

1. BICYCLE ROUTE NETWORK

BICYCLE ROUTE NETWORK GOAL AND OBJECTIVES

Goal:

Refine and Expand the Existing Bicycle Route Network

Objectives:

- Establish a comprehensive network of bikeways that are appropriately signed, marked and traffic-calmed and that provide convenient and direct connections to all of San Francisco's neighborhoods. The facilities along the bicycle route network should include conventional treatments depending on the design of the bicycle improvements and conditions such as:
 - Off-street bicycle and mixed-use paths (refer to Figure 1-1 on page 1-4)
 - Bicycle lanes (refer to Figure 1-2 on page 1-4)
 - On-street signed bicycle routes (refer to Figure 1-3 on page 1-4)
 - Shared roadway bicycle markings (sharrows)¹
 - Traffic-calmed streets
- Utilize innovative designs, where appropriate, to improve bicycle usage and safety
- Ensure that the bicycle route network:
 - Provides bicycle access to all commercial and residential areas
 - Provides bicycle access to all San Francisco Municipal Railway (Muni) metro, Bay Area Rapid Transit (BART), and Caltrain stations, ferry terminals and other major transit hubs
 - Is well signed, well striped, and well paved

¹ Sharrows are a type of pavement marking placed within a traffic lane. The markings are intended to alert drivers that bicyclists share the traffic lane and also to reduce the chance of bicyclists impacting the open doors of parked vehicles. More information on sharrows can be viewed online at <http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd/CAMUTCD-Part9.pdf>

INTRODUCTION

The existing bicycle route network is the result of many years of work by the San Francisco Municipal Transportation Agency (SFMTA) Bicycle Program, San Francisco Bicycle Coalition (SFBC), the Bicycle Advisory Committee (BAC) and many other agencies and organizations. The bicycle route network is included in the San Francisco General Plan's Transportation Element and is a component of the City's official transportation policy. This Plan aims to refine and expand the existing bicycle route network, to increase safe space for bicyclists citywide and to improve the visibility of the network on San Francisco's streets. As changes to the bicycle route network occur, corresponding updates of the Bicycle Plan and San Francisco General Plan should occur².

This chapter provides an overview of the existing bicycle route network and outlines recommended near-term, long-term and minor improvements to the existing bicycle route network to improve its utility for bicyclists.

Action 1.1

Implement improvements to streets and paths identified as proposed near-term bicycle improvement projects and implement minor improvements to other streets and paths on the existing bicycle route network, if feasible.

Near-term bicycle route network improvement projects (near-term improvements) have had design options developed and are anticipated to be constructed within the next five years following completion of environmental review and approval of the Bicycle Plan. Minor improvements include minor pavement marking and signage changes to improve bicycle travel such as the installation of colored pavement materials, the installation of sharrows, bicycle boxes, minor changes to parking configurations and minor changes to intersection traffic signal timing plans. Traffic signal timing changes will not be made if changes will substantially impede traffic flow.

Action 1.2

Complete the required design and engineering for improvements to streets and paths identified as proposed long-term bicycle improvement projects and implement, if feasible.

Long-term bicycle route network improvement projects (long-term improvements) are either proposed along the existing bicycle route network or consist of potential additions to the bicycle route network at a future date. Specific designs for these future projects have not been developed.

² Recommended amendments to the San Francisco General Plan can be found in Chapter 7 of this Plan.

EXISTING BICYCLE ROUTE NETWORK

BICYCLE ROUTE NETWORK FACILITY TYPES

The existing bicycle route network is composed of Class I, II and III bikeways³. Typical cross-sections of these facility types are shown in Figures 1-1 through 1-3 below. Class III bicycle facilities may consist of a variety of treatments including streets with wide curb lanes (travel lane width closest to the curb is at least 14 feet wide), sharrows, traffic calming measures or simply streets signed as bicycle routes. A summary of the total miles of each bicycle facility type on the existing bicycle route network as of 2008 is shown in Table 1-1 below.

Table 1-1
Existing Bicycle Route Network Facilities

Facility Type	Mileage Total*
Bicycle Path (Class I)	23 miles
Bicycle Lane (Class II)	45 miles
Bicycle Route (Class III)**	132 miles
TOTAL***	208 miles

* This is the approximate number of miles of City streets and pathways with bicycle facilities and not the actual number of miles of bicycle facilities, i.e., it is not 45 miles of bicycle lanes, but 45 miles of City streets with bicycle lanes (whether a two-way street with bicycle lanes in each direction or a one-way street with a bicycle lane in only one direction). For reference, San Francisco has a total of 1,029 miles of non-freeway streets.

** Class III bicycle routes are signed as bikeways, but do not all have bicycle-specific pavement markings installed; approximately 53 miles of Class III bicycle routes have wide curb lanes and approximately 23 miles of Class III bicycle routes have sharrows.

*** Total includes additional eight miles of unpaved paths

³ The California Streets and Highway Code Section 890.4 defines a "bikeway" as a facility that is provided primarily for bicycle travel and provides the following definitions for bikeway facilities:
 Class I Bikeway (Bike Path) - Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.
 Class II Bikeway (Bike Lane) - Provides a striped lane for one-way bike travel on a street or highway.
 Class III Bikeway (Bike Route) - Provides for shared use with pedestrian or motor vehicle traffic.

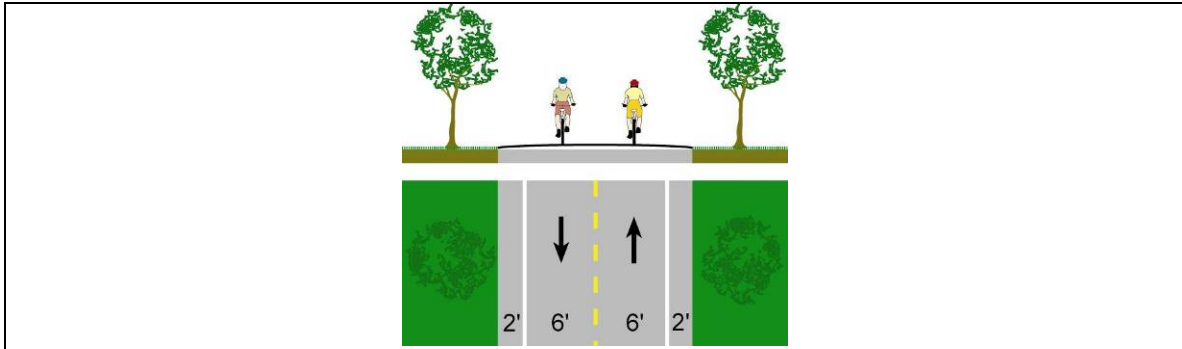


Figure 1-1: Typical Class I Facility – Bicycle Path or Multi-Use Trail

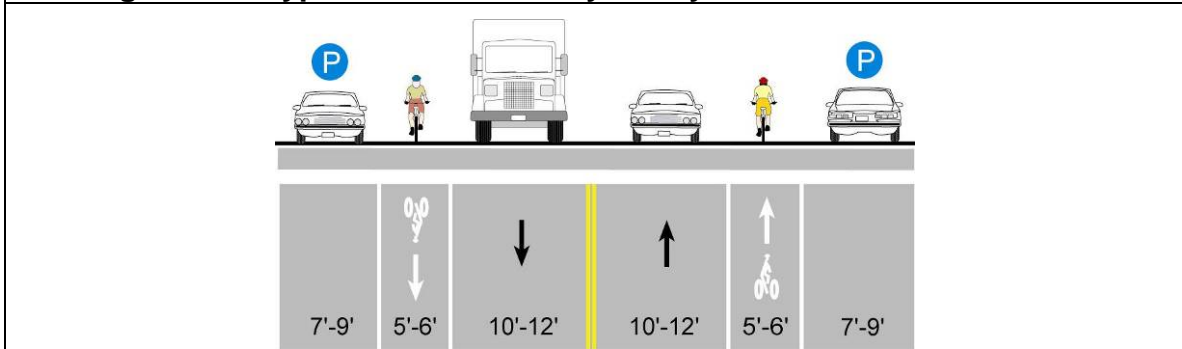


Figure 1-2: Typical Class II Facility - Bicycle Lane

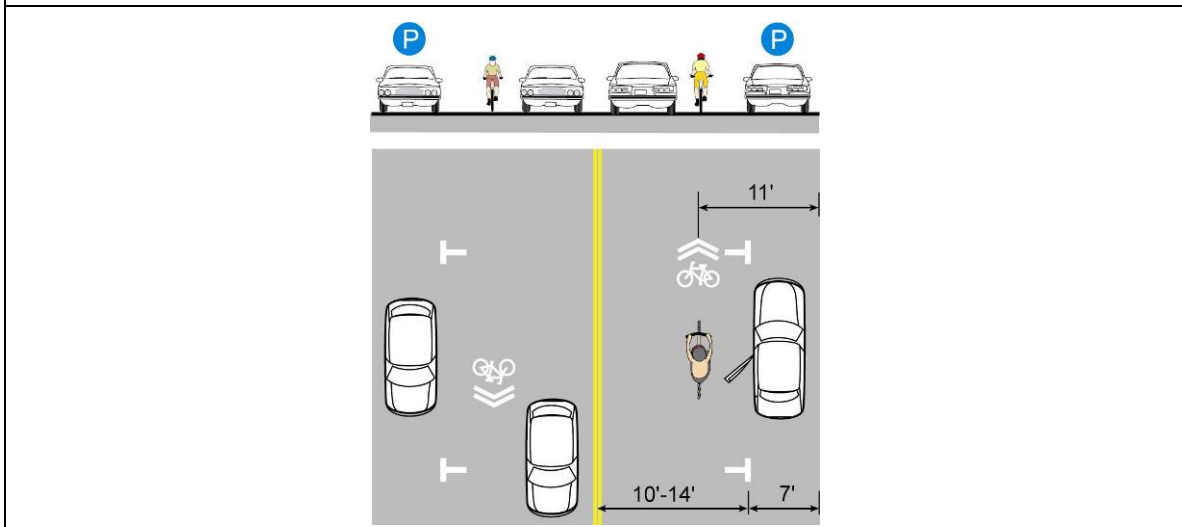


Figure 1-3: Typical Class III Facility – Signed Bicycle Route

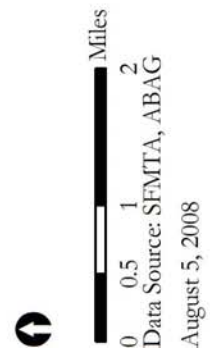
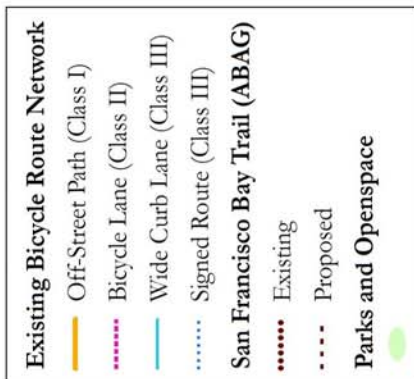
Historically, San Francisco bicycle facilities were placed only on streets where potential conflicts with other competing demands were minimal. As improvements recommended in the 1997 Bicycle Plan were implemented, bicycle facilities were increasingly installed on higher-volume, complex streets that provided greater access to the destinations that bicyclists wished to reach. Implemented bicycle facility improvements, such as the bicycle lanes on Fell, Polk, and Valencia Streets, exemplify the planning and design challenges, as well as the benefits for bicyclists, when major transportation corridors are retrofitted⁴.

