ENTRIPS

EASTERN NEIGHBORHOODS
TRANSPORTATION IMPLEMENTATION PLANNING STUDY

FINAL REPORT

DECEMBER 2011

AKNOWLEDGEMENTS

SFMTA Staff

Erin Miller, Project Manager

Timothy Papandreou

Jerry Robbins

Pamela Stone

Mike Sallaberry

Chris Dimeling

Emily Drennen

Suzanne Chen-Harding

San Francisco County Transportation Authority

Chester Fung

San Francisco Planning Department

Jon Swae

Steve Wertheim

Community Outreach Partner

Urban Ecology

Consultants to the SFMTA

Nelson\Nygaard Consulting Associates

Community Design + Architecture

Fehr and Peers

The SFMTA would also like to acknowledge the efforts of the Eastern Neighborhoods Citizens Advisory Committee, the EN TRIPS Community Task Force, and the community members who participated in EN TRIPS workshops.

The EN TRIPS project was made possible in part through funding from Caltrans, the Metropolitan Transportation Commission, and the San Francisco Foundation.

For more information on EN TRIPS, contact Erin Miller, Project Manager, at Erin.Miller@sfmta.com or visit: http://www.sfmta.com/cms/oentrips/indxentrips.htm

Table of Contents

Appendices

EXECUTIVE SUMMARY

BACKGROUND AND SCOPE

San Francisco's Eastern Neighborhoods are made up of the diverse communities of the Mission District, South of Market, Central Waterfront, Showplace Square, and Potrero Hill. These neighborhoods, along with the San Francisco Planning Department, worked together to complete the Eastern Neighborhoods Community Plan. The plan, adopted in 2009, outlines opportunities for increased housing and new development throughout the eastern third of San Francisco. The plan also includes a vision for changes in the transportation network to support proposed land use changes.

This Eastern Neighborhoods Transportation Implementation Planning Study (EN TRIPS) begins to implement the transportation vision established in the Eastern Neighborhoods area plans. It addresses impacts of growth and change in the Eastern Neighborhoods by identifying, designing, and seeking funding for key transportation infrastructure projects. The study included the following steps, which were all completed with extensive public involvement:

1. Perform technical analysis to determine existing and future circulation needs based on land use growth and change.
2. Select a number of key corridors which are candidates for short term improvement and which are not already being considered in other studies.
3. Evaluate a number of potential concepts for each corridor and determine the overall effect on circulation caused by changes on individual corridors.
4. Create conceptual designs for the most promising alternatives, and evaluate the opportunities and constraints resulting from changing the circulation system.
5. Develop funding and implementation strategies for the proposed projects.

The project sought to identify and prioritize transportation needs in the major transportation networks in the Eastern Neighborhoods, and then advanced the highest priority transportation projects that were unlikely to be met through other efforts. Following adoption of this plan, the proposed projects will be moved forward into environmental review and detailed design.

EN TRIPS was guided by the transportation objectives established through the Eastern Neighborhoods Area plans. These objectives have a strong multi-modal focus, recognizing the need to efficiently move people and goods through a variety of modes of transportation.

SUMMARY OF MAJOR CHALLENGES AND OPPORTUNITIES

Major challenges and opportunities for the Eastern Neighborhoods transportation system are discussed below. The chapters that follow propose transportation capital investments and circulation changes that begin to address many of these issues.

Capacity for movement of people and goods

- The Eastern Neighborhoods transportation system is already at or near capacity in some corridors during peak periods. As growth occurs, system capacity may be further taxed.
- Maintaining sufficient system capacity in growing neighborhoods will require improved alternatives to travel by private vehicle.

Livability

- The challenges in the transportation system decrease livability in the South of Market area.
- Areas with lower projected growth also require pedestrian and public realm improvements.

