%	17.4%	16.6%	55.3%	5.6%
Anaheim	139,343	1.2%	2.3%	4.6%	17.5%	71.1%	3.4%
Berkeley	54,674	5.6%	14.9%	18.6%	9.6%	43.2%	8.1%
Fresno	156,569	0.8%	2.1%	2.5%	16.0%	74.7%	3.9%
Long Beach	184,479	0.7%	2.5%	6.6%	13.7%	72.6%	3.8%
Los Angeles	1,494,895	0.6%	3.6%	10.2%	14.7%	65.7%	5.1%
Sacramento	166,419	1.4%	2.8%	4.6%	16.3%	71.0%	4.0%
San Diego	580,318	0.7%	3.6%	4.2%	12.2%	74.0%	5.3%
San Francisco	418,553	2.0%	9.4%	31.1%	10.8%	40.5%	6.2%
San Jose	427,984	0.6%	1.4%	4.1%	14.1%	76.4%	3.4%
San Leandro	36,928	0.6%	1.9%	10.2%	13.1%	70.3%	3.9%
Santa Ana	124,289	1.1%	2.2%	8.5%	24.7%	60.1%	3.3%

Figure 2.2: *Mode Split for Oakland and Other California Cities.* (US Census 2000, Journey to Work)

Oakland may be expected to have larger than average increases due to its mild climate and level terrain (in many neighborhoods) as well as its proximity to the University of California, Berkeley.¹

2.4 Transit Connections

Allowing bicycles on transit vehicles provides significant benefits for both bicyclists and transit providers. For cyclists, it increases the range of destinations accessible by bicycle and can be used to overcome barriers including long distances, bad weather, hilly terrain, traveling at night, and riding through seemingly unsafe areas. For transit operators, providing on-board bicycle access is an incentive for people to use their service. This incentive increases the number of potential riders while decreasing the proportion of car parking required at transit stations. People who prefer to leave a bicycle at either end of their transit trip should be accommodated with secure parking that is conveniently located at the transit station.

As shown in Figure 2.3, a significant number of Oakland residents live within proximity of at least one major transit station. While 8% of Oakland residents live within a one-half mile of a station, 85% of Oakland residents live within two miles of a station. In the case

¹Note that these models are based on the limited data available and their results should be interpreted with a degree of caution. The models do not address education, encouragement, or enforcement and they are subject to the above qualifications regarding the US Census data on bicycling. The research establishes a correlation—not a causal relationship—between bikeways and mode share. The projections for Oakland are based on the following numbers for population (400,000), land area (55 square miles), existing bikeways in 2000 (10 miles), total bikeways upon completion of the network (215 miles). In addition to the differences between the two models, the range of 4% to 5% arises from different assumptions on how to classify arterial bicycle routes (Class 3A) and bicycle boulevards (Class 3B). See Section 4.5 for additional information on these bikeway types.

Major Transit Station	1/2 mile	1 mile	2 miles
Amtrak -- Jack London Square	501	9,307	57,850
Amtrak -- Oakland Coliseum	318	6,950	57,763
BART -- 12th St	6,006	21,487	87,884
BART -- 19th St	4,512	27,080	96,647
BART -- Coliseum	1,177	9,117	63,085
BART -- Fruitvale	4,712	22,101	111,576
BART -- Lake Merritt	4,405	19,431	78,584
BART -- MacArthur	5,234	22,688	96,575
BART -- Rockridge	4,472	18,134	84,472
BART -- West Oakland	2,953	9,093	28,445
Oakland/Alameda Ferry	9	6,067	41,553
TOTAL for Oakland	30,524	115,290	337,974

Figure 2.3: *Residential Population Near Major Transit Stations*. Data courtesy of the Metropolitan Transportation Commission using US Census 2000. Distances between home and station were computed using the road network (excluding freeways).

of MacArthur BART, for example, 18 times as many people live within two miles of the station compared to the number of people who live within one-half mile. While two miles is further than most people will walk, this distance is easily covered in a 12-minute bicycle ride. Because many of Oakland's transit stations are within two miles of each other, many residents live within two miles of more than one station.

The following policies govern on-board bicycle access for transit serving Oakland. Folding bicycles are allowed on all transit vehicles at all times.

- AC Transit: As of 2001, all AC Transit buses are equipped with front-mounted bicycle racks that hold two bikes. A limited number of transbay lines have under-carriage bicycle racks in the luggage bins that carry an additional two bicycles. Full-size bicycles are allowed on-board between 12:30am and 5:30am on weekdays and 12:30am and 9:00am on weekends and holidays if the rack is full and space is available inside.
- Alameda/Oakland Ferry: Bicycles are allowed on the ferry on a first come, first served basis. The Encinal, the service's flagship, has a bicycle rack on the first deck with significant storage space.
- BART: Bicycles are allowed on most BART trains except for those traveling at the peak time in the peak direction. During commute hours, bicycles are not allowed in the 12th and 19th Street stations. The particular train and station restrictions are highlighted in the BART Fares and Schedules brochure. Bikes are never allowed on the first car or on crowded cars.
- Caltrans Bay Bridge Bike Shuttle: This service runs between MacArthur BART, Treasure Island, and the Transbay Terminal using a van and trailer that accommo-

Station	Bicyclist Mode Share	Total Bicyclists	Growth Potential
12 th Street	1%	40	Medium
19 th Street	3%	62	Medium
Ashby	7%	193	High
Coliseum/Oakland Airport	2%	52	Low
Fruitvale	4%	208	High
Lake Merritt	5%	105	Medium
MacArthur	4%	147	High
Rockridge	3%	92	Medium
San Leandro	2%	64	Medium
West Oakland	1%	31	Low

Figure 2.4: *Bicyclist Mode Share at BART Stations*, based on 1999 data (Bay Area Rapid Transit District 2002, p. A-6). A 2006 survey at MacArthur BART by the City of Oakland found a 7% bicyclist mode share.

dates 14 bicyclists. The shuttle runs on weekdays during commute hours with seven departures per day in each direction.

- Capitol Corridor: Bicycle racks are located on the lower level of most coach cars. Each rack accommodates three bicycles. If the racks are full, the conductor will identify a place to secure additional bikes. Capitol Corridor buses allow unboxed bicycles in the luggage compartments.

In the BART system, 3% of patrons travel from home to the station by bicycle. Of the top ten BART stations by bicycle mode share, four are located in Oakland: Lake Merritt, Fruitvale, MacArthur, and Rockridge. Additionally, the Ashby station serves Oakland residents and has the second highest bicycle mode split in the BART system (Bay Area Rapid Transit District 2002, p. 1-17). BART developed a “Bicycle Access Growth Potential” tool to rank stations by their likelihood of increasing bicycle mode share (Bay Area Rapid Transit District 2002, Table A-11). This analysis considered topography and major barriers, nearby population and car ownership levels, existing bicycle mode share, total station ridership, and the number of home-based passenger entries. These results were summarized on a scale of high, medium, or low and are included in Figure 2.4.

In November 2000, AC Transit had a total of 1,312 weekday bicycle boardings. Of these trips, 88% were on local routes and the remaining 12% on transbay routes.

In February 2006, the Capitol Corridor Satisfaction Study surveyed riders on how they got to and from the train stations along the Capitol Corridor line. For Jack London Square, 3.6% of patrons (5 out of 138) bicycled to the train and 10.1% of patrons (18 out of 179) bicycled from the train to their final destination. For Emeryville, 4.6% of patrons (14 out of 305) bicycled to the train and 5.1% of patrons (16 out of 316) bicycled from the train to

their final destination. Complete data were not available for the recently opened Oakland Coliseum Station. System wide, the survey found that 7.3% of riders bicycled to the train and 9.3% bicycled from the train to their final destination.

2.5 Bicyclist Collisions

The following analysis identifies general patterns in bicyclist-involved collisions across the city over a multi-year period. In particular, the analysis shows trends with respect to geographical location of the collisions, demographics of the involved bicyclists, and the general reasons for these collisions. The insights from these collision data inform the policies, programs, and facilities that are described in the remainder of this plan.

This collision analysis is based on data from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). The data set includes non-injury, injury, and fatality collision reports taken by the Oakland Police Department and filed with the California Highway Patrol. These data are widely regarded as an undercount of actual collisions in that they include only the reported collisions that are field investigated. Non-injury collisions, especially those involving a bicyclist and a stationary object or poor pavement conditions, are the least likely to be reported. Unless noted otherwise, all analyses are based on data from 2000 to 2004.

Oakland in State Perspective

Oakland is a relatively safe city for bicycling in comparison to other cities throughout California. The absolute number of injury and fatality collisions per population is amongst the lowest of the cities listed in Figure 2.5. Yet this comparison is of limited value because it does not account for the number of collisions relative to the number of bicyclists. Fewer cyclists on a city's streets will generally result in a lower number of collisions. Thus collision numbers by themselves provide an incomplete understanding of safety.

Jacobsen (2003) addressed this issue by analyzing the number of collisions relative to the number of bicyclists for 68 cities throughout California with a population over 60,000. He developed a "relative risk index" of collision rates based on the total number of injury and fatality collisions divided by the bicyclist mode share. The analysis is based on US Census Journey to Work and SWITRS data, both for the year 2000. (The index also includes a normalization factor such that the resulting numbers are greater than one.) By measuring the number of collisions relative to the number of cyclists, a lower risk index indicates greater bicyclist safety. By this measure, Oakland ranked as the fourth safest city in California with a population over 60,000. Oakland's risk index of 2.50 follows Berkeley (2.17),

City	Population	Injury+Fatality Collisions	Collisions per 100,000	Bicyclist Mode Share	Risk Index
Oakland	399,484	123	31	1.2%	2.50
Anaheim	328,014	135	41	1.2%	3.40
Berkeley	102,743	125	122	5.6%	2.17
Fresno	427,652	109	25	0.8%	3.24
Long Beach	461,522	245	53	0.7%	7.27
Los Angeles	3,694,820	1,372	37	0.6%	6.15
Sacramento	407,018	230	57	1.4%	4.18
San Diego	1,223,400	469	38	0.7%	5.29
San Francisco	776,733	360	46	2.0%	2.34
San Jose	894,943	319	36	0.6%	5.79
San Leandro	79,452	21	26	0.6%	4.22
Santa Ana	332,353	133	40	1.1%	3.53

Figure 2.5: *Bicyclist Collisions in Oakland and Other California Cities.* Population and Bicyclist Mode Share: US Census 2000; Collisions: SWITRS 2000; Risk Index: Jacobsen (2003).

Huntington Park (2.33), and San Francisco (2.34).

Overall, Jacobsen's analysis indicates that more people bicycling (and walking) correlates with a lower rate of collisions. For example, increasing the number of people bicycling by 100% will only increase the number of collisions by 32% (p. 208). Jacobsen suggests the following explanation: "[M]otorists in communities or time periods with greater walking and bicycling are themselves more likely to occasionally walk or bicycle and hence may give greater consideration to people walking and bicycling. Accordingly, the most plausible explanation for the improving safety of people walking and bicycling as their numbers increase is behavior modification by motorists when they expect or experience people walking and bicycling" (p. 208). A key policy implication is that increasing bicycle use will increase the relative safety of all bicyclists. The following subsections provide additional detail on bicyclist-involved collisions in Oakland.

Rates of Bicyclist Collisions

On average, a bicyclist-involved collision occurs every other day in Oakland. However, there was a significant decrease in the total number of collisions between 1995 to 1999 and 2000 to 2004. In the earlier period, there was an average of 221 collisions/year versus 170 collisions/year in the latter period. This decrease in collisions per year occurred in spite of a growing number of cyclists as described in Section 2.3. While the necessary bicycle volume data are not available for detailed calculations, the general trend is that the absolute number of bicyclists is increasing while, simultaneously, the absolute number of collisions is decreasing.

Year	Non-injury	Injury	Fatality	Total
1995	80	139	1	220
1996	71	132	2	205
1997	87	133	1	221
1998	88	135	0	223
1999	91	145	0	236
2000	58	120	3	181
2001	6	130	1	137
2002	34	129	1	164
2003	59	131	1	191
2004	61	118	0	179
Total	635	1312	10	1957
% Total	32.5%	67.0%	0.5%	100%

Figure 2.6: *Bicyclist Collisions by Year.*

Parties	Collisions	% Collisions
Bicyclist and Driver	791	92.8%
Bicyclist and Parked Car	28	3.3%
Bicyclist Only	16	1.9%
Bicyclist, Parked Car, and Driver	10	1.2%
Bicyclist and Pedestrian	5	0.6%
Bicyclist, Driver, and Pedestrian	1	0.1%
Bicyclist and Bicyclist	1	0.1%
Total	852	100.0%

Figure 2.7: *Bicyclist Collisions by Involved Parties.*

Note that total bicyclist collisions for 2000 and 2001 may be artificially low because the Oakland Police Department did not file reports on non-injury collisions from October 2000 to October 2001. Additionally, the total collisions for 2002 may be artificially deflated if police officers did not immediately begin taking non-injury collision reports following this reporting change in October 2001. Excluding these data for 2000 to 2002, the 2003 to 2004 period had an average of 185 collisions/year versus the 221 collisions/year for the 1995 to 1999 period.

Ninety-seven percent of collisions involved a bicyclist and a motor vehicle, 4% of which involved parked cars. Pedestrians were involved in a total of five reported collisions, or approximately one bicyclist/pedestrian collision per year. (While bicyclist/pedestrian collisions are certainly underreported, the more serious collisions are likely to result in a police report.) Of the 643 injuries associated with these collisions, 97% were sustained by bicyclists while 2% were sustained by drivers (or their passengers). All six fatalities associated with these collisions were sustained by bicyclists.

Rank	Roadway	Collisions
1	Grand Ave	44
2	Telegraph Ave	43
3	International Blvd	42
4	MacArthur Blvd	26
5	College Ave	23
5	Foothill Blvd	23
6	San Pablo Ave	22
7	Broadway	20
8	Market St	19
8	Martin Luther King Jr Wy	19
9	Fruitvale Ave	16
10	73rd Ave	13
10	98th Ave	13
10	Shattuck Ave	13
11	Bancroft Ave	12
11	Lakeshore Ave	12
12	High St	11

Figure 2.8: *Top Bicyclist Collision Streets by Total Number of Collisions.*

Location of Bicyclist Collisions

Bicyclist-involved collisions occurred throughout Oakland, although the concentration was significantly higher in the flatlands. (See the map of “Citywide Bicyclist Collisions, 2000–2004” on page 142). Comparatively few collisions occurred in the area bounded by Highway 13, Interstate 580, and Broadway, while fewer still occurred in the Oakland Hills above Highway 13. The greatest concentrations of collisions were in North Oakland, West Oakland, downtown, and the area surrounding Lake Merritt. Of the ten roadways with the most collisions, seven were located in these areas. When normalized by roadway length, eight of the ten top collision streets were in these areas. College Avenue, a comparatively short street, had the highest rate of collisions per road mile.

Thirteen intersections had four or more bicyclist-involved collisions over the five years from 2000 to 2004. Ten of those intersections are on the top ten streets with the greatest number of collisions. Overall, 85% of collisions over this five-year period occurred within 100 feet of an intersection. While some collisions occurred on local streets, the majority occurred on the city’s arterials. This situation is likely explained by the arterials having (a) the greatest number of motor vehicles; and (b) higher bicyclist volumes since these streets serve the major destinations for work, shopping, and other services.

Time of Bicyclist Collisions

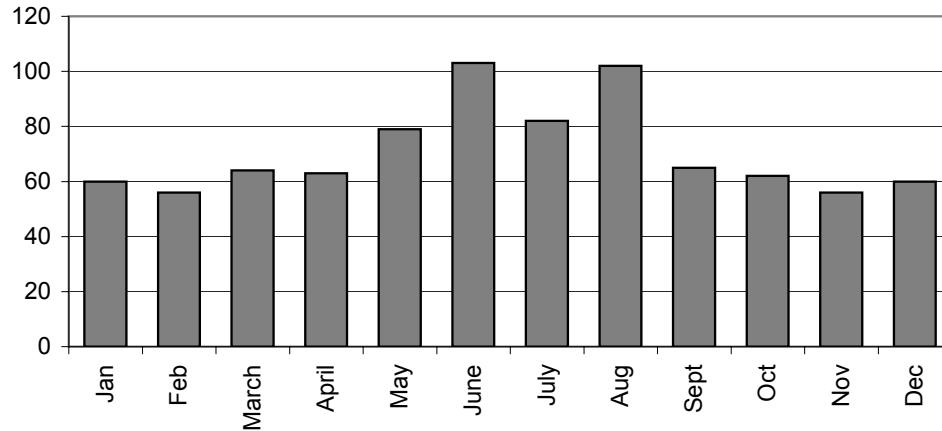
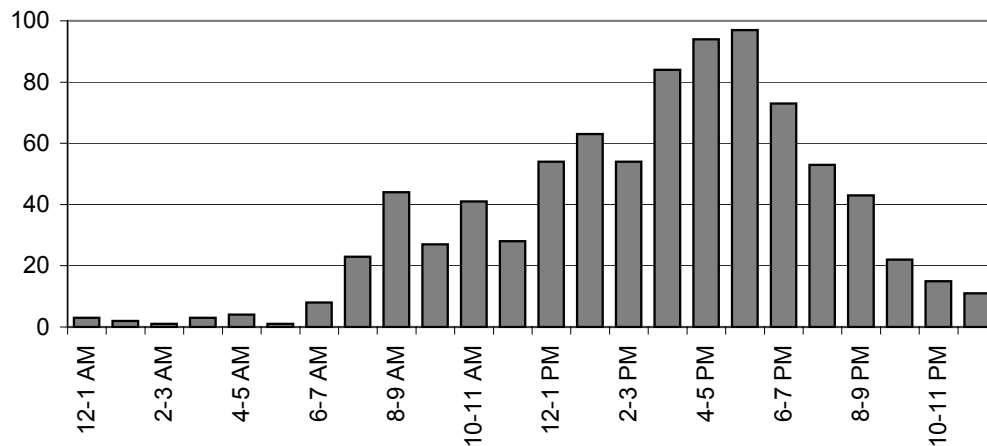
The greatest number of bicyclist collisions occurred during the summer months (particularly June and August). One-third of all collisions occurred within this quarter of the year. These

Rank	Roadway	Collisions per Road Mile	Collisions	Length (miles)
1	College Ave	23.0	23	1.0
2	Telegraph Ave	13.0	43	3.3
3	Grand Ave	11.6	44	3.8
4	Shattuck Ave	10.0	13	1.3
5	73rd Ave	9.3	13	1.4
6	San Pablo Ave	8.8	22	2.5
7	International Blvd	6.2	42	6.8
8	Lakeshore Ave	5.5	12	2.2
9	Market St	5.3	19	3.6
10	Martin Luther King Jr Wy	5.1	19	3.7
11	Fruitvale Ave	4.8	16	3.3
12	High St	4.1	11	2.7
13	98th Ave	3.8	13	3.4
14	Foothill Blvd	3.7	23	6.2
15	Broadway	3.4	20	5.8
16	Bancroft Ave	2.7	12	4.5
17	MacArthur Blvd	2.5	26	10.4

Figure 2.9: Top Bicyclist Collision Streets by Collisions per Road Mile.

Rank	Intersection	Collisions
1	Fruitvale Ave / Foothill Blvd	6
1	Telegraph Ave / Grand Ave	6
2	Telegraph Ave / MacArthur Blvd	5
3	73rd Ave / Weld St	4
3	Broadway / 27th St	4
3	Edes Ave / 98th Ave	4
3	Grand Ave / Perkins St	4
3	International Blvd / 73rd Ave	4
3	International Blvd / 81st Ave	4
3	Market St / 36th St	4
3	Shattuck Ave / 52nd St	4
3	Telegraph Ave / 40th St	4

Figure 2.10: Top Intersections by Number of Bicyclist Collisions.

Figure 2.11: *Bicyclist Collisions by Month.*Figure 2.12: *Bicyclist Collisions by Time of Day.*

higher numbers likely correspond to more bicyclists during the summer months because of good weather and more daylight hours.

Similarly, the greatest proportion of collisions occurred between the hours of 3:00pm to 7:00pm. These four hours, comprising 17% of the day, account for 41% of all collisions. This concentration suggests the importance of safety improvements and educational efforts directed at commute hour conditions, particularly in the evening period.

Demographics of Bicyclists Involved in Collisions

By age group, the greatest number of collisions involved children ages 10 to 17. This finding is especially significant because people of this age group account for 10.3% of Oakland's population but 21.0% of all bicyclist-involved collisions. People ages 18 to 24 are also overrepresented in collisions based on their share of the population. In contrast,

Bicyclist Age	Collisions	% of Collisions	% of Population
0 - 9	71	8.8%	14.6%
10 - 17	170	21.0%	10.3%
18 - 24	118	14.6%	9.6%
25 - 34	151	18.7%	18.1%
35 - 44	108	13.4%	15.8%
46 - 54	106	13.1%	13.5%
55 - 64	64	7.9%	7.4%
65+	20	2.5%	10.5%

Figure 2.13: *Collisions by Bicyclist Age.*

Rank	Intersection	Collisions
1	98th Ave / Edes Ave	4
1	International Blvd / 81st Ave	4
2	73rd Ave / Weld St	3
2	Adeline St / 8th St	3
2	Fruitvale Ave / Foothill Blvd	3
2	MacArthur Blvd / West St	3
2	Shattuck Ave / 52nd St	3
2	Telegraph Ave / MacArthur Blvd	3
3	(19 intersections)	2

Figure 2.14: *Top Intersections by Number of Child Bicyclist Collisions (<18).*

children 9 years and under as well as senior citizens 65 and over are significantly underrepresented in collisions based on their respective share of the overall population.

Younger children and older adults are less likely to ride bicycles than people of other ages, resulting in a lower exposure rate and a smaller number of collisions for these age groups. While cycling rates by age are not available, youth of ages 10 to 17 are more likely to ride bicycles than most other age groups and thus have a higher exposure rate. However, it is unclear if youth are overrepresented in collisions based on their share of trips, vehicle miles traveled, or their more limited understanding of the rules of road.

By race and ethnicity, the trends are less distinct because the data are unavailable for over 40% of the bicyclist-involved collisions. The available information suggests that Blacks and Whites may be over-represented as bicyclists in collisions. Similarly, Hispanics and Asians appear to be under-represented in these collisions based on their respective share of Oakland's population. As with the collisions by age group, it is not known if particular racial or ethnic groups are overrepresented based on their share of trips or vehicle miles traveled.

Race/Ethnicity	Bicyclists	% Collisions	% Population
Black	256	29.8%	35.1%
White	146	17.0%	23.5%
Hispanic	71	8.3%	21.9%
Asian	23	2.7%	15.6%
Other	9	1.0%	3.9%
Not Stated	355	41.3%	NA
Total*	860	100%	100%

Figure 2.15: *Bicyclist Collisions by Race/Ethnicity.*

Reasons for Bicyclist Collisions

Bicyclists were named as the party at fault in approximately 60% of all collisions while drivers were named in approximately 40% of the cases. Of the 60% of collisions where the bicyclist was at fault, 22% were attributed to youth cyclists (17 years and under) and 33% to adult cyclists (18 years and over). For bicyclists, the most common primary collision factors were riding on the wrong side of the road and failure to obey traffic signals and signs. For drivers, the most common factors were right of way violation, improper turning, unsafe speed, and failure to obey traffic signals and signs. For bicyclists, the movement preceding collision was “proceeding straight” in 76% of all collisions. For drivers, “proceeding straight” accounts for 49% of all collisions, while “making right turn” and “making left turn” account for 18% and 14%, respectively. For collisions in which a vehicle code violation was specified, 8% were caused by “dooring”—a person opening a vehicle’s door into the path of an oncoming cyclist. Given that bicyclists sustained 97% of the injuries associated with these collisions, bicyclists in general bear the consequences of their own illegal behaviors as well as the illegal behaviors of drivers.

2.6 Education, Encouragement, and Enforcement

Education, encouragement, and enforcement are important elements for promoting bicycling while simultaneously improving safety. The need for enhanced bicycle safety education is demonstrated by surveys that consistently identify safety concerns as being the top reason that more people do not ride bicycles. Both motorists and cyclists are often unaware of basic rules of the road. Programs should target youth cyclists, the parents of youth cyclists, adult cyclists, and motorists. The following resources and programs have been active or developed since the adoption of Oakland’s first *Bicycle Master Plan* in 1999.

CHAPTER 2. EXISTING CONDITIONS

30

Primary Collision Factor	# of Collisions	Party at Fault			
		Bicyclist			Driver
		Youth	Adult	Unstated	
Wrong side of road	173	61	98	6	8
Auto right of way	117	15	21	2	79
Other hazardous violation	109	23	34	5	47
Traffic signals and signs	105	33	33	7	32
Improper turning	94	13	22	6	53
Unsafe speed	48	2	12	1	33
Unsafe starting or backing	15	2	0	1	12
Not stated	14	3	2	2	7
Driving or Bicycling under the influence	13	1	6	0	6
Pedestrian violation	10	7	3	0	0
Pedestrian right of way	10	0	0	0	10
Improper passing	10	0	4	0	6
Total	718 (100%)	160 (22.3%)	235 (32.7%)	30 (4.2%)	293 (40.8%)

Figure 2.16: *Primary Collision Factor by Party at Fault.* Youth \leq 17 years of age; Adult \geq 18 years of age.

Movement	# of Bicyclists
Proceeding straight	652
Entering traffic	43
Making left turn	29
Traveling wrong way	28
Stopped	18
Changing lanes	13
Making right turn	12
Other unsafe turning	9
Crossed into opposing lane	4
Merging	4
Making u-turn	3
Passing other vehicle	3
Other or Not Stated	42

Figure 2.17: *Bicyclist Movement Preceding Collision.*

Movement	# of Drivers
Proceeding straight	386
Making right turn	142
Making left turn	114
Stopped	55
Entering traffic	18
Parked	16
Backing	7
Slowing/stopping	7
Parking Maneuver	7
Making u-turn	5
Changing lanes	3
Merging	3
Traveling wrong way	3
Other or Not Stated	24

Figure 2.18: *Driver Movement Preceding Collision.*

Brochures

- **Bicycle Safety Quiz:** The East Bay Bicycle Coalition developed this brochure to promote bicyclist safety by describing basic rules of the road that are often unknown or disobeyed by cyclists and motorists. The brochure is distributed in English, Spanish, and Chinese and is also available on-line at www.ebbc.org/safety.html.
- **Shared Lane Markings (“Sharrows”):** Oakland’s Public Works Agency prepared this flyer with answers to frequently asked questions for educating Oakland’s bicyclists and drivers on this traffic control device that was approved in September 2005 for use in California.

Courses

- **Bicycle Safety Helmet Program (Oakland Parks and Recreation Department):** This program provides children (ages 5-10 years) an opportunity to earn a bicycle helmet, T-shirt, certificate of completion, and promotional materials by completing a five-hour course on bicycle safety.
- **Bicycle Traffic School:** The East Bay Bicycle Coalition organized a workshop in 2002 to educate city and county officials on the need for traffic school for bicyclists. The one-day workshop featured speakers from the City of Walnut Creek, Los Angeles Unified School District, and UC Berkeley. This program would be analogous to traffic school for drivers whereby bicyclists who receive moving violations could choose to take a class on bicyclist safety and thereby reduce the financial penalty of their violation. As of this writing, Oakland does not have a bicycle traffic school program.
- **Cycles of Change** is a community-based organization that teaches middle school students bicycle safety and mechanics in conjunction with environmental education through after school programs. The organization began in 1998 at Roosevelt Middle School and is now operating programs at twelve public schools in the East Bay.
- **Earn Your Bike Program (Oakland Parks and Recreation Department):** This program provides youth (ages 10-18 years) an opportunity to earn a bicycle, helmet, and other safety materials by completing 32 hours of training in bicycle safety, bicycle repair, and community service in Oakland’s parks, playgrounds, and recreation centers.
- **Road I Course:** The League of American Bicyclists offers this nine-hour course curriculum as a basic bicycle safety primer for adults and children 14 years and older.

It is taught locally by League Certified Instructors (LCIs). While the East Bay Bicycle Coalition offered this course in 2002 with funding from Oakland's Public Works Agency, there is no ongoing program available to Oakland residents.

Events

- **Bike to Work Day:** This annual event encourages people to try bicycling to work, school, or errands and provides positive reinforcement for those who already do so. The Public Works Agency, in collaboration with the East Bay Bicycle Coalition, initiated Oakland's Bike to Work Day in 1994. The event's activities have included a pancake breakfast, a transportation fair, and all-day valet parking at City Hall, energizer stations around town, noontime activities at Frank Ogawa Plaza, and raffles with prizes donated by local businesses.
- **Oakland Bike Trippers:** The Oakland Museum of California organizes bicycle tours of local historic sites. These two-hour tours are offered monthly from May through October and cover five miles at a leisurely pace.
- **Valet Bicycle Parking:** The East Bay Bicycle Coalition provides valet bicycle parking for major events including street fairs, festivals, and sports games. Additional information on valet bicycle parking is provided in the chapter on "Bicycle Parking and Support Facilities."

Maps

- **511 BikeMapper:** This on-line mapping tool is part of www.511.org and includes the nine-county San Francisco Bay Area. It provides dynamically generated maps of existing bicycle paths, lanes, and routes based on an origin and destination specified by the user.
- **Bicycle Transportation Map of the East Bay, Map 1: West of the Hills (1996)** is published by the East Bay Bicycle Coalition and identifies recommended bikeways throughout Oakland and adjoining cities.
- **San Francisco Bay Trail: East Bay, Richmond to Hayward (2003)** shows the existing and proposed alignment of the Bay Trail through West Oakland and Jack London Square, along the Estuary, and around Arrowhead Marsh.

- Walk Oakland! Map & Guide, 2nd Edition (2004) includes existing bicycle paths, lanes, and routes within Oakland as well as information on street grades, neighborhoods, historic landmarks, parks, and civic destinations.

Organizations

- *East Bay Bicycle Coalition (EBBC)* is dedicated to promoting bicycling as an everyday means of transportation and recreation. The EBBC safeguards the interest of bicyclists in Alameda and Contra Costa Counties. The EBBC works with cities, counties, Caltrans, and other government agencies to improve conditions for cyclists (www.ebbc.org).
- *Oakland Yellowjackets Bicycle Club (OYJ)* is a social, multicultural bicycling group for men and women of all ages and skill levels. The OYJ regular ride season starts in mid-April and concludes in late-September or early October. Weekly rides in the off-season are weather dependent (www.oaklandyellowjackets.org).
- *Royal Ground Velo Raptors* is an Oakland-based bicycle club that promotes the fitness and health of its members through bicycling for recreation, exercise, touring, and transportation. The club's activities include weekly rides leaving from Montclair and cyclists of all levels are welcome to participate (www.veloraptors.com).

Programs

- Hazard Reports (East Bay Bicycle Coalition): The East Bay Bicycle Coalition (EBBC) maintains an on-line reporting system and database of hazards submitted by the public. EBBC then forwards reports to the responsible agencies.
- Hazardous Grate Replacement Project (City of Oakland): The City of Oakland received a \$340,000 grant from the Hazard Elimination and Safety Program (Caltrans) to replace drainage grates that could catch bicycle wheels. Between 2004 and 2006, the City replaced approximately 900 such grates throughout Oakland.
- Maintenance Reports (City of Oakland): People may report bicycle-related maintenance issues like debris, potholes, damaged signs, and faded striping to the Public Works Agency Customer Call Center (510-615-5566).
- Police Bicycle Patrol (City of Oakland): The Oakland Police Department (OPD) has fifteen officers who patrol by bicycle in the downtown and neighborhood commercial districts (including Rockridge, Piedmont Ave, and Montclair). These officers

are also used in areas that are inaccessible to patrol cars. As part of a community policing approach, the bicycle patrols are used to provide a highly visible presence in a small geographical area to address quality of life issues. OPD seeks to grow the program based on positive responses from merchants and residents who appreciate the opportunities for personal interaction with the bicycle patrol officers.