The existing signed and numbered bicycle route network, established by the 1997 San Francisco Bicycle Plan and subsequent implementation of bicycle improvements completed since adoption of that Plan, is shown in Figure 1-4 below and is described in detail in Appendix A.

⁴ The Fell, Valencia and Polk Street Reports can be found on the SFMTA Bicycle Program's website – see <http://www.sfmta.com/cms/rbikes/3172.html>

FIGURE 1-4 – EXISTING BICYCLE ROUTE NETWORK

Figure 1-4
Existing Bicycle Route Network



CHANGES TO THE EXISTING BICYCLE ROUTE NETWORK

Action 1.3

Maintain an SFMTA Geographic Information System (GIS) database of the bicycle route network and update the database whenever route changes occur.

The signed and numbered bicycle route network developed by the 1997 Bicycle Plan and designated within the San Francisco General Plan's Transportation Element has been updated over time. Tables 1-2 through 1-4 reflect modifications that have occurred since the 1997 Bicycle Plan was published. Many of the improvements associated with these changes to the bicycle route network have been implemented. The formal modification of these routes, however, requires approval and adoption of this Plan by the SFMTA Board of Directors. Changes to the bicycle route network have been reflected in a City-maintained Geographic Information System (GIS) database and are reflected in Figure 1-4 above. The changes are also reflected on a citywide bicycle user map that is periodically updated (this map is currently published by Rufus Graphics). As changes to the bicycle route network occur, corresponding updates of the San Francisco General Plan should occur. The primary reasons for these bicycle route network modifications are:

- Relocations of the official numbered bicycle route network from an existing street location or segment to a new location
- Addition of an official numbered bicycle route network designation to existing bicycle facilities
- Removal of the official numbered bicycle route network designation from temporary or outdated bicycle facilities recommended in the 1997 Bicycle Plan that have since been made obsolete by new or improved bicycle facilities elsewhere

The numbered bicycle route system developed by the 1997 Bicycle Plan assigned odd numbers to north-south routes and even numbers to east-west routes, with numbers ascending from north to south and from east to west. Some numbers were skipped to allow for future routes to be developed. Three-digit routes were assigned to short connector routes that primarily serve to connect two or more longer routes.

Table 1-2
Changes to the Existing Bicycle Route Network – Network Relocations

Route Number	Street or Path From and To	Explanation
45	<ul style="list-style-type: none"> • Alemany Boulevard from Rousseau Street to San Jose Avenue • Cayuga Avenue from Geneva Avenue to Lyell Street 	Route 45 will be moved from Cayuga Avenue to Alemany Boulevard in conjunction with new bicycle lanes on Alemany Boulevard. Refer to Near-Term Improvement Project 5-3.
25	<ul style="list-style-type: none"> • Barneveld Avenue from Jerrold Avenue to Loomis Street • Bayshore Boulevard from Jerrold Avenue to Industrial Street • Industrial Street from Bayshore Boulevard to Loomis Street • Jerrold Avenue from Barneveld Avenue to Bayshore Boulevard • Loomis Street from Barneveld Avenue to Industrial Street 	Southbound Route 25 will be moved from Bayshore Boulevard onto Jerrold Avenue, Barneveld Avenue, Loomis Street and Industrial Street. Southbound Route 25 could be returned to Bayshore Boulevard pending improvements on Bayshore Boulevard. Refer to Near-Term Improvement Project 5-4.
30	<ul style="list-style-type: none"> • Fell Street from Baker Street to Scott Street • Hayes Street from Baker Street to Scott Street 	Addition of westbound bicycle lane on Fell Street creates an extension of the “Wiggle.” Westbound Route 30 will be moved from Hayes Street to Fell Street.
170	<ul style="list-style-type: none"> • Oakdale Avenue from Mendell Street to Phelps Street • Palou Avenue from 3rd Street to Phelps Street • Phelps Street from Oakdale Avenue to Palou Avenue 	Route 170 will be moved from Palou Avenue and Phelps Street to Oakdale Avenue in conjunction with new bicycle lanes and a pedestrian plaza on Oakdale Avenue.
5	<ul style="list-style-type: none"> • 3rd Street from Cargo Way to Terry Francois Boulevard • Illinois Street from 16th Street to Cargo Way • Terry Francois Boulevard from 3rd Street to Illinois 	Route 5 moved from 3 rd Street to Illinois Street and Terry Francois Boulevard due to addition of Muni light rail line on 3 rd Street. Refer to Near-Term Improvement Project 4-3. Route 40 extended north on Illinois Street to Terry Francois Boulevard.

Table 1-3

Changes to the Existing Bicycle Route Network – Removal of Interim 1997 Network Designations

Route Number	Street or Path From and To	Explanation
75	<ul style="list-style-type: none"> • Alemany Boulevard from Arch Street to Saint Charles Avenue • Arch Street from Alemany Blvd to Randolph Street • Randolph Street from 19th Avenue to Arch Street 	1997 Bicycle Plan, pp. 3-36 discusses Route 75 interim measure that is no longer necessary. It is being eliminated because the Saint Charles Path was reconstructed and a traffic signal installed to improve bicycle circulation through this area.

Table 1-4

Changes to the Existing Bicycle Route Network – Addition of Network Designation to Existing Facilities

Route Number	Street or Path From and To	Explanation
45	<ul style="list-style-type: none"> • Arlington Street from Bosworth Street to San Jose Avenue southbound off-ramp • Dolores Street from 30th Street to San Jose Avenue • Guerrero Street from Cesar Chavez Street to San Jose Avenue • San Jose Avenue southbound from Guerrero Street to San Jose Avenue southbound off-ramp at Arlington Street • San Jose Avenue northbound from Guerrero Street to Milton Street 	Route 45 moved from Chenery to San Jose in conjunction with new bicycle lanes on Guerrero Street and San Jose Avenue. Chenery becomes Route 145.
801	Avenue of the Palms from Avenue of the Palms to Perimeter Path	New Route 801 created on Treasure Island.
51	<ul style="list-style-type: none"> • Golden Gate Avenue from Baker Street to Parker Avenue • Parker Avenue from Golden Gate Avenue to • Turk Street 	Route 51 extended as alternate to Route 20 in conjunction with new bicycle lanes on Golden Gate Avenue.

1. BICYCLE ROUTE NETWORK

Route Number	Street or Path From and To	Explanation
106	Laguna Street from Bay Street to Marina Boulevard	Route 106 extended on Fort Mason pathway.
802	Perimeter Path from Avenue of the Palms	New route 802 created on Treasure Island.

RECOMMENDED IMPROVEMENTS TO THE BICYCLE ROUTE NETWORK

As outlined in the Introduction, a list of potential bicycle route network improvements was created from extensive public comments, staff analysis, remaining, unimplemented projects from the 1997 Bicycle Plan and public workshops and surveys conducted during the 2002-2005 bicycle planning effort. Since the 2002-2005 bicycle planning effort, additional potential bicycle route network improvements have been identified through various planning efforts. This Plan contains 60 proposed near-term and 24 proposed long-term improvements to the bicycle route network. Additionally, minor improvements are proposed throughout the bicycle route network. Public input on the proposed near-term improvements within this Plan was gathered at a series of public meetings held from March to June 2008.

Recommended near-term, long-term and minor improvements to the bicycle route network are listed below and shown in Figure 1-5. Recommended near-term improvements are grouped into eight clusters, as shown in Figure 1-6. Clusters were developed, each containing near-term improvements in close geographic proximity to each other, in order to evaluate and understand the combined potential transportation-related impacts related to implementation of the near-term improvements. Detailed design options for 60 near-term improvement projects have been developed and are described in Appendix B. Specific designs for long-term and minor improvements have not been developed.