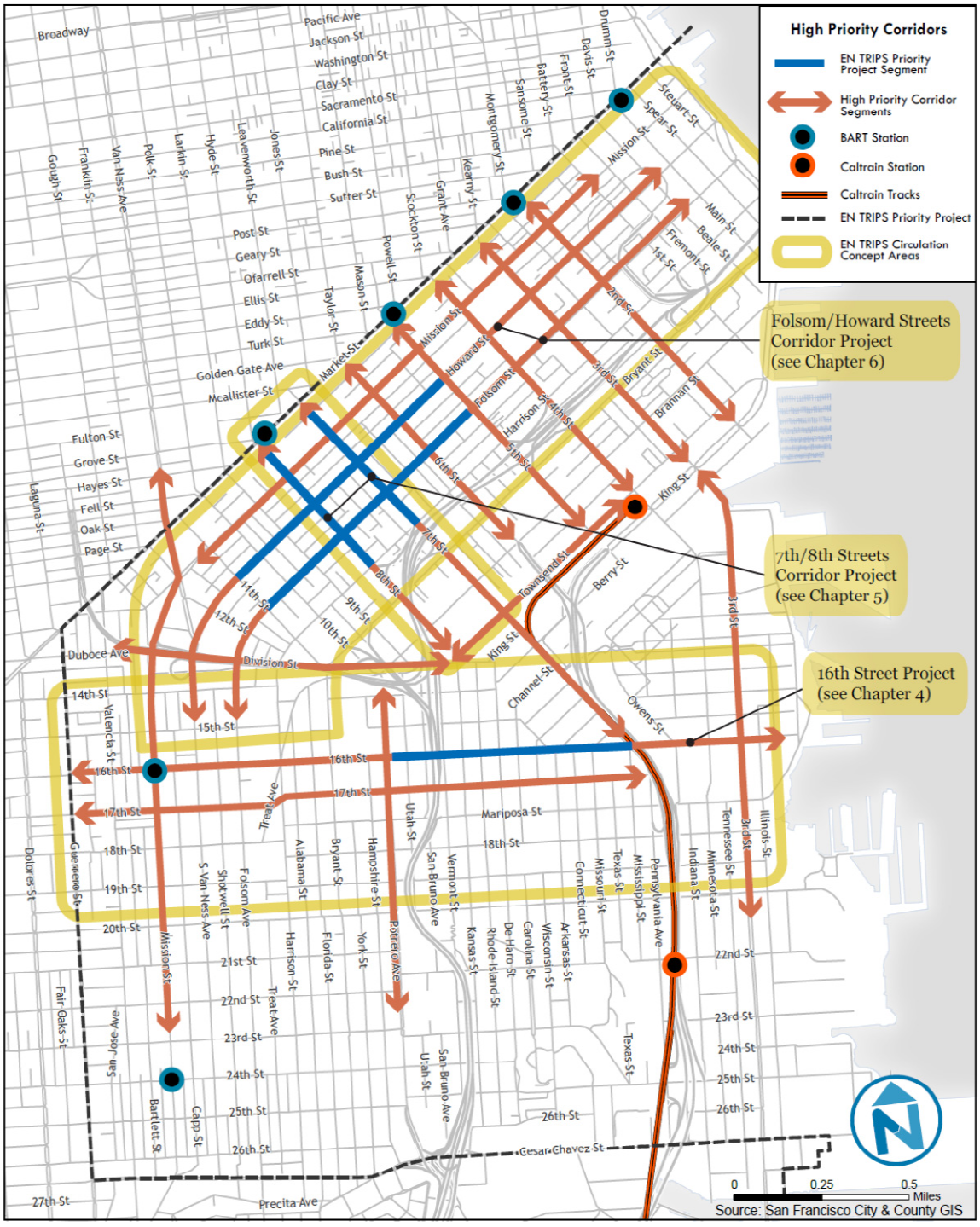
Connectivity

- Throughout the Eastern Neighborhoods, barriers such as elevated freeways, railroad tracks, wide arterials, and steep topography interrupt paths of travel and divide neighborhoods.
- The regional-scale rail service investments planned for the Eastern Neighborhoods create both opportunities and connectivity challenges.
- The Eastern Neighborhoods remain the industrial heart of San Francisco. Even as neighborhoods change, the heavy and light industry businesses that provide nearly 30,000 jobs in Eastern Neighborhoods plan areas will continue to require delivery trucks of all kinds.

CORRIDOR PROJECTS

Responding to major land use and transportation system changes in the coming decades, the EN TRIPS project sought to develop major capital investments to improve transportation and the public realm on a small number of very important transportation corridors in the study area. The priority projects aim not only to address major challenges for circulation and livability at the neighborhood scale, but also to address challenges for the overall Eastern Neighborhoods circulation system. While the selected projects were the focus of design effort, the EN TRIPS plan also proposes circulation changes for the surrounding transportation networks where doing so supports the project goals and helps to meet EN TRIPS project objectives. Finally, the project sought to advance corridors for which design and circulation planning work could help to inform future improvement projects for several other priority Eastern Neighborhoods corridors. The recommended project designs are summarized below and detailed in Chapters 4, 5, and 6 of this report.