- **Traffic Reports (City of Oakland):** People may report bicycle-related issues with traffic signals, signage, and striping to the Transportation Services Division (510-238-3466) for evaluation by a transportation engineer. Requests for basic maintenance to existing facilities should be submitted as described under “Maintenance Reports” above.
- **Traffic Safety Mini-grant Program (City of Oakland):** From 2001 to 2004, the Oakland Pedestrian Safety Project administered a program that awarded mini-grants to community-based organizations for traffic safety projects. Funded by the California Office of Traffic Safety, the bicycle-related projects included bicycle safety training, helmet distribution, educational brochures, and public service announcements.

Public Service Announcements

- **Love Life Foundation:** As part of the Traffic Safety Mini-grant Program the Love Life Foundation produced a public service announcement (PSA) about safe bicycling to work as one in a series of five PSAs on traffic safety themes. These PSAs aired on KTOP and KMTP (Channel 32).
- **Oakland Public Works Agency** produced two public service announcements on the “CityRacks Bicycle Parking Program” and “Oakland’s Bike Lanes.” These PSAs are aired on KTOP and are also available on the web page of the Bicycle and Pedestrian Facilities Program.

Web Resources

- www.oaklandpw.com/bicycling is the home page for the City of Oakland’s Bicycle and Pedestrian Facilities Program. It provides information on existing facilities, current projects, Bike to Work Day, the *Bicycle Master Plan*, and other city programs that affect bicyclists and pedestrians.
- www.511.org: The Metropolitan Transportation Commission provides bicycling information as part of its comprehensive web site on transportation for the San Francisco Bay Area. Bicycle-specific information includes maps, transit, parking, local

bridges, organizations, and promotional materials. The site also includes the interactive BikeMapper described under “Maps.”

California Vehicle Code

The California Vehicle Code (CVC) specifies the legal requirements for riding a bicycle in the public right-of-way. The operation of bicycles is addressed in Sections 21200-21212 while the registration and licensing of bicycles is addressed in Sections 39000-39011. Opening a vehicle’s door in the path of an oncoming bicyclist is prohibited by Section 22517. In general, Section 21200(a) states, “Every person riding a bicycle upon a highway has all the rights and is subject to all the provisions applicable to the driver of a vehicle. . .”

The CVC is available on-line at <http://www.dmv.ca.gov/pubs/vctop/vc/vc.htm>.

The California Vehicle Code does not regulate bicycle riding on sidewalks. However, the Oakland Municipal Code (OMC) does prohibit sidewalk riding in OMC 10.16.150.

2.7 Community Outreach

This update of Oakland’s Bicycle Master Plan included outreach to and coordination with neighborhood groups and merchant associations, local transit operators, adjoining jurisdictions, and countywide and regional agencies. The following bullets identify the key components of this outreach process:

- **Citizens Advisory Committee (CAC):** This committee was composed of residents from each council district, representatives of community-based organizations, and interested individuals. It met monthly to provide public input and oversight for each stage of the process.
- **Meetings with community-based organizations:** The project manager and members of the CAC gave presentations to neighborhood groups and merchants associations as part of those groups’ regularly scheduled meetings. The process included 34 meetings that reached 569 people. [EDITORIAL NOTE: These totals are as of 1-Feb-07. To request a presentation, contact Jason Patton at 510-238-7049, jpatton@oaklandnet.com.]
- **Public meetings:** Three large format, open invite public meetings were held over the course of the project. The first two meetings were held at the beginning of the project and the third meeting was held after the release of the draft bicycle plan.

- Technical Advisory Committee (TAC): This committee facilitated cooperation with outside agencies and had a primary focus on AC Transit and the adjoining jurisdictions of Alameda, Berkeley, Emeryville, Piedmont, and San Leandro. A full listing of TAC participants is included in the Acknowledgements.
- EIR and General Plan Amendment: The preparation of the associated Environmental Impact Report (EIR) and the adoption of this document through a General Plan amendment included public hearings and actions by the Planning Commission, Community and Economic Development Committee, and City Council.

This public outreach noted the following issues that were subsequently addressed through the planning process and integrated into this document. Many Oakland residents would like to bicycle (or bicycle more often) but they do not feel safe given the current traffic conditions on many of Oakland's streets. Merchants in the neighborhood commercial districts are concerned that bikeways on their streets could cause localized congestion that would negatively affect their businesses. Some bicyclists are seeking the most direct routes (regardless of traffic conditions) while others (including parents with children) are seeking residential streets and bicycle paths. Bicyclists are very interested in ensuring that Oakland's bikeways provide seamless connections to the bikeways in adjoining jurisdictions. Bus and shuttle operators are concerned that some bikeways may cause localized congestion that would adversely affect their transit operations. Especially at night, many cyclists ride busier streets because of their concerns for personal security on the quieter side streets. People's priorities for improvements include developing bikeway connections to transit stations, the downtown, Oakland's waterfront, and connecting Lake Merritt to the surrounding neighborhoods.

Additional details on the outreach process are included in Section C.1. The ongoing role of community outreach and public participation for implementation of the *Bicycle Master Plan* is described in Section 6.6.

3. Policy Recommendations

Numerous policies at the federal, state, and regional levels promote the routine accommodation of bicyclists in transportation projects. After summarizing these policies, this chapter develops the city policies and actions for achieving the goals of the *Bicycle Master Plan*. These policies emphasize the physical accommodation of bicyclists through the development of the bikeway network and accompanying parking facilities. In particular, Safe Routes to Transit is a policy priority for linking cycling trips to transit trips and thereby promoting the viability of both cycling and transit-riding. The policy on routine accommodation specifies how the needs of bicyclists should be considered in all transportation projects. These policies also address key education and enforcement programs and provide a framework for implementation. This chapter concludes with a section on bikeway guide signage and mountain biking as issues where further discussion is necessary for establishing policy positions.

3.1 Related Federal, State, and Local Policies

U.S. Department of Transportation

US DOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure: Design Guidance (2001): In response to Section 1202(b) of the Transportation Equity Act for the 21st Century (TEA-21), this document is "a policy statement that bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist."

United States Code, Title 23, §217: Bicycle Transportation and Pedestrian Walkways:

- (e) Bridges. – In any case where a highway bridge deck being replaced or rehabilitated with Federal financial participation is located on a highway on which bicycles are permitted to operate at each end of such bridge, and the Secretary determines that the safe accommodation of bicycles can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations.
- (g) Planning and Design. – In General. – Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new

construction and reconstruction of transportation facilities, except where bicycle and pedestrian use are not permitted.

United States Code, Title 23, §109(m) Protection of Nonmotorized Transportation Traffic.

– The Secretary shall not approve any project or take any regulatory action under this title that will result in the severance of an existing major route or have significant adverse impact on the safety for nonmotorized transportation traffic and light motorcycles, unless such project or regulatory action provides for a reasonable alternate route or such a route exists.

State of California

California Department of Transportation (Caltrans), Deputy Directive 64, Accommodating Non-Motorized Travel (2001): “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.”

Assembly Concurrent Resolution No. 211 (2002): “That in order to improve the ability of all Californians who choose to walk or bicycle to do so safely and efficiently, the Legislature of the State of California hereby encourages all cities and counties to implement the policies of the California Department of Transportation Deputy Directive 64 and the United States Department of Transportation’s design guidance document on integrating bicycling and walking when building their transportation infrastructure.”

California Bicycle Transportation Act, Streets and Highways Code 890-894.2: “It is the intent of the Legislature, in enacting this article, to establish a bicycle transportation system. It is the further intent of the Legislature that this transportation system shall be designed and developed to achieve the functional commuting needs of the employee, student, business person, and shopper as the foremost consideration in route selection, to have the physical safety of the bicyclist and bicyclist’s property as a major planning component, and to have the capacity to accommodate bicyclists of all ages and skills.”

Congestion Management Programs, Government Code 65089(b)(1)(B)(5): “It is the intent of the Legislature that, when roadway projects are identified in the program, consideration be given for maintaining bicycle access and safety at a level comparable to that which existed prior to the improvement or alteration.”

San Francisco Bay Conservation and Development Commission, Government Code 66602 (McAteer-Petris Act): “[E]xisting public access to the shoreline and waters of the San

Francisco Bay is inadequate and that maximum feasible public access, consistent with a proposed project, should be provided.”

Metropolitan Transportation Commission

Regional Transportation Plan (RTP), Transportation 2030 Plan for the San Francisco Bay Area (2005): Calls to Action, “Address Nonmotorized Transportation Needs” (p. 58) – “Bicyclists, pedestrians, and wheelchair users must be full partners in the planning process, and bicycle facilities and walkways must be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation facilities. Project sponsors must also consider safety and contiguous routes for bicyclists and pedestrians. These actions greatly reduce the future cost of retrofitting facilities for nonmotorized travelers, and encourage safe and convenient bicycling and walking. MTC will monitor routine accommodation of nonmotorized transportation needs in its programming processes.”

Transit-oriented Development Policy for Regional Transit Expansion Projects (Resolution 3434, 2005): “Clearly identify any barriers for pedestrian, bicycle and wheelchair access to the station from surrounding neighborhoods, and propose strategies that will remove these barriers and maximize the number of residents and employees that can access the station by these means.”

Regional Policies for Accommodation of Bicycle and Pedestrian Facilities in Transportation Project Planning, Design, Funding and Construction (Resolution 3765, 2006): “Projects funded all or in part with regional funds (e.g. federal, STIP, bridge tolls) shall consider the accommodation of bicycle and pedestrian facilities, as described in Caltrans Deputy Directive 64.”

City of Oakland

Resolution Declaring the City of Oakland’s Support for Public Transit and Other Alternatives to Single-Occupant Vehicles (Resolution 73036, 1996): “It shall be the official policy of the City of Oakland to encourage and promote bicycle and pedestrian travel by providing a bicycle circulation system which includes Class I, II, and III facilities, safe and secure bicycle parking, pedestrian/bicycle bridges, pedestrian plazas, bicycle loop detectors, traffic calming devices, crosswalks and sidewalk bulbs, median ‘safety zones,’ and repair of damaged sidewalks.”

Oakland’s *General Plan* contains numerous statements on bicyclist safety and access in the *Land Use and Transportation Element* (1998), *Open Space, Conservation, and Recreation Element* (1996), and the *Estuary Policy Plan* (1999). These policies and actions are

collected in Appendix D. Oakland's *Pedestrian Master Plan* (2002), part of the Land Use and Transportation Element, is a companion document to the *Bicycle Master Plan* with mutually reinforcing goals, policies, and projects.

3.2 Bicycle Master Plan Policies

The following policy recommendations provide direction for the City of Oakland's decision-makers and staff in realizing the goals of the *Bicycle Master Plan*. The recommendations include specific policies for each of the plan's goals on infrastructure, education, and coordination. In turn, each policy has an associated list of actions—the detailed steps for acting on those policies to achieve the overarching goals. These actions apply to the areas, both geographic and programmatic, over which the City of Oakland has legal authority. The implementation of any particular action will depend upon its feasibility with respect to physical, economic, legal, and other constraints. When acting on these policies, the Planning Commission and the City Council will ensure that decisions and projects are consistent with the General Plan by balancing various policies that may be in competition with each other.

Goal 1: Infrastructure – Develop the physical accommodations, including a network of bikeways and support facilities, which provide for safe and convenient access by bicycle.

BMP Policy 1A – Bikeway Network: Develop and improve Oakland's bikeway network.

Action 1A.1 – Bicycle Lanes (Class 2): Install bicycle lanes where feasible as the preferred bikeway type for all streets on the proposed bikeway network (except for the bicycle boulevards proposed for local streets with low traffic volumes and speeds).

Action 1A.2 – Arterial Bicycle Routes (Class 3A): Install arterial bicycle routes on collector and arterial streets only when bicycle lanes are infeasible. These shared lane facilities shall include best practices for lane widths, signage, and striping.

Action 1A.3 – Bicycle Boulevards (Class 3B): Enhance bicycle routes on local streets by developing bicycle boulevards with signage, striping, and intersection modifications to prioritize bicycle travel.

Action 1A.4 – Route Signage: Develop an informative and visible signage system for the bikeway network, building on existing bikeway signage, that includes directional and distance information to major destinations.

Action 1A.5 – Neighborhood Connectors: Develop maps to identify additional cycling streets within neighborhoods that would provide community benefit but not require the capital improvements typically associated with designated bikeways.

Action 1A.6 – Bicycle Performance Measure: Work to identify and integrate a quantitative performance measure for bicycles into the City’s process for environmental review and transportation impact analysis.

Action 1A.7 – Dedicated Right Turn Lanes: Avoid the use of dedicated right turn lanes on streets included in the bikeway network. Where infeasible, consider a bicycle through lane to the left of the turn lane or a combined bicycle lane/right turn lane.

Action 1A.8 – Diagonal Parking: Discourage the installation of “head-in/back-out” diagonal parking on streets included on the bikeway network. Where feasible, relocate existing diagonal parking on the bikeway network to other streets.

Action 1A.9 – Rails-to-Trails Conversions: Where rail lines, sidings, and spurs are unused, evaluate the feasibility of acquiring those alignments for mixed use paths.

Action 1A.10 – Bicycle Path Security: Where appropriate, consider security and monitoring mechanisms such as lighting, video cameras, call boxes, emergency access, and bicycle patrols along paths in isolated areas.

Action 1A.11 – Maintenance: Continue and improve the PWA Customer Call Center as the system for reporting and responding to maintenance issues on bikeways.

Action 1A.12 – Street Cleaning: Strive to keep bikeways free of debris through regularly scheduled street sweeping. In industrial areas, work with businesses to ensure their compliance with related use permits for keeping adjacent roadways and bikeways clear of sand, gravel, and other debris.

BMP Policy 1B: Routine Accommodation: Address bicycle safety and access in the design and maintenance of all streets.

Action 1B.1 – Roadway Improvements: Include bicycle safety and access improvements in roadway resurfacing, realignment, and reconstruction projects.

Action 1B.2 – Traffic signals: Include bicycle-sensitive detectors, bicycle detector pavement markings, and adequate yellow time for cyclists with all new traffic signals and in the modernization of all existing signals.

Action 1B.3– Freeway Ramps: Work with Caltrans to reduce conflicts created by ramps, dedicated turn lanes, and high-speed merges at freeway interchanges.

Action 1B.4 – Bridges: Include two-way bicycle access in projects that would rebuild or create new bridges over the Oakland Estuary, Lake Merritt Channel, railroad tracks, or freeways.

Action 1B.5 – Railroad crossings: Inventory railroad crossings and strive to improve the pavement quality at these locations.

Action 1B.6 – Automobile Diagonal Parking: Consider the negative impacts on cyclists in proposals to convert parallel parking to diagonal parking.

Action 1B.7 – Pavement Quality and Drainage Grates: Strive to ensure smooth paving surfaces and bicycle-safe drainage grates on city streets and paths.

BMP Policy 1C – Safe Routes to Transit: Improve bicycle access to transit, bicycle parking at transit facilities, and bicycle access on transit vehicles.

Action 1C.1 – Bikeways to Transit Stations: Prioritize bicycle access to major transit facilities from four directions, integrating bicycle access into the station design and connecting the station to the surrounding neighborhoods.

Action 1C.2 – Bicycle Parking at Transportation Hubs: Work with partner agencies to provide secure bicycle parking that accommodates demand at all BART stations, major AC Transit bus stops, Amtrak stations, Oakland/Alameda ferry terminal, and park and ride lots.

Action 1C.3 – Bicycles on BART: Encourage BART to expand bicycle access during commute hours to trains and the 12th and 19th Street stations. Encourage the research and development of train car interiors specifically designed to accommodate bicycles.

Action 1C.4 – Bicycle Racks on Buses: Support AC Transit's efforts to maintain and expand the carrying capacity of bicycles on buses using front-mounted racks as well as the luggage compartments on transbay buses.

Action 1C.5 – Bicycles on Amtrak/Capitol Corridor: Support Amtrak and the Capitol Corridor in continuing to provide adequate capacity for bicyclists on trains serving Oakland.

Action 1C.6 – Bicycles on Ferries: Encourage partner agencies to ensure that ferry service to San Francisco and Alameda continues to provide adequate on-board bicycle storage.

Action 1C.7 – Estuary Crossing: Encourage the Port of Oakland, City of Alameda, and the Alameda County Congestion Management Agency to provide reliable water taxi service—and study potential alternatives—for bicycle access across the Oakland Estuary.

Action 1C.8 – Bicycle-Transit Information: Encourage transit agencies and the Metropolitan Transportation Commission to provide accurate and complete bicycle-transit information through their publications and the 511 program.

BMP Policy 1D – Parking and Support Facilities: Promote secure and conveniently located bicycle parking at destinations throughout Oakland.

Action 1D.1 – CityRacks Program: Continue Oakland’s program of installing bicycle racks in the public right-of-way based on requests by residents and merchants.

Action 1D.2 – Parking Meter Removal: Develop a program to replace parking meters with bicycle racks when parking meters are removed or consolidated into central pay stations.

Action 1D.3 – Valet Bicycle Parking: Work with partner organizations to provide valet bicycle parking at festivals and street fairs including all large city-sponsored events.

Action 1D.4 – Support Facilities: Encourage the inclusion of public restrooms, drinking fountains, and telephones at major transit stations and along the San Francisco Bay Trail.

Action 1D.5 – Security: Identify security and monitoring mechanisms for bicycle parking including lighting, video cameras, call boxes, and security patrols.

Action 1D.6 – Bicycle Parking Ordinance: Adopt an ordinance as part of the City’s Planning Code that would require new development to include short and long-term bicycle parking.

Action 1D.7 – Development Incentives: Consider reduced automobile parking requirements in exchange for bicycle facilities as part of transportation demand management strategies in new development.

Action 1D.8 – Abandoned Bicycle Removal: Develop a process, as part of Oakland’s Abandoned Vehicle program, for noticing and removing abandoned bicycles from the public right-of-way.

Goal 2: Education – Improve the safety of bicyclists and promote bicycling skills through education, encouragement, and community outreach.

BMP Policy 2A – Education: Work with public agencies and the private sector to improve bicycle education, enforcement, and promotional programs.

Action 2A.1 – Child Education: Work with the Oakland Unified School District to develop educational programs and parking facilities to promote bicycling to school.

Action 2A.2 – Adult Education: Work with bicycling organizations and partner agencies to provide street skills bicycle safety courses for adult cyclists.

Action 2A.3 – Driver Education: Work with stakeholder organizations and the media to educate drivers on the rights and responsibilities of cyclists and drivers through brochures and public service announcements.

Action 2A.4 – Commute Incentives: Develop a bicycle commute incentive program for city employees that would serve as a model for major employers in Oakland.

Action 2A.5 – Bicycle/Bus Education: Work with AC Transit to develop a joint educational campaign for bicyclists and bus drivers on sharing the road safely and courteously.

Action 2A.6 – Public Awareness: Publicize the benefits of bicycling, existing facilities, and available programs through Bike to Work Day, the City of Oakland's web site, and other outreach opportunities.

Action 2A.7 – Maps: Support the creation, maintenance, and distribution of bicycling maps including the *Walk Oakland! Map & Guide*, the on-line BikeMapper at www.511.org, and the East Bay Bicycle Coalition's *West of the Hills* map.

BMP Policy 2B – Enforcement: Prioritize the enforcement of traffic laws that protect bicyclists.

Action 2B.1 – Bicycle Diversion Program: Consider developing a fine structure tailored to bicycle violations in conjunction with a bicycle traffic school program.

Action 2B.2 – Officer Training: Educate police officers on the importance of and methods for citing bicycle offenders.

Action 2B.3 – Bicycle Patrols: Continue and extend the use of bicycle patrol officers in downtown, neighborhood commercial districts, parks, and along the Bay Trail.

Action 2B.4 – Oakland Municipal Code: Review and update the sections of the Oakland Municipal Code that relate to bicycles.

Goal 3: Coordination – Provide a policy framework and implementation plan for the routine accommodation of bicyclists in Oakland's projects and programs.

BMP Policy 3A – Resources: Seek the necessary staff and funding to implement the *Bicycle Master Plan*.

Action 3A.1 – Staffing: Dedicate the necessary staff in all agencies, divisions, and departments to implement the *Bicycle Master Plan*.

Action 3A.2 – Funding: Use local resources to leverage grant funding for implementing the bikeway network and accompanying support facilities.

Action 3A.3 – Routine Accommodation: Integrate bicycle facilities and their associated costs into the implementation of streetscape and resurfacing projects.

BMP Policy 3B – Project Development: Prioritize and design bicycle projects in cooperation with key stakeholders.

Action 3B.1 – Prioritization: Work with the Bicycle and Pedestrian Advisory Committee to identify and prioritize projects based on the recommendations of this plan.

Action 3B.2 – Resurfacing: Integrate proposed bikeways into resurfacing projects. In developing resurfacing schedules, prioritize streets with existing or proposed bikeways when choosing between streets of otherwise equal priority.

Action 3B.3 – Feasibility and Design: Complete feasibility studies and the design of proposed bikeways in close cooperation with key stakeholders including AC Transit, adjacent jurisdictions, and the Bicycle and Pedestrian Advisory Committee.

Action 3B.4 – Maintenance: In project development and design, identify the cost, funding source, and responsible agency for the maintenance and operation of the proposed facilities.

BMP Policy 3C – Public Review: Prior to the implementation of bikeway projects, affected residents, merchants, and property owners shall be notified of the project's costs and benefits.

Action 3C.1 – Information Sharing: Maintain and expand the web pages on bicycling in Oakland to provide current and complete information on facilities, programs, and proposed projects.

Action 3C.2 – Contact List: Maintain a contact list of interested individuals and organizations and notify them of projects related to bicycling in Oakland.

Action 3C.3 – Community Input: Seek community input through mailers and/or meetings for the implementation of new bikeways.

Action 3C.4 – City Council Approval: If the design of a bikeway will reduce the number of motor vehicle lanes or on-street parking spaces (by 10% or more in the project area), there shall be a vote of the City Council before implementation of the bikeway project.

3.3 Issues for Further Discussion

This chapter concludes with this section on bikeway guide signage and mountain biking as issues for further discussion. These issues require ongoing dialog because they lack consensus for establishing policy positions in the *Bicycle Master Plan*. The differing viewpoints on these issues are presented here to facilitate further discussion on how best to promote bicyclist safety and access in the City of Oakland while being sensitive to the competing demands of multiple stakeholders.

Bikeway Guide Signage

Oakland uses a combination of “Bike Route” signs (G93) and “Bicycle Route Number Marker” signs (SG45) to designate bikeways and provide wayfinding information. The numbered routes are based on a system specified by the Alameda Countywide Bicycle Plan whereby north-south bikeways end in “5” (5, 15, 25, ...) and east-west bikeways end in “0” (10, 20, 30, ...). Analogous to the interstate highway system, the north-south bikeways are numbered west to east (5 is the westernmost) and the east-west bikeways are numbered north to south (10 is the northernmost). Oakland applied this framework to locally designated bikeways with north-south bikeways ending in odd numbers (other than 5) and east-west bikeways ending in even numbers (other than 0).

There are various strengths and weaknesses to this approach regarding maintenance, general visibility, and the information provided by the signs. In particular, the SG45 signs have the following benefits. The signs are manufactured in-house and have a highly reflective surface material. The Caltrans standard provides a uniform look across jurisdictions while allowing for customization at the local level. Other jurisdictions, including San Francisco and Marin County, are also using the SG45 sign. In Oakland’s case, the distinctive design integrates the City’s oak tree logo and is a source of pride for the staff involved in its development. The City of Oakland has already made a commitment to the SG45 with a signage project completed in 2004. The smaller sign size (12”x18”) is also less likely to be damaged by trucks or vandalism. Overall, the design of the sign is very attractive while minimizing the associated maintenance needs.

However, the following concerns have arisen with this signage scheme. Oakland’s street grid does not follow the cardinal directions and thus the overall framework for the numbering system is not intuitive. The numbering for the countywide bikeways was developed as a planning tool and was not necessarily intended to be used as a wayfinding system (Alameda County Congestion Management Agency 2001, p. 4-3). At the local level, this approach requires many numbers for all of the bikeways—more numbers than people are likely to

learn. The SG45 signs are not large enough to be readily visible to bicyclists and to drivers. In particular, the destination and directional information is difficult to read due to the necessary font size given the sign's limited width. Neither the SG45 nor the G93 signs include distances to key destinations. Overall, the signs do not provide sufficient information in an intuitive format.

Given these strengths and weaknesses, the following points offer suggestions on how to continue the discussion regarding bikeway guide signage:

- Consider using the SG45 signs only for countywide bikeways to limit the extent of numbered bikeways and simplify the overall numbering system. This limited use of numbers could make the numbered bikeways more readily understandable.
- When using the SG45 signs, consider the Caltrans standard 18"x24" sign rather than the 12"x18" size currently in use. The larger format would improve the signs' visibility and provide more space for wayfinding information. These potential benefits should be weighed against the cost and maintenance implications of larger signs.
- Consider using G93 signs on locally designated bikeways. Include the "Bicycle Route Name Marker" supplementary sign on bikeways that are readily identified by name (e.g. "Webster-Shafter").
- Consider the use of the D1 and D11 Series Bicycle Guide Signs developed by the City of Chicago and recommended by the National Committee on Uniform Traffic Control Devices (NCUTCD) in 2006 for inclusion in the MUTCD. These signs build on the common bicycle route sign (G93) to include route name, destination, direction, and distance information.¹

Mountain Biking

Mountain biking is a popular activity in the East Bay Hills, especially in the East Bay Regional Parks as well as the City of Oakland's Joaquin Miller Park. The Oakland Municipal Code 12.60.070 describes the legal requirements for using bicycles on trails under the jurisdiction of the City of Oakland. In particular, it states, "Within city parks, bicyclists can ride on named trails only and are prohibited from operating bicycles off-trail. . . The City Manager, or his or her designees, shall determine trail accessibility for bicyclists." There are currently a number of named trails in Joaquin Miller Park that are accessible to mountain bikers. The mountain biking community seeks to improve and expand that trail access

¹<http://members.cox.net/ncutcdbtc/fall05/bike02-bikeguidesign.pdf>

while other park users have concerns over the use of the park by mountain bikers. Under the auspices of Councilmember Jean Quan, the Joaquin Miller Working Group has been meeting on a regular basis to provide a forum for negotiating these concerns.

There are three primary concerns over the use of bicycles on off-road, unpaved trails: (1) the environmental effects of mountain biking (namely erosion) may be incompatible with some trails and park areas; (2) some feel that hikers should be able to use trails for the park experience without the disruption caused by mountain bikers; and (3) some multi-use trails in their current form do not adequately accommodate hikers, mountain bikers, dog walkers, and equestrians. These concerns are addressed in various ways in the *Open Space, Conservation, and Recreation Element* (OSCAR, 1996) of the City of Oakland's *General Plan*. On one hand, OSCAR Policy OS-1.1 addresses wildland parks and resource conservation areas in which park uses are generally limited to passive recreation. There are concerns that mountain biking is not (or should not be) a form of passive recreation. On the other hand, Policy OS-5.3 on trail design specifies that trails be planned and designed by considering the needs of multiple users (including pedestrians, bicyclists, and persons with disabilities). This policy suggests that, to the extent feasible, trails should be made accessible to diverse groups.

In 2000, the City's Office of Parks and Recreation commissioned "An Assessment of Trails, Watercourses, Soils, and Redwood Forest Health in Joaquin Miller Park, Oakland, California, with Recommendations for Management" (Koehler et al. 2000). The report was motivated by concerns that increased recreational use in the park was causing negative impacts, namely erosion and sedimentation. With respect to the park's maintained trails, the report explains, "Many of these trails were constructed with adequate grade, alignment, and width characteristics. Because of tight compaction and good construction techniques, trails that have gentle gradients and/or bedrock tread material were observed to be relatively resistant to erosion and have few erosion problems. Some trails, however, were constructed with poor grade and alignment characteristics on areas with soft soils" (Koehler et al. 2000, pp. 5-6). These problematic trails include the Cinderella Trail, Upper Palos Colorados Trail, and the Fern Trail (Koehler et al. 2000, p. 26). The report recommends that, in the long term, these trails should be rebuilt with switchbacks and gentler grades to rectify these erosion issues. The report also notes that recreational use is a major source of erosion on "bootleg" trails (trails created by users that are not maintained by the park) and that the use of such informal trails should be actively discouraged through signage and fencing.

This background and policy context suggest an approach to determining bicycle access based on the environmental effects of that access and the ability of particular trails to be designed and built in a manner that safely accommodates multiple user groups. Specifically, the process would need to address bicycle access on existing trails that do not meet current

design guidelines. OSCAR Action OS-5.3.2 calls for the preparation of a Bicycle Trail Plan that has not yet been developed (as of the completion of this *Bicycle Master Plan*). Such a planning process could involve key stakeholders for the various user groups as well as representatives of the environmental issues. The process would develop a trail plan and design guidelines that meet stakeholder needs and are consistent with the General Plan direction provided by the OSCAR policies. Such a plan could be incorporated into a future update of Oakland's *Bicycle Master Plan*, providing more comprehensive policy guidance for accommodating on- and off-street bicyclists in Oakland.

4. Bikeways

The proposed bikeway network includes streets throughout Oakland for bicycle access improvements. It links neighborhoods, commercial districts, downtown, and the major transit stations across the city. The network focuses and prioritizes the implementation of bikeways where they will provide the best connectivity and greatest community benefit. Designated bikeways also improve safety by concentrating cyclists and thereby building awareness amongst drivers to expect cyclists on those streets. The overall goal of the network is to provide safe and convenient bikeways such that the majority of any bicycle trip could be made on a designated facility.

4.1 Bikeway Types

Bikeways are streets or corridors that include either bicycle paths, bicycle lanes, or bicycle routes. These three bikeway types are defined by the California Department of Transportation (Caltrans) in Chapter 1000 of the Highway Design Manual. The California Streets and Highways Code Section 891 states that all local agencies must comply with the minimum design criteria and uniform symbols specified in Chapter 1000. Bikeway design guidelines are provided in Section 4.5.

- *Bicycle Paths (Class 1)* provide for bicycle travel on a paved right-of-way that is completely separated from the street. Bicycle paths are often located along waterfronts, creeks, railroad rights-of-way (active or abandoned), or freeways where there are a limited number of cross streets and driveways that create conflict points. They are typically shared with pedestrians and often called mixed-use paths.
- *Bicycle Lanes (Class 2)* are striped lanes on streets, designated with specific signage and stencils, for the use of bicyclists. Bicycle lanes are the preferred treatment for all arterial and collector streets on the bikeway network. Bicycle lanes should not be installed on low-volume, low-speed residential streets where, because of driveways, bicyclists are safer riding in the middle of the travel lane.
- *Bicycle Routes (Class 3)* designate preferred streets for bicycle travel using lanes shared with motor vehicles. While the only required treatment is signage, bicycle routes are designated because they are suitable for sharing with motor vehicles and provide better connectivity than other streets. The following three bikeway types are

variations on the standard bicycle route (Cupertino 1998, pp. 2-4 to 2-5). These variations provide tools for addressing the following issues that are commonly found in Oakland: (1) limited right-of-way width may preclude adding bicycle lanes; (2) parallel streets may not provide an alternative bikeway alignment; (3) bicycle lanes may not be feasible due to diagonal parking; and (4) neighborhood streets may provide good bicycle connections and could be marked as bikeways.