**FIGURE 1-5
RECOMMENDED NEAR-TERM AND LONG-TERM IMPROVEMENTS TO THE
BICYCLE ROUTE NETWORK**

**Figure 1-5
Recommended Near-Term and Long-Term Improvements to the Bicycle Route Network**

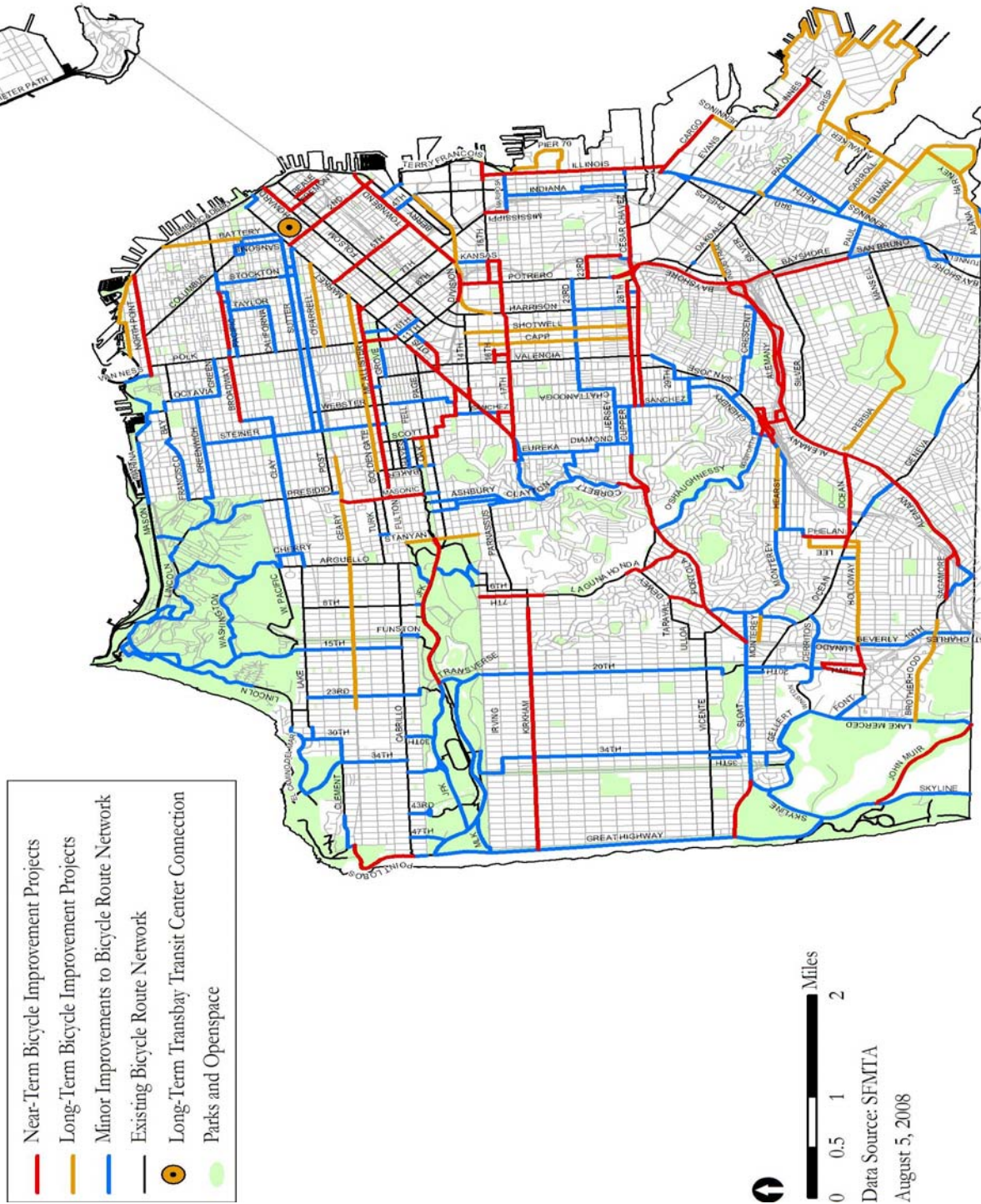
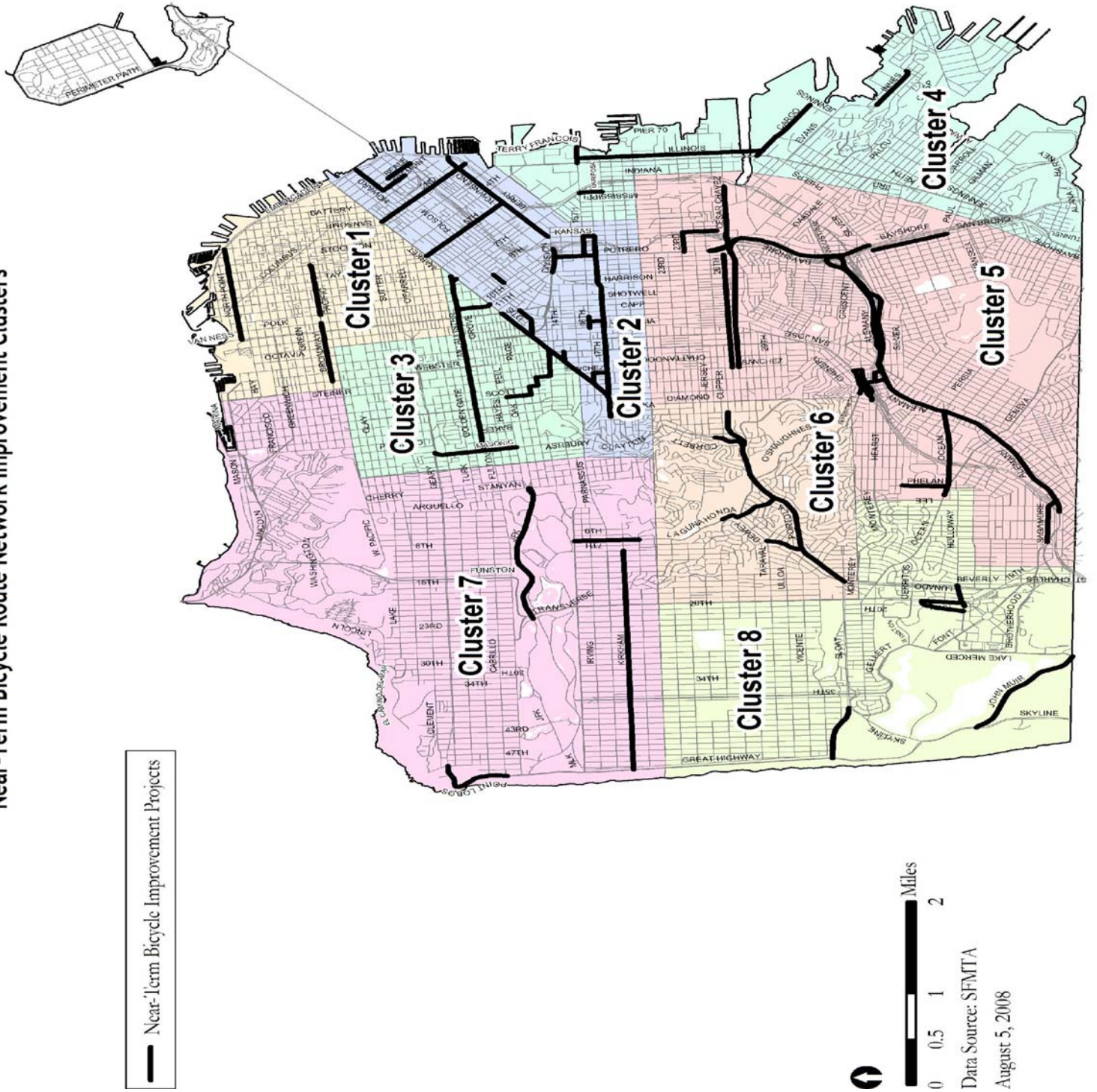


FIGURE 1-6

NEAR-TERM BICYCLE ROUTE NETWORK IMPROVEMENTS CLUSTERS

Figure 1-6
Near-Term Bicycle Route Network Improvement Clusters



RECOMMENDED NEAR-TERM IMPROVEMENTS

The following is a list of recommended near-term improvement projects, which are shown in Figure 1-5 (the first number for each proposed project indicates the project's cluster, as shown in Figure 1-6):

Project 1-1	Broadway Bicycle Lanes, Polk Street to Webster Street
Project 1-2	Broadway Tunnel Signage Improvements
Project 1-3	North Point Street Bicycle Lanes, The Embarcadero to Van Ness Avenue
Project 2-1	2 nd Street Bicycle Lanes, King Street to Market Street
Project 2-2	5 th Street Bicycle Lanes, Market Street to Townsend Street
Project 2-3	14 th Street Bicycle Lane, Dolores Street to Market Street
Project 2-4	17 th Street Bicycle Lanes, Corbett Avenue to Kansas Street, including connections to the 16 th Street BART Station via Hoff Street or Valencia Street and 16 th Street and to Division Street via Potrero Avenue
Project 2-5	Beale Street Bicycle Lane, Bryant Street to Folsom Street
Project 2-6	Division Street Bicycle Lanes, 9 th Street to 11 th Street
Project 2-7	Fremont Street Bicycle Lane, Howard Street to Harrison Street
Project 2-8	Howard Street Bicycle Lane, Extension at 9 th Street
Project 2-9	Howard Street Bicycle Lane, The Embarcadero to Fremont Street
Project 2-10	Market Street and Valencia Street Intersection Improvements
Project 2-11	Market Street Bicycle Lanes, 17 th Street to Octavia Boulevard
Project 2-12	Market Street Bicycle Lanes, Octavia Boulevard to Van Ness Avenue
Project 2-13	McCoppin Street Bicycle Path, Market Street to Valencia Street

Project 2-14	McCoppin Street Bicycle Lane, Gough Street to Valencia Street
Project 2-15	Otis Street Bicycle Lane, Gough Street to South Van Ness Avenue
Project 2-16	Townsend Street Bicycle Lanes, 8 th Street to The Embarcadero
Project 3-1	Fell Street and Masonic Avenue Intersection Improvements
Project 3-2	Masonic Avenue Bicycle Lanes, Fell Street to Geary Boulevard
Project 3-3	McAllister Street Bicycle Lane, Market Street to Masonic Avenue
Project 3-4	Polk Street Bicycle Lane, Market Street to McAllister Street
Project 3-5	Scott Street Bicycle Lane, Fell Street to Oak Street
Project 3-6	The “Wiggle” Improvements, Duboce Avenue between Market and Steiner Streets, Steiner Street between Duboce Avenue and Waller Street, Waller Street between Steiner and Pierce Streets, Pierce Street between Waller and Haight Streets, Haight Street between Pierce and Scott Streets and Scott Street between Haight and Fell Streets.
Project 4-1	16 th Street Bicycle Lanes, 3 rd Street to Terry Francois Boulevard
Project 4-2	Cargo Way Bicycle Lanes, 3 rd Street to Jennings Street
Project 4-3	Illinois Street Bicycle Lanes, 16 th Street to Cargo Way
Project 4-4	Innes Avenue Bicycle Lanes, Donahue Street to Hunters Point Boulevard
Project 4-5	Mississippi Street Bicycle Lanes, 16 th Street to Mariposa Street
Project 5-1	23 rd Street Bicycle Lanes, Kansas Street to Potrero Avenue
Project 5-2	Alemaný Boulevard Bicycle Lanes, Bayshore Boulevard to Rousseau Street
Project 5-3	Alemaný Boulevard Bicycle Lanes, Rousseau Street to San Jose Avenue

Project 5-4	Bayshore Boulevard Bicycle Lanes, Cesar Chavez Street to Silver Avenue
Project 5-5	Cesar Chavez Street Bicycle Lanes, I-280 to US 101 Freeways
Project 5-6	Cesar Chavez Street/26 th Street Bicycle Lanes, Sanchez Street to US-101
Project 5-7	Glen Park Area Bicycle Lanes: a) Connection between Alemany Boulevard and San Jose Avenue and b) Connection between Monterey Boulevard and San Jose Avenue a) Connection between Alemany Boulevard and San Jose Avenue via Arlington Street, Bosworth Street, Lyell Street, Milton Street, Rousseau Street and Still Street and b) Connection between Monterey Boulevard and San Jose Avenue via Monterey Boulevard and San Jose Avenue ramps
Project 5-8	Kansas Street Bicycle Lanes, 23 rd Street to 26 th Street
Project 5-9	Ocean Avenue Bicycle Lanes, Alemany Boulevard to Lee Avenue
Project 5-10	Phelan Avenue Bicycle Lanes, Judson Avenue to Ocean Avenue
Project 5-11	Potrero Avenue and Bayshore Boulevard Bicycle Lanes, 25 th Street to Cesar Chavez Street
Project 5-12	Sagamore Street and Sickles Avenue Bicycle Lanes, Alemany Boulevard to Brotherhood Way
Project 5-13	San Bruno Avenue Bicycles Lanes, Paul Avenue to Silver Avenue
Project 6-1	Claremont Boulevard Bicycle Lanes, Dewey Boulevard to Portola Drive
Project 6-2	Clipper Street Bicycle Lanes, Douglass Street to Portola Drive
Project 6-3	Laguna Honda Boulevard Bicycle Lanes, Plaza Street to Woodside Avenue

Project 6-4	Laguna Honda Boulevard Bicycle Lanes, Portola Drive to Woodside Avenue
Project 6-5	Portola Drive Bicycle Lanes, Corbett Avenue to O'Shaughnessy Boulevard
Project 6-6	Portola Drive Bicycle Lanes, O'Shaughnessy Boulevard/Woodside Avenue to Sloat Boulevard/St. Francis Boulevard
Project 7-1	Intersection Improvements at 7 th Avenue and Lincoln Way
Project 7-2	7 th Avenue Bicycle Lanes, Lawton Street to Lincoln Way
Project 7-3	Great Highway and Point Lobos Avenue Bicycle Lanes, El Camino Del Mar to Cabrillo Street
Project 7-4	John F. Kennedy Drive and Kezar Drive Bicycle Lanes, Stanyan Street to Transverse Drive
Project 7-5	Kirkham Street Bicycle Lanes, 9 th Avenue to Great Highway
Project 7-6	Page and Stanyan Streets Intersection Traffic Signal Improvements
Project 8-1	19 th Avenue Mixed-Use Path, Buckingham Way to Holloway Avenue
Project 8-2	Buckingham Way Bicycle Lanes, 19 th Avenue to 20 th Avenue
Project 8-3	Holloway Avenue Bicycle Lanes, Junipero Serra Boulevard to Varela Avenue
Project 8-4	John Muir Drive Bicycle Lanes, Lake Merced Boulevard to Skyline Boulevard
Project 8-5	Sloat Boulevard Bicycle Lanes, Great Highway to Skyline Boulevard

RECOMMENDED LONG-TERM IMPROVEMENTS

Long-term improvements are either major improvements to segments of the existing bicycle route network or are potential future additions of new streets and pathways to the bicycle route network. Currently, neither a schedule nor specific designs for these projects has been developed. The following is a list of recommended long-term improvement projects, which are shown in Figure 1-5:

- Battery Street between Clay Street and The Embarcadero
- Bay Trail improvements in the vicinity of Fisherman’s Wharf
- Bay Trail improvements in the vicinity of Hunters Point
- Bayview Transportation Improvements Project (BTIP)
- Brotherhood Way between Arch Street and Lake Merced Boulevard
- Capp Street between 15th Street and 26th Street
- Geary Boulevard between 25th Avenue and Divisadero Street
- Golden Gate Avenue between Baker Street and Market Street
- Harold Avenue between Holloway Avenue and Ocean Avenue
- Holloway Avenue between Harold Avenue and Junipero Serra Boulevard
- Industrial Street between Loomis Street and Oakdale Avenue
- Jennings Street between Cargo Way and Evans Avenue
- Lee Avenue between Holloway Avenue and Phelan Avenue
- Mansell Street/Persia Avenue between Ocean Avenue and University Street
- Mendell Street between Oakdale Avenue and Palou Avenue
- Mission Creek Bikeway between 4th Street and Harrison Street
- Monterey Boulevard between Circular Avenue and Genessee Street
- Monterey Boulevard between Junipero Serra Boulevard and San Benito Way
- Oak Street between Baker Street and Scott Street
- O’Farrell Street between Market Street and Polk Street
- Pier 70 between 18th Street and 22nd Street
- Shotwell Street between 14th Street and 26th Street
- Stanyan Street between Frederick Street and Fulton Street
- Transbay Transit Center Connection

The BTIP includes several options, as described below.

For all BTIP Build Alternatives:

Proposed relocation of Bicycle Route #805:

From: Arelious Walker Drive (between Carroll Avenue and Gilman Avenue) and Carroll Avenue (between Arelious Walker Drive and Jennings Street).

To: Gilman Avenue (between Arelious Walker Drive and Jennings Street) and Jennings Street (between Gilman Avenue and Carroll Avenue).

For all BTIP Southern Build Alternatives:

Proposed bicycle lanes on Gilman Avenue between Donahue Street and Arelious Walker Drive.

Proposed bicycle lanes on Harney Way Extension between Jamestown Avenue and Gilman Avenue.

Proposed bicycle lanes on Jamestown Avenue Extension and Hunters Point Expressway.

Proposed bicycle lanes on Alana Way between US 101 and Harney Way.

Proposed bicycle lanes on Harney Way between Alana Way and Jamestown Avenue.

For BTIP S1 - Walker Bridge Build Alternative:

Proposed bicycle lanes on Arelious Walker Drive Extension between Bancroft Avenue and Crisp Avenue.

Proposed bicycle lanes on Crisp Avenue between Arelious Walker Drive Extension and Spear Street.

Proposed bicycle path along Crisp Avenue right-of-way between the intersection of Palou/Griffith and Arelious Walker Drive Extension.

For BTIP S2 - Griffith Bridge and S3 - Ingalls Street Build Alternatives:

Proposed bicycle lanes on Crisp Avenue between the intersection of Palou Avenue/Griffith Street and Spear Street.

For BTIP S4 - Underwood Avenue Build Alternative:

Proposed bicycle lanes on Underwood Avenue between Hawes Street and Arelious Walker Drive Extension. Proposed bicycle lanes on Crisp Avenue between Arelious Walker Drive Extension and Spear Street.

Proposed bicycle path along Crisp Avenue right-of-way between the intersection of Palou Avenue/Griffith Street and Arelious Walker Drive Extension.

RECOMMENDED MINOR IMPROVEMENTS

Minor improvements are treatments that will be implemented as necessary to improve conditions for bicycle use within the City. Minor improvements will be implemented to address gaps and deficiencies in the bicycle route network, and will generally be implemented along portions of the bicycle route network where bicycle facility improvements (excluding bicycle route network signage) have not been made in the past as shown in Figure 1-5.

BICYCLE AND TRANSIT POLICY

Action 1.4

Work with other City agencies to ensure that San Francisco continues to implement the *Transit First* policy.

San Francisco's *Transit First* policy supports pedestrians and bicycles in addition to transit as important non-automobile components of a balanced transportation system. San Francisco's *Transit First* policy (Section 16.102 of the City Charter) includes the following:

- "Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile;"
- "Decisions regarding the use of limited public street and sidewalk space shall encourage the use of public rights of way by pedestrians, bicyclists and public transit;" and

- “Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes and secure bicycle parking.”

Implementation of the recommendations in this Plan will help support the *Transit First* policy.

BICYCLE FACILITIES ON TRANSIT ROUTES

This section provides a preliminary framework to guide the SFMTA, the Planning Department and other agencies in the selection of specific streets for bicycle improvements along transit routes. Bicycle improvements on transit routes should be considered on a case-by-case basis and should include technical analysis and mitigation measures appropriate to each particular case.

Appropriate agencies should work closely together to identify and mitigate, where possible, negative impacts on transit that could potentially result from implementation of bicycle improvements. Working together to create world-class facilities for both transit riders and bicyclists will result in greater mode shifts to more sustainable forms of transportation, ultimately benefiting both transit riders and bicyclists.

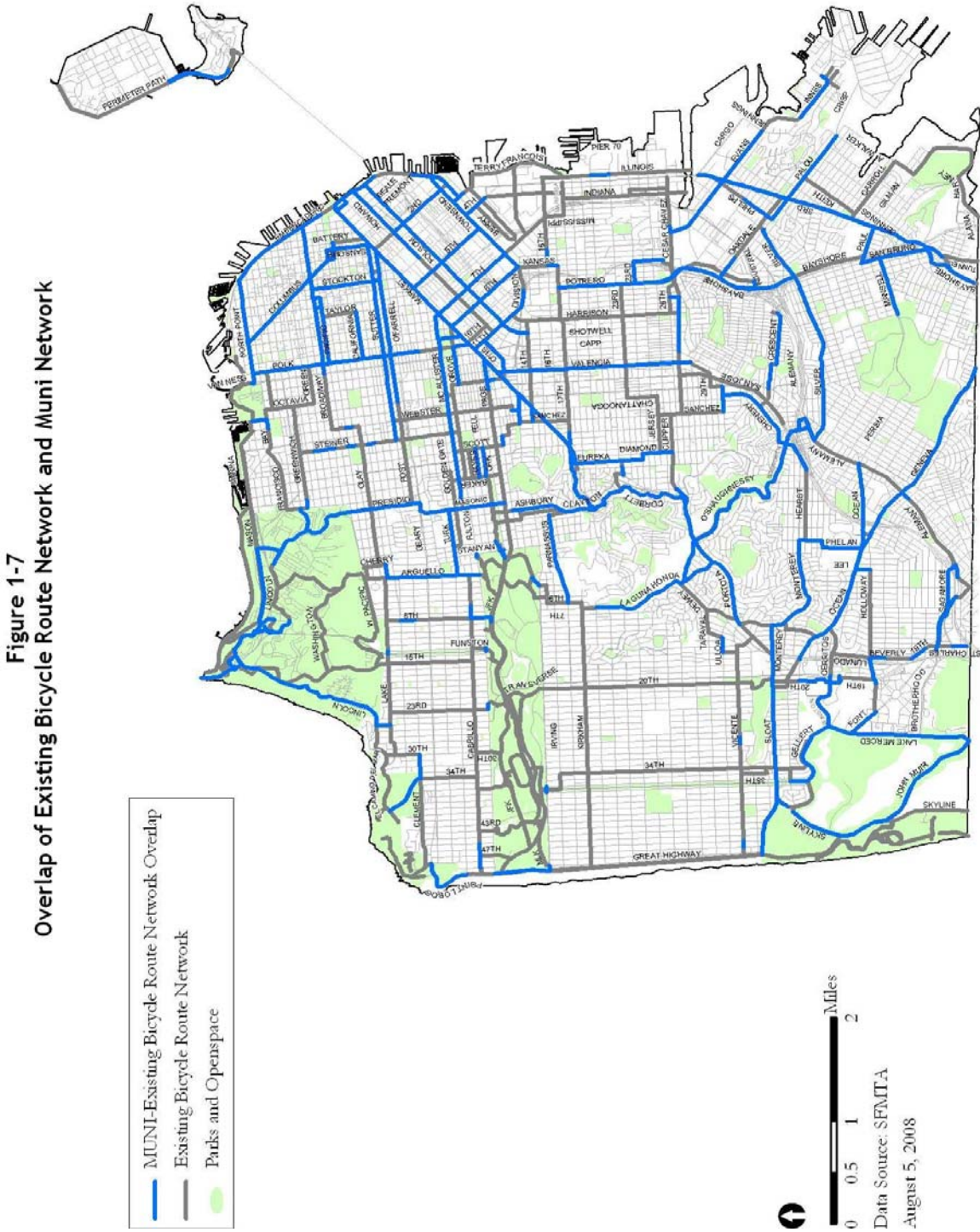
When bicycle facilities are proposed on streets where non-Muni transit service is operated (such as AC Transit, Golden Gate Transit, or Samtrans), the SFMTA should work with these transit agencies to ensure that facilities are designed to meet the needs of both bicyclists and transit.