- *Arterial Bicycle Routes (Class 3A)*: Bicycle routes may be used on some arterial streets where bicycle lanes are not feasible and parallel streets do not provide adequate connectivity. These streets should promote shared use with lower posted speed limits (preferably 25mph), shared lane bicycle stencils, wide curb lanes, and signage.
- *Bicycle Boulevards (Class 3B)*: Bicycle boulevards are bicycle routes on residential streets that prioritize through trips for bicyclists. The route should appeal to cyclists of varied skill levels by providing direct connections on streets with low traffic volumes. The route should reduce delay to bicyclists by assigning right-of-way to travel on the route. Traffic calming should be introduced as needed to discourage drivers from using the boulevard as a through route. Intersections with major streets should be controlled by traffic signals with bicycle actuation.
- *Neighborhood Connectors*: While most of the designated bikeways provide connections *between* neighborhoods, there are numerous streets that currently provide good connections *within* neighborhoods. These streets could be mapped to improve their public visibility without installing the standard bicycle route signage. This map-only designation would provide community benefit through identified routes while allowing the City to focus physical improvements on the other bikeway types that provide the key links in the bikeway network.

4.2 Proposed Bikeway Network

The proposed bikeway network reflects incremental modifications and improvements to the network presented in the 1999 *Bicycle Master Plan*. The 1999 network was evaluated and revised based on the following criteria:

1. *Connectivity*: Connect major transit stations, downtown, commercial districts, neighborhoods, and adjoining jurisdictions with a citywide network of bikeways.
2. *Coverage*: Identify bikeways spaced at one-half mile intervals (on average) to ensure coverage throughout Oakland.

	Bike Path (Class 1)	Bike Lane (Class 2)	Bike Route (Class 3)	Arterial Bike Route (Class 3A)	Bike Boulevard (Class 3B)	Totals
Existing	15.6	19.1	45.5	0.5	0.0	80.7
Proposed	19.0	73.3	4.0	38.4	30.4	165.1
When Completed	34.2	91.0	22.0	38.8	30.4	216.4

Figure 4.1: *Bikeway Network Summary.*

3. *Safety*: Designate arterial and collector streets as bikeways where bicycle lanes, wide curb lanes, or shared lane treatments are feasible.
4. *Convenience*: Select direct connections using the most level streets available.
5. *Ability*: Include a mixture of bicycle paths, lanes, and routes as part of the overall network to support cyclists of differing experience levels.
6. *Feasibility*: Propose bikeways that meet the evaluation criteria in the plan's citywide feasibility analysis.

The resulting network is shown on the map of the "Proposed Bikeway Network" on page 143. Figure 4.1 provides a summary of the total miles by bikeway type included in this network. The following subsection explains the citywide feasibility analysis while narrative descriptions of key bikeways are included in Appendix F.

On average, bikeways spaced at one-half intervals result in four miles of bikeway per square mile of land area, or approximately 220 miles of bikeway throughout Oakland's 55 square miles. Note that the bikeway selection criteria could not be met in all cases. In particular, very few streets in the Oakland Hills meet both the requirements for coverage and convenience. Conversely, the network has more bikeways serving major activity centers including downtown, Lake Merritt, the waterfront, and major transit stations.

Bikeways proposed for implementation may deviate from the alignments specified by the proposed bikeway network in two cases. First, a feasibility study may show that a quality bikeway is infeasible on a particular street included in the bikeway network. In such cases, an alternate alignment in the same corridor may be developed if that alternative would provide a superior bicycle accommodation. Second, bicycle lanes may be included in neighborhood traffic calming projects that narrow or reconfigure travel lanes in order to reduce motor vehicle speeds and improve pedestrian safety. An example of such a project is the bicycle lanes on Santa Clara Ave between Vernon St and Lake Park Ave. This project was not included in the 1999 *Bicycle Master Plan*. It was implemented in 2001 as a traffic calming project and subsequently integrated into the bikeway network as part of the MacArthur Blvd bikeway.

Zone	Area	Average Slope	Maximum Slope	Difficulty
1	Flatlands (below MacArthur Blvd, Broadway, College Ave)	≤ 6%	≤ 8%	≤ 5
2	Lower Hills (below Mountain Blvd, above Flatlands)	≤ 8%	≤ 10%	≤ 15
3	Upper Hills (above Mountain Blvd)	≤ 10%	≤ 12%	≤ 25

Figure 4.2: *Street Grade Analysis.*

Citywide Feasibility Analysis

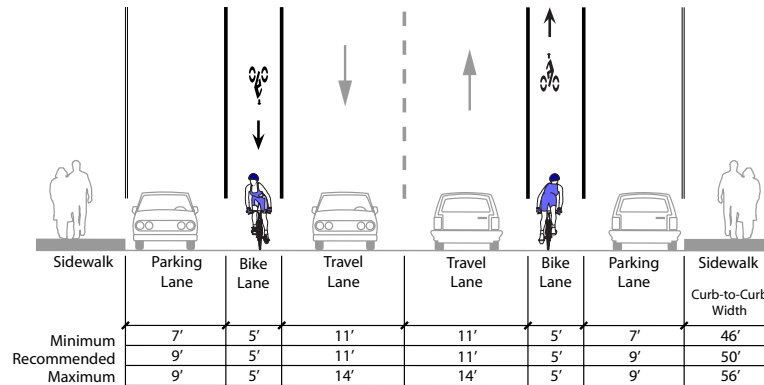
The citywide feasibility analysis applied criteria to all streets on the recommended bikeway network from the 1999 *Bicycle Master Plan* plus a number of additional streets that were evaluated as potential alternatives. Overall, approximately 700 segments of potential bikeway were analyzed. Segments were defined by uniform characteristics including width, lane configuration, and parking configuration. The segments are commonly one-third mile in length although some are as short as one block. The criteria included street grade, curb-to-curb street width, existing motor vehicle volumes, and bicycle/bus interactions to propose bikeway alignments and recommended cross-sections for all arterial and collector streets. The results of the following analyses are included in Appendix H.

- *Street Grade Analysis:* Figure 4.2 provides the guidelines for hills that are appropriate on the bikeway network. For particular streets, the average slope and maximum slope were computed using overlapping GIS layers of the street grid and contour lines. The difficulty factor relates the steepness and length of a given hill through the following expression: (total elevation gain) * slope * slope * 10. This factor accounts for the relationship between steepness and length that shapes overall difficulty. The factor is normalized such that most hills in Oakland have a difficulty between 0 and 40, where the higher numbers indicate more difficult hills. All significant hills on the network were screened by these three criteria: average slope, maximum slope, and overall difficulty. In general, a hill was excluded from the network if it exceeded two or three of the criteria.
- *Street Width Analysis:* The curb-to-curb street width was inventoried for all bikeway segments on collector and arterial streets.¹ The analysis then applied proposed cross-sections based on the following “minimum” lane widths: 7’ parking lanes, 5’ bicycle lanes, 11’ outer travel lanes, 10’ inner travel lanes, and 10’ two-way center turn lanes.

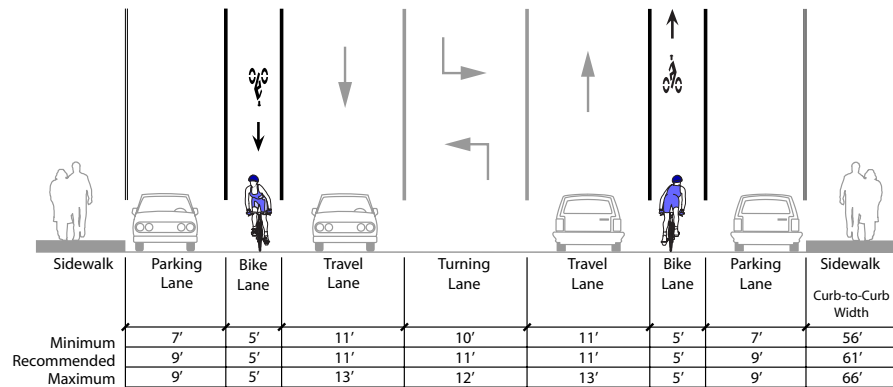
¹The bulk of these data were from high-resolution aerial photographs (four pixels per foot). Additional data were gathered from fieldwork, feasibility studies, and the final design for new and pending projects.

On streets with rapid bus lines, a minimum 11' inner travel lane is necessary. A minimum of 11' is also required for turn lanes used by fixed route bus service. (See Figures 4.3 to 4.6.) In general, the "recommended" lane widths include 11' travel lanes and 9' parking lanes when adjacent to bicycle lanes (to encourage cyclists to ride outside of the door zone). The "maximum" lane widths specify a possible right-of-way allocation for which the next widest cross-section would also be feasible (using the "minimum" lane widths associated with that cross-section). For arterial and collector streets, proposed bikeways without adequate width to accommodate bicycle lanes were either rerouted to parallel streets or identified as Class 3A (shared lane treatment with wide outer lanes).

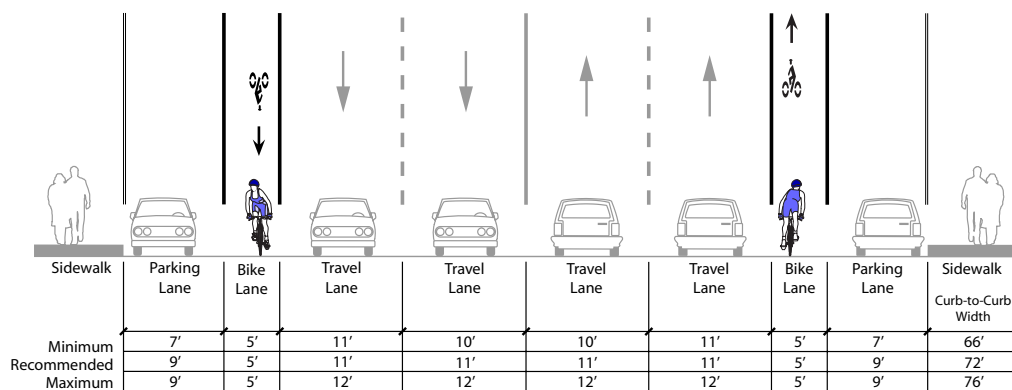
- *Capacity Analysis:* This analysis was completed for all segments in which the proposed cross-section would require the conversion of travel lanes to accommodate bicycle lanes or wide outer curb lanes. (A number of the streets on the bikeway network have enough width to accommodate the proposed cross-section without converting travel lanes.) Peak hour volumes were compared to a threshold based on the service volumes for urban streets specified by the Highway Capacity Manual (Transportation Research Board 2000, p. 10-10). Under the most urbanized conditions (Class IV) operating at a level of service E, each travel lane can be expected to accommodate roughly 800 motor vehicles per hour. This analysis used 1,080 motor vehicles per lane per hour as the capacity threshold, or 135% of the 800 vehicles specified by the Highway Capacity Manual. This threshold is deliberately conservative (i.e., greater than 100%) so that potentially feasible bikeway projects are not eliminated unnecessarily by this citywide analysis. The viability of these borderline cases will be determined through engineering analysis. Thus, the capacity analysis does not determine the ultimate feasibility of such lane conversion projects. Rather, it provides planning-level guidance as to which segments merit an engineering analysis to determine their operational viability. The segments that failed the capacity analysis were either rerouted to a different street or the proposed cross-sections were changed to accommodate the existing motor vehicle volumes.
- *Bicycle/Bus Interactions:* This analysis compared potential bikeways to existing bus routes (AC Transit, Emery-Go-Round, and AirBART) to minimize the complications in both design and operations of having designated bikeways on heavily used transit streets. Based on their headways and ridership, bus lines were categorized by overall importance into a hierarchy of four groups (Figure 4.7). The most important transit streets—those with "rapid/trunk lines" and "major lines"—were avoided where possible and bikeways were designated on parallel streets. Where this solution was



T2 Cross Section: 2 Lane Street, 46'-56' Curb-to-Curb Width
Example (existing): MacArthur Blvd (Lincoln Ave to 35th Ave)

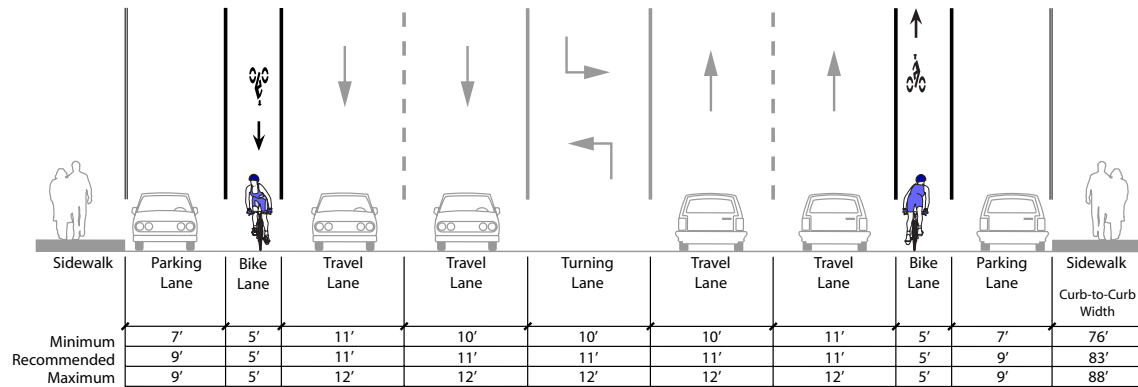


T3 Cross Section: 3 Lane Street, 56'-66' Curb-to-Curb Width
Example (existing): Bancroft Ave (50th Ave to 66th Ave)



T4 Cross Section: 4 Lane Street, 66'-76' Curb-to-Curb Width
Example (existing): Telegraph Ave (Woolsey St to Aileen St)

Figure 4.3: Bikeway Cross-Sections (1 of 4)



T5 Cross Section: 5 Lane Street, 76'-88' Curb-to-Curb Width
 Example (existing): Grand Ave (El Embarcadero to Bay Pl)

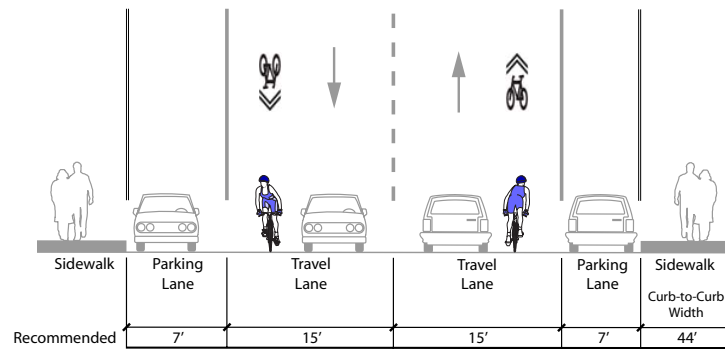
Figure 4.4: Bikeway Cross-Sections (2 of 4)

not possible due to Oakland's irregular street grid, the proposed cross-sections were chosen to minimize potential effects on bus operations. In particular, an effort was made to avoid lane conversions to only one travel lane per direction on rapid/trunk and major lines.

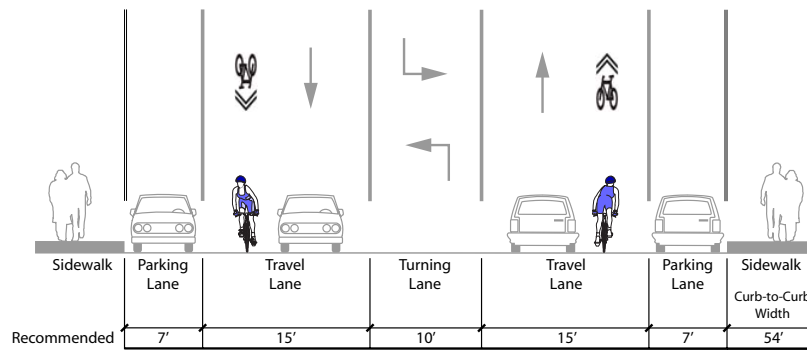
A small number of streets failed the citywide feasibility analysis but were retained as part of the bikeway network because they provide key links for which there are not alternatives. These proposals are retained as long-term projects in that they would likely require major roadway reconstruction. Section F.3 identifies these streets and provides an accompanying explanation of the key issues for each.

4.3 Safe Routes to Transit

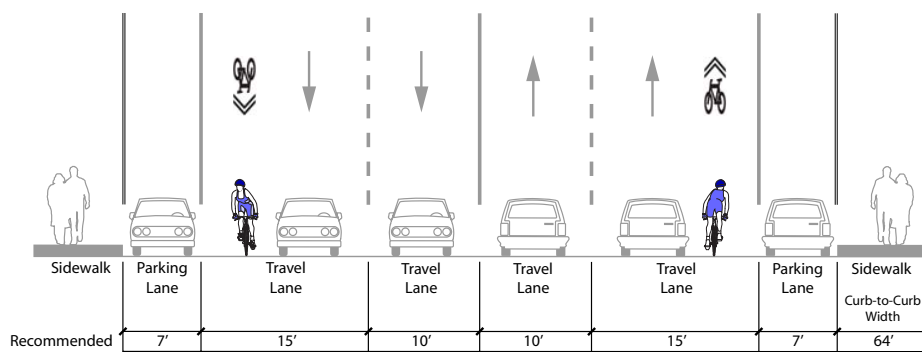
The bikeway network serves as a feeder system to Oakland's major transit stations including BART, the Capitol Corridor, Eastmont Transit Center, and the Alameda/Oakland Ferry. People are generally willing to walk up to one-half mile to a transit station. In comparison, a bicycle ride covering two miles (about 12 minutes) greatly increases the number of destinations that are conveniently accessible by transit. Such a two-mile ride can reach destinations within an area that is sixteen times larger than the area reached by a one-half mile walk. As described in Section 2.4, 31,000 Oakland residents live within one-half mile of a major transit station while 338,000 Oakland residents live within two miles of a major transit station. In fact, many residents live within two miles of multiple transit stations. Bikeways serving these transit stations are thus a priority because of the large number of people that are within easy bicycling distance of high quality transit service.



TS2 Cross Section: 2 Lane Street (Shared Lane), 42'-<46' Curb-to-Curb Width
 Example (proposed): Fruitvale Ave (MacArthur Blvd to Foothill Blvd)

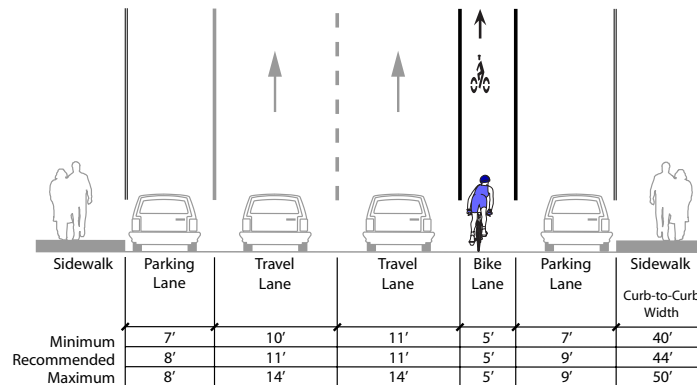


TS3 Cross Section: 3 Lane Street (Shared Lane), 52'-<56' Curb-to-Curb Width
 Example (existing): Foothill Blvd (35th Ave to 41st Ave)

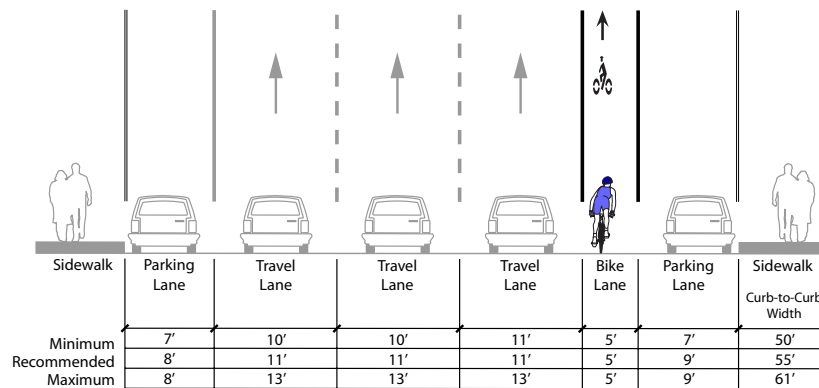


TS4 Cross Section: 4 Lane Street (Shared Lane), 56'-<66' Curb-to-Curb Width
 Example (proposed): MacArthur Blvd (35th Ave to High St)

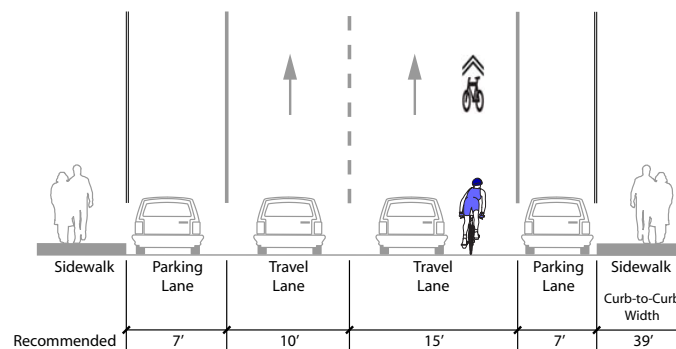
Figure 4.5: Bikeway Cross-Sections (3 of 4)



W2 Cross Section: One-way Two-lane, 40'-50' Curb-to-Curb Width
Example (existing): Bancroft Ave (42nd Ave to 50th Ave)



W3 Cross Section: One-way Three-lane, 50'-61' Curb-to-Curb Width
Example (proposed): Franklin St (20th St to 14th St)



WS2 Cross Section: One-way 2 Lane Street (Shared Lane),
35'-<40' Curb-to-Curb Width
Example (proposed): 9th St (Washington St to Broadway)

Figure 4.6: Bikeway Cross-Sections (4 of 4)

Priority	Service Type	Bus Line	Primary Streets
1	Rapid/Trunk	40/40L	Telegraph Ave, Foothill Blvd, Bancroft Ave, 11th/12th St
		43	Shattuck Ave, Telegraph Ave, Foothill Blvd, 11th/12th St
		51	College Ave, Broadway
		57	40th St, MacArthur Blvd
		72R/72/72M	San Pablo Ave
		82/82L	International Blvd, 11th/12th St
		NL	Grand Ave, MacArthur Blvd, 20th St
2	Major	14	Adeline St, 14th St
		15	MLK Jr Wy, Park Blvd, 11th/12th St
		19	Peralta St
		50	Hegenberger Rd, 73rd Ave, MacArthur Blvd
		53	Fruitvale Ave
		54	35th Ave, Redwood Rd, Campus Dr
		62	7th St, 8th St, 23rd Ave
		88	Market St
		F	Market St
		EM*	40th St
		AB*	66th Ave, Hegenberger Rd
3	Transbay	B, C, CB, E, NX, NX1, NX2, NX3, O, OX, P, V, W, 800	
	Other	7, 11, 12, 13, 45, 46, 47, 48, 56, 59/59A, 63, 98, 801, 802, 805, 840, 851	

Figure 4.7: *Bus Service Types*. *EM = Emery-Go-Round; AB = AirBART.

For each major transit station, the proposed bikeway network includes a bikeway connecting from each of the four directions surrounding the station. These segments are identified as high priority projects for implementation because of their ability to increase transit ridership while connecting cyclists to destinations throughout the region. In many cases, these segments will require careful coordination with AC Transit and shuttle operators because of the heavy bus volumes and localized congestion at major transit stations. This coordination should be a part of comprehensive station area access planning to ensure that the streets surrounding the major transit stations provide superior multimodal accommodations.

4.4 Existing Bikeways

As shown in Figure 4.1 and the map of “Existing Bikeways” (on page 144), Oakland has 80 miles of existing bikeways. Major accomplishments to date include the Grand Ave bikeway, Bancroft Ave bikeway, and on-street portions of the San Francisco Bay Trail (including Mandela Pkwy, 3rd St, and Embarcadero). The majority of the existing bikeways are bicycle routes (Class 3), especially in the Oakland Hills and in downtown. In general, existing bicycle routes below Mountain Blvd are proposed to be upgraded—as feasible—to bicycle lanes (Class 2), arterial bicycle routes (Class 3A), or bicycle boulevards (Class 3B) to improve those bikeways. In a small number of cases, existing bikeways are proposed for relocation to different streets for improved connectivity or better facilities. These proposed modifications to existing bikeways are described in detail in Section F.4.

Major Transit Station	North	South	East	West
Amtrak -- Emeryville	(Emeryville)	Mandela Pkwy, Hollis St, 32nd St	53rd St, 55th St	(Emeryville)
Amtrak -- Jack London Square	Madison St / Oak St	(waterfront)	2nd St, Embarcadero	2nd St
BART -- 12th St	Franklin St / Webster St	Clay St, Washington St	14th St	14th St
BART -- 19th St	Telegraph Ave	Franklin St / Webster St	20th St	20th St
BART -- Ashby	(Berkeley)	Market St	(Berkeley)	(Berkeley)
BART -- Coliseum / Amtrak	66th Ave, Hegenberger Rd	BART to Bay Trail Connector	San Leandro St	San Leandro St
BART -- Fruitvale	38th Ave, Fruitvale Ave	Fruitvale Ave	E 12th St	E 12th St
BART -- Lake Merritt	Madison St / Oak St	Madison St / Oak St	10th St	8th St/9th St
BART -- MacArthur	Telegraph Ave	Telegraph Ave	MacArthur Blvd, 41st St	40th St
BART -- Rockridge	College Ave, Webster-Shafter	College Ave, Webster-Shafter	Chabot Rd, Lawton Ave	Shafter Ave, Cavour St, 55th St
BART -- San Leandro	(San Leandro)	(San Leandro)	(San Leandro)	San Leandro St
BART -- West Oakland	Mandela Pkwy	Mandela Pkwy	7th St	8th St
Eastmont Transit Center	(none)	73rd Ave	MacArthur Blvd	MacArthur Blvd
Oakland/Alameda Ferry	Washington St / Clay St	(waterfront)	2nd St	2nd St, 3rd St

Figure 4.8: *Safe Routes to Transit – Priority Bikeways.*

4.5 Bikeway Design Guidelines

The following guidelines reflect the minimum requirements established by:

- California Department of Transportation (Caltrans). *Highway Design Manual, Chapter 1000: Bikeway Planning and Design.*
- Federal Highway Administration (FHWA). *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD).
- California Department of Transportation (Caltrans). *California Manual of Uniform Traffic Control Devices for Streets and Highways.*

In particular, Section 891 of the California Streets and Highways Code specifies that local agencies must comply with the minimum design criteria provided by Chapter 1000 in the current Highway Design Manual. The following descriptions include the basic parameters that city staff and consultants should address when developing projects with designated bikeways. The design guidelines described herein may change over time as standards are revised by the respective authorities. Definitive documentation is provided by the current versions of the manuals listed above. Other useful references include:

Project	Completion Date	Funding Source(s)	Cost Estimate	Notes
BIKEWAYS				
12th Street Dam-Interim Bicycle Path	2005	TDA Article 3, Measure B	\$100,000	includes staff costs
16th Ave Bikeway Lighting Improvements (E 12th St to Embarcadero)	1998 (Apr)	City	\$40,000	includes staff costs
3rd St Bicycle Lane (Mandela Pkwy to Brush St)	2005 (Dec)	TDA Article 3	\$100,000	
73rd Ave Bicycle Lanes (MacArthur Blvd to International Blvd)	2001	TEA-21, TFCA-Regional	\$250,000	includes staff costs
7th St Bicycle Path (Portview Park to Wood St)	N/A	N/A	N/A	Port of Oakland
8th St Bicycle Lanes (Jefferson St to Broadway)	2005 (Feb)	Urban Development Action Grant	\$15,000	
8th St Bicycle Lanes (Mandela Pkwy to Union St)	2005 (Jun)	CMAQ	\$750,000	Entire project cost including streetscape improvements
8th St Bicycle Lanes (Market St to Union St)	2001 (Sep)	Caltrans/MTC	\$20,000	
8th Street Bicycle Lanes/Bicycle Route (Wood St to Mandela Pkwy)	2005 (Feb)	TLC/TFCA-Local/CMAQ	\$32,000	
Airport Dr Path (Doolittle Dr to Ron Cowan Pkwy)	N/A	N/A	N/A	Port of Oakland
Bancroft Ave Bicycle Lanes (42nd Ave to 66th Ave, 82nd Ave to 98th Ave)	2003	TEA-21, Measure B	\$300,000	includes staff costs
Bancroft Ave Bicycle Lanes (98th Ave to Durant Ave)	2003 (Sep)	TDA Article 3	\$92,483	
Broadway Bicycle Lanes (25th St to I-580)	1998 (Nov)	ISTEA	\$10,000	
City Center/Ferry Bicycle Route Signs	1999 (Feb)	TDA Article 3	\$10,000	includes staff costs
Citywide Bicycle Route Signage Project	2004 (Dec)	TFCA-Local	\$91,514	
Doolittle Dr Bicycle Lanes (Swan Wy to Eden Rd)	N/A	N/A	N/A	Port of Oakland
Embarcadero Bicycle Lanes (Oak St to Kennedy St), Kennedy St Bicycle Lanes (Embarcadero St to 23rd Ave), 23rd Ave Bicycle Route (Kennedy St to 29th Ave)	2004 (Feb)	TEA-21, TDA Article 3, TFCA, Bay Trail RDP	\$1,550,000	entire project cost including sidewalk work and repaving
Foothill Blvd Arterial Bicycle Route (36th Ave to 41st Ave)	2005 (Nov)	Measure B	\$4,286	
Fruitvale Ave Bicycle Lanes (E 12th St to Alameda Ave)	2000	City of Alameda	\$20,000	
Grand Ave Bicycle Lanes (Market St to El Embarcadero) and Harrison St Bicycle Lanes (Grand Ave to 20th St)	2001	TFCA-Local	\$400,000	
John Glenn Rd Bicycle Lanes (Ron Cowan Pkwy to Alan Shephard Wy)	2006 (Jun)	N/A	N/A	Port of Oakland
Lake Merritt Bicycle Path	N/A	N/A	N/A	

Figure 4.9: Bicycle Facility Expenditures (1 of 3)

Project	Completion Date	Funding Source(s)	Cost Estimate	Notes
Lake Merritt Channel Bicycle Path (Lake Merritt Bicycle Path to 4th St Path); 4th St Bicycle Path (4th St to Lake Merritt Channel Path)	early 1980s	N/A	N/A	
Lake Temescal Bicycle Path	2000	Caltrans (mitigation)	\$300,000	
MacArthur Blvd Bicycle Lanes (Lakeshore Ave to Park Blvd)	2004 (Jun)	TDA Article 3, TFCA-Regional, Measure B	\$176,253	
MacArthur Blvd Bicycle Lanes (Lincoln Ave to 35th Ave)	2001	Measure B	\$100,000	includes staff costs
Mandela Pkwy Bicycle Lanes (7th St to 3rd St)	2005 (Apr)	Federal/AMTRAK	\$1,150,000	entire project cost including sidewalk work and repaving
Mandela Pkwy Bicycle Lanes (Horton St to 8th St); Horton St Bicycle Lanes (40th St to Mandela Pkwy)	2005 (Jun)	Caltrans SHOPP	\$750,000	
Market St Bicycle Lanes (57th St to MacArthur Blvd)	2005 (Jan)	TFCA-Regional, Measure B	\$35,000	
Middle Harbor Park Bicycle Path (7th St Bicycle Path through Middle Harbor Shoreline Park)	N/A	N/A	N/A	Port of Oakland
Oyster Bay Bicycle Path (Airport Dr Bicycle Path to Oyster Bay Slough Bridge)	N/A	N/A	N/A	Port of Oakland
Ron Cowan Pkwy Bicycle Lanes and Path (Harbor Bay Pkwy to Airport Dr)	N/A	N/A	N/A	Port of Oakland
Santa Clara Ave Bicycle Lanes (Grand Ave to Vernon St)	2001	Measure B	\$100,000	includes staff costs
Shepherd Canyon Bicycle Path (Saroni Dr to La Salle Ave)	N/A	N/A	N/A	
Telegraph Ave Bicycle Lanes (Woolsey St to Aileen St)	2001	TFCA-Regional & Local	\$141,830	
Waterfront Trail Bicycle Path (Jack London Square to 66th Ave)	In progress	Measure DD		
West Street Bicycle Lanes (MacArthur Blvd to W Grand Ave)	1997	General Fund	\$20,000	
BICYCLE PARKING				
City Administration Building Bicycle Parking Cage	1998 (Dec)	TFCA-Regional	\$108,490	includes staff costs
CityRacks I (bicycle racks)	1999 (Nov)	TFCA-Regional, TFCA-Local	\$36,650	includes staff costs
CityRacks II (bicycle racks)	2001 (Sep)	TFCA-Regional	\$21,393	includes staff costs
CityRacks III (bicycle racks)	2002 (Dec)	TFCA-Regional, TFCA-Local	\$23,429	includes staff costs
CityRacks IV (bicycle racks and lockers)	2006 (Sep)	TFCA-Regional, Measure B	\$80,000	includes staff costs
Downtown Bicycle Parking Bike Racks	1994	TFCA-Local	\$25,000	includes staff costs
Frank H. Ogawa Plaza Bike Racks	1999 (Aug)	TFCA-Local	\$7,000	

Figure 4.10: Bicycle Facility Expenditures (2 of 3)

Project	Completion Date	Funding Source(s)	Cost Estimate	Notes
Fruitvale BART Bikestation	2004 (Nov)	BTA, TFCA-Regional	\$1,200,000	joint BART, Unity Council, and City project; includes staff costs
Parks and Recreation Centers Bike Racks	1998 (Nov)	TFCA-Local	\$5,000	
EDUCATION AND OUTREACH				
Bike-to-Work-Day, 1994-2006	annual event	General Fund	\$1,000	
CarFree Day, 2004-2006	annual event	General Fund	\$500	
Commuter Kiosk	1998	TFCA-Local	\$37,500	includes staff costs
Downtown Oakland Bicycle Parking Map	1998 (Nov)	General Fund	\$500	
Earn-A-Bike Program	ongoing	OTS, General Fund	\$60,000	FY04-06
GIS Bicycle Mapping Project	ongoing	Measure B	\$1,000	staff costs only

Figure 4.11: Bicycle Facility Expenditures (3 of 3)

- American Association of State Highway and Transportation Officials (AASHTO). 1999. *Guide for the Development of Bicycle Facilities*.
- California Department of Transportation (Caltrans). 2005. *Pedestrian and Bicycle Facilities in California*.
- Institute of Transportation Engineers (ITE). 2002. *Innovative Bicycle Treatments*.
- San Francisco, City of. 2003. *Bicycle Plan Update: Supplemental Design Guidelines*.
- Santa Clara Valley Transportation Authority (VTA). 1999. *VTA Bicycle Technical Guidelines*.