When a bicycle improvement is proposed along an existing transit route, SFMTA Bicycle Program staff will work with Muni Service Planning staff to review the proposed bicycle improvement and identify specific data needs and steps required to demonstrate its viability.

Bicycle improvements should not create negative impacts to transit operations (e.g., transit travel times or schedule adherence). Bicyclists’ safety, however, also must be considered and balanced with the need for reliable transit service. Where a proposed bicycle improvement may result in negative impacts to transit, appropriate measures should be identified to ensure minimal transit service degradation (or potential transit service improvements), while improving conditions for bicyclists.

Figure 1-7 below shows the overlap of the existing bicycle route network and the existing Muni transit network. This map should be consulted when planning bicycle improvements.

**FIGURE 1-7
OVERLAP OF EXISTING BICYCLE ROUTE NETWORK AND MUNI NETWORK**



ALLOWING BICYCLES IN EXCLUSIVE BUS LANES

Action 1.5

Conduct a before and after study on the impacts of allowing bicycles in exclusive bus/taxi lanes.

Cities around the world have developed shared bus/bicycle lanes to provide both transportation modes with dedicated space separated from motor vehicle traffic. While such facilities may improve conditions for bicycles and transit by reducing conflicts with automobiles, they also have the potential to increase conflicts between bicycles and buses; therefore, safety and operational issues must be thoroughly addressed (see Action 4.8 in Chapter 4 for further discussion of bicycle and bus safety issues).

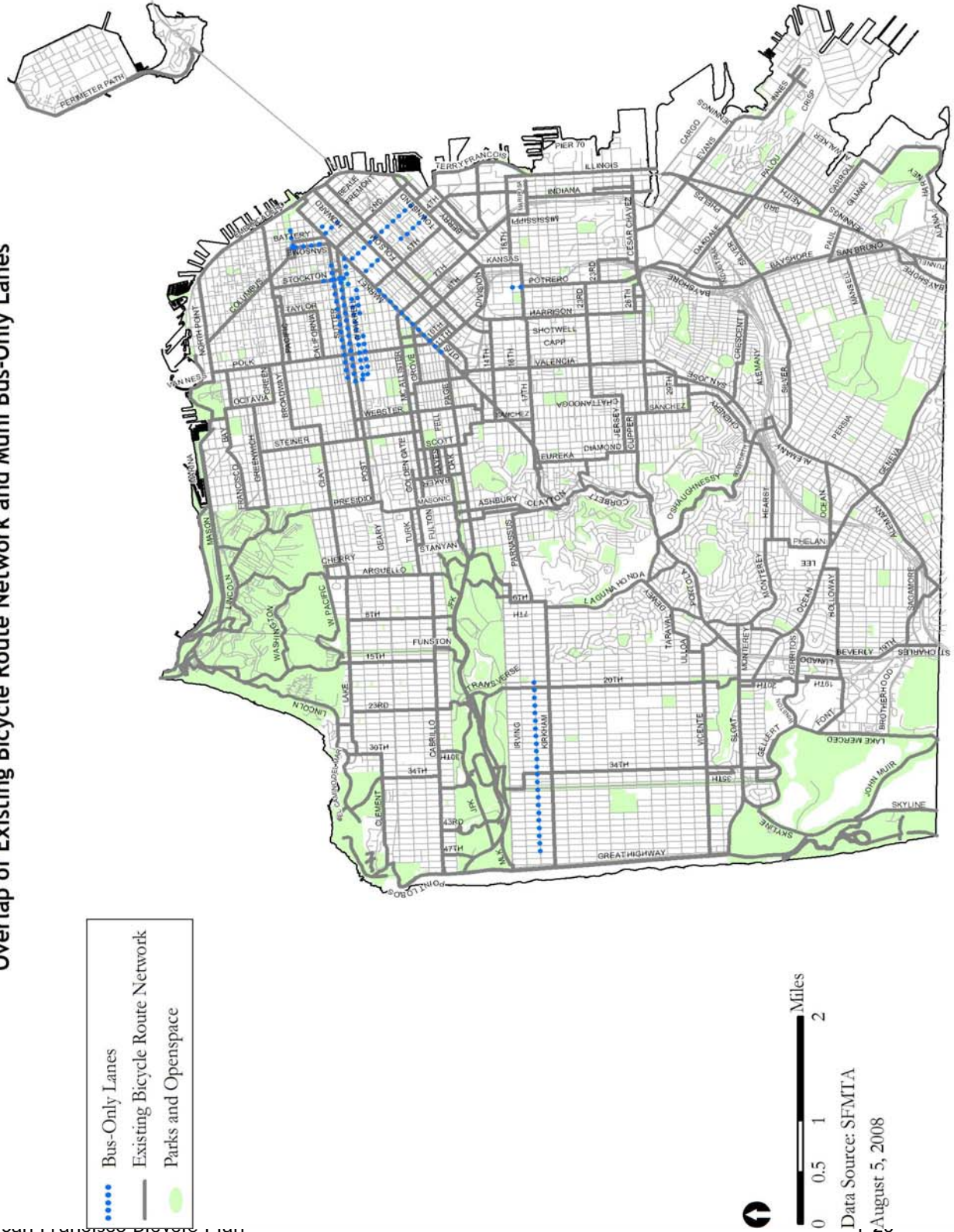
The California Vehicle Code (CVC¹) Section 21655.7 allows local authorities to designate portions of highways for their exclusive use as a “public mass transit guideway.” San Francisco establishes exclusive transit areas through the San Francisco Transportation Code (SFTC) Division II, Section 601, and no vehicles except transit vehicles, taxicabs, vehicles preparing to make a turn and vehicles moving from a stopped position at the curb are permitted to use them. Exclusive transit areas are usually designated as the far-right lane, where bicyclists are generally required by law to ride (CVC Section 21202).

The lack of clarity about where a bicyclist should ride where there is a transit-only lane on the right side of the roadway creates confusion for bus operators, bicyclists and motorists. Under local law as written, bicycles could use the transit-only lanes, because the SFTC prohibits “vehicles” from using the transit-only lanes, and bicycles are not classified as “vehicles” under the CVC (Sections 231 and 670); however, San Francisco can only exercise the powers in this area that are delegated to it by the state under CVC Section 21. State law only authorizes use of transit-only lanes for “public mass transit.” Changes in designated transit-only lanes may be legislated by the SFMTA Board of Directors by amending the SFTC, but a change in state law would be required to allow bicycles to operate in transit-only lanes. If the results of a California Traffic Control Devices Committee (CTCDC) sponsored experiment show that shared use with bicycles is determined to be safe for bicyclists and would not impede the movement of transit vehicles, legislation could be drafted to amend CVC Section 21655.7 to allow bicyclists to travel in transit-only lanes.

Figure 1-8 below shows the existing bicycle route network and existing Muni bus-only lanes.

**FIGURE 1-8
OVERLAP OF EXISTING BICYCLE ROUTE NETWORK AND MUNI BUS-
ONLY LANES ADDITIONAL CITY POLICIES**

**Figure 1-8
Overlap of Existing Bicycle Route Network and Muni Bus-Only Lanes**



This section recommends actions that could impact the continued expansion and refinement of the bicycle route network.

MULTI-LANE STREETS AND STATE HIGHWAYS

Action 1.6

Review multi-lane streets for excess capacity and explore travel lane removals where excess capacity exists to accommodate bicycle lanes or other bicycle-friendly treatments.

The genesis for review of a multi-lane street for potential travel lane removal can occur from a variety of sources: The Department of Public Works' (DPW) planned street resurfacing, recommendations from advocacy groups or SFMTA staff recommendations. Additionally, as advances in Intelligent Transportation System (ITS) technology continue, they should be used to improve the effective capacity of existing multi-lane streets, thereby possibly allowing travel lane removal and the addition of bicycle facilities. Extra capacity on arterial streets, however, allows for the management of traffic volume fluctuations. Extra capacity is particularly relevant when there are parallel residential streets, bicycle routes or transit routes. Travel lane removals that divert traffic volumes onto residential streets, bicycle routes or transit routes should be avoided.

Action 1.7

Work with the California Department of Transportation (Caltrans) to analyze and add bicycle facilities where appropriate on current State highways within San Francisco.

The City should work with Caltrans to transfer State highways to the City where it is determined to be mutually beneficial.

LEVEL OF SERVICE STANDARDS AND METHODOLOGIES

Action 1.8

Work with the responsible San Francisco agencies to develop revisions to San Francisco's level of service (LOS) standards and methodologies such that they better respond to the multimodal nature of San Francisco's transportation system, specifically addressing bicycles.

LOS measures are used to predict the impacts of proposed projects on the City's transportation system under the California Environmental Quality Act (CEQA). Existing LOS standards and methodologies used by the City are focused primarily on automobile travel, secondarily on transit travel and very little on bicycle and pedestrian travel.

The San Francisco County Transportation Authority (SFCTA) adopted a Strategic Analysis Report (SAR 02-3) “Transportation Level of Service (LOS) Methodologies” in December 2003 which concluded that conventional LOS measures, and the City’s current process for evaluating transportation projects, are not consistent with the City’s General Plan policy guidance toward development of a balanced, multi-modal transportation systemⁱⁱ. Specifically, they conflict with General Plan Policy 10.1, which calls for the City’s transportation system to be assessed in terms of the movement of people and goods rather than vehicles. Furthermore, the City’s LOS measures do not incorporate factors most important to bicyclists and provide limited acknowledgement of the environmental benefits of bicycling.

An LOS technical working group (TWG), recommended in SAR 02-3, began meeting in June 2004. It consists of representatives from the SFCTA, the SFMTA, the Planning Department, Caltrans, the Association of Bay Area Governments (ABAG), a transportation consultant, an academic researcher, bicycle and pedestrian advocates and a CEQA expert from the City Attorney’s Office. When the LOS TWG completes its work, it will present its recommended revisions to current City LOS standards and methodologies (a refined version of SAR 02-3’s recommendations) to the SFCTA Board. The LOS TWG could make recommendations for amending existing LOS methods to better reflect the multimodal nature of travel in San Francisco. The LOS TWG is currently working to complete a study on the potential for a new measure of automobile trips generated to replace the City’s LOS standards and methodologies. To implement any new recommended methodologies, the Planning Commission would have to adopt these new methodologies by revising its Guidelines for Environmental Review.

A different analytical process as part of the transportation evaluation component of environmental review might reduce the time needed for bicycle project delivery and might help reduce bicycle project costs as well.

TRAFFIC CALMING

Action 1.9

Define “bicycle boulevards,” and develop criteria for identifying streets that could be designated as bicycle boulevards.

In 1998, the SFCTA led a citywide effort to establish Traffic Calming Guidelines. In February 2001, a new section in the SFMTA’s Traffic Engineering Division was created - the Livable Streets Section – which included a Traffic Calming Program created to implement these guidelines.

The 1997 San Francisco Bicycle Plan included specific recommendations for bicycle-related traffic calming measures to be implemented by the SFMTA's Bicycle Program. However, since the creation of the SFMTA Traffic Calming Program, all traffic calming projects are managed by this program, with the SFMTA Bicycle Program serving in an advisory role. Traffic Calming projects must follow the approved Traffic Calming Guidelines.

The Traffic Calming Guidelines were established through a comprehensive citywide effort with input from many community groups including the SFBC and BAC. These guidelines were adopted by the SFMTA Board of Directors and any changes to these guidelines would require additional public outreach and approval by the SFMTA Board of Directors. The first step in amending these guidelines to include bicycle boulevards is to define "bicycle boulevards" and then develop criteria for selecting streets as potential bicycle boulevard candidates. The 1997 Bicycle Plan's "bicycle priority streets" provide a good starting point for defining bicycle boulevards. However, since the 1997 Bicycle Plan predated the formation of the SFMTA Traffic Calming Program and the Traffic Calming Guidelines, the selection of these "bicycle priority streets" needs to be reconsidered in terms of a new definition of "bicycle boulevards." The "bicycle boulevards" definition should take San Francisco's *Transit First* policy into account and be incorporated into the City's General Plan. For the purposes of this Plan, the terms "bicycle arterial street," "bicycle boulevard" and "bicycle priority street" are the same. Once bicycle boulevards are defined and included in the Traffic Calming Guidelines and criteria are developed for selecting streets as potential bicycle boulevards, the SFMTA Bicycle Program should work with the SFMTA Traffic Calming Program to implement bicycle boulevards.

SUPPLEMENTAL DESIGN GUIDELINES

Action 1.10

Review international best practices and implement innovative design treatments along the bicycle route network with an appropriate level of analysis and study.

The Supplemental Design Guidelines were developed as a part of the 2002-2005 bicycle planning effort by the SFMTA Bicycle Program staff and a consultant teamⁱⁱⁱ. They were reviewed by the Plan's Technical Advisory Committee and approved by the Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT) in September 2003. The Supplemental Design Guidelines complement the San Francisco Bicycle Plan, and are intended to provide City staff with a more detailed and varied set of tools to apply when planning and designing improvements to the bicycle route network.

The design concepts developed in the Supplemental Design Guidelines are intended to supplement the design guidelines for typical bikeway situations provided in Caltrans Highway Design Manual (HDM) Chapter 1000 – Bikeway Planning and Design, the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities and the Federal Manual of Uniform Traffic Control Devices (MUTCD) Part 9 - Traffic Controls for Bicycle Facilities (including the associated California MUTCD). These design concepts draw upon creative solutions used in other locations in California, other states and European cities.

These designs are conceptual, and prior to application to specific situations, they should be reviewed further on a case-by-case basis. Continued development of the Supplemental Design Guidelines will allow San Francisco to improve the quality of the bicycle route network by applying the highest standards of bicycle safety, comfort and convenience.

Caltrans HDM Chapter 1000, the AASHTO Guide for the Development of Bicycle Facilities and the MUTCD should be the primary references, and the use of the Supplemental Design Guidelines augment these reference materials.

SHARED ROADWAY BICYCLE MARKINGS

Action 1.11

Prioritize installation of shared roadway bicycle markings where safety could be improved.

Shared roadway bicycle markings (sharrows) are a type of pavement marking placed within a traffic lane. The markings are intended to alert drivers that bicyclists share the traffic lane and to reduce the chance of bicyclists impacting the open doors of parked vehicles. A study on the effectiveness of sharrows titled “San Francisco’s Shared Lane Pavement Markings: Improving Bicycle Safety”^{iv} found that after installation of sharrows:

- Bicyclists rode further away from the door zone
- Motorists shifted to the left and gave more room when passing bicyclists
- Fewer bicyclists rode on the sidewalk
- Fewer bicyclists rode the wrong way on the street

Sharrows were studied in mid-block locations but they also may be effective in other situations, such as intersection approaches with multiple turn lanes where a through-moving bicyclist should be positioned in the center of an optional through/turn lane. Further study of the sharrows in these types of situations should be undertaken by the SFMTA.

BICYCLE ROUTE NETWORK IMPROVEMENTS – STEPS FOR IMPLEMENTATION

A. IMPROVEMENT IMPETUS

A proposed bicycle route network improvement can originate from several sources:

- Noted by staff as a necessary safety improvement
- Recommended as an improvement in this Plan
- Requested by the public or advocacy group
- Requested by City officials
- Opportunity presented by another project or another agency

B. BICYCLE PROGRAM STAFF ANALYSIS

In evaluating a proposed improvement, typical questions and data collection by the SFMTA Bicycle Program staff include:

Design

What is the current condition of the facility and what is being proposed?

Data: drawings and descriptions of current and proposed conditions

Problem/Solution

What is the problem and how does the proposed improvement address it?

Data: bicycle counts, collision history, prevailing motor vehicle speeds, knowledge of route and existing bicycle facilities in the project area and consideration of alternative solutions or routes

History/Background

What is the history of transportation related requests in the area?

Data: knowledge of correspondence related to the project (requests for bicycle facilities, traffic calming, tow-away changes, etc.) and existing plans for the area

Traffic Capacity

Has capacity changed in any way?

Data: recent traffic volumes

Can significant LOS/travel time degradations be addressed?

Data: proposed traffic signal changes, tow-away lanes, turn restrictions, and motor vehicle lane changes

What effect will changes have on neighboring streets?

Data: knowledge of area and potential cut-through traffic routes

Transit

Is the proposed improvement on a transit route?

Data: what route(s), what transit headway, use by "dead head" routes (transit vehicles not carrying passengers, usually operating to/from transit yards) and location of any tracks

How will it affect transit?

Data: travel time and delay studies, width of lanes used by transit vehicles, location of and effect on transit stops or zones and accommodation of transit turns

Parking

Are there any parking changes proposed?

Data: existing vs. proposed parking, number of parking spaces gained/lost and changes in colored curb zones

What is the current parking occupancy for various times of day?

Data: parking survey

What is the public response to parking changes?

Trucks

Is the proposed improvement on a truck route?

Data: approximate frequency of truck use, width of lanes used by trucks and accommodation of truck turns

Pedestrians

Will the proposed improvement improve or degrade pedestrian access or safety?

Data: traffic speed data (if the project may have a traffic calming effect) and planned pedestrian or other SFMTA Livable Streets projects

Land Use

How will the proposed improvement fit in with existing land use?

Data: knowledge of land use and location of heavily used driveways or loading docks

Other Departments or Agencies

Does the proposed improvement require outreach to other City departments or non-City agencies?

Data: evidence of outreach and departments' and/or agencies' recommendations

Will the street be repaved in the near future?

Data: Check DPW paving schedule and modify schedule for proposed improvement as appropriate.

C. ADDITIONAL REVIEW AND ENVIRONMENTAL ANALYSIS

Upon completion of data collection and initial design, the SFMTA Bicycle Program reviews the proposed improvement with other City departments, external agencies, advocacy groups, and internally within the SFMTA to determine if there are any additional data needs or concerns. This review includes CEQA compliance and conformity to the San Francisco General Plan, the Bicycle Plan and other relevant planning documents.

Environmental review of proposed improvements often results in the application of a categorical exemption, or a finding resulting in a negative declaration. Some proposed improvements require an Environmental Impact Report (EIR) depending on the type of environmental impact and whether such impact can be mitigated. Historically, the SFMTA Bicycle Program has attempted to address the impacts in the steps above. Whenever possible, solutions are recommended that involve no significant negative impacts on the circulation of other vehicles or pedestrians. In some cases, it is not possible to improve conditions for bicyclists without having some impacts on other modes.