All traffic modifications in the public right-of-way are subject to review by the Transportation Services Division. Where feasible, all bikeway pavement markings should be constructed using thermoplastic paint or thermoplastic tape to maximize visibility and minimize long-term maintenance costs.

Bicycle Paths (Class 1) provide for bicycle travel on a paved right-of-way that is completely separated from the street.

- **Width:** Paths shall be at least 8' in width and include 2' graded shoulders on either side. A wider path may be substituted for the graded shoulders. All obstructions (including poles, benches, and architectural elements) should be at least 2' from the edge of pavement. *Oakland Practice:* Develop paved paths of at least 12' in width

to reduce bicyclist/pedestrian conflicts and to avoid the maintenance associated with graded shoulders.

- *Alignment:* The bicycle paths included in the proposed bikeway network illustrate the proposed linkages that these paths would contribute to the overall network. The alignment of any particular path would be determined by project development and analysis that would consider site-specific circumstances including right-of-way and topography. All bicycle paths shall be designed, to the extent feasible, to avoid adverse environmental effects on water resources, biological resources, hazardous materials, and cultural resources.
- *Lateral Separation:* When a path parallels a roadway, there must be at least 5' of lateral separation between the edge of the paved path and the edge of the roadway (typically the face of curb). A path's graded shoulder may be counted as part of this lateral separation. A vertical barrier may be used in lieu of the lateral separation.
- *Design Speed and Curve Radius:* Class 1 Bicycle Paths require a minimum design speed of 25mph and a minimum curve radius of 155'. *Oakland Practice:* In areas with significant pedestrian activity—and where it is not possible to separate pedestrians and bicyclists—develop multi-purpose trails with a minimum design speed of 12mph and a minimum curve radius of 36'. In such locations, accommodate faster moving cyclists with a parallel on-street bikeway where feasible.
- *Striping:* Bicycle paths may include yellow center lines to separate directions of travel or white lines to separate different types of users. White edge lines may also be used if the path's paving is contiguous with a fixed object of extended length (like a retaining wall). *Oakland Practice:* Include striping to delineate the two directions of bicycle travel only when a separate pedestrian path is provided. In other cases, limit the use of striping to tight turns, blind corners, intersection approaches, and other spot locations where conflicts may occur.
- *Cross Streets and Driveways:* Paths should cross as few streets and driveways as possible to reduce conflicts between cyclists and drivers. Where such street crossings are necessary, significant attention should be given to maximizing sight lines for both drivers and cyclists. Driveways should be designed to maximize sight lines and minimize driver speeds.
- *Bollards:* Minimize the use of bollards to avoid creating obstacles for bicyclists. The California supplement to the MUTCD explains, "Such devices should be used only where extreme problems are encountered" (Section 9C.101-CA). Instead, design the

path entry and use signage to alert drivers that motor vehicles are prohibited. Where a bollard is deemed essential for restricting motor vehicle access, the bollard should be marked with reflectors or reflective tape and include a diamond-shaped envelope striped around its base. Where removable bollards are used, the mount point should be flush with the path's surface so as not to create a hazard when the bollard is not in place.

Bicycle Lanes (Class 2) are on-street, striped lanes for specific use by bicyclists. They are the recommended bikeway type, where feasible, for arterial and collector streets on Oakland's bikeway network. Bicycle lanes are recommended over wide curb lanes because they discourage sidewalk and wrong-way riding while reducing bicyclist/pedestrian conflicts. Compared to wide curb lanes, bicycle lanes also decrease the frequency of drivers encroaching into the adjoining travel lane when passing bicyclists (Hunter et al. 1999).

- *Width*: With parallel parking, the bicycle lane must be at least 5' wide and the parking lane at least 7' wide. Without parallel parking, a minimum 4' bicycle lane is allowed if at least 3' is clear of the gutter pan. On roadways without curb and gutter, a minimum 4' bicycle lane is allowed. *Oakland Practice*: Where width allows, use 8-9' parking lanes adjacent to bicycle lanes to reduce the risk associated with the door zone.
- *Hills*: Bicycle lanes should be avoided if the steepness and length of a downhill grade will allow a typical cyclist to travel at the prevailing traffic speed. In such cases, the shared roadway bicycle marking (sharrow) should be provided to encourage cyclists to use the full travel lane, thereby reducing conflicts with vehicles entering traffic from cross streets, driveways, and parking spaces. See the design guidelines for arterial bicycle routes (Class 3A).
- *Signage*: Bicycle lanes require the following regulatory signage: R81 (Bike Lane) signs shall be placed at the beginning of each bicycle lane and along its length at every arterial cross street, all major directional changes, and at a maximum 1/2 mile intervals. The R81A (Begin) and R81B (End) supplemental signs are recommended, respectively, in conjunction with the R81 at the beginning and end of the bicycle lane. See also the explanation of guide signage below. *Oakland Practice*: Always use the R81B to alert road users where bicycle lanes end.
- *Stencils*: The bicycle symbol and arrow stencil shall be placed in the bicycle lane on the far side of each intersection. *Oakland Practice*: Oakland uses the bicycle symbol rather than the "bike lane" stencil because the symbol is more intuitive and does not

require familiarity with the English words. *Oakland Practice*: Encourage cyclists to ride outside of the door zone by locating the bicycle symbol to the left side of the bicycle lane (leaving 4" from the symbol edge to bicycle lane stripe). *Oakland Practice*: To minimize maintenance, locate the bicycle symbol and arrow stencil approximately 15' beyond the curb return of the intersection and thereby outside the path of turning vehicles.

- *Intersection Approaches*: Bicycle lanes should be continuous from one intersection to the next. In some cases, it is necessary to drop the bicycle lane at an intersection approach in order to accommodate additional travel lanes for motor vehicle queuing. To the extent feasible, this design should be avoided in favor of continuous bikeways.

Bicycle Routes (Class 3) are preferred streets for bicycle travel using lanes shared with motor vehicles. The only requirement for bicycle routes is that they be marked with guide signs. However, the Highway Design Manual (1000-24) specifies that "bike routes should offer a higher degree of service than alternative streets" and that service may be achieved through traffic control devices that prioritize bicyclists, higher maintenance standards, and the like. *Oakland Practice*: Maintain a strong presumption in favor of bicycle routes with additional improvements following the guidelines for arterial bicycle routes (Class 3A) and bicycle boulevards (Class 3B). In general, limit the use of signage-only bicycle routes (Class 3) to recreational routes in the Oakland Hills above Mountain Blvd. For these recreational routes, include shoulder improvements where feasible.

Bicycle Routes – Arterials (Class 3A): Arterial bicycle routes are a compromise treatment for arterial and collector streets where the available street width does not allow for bicycle lanes and parallel streets do not provide viable alternatives. This bikeway type should only be used in cases where bicycle lanes are infeasible for the foreseeable future. While this bikeway type is not specifically identified by the Highway Design Manual, the following design guidelines meet Caltrans standards.

- *Width*: On multi-lane roadways, the lane striping should maximize the width of the outside lane that will be shared by bicyclists and drivers. A 14' travel lane adjoining a 7' parking lane is acceptable while a 15' lane is desirable. Narrower shared lane facilities are acceptable only if no other alternative exists. A bicycle lane should be used where the outside lane (with parking prohibited) is 15' or more. If parallel parking is permitted, a bicycle lane should be used where the outside lane is 16' or more (plus a minimum of 7' for the parking lane).
- *Stencils*: The shared roadway bicycle marking (sharrow) consists of a bicycle symbol and two chevrons. It should be used on designated bikeways with parallel parking

and without bicycle lanes. The stencil guides bicyclists to ride outside of the door zone and alerts drivers to share the lane with bicyclists. *Oakland Practice:* For each direction of travel, place a minimum of two sharrows on a 250-foot block with additional sharrows used on longer blocks. Locate the sharrow at a minimum distance of 11.5' from the curb. A travel lane plus parallel parking of less than 21' in width is too narrow for a bicyclist to share side-by-side with a driver and stay clear of the door zone. In such situations, the sharrow should be placed at the center of the travel lane to indicate that bicyclists should take the lane.

- *Signage:* Travel lanes of less than 14' (with parallel parking) and 13' (without parallel parking) do not provide adequate width for a bicyclist to ride clear of the door zone or standard gutter and safely share the lane with passenger cars. In such cases, bicyclists should ride in the center of the travel lane such that drivers pass in the adjoining lane or wait for the cyclist to clear the bottleneck. To facilitate these interactions, such roadway conditions may be accompanied with a regulatory sign that reads "Bicyclists May Use Full Lane." This sign is explained below under "Nonstandard Treatments."
- *Speed Limits:* To safely accommodate bicyclists, the recommended speed limit on arterial bicycle routes is 25mph. Section 627 of the California Vehicle Code allows bicyclist safety to be used as a factor in establishing speed limits. *Oakland Practice:* Consider the safety of bicyclists when setting speed limits on arterial bicycle routes.

Bicycle Routes – Boulevards (Class 3B): Bicycle boulevards are bicycle routes on residential streets that prioritize through trips for bicyclists. While this bikeway type is not specifically identified by the Highway Design Manual, the following design guidelines meet Caltrans standards.

- *Stencils:* Like the arterial bicycle routes, use the shared roadway bicycle marking (sharrow) to identify designated bikeways. In addition to promoting lane sharing, the sharrows also provide a significant wayfinding benefit for bicycle routes in neighborhoods with irregular street grids.
- *Intersection Control:* Where feasible, modify stop signs and traffic signals to prioritize bicycle travel along the bicycle boulevard. In particular, minimize the number of intersections where cross traffic does not stop. Such modifications to intersection control shall be contingent on an engineering analysis of operations and safety.
- *Traffic Calming:* Consider bicycle-friendly speed humps, traffic circles, and partial street closures on bicycle boulevards with speeds and/or volumes of motor vehicle

traffic that are incompatible with the bicycle route and the character of the residential street.

Additional Guidelines

Bicycle Signals: This traffic control device is used in conjunction with standard traffic signals to provide a separate phase for bicyclists. It uses green, yellow, and red lighted bicycle symbols to direct bicycle traffic. The California Supplement to the MUTCD provides a warrant for these signals based on traffic volumes, collision history, and geometric factors (Section 4C.103). For example, candidate locations may include intersections where a legal bicycle movement is not allowed for motor vehicles (like where a bicycle path crosses a street). In general, a bicycle signal should be considered only if other solutions involving signing, striping, and geometrics do not adequately address the issue (Section 4D.104).

Construction Zones: Bicyclist safety and access shall be considered in the staging of construction zones that encroach on the public right-of-way or require detours. Special consideration should be given to construction zones that affect designated bikeways. Detour plans should avoid directing cyclists onto arterial or collector streets with narrow travel lanes (less than 14') when no other accommodation is provided. For bicycle paths, consider a temporary path or an on-street detour. For on-street bikeways, temporary bicycle lanes may be delineated by cones so long as the clear width is at least five feet. If a bicycle lane is closed, additional signage should be considered including the "Bicycles May Use Full Lane" sign described below.

Curbside Parking:

- *Diagonal Parking:* The common form of diagonal parking (head-in/back-out) is incompatible with bicycle lanes and a general source of conflict with bicyclists. When backing out, drivers have limited views of oncoming traffic and bicyclists riding on the right side of the travel lane have little time to react. *Oakland Practice:* Avoid head-in/back-out diagonal parking adjacent to bicycle lanes and minimize its use on designated bikeways. See also "Diagonal Parking" under "Other Treatments."
- *Parallel Parking:* Parking space markings (often called parking T's) are typically used to delineate curbside parallel parking spaces in areas with parking meters or consolidated pay stations. *Oakland Practice:* Oakland's standard parking T is 2' (parallel to the curb) by 3' (perpendicular to the curb). On designated bikeways with metered parking, use elongated parking T's such that the perpendicular line extends 2' into the travel lane. These design considerations help cyclists identify and ride clear of the door zone.

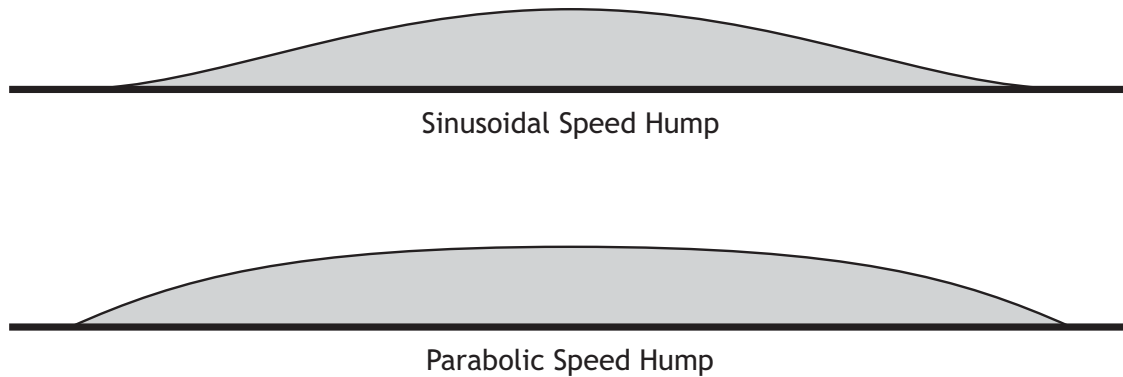


Figure 4.12: *Speed Hump Profiles*. Sinusoidal speed humps provide a smoother ride for bicyclists by eliminating the abrupt lip associated with parabolic speed humps. Both profiles are effective for reducing motor vehicle speeds.

Guide Signage: To date, Oakland has used a combination of “Bike Route” signs (G93) and “Bicycle Route Number Marker” signs (SG45) to designate bikeways and provide wayfinding information. There are various strengths and weaknesses to this approach regarding maintenance, general visibility, and the information provided by the signs. Because of these outstanding issues, there was a lack of agreement at the time of this planning process on how best to provide guide signage with future projects. Thus the plan does not include new recommendations regarding guide signage. This topic is discussed in detail in Section 3.3. In general, all guide signage should comply with MUTCD standards regarding placement, size, symbols, colors, and fonts.

Speed Humps: Speed humps on bikeways should be designed to slow motor vehicles while minimizing the disruption to bicyclists. Bicyclists feel the lip of the hump—the edge of the paving where the hump meets the street—as an abrupt jolt. The height of the hump has comparatively little impact because of the typical speed of bicyclists on residential streets. While drivers feel the height of the hump, they do not feel the abrupt lip because of the cars’ greater shock absorbency. Bicycle-friendly speed humps eliminate this lip by providing a smooth transition from street to hump and thus provide a smooth ride. Such humps still have the intended affect of slowing motor vehicles because the height of the hump remains the same. More specifically, bicycle-friendly speed humps have a sinusoidal profile whereas the abrupt lip is created by speed humps with parabolic profiles. While sinusoidal speed humps are more difficult to install, the installation of speed humps on bikeways should seek to minimize this lip by providing a smooth pavement transition (Transport Research Laboratory).

Traffic Signals: Where feasible, traffic signals should accommodate bicyclists by providing (a) bicycle actuation (with loop detectors or video detection); and (b) an adequate

clearance interval for cyclists to clear intersections. “On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists” (Federal Highway Administration 2004, 9D.02). Signals on existing bikeways should be prioritized for these modifications. In Oakland, video detection is used with all new signals and to replace failed loop detectors. The installation of video detection may require other signal modifications to meet industry and City of Oakland standards. Where bicycle-sensitive loop detectors remain in use, they should be accompanied by the bicycle detector pavement marking for each intersection approach (California Department of Transportation 2006a, Figure 9C-7). For multi-lane approaches like double left turn lanes, the right-most lane should be marked to encourage proper bicyclist positioning. The following sources provide methods for calculating adequate clearance intervals for bicyclists:

- American Association of State Highway and Transportation Officials. 1999. *Guide for the Development of Bicycle Facilities*, pp. 64-65.
- Wachtel, Alan, John Forester, and David Pelz. 1995 (March). Signal Clearance Timing for Bicyclists. *ITE Journal*, pp. 38-45.

The implementation of all traffic signal modifications is contingent on need, priority, feasibility, and funding as determined by the Transportation Services Division.

Transit Streets: Coordinate the installation of bikeways on transit streets with signage and striping modifications that would improve bus operations. In particular, work with AC Transit to identify bus stops that would benefit from additional red zone length or stop relocation (especially the conversion of near-side to far-side stops). Integrate these changes with the design of the bikeways to develop more holistic projects for improving bicycle/bus corridors.

Other Treatments

The following treatments have not been specifically approved as traffic control devices. Some of these treatments are currently under consideration for approval and others may be appropriate in particular circumstances based on engineering judgment. All of the treatments are being used successfully in other US cities. In particular, the MUTCD explains, “Regulatory word message signs other than those classified and specified in this Manual and the ‘Standard Highways Sign’ book may be developed to aid the enforcement of other laws or regulations. Except for symbols on regulatory signs, minor modifications in the design may be permitted provided that the essential appearance characteristics are met” (Federal Highway Administration 2004, 2B.54). As with all proposed roadway modifications,

implementation of the following treatments is subject to the evaluation and determination of the Transportation Services Division on a case-by-case basis.

“Bicycles May Use Full Lane” Signs: The California Vehicle Code 21202 allows bicyclists to ride in the center of a travel lane when that lane is too narrow to safely share with passing motor vehicles. The proposed “Bicycles May Use Full Lane” Sign (R4-11) is intended to alert road users to this law and encourage bicyclists to ride outside of the door zone on streets with narrow lanes. As of this writing, the sign is under consideration by the National Committee on Uniform Traffic Control Devices.² Consider using this sign at regular intervals on arterial bicycle routes (Class 3A) where the curb lane plus parking is less than 21’ in width. This signage should only be used on bikeway segments where the curb-to-curb right-of-way cannot accommodate a bicycle lane or an outer travel lane of at least 14’ in width. Narrow travel lanes generally provide poor bicyclist accommodation and the proposed bikeway network was developed to minimize the instances of narrow lanes to be shared by bicyclists and drivers. On the proposed network, the segments of arterial bicycle routes with narrow lanes provide key connections and could include this sign, in conjunction with the shared roadway bicycle marking (sharrow), to improve bicyclist safety.

Bike Boxes (Advance Stop Lines): This treatment may be used to improve the visibility and positioning of bicyclists at signalized intersections with heavy turning movements. It uses an advance stop line to create a “box” between the crosswalk and where motor vehicles stop at a red traffic signal. During the red phase, bicyclists are allowed to proceed to the head of the queue and position themselves in the bike box for their desired movement through the intersection. During the green phase, bicyclists use the standard lanes that correspond to their respective movements. Bike boxes may be marked with bicycle stencils, color pavement, and/or regulatory signage indicating that drivers must stop behind the advance stop line while bicyclists may stop in the bike box (Ridgeway and Nabti 2002; San Francisco 2003).

Blue Bike Lanes: This treatment marks the conflict area created by turning vehicles merging across a bicycle lane (typically associated with slip turns, on-ramps, and off-ramps). Such turning movements create difficult situations for bicyclists because of the high vehicle speeds and poor visibility associated with these merges. By making the bicycle lane blue in such locations, bicyclists and drivers are alerted to the specific conflict area. This treatment is used successfully in Portland, OR based on its more extensive use in European cities (Hunter 2000b; Portland 1999).

Combined Bicycle Lane/Right-Turn Lanes: This design applies to intersection approaches

²<http://members.cox.net/ncutcdbt/bike01-bmufl.pdf>

where a dedicated right turn lane is deemed necessary and there is not adequate right-of-way to continue the bicycle lane along the left side of the right turn lane. In such cases, the bicycle lane often ends before the intersection to accommodate the turn lane. This approach creates difficult situations for cyclists who must either merge left into the adjoining travel lane or proceed straight through the turn lane and thus violate the law. In contrast, the combined bicycle lane/right-turn lane allows bicyclists to legally proceed straight by delineating these overlapping movements with specific striping and signage (Hunter 2000a; San Francisco 2003).

Diagonal Parking (back-in/head-out): As described under “Additional Guidelines” above, the common form of diagonal parking (head-in/back-out) is incompatible with bicycle lanes and a general source of conflict on bikeways. A number of cities have installed back-in/head-out diagonal parking to eliminate these conflicts (Nelson Nygaard Consulting Associates 2005). Drivers pulling out of such parking spaces can readily see oncoming traffic and make eye contact with approaching bicyclists. The installation of back-in/head-out diagonal parking in Oakland may require a modification to the Oakland Municipal Code 10.28.060 which restricts back-in parking for loading and unloading.

5. Parking and Support Facilities

The bicycle is a viable means of transportation when physical accommodations ensure that people's trips are safe and convenient and that their property is secure. Every bicycle trip includes the route of travel and the facilities at the destination. These facilities include various types of bicycle parking as well as restrooms, showers, and lockers. Bicycle parking is critical because many people's decision to bicycle is affected by security concerns for their property. Shower and locker facilities are a key incentive for people with longer commutes who can turn their ride into a daily workout and still dress for the office.

5.1 Facility Types

There are three main types of bicycle parking and support facilities that serve a variety of cyclists and trip types.

Long-term Bicycle Parking (Class 1 Parking) serves people who frequently leave their bicycles at the same location for the day or overnight. Examples include commuters parking their bicycles at work, school, or transit and residents parking their bicycles at home. These facilities should provide superior security and protection from the weather. Long-term bicycle parking includes the following:

- Bicycle lockers are enclosed storage units that each store one bicycle. Traditionally, these lockers have been assigned to individual users who have a personal locker with a dedicated key. Recently, lockers are being designed for electronic access cards (or access via cell phone) such that multiple users—one after the next—can each access an available locker.
- Bicycle cages are secure rooms of bicycle racks where access is limited to authorized individuals. Bicycle cages are commonly located in parking garages or on school grounds.
- Bicycle stations provide attendants who check in bicycles and store them in secure facilities. Stations are often integrated with retail concessions offering bicycle supplies and repair services. Some bike stations are open outside of the attendants' work hours to registered members with electronic access cards.

Short-term Bicycle Parking (Class 2 Parking) serves people who leave their bicycles for relatively short periods of time, typically for shopping, recreation, eating, or errands. The

parking must be conveniently located at the destination to effectively serve these short trips. Short-term bicycle parking includes the following:

- Bicycle racks allow cyclists to securely lock their frames and wheels to a fixed object. The racks are secured to the ground and should be located in visible areas with significant foot traffic. Racks are most often found in commercial districts and at particular destinations like civic buildings, parks, and transit facilities.
- Valet bicycle parking works like a temporary bike station to provide added parking capacity at major events like street fairs, festivals, and sports games. People check their bicycles with an attendant who then stores the bicycles in a temporary corral.

Support Facilities include showers, lockers, and restrooms for changing clothes and storing belongings. Showers are important for those who must dress in more formal attire or who have a more rigorous commute. Lockers provide a place for cyclists to store clothing and accessories during the workday.

5.2 Existing and Proposed Facilities

The installation of new bicycle parking by the City of Oakland should be prioritized to serve: (1) transit stations and major activity centers; and (2) citizen and merchant requests. Bicycle parking should also be included in all public infrastructure improvements including streetscape projects and new buildings. In particular, secure bicycle parking at transit stations is a key strategy for promoting both cycling and transit use. Because bicycle parking is space efficient and cost effective, it is integral to Oakland's emphasis on transit-oriented development.

Long-term Bicycle Parking (Class 1 Parking)

- Bicycle lockers are currently located at Oakland BART Stations and the Caltrans Fruitvale/Champion Park & Ride Lot. The City of Oakland installed electronic lockers on Broadway at 14th St and 20th St to serve the 12th and 19th St BART stations.
- Bicycle cages are available to employees in some of the larger office buildings in downtown. Examples include 250 Frank Ogawa Plaza (City of Oakland), 300 Lakeside Dr (BART), and 1111 Franklin St (University of California). A bicycle cage is also planned for Roosevelt Middle School (Oakland Unified School District). Bicycle cages are the primary means for new development to meet the long-term parking requirements described in the following section.

- Bicycle stations are currently in operation in the Bay Area at Fruitvale BART, Berkeley BART, Embarcadero BART, and the Palo Alto Caltrain Station. The most likely location in Oakland for the next bike station is MacArthur BART.

Short-term Bicycle Parking (Class 2 Parking)

- Bicycle racks: Since 1999, the City of Oakland has installed over 850 racks through the CityRacks bicycle parking program. These racks—accommodating over 1,700 bicycles—are located on sidewalks as well as at parks, libraries, and other public facilities. Racks are installed based on citizen and merchant requests and, in most cases, require the approval of the adjacent property owner. The racks are installed free of charge and have been funded by the Transportation Fund for Clean Air, Measure B, and Transportation Development Act Article 3.
- Valet bicycle parking: The East Bay Bicycle Coalition regularly provides valet bicycle parking at Oakland events including PortFest, Bike to Work Day, and Dia de Los Muertos. The service is free to event attendees. The parking should be located in a visible and convenient location with sufficient space for the anticipated demand. All marketing materials should promote the service and also indicate its location at the event.

Additional information on bicycling parking at BART stations is available from the BART planning documents that are listed in Section C.4. As of this writing, AC Transit is preparing a bicycle parking plan to prioritize locations and facility types for the installation of bicycle parking at transit centers and along major bus lines.

Support Facilities

Map H.5 on page 145 shows the location of bicycle parking and support facilities. Existing shower facilities are located in City Center Plaza, Elihu Harris State Building, and the Dalziel Building.

5.3 Bicycle Parking Ordinance

As part of the City of Oakland's plan review process conducted by the Planning & Zoning Division, developers are required to provide an adequate amount of automobile parking to accommodate proposed development projects. Many cities have also incorporated requirements into their planning codes to ensure that adequate bicycle parking is provided. The 1999 *Bicycle Master Plan* included a draft ordinance that was never adopted. This draft

Transportation Hub	Rack Spaces	Locker Spaces	Bike Station Spaces
Amtrak -- Jack London Square	10	0	0
Amtrak -- Coliseum	6	0	0
BART -- 12th St (1)	26	8	0
BART -- 19th St (1)	12	8	0
BART -- Coliseum	63	2	0
BART -- Fruitvale	56	38	236
BART -- Lake Merritt	52	25	0
BART -- MacArthur	84	30	0
BART -- Rockridge	133	56	0
BART -- West Oakland	91	8	0
Caltrans Park & Ride -- Fruitvale/Champion	4	10	0
Caltrans Park & Ride -- 7th/Linden	0	0	0
Eastmont Transit Center	0	0	0
Oakland/Alameda Ferry	4	0	0

Figure 5.1: *Bicycle Parking at Transportation Hubs.* (1) The bicycle parking at the 12th and 19th St BART stations is located at street level in the City of Oakland's right-of-way.

will be revised based on a comparison with the parking requirements of similar cities. The proposed ordinance will be taken to City Council as a separate item from the resolution to adopt the updated *Bicycle Master Plan*.

5.4 Parking Design Guidelines

The following guidelines summarize the City of Oakland's "Bicycle Parking Placement Guidelines" (October 2004), the recommendations of the Association of Pedestrian and Bicycle Professionals' "Bicycle Parking Guidelines" (2002), and the City of Oakland's "Event Bike Parking Requirements, Guidelines, and Resources."

Bicycle Racks (Class 2 Parking) should be located within 50 feet (and no more than 120 feet) of the destination they serve. They should be placed in a visible area with significant foot traffic and, if possible, under an awning to provide protection from the weather. Such an awning is generally not possible with sidewalk installations.