D. APPROVAL PROCESS

The CVC delegates authority to implement certain traffic regulations to local jurisdictions, including the authority to establish traffic patterns, regulate traffic with traffic control devices and to establish roadway markings and design features. In San Francisco, some of these changes can be made under the authority of the City Traffic Engineer, while some can only be made following a public hearing and others require action by the SFMTA Board of Directors⁵. If a proposed improvement requires the SFMTA Board of Directors approval, the proposal is submitted to the SFMTA Board of Directors to review, generally by following the steps below.

SFMTA Staff Meeting

Proposed improvements are discussed at a bimonthly SFMTA staff meeting and may need modification and discussion at more than one meeting.

TASC Meeting

⁵ Refer to San Francisco Transportation Code Section 201

The Transportation Advisory Staff Committee (TASC) is chaired by an SFMTA Traffic Engineering staff member and consists of representatives of other City departments (including Public Works, Fire, Planning, Police, Public Health, Port and the Taxi Commission). TASC reviews proposed improvements when they are in their final design phase to ensure they do not interfere with other current and projected transportation uses, especially the delivery of essential services (e.g., Fire, Muni, Police etc.). Design details such as precise lane widths and curb heights, exact signage placement and compatibility with emergency response plans are reviewed by TASC. Final design details are not available for all improvements proposed in this Plan; therefore, most proposed improvements (excluding minor striping or signage recommendations) in this Plan will need to be submitted for TASC review when they are sufficiently developed. TASC provides an opportunity for City staff to comment on proposed improvements. Proposed improvements may need modification and discussion at more than one meeting.

BAC Meeting

The BAC may consider and take action on a resolution supporting a proposed improvement. Public comment can be heard at BAC Meetings.

SFMTA Public Hearing

For proposed improvements requiring a public hearing, public notices are posted in the project area and on the SFMTA website and distributed to interested parties. An SFMTA staff Hearing Officer presides over the hearing and records public concerns and questions received prior to and at the hearing. Some proposed improvements are returned to staff for possible modification to address concerns raised at the hearing.

SFMTA Board of Directors Meeting

If the SFMTA Board of Directors approves an item, it authorizes staff to take the necessary steps to begin implementation of the proposed improvements or other appropriate action. If the SFMTA Board of Directors does not approve an item, it is sent back to staff for possible modification. Additional public comment can be heard at this meeting.

E. IMPLEMENTATION

After the approval process is complete, the proposed improvement can be implemented. For improvements requiring new striping, pavement quality is a major consideration. Generally, new pavement striping would occur after a roadway-resurfacing project. Resurfacing projects are scheduled by DPW using its Pavement Management and Mapping System (PMMS).

BICYCLE ROUTE NETWORK MAINTENANCE STANDARDS

Among other responsibilities, DPW is in charge of cleaning, repairing and maintaining city streets; coordinating street excavation work; removing graffiti and illegal signs; regulating street and sidewalk use; and enhancing and protecting the public right-of-way (ROW).

The City's streets can be made safer for bicycling through improved maintenance standards specifically targeting bicyclists' needs. Through its street and sewer inspection program and response to citizens' reports, DPW has developed a standard of street maintenance that primarily responds to the needs of automobiles. While damaged road surfaces may be merely a nuisance to auto users, they can present safety hazards to bicyclists.

The recommendations in this section do not create new specifications, but are recommended changes to existing DPW and SFMTA specifications, regulations, and policies. Whatever changes or refinements are made should be incorporated into the appropriate sections of the City's existing standard specifications, including the SFMTA's "Regulations for Working in San Francisco Streets"^v and the DPW's "Regulations for Excavating and Restoring Streets in San Francisco"^{vi}.

The SFMTA, the DPW, the BAC, and the SFBC should work together to ensure that all telephone, internet, print and any other public outreach materials regarding street surface issues are current and consistent. The City should also coordinate with Caltrans on information regarding street surface conditions, where needed.

The City of San Francisco has developed a single phone number for all service requests, 311. San Francisco residents should call the 311 Customer Service Center for all service requests and complaints regarding bicycle facility maintenance. The 311 system provides tracking information for service requests for numerous City departments.

EXISTING POLICIES

Many DPW policies of interest to bicyclists are addressed in the 1999 revision of DPWs “Regulations for Excavating and Restoring Streets in San Francisco,” adopted following approval of the 1997 Bicycle Plan. These include:

Section 6.3.A: For major projects (lasting 15 calendar days or longer), notices must be mailed (at least 30 but not more than 60 calendar days before start of work) to the SFBC and the SFBAC when excavations occur on designated bicycle routes.

Section 9.1.D: “Excavation in concrete pavement and parking strips . . . which carry bicycle lanes shall require removal of concrete to an existing joint. Excavation and restoration in these areas shall not result in any new joints in the concrete.”

Section 12.4.A: “ACWS [asphalt concrete wearing surface] on designated bicycle routes must be removed and restored for the full width of the bicycle lane.”

The SFMTA’s “Regulations for Working in San Francisco Streets” (commonly referred to as the “Blue Book” because of its blue cover) that is referenced in the “Regulations for Excavating and Restoring Streets in San Francisco,” contains a map of all San Francisco bicycle routes and establishes rules so that work can be done both safely and with the least possible interference with pedestrian, bicycle, transit and vehicular traffic.

INTERDEPARTMENTAL MAINTENANCE COORDINATION

Representatives from the DPW, the Recreation and Park Department, and the SFMTA should improve interdepartmental coordination regarding maintenance issues on San Francisco's accepted streets and paths, especially on designated bikeways. This will result in ongoing maintenance or street cleaning issues having a better chance of being aired, prioritized, and monitored for implementation.

“SPOT” IMPROVEMENT PROGRAM

In 1993, a “Spot” improvement postcard program was initiated to identify and implement various bicycle-related improvements. Suggested small-scale bicycling improvements were largely identified through postage-paid mail-in postcards which were distributed through bicycle organizations and bicycle shops in the City. This program was managed by the SFMTA Bicycle Program and any needed repair work was coordinated between the DPW and the SFMTA. San Francisco residents should call 311 for all service requests and complaints regarding “spot” improvements.

STANDARDS FOR CONTRACT WORK

Action 1.12

Work with the Department of Public Works (DPW) to enforce standards that must be strictly adhered to by contractors for street excavation restoration.

An important step toward improving the quality of road maintenance done for the City through contract work is to develop a set of standards that must be strictly adhered to and enforced by DPW with a guarantee of a minimum of one year for replacement of any defective work. A pre-qualification of acceptable contractors who do City work may help ensure quality work. DPW should improve enforcement of existing standards, published in “Regulations for Excavating and Restoring Streets in San Francisco,” to ensure that non-compliant contractors are cited for violations.

PATHWAY MAINTENANCE

Action 1.13

Work with the responsible San Francisco agencies to create a prioritized citywide bicycle and mixed-use pathway inventory that includes surface condition, signage and lighting status, required maintenance or improvements needed and the agency responsible for each pathway.

The DPW, the Recreation and Park Department, and the SFMTA should develop a bicycle pathway inventory that provides reports on the current condition of every bicycle and mixed-use pathway in the City and the agency responsible for each facility. This inventory should be kept updated through regular surface condition surveys to provide a prioritized maintenance list for all City-maintained pathways. In addition, this inventory should review the status of pathway signage, lighting and maintenance information. When maintenance is scheduled, the responsible agency should provide advanced warning of maintenance work and a traffic routing plan or detour route should be established and signed for bicyclists.

SPRINKLERS

In addition to maintaining pathways, the City should review the placement and scheduling of automatic sprinkler systems to minimize their impact on bicyclists.

STREET CLEANING

Action 1.14

Work with the DPW and the Recreation and Park Department to maintain a regular sweeping schedule of bicycle routes on City-accepted streets and City-maintained off-street paths that are not currently cleaned on a regular schedule—in addition to sweeping bikeways whenever there is an accumulation of debris such as gravel, glass and sand.

Broken glass, gravel and debris along roadsides and on paths can cause punctured tires and bicycle crashes. City-maintained streets in San Francisco are cleaned on a regular schedule by DPW except for streets, trails and paths in parks (maintained by the Recreation and Park Department). In addition to its full-sized mechanical street sweepers, DPW owns several small mechanical sweepers (commonly referred to as “Green Machines”), sized to sweep off-street paths and sidewalks. Currently, several off-street paths are not cleaned on a regular schedule, resulting in debris buildup. DPW and the Recreation and Park Department should maintain a regular sweeping schedule for all off-street City-maintained paths in the City, and should clean City-maintained streets after storms (especially downhill street segments) where bicyclists are more likely to lose control due to accumulated sand and gravel. San Francisco residents should call 311 for all service requests and complaints regarding street cleaning.

PAVEMENT

Potholes are repaired by filling with asphalt to the level of the surrounding surface. The asphalt is compacted to prevent future settlement and is then inspected for quality compliance. DPW repairs potholes (including in City parks) within 48 hours of receiving a request during weekdays. If the repair is the responsibility of another agency, DPW notifies that agency. San Francisco residents should call 311 for all service requests and complaints regarding pavement quality.

PATCHING AND PAVING

Poor pavement quality can lead to damaged bicycle wheels, or can cause bicyclists to lose control, potentially resulting in crashes. The following actions should be prioritized to ensure better pavement quality along the bicycle route network.

Action 1.15

Work with the DPW to prioritize streets on the bicycle route network within the DPW’s street resurfacing program.

Action 1.16

Work with the DPW to inspect streets on the bicycle route network on a yearly basis.

DPW has established a tracking system for pavement patching and paving requests that is linked to the 311 system. DPW staff have partnered with SFBC volunteers on identifying and reporting pavement problems.

San Francisco should adopt stricter paving, compaction, and smoothness standards similar to those of Palo Alto^{vii}. DPW should give bicycle routes higher priority than other streets when developing paving projects, since poor pavement quality can adversely impact bicycle safety. DPW currently uses a Pavement Management and Mapping System (PMMS) to prioritize street paving based upon a point system. The PMMS uses a numeric “Pavement Condition Score” based on a field inspection of three surface features: cracking, raveling (erosion) and motor vehicle ride quality. This score assesses each block’s maintenance need, identifying its just-in-time maintenance time point and its relative priority. The rating system does not replace engineering judgment. The maintenance recommendation is a starting point for the engineering effort. Each block still requires an engineer’s on-site assessment of its exact maintenance needs. (The Pavement Condition Score only applies to the pavement condition and does not account for traffic volume, number of citizen street-surface complaints, geographic equity or whether the street is on a bicycle or Muni route). The highest priority for street resurfacing is not always streets in the worst condition. Streets that can have their life prolonged without complete reconstruction receive higher priority so they do not deteriorate to the point where they require complete reconstruction, a more costly option. SFMTA should work with DPW to amend the PMMS so that it gives higher priority to streets on the bicycle route network.