- **Rack Type:** Inverted "U" racks are strongly recommended because they provide two points of contact with the bicycle and allow the frame and both wheels to be locked to the rack. Inverted "U" racks may include multiple loops fastened to a single "footer." This design is required for racks mounted on a surface other than concrete (including asphalt, brick, and pavers). Racks that only support one wheel (including comb, toast, and school-yard types) are not acceptable. Wave racks are strongly discouraged because they do not provide two points of contact and the middle spaces can be difficult to access. (Wave racks may be acceptable in some cases where multiple

Measurements

Footprint: 6' long x 2.5' wide (the area occupied by a bicycle when parked at the rack)

Rack: 36" tall x 21" wide

Location Details

● Commercial District

● On public property

● With business owner's permission

● On a flat concrete sidewalk

● Sidewalk must be free from cracks or other damage

Clearance

There should be a minimum of 5.5' clear for pedestrian right-of-way outside of the footprint; 7' in areas of heavy pedestrian traffic. Rack should be located a minimum of:

5' from:	Fire Hydrant		
4' from:	AC Transit Red Zone	Blue Zone (disabled parking)	Crosswalk
	Loading Zone	Curb Ramps	BART Entrance
3' from:	Newspaper Racks	Bus Shelter	Standpipes
	US Mailbox	Driveway	Bus Benches
	Light Pole	Surface Hardware (utilities)	Trash Cans
	Sign Pole	Street Furniture	Other sidewalk obstructions
18" from:	The Curb		

Figure 5.2: *Placement Standards for Bicycle Racks.* City of Oakland, Public Works Agency, Bicycle Parking Guidelines (Oct 2004).

“U” racks cannot be installed because of limited space.) Any non-standard rack or installation shall be approved by the City of Oakland’s Bicycle and Pedestrian Coordinator prior to installation.

- **Rack Clearance:** Racks should be located with at least 30” of clearance in all directions from all vertical obstructions, including other racks and landscaping. Additional spacing requirements mandating 3’ to 5’ of clearance are specified in the “Bicycle Parking Placement Guidelines.”
- **Pedestrian Right-of-way:** When parked at a rack, a bicycle occupies a footprint that is 6’ long and 2.5’ wide. Rack installations on sidewalks should maintain a minimum of 5.5’ of unobstructed pedestrian right-of-way outside of this footprint. For sidewalks with heavy pedestrian traffic, at least 7’ of unobstructed right-of-way is required.

Bicycle Lockers (Class 1 Parking) should also be located in convenient and visible locations. Compared to racks, lockers provide superior security but require additional space.

- **Locker Type:** All bicycle lockers located in the public right-of-way shall be multi-user electronic lockers. Lockers in the public right-of-way shall not be leased to individuals for their exclusive use.

- *Locker Clearance:* A single wedge-shaped locker is approximately 6.5' long and 3' wide. Lockers may be stacked against each other to form rectangular blocks, semi-circles, or full circles. For example, two lockers may be stacked to form a rectangle of 6.5' in length and 3' in width. Additional clearance is needed to accommodate the doors (of approximately 2.5' in width) that are hinged to swing outwards.
- *Pedestrian Right-of-way:* Locker locations should be selected on a case-by-case basis because of the multiple possible configurations, the necessary clearance for their doors, and potential sight line issues created by the lockers' massing. As a rule of thumb, sidewalk installations should maintain a minimum 7.5' of unobstructed pedestrian right-of-way from the face of locker doors. When the 2.5' door is entirely open, this spacing would allow 5' of clearance for pedestrian circulation and room to maneuver a bicycle into the locker.

Bicycle Cages (Class 1 Parking) are most appropriate in parking garages and on school grounds. They should be located near entrances in visible locations, especially when included in parking garages.

- *Cage Size:* For security purposes, small cages are preferred to limit the number of people with access to any single cage. Multiple small cages should be considered for high-demand locations. For example, a single cage of 18' x 20' occupies the same footprint as two standard parking stalls (of 9' x 20' each) (American Association of State Highway and Transportation Officials 2004, p. 371). Such a cage can accommodate a center aisle between two rows of seven "U" racks each. Assuming two bicycles per rack, such a cage can accommodate up to 28 bicycles in the same footprint at two cars.
- *Rack Clearance:* Within a cage, "U" racks should be spaced 2.5' from each other and the walls of the cage. The center aisle should allow 6' of unobstructed space between the facing rows of parked bicycles. These specifications are consistent with the 18' x 20' cage described above that includes 14 "U" racks.

Valet Bicycle Parking (Class 2 Parking) shall be provided at all special events held in Oakland between April 1 and October 31 with an expected attendance of 5,000 or more people. As a general guideline, bicycle parking spaces should be provided for 1% of the expected attendees and each bicycle requires 9 square feet of storage space. For example, an event expecting 10,000 attendees should plan for 100 bicycles by allocating 900 square feet of storage space. The service provider for each event should track the number of

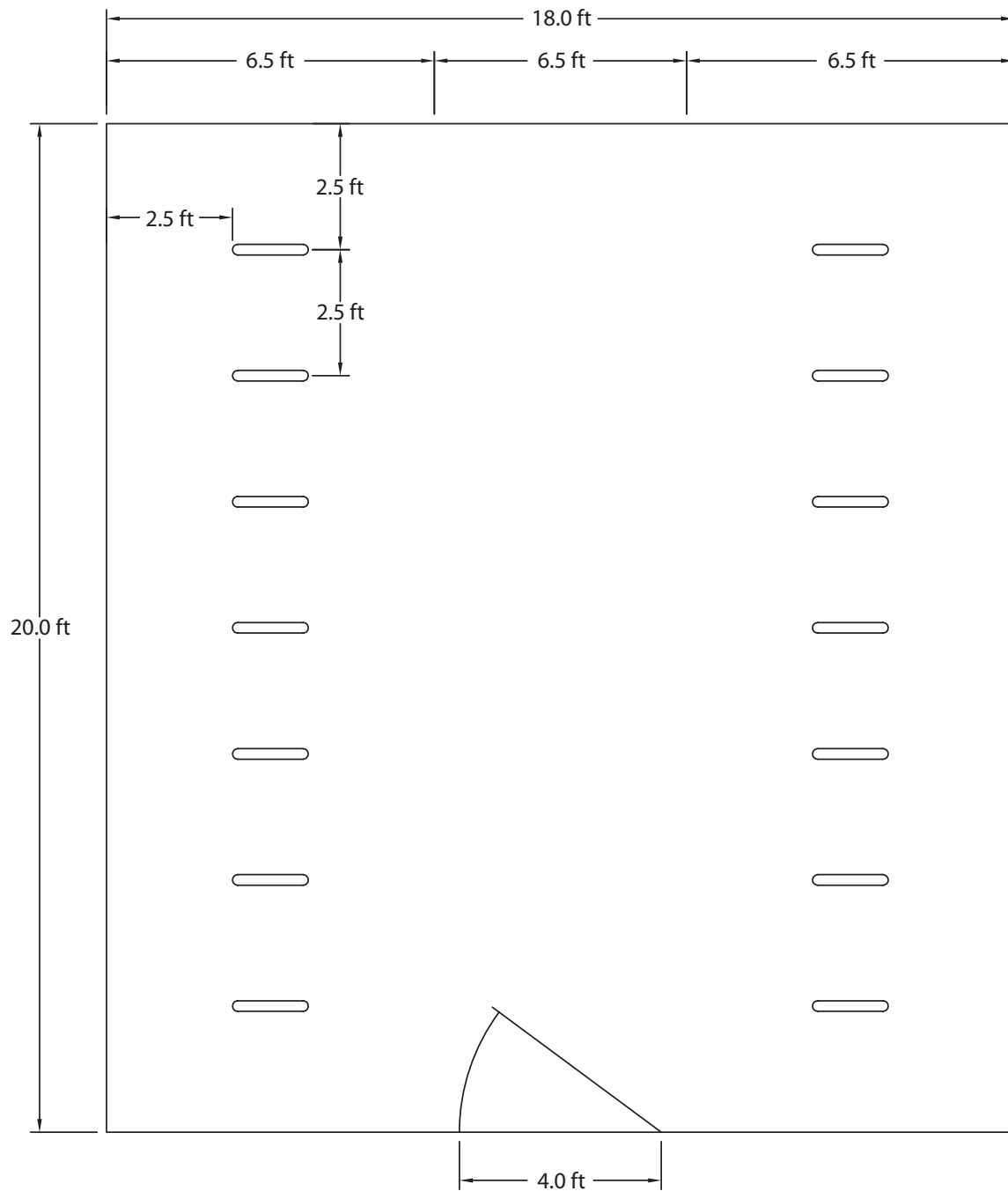


Figure 5.3: *Bicycle Cage for 28 Bicycles (18' x 20')*. This bicycle cage occupies the same footprint as two standard parking spaces of 9' x 20' each.

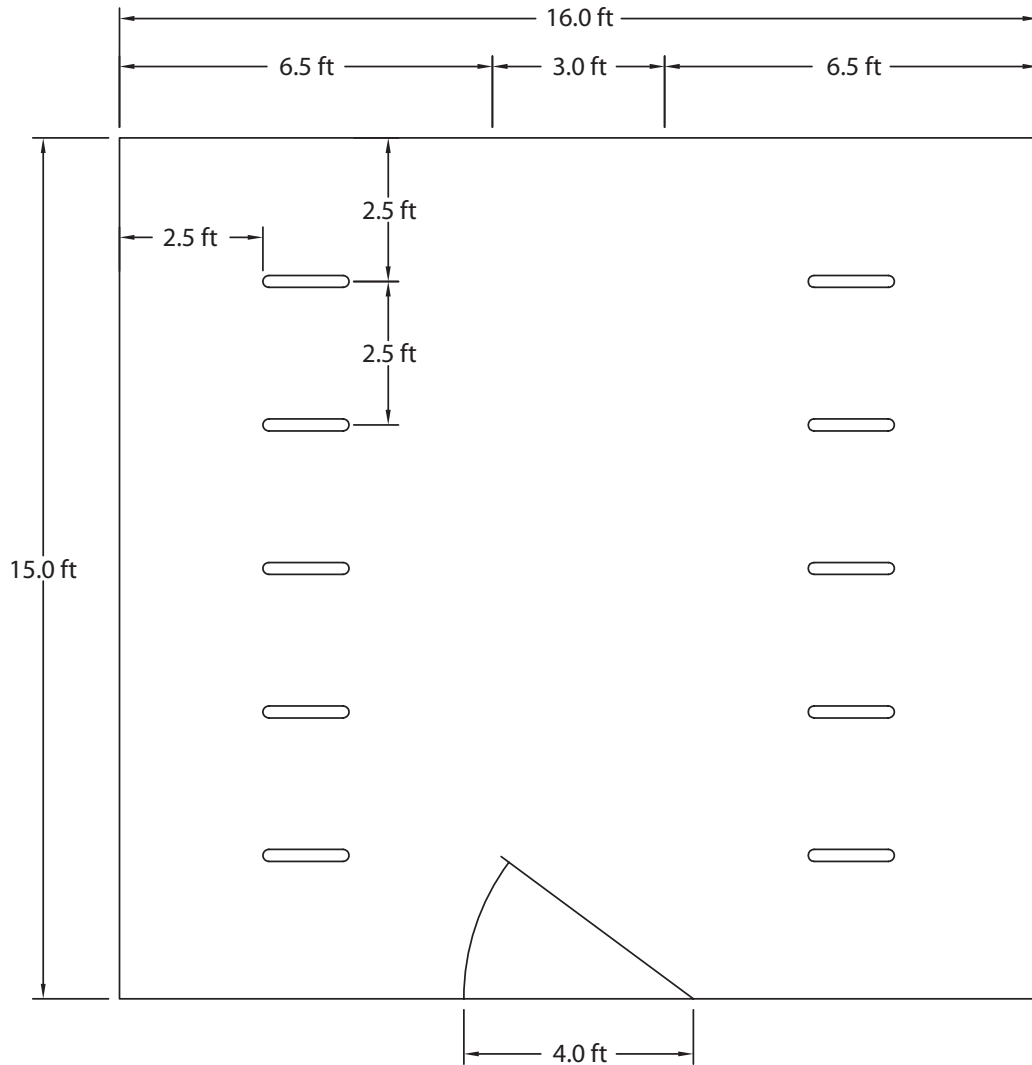


Figure 5.4: *Bicycle Cage for 20 Bicycles (16' x 15')*. This bicycle cage occupies the same footprint as two compact parking spaces of 8' x 15' each.

bicycles parked and this documentation will be used by the event organizer to plan for the following year's event. The storage corral should be enclosed and secure on three sides with tables on the fourth side to allow bicycles to be checked in and out. It should be located in a visible and easily accessible location, preferably at the event's entrance gate and no more than one block from the event. The valet parkers will monitor and handle the bicycles, using claim checks to match patrons and their bicycles. The service must be provided throughout the event's hours of operation.

6. Implementation

Achieving the goals of the *Bicycle Master Plan* requires the careful coordination of staff time with available funding and public input. This chapter identifies priority projects and programs—those bikeway segments and outreach efforts that are likely feasible and most capable of providing the greatest community benefit. This implementation plan is a critical component of the overall planning effort. It helps ensure a consensus-based approach to project development that involves the bicycling community, the general public, elected officials, city staff, partner organizations, and funding agencies. Additionally, the implementation plan serves as a measure of Oakland’s progress on achieving these goals through the completion of particular projects with each passing year.

6.1 Priority Projects

All segments of the proposed bikeway network are designated as either primary bikeways or secondary bikeways. This distinction is a prioritization tool—from the perspective of the overall bikeway network—to specify the relative importance of various bikeway connections. It is analogous to the distinctions between arterial/collector roadways and trunk/local bus lines. The primary bikeway network provides basic connectivity throughout Oakland and includes only those segments that passed the citywide feasibility analysis (as described in Section 4.2). The secondary bikeway network provides additional connections at a finer level of detail, decreasing the distance between the bikeways on the primary network. The secondary network also includes a small number of segments that, based on the planning level analysis, were determined to be infeasible at this time. While an effort was made to minimize the number of such segments, some were retained because they provide critical connections that should be considered in the long term. A map of the “Primary Bikeways” is on page 146.

To develop priorities, the proposed bikeway network was divided into projects of approximately one-half mile to two miles in length. These projects were then awarded points based on the following criteria, creating a ranking system of zero to ten for all proposed bikeways.

1. *Primary Bikeway*: Is the project part of a primary bikeway?

- (a) 2 points: Yes.

- (b) 0 points: No.
- 2. *Gap Closure*: Does the project connect to existing bikeways (Class 1, 2, 3A, or 3B)?
 - (a) 2 points: The project closes a gap between existing bikeways.
 - (b) 1 point: The project extends an existing bikeway.
 - (c) 0 points: The project does not connect to an existing bikeway.
- 3. *Safe Routes to Transit*: Does the project create a direct connection to a transit station?
 - (a) 2 points: Yes.
 - (b) 0 points: No.
- 4. *Land Use*: Do the surrounding land uses support cycling or include key destinations?
 - (a) 2 points: Strongly supportive.
 - (b) 1 point: Supportive.
 - (c) 0 points: Not supportive.
- 5. *Feasibility*: From the planning level analysis, how feasible is the project compared to other projects of the same project type (Signing and Striping, Lane Conversion, Bicycle Path)?
 - (a) 2 points: Comparatively easy.
 - (b) 1 point: Typical.
 - (c) 0 points: Comparatively difficult.

These points were awarded based on the following methods and assumptions. The evaluation of “primary bikeway” projects was based on the accompanying map of primary bikeways. Gap closures were determined based on the map of existing bikeways. The evaluation of “Safe Routes to Transit” projects was based on the streets listed in Figure 4.8. The land use points were awarded by a qualitative assessment that considered land use density and mix, recreational opportunities, and topography. The relative feasibility of projects was determined from the data and fieldwork of the citywide feasibility analysis.

The priority projects were then checked against the streets and intersections with the greatest number of bicyclist-involved collisions as described in Section 2.5. All of these locations are either included in the priority projects list, addressed by a nearby priority project that provides a preferred routing, or the location already has an existing bikeway.¹

When pursuing project implementation, city staff will also consider the following factors:

1. *Concurrent Project*: The proposed bikeway would be included, where feasible, as part of a pending street resurfacing, streetscape, reconstruction, or development project.
2. *Gap Closure*: The project rankings will be updated as new bikeways are constructed to reflect the changing nature of key gaps in the bikeway network.
3. *BPAC Review*: Modifications to the bikeway prioritization list shall be reviewed by the Bicycle and Pedestrian Advisory Committee.

In particular, lower priority projects may be implemented sooner if they are bundled with resurfacing projects because of the improved efficiencies in project delivery.

6.2 Priority Programs

The following priority programs offer a holistic approach for promoting safe bicycling. This prioritization emphasizes (a) the maintenance and expansion of existing programs; and (b) the creation of new programs to meet specific and pressing needs regarding adult education and improved enforcement.

Education

1. *Youth*: Continue and expand bicycle education for youth through the “Earn Your Bike” and “Bicycle Safety Helmet” programs offered by the Parks and Recreation Department.
2. *Adults*: Develop an ongoing program of bicycle education classes for adults using the League of American Bicyclists’ “Road I” course curriculum.

Encouragement

¹In the case of existing facilities, the concentration of collisions may be explained by the larger number of cyclists using that bikeway when compared to other streets without bikeways. See Section 2.5 for a discussion of bicyclist collisions with respect to cycling rates.

Project	From	To	Segments	Miles	Class
104th/105th/106th Aves	Stanley Ave	Edes Ave	195, 197, 639, 193, 194, 751, 758	2.14	2, 3A
14th St	Wood St	Brush St	424, 425	0.75	2
16th Ave	E 21st St	Embarcadero	695, 677, 749	0.79	2, 3B
20th St	San Pablo Ave	Harrison St	628, 427, 426, 344	0.55	2, 3A
2nd St	Brush St	Oak St	28, 29	0.99	3A
38th Ave	MacArthur Blvd	E 12th St	433, 432, 621, 620, 619	1.76	2, 3A
4th/5th Aves	E 18th St	Embarcadero	336, 338, 757	0.87	2, 3B
53rd St/55th St/Cavour St	Emeryville border	Shafter Ave	655, 624, 623, 690, 691	1.58	2, 3B
Camden/Havenscourt (1)	MacArthur Blvd	International Blvd	105, 108	1.32	2
College Ave	Alcatraz Ave	Broadway	374, 51, 612, 692, 52	2.38	3A
E 12th St (1)	Fruitvale Ave	40th Ave	409	0.50	3A
E 7th St	Kennedy St	Fruitvale Ave	663, 33	0.55	2, 3B
Foothill Blvd	23rd Ave	Fremont Wy	237, 241, 242, 657	1.45	3A
Fruitvale Ave	MacArthur Blvd	Foothill Blvd	82	1.20	3A
Hollis St/32nd St/San Pablo	Emeryville border	16th St	101, 104, 674, 2, 3, 675, 659, 660	2.88	3A, 3B
MacArthur Blvd	35th Ave	High St	269	0.55	3A
Mountain Blvd	Lake Temescal Path	Park Blvd	299, 302, 747, 748, 641, 308	1.92	3A, 3B
San Leandro St (1)	66th Ave	85th Ave	164, 165	0.93	2
Telegraph Ave (2)	20th St	Broadway	282, 283, 597	0.28	3A
Webster/Shafter/Forest/Colby	Berkeley border	29th St	202, 203, 204, 205, 206, 207, 385, 755	2.99	3B

Figure 6.1: *Priority Projects – Signing and Striping Projects.* (1) Under development; (2) Construction pending.

Project	From	To	Segments	Miles	Class
12th St Reconstruction (2)	Lakeside Dr	Foothill Blvd	693, 694	0.56	2
14th St	Brush St	Lakeside Dr	617, 618	0.96	2, 3A
40th St (1)	Emeryville border	Telegraph Ave	434, 729	0.77	2
Bancroft Ave (2)	66th Ave	82nd Ave	244, 115	1.36	2
Broadway (1)	Keith Ave	MacArthur Blvd	470, 471, 472, 473, 157, 158, 496, 173,	1.89	2
E 12th St (1)	1st Ave	Fruitvale Ave	408, 156	2.29	2
Fruitvale Ave	Foothill Blvd	E 12th St	83, 84	0.55	2
Lakeshore Ave (2)	MacArthur Blvd	E 12th St	538, 367, 368, 539, 369, 253, 418	1.13	2
MacArthur Blvd (1)	Park Blvd	Lincoln Ave	550, 551, 552, 553, 266, 744, 745, 754, 759	1.86	2
Madison/Oak/Lakeside Dr	2nd St	Grand Ave	251, 252, 558, 559, 560, 577, 576, 378, 361, 540, 541, 521, 31	2.36	2
Market St (1)	Berkeley border	Adeline St	128, 688, 127	0.44	2
Market St (2)	MacArthur Blvd	3rd St	130, 562, 131, 132, 563, 564, 565	2.00	2
Telegraph Ave (1) (*)	Aileen St	20th St	280, 281, 596	2.26	2
W Grand Ave	Mandela Pkwy	Market St	318	0.61	2
W MacArthur Blvd (1)	Market St	Broadway	543	0.91	2
Washington/Clay Sts	Telegraph Ave	2nd St	349, 654, 345, 346, 351, 348, 347, 352, 353	1.28	2, 3A
Webster/Franklin couplet (1)	25th St	8th St	604, 627, 603, 602, 509, 638, 508, 673	1.97	2, 3A

Figure 6.2: *Priority Projects – Lane Conversion Projects.* (1) Under development; (2) Construction pending; (*) Telegraph Ave (Aileen St to 20th St) is provisionally designated as part of the Proposed Bikeway Network. The provisional designation will only be lifted, and those segments automatically incorporated into the Proposed Bikeway Network, if further environmental review is performed and appropriate CEQA findings are adopted by the City.

Project	From	To	Segments	Miles	Class
Bay Bridge Connector Paths (1)	Bay Bridge Path	Maritime St / Shellmound St	1, 736, 319, 756	4.14	1
Coliseum BART to Bay Trail Connector Path (1)	San Leandro St	Oakport Rd	738	0.90	1
East Bay Greenway (1)	Fruitvale Ave	San Leandro border	739	4.35	1
Estuary Crossing (*)	Jack London Square	Alameda	43	0.25	1*
Lake Merritt Channel Path (1)	Lake Merritt Path	Waterfront Trail	850, 852, 853, 17	0.55	1
Lake Merritt Path (1)			860, 862, 865	1.83	1
Park Blvd Path	Mountain Blvd	Leimert Blvd	309	0.80	1
Waterfront Trail (1)	Jack London Square	MLK Jr Shoreline	801 to 835	3.39	1

Figure 6.3: *Priority Projects – Bicycle Path Projects*. (1) Under development. (*) The Estuary Crossing project may include a water taxi, improvements to the Posey Tube, and/or some other facility type.

1. *Bike to Work Day*: Continue and expand Bike to Work Day as Oakland's primary event to promote bicycling.
2. *Youth encouragement*: Work with stakeholder organizations to develop an event for encouraging youth to bicycle.
3. *Maps*: Continue to update the *Walk Oakland! Map & Guide* to provide current and complete information on bicycling in Oakland. Consider renaming this resource as the *Walk/Bike Oakland! Map & Guide*.

Enforcement

1. *Bicycle Citations*: Lower the fines for bicycle moving violations and thereby encourage police officers to issue bicycle citations.
2. *Bicycle Traffic School*: Develop a diversion program whereby individuals may reduce the penalty of their bicycle citations by completing a course on bicyclist safety.

The City of Oakland should continue to work with and support related programs offered by community-based organizations. In particular, Cycles of Change and the East Bay Bicycle Coalition have developed programs and resources for youth and adults, respectively.

6.3 Project Implementation

The implementation of new bikeways begins with the specification of a priority project or through coordination with another roadway project. Priority projects and the process

for their selection are described in Section 6.1. The coordination of a new bikeway with another roadway project is most common with resurfacing projects but may also occur in conjunction with streetscape projects, bridge replacements, and other types of roadway reconstruction. Such coordination delivers better projects through integrated design while also realizing significant cost savings through the coordinated project delivery. For a project to move forward, a feasibility study must be completed to provide an engineering analysis of the planning-level recommendation made in this document. In general, these feasibility studies consider traffic operations and roadway geometrics to understand how the proposed bikeway would be integrated into the given street. Proposed bikeways on certain transit streets undergo an additional level of analysis regarding bus operations. A detailed explanation of these feasibility studies is provided in the following subsections.

Public Outreach

The public outreach process begins at the planning level with the specification of roadways and proposed cross-sections for improving bicycle access. In completing the *Bicycle Master Plan*, the proposed bikeways for particular areas throughout the city were reviewed by neighborhood groups and merchants associations to provide early notification and an opportunity to comment. This outreach process is described in detail in Section C.1. Depending on the nature of the proposal, the outreach for a specific project may include mailings, presentations to neighborhood groups, and townhall meetings. A flyer is mailed to all addresses in the project area and recipients are encouraged to provide written comments. Community meetings are held for projects that generate significant community interest. If possible, project presentations should be coordinated with the regular meetings of nearby neighborhood groups and merchants associations. Large or complicated projects may require one or more standalone meetings. All bikeway projects that reduce the number of travel lanes or on-street parking spaces (by 10% or more in the project area) must be approved by City Council vote before project implementation. Oakland's Bicycle and Pedestrian Advisory Committee (BPAC) also provides a monthly forum for citizen involvement in the prioritization and design of new bikeways.

Project Feasibility

The proposed bikeway network is based on a citywide feasibility analysis that—from a planning level—considered the curb-to-curb street width and current motor vehicle volumes for the proposed on-street bikeways. Based on these factors, the plan recommends proposed cross-sections and bikeway types to improve bicycle safety and access on these

streets. This planning-level analysis specifies feasible proposals that merit further study at an engineering level. That additional feasibility study will develop proposals into projects for implementation. In other words, identifying a feasible proposal is a necessary but insufficient condition for implementing a new bikeway. The feasibility of a proposed project will be determined through a feasibility study based on engineering analysis and design.

There are three basic project types and each requires a different kind of engineering analysis:

- *Signing and Striping Projects (SS)* add sharrows or bicycle lanes and their accompanying signage to the street's existing lane configuration. Examples include bicycle boulevards (Class 3B) on local streets and bicycle lanes (Class 2) on streets with sufficient width to accommodate the bicycle lanes without additional modifications. These projects may also include arterial bicycle routes (Class 3A) where the lane widths are reallocated to maximize the width of the outside travel lanes. Signing and striping projects do not require a study of traffic operations because the projects do not affect the streets' motor vehicle capacity. In these cases, the engineering focuses on the design of the signing, striping, and intersection control for improving bicycle safety and access.
- *Lane Conversion Projects (LC)* convert travel lanes to bicycle lanes and typically require the restriping of the street's overall lane configuration. Often called road diets, these projects may take advantage of a street's excess motor vehicle capacity and/or be motivated by pedestrian safety and neighborhood traffic calming concerns. In some cases, lane conversion projects are recommended for arterial bicycle routes (Class 3A) to increase the width of the outer travel lane (but where there is not enough width to include bicycle lanes). Each lane conversion project requires a feasibility study to assess the impacts of the proposed lane conversion on traffic operations. In the limited number of cases where parking removal is proposed, a parking occupancy study must be completed if the project would remove 10% or more of the on-street parking spaces within the project area.
- *Bicycle Path Projects (BP)* create paved paths that are separated from the street for use by bicyclists and pedestrians. Bicycle paths are proposed in public rights-of-way, in parklands, on the waterfront, and along railroad rights-of-way. Feasibility studies for these projects address right-of-way width and alignment, street crossings, and potential environmental impacts. The analyses consider water resources, biological resources (including sensitive habitats and trees), hazardous materials, and cultural resources that may be affected by bicycle path projects. For each project,

the feasibility study examines these issues to develop a design that would avoid or mitigate potential impacts through modifications to the path's alignment. Typically, bicycle paths are integrated with park or waterfront improvements and not developed as standalone bicycle projects.

The requirements for bikeway feasibility studies are included in Appendix G. A set of the requirements apply to all projects while additional analyses apply to projects of particular types. These project types include on-street bikeways that would remove travel lanes or parking spaces and off-street bikeways that require the development of specific bicycle path alignments.²

Transit Streets

A key constraint to the planning and implementation of Oakland's bikeway network in many parts of the city are the limited number of streets that connect one neighborhood to the next. This irregular street grid is attributable topographical features, land subdivision in the streetcar era, and the construction of urban freeways. All transportation modes share the through streets which can create competition between modes in the allocation of limited right-of-way and complicate the streets' operations. In other words, there are limited opportunities for prioritizing different transportation modes on different streets in the same corridor. As a consequence, there is significant overlap between Oakland's bikeway network and AC Transit's bus network because of a shared reliance on the same streets. This update to the *Bicycle Master Plan* provided an opportunity to address this overlap in a comprehensive manner. This section establishes a framework for addressing these issues through the ongoing implementation of Oakland's bikeway network. Due to limitations on available research and examples, this framework requires ongoing dialogue and cooperation between the stakeholders to ensure that key concerns are effectively understood and addressed.

Through the citywide feasibility analysis, the bikeway network was revised in part to minimize the extent of proposed bikeways on rapid, trunk, and major bus lines. (See Section 4.2 for additional explanation.) Examples include the realignment of proposed bikeways from International Blvd to E 12th St (from 1st Ave to 54th Ave) and from Broadway to

²These feasibility study requirements do not address bikeway projects that would require the removal of a continuous two-way center turn lane. The proposed bikeway network provisionally includes two segments of this project type: Telegraph Ave (Aileen St to 20th St) and International Blvd (54th Ave to 82nd Ave). This provisional designation will only be lifted, and those segments automatically incorporated into the proposed bikeway network, if further environmental review is performed and appropriate CEQA findings are adopted by the City.

Roadway	From	To	Miles
14th Ave	E 31st St	E 19th St	0.83
40th St	Adeline St	MLK Jr Wy	0.55
66th Ave	San Leandro St	Coliseum Wy	0.28
Adeline St	36th St	5th St	1.77
Foothill Blvd	14th Ave	23rd Ave	0.68
Fruitvale Ave	Foothill Blvd	E 12th St	0.55
MacArthur Blvd	High St	Buell St	0.46
MacArthur Blvd	73th Ave	Foothill Blvd	1.94
Park Blvd	Grosvenor Pl	E 18th St	1.13

Figure 6.4: *Transit Streets for Additional Study.*

Franklin/Webster Streets (in downtown). Where such realignments were not possible, bike-way proposals were modified to minimize the number of proposed lane conversion projects that would result in a single travel lane per direction. This single-lane configuration is of particular concern to AC Transit because of its potential effects on bus travel times. By considering alternative alignments and treatments, the extent of overlapping bikeways and bus lines was reduced without compromising the integrity of the overall bikeway network.

However, in some cases such alternatives were not available and thus there is a group of proposed bikeways that require additional study. These projects fall into two categories: (1) proposed bikeways with lane conversions on rapid, trunk, or major bus lines that would result in one travel lane per direction; and (2) proposed bikeways that would remove a travel lane or two-way center turn lane on a street with an existing or proposed rapid bus or bus rapid transit line.