Streets cannot be resurfaced until all the required utility clearances are received to ensure that all planned utility work is complete before they are resurfaced. This may often take several years. If a small section of street is in very poor condition and the entire block is not scheduled for repair in the near future, “patch paving” is done. This involves grinding out and replacing the pavement section. It is important that contractors and utilities be held to strict standards regarding annual re-patching and replacing of defective asphalt patches. Asphalt pavement replacement must be flush with surrounding pavement, including any adjacent concrete gutter. The Public Works Code provides that it can be inspected up to one year after installation to check for settling and the contractor should replace resurfaced pavement if found defective.

Section 8.3 of DPW’s “Regulations for Excavating and Restoring Streets in San Francisco” specifies that excavation sites shall be swept at the end of each workday. This avoids leaving loose asphalt materials that can adhere to the existing asphalt or concrete surface.

Section 10 (Trench Backfill Requirements) of DPW's "Regulations for Excavating and Restoring Streets in San Francisco" requires that the top three feet of backfill be compacted to a relative compaction of not less than 95 percent and material below the top three feet to not less than 90 percent. Although certified compaction tests must be taken every 200 square feet of excavation or as specified by DPW, stricter compaction and smoothness standards similar to those published by the City of Palo Alto should be adopted by DPW⁶. Additionally, contractors and utilities need to be held to strict standards regarding re-patching and replacing of defective asphalt patches. Section 2.4.70 of the Public Works Code already obligates the owner of the facility who excavates in the public ROW to be responsible to maintain, repair or reconstruct the site of the excavation until the public ROW is reconstructed, repaved or resurfaced. Section 11 of DPW's "Regulations for Excavating and Restoring Streets in San Francisco" details "Pavement Base Requirements," and Section 12 details "Paving Requirements."

STREET CUTS

In accordance with the Public Works Code:

1. Open street cuts are generally marked with barriers, or covered with 2 inches of asphalt or metal plates.
2. After work is complete, all filled and repaved street cuts should be flush with the adjacent surface.
3. When a street is resurfaced with an asphalt overlay, the existing asphalt in the area adjacent to the gutter lip should be ground to the depth of the asphalt concrete to be placed on the street.
4. Temporary asphalt ramps should be installed at all wedge cuts located at intersections and pedestrian and bicycle crossings to provide a transition at the vertical differential.
5. When the asphalt concrete is finally placed on the street, the level of the asphalt should match the level of the gutter within a one-quarter inch to eliminate the edge.

⁶ DPW's trench restoration standard requires that new pavement extend one foot beyond the trench line, but this "T-trenching" is only required on moratorium blocks (those blocks that have been reconstructed, repaved or resurfaced by DPW or any other owner or person in the preceding five-year period).

DPW's Street Construction Coordination Center (SCCC) oversees street excavation and issues excavation permits. SCCC uses the bicycle network GIS database to determine which excavation permits involve streets on the bicycle route network. Locations of current street excavations can be found by street name on DPW's website^{viii}.

Based on the Public Works Code, the City, utility companies or private contractors that excavate in the City's streets have 72 hours from the time the excavation-related construction is finished to complete the excavation, then 72 hours to backfill and compact a trench. They then have 72 hours from the time the excavation is backfilled to replace the pavement base. They have 72 hours after pavement base replacement to restore the finished pavement. San Francisco residents should call 311 for all service requests and complaints regarding street cuts and excavation work.

STEEL PLATES

Utilities and private companies that install utility trenches on streets cover them with steel plates during construction. If care is not taken to provide a smooth transition between the plate and the street surface, the resulting vertical deflection can be a hazard to bicyclists.

Steel plates used to cover work in progress may shift position under the movement of heavy trucks and buses, leaving gaps. The DPW and the SFMTA require that steel plates have beveled edges and non-skid surfaces, that the plates are secured in place with wooden wedges, that their edges are ramped with asphalt (which must be replaced and renewed frequently) to provide a transition to the adjacent street surface, and that where multiple plates are used, they must be welded together. The surface of non-skid plates can become worn smooth with wear. If worn non-skid plates are used, they are no longer compliant with the City's requirement for non-skid plates.

UTILITY COVERS AND UNDERGROUND PIPES

All utility covers should be flush with the surrounding pavement. Where underground pipes carry steam (not very common in San Francisco), the asphalt around steam utility covers can deform, causing warped pavement. Maintaining heat resistant concrete pads of at least a three-foot radius from the edge of the cover should stop warping of the asphalt near the edges. If possible, concrete should be installed above submerged steam pipes to prevent humping of the street surface.

CATCH BASIN GRATES

There are over 68,000 storm sewer catch basins in the City. Many older grates are semi-circular in shape with bars parallel to the direction of bicycle travel. These parallel-bar grates have openings that can catch and destroy a bicycle wheel and cause a bicyclist to crash. Many bicyclists also swerve to avoid the grates, risking collision with motor vehicles. These grate locations were identified by the SFMTA Bicycle Program Manager and were replaced by grates with bars perpendicular to the direction of travel to improve safety for bicyclists. Sunken catch basin grates should be raised to pavement elevation to improve bicycle safety and enhance smooth riding. This is much more costly, because it requires replacement of the frame that supports the grate. San Francisco residents should call 311 to report any remaining catch basin grate issues.

GUTTERS

Curb and gutter upheavals can cause “ponding” of water in bicycle lanes. A regular inspection of every linear foot of curb and gutter and along the bicycle route network should identify those that are raised, sunken or that have some vertical differential that would cause “ponding” and these should be repaired. Sometimes small asphalt dams are constructed in gutters to divert storm water into catch basins. These dams should not be constructed along the bicycle route network and existing ones should be removed where possible.

RAILROAD TRACKS

Action 1.17

Create an inventory of locations along the bicycle route network that intersect or run parallel to railroad tracks, and identify appropriate measures to mitigate the impacts of the track crossings to bicyclists.

Railroad tracks that are no longer used can be removed or covered with asphalt pavement. Removal is preferable, as pavement covering buried tracks often deforms around the underlying tracks. However, for tracks that cannot be removed (such as tracks that have been designated as historic resources), specially designed fabric can be placed over them before they are covered so that pavement deformation is minimized. DPW is responsible for removing or covering tracks, unless the tracks are located within another jurisdiction, such as the Caltrain Joint Powers Board, Golden Gate National Recreation Area, Port of San Francisco, or the SFMTA, or are subject to a railroad franchise. Any track removal within the jurisdiction of the Port of San Francisco must be approved by the Port Commission.

Although some railroad tracks are considered historic resources or may contribute to the character of a neighborhood, they should be removed or covered where bicyclists' safety would be improved. Railroad track removal or covering should be prioritized according to the location and orientation to bicyclists' path of travel. Tracks on streets most heavily used by bicyclists and those situated at an oblique angle to bicyclists' path of travel should receive the highest priority for removal or covering.

STRIPING, PAVEMENT LEGENDS AND EDGE LINE MARKINGS

Non-skid surfaces should be used for all traffic striping, and should conform to standards in the California MUTCD. The SFMTA currently uses thermoplastic, methyl methacrylate (MMC) and occasionally pavement marking tape for striping.

Glass beads are applied to new thermoplastic and MMC striping as a standard procedure to improve skid resistance and reflectivity. Raised pavement markers should not be used to supplement striping along bicycle routes because they present problems for bicyclists⁷. Where edge line raised reflectors are needed for motorists, they should be installed on the motorists' side of the line. The SFMTA has a policy of not using raised pavement markers on striping that crosses bicyclists' path of travel (such as lane guidelines through intersections). Given San Francisco's dense urban character, there are few locations where edge lines with raised pavement markers are used.

SIGNAGE

Most signs are installed and maintained by the SFMTA, and should conform to standards in the California MUTCD. San Francisco residents should call 311 to report missing or damaged signs.

i CVC 21202. (a) Any person operating a bicycle upon a roadway at a speed less than the normal speed of traffic moving in the same direction at that time shall ride as close as practicable to the right-hand curb or edge of the roadway except under any of the following situations:

- (1) When overtaking and passing another bicycle or vehicle proceeding in the same direction.
- (2) When preparing for a left turn at an intersection or into a private road or driveway.
- (3) When reasonably necessary to avoid conditions (including, but not limited to, fixed or moving objects, vehicles, bicycles, pedestrians, animals, surface hazards or substandard width lanes) that make it unsafe to continue along the right-hand curb or edge, subject to the provisions of Section 21656. For purposes of this section, a "substandard width lane" is a lane that is too narrow for a bicycle and a vehicle to travel safely side by side within the lane.
- (4) When approaching a place where a right turn is authorized.

(b) Any person operating a bicycle upon a roadway of a highway, which highway carries traffic in one direction only and has two or more marked traffic lanes, may ride as near the left-hand curb or edge of that roadway as practicable.

7 California HDM 1003.2 (2): "Raised barriers (e.g., raised traffic bars and asphalt concrete dikes) or raised pavement markers shall not be used to delineate bike lanes."

- ii SAR 02-3 can be viewed online at
http://www.sfcta.org/images/stories/legacy/documents/FinalSAR02-3LOS_Methods_000.pdf.
- iii The Supplemental Design Guidelines can be viewed online at
http://www.sfmta.com/cms/uploadedfiles/dpt/bike/Bike_Plan/SF_Design_Guidelines_Feb04.pdf.
- iv The study - "San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety" – can be viewed online at
http://www.sfmta.com/cms/uploadedfiles/dpt/bike/Bike_Plan/Shared%20Lane%20Marking%20Full%20Report-052404.pdf.
- v Regulations for Working in San Francisco Streets can be viewed online at
<http://www.sfmta.com/cms/vcons/bluebook.htm>.
- vi Regulations for Excavating and Restoring Streets in San Francisco can be viewed online at
http://www.sfgov.org/site/uploadedfiles/sfdpw/bsm/sccc/sccc_dpw_order.pdf.
- vii Information regarding the City of Palo Alto's street maintenance standards can be found by contacting the City of Palo Alto, Public Works Department, Engineering Division, 250 Hamilton Avenue, 6th Floor, Palo Alto, CA 94301.
- viii http://www.sfgov.org/site/sfdpw_page.asp?id=32800.