To deal with the first category of projects, the City of Oakland received a grant from the Safe Routes to Transit program (funded by Regional Measure 2) to study one such project—40th St in the vicinity of MacArthur BART—as a case study for how to address this type of project. The following approach is based on the work of this MacArthur BART Bicycle Access Study. It applies to the streets identified in Figure 6.4. For each of the proposed projects in this first category, the City of Oakland will include the following considerations in the project’s feasibility study and thereby assess the effects of the proposed project on bus operations:

1. *Bus Travel Times:* What is the sum of the delays created by the proposed project at the controlled intersections in the project area and along the bus line?
2. *Bus Stop Access:* Given one travel lane per direction, what is the effect of queue lengths on the bus accessing its stops? What is the effect on traffic gaps for bus egress from the stop?

3. *Incident Delays*: How will double-parked vehicles (including delivery vans, garbage trucks, private vehicles, and the like) affect bus movements?
4. *Total Travel Delay*: What is the bus's total travel delay in the project area associated with bus travel times, bus stop access, and incident delays?
5. *Cumulative Effects*: What other bikeway and/or streetscape projects are proposed on the rapid, trunk, or major bus line in question? Would those projects have similar effects on bus travel times?

Some of these issues—like incident delays and cumulative effects—do not have established methods of study. Ongoing dialogue and cooperation between the stakeholders are necessary for making progress on these issues with the available tools. By assessing the potential effects on transit, these feasibility studies will provide a more comprehensive accounting of the proposed project and thus guide decision-making on project feasibility, development, and implementation.

Projects in the second category are proposed bikeways that would remove a travel lane or two-way center turn lane on a street with an existing or proposed rapid bus or bus rapid transit line. This category includes the following roadway segments:

- Broadway (MacArthur Blvd to College Ave)
- International Blvd (54th Ave to 82nd Ave)
- Telegraph Ave (Aileen St to 20th St)
- W Grand Ave (Market St to Mandela Pkwy)

These projects should be addressed on a case-by-case basis to ensure close coordination with AC Transit's efforts for capital and operations improvements. This coordination should occur throughout project scoping, analysis, and design.

Bicycle Performance Measures

Action 1A.6 of this plan recommends that the City of Oakland work to integrate a quantitative performance measure of street performance for bicycles into transportation decision-making. Such tools, including bicycle level of service (BLOS) and bicycle compatibility index (BCI) (Federal Highway Administration 1998), are not in common usage but could help evaluate how different design alternatives serve cyclists. This analysis would inform

the design process and thus improve the overall quality of the proposed facility by providing feedback before the facility is built. It would also help inform decision-making where tradeoffs are required to accommodate bicyclists. By quantifying the costs/benefits to cyclists, such a performance measure would provide more complete accounting of street design—and thus promote better decision making—when used in conjunction with other methodologies (like the Highway Capacity Manual's LOS analysis). Given the lack of an industry standard, it is recommended that various performance measures like the BLOS and BCI be tested and evaluated as part of future bikeway feasibility studies.

6.4 Other Roadway and Development Projects

Other roadway or development projects may have an impact on existing or proposed bicycle facilities. This issue may be addressed in a project's transportation impact analysis and/or through the environmental review process in the Initial Study and Environmental Checklist Form under Transportation/Traffic: "Would the project conflict with adopted policies, plans, or programs supporting alternative transportation?" For example, projects that would remove an existing bikeway or preclude the installation of a proposed bikeway may have a significant impact. These impacts would require study that may lead to mitigation measures.

In addition to a project's direct impacts on bicycle facilities, the project's proposed mitigation measures (for example, to accommodate additional motor vehicle traffic) may negatively impact existing or proposed bicycle facilities. The two most common traffic mitigations with negative impacts on bicycle travel are signal retiming and the addition of dedicated right turn lanes. All new and modified signals should include adequate yellow time for cyclists to clear intersections as well as bicycle detection (for actuated signals). Due to safety concerns, dedicated right turn lanes are strongly discouraged, particularly on existing and proposed bikeways.

These issues are addressed in the Policy Recommendations through Action 1A.7 (Dedicated Right Turn Lanes) and Action 1B.2 (Traffic Signals). Other actions that may relate to new development include Action 1A.6 (Bicycle Performance Measure), Action 1A.8 (Diagonal Parking), Action 1D.6 (Bicycle Parking Ordinance), and Action 1D.7 (Development Incentives). Greater detail on the design treatments associated with these issues is provided in Section 4.5.

6.5 Funding

A planning-level estimate of the cost to implement Oakland's *Bicycle Master Plan* is \$28 million (or \$70 per resident). This amount is based on the estimates provided in Figure

Capital Projects	Cost	Unit	Notes
Bicycle Path (Class 1)	\$750,000	mile	
Bicycle Lane (Class 2)	\$100,000	mile	
Bicycle Route (Class 3)	\$10,000	mile	
Arterial Bike Route (Class 3A)	\$75,000	mile	
Bicycle Boulevard (Class 3B)	\$50,000	mile	
CityRacks (bicycle parking)	\$20,000	year	approx 100 spaces (on average)
Education and Encouragement	Cost	Unit	Notes
Youth education programs	\$30,000	year	
Adult education programs	\$7,000	year	2 courses reaching 40 people each
Bike to Work Day	\$5,000	year	downtown event only
Maps and outreach materials	\$2,000	year	

Figure 6.5: *Cost Estimates for Bikeway Projects and Programs.* These unit costs for capital projects are generalized estimates for planning purposes only and should not be used for estimating the cost of any particular project. The estimates were adapted from the *Alameda Countywide Bicycle Plan* (2006) to reflect Oakland-specific circumstances. Program costs do not include staff time.

6.5. For items with a unit cost per year, this total assumes a twenty-year time frame. These estimates do not include a number of physical improvements like road resurfacing or new traffic signals that may benefit bicyclists but are not standalone bicycle projects. Such costs should be integrated into various project budgets in light of the policies on routine accommodation. Two proposed pedestrian/bicyclist bridges—the Lake Merritt Channel Bridge and the Lake Temescal Bridge—are part of the bikeway network. Including these two projects (at roughly \$5 million each), the total cost of plan implementation is \$38 million.

The following sources are the primary funding mechanisms for bicycle facilities and programs in Oakland. Bicycle facilities may also be included as part of other capital projects including resurfacing and streetscapes (often funded by grants and redevelopment funds, respectively). The City of Oakland’s Measure DD includes funding for extensive bicycle projects along Lake Merritt, the Lake Merritt Channel, and the Oakland Estuary. Bicycle planning for specific neighborhoods may be included in planning grants from the Transportation for Livable Communities (Metropolitan Transportation Commission) or Environmental Justice Planning and Community Based Transportation Planning (Caltrans) programs. For additional information on funding, refer to the *Alameda Countywide Bicycle Plan* (Alameda County Congestion Management Agency 2006, pp. 74–79).

Bay Trail Project: The Bay Trail Project is a non-profit organization that offers grants for the planning, design, and construction of Bay Trail segments. The Association of Bay Area Governments (ABAG) administers the competitive grants funded by the State’s Proposition 12 (State Parks and Open Space Bond). The Bay Trail Board recommends grant awards

that are reviewed and approved by the Board of the Coastal Conservancy.

<http://baytrail.abag.ca.gov/index.html>

Bicycle Transportation Account (BTA): Caltrans administers this state program that funds projects to improve safety and convenience for bicycle commuters. The required local match is ten percent of the total project cost. A single applicant may not receive more than 25% of the total amount transferred to the BTA in a single fiscal year. In recent years, \$5–7 million have been available statewide on an annual basis.

www.dot.ca.gov/hq/LocalPrograms

Congestion Mitigation and Air Quality Improvement Program (CMAQ): This federal block grant program funds projects in Clean Air Act non-attainment areas that will help meet the national ambient air quality standards stated in the 1990 Clean Air Act amendments. CMAQ funds are typically bundled by the Metropolitan Transportation Commission with other federal funds to create programs like the Regional Bicycle and Pedestrian Program and the Transportation for Livable Communities Program.

www.dot.ca.gov/hq/transprog/reports/Official_CMAQ_Web_Page.htm

Environmental Enhancement and Mitigation Program (EEM): The State Air Resources Board administers the EEM program which provides \$10 million annually in grants to local, state, and federal agencies and to not-for-profit organizations. The program is funded through the state gasoline tax. Eligible projects mitigate the environmental impacts of new or modified state transportation facilities. Bicycle projects fall within two of the EEM grant categories: (1) Highway Landscape and Urban Forestry (projects designed to improve air quality through the planting of trees and other suitable plants, including urban streetscape projects); (2) Roadside Recreational (projects for the acquisition and/or development of roadside recreational opportunities, including rest stops for bicyclists).

<http://resources.ca.gov/eem/>

Hazard Elimination and Safety Program (HES): Administered by Caltrans, this federally funded program provides grants for safety improvements on all public roads and highways. Eligible projects, including bicycle safety improvements, should reduce or eliminate the number and/or severity of traffic collisions. For example, Oakland received an HES grant to replace drainage grates that posed a hazard to bicyclists.

www.dot.ca.gov/hq/LocalPrograms/hesp/hesp.htm

Lifeline Transportation Program: The San Francisco Bay Area's county congestion management agencies administer this program for overcoming transportation gaps and improving transportation choices in low-income communities. Projects must be developed through a community-based transportation plan or a similarly inclusive planning process. Eligible projects include transit operations, voucher programs, and capital improvement projects.

Note that historically these funds have been dedicated to transit operations.

www.mtc.ca.gov/planning/lifeline/index.htm

Measure B Pedestrian and Bicycle Funds: The Alameda County Transportation Improvement Authority (ACTIA) administers the half-cent sales tax of which five percent is allocated to bicycle and pedestrian projects. The Measure B Local Pedestrian and Bicycle Funds are distributed directly to local jurisdictions and account for 75% of the total bicycle and pedestrian funding. Over the twenty-year time horizon of the sales tax, the City of Oakland will receive an estimated \$29 million for bicycle and pedestrian projects. The remaining 25% of the funds are awarded competitively. Eligible projects include bikeways, bicycle parking, signage, plans, and educational programs.

www.acta2002.com/bikeped.html

Office of Traffic Safety (OTS): The State of California's Office of Traffic Safety provides grants for education and enforcement programs that reduce traffic-related injuries and fatalities. Bicycle-related grants may include safety training courses, helmet programs, public service announcements, and other educational materials.

www.ots.ca.gov

Regional Bicycle and Pedestrian Program (RBPP): The Metropolitan Transportation Commission's long-range transportation plan, *Transportation 2030*, provides \$200 million to the RBPP over a 25-year period for building the Regional Bikeway Network and regionally significant pedestrian projects. The Alameda County Congestion Management Agency (CMA) administers the RBPP funds for the county. The Alameda County portion of this program may amount to \$40 million over the life of the program.

www.mtc.ca.gov/planning/bicyclespedestrians/regional.htm#bikepedprog

Regional Surface Transportation Program (RSTP): This federal block grant program funds a variety of transportation projects including bicycle parking facilities at terminals, bicycle racks on buses, bicycle transportation facilities, pedestrian walkways, bicycle-activated traffic lights and preservation of abandoned railway corridors for pedestrian and bicycle paths. In the Bay Area, funds from the Surface Transportation Program are administered through the congestion management agencies. In Alameda County, these funds are dedicated to street resurfacing projects that can be bundled with bikeway projects.

www.dot.ca.gov/hq/transprog/reports/Official_RSTP_Web_Page.htm

Safe Routes to Transit (SR2T): This program was established in 2004 by Regional Measure 2, a \$1 bridge toll increase to reduce bridge congestion. SR2T includes \$20 million in grant funding for capital and planning projects that improve bicyclist and pedestrian access to regionally significant transit stations. Beginning in 2005, the grants are being awarded through five calls for projects of \$4 million each over the next ten years.

www.transcoalition.org/c/bikeped/bikeped_saferoutes.html

Transportation Development Act Article 3 (TDA): This state program specifies that one quarter cent of the gasoline tax is returned to the county of origin to fund transportation improvements in that county that primarily benefit bicyclists and pedestrians. Oakland typically receives between \$250,000 and \$300,000 per year in TDA Article 3 funds. MTC Resolution 875 requires that each county and city in the San Francisco Bay Area have a Bicycle Advisory Committee “to review and prioritize TDA Article 3 bicycle projects and to participate in the development and review of comprehensive bicycle plans.”

www.mtc.ca.gov/funding/STA-TDA/index.htm

Transportation Enhancement Activities Program (TEA): This federal program funds projects that enhance local quality of life by better integrating major transportation facilities into their surrounding communities. Eligible projects include bicycle facilities, bicycle education, and “rails-to-trails” projects.

www.dot.ca.gov/hq/TransEnhAct/index1_files/index1.html

Transportation for Livable Communities Program (TLC): TLC funds are awarded through regional and countywide competitive grant programs administered by the Metropolitan Transportation Commission and the county congestion management agencies, respectively. These funds support community-based transportation projects that bring new vibrancy to downtown areas, commercial districts, and transit hubs. The goal is to develop the character of these mixed-use places and ensure that they are easily accessible by bicycling, walking, and transit.

http://www.mtc.ca.gov/planning/smart_growth/tlc_grants.htm

Transportation Fund for Clean Air (TFCA): The Bay Area Air Quality Management District manages this program with funds generated by a \$4 surcharge paid on all motor vehicles registered in the Bay Area. Bikeways and bicycle parking that promote utilitarian bicycling are eligible for funding. Education and marketing campaigns are not eligible.

www.baaqmd.gov/planning/plntrns/tfcapage.htm

6.6 Staffing and Public Participation

Multiple city agencies are involved in the planning, design, delivery, and administration of Oakland’s bicycle programs. The Transportation Services Division of the Public Works Agency (PWA) houses the Bicycle and Pedestrian Program. This program has two full-time staff (the Bicycle/Pedestrian Program Manager and the Bicycle/Pedestrian Facilities Coordinator) who coordinate grant applications, feasibility studies, design, and project delivery for bicycle facilities and provide design review for related projects. The program focuses on developing new bikeways, installing bicycle parking, and organizing Bike to Work Day.

The Planning and Zoning Division of the Community and Economic Development Agency (CEDA) has a pedestrian/bicycle planner who managed the update to this plan. CEDA's ongoing involvement focuses on planning- and design-level coordination with other projects, agencies, and the public on the implementation of the proposed bikeway network and bicycle parking. The Office of Parks and Recreation offers children's programs on bicycle safety, education, and promotion. Staff in these three agencies should work to provide closer coordination between Oakland's capital improvements, planning efforts, and education programs. Additionally, improved coordination with the Oakland Police Department on bicycle education and traffic enforcement is a key component in Oakland's efforts to become a bicycle-friendly community.

Public Participation

There are three primary mechanisms for ongoing public participation in the implementation of Oakland's *Bicycle Master Plan*. First, the plan requires the notification of nearby residents, merchants, and property owners prior to the implementation of new bikeway projects. In addition to mail notification, public meetings should be held with neighborhood groups and merchants associations in the immediate vicinity. Where possible, the proposed project should be included on the agenda of a regularly scheduled meeting (out of respect for the existing organization and for people's time). In general, one-time, one-issue meetings should be avoided because they tend to have poor participation. Neighborhood-level meetings provide an ongoing opportunity for publicizing the *Bicycle Master Plan* while keeping staff apprised of neighborhood-specific interests and concerns that shape the implementation process.

Second, bikeway projects must be approved by the City Council if the project would require the conversion of travel lanes or create parking impacts. These projects are thus subject to the public notification, review, and comment that accompanies all City Council actions.

Third, the City of Oakland's Bicycle and Pedestrian Advisory Committee (BPAC) provides a monthly forum for public participation in the planning, design, and implementation of bicycle facilities. The BPAC also reviews plans and projects that are not specifically bicycle-related for their effects on cyclists. The committee provides the following basic input to the City via PWA staff:

- Review plans and projects for their effects on bicyclists and pedestrians. In particular, the BPAC must review all projects submitted for TDA Article 3 funding (Metropolitan Transportation Commission, Resolution 875).

- Help prioritize projects for implementation.
- Advise staff on improving bicyclist/pedestrian safety and access in Oakland.

For additional information on Oakland's Bicycle Master Plan, including opportunities for public participation in bicycle projects, contact the Bicycle and Pedestrian Facilities Coordinator (510-238-3983, bikeped@oaklandnet.com) or see www.oaklandpw.com/bicycling.

A. Caltrans BTA Requirements

To be eligible for funding from the State's Bicycle Transportation Account (BTA), local agencies must have an adopted Bicycle Transportation Plan that was approved by the Regional Transportation Planning Agency and by Caltrans. The plan must comply with the requirements specified in the Streets and Highways Code Section 891.2. This appendix lists those eleven requirements and notes where they are addressed in this plan.

Requirement	Location
(a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	Section 2.3
(b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	[forthcoming map from Walk Oakland base], Section F.1
(c) A map and description of existing and proposed bikeways.	Chapter 4, Appendix F
(d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	Section 5.2
(e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	Section 2.4, Section 4.3, Section 5.2
(f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	Section 5.2
(g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	Section 2.6, Section 6.2
(h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	Section 2.7, Section 6.6, Section C.1
(i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	Section C.2, Section C.3, Section C.4
(j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	Section 6.1, Section F.1, Section F.2
(k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	Section 4.4, Section 6.5

B. Major Changes from the 1999 Plan

This document is the first update to Oakland's *Bicycle Master Plan*, originally adopted in 1999. The update is comprehensive in that it addressed all sections of the previous plan, providing greater detail and incremental improvements throughout. The following list summarizes the major changes at a policy level.

- *Routine Accommodation*: In light of policies at the regional, state, and federal levels, this plan is based on a policy position that Oakland will consider bicycle safety and access in the design and maintenance of all streets. This policy differs from the 1999 Plan in that the scope of potential bicycle improvements is not as focused on the proposed bikeway network. At the same time, this plan retains the bikeway network as a foundational concept for prioritizing and improving streets as bikeways that will have the greatest community benefit.
- *Safe Routes to Transit*: While the 1999 Plan emphasized connections to transit, this update integrates "Safe Routes to Transit" as a key policy in identifying and prioritizing capital improvements. For each major transit station, the proposed bikeway network includes a bikeway connecting from each direction surrounding the station. These streets are explicitly named and prioritized because of their potential to increase transit ridership while connecting cyclists to destinations throughout the region. These recommendations reflect the growing emphasis on station area access plans and transit-oriented development.
- *Citywide Feasibility Analysis*: The greatest effort in this plan update was invested in the detailed evaluation of all streets on the bikeway network. The 1999 recommended bikeway network was a more general planning tool, identifying bikeway corridors throughout the city, without specifically considering the feasibility of those proposals. In contrast, the updated bikeway network is based on an evaluation of street grades, curb-to-curb rights-of-way, peak hour traffic volumes, and bicycle/bus interactions. The purpose of this analysis was to develop feasible proposals that maximize bicyclist safety and access while minimizing associated impacts on motor vehicle congestion, parking, and bus operations.
- *Additional Bikeway Types*: Since the completion of 1999 Plan, the State of California adopted the shared roadway bicycle marking (sharrow). This traffic control

device is a tool for improving existing bicycle routes and provides a potential alternative in cases where bicycle lanes are not feasible. The sharrow is one aspect of two new bikeway types that are explained in Chapter 4 and integrated into the proposals for Oakland's bikeway network: arterial bicycle routes (Class 3A) and bicycle boulevards (Class 3B).

C. Local and Regional Coordination

The development of Oakland's *Bicycle Master Plan* benefited from significant public outreach and coordination with other agencies. In particular, this effort included neighborhood groups and merchants associations, local transit operators, and adjoining jurisdictions, as well as countywide and regional agencies. The following sections summarize the community outreach, explain the coordination with other agencies, and list other planning documents that intersect with the *Bicycle Master Plan*.

C.1 Community Outreach

This following list itemizes the outreach strategies that were used for this update to Oakland's *Bicycle Master Plan*. In general, the process emphasized continuous oversight by a Citizens Advisory Committee and proactive outreach to neighborhood groups, merchants associations, and other community-based organizations.

- *Citizens Advisory Committee (CAC)*: This committee was composed of representatives from each council district, representatives of community-based organizations, and interested individuals. It met monthly from April 2005 to [END DATE], providing public input and oversight for each stage of the process. Overall, twenty people participated in the CAC.
- *Meetings with community-based organizations*: The project manager and members of the CAC gave presentations to neighborhood groups and merchants associations as part of those groups' regularly scheduled meetings. The purpose of the meetings was to build neighborhood-level understanding of Oakland's *Bicycle Master Plan* by taking the project directly to the neighborhoods. 34 presentations were made to these groups, reaching 569 people. [EDITORIAL NOTE: These numbers are as of 1-Feb-07.]
- *Public meetings*: Three large format, open-invitation public meetings were held over the course of the project. The first two meetings were held at the beginning of the project and presented the same agenda in two locations (Lake Merritt Garden Center and Arroyo Viejo Recreation Center). The third meeting was held at the Lake Merritt Garden Center after the public release of the draft bicycle plan.

- *Technical Advisory Committee (TAC)*: This committee facilitated cooperation with outside agencies with a primary focus on AC Transit and the adjoining jurisdictions of Alameda, Berkeley, Emeryville, Piedmont, and San Leandro. Approximately 30 agency representatives were involved with the TAC. Because of the large number of participants, meetings were held with individual agencies on an issue specific basis.
- *EIR and General Plan Amendment*: The preparation of the Environmental Impact Report (EIR) and the adoption of a General Plan amendment required the following public meetings and review periods: public scoping meeting for the Notice of Preparation (Planning Commission) and comment period (30 days); public hearing for the draft EIR and General Plan amendment (Planning Commission) and review period (45 days); and final EIR public hearing (Planning Commission). Adoption of the plan also required action by the Planning Commission, Community and Economic Development Committee, and City Council.
- *Opinion survey*: In 2003, the Public Works Agency distributed 1,000 copies of a bicycling access survey and received 174 responses. The survey was distributed through Bike to Work Day, bicycle shops, libraries, and the web pages of the Public Works Agency and the East Bay Bicycle Coalition. The survey collected information on trip purpose, trip length, cycling constraints and basic demographic information about the respondents.
- *Project Postcard*: A project postcard was created to provide a basic overview of the *Bicycle Master Plan* update and encourage people to participate in the process. Over 4,000 postcards were distributed through the CAC, neighborhood meetings, and Bike to Work Day.
- *Project Contact List*: This list was developed to provide ongoing contact with people interested in the development and implementation of the *Bicycle Master Plan*. Names and contact information were gathered from the opinion survey, community meetings, and the project web site. Project updates were sent to the people on this list to notify them of major developments. This list will be maintained as an ongoing resource to involve citizens with the implementation of the plan.
- *Web page*: A web page was used to post the current status of the project, make key documents available, and encourage people to join the project contact list. This page also satisfied the public posting requirements of the grant provided by the Alameda County Transportation Improvement Authority. The page, located at www.oaklandpw.com/bicycling/bikeplan.htm, will be maintained as an ongoing reference for Oakland's *Bicycle Master Plan*.

- *Mailings*: Direct mailings notified individuals and groups of the public meetings and the public review periods associated with the EIR and General Plan amendment. These mailings included the approximately 120 organizations on CEDA's neighborhood group list and all of Oakland's bicycle shops.

C.2 Local Planning

The Oakland *General Plan* contains the following elements that have bicycle-related policies. These policies and associated actions are collected in Appendix D.

- *Estuary Policy Plan* (1999) includes continuous bikeways along the waterfront (Jack London Square to Damon Slough), Lake Merritt Channel, and in the Jack London District.
- *Land Use and Transportation Element* (1998) calls for the adoption of a *Bicycle Master Plan*, the inclusion of bikeways in new projects, the conversion of underused travel lanes into bikeways, the reuse of abandoned rail lines as mixed use paths, and the general promotion of walking, cycling, and transit-riding.
- *Pedestrian Master Plan* (2002) specifies Safe Routes to Transit as a policy directive and incorporates lane conversion projects (as per the *Bicycle Master Plan*) as pedestrian safety improvements.
- *Open Space, Conservation, and Recreation Element* (1996) describes the creation of linear parks that include mixed use paths and calls for the creation of a Bicycle Trail Plan as part of the Land Use and Transportation Element.

The following plans have bicycle-related proposals for specific areas of Oakland. The list includes some streetscape projects that do not explicitly address bicycle access to note potential conflicts with the bikeway network. All plans were completed by the City of Oakland except for those where another agency or organization is specified.

- *23rd Ave Community Action Plan* (Urban Ecology, 2005) calls for the re-striping of Foothill Blvd (14th Ave to 23rd Ave) to include bicycle lanes and improve pedestrian safety (p. 53).
- *Acorn-Prescott Neighborhood Transportation Plan* (1999) identifies the need for more bikeways connecting to regional routes, Mandela Parkway, and Jack London Square (pp. 2-12, 3-11).

- ***Clinton Park Plan*** (Urban Ecology, 1999) identifies improvements in the Eastlake neighborhood including bicycle lanes on E 12th St and E 14th St (now International Blvd) and bicycle parking as well as wayfinding signage in the park (pp. 17, 27-28).
- ***Coliseum BART to Bay Trail Connector*** (Alameda County Public Works Agency, 2003) evaluates alternatives for creating a mixed-use path from Coliseum BART along the Damon Slough and the 66th Ave overcrossing to the Bay Trail at Martin Luther King Jr Regional Shoreline Park.
- ***Downtown Oakland Streetscape Master Plan*** (2003) proposes improvements to the following streets with existing or proposed bikeways: Washington St (Embarcadero to 10th St), Telegraph Ave (Broadway to 40th St), Webster St (Embarcadero to 12th St), Oak St (Embarcadero to 14th St), Lakeside Dr (14th St to 20th St), 9th St (Martin Luther King Jr Wy to Alice St), 14th St (I-980 to Lake Merritt), and 20th St (San Pablo Ave to Harrison St).
- ***Downtown Transportation and Parking Plan*** (Draft 2003, not adopted) reiterates the proposed bikeways in the 1999 *Bicycle Master Plan* (pp. 21-23).
- ***Fruitvale Alive! Community Transportation Plan*** (2005) recommends an arterial bicycle route on Fruitvale Ave (MacArthur Blvd to International Blvd). The plan recommends against this treatment on Coolidge Ave (MacArthur Blvd to Foothill Blvd) due to narrow travel lanes (pp. 59-61).
- ***Gateway to the East Bay: Final Reuse Plan for the Oakland Army Base*** (2002) includes the Port of Oakland Development area (Port expansion) and the mixed commercial Gateway Development Area (Redevelopment Agency). This development will likely shape how the Bay Bridge Eastern Span Path connects to the local bike-way networks in Oakland and Emeryville.
- ***Hegenberger Rd/98th Ave Gateway Development Plan*** (1998) does not address bicycle access.
- ***International Blvd Main Street Project*** (2001) does not address bicycle access.
- ***International Boulevard Urban Design Plan*** (2001) does not address bicycle access within its four target areas on International Blvd (40th to 44th Ave, 72nd to 75th Ave, 80th to 89th Ave, 105th to Durant Ave).
- ***Lake Merritt Channel Estuary Park Bike and Pedestrian Trail: Final Design Development Report*** (2000) describes mixed-use paths along (1) both sides of the Lake

Merritt Channel (under I-880); and (2) along the abandoned Union Pacific rail corridor between Victory Ct (near Fallon St) and 5th Ave.

- ***Lake Merritt Park Master Plan*** (2002) includes continuous on- and off-street bike-ways around Lake Merritt (p. III-11).
- ***MacArthur BART Station West Side Pedestrian Enhancement Project*** (2004) includes bicycle lanes on 40th St (Martin Luther King Jr Wy to Telegraph Ave) (p. 45).
- ***MacArthur Blvd Conceptual Streetscape Improvement Plan*** (2001) does not address bicycle access within its project area on MacArthur Blvd (73rd Ave to Durant St).
- ***Mandela Parkway Corridor Plan*** (1997) proposes bicycle lanes and a mixed-use median path as part of the Bay Trail (p. iv).
- ***Middle Harbor Shoreline Park Public Access Feasibility Study*** (Port of Oakland, 2001) evaluates three bicycle access alternatives for connecting the park via Middle Harbor Rd to the greater Oakland area: (1) Embarcadero; (2) Adeline St; and (3) 7th St (pp. 3-1 to 3-16).
- ***Oakland Waterfront Trail: Bay Trail Feasibility & Design Guidelines*** (2003) identifies 37 segments of mixed-use path along the waterfront between Jack London Square and 66th Ave. Key connections to the neighborhoods (and across I-880) include Washington St, Webster St, Madison St, Oak St, 5th Ave, 16th Ave, 23rd Ave, Fruitvale Ave, High St, and 66th Ave.
- ***Park St Triangle Traffic Study*** (2005) addresses overall traffic circulation, including bicycle access, in the area bounded 23rd Ave, 29th Ave, Ford St, Park St Bridge, and the proposed Waterfront Trail.
- ***Revive Chinatown Community Transportation Plan*** (2004) includes a bikeway on 9th St in conjunction with the conversion of this street from one-way to two-way traffic flow. Because of double parking in the Chinatown core, it recommends an arterial bicycle route from Broadway to Harrison with bicycle lane connections on either side (p. 70).
- ***Telegraph Avenue Pedestrian Streetscape Improvement Project*** (2005) notes that Telegraph Ave (20th St to 55th St) is a proposed bikeway in the city, county, and regional bicycle plans but does not address bicycle access as part of its scope (p. 1).

- ***Telegraph-Northgate Neighborhood Plan*** (2000) addresses Telegraph Ave (21st to 27th St) and reiterates the 1999 *Bicycle Master Plan*'s proposal for bicycle lanes on Telegraph Ave (p. 52).
- ***West Oakland Community-Based Transportation Plan*** (2006) includes the following priority bikeway projects: (1) Market St bicycle lanes (MacArthur Blvd to 3rd St); (2) W Grand Ave bicycle lanes (Mandela Pkwy to Market St), and (3) 14th St bicycle lanes (Mandela Pkwy to Martin Luther King Jr Wy).

C.3 Adjacent Jurisdictions

Oakland shares borders with the cities of Alameda, Berkeley, Emeryville, Piedmont, and San Leandro. It also adjoins land under the jurisdiction of the Port of Oakland and the East Bay Regional Park District. This plan's proposals were coordinated with these agencies to help ensure direct and intuitive bikeways across these borders. In particular, the following areas received detailed consideration:

- Bay Bridge Eastern Span Bicycle and Pedestrian Path: facilitating the connections between this future path and the local bikeway networks in Oakland and Emeryville.
- Berkeley and Emeryville: ensuring that the bikeway connections at city borders are direct and intuitive from the bicyclist's perspective.
- Piedmont: developing recommended bikeways through Piedmont to ensure the connectivity of Oakland's adjoining bikeways. The bikeways in Piedmont on the map of Oakland's bikeway network were vetted with City of Piedmont staff.
- Port of Oakland: facilitating the implementation of the San Francisco Bay Trail and ensuring bicycle access to the Oakland International Airport.
- San Pablo Avenue corridor: promoting a direct connection between downtown Oakland, Emeryville and West Berkeley.

The results of these collaborations are included on the map of Oakland's bikeway network. Note that this map also includes the existing and proposed facilities in adjoining jurisdictions. The most recently adopted plans for the adjoining jurisdictions are:

- Alameda: ***Bicycle Master Plan*** (1999, readopted 2002)
- Berkeley: ***Bicycle Plan*** (2000), ***Bicycle Plan Update: An Addendum to the 2000 Berkeley Bicycle Plan*** (2005)

- Emeryville: *Bicycle and Pedestrian Plan, 1998-2010* (1998)
- Piedmont does not have a bicycle plan but has expressed interest in developing one based on the recommended bikeways developed in discussions between Piedmont and Oakland staff as part of this planning process.
- San Leandro: *Bicycle and Pedestrian Master Plan* (2004)

C.4 County and Regional Planning

The following county- and regional-level plans, studies, and reports contain proposals that intersect with Oakland's bikeway network. They are itemized here to facilitate ongoing discussion regarding their implementation.

Alameda-Contra Costa Transit District (AC Transit)

- *Berkeley/Oakland/San Leandro Major Investment Study* (2001) examines multiple alignments and transit technologies to identify opportunities for a major investment in East Bay transit service. The study's preferred alternative is bus rapid transit (BRT) in the Telegraph Ave/International Blvd corridor.
- *Designing with Transit: Making Transit Integral to East Bay Communities* (2004) provides policies and best practices for land use and street design to strengthen transit service.
- *Short Range Transit Plan, 2003-2012* (2003) is the guiding document for how AC Transit will provide service over the next ten years. The plan is updated every three years. The 2003 document emphasizes preservation of the existing system (in response to fiscal constraints) and strategic investment on the most heavily used lines.
- *Strategic Vision: A World Class Transit System for the East Bay, 2001-2010* (2002) identifies the policy direction for AC Transit's long term investments: service and capital improvements on the major trunk lines to develop Enhanced Bus routes and Bus Rapid Transit on the corridors with the greatest potential ridership.

Alameda County Congestion Management Agency

- *Alameda Countywide Bicycle Plan* (2006) identifies and prioritizes bikeways of countywide significance that link local jurisdictions and major destinations. See Figure H.7 for the countywide and regional bikeways in Oakland.

- ***San Pablo Ave Corridor Study*** (1997) addresses inter-jurisdictional coordination on transportation improvements between Albany, Berkeley, Emeryville, Oakland, and AC Transit with a major focus on rapid bus service. Proposed bicycle projects include parking, support facilities, improved transit connections, and a corridor bike-way project that would parallel San Pablo Ave.
- ***Transit Operations and Traffic Engineering Analysis for the Grand-MacArthur BRT Project in Oakland*** (2006) provides corridor-wide and segment-specific improvements to the AC Transit NL line, primarily on Grand Ave (Maritime St to MacArthur Blvd), MacArthur Blvd (Grand Ave to 73rd Ave), and 20th St (San Pablo Ave to Harrison St).

Association of Bay Area Governments (ABAG)

- ***Bay Trail: Planning for a Recreational Ring Around San Francisco Bay*** (1989) proposes the development of a 400-mile mixed-use path circling the bay.
- ***San Francisco Bay Trail Project Gap Analysis Study*** (2005) develops costs, strategies, and an overall timeframe for completing the Bay Trail. When complete, the trail will link the waterfronts of 47 cities and all nine Bay Area counties. At the time of the study, half of the length of the 500-mile Bay Trail was complete.

Bay Area Rapid Transit District (BART)

- ***Bicycle Access and Parking Plan, Volume 1*** (2002) identifies strategies for increasing BART's bicycle mode share. It addresses the system-wide issues of promoting bicycling to BART and accommodating bicyclists at stations.
- ***Bicycle Access and Parking Plan, Volume 2*** (2003) describes the existing conditions and needs and makes recommendations to improve bicycle access and parking at individual stations. Plans for Oakland stations are completed for Coliseum/Oakland Airport (March 2003) and West Oakland (March 2003).
- ***Station Access Plans*** (various dates) identify station-area improvements to reduce the drive alone mode share to BART stations by promoting other modes. Plans for Oakland stations are completed for Coliseum (2002), Fruitvale (2002), Lake Merritt (2006), and West Oakland (2002).
- ***Transit-Oriented Development Policy*** was adopted 14-Jul-05 by the BART Board of Directors. Goal D specifies, "Reduce the access mode share of the automobile by

enhancing multi-modal access to and from BART stations in partnership with communities and access providers.” Land Use Strategy D includes, “Encourage direct connections to stations from surrounding development in order to promote pedestrian and non-motorized access.”

East Bay Regional Park District

- ***East Bay Regional Park District Master Plan*** (1997) includes the following two “Potential Regional Trails”: 1E San Francisco Bay Trail (Martin Luther King Jr Regional Shoreline to Eastshore State Park); and 14 Redwood Regional Park to Lake Merritt (via Shepherd Canyon, Dimond Canyon, and Trestle Glen).

Metropolitan Transportation Commission (MTC)

- ***Regional Bicycle Plan*** (2001) recommends a 1,894-mile bikeway network throughout the nine county Bay Area with 418 miles in Alameda County. The regional network in the East Bay is a subset of the bikeways identified in the Alameda Countywide Bicycle Plan. See Figure H.7 for the countywide and regional bikeways in Oakland.
- ***Transportation 2030 Plan for the San Francisco Bay Area*** (2005) is the region’s 25-year plan for transportation funding and improvements. The Calls to Action relating to bicyclists include developing a policy on routine accommodation, improving data collection, supporting Safe Routes to Schools programs, and encouraging more funding through countywide sales taxes and the Transportation for Livable Communities program (pp. 56-58).

San Francisco Bay Conservation and Development Commission

- ***San Francisco Bay Plan*** (1969) is the guiding document for the Bay Conservation and Development Commissions (BCDC) regulation of shoreline development. It contains policies and land use maps that are amended through an ongoing review process as specified by the McAteer-Petris Act (1965), the state legislation that established the Commission and called for the creation of this plan.
- ***Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay*** (2005) is a design resource for providing maximum feasible public access to the Bay as part of new development within 100 feet of the shoreline.

D. Oakland General Plan Policies

This appendix collects all of the objectives, policies, and actions from Oakland's *General Plan* that are related to bicycles. These references are from the following three documents: *Land Use and Transportation Element* (1998), *Open Space, Conservation, and Recreation Element* (1996), and *Estuary Policy Plan* (1999).

Land Use and Transportation Element (1998)

Objective T3, Transportation Networks: Provide a hierarchical network of roads that reflects desired land use patterns and strives for acceptable levels of service at intersections (p. 56).

Policy T3.4, Emerging New Technologies: The City should encourage the use of new technologies in traffic control devices to maximize efficiency of car, bicycle, and pedestrian traffic (p. 57).

Policy T3.5, Including Bikeways and Pedestrian Walks: The City should include bikeways and pedestrian walks in the planning of new, reconstructed, or realized streets, wherever possible (p. 57).

Objective T4, Alternative Modes of Transportation: Increase use of alternative modes of transportation (p. 58).

Policy T4.1, Incorporating Design Features for Alternative Travel: The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking (p. 58).

Policy T4.2, Creating Transportation Incentives: Through cooperation with other agencies, the City should create incentives to encourage travelers to use alternative transportation options (p. 58).

Policy T4.5, Preparing a Bicycle and Pedestrian Master Plan: The City should prepare, adopt, and implement a Bicycle and Pedestrian Master Plan as a part of the Transportation Element of this General Plan (p. 58).

Policy T4.7, Reusing Abandoned Rail Lines: Where rail lines (including siding and spurs) are to be abandoned, first consideration should be given to acquiring the line for transportation and recreational uses, such as bikeways, footpaths, or public transit (p. 59).

Policy T4.8, Accommodating Multiple Types of Travel on the Bay Bridge: The City should encourage the design and engineering for the new Bay Bridge to accommodate multiple means of access and travel by automobiles, transit, bicycles, pedestrians, and future mass transit (p. 59).

Policy T4.10, Converting Underused Travel Lanes: Take advantage of existing transportation infrastructure and capacity that is underutilized. For example, where possible and desirable, convert underused travel lanes to bicycle or pedestrian paths or amenities (p. 59).

Policy T6.3, Making the Waterfront Accessible: The waterfront should be made accessible to pedestrians and bicyclists throughout Oakland (p. 60).

Objective T7, Air Quality: Reduce air pollutants caused by vehicles (p. 61).

Policy W2.1, Linking Neighborhoods with the Waterfront: All recreational activity sites along the waterfront should be connected to each other to create continuous waterfront access. Safe and direct automobile, bicycle, pedestrian, and waterway access between the waterfront and adjacent neighborhoods should be created and strengthened (p. 78).

Policy W2.5, Improved Railroad Crossings: To create safe access to the water pedestrian, bicycle, and automobile railroad crossings should be provided where feasible. Crossings could include grade separations, at-grade crossings, skyway bridges, or connections between buildings (p. 79).

Policy W10.6, Specifying Public Access and Linkages: Public Access along the estuary should be facilitated by commercial and active residential uses. It is important to have physical access to and between uses and activities along the waterfront, particularly along the shoreline. Opportunities for landscaped and signed linkages along Broadway, Webster, Harrison, and Oak streets, as well as the Lake Merritt Channel, should be developed for (land and water) auto, bicycle, pedestrian, and public transportation (p. 96).

Policy N7.4, Designing Local Streets: Local streets should be designed to create an intimate neighborhood environment and not support high speed nor large volumes of traffic. Providing on-site parking for cars and bicycles, planting and maintaining street trees, and landscaping, minimizing the width of driveway curb cuts, maintaining streets, bike routes, and sidewalks, and orienting residential buildings toward the street all contribute to the desired environment (p. 110).

Open Space, Conservation, and Recreation Element (1996)

Objective OS-5, Linear Parks and Trails: To develop a system of linear parks and trails which (a) links existing parks together; (b) provides safe, convenient access to open space

from residential areas and employment centers; (c) provides places to hike, bike, and experience Oakland's scenery; and (d) provides a means of moving from one place to another without an automobile (p. 2-33).

Policy OS-5.2, Joint Use of Rights-of-Way: Promote the development of linear parks or trails within utility or transportation corridors, including transmission line rights-of-way, abandoned railroad rights-of-way, and areas under the elevated BART tracks (p. 2-37).

Policy OS-5.3, Trail Design Principles: Plan and design all new trails in a manner which: (a) minimizes environmental impacts; (b) fully considers neighborhood privacy and security issues; (c) involves the local community in alignment and design; and (d) considers the needs of multiple users, including pedestrians, bicycles, and wheelchairs (p. 2-39).

Action OS-5.3.2, Preparation of Bicycle Trail Plan: Develop a Bicycle Trail Plan as part of the Land Use and Transportation Element Update (p. 2-40).

Policy OS-7.5, Lateral Access and Links to the Flatlands: Improve lateral access along the Oakland shoreline and linkages between the shoreline and nearby neighborhoods by creating a Bay Trail along the length of the Oakland waterfront. Where an alignment immediately along the waterfront is not possible, site the trail as close to the water as possible, with spur trails leading to the water's edge. In the transitional areas between Jack London Square and High Street, interim alignments may be designated along local streets but the ultimate goal should be an unbroken trail along the water's edge between Jack London Square and Martin Luther King, Jr. Regional Shoreline (p. 2-53).

Action OS-7.5.4, Improvements to 16th and 66th Avenue Overcrossings: Work with Caltrans to program pedestrian/bicycle lanes on the 16th and 66th Avenue overcrossings of Interstate 880 (p. 2-55).

Policy CO-12.1, Land Use Patterns which Promote Air Quality: Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis (p. 3-52).

Policy CO-12.2, Coordinated Transportation Systems: Maintain a coordinated bus, rail, and ferry transit system which provides efficient service to major destinations and promotes alternatives to the single passenger auto (p. 3-53).

Action CO-12.2.3, Improved Bicycle and Pedestrian Systems: Develop a viable bicycle

and pedestrian circulation system, with routes providing safe, convenient access between residential neighborhoods and employment centers (p. 3-54).

Estuary Policy Plan (1999)

Objective C-2: Establish a continuous waterfront parkway; a safe promenade for pedestrians, bicycles, and slow-moving automobiles (p. 48).

Objective C-6: Improve pedestrian and bicycle circulation (p. 49).

Policy JL-15: Enhance bicycle circulation through the Jack London District (p. 80).

- JL-15.1: Provide bike lanes on Second and Third Streets.
- JL-15.2: Establish bike lanes on Washington Street.
- JL-15.3: Provide bike storage areas in appropriate locations.

Policy OAK-1.2: Provide for continuous pedestrian and bicycle movement along the water's edge (p. 87).

Policy OAK-3: Link the Estuary to Lake Merritt by enhancing the Lake Merritt Channel (p. 92).

Policy OAK-9: Improve the Embarcadero east of Oak Street as a multimodal landscaped parkway with bicycle, pedestrian and vehicular facilities (p. 97).

Policy SAF-9: Provide a continuous Embarcadero Parkway from Ninth Avenue to Damon Slough (p. 116)

- SAF-9.1: In conjunction with the extension and enhancement of Embarcadero Parkway, provide a continuous bikeway from Ninth Avenue to Damon Slough.

E. Oakland Municipal Code

In addition to the California state codes, the Oakland Municipal Code (OMC) legislates the use, registration, sale, and promotion of bicycles in Oakland. This section provides summaries and excerpts for all substantive references to bicycles in the OMC. Note that some of these provisions, like the Employer-based Trip Reduction Program (Chapter 10.68), are outdated and potentially in conflict with prevailing laws. Action 2B.4 of this plan recommends that the bicycle-related sections of the Oakland Municipal Code be examined and revised as needed.

The OMC is available on-line at <http://bpc.iserver.net/codes/oakland>.

Chapter 10.04 General Provisions

10.04.040 Definitions of words and phrases.

- Bicycle means every device propelled by human power upon which any person may ride, having two tandem wheels either of which is over twenty (20) inches in diameter, and including any device generally recognized as a bicycle though equipped with two front or two rear wheels.
- Traffic means pedestrians, ridden or herded animals, vehicles, bicycles and other conveyances either singly or together while using any street for purposes of travel.

Chapter 10.16 Miscellaneous Traffic Control Regulations

10.16.130 Regulations of traffic on freeways. No person shall drive or operate any bicycle, motor driven cycle, or any vehicle which is not drawn by a motor vehicle upon any street established as a freeway or limited access highway, nor shall any pedestrian walk across or along any such street so established except in space set aside for the use of pedestrians, provided official signs are in place giving notice of such restrictions.

10.16.150 Bicycles prohibited--General. A. No person shall ride a bicycle which has wheels of twenty (20) inches or greater in diameter or a frame of fourteen (14) inches or greater in length on any sidewalk within the city. This prohibition shall not be applicable to Oakland police officers operating a bicycle while engaged in their assigned duties. B. When appropriate signs are in place giving notice thereof, no person shall ride or otherwise propel any

bicycle in or through that portion of the lower tunnel between the city and Contra Costa County which lies within the corporate limits of the city.

10.16.220 Double penalties for violating traffic regulations in school zones.

Excerpts: B. Proceeds from the collection of fines shall be deposited in a designated Bicycle and Pedestrian School Safety Fund, with the funds used for the creation and maintenance of a comprehensive safe routes to school program, including, but not limited to, the crossing guard program, safety education programs in schools, capital improvements around schools impacting pedestrian and bicycle safety, and tracking and monitoring of safe routes activities.

[Note: The State legislation enabling double fine school zones sunseted at the end of 2006.]

Chapter 10.68 Employer-based Trip Reduction Program

Summary: This chapter requires Oakland employers with 100 or more employees at a single work site to develop and implement a trip reduction plan that promotes the use of transportation alternatives. The plan may include the employer providing bicyclists with information, travel allowances, and facilities including paths, parking, showers, and lockers.

[Note that this program is no longer active and that this provision in the OMC may be in conflict with prevailing laws.]

Chapter 12.08 Encroachments

12.08.100 Extent of encroachment.

Excerpts: No major or minor encroachment into the public right-of-way may be granted unless a minimum clear space of five and one-half feet remains open for public use in the sidewalk area. Bicycle racks and flagpole sockets may be placed in the area near a curb face if properly located and an encroachment permit is obtained.

[The City of Oakland does not require an encroachment permit of itself for installing a bicycle rack within the City's right-of-way. The permit requirement applies to other entities seeking to install racks in the public right-of-way.]

Chapter 12.60 Bicycles

12.60.010 Bicycle license required. It is unlawful for any person to operate or use a bicycle, as defined in Section 39000 of the California Vehicle Code, upon any street in the city of

Oakland without first obtaining a California Bicycle License therefore.

[Note: The Oakland Police Department has not been enforcing this provision of the Oakland Municipal Code. Section 39002(a) of the California Vehicle Code allows local jurisdictions to require licenses by ordinance. State law does not require bicycle licenses.]

12.60.020 Bicycle license–Issuance. The Chief of Police is authorized and directed to issue a registration card and a California bicycle license which, when issued, shall entitle the licensee to operate such bicycle for which said license has been issued, upon all streets, exclusive of sidewalks, in the city for the calendar year or portion thereof for which said license is issued.

[Note: Bicycle licenses are issued in Oakland by the Fire Department.]

12.60.030 Bicycle license plates and registration cards–Loss. It shall be the duty of the Chief of Police to cause to be attached to the frame of each bicycle a California bicycle license, and to issue a registration card to the licensee upon payment of the license fee provided for in this chapter. Upon loss or mutilation of a license, the licensee shall report said loss within seven days. Upon receipt of such report, the Chief of Police shall cancel such license and issue a new license.

12.60.040 Bicycle and bicycle parts business reports. All persons engaged in the business of buying secondhand bicycles or secondhand bicycle parts are hereby required to make a daily report to the Chief of Police, giving the name and address of the person from whom each bicycle or bicycle part is purchased, the description of each bicycle or bicycle part purchased, the frame number or numbers of each bicycle purchased and the number of license found thereon, if any. All persons engaged in the business of selling new or secondhand bicycles or new or secondhand bicycle parts are required to make a daily report to the Chief of Police, giving a list of all sales made by such dealers, which list shall include the name and address of each person to whom sold, the kind of bicycle or bicycle part sold, together with a description thereof and frame number or numbers of each bicycle and the number of the license attached thereto, if any. Junk collectors and junk dealers, as defined in Chapter 5.04 of this code and secondhand dealers and exchange dealers as defined in Chapter 5.46 are required to make daily reports, as in this section provided, for any transaction involving secondhand bicycles or secondhand bicycle parts.

12.60.050 Bicycle licensees report of sale, transfer of registration, or change of address. It shall be the duty of every person who sells or transfers ownership of any bicycle licensed hereunder to report such sale or transfer by returning to the Chief of Police the registration card issued to such person as licensee thereof, together with the name and address of the person to whom said bicycle is sold or transferred, and such report shall be made within ten days of the date of said sale or transfer. It shall be the duty of the purchaser or transferee of

such bicycle to apply for a transfer of registration thereof within ten days of the date of said sale or transfer. Whenever the owner of a bicycle licensed pursuant to this code changes his or her address, he or she shall within ten days notify the Chief of Police of the old and new address.

12.60.060 Destroying bicycle numbers or licenses. It is unlawful for any person to willfully or maliciously remove, destroy, mutilate or alter the number of any bicycle frame licensed pursuant to the provisions of this chapter. It is also unlawful for any person to remove, destroy, mutilate or alter any license plate, seal or registration card during the time in which said license plate, seal or registration card is operated; provided, however, that nothing in this chapter shall prohibit the Chief of Police from stamping numbers on the frames of bicycles on which no serial number can be found, or on which said number is illegible or insufficient for identification purposes.

12.60.070 Bicycle operation rules--Violation--Penalty. It is unlawful to operate a bicycle on any trail within the city in an unsafe, reckless, dangerous or negligent manner. No person shall operate a bicycle in excess of fifteen (15) miles per hour, nor in excess of five miles per hour when passing pedestrians or equestrians or when approaching and negotiating a blind turn, nor at a greater speed than is reasonable or prudent. Within city parks, bicyclists can ride on named trails only and are prohibited from operating bicycles off-trail. Bicyclists must obey all posted signs and rules. Bicyclists must call out when passing pedestrians, or other bicyclists and then must pass to the left. Bicyclists must yield to equestrians by calling out and requesting instructions to pass. The City Manager, or his or her designees, shall determine trail accessibility for bicyclists. Any person who violates this section shall be guilty of an infraction punishable as provided in Chapter 1.28 of this code.

12.60.080 Violation of Sections 12.60.010 through 12.60.060--Fine. Any person who violates or fails to comply with the provisions of Sections 12.60.010 through 12.60.060 shall be subject to a fine of not more than ten dollars (\$10.00).

F. Bikeway Descriptions

This appendix provides narrative descriptions of priority bikeway projects, bicycle paths and bridges, major on-street projects, and proposed changes to existing bikeways.

F.1 On-street Bikeways – Priority Projects

This section provides short, narrative descriptions for the on-street bikeways that are priority projects as per the explanation in Section 6.1. All bicycle paths, including those that are priority projects, are described in Section F.2.

2nd St (Brush St to Oak St) is part of the San Francisco Bay Trail and serves Jack London Square, the Amtrak Station, and the Oakland/Alameda Ferry. This project would upgrade the existing bicycle route to an arterial bicycle route, providing a better connection between the existing bicycle lanes on 3rd St (to the west) and on Embarcadero (to the east).

4th/5th Aves (E 18th St to Embarcadero) would serve the Lake Merritt Commercial District, Eastlake neighborhood, Oakland Unified School District central offices, and Laney College. It would connect these destinations to the waterfront, and the existing bicycle lanes on Embarcadero. Note that 5th Ave provides the only connection between the neighborhoods and the waterfront from Oak St to 16th Ave.

12th St Reconstruction (Lakeside Dr to Foothill Blvd) is part of the Measure DD projects making improvements around Lake Merritt. This project will replace the 12th St Dam (and the temporary bicycle path along its length) with a boulevard-style street including bicycle lanes and traffic signals. This project is critical for connecting the neighborhoods east of the lake with downtown.

14th St (Wood St to Brush St) would create a new bikeway halfway between W Grand Ave and 8th St, providing a direct connection between the center of West Oakland and downtown. The project would connect to the existing bicycle lanes on Mandela Parkway and serve Lowell Middle School.

14th St (Brush St to Lakeside Dr) would extend the above project from West Oakland into downtown and connect to Lake Merritt at the 12th St Reconstruction. 14th St is only east-west street in the downtown that is not a freeway access route and connects to both West Oakland and Lake Merritt. As such, it provides the key east-west bikeway between Grand Ave and Jack London Square. Note that the 11th/12th St couplet provides the primary east-west bus access across downtown.

APPENDIX F. BIKEWAY DESCRIPTIONS

121

16th Ave (Foothill Blvd to Embarcadero) would connect San Antonio Park (near Roosevelt Middle School) to the waterfront via the 16th Ave Bridge. For the foreseeable future, this bikeway would provide the only bicycle access to the waterfront between 5th Ave and Fruitvale Ave. The project would build upon the existing bicycle lanes on Embarcadero.

20th St (San Pablo Ave to Harrison St) would serve 19th St BART and the new AC Transit hub between Broadway and Telegraph Ave. The connection to Lake Merritt and Grand Ave (via Harrison St) is especially important given the current number of cyclists from the Adams Point and Grand Lake neighborhoods who are using the Grand Ave bikeway and the 19th St BART station.

38th Ave (MacArthur Blvd to E 12th St) provides a preferred alternative alignment to both 35th Ave and High St. A portion of 38th Ave has surplus width that is well-suited for bicycle lanes. This project is especially important for connecting residents of the Allendale and Laurel Districts to the BART system via a quality bikeway. Note that 38th Ave provides the only good cross-town bikeway between Fruitvale Ave and 55th Ave.

40th St (Emeryville border to Telegraph Ave) would connect Emeryville's bikeway network to the MacArthur BART station. The project would also link to the existing bikeways on Market St and West St. Access on the east side of MacArthur BART would be provided via MacArthur Blvd and 41st St.

53rd St/55th St/Cavour St (Emeryville border to Shafter Ave) would provide a cross-town connection in North Oakland between Emeryville and the Rockridge commercial district. Major destinations include Rockridge BART, Department of Motor Vehicles, Children's Hospital, and Emery High School. The bikeway would use some local streets for bicycle boulevards while making use of available width on 55th St for bicycle lanes. It would connect the existing Horton St bikeway in Emeryville with the existing Webster/Shafter bikeway in North Oakland.

104th/105th/106th Aves (Stanley Ave to Edes Ave) would provide a cross-town connection in East Oakland between Sobrante Park and Toler Heights, serving the Edes Ave and Elmhurst commercial districts. It provides the best alternative to 98th Ave and makes use of available width on 105th Ave for bicycle lanes.

Bancroft Ave (66th Ave to 82nd Ave) is the remaining project to complete the Bancroft bikeway from 42nd Ave to the San Leandro border. This bikeway continues on Bancroft Ave across the city of San Leandro. The gap closure would connect to the existing 73rd Ave bikeway and provide improved access to Eastmont Town Center and Transit Center as well as Arroyo Viejo Park. The project is also in proximity to Castlemont High School.

Broadway (Keith Ave to MacArthur Blvd) would extend the existing bikeway on Broadway (MacArthur Blvd to 25th St) to the Upper Rockridge neighborhood. Key destinations

include the Rockridge commercial district, California College of the Arts, Oakland Tech High School, Kaiser Hospital, and Mosswood Park. This bikeway also serves as an important commuter corridor into downtown Oakland.

Camden/Havenscourt (MacArthur Blvd/International Blvd) would connect the neighborhoods of Millsmont, Picardy, Havenscourt, and Lockwood using available street width for bicycle lanes. Major destinations include Mills College, Frick Middle School, and Havenscourt Middle School. As part of separate projects, this bikeway would ultimately connect to the Coliseum, Coliseum BART, Amtrak, and the Martin Luther King, Jr Regional Shoreline.

College Ave (Alcatraz Ave to Broadway) would serve the Rockridge commercial district, Claremont Middle School, and Rockridge BART, connecting to the Webster/Shafter bikeway and the Skyline regional bikeway (via Chabot Rd). No alternative alignment is possible given the absence of streets parallel to College Ave. Arterial bicycle route improvements are proposed given this lack of alternatives and the number of bicyclist-involved collisions on College Ave. At Alcatraz, the bikeway would jog off of College Ave to Berkeley's Hillegass bicycle boulevard.

E 12th St (1st Ave to Fruitvale Ave) would connect the Measure DD projects around Lake Merritt to Fruitvale BART. It would be the primary bikeway linking downtown to the neighborhoods east of the lake including Eastlake, San Antonio, 23rd Ave, and Fruitvale. E 12th St provides an alternative alignment to International Blvd for minimizing conflicts with AC Transit bus lines.

E 12th St (Fruitvale Ave to 40th Ave) would connect Fruitvale BART to the other E 12th St bikeway project and to the 38th Ave bikeway project extending to the Laurel District. This stretch of E 12th St is called out as a separate project due to roadway characteristics different from those to the west of Fruitvale Ave.

E 7th St (Kennedy St to Fruitvale Ave) would upgrade an existing bicycle route to a bicycle boulevard. This bicycle route connects the existing bicycle lanes on Embarcadero and Fruitvale Ave. This on-street component of the San Francisco Bay Trail is an important facility for utilitarian bicycle trips given its low motor vehicle volumes and its connection to downtown.

Foothill Blvd (23rd Ave to Fremont Wy) would connect through the Fruitvale to the San Antonio and Melrose neighborhoods. Major destinations include Roosevelt Middle School, Foothill/Fruitvale commercial district, Cesar Chavez Park, Fremont High School, Fremont Pool, and Melrose Library. The stretch of Foothill Blvd provides the only viable east-west bikeway between MacArthur Blvd and E 12th St. Nearby local streets do not provide

APPENDIX F. BIKEWAY DESCRIPTIONS

123

alternatives because of discontinuities in the street grid and significant hills along Peralta and Courtland Creeks.

Fruitvale Ave (MacArthur Blvd to Foothill Blvd) would connect the Dimond and Fruitvale neighborhoods, serving Dimond Park, Dimond Library, Dimond commercial district, Patten University, and the Foothill/Fruitvale commercial district. Coolidge Ave does not provide a viable alternative given its narrower street width and existing motor vehicle volumes.

Fruitvale Ave (Foothill Blvd to E 12th St) would extend the Fruitvale Ave project described above to Fruitvale BART and the existing bicycle lanes on Fruitvale Ave below E 12th St. While parallel streets could serve the BART station, only Fruitvale Ave provides a direct connection between the Dimond, the Fruitvale, BART, Waterfront Trail, and the City of Alameda.

Grand Ave (Mandela Pkwy to Market St) would close the gap between the existing bicycle lanes on Grand Ave and those on Mandela Pkwy. Nearby destinations include McClymonds High School and the West Oakland Library. This connection would provide for continuous bikeways from Lake Merritt through West Oakland to both Emeryville and Jack London Square. This portion of West Grand Ave would also provide the direct connection the forthcoming bicycle path on the eastern span of the Bay Bridge.

Lakeshore Ave (MacArthur Blvd to E 12th St) is part of the improvements identified in the Lake Merritt Park Master Plan and funded by Measure DD. The project would connect the Grand Lake to the Lake Merritt commercial district and into downtown via the 12th St Reconstruction project. It is one in a set of projects for providing continuous on-street bicycle lanes around Lake Merritt. It would connect via El Embarcadero to the existing bicycle lanes on Grand Ave.

MacArthur Blvd (35th Ave to High St) would extend the existing MacArthur bikeway through the Laurel District. It would also connect to the 38th Ave bikeway serving Fruitvale BART. Based on discussions with the Laurel merchants, the proposal is for an arterial bicycle route that would maintain the current roadway configuration with four travel lanes.

MacArthur Blvd (Market St to Broadway) would serve MacArthur BART, Kaiser Hospital, and Mosswood Park. It would connect to the existing bicycle lanes on both Broadway and Market St. This portion of W MacArthur Blvd provides an alternative bikeway alignment to 40th St (Telegraph Ave to Broadway), minimizing the potential conflicts with AC Transit bus service in the vicinity of the MacArthur BART transit hub.

MacArthur Blvd (Park Blvd to Lincoln Ave) would close a key gap in the MacArthur bikeway, providing a continuous connection from the Grand Lake (at Lakeshore Ave) to the

Laurel (at 35th Ave). It would serve both Edna Brewer Middle School and Oakland High School. Westbound access between Ardley Ave and Park Blvd would be provided on Excelsior Ave due to right-of-way constraints and freeway traffic on Chatham Rd.

Madison/Oak/Lakeside Dr (2nd St to Grand Ave) provides for part of the continuous bicycle lanes around Lake Merritt as well as the on-street bikeway between Lake Merritt and Jack London Square. Major destinations include the Main Library, Alameda County Courthouse, Oakland Museum, Kaiser Convention Center, Laney College, Lake Merritt BART, 19th St BART, and the Jack London Amtrak Station.

Market St (Berkeley border to Adeline St) is a gap closure project between the existing bicycle lanes on Market St and the existing bicycle boulevard on California and King Streets in Berkeley. The project would improve the connections to both Ashby BART and Children's Hospital.

Market St (MacArthur Blvd to 3rd St), in conjunction with the Market St project described above, would complete the Market St bikeway. It would provide a continuous bikeway from Jack London Square to Solano Ave in North Berkeley via the California/King bicycle boulevard. It would serve McClymonds High School, Lowell Middle School, and improve connections to both MacArthur BART and West Oakland BART.

Mountain Blvd (Lake Temescal Path to Park Blvd) would connect the Montclair District and the Shepherd Canyon Path to Lake Temescal and the Skyline Regional Bikeway (on upper Broadway). The project would also connect to the proposed Park Blvd Path along Dimond Canyon (between Mountain Blvd and Leimert Blvd). Taken together, these projects would dramatically improve bicycle access in the greater Montclair area.

San Leandro St (66th Ave to 85th Ave) would provide direct access to Coliseum BART and Amtrak. The endpoints of 66th Ave and 85th Ave are significant because these streets provide access to the neighborhoods north of the station area. On the south side, 66th Ave would connect to the San Francisco Bay Trail (at Martin Luther King, Jr Regional Shoreline) while 85th Ave would serve the neighborhoods of Brookfield Village, Columbian Gardens, and Sobrante Park.

Telegraph Ave (Aileen St to 20th St) would extend the existing bicycle lanes in North Oakland and in Berkeley into downtown Oakland. Major destinations include 19th St BART, Summit Medical Center, MacArthur BART, Temescal Library, and the Northgate and Temescal commercial districts. Telegraph Ave would provide a direct connection between downtown Oakland and the University of California, Berkeley. This bikeway is provisionally designated as part of the proposed bikeway network. This provisional designation will only be lifted, and this bikeway automatically incorporated into the proposed

bikeway network, if further environmental review is performed and appropriate CEQA findings are adopted by the City.

Telegraph Ave (20th St to Broadway) would serve the emerging Uptown district. Major destinations include Frank Ogawa Plaza, 12th St BART, 19th St BART, and the AC Transit hub on 20th St (at Telegraph Ave). This portion of Telegraph Ave also provides a viable alternative to Broadway for bicycling into downtown.

Washington/Clay Sts (Telegraph Ave to 2nd St) would improve and extend portions of an existing bicycle route. Major destinations include Jack London Square, Oakland Ferry Terminal, Old Oakland, Oakland Convention Center, Federal Building, State Building, and Frank Ogawa Plaza. By connecting to Telegraph Ave via 16th and 17th Streets, this project provides an alternative to Broadway for the west side of downtown.

Webster/Franklin couplet (25th St to 8th St) would provide an alternative to Broadway for the east side of downtown. Major destinations include the Kaiser Building and surrounding office towers, 19th St BART, 12th St BART, and Chinatown. The project would connect to the existing bicycle lanes on Broadway above 25th St, providing a key commuter bikeway into downtown.

Webster/Shafter/Forest/Colby (Berkeley border to 29th St), known as the Webster/Shafter bikeway, is an existing route on local streets that provides an important (but less direct) alternative to Broadway and Telegraph Ave. The project would improve the route as a bicycle boulevard, connecting to the Hillegass bicycle boulevard in Berkeley. The route serves the Rockridge BART and commercial district, Studio One Arts Center, Temescal Pool, Temescal commercial district, Carter Middle School, Mosswood Park, and Summit Medical Center.

F.2 Bicycle Paths and Bridges

The following bicycle paths and bridges are included in the proposed bikeway network:

- *4th St Path* (existing) connects the end of 4th St (near Fallon St) to the Lake Merritt Channel Path. This path is being reconstructed by Caltrans as part of the seismic retrofit to I-880 in this vicinity.
- *7th St Path* (existing, substandard) connects 7th St at Wood St to Middle Harbor Shoreline Park. Between Wood St and the railroad tracks (immediately west of I-880), the path does not meet Caltrans standards for width or lateral separation from the adjacent roadway.

- *Airport Dr Path* (existing) connects Doolittle Dr to Ron Cowan Pkwy. The path is in the jurisdiction of the Port of Oakland.
- *Bay Bridge Connector Paths* (proposed) would link the bicycle path on the new eastern span of the Bay Bridge to the bikeway networks in Oakland and Emeryville. It includes the following segments: (a) Burma Rd (Bay Bridge Path to Maritime St Path); and (b) Interstate 80 (Burma Rd to Shellmound St/40th St).
- *Brookfield Bridge* (existing) connects Jones Ave to Coral Rd over I-880 near 98th Ave.
- *Burdeck Path* (existing) is parallel to Highway 13 and connects the end of Burdeck Dr to Joaquin Miller Rd at Highway 13.
- *Coliseum BART to Bay Trail Connector Path* (proposed) would link San Leandro St at 73rd Ave to Oakport St at 66th Ave along Damon Slough. Alameda County is the lead agency for this project.
- *East Bay Greenway* (proposed) would create a linear park between Oakland's San Antonio neighborhood (around 16th Ave) and the Fremont BART Station along the BART right-of-way and/or Union Pacific Railroad right-of-way. In Oakland, the proposed greenway would include a bicycle path from Fruitvale BART to the San Leandro border, parallel to San Leandro St.
- *Genoa-King Connector* (proposed) would connect the Genoa St bikeway to the King St bicycle boulevard in Berkeley. This segment would cross the raised medians on Adeline St and Stanford Ave. Because of the associated design issues, it is identified here as path connector.
- *Lake Merritt Channel Path and Bridge* (partially existing) would connect the Oakland Estuary to Lake Merritt via the Lake Merritt Channel. The bicyclist and pedestrian bridge would cross Embarcadero and the adjacent railroad tracks.
- *Lake Merritt Path* (partially existing) will improve the existing path around the perimeter of Lake Merritt as per the Lake Merritt Park Master Plan. It includes a bicycle and pedestrian bridge over the Channel at Lake Merritt.
- *Lake Temescal Bridge* (proposed) would link the Lake Temescal Path to Tunnel Rd near the interchange of Highways 24 and 13.
- *Lake Temescal Path* (existing) connects Broadway to Broadway Terrace between Lake Temescal and Highway 13. This path is in jurisdiction of the East Bay Regional Park District.

- *Leona Quarry Path* (proposed) would connect Mountain Blvd at Edwards Ave to Mountain Blvd at Kunhle Ave, parallel to Interstate 580.
- *Maritime St Path* (proposed) would parallel Maritime St from 7th St to W Grand Ave. This project depends upon the reuse of the Oakland Army Base.
- *Martin Luther King Jr. Regional Shoreline Paths* (partially existing) are the most extensive network of bicycle paths in Oakland. The incomplete segments parallel Doolittle Dr along Airport Channel from Swan Wy to Harbor Bay Pkwy and would connect to the existing network of paths in this regional park.
- *Middle Harbor Rd Path* (proposed) would parallel Middle Harbor Rd from 7th St to the Adeline St overpass near 3rd St. The Port of Oakland would be the lead agency on this project.
- *Oyster Bay Path* (existing) connects the Airport Dr Path (near Ron Cowan Pkwy) to the proposed Oyster Bay Slough Bridge. The path is in the jurisdiction of the Port of Oakland.
- *The Oyster Bay Slough Bridge* (proposed) would connect the Oyster Bay Path to bicycle paths in Oyster Bay Regional Shoreline. The City of San Leandro is the lead agency for this Bay Trail project.
- *Park Blvd Path* (proposed) would parallel Park Blvd along Dimond Canyon from Leimert Blvd to Monterey Blvd.
- *Posey Tube Path* (existing, substandard) connects Jack London Square (at Harrison St and 6th St) to Alameda via the Posey Tube. This path does not meet Caltrans standards for width.
- *Ron Cowan Path* (existing) connects Air Cargo Rd to Airport Dr parallel to Ron Cowan Parkway. This path is within the jurisdiction of the Port of Oakland.
- *San Leandro Creek Path* (proposed) would connect Hegenberger Rd to 98th Ave along San Leandro Creek. This land is under the jurisdiction of the Alameda County Flood Control District.
- *Shepherd Canyon Path* (existing) connects Montclair Village to Saroni Dr via a former railroad right-of-way.
- *Waterfront Trail* (partially existing) would connect Jack London Square to Martin Luther King, Jr. Regional Shoreline along the Oakland Estuary. Of the forty segments that comprise the project, segments #21 and #40 are not paths and thus not

included in the proposed bikeway network. Segment #36 includes a class 2 bicycle lane on Tidewater Ave and it is included as part of the proposed bikeway network as an on-street facility.

F.3 Major On-street Projects

The proposed bikeway network includes the following projects that would require significant transportation analyses or physical modifications beyond those typically associated with on-street bikeways.

One-way to Two-way Street Conversions: While two-way streets are typically preferable for bicycle travel, the *Bicycle Master Plan* does not propose street conversions for this general benefit. Rather, the following one-way to two-way conversions would overcome specific barriers that are embedded in the proposed bikeway network:

- Carlston St (Mandana Blvd to Paramount Rd): This one block segment is a key link in the most level route between the Grand Lake neighborhood and the Leimert Bridge via Mandana Blvd and Sunnyhills Rd. Currently, it is configured as a one-way street in the downhill direction and thus does not accommodate uphill bicyclists. If two-way bicycle travel on this segment should prove infeasible, the plan identifies an alternative but less desirable route via Longridge Rd and Midcrest Rd.
- E 12th St (40th Ave to 44th Ave): This eastbound, one-way segment over the 42nd Ave subway creates a very difficult barrier by forcing westbound cyclists onto High St and International Blvd or San Leandro St. Except for this barrier, E 12th St provides a strongly recommended alternative to both International Blvd and San Leandro St between Fruitvale Ave and 54th Ave. Overcoming this barrier should be a priority in the development of the E 12th St bikeway.
- Webster St (21st St to Grand Ave): The *Bicycle Master Plan* recommends bikeways on Webster St and Franklin St as an alternative to Broadway in the downtown. However, the one-way street system forces cyclists traveling northbound on Franklin St to use Broadway from Franklin St (at 22nd St) to 25th St (at Webster St). In contrast, bicyclists could avoid this constrained section of Broadway if Webster St from 21st St to Grand Ave allowed for two-way travel. Northbound cyclists on Franklin St could then turn right on 21st St, left on Webster St, and meet up with the existing Broadway bicycle lanes where Webster St intersects Broadway at 25th St. If this conversion should be infeasible, the recommended alternative is an arterial bicycle route (Class 3A) on Broadway (22nd St to 25th St).

Right-of-way Constraints: The following segments failed the capacity analysis and do not have a viable alternative. No parallel route exists and no alternative cross-section would adequately accommodate bicycle travel. These segments are central to the overall integrity of the bikeway network and thus could not be eliminated. They are reserved as long-term projects in that their implementation would likely require major roadway reconstruction.

- 14th Ave (E 31st St to E 12th St): 14th Ave provides the most level route up to MacArthur Blvd between Lake Merritt and Fruitvale Ave. However, the available volume data suggest that a lane conversion project may not be feasible on this roadway. Additionally, the existing right-of-way does not provide adequate width for a Class 3A treatment. 13th Ave and 16th Ave (with a connection via E 21st St) could provide a viable alternative if traffic calming were implemented on 13th Ave to discourage through motor vehicle trips.
- 23rd Ave overcrossings (E 12th St to Kennedy St) plus 22nd Ave (Foothill Blvd to E 12th St): The two bridge structures over Interstate 880 and the railroad tracks cannot accommodate bicycle access in their current form. This proposed bikeway segment was retained because it would connect the waterfront with the neighborhoods between 16th Ave and Fruitvale Ave. Bikeway access should be included with any future reconstruction of the 23rd Ave overcrossings.
- High St (E 12th St to Oakport St): This congested and constrained undercrossing of Interstate 880 provides the only access route to the waterfront between Fruitvale Ave and 66th Ave. Under the existing conditions, there is no feasible proposal for bicycle access.

Bridges and Freeway Crossings: In Section F.2, a small number of bicycle bridges are proposed at locations of key importance. But in general, the proposed bikeway network uses existing structures on the roadway network to cross freeways, bodies of water, and railroad tracks. In most cases, these structures were built at a time when bicycle access was not a design consideration and thus these structures often create barriers to bicycle travel. Bridges, underpasses, and tunnels may be too narrow for a quality bicycle facility. Underpasses and tunnels may be poorly lit. At crossings where freeway access is provided, high speed turning movements may create conflicts with bicyclists. In the long term, these structures will be rebuilt for seismic reasons or due to changing needs and priorities. At that time, the redesign of these structures should fully consider improvements to bicycle access as per Actions 1B.3 and 1B.4. These structures include, but are not limited to, the following crossings:

- Lake Merritt Channel at the 12th St Dam, 10th St, and Embarcadero
- Oakland Estuary at the Webster/Posey Tubes, Park St Bridge, Fruitvale Bridge (Miller-Sweeney Bridge), and High St Bridge
- Railroad crossings at Adeline St (near 3rd St), 23rd Ave (near E 12th St), and Hegenberger Rd (near San Leandro St)
- Interstate 580 at Adeline St, Market St, West St, Oakland Ave/Harrison St, Grand Ave, Lakeshore Ave, Park Blvd, MacArthur Blvd (at Buell St), Seminary Ave, Edwards Ave, and 98th Ave
- Interstate 880 at W Grand Ave, Madison St/Oak St, 5th Ave, 23rd Ave, High St, 66th Ave, and Hegenberger Rd
- Interstate 980 at 14th St and 27th St
- Highway 13 at Broadway Ter, Moraga Ave, Park Blvd, Redwood Rd, and Davenport Ave (at Interstate 580)
- Highway 24 at 40th St, Telegraph Ave, Claremont Ave, and Broadway (from Keith Ave to Golden Gate Ave)

F.4 Proposed Changes to Existing Bikeways

This plan includes proposals for upgrading most existing Class 3 bicycle routes to Class 3A arterial bicycle routes or Class 3B bicycle boulevards. (The exceptions are the existing routes above Mountain Blvd.) In addition to these general changes, the following modifications are proposed to existing bikeways:

- *2nd Ave (E 15th St to E 10th St)*: This existing bicycle route will be replaced by bicycle lanes on 1st Ave as per the 12th St Reconstruction project.
- *8th St (Mandela Pkwy to Market St)*: These existing bicycle lanes required the removal of curbside parallel parking in a residential neighborhood that has created conflicts with residents. Consider replacing the bicycle lanes with a bicycle boulevard on this low-volume local street.
- *Broadway (25th St to 2nd St)*: This existing bicycle route is proposed to be replaced by a bikeway on the Webster/Franklin couplet (25th St to 8th St) and the existing bikeway on Washington St (9th St to 2nd St). This rerouting will both reduce conflicts with bus operations and make use of streets where significant bicycle improvements are more likely feasible.

- *Broadway Ter (Lake Temescal Path to Clarewood Dr)*: This existing bicycle route is proposed to be replaced by Broadway to the north and Moraga Ave to the south. This section of Broadway Ter was removed from the bikeway network because of a 250-foot elevation gain with an average slope of 9% and a maximum slope of 11%. See the slope analysis for additional details.
- *Oakport St (High St to Hassler Wy)*: This existing bicycle route is proposed to be replaced with the Waterfront Trail, including bikeways on Tidewater Ave and Edgewater Dr. These alternatives provide a route that is comparably direct while avoiding the freeway traffic and views associated with Oakport St. The existing bicycle route on Hassler Wy (Oakport St to Edgewater St) would also be removed.
- *Mountain Blvd (Broadway Ter to Moraga Ave)*: This existing bicycle route is proposed for some minor rerouting to make use of streets with lower motor vehicle volumes and speeds. In particular, the proposed routing follows Fernwood Dr and uses Mountain Blvd (rather than Moraga Ave) through Montclair Village. See the maps of existing bikeways and the bikeway network for complete details.
- *Ron Cowan Pkwy (Air Cargo Wy to Airport Dr)*: The Port of Oakland proposes to remove these existing bicycle lanes in favor of the existing bicycle path along the same stretch of roadway.

G. Requirements for Bikeway Feasibility Studies

The following requirements for bikeway feasibility studies provide a framework for the development and implementation of segments on the proposed bikeway network as described by the *Bicycle Master Plan*. Proposed bikeways that are not included in the proposed bikeway network would be subject to the same requirements. These requirements provide the mechanism for the environmental clearance of the proposed bikeways in that the application of these requirements would result in the identification and mitigation of potential impacts as described in the associated program EIR.¹ The following requirements apply to all bikeway projects: Data Collection (1), Comparative Analysis of Alternatives (5), Conceptual Plans (6), and Reporting (7). Additional requirements apply to projects of particular types: Analysis of Travel Lane Removal (2), Analysis of Parking Space Removal (3), and Analysis of Bicycle Path Alignment (4).

1. **Data Collection: Base Information.** Obtain recent project area information that may include aerial photos, topography, speed surveys, bicyclist counts, collision history, land uses, and related projects. For bicycle paths, collect project area information as applicable on water resources, biological resources (including sensitive habitats and trees), hazardous materials, and cultural resources.
2. **Analysis of Travel Lane Removal** (*if applicable; see Figure G.1*).
 - (a) **Data Collection: Traffic Counts.** Obtain recent peak period count data of vehicles, pedestrians, transit, and on-street parking at key intersections.
 - (b) **Intersection Operations Analysis.** Identify operating conditions at key intersections under four scenarios (existing, existing plus project, cumulative, cumulative plus project).² The key intersections will be determined based on engineering judgment and generally include most signalized intersections. Identify

¹This framework does not address bikeway projects that would require the removal of a continuous two-way center turn lane. Two bikeways of this type are provisionally included in the proposed bikeway network: Telegraph Ave (Aileen St to 20th St) and International Blvd (54th Ave to 82nd Ave). This provisional designation will only be lifted, and these segments automatically incorporated into the proposed bikeway network, if further environmental review is performed and appropriate CEQA findings are adopted by the City.

²Model years for five- and twenty-year cumulative scenarios are determined by the Alameda County Congestion Management Agency (ACCMA). At the time of this writing, the ACCMA was transitioning from 2010/2025 model years to 2015/2030 model years. For analyses of travel lane removal, bikeway feasibility studies include the twenty-year scenario to assess the potential for long term impacts. Five-year cumulative scenarios may also be included in some cases.

impacts related to any traffic diversion. Provide a qualitative analysis of circulation, access, parking, and safety for all transportation modes.

- (c) **MTS Analysis** (*if applicable; see Figure G.2*). Identify street segment volume-to-capacity (V/C) ratios under two scenarios (cumulative, cumulative plus project). The forecast year for the cumulative scenario will be determined by ACCMA staff.
 - (d) **Transit Streets Analysis** (*if applicable; see Figure G.3*). Identify project impacts on bus travel time and bus stop operations under four scenarios (existing, existing plus project, cumulative, cumulative plus project). The analysis will consider incident delays (due to double-parked vehicles) and the potential impacts from other bikeway and streetscape projects proposed along the bus line in question.
3. **Analysis of Parking Space Removal** (*if applicable; see Figure G.4*). Conduct a parking occupancy and turnover survey for proposed projects that would result in the removal of ten percent or more spaces within the project area. The study will be used to determine project specific impacts, minimize the impacts of parking removal, and ensure that such removal will not create a parking shortage and generate a demand for new parking facilities.
 4. **Analysis of Bicycle Path Alignment** (*applies to all bicycle path projects*): Conduct an analysis of the proposed bicycle path alignment with respect to any water resources, biological resources, hazardous materials, and cultural resources identified by the data collection. If the alignment would cause a significant adverse impact, develop an alternative alignment that would avoid or reduce that impact, if feasible.
 5. **Comparative Analysis of Alternatives**. Complete a comparative analysis of the project and no project alternatives. Include one or more additional alternatives if such alternatives exist, they meet the project goals, and they respond to issues identified in the project analysis. For on-street bikeways, the analysis will address whether the motor vehicle impacts (circulation and/or parking) would be offset by improved safety and access for bicyclists and pedestrians.
 6. **Conceptual Plans**. Prepare preliminary conceptual plans and cross sections of selected intersections and mid-block locations under two scenarios (existing, existing plus project). For bicycle paths, prepare preliminary conceptual plans for path alignment and roadway crossings.

7. **Reporting.** Prepare draft and final reports. The reports will include data, analysis, findings, recommendations, and responses to comments from agency stakeholders and community members. The reports will explain how the feasibility study meets the requirements established by the Program EIR for the Bicycle Master Plan. If the study does not meet these requirements, the project will require additional environmental review.

APPENDIX G. REQUIREMENTS FOR BIKEWAY FEASIBILITY STUDIES

135

Roadway	From	To	Miles
10th St	Madison St	Oak St	0.07
14th Ave	E 31st St	E 19th St	0.83
14th St	Brush St	Lakeside Dr	0.97
17th St	Clay St	Telegraph Ave	0.12
22nd/23rd Aves	Foothill Blvd	Kennedy St	0.94
27th St	San Pablo Ave	Harrison St	0.89
40th St	Adeline St	MLK Jr Wy	0.55
66th Ave	San Leandro St	Coliseum Wy	0.28
7th St	Castro St	MLK Jr Wy	0.06
8th St	MLK Jr Wy	Jefferson St	0.07
8th St	Harrison St	Oak St	0.29
9th St	MLK Jr Wy	Clay St	0.14
Adeline St	Genoa St	47th St	0.62
Adeline St	36th St	5th St	1.77
Bancroft Ave	66th Ave	82nd Ave	1.00
Broadway	Keith Ave	I-580	1.68
Claremont Ave	Alcatraz Ave	Telegraph Ave	1.16
Clay St	17th St	9th St	0.41
E 12th St	2nd Ave	Fruitvale Ave	2.23
Foothill Blvd	14th Ave	23rd Ave	0.68
Franklin St	21st St	8th St	0.77
Fruitvale Ave	Foothill Blvd	E 12th St	0.55
Golf Links Rd	Grass Valley Rd	Scotia	0.28
Grand Ave	Market St	Mandela Pkwy	0.61
Harrison St	27th St	20th St	0.37
High St	E 12th St	Alameda border	0.68
Lakeshore Ave	I-580	Foothill Blvd	0.89
Lakeshore Ave	Winsor Ave	Mandana Blvd	0.39
Lakeside Dr	Harrison St	14th St	0.52
MacArthur Blvd	Market St	Fairmount Ave	1.21
MacArthur Blvd	High St	Buell St	0.46
MacArthur Blvd	73th Ave	Foothill Blvd	1.75
Madison St	Lakeside Dr	5th St	0.74
Market St	MacArthur Blvd	24th St	0.84
Market St	18th St	3rd St	0.81
MLK Jr Wy	20th St	2nd St	0.97
Mountain Blvd	Keller Ave	Fontaine overcrossing	0.36
Oak St	14th St	7th St	0.26
Oak St	2nd St	Embarcadero	0.05
Park Blvd	Grosvenor Pl	E 18th St	1.13
Seminary Ave	Sunnymere Ave	MacArthur Blvd	0.78
Telegraph Ave	20th St	Broadway	0.29
Webster St	25th St	8th St	1.14
West St	52nd St	MacArthur Blvd	0.67

Figure G.1: *Analysis of Travel Lane Removal*. Proposed bikeways that would require the removal of one or more travel lanes.

Roadway	From	To	Miles
14th St	Brush St	Lakeside Dr	0.97
7th St	Castro St	MLK Jr Wy	0.06
8th St	MLK Jr Wy	Jefferson St	0.07
Adeline St	Genoa St	47th St	0.62
Adeline St	36th St	W Grand Ave	0.80
Broadway	Keith Ave	I-580	1.68
Claremont Ave	Alcatraz Ave	Telegraph Ave	1.16
E 12th St	2nd Ave	Fruitvale Ave	2.23
Fruitvale Ave	Foothill Blvd	E 12th St	0.55
Golf Links Rd	Grass Valley Rd	Scotia	0.28
Grand Ave	Market St	Mandela Pkwy	0.61
Harrison St	27th St	20th St	0.37
High St	E 12th St	Alameda border	0.68
MacArthur Blvd	Market St	Fairmount Ave	1.21
MacArthur Blvd	High St	Buell St	0.46
MacArthur Blvd	73th Ave	98th Ave	1.29
MLK Jr Wy	20th St	5th St	0.74
Park Blvd	Grosvenor Pl	E 18th St	1.13
Telegraph Ave	20th St	Broadway	0.29
Webster St	14th St	8th St	0.30

Figure G.2: *MTS Analysis*. Proposed bikeways on the Metropolitan Transportation System (MTS) that would require the removal of one or more travel lanes.

Roadway	From	To	Miles
14th Ave	E 31st St	E 19th St	0.83
40th St	Adeline St	MLK Jr Wy	0.55
66th Ave	San Leandro St	Coliseum Wy	0.28
Adeline St	36th St	5th St	1.77
Foothill Blvd	14th Ave	23rd Ave	0.68
Fruitvale Ave	Foothill Blvd	E 12th St	0.55
MacArthur Blvd	High St	Buell St	0.46
MacArthur Blvd	73th Ave	Foothill Blvd	1.94
Park Blvd	Grosvenor Pl	E 18th St	1.13

Figure G.3: *Transit Streets Analysis*. Proposed bikeways that would require the removal of one or more travel lanes and would result in one travel lane per direction on rapid, trunk, or major bus lines.

Roadway	From	To	Miles
66th Ave	International Blvd	San Leandro St	0.55
Broadway	Golden Gate Ave	Brookside Ave	0.11
Broadway Ter	Lake Temescal Path	Duncan Wy	0.32
E 12th St	40th Ave	High St	0.18
Edwards Ave	Mountain Blvd	Sunnymere Ave	0.17
MacArthur Blvd	High St	Seminary Ave	1.10
Mountain Blvd	Blackwood St	Golf Links Rd	0.81
San Leandro St	54th Ave	Seminary Ave	0.32

Figure G.4: *Analysis of Parking Removal*. Proposed bikeways that would require the removal of 10% or more of the parking spaces within the project area.

H. Supplementary Documentation

EDITORIAL NOTE: This appendix contains documentation for the plan's analyses. These files will be made available in pdf format on a CD that accompanies the plan (upon request). It will include the following files:

1. citywide feasibility analysis: explanation of fields
2. citywide feasibility analysis: database report of existing conditions and proposed cross-sections
3. street grade analysis
4. project prioritization table

For reviewers of the public draft Bicycle Master Plan, these files are available via the project's web site at www.oaklandpw.com/bicycling/bikeplan.htm.

References

- Alameda County Congestion Management Agency. 2001, July. "Alameda Countywide Bicycle Plan." Technical Report, Oakland, CA.
- . 2006, October. "Alameda Countywide Bicycle Plan." Technical Report, Oakland, CA.
- Alameda County Public Health Department. 2004. "Oakland Health Profile." Technical Report, Oakland, CA.
- American Association of State Highway and Transportation Officials. 1999. *Guide for the Development of Bicycle Facilities*. 3rd Edition. Washington, DC.
- . 2004. *A Policy on Geometric Design of Highways and Street*. 5th Edition. Washington, DC.
- American Automobile Association. 2006. "Your Driving Costs."
- Association of Pedestrian and Bicycle Professionals. 2002. "Bicycle Parking Guidelines." Technical Report, Washington, DC.
- Bay Area Rapid Transit District. 2002, August. "Bicycle Access and Parking Plan, Volume 1." Technical Report, Oakland, CA.
- California Department of Education. 2005. "California Physical Fitness Test." Technical Report, Sacramento, CA.
- California Department of Transportation. 2005, July. "Pedestrian and Bicycle Facilities in California: A Technical Reference and Technology Transfer Synthesis for Caltrans Planners and Engineers." Technical Report, State of California Business Transportation and Housing Agency, Sacramento, CA.
- . 2006a. *California Manual on Uniform Traffic Control Devices for Streets and Highways*. Sacramento, CA: State of California Business Transportation and Housing Agency.
- . 2006b. "Highway Design Manual, Chapter 1000: Bikeway Planning and Design." Technical Report, State of California Business Transportation and Housing Agency, Sacramento, CA.
- Cupertino, City of. 1998. "Bicycle Transportation Plan." Technical Report, Cupertino, CA.

- Dill, Jennifer, and Theresa Carr. 2003. "Bicycle Commuting and Facilities in Major US Cities: If You Build Them, Commuters Will Use Them." *Transportation Research Record* 1828, no. 03-4134.
- Federal Highway Administration. 1998, December. "The Bicycle Compatibility Index: A Level of Service Concept." Technical Report FHWA-RD-98-095, US Department of Transportation, McLean, VA.
- . 1999. "Summary of Travel Trends: 1995 Nationwide Personal Transportation Survey." Technical Report, US Department of Transportation, McLean, VA.
- . 2004, November. *Manual of Uniform Traffic Control Devices for Streets and Highways, 2003 Edition*. Revision 1. McLean, VA: US Department of Transportation.
- Hunter, William W. 2000a. "Evaluation of a Combined Bicycle Lane/Right Turn Lane in Eugene, Oregon." Technical Report FHWA-RD-00-151, Federal Highway Administration, McLean, VA.
- . 2000b. "Evaluation of the Blue Bike Lane Treatment used in Bicycle-Motor Vehicle Conflicts Areas in Portland, Oregon." Technical Report FHWA-RD-00-140, Federal Highway Administration, McLean, VA.
- Hunter, William W., J. Richard Stewart, Jane C. Stutts, Herman H. Huang, and Wayne E. Pein. 1999, October. "Bicycle Lanes versus Wide Curb Lanes: Operational and Safety Findings and Countermeasure Recommendations." Technical Report FHWA-RD-99-035, U.S. Department of Transportation, Federal Highway Administration, McLean, VA.
- ICLEI. 2006, December. "City of Oakland Baseline Greenhouse Gas Emissions Inventory Report." Technical Report, Oakland, CA.
- Jacobsen, P. L. 2003. "Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling." *Injury Prevention* 9:205–209.
- Koehler, Richard D., Janet M. Sowers, Frank Mileham, and Clare Tipple Golec. 2000, December. "An Assessment of Trails, Watercourses, Soils, and Redwood Forest Health in Joaquin Miller Park, Oakland, California, with Recommendations for Management." Technical Report, William Lettis and Associates and Natural Resources Management Corporation, Walnut Creek, CA.
- Metropolitan Transportation Commission. 2004, August. "San Francisco Bay Area Travel Survey 2000: Regional Travel Characteristics." Technical Report, Oakland, CA.
- Nelson, Arthur C., and David Allen. 1997. "If You Build Them, Commuters Will Use Them: Association Between Bicycle Facilities and Bicycle Commuting." *Transportation Research Record* 1578, no. 970132.

- Nelson Nygaard Consulting Associates. 2005, January. "Back-in/Head-out Angle Parking." Technical Report, San Francisco, CA.
- Parkwood Research Associates. 1995. *Pathways for People II*. Rodale Press.
- Portland, City of. 1999, July. "Portland's Blue Bike Lanes: Improved Safety Through Enhanced Visibility." Technical Report, Office of Transportation, Portland, OR.
- Ridgeway, Mathew, and Jumana Nabti. 2002. *Innovative Bicycle Treatments*. Washington, DC: Institute of Transportation Engineers.
- San Francisco, City of. 2003. "Bicycle Plan Update: Supplemental Design Guidelines." Technical Report, San Francisco, CA.
- Santa Clara Valley Transportation Authority. 1999. "Bicycle Technical Guidelines." Technical Report, San Jose, CA.
- Transport Research Laboratory. "Road Humps: Discomfort, Noise, and Ground-borne Vibration." Technical Report, Department of the Environment, Transport, and the Regions, London.
- Transportation Research Board. 2000. *Highway Capacity Manual*. Washington, DC: National Research Council.
- US Department of Health and Human Services. 2005. "Dietary Guidelines for Americans." Technical Report, US Department of Agriculture.
- Wachtel, Alan, John Forester, and David Pelz. 1995. "Signal Clearance Timing for Bicyclists." *ITE Journal*, March, 38–45.
- Wilkinson III, W. C., A. Clarke, B. Epperson, and R. Knoblauch. 1994, January. "Selecting Roadway Design Treatments to Accommodate Bicycles." Technical Report FHWA-RD-92-073, U.S. Department of Transportation, Federal Highway Administration, McLean, VA.