Figure ES-1 EN TRIPS Priority Corridors



16th Street Corridor

Sixteenth Street is a major east-west corridor connecting the Eastern Neighborhoods and connecting the Eastern Neighborhoods to the rest of the city. In a part of the city marked by multiple barriers (including hilly terrain, US 101 and Interstate 80, and the Caltrain right-of-way), 16th Street it is the only east-west street that allows for continuous travel all the way from the Mission District to Mission Bay. Substantial development is expected in several neighborhoods connected by 16th Street including the north Mission District, Showplace Square, and Mission Bay. The 22 Fillmore currently provides transit service along 16th Street from the Castro district as far east as Kansas Street in Potrero Hill. In the future, SFMTA plans to re-route Route 22 so that it serves the full length of 16th Street to Mission Bay.

Sixteenth Street was identified as a high-need corridor in the Eastern Neighborhoods area plans, and improvements to the corridor were specified as a priority project by the San Francisco Board of Supervisors. The segment of 16th Street between Potrero Avenue and Seventh Street was prioritized for investment because of expected residential growth, forecast vehicle congestion, transit capacity constraints, and community priority.

Project Objectives

In designing transportation improvements for 16th Street, the SFMTA was guided by the principles listed below. With a limited right-of-way, project design requires tradeoffs between each of these priorities, but the project alternatives attempt to strike a balance between priorities.

- **Transit performance.** The project should maximize transit speed and reliability on 16th Street while providing a safe and comfortable waiting environment for passengers.
- **The public realm.** Open space, landscaping, and other urban design elements should be enhanced to upgrade 16th Street to a "green connector" street.
- **Pedestrian conditions.** Pedestrian comfort and safety should be improved. Currently, this segment has limited pedestrian facilities.
- **Bicycle conditions.** A safe, comfortable, and attractive bicycle route should be provided within the corridor.
- **Vehicle circulation.** The street grid as a whole should continue to accommodate east-west vehicle travel between the Mission District, Potrero Hill, Showplace Square, and Mission Bay.
- **Parking and loading.** Delivery access to businesses should be maintained and parking opportunities should be provided where possible, but parking and loading is less important than through-travel in this segment.
- **Deliverability and cost-effectiveness.** The project should maximize cost-effectiveness and speed delivery of the most crucial transit priority improvements.

Project Development

The EN TRIPS project team developed a total of nine project alternatives. The project alternatives share a number of similarities. First, all of them provide dedicated transit lanes (either on the center or the side of the street), as well as other transit priority treatments such as near-level boarding and transit signal priority. All would restrict left turns for vehicles at most intersections on 16th in order to maintain capacity for through-travel. Most would remove a large share of the

parking on 16th Street. Key differences between the alternatives include the placement of bicycle facilities (either 16th or 17th Street), the type of transit only lane (center or side-running), and the placement of bus stops (boarding island or curb stops).

Based on the evaluation, the three most promising concepts were selected for additional analysis, design, and community input. The concepts advanced include the Median Transitway (Alternative 1), the Center Queue Jump (Alternative 4), and the Green Median (Alternative 7). The Median Transitway is recommended as the concept that provides the greatest benefits across the full range of project objectives. This alternative is summarized below, and developed in detail in Chapter 4.

In addition, in section 4.5 of this report, the two other promising alternatives are summarized. It should be noted that, in the judgment of the project team, the recommended alternative is clearly the strongest concept across the range project objectives. However, these additional options are included for stakeholder review and potential inclusion as alternatives in environmental review.

Recommended Alternative

The recommended alternative would provide the strongest transit priority to the re-aligned 22 Fillmore, a service that is of vital importance to the future of the Eastern Neighborhoods as a whole. It would also substantially upgrade pedestrian conditions and improve the public realm. While it would remove a segment of bicycle lanes on 16th Street, bicycle travel would be accommodated in a new high-quality bicycle facility on 17th Street. While this alternative will require major public investment, it can be easily phased, with the most crucial transit priority and pedestrian safety aspects of the project implemented first, followed by the costlier public realm improvements when funding becomes available.

Traffic impacts of the proposed transit priority treatments will be analyzed in detail as part of the TEP environmental review process. This project will maintain one lane of traffic in the eastbound direction (as today) while reducing westbound vehicle lanes from two to one. A number of factors could help offset this reduced capacity: first, a substantial increase in transit performance could reduce the demand for vehicle trips in this corridor. Second, the City can invest in reconnecting the east-west transportation grid in this part of the city, relieving some of the burden on 16th Street as the primary east-west vehicle route. Similarly, continued efforts at Transportation Demand Management and parking management at Mission Bay could also reduce the demand for vehicle trips.

This page intentionally left blank.

Figure ES-2 16th Street Corridor Issues and Opportunities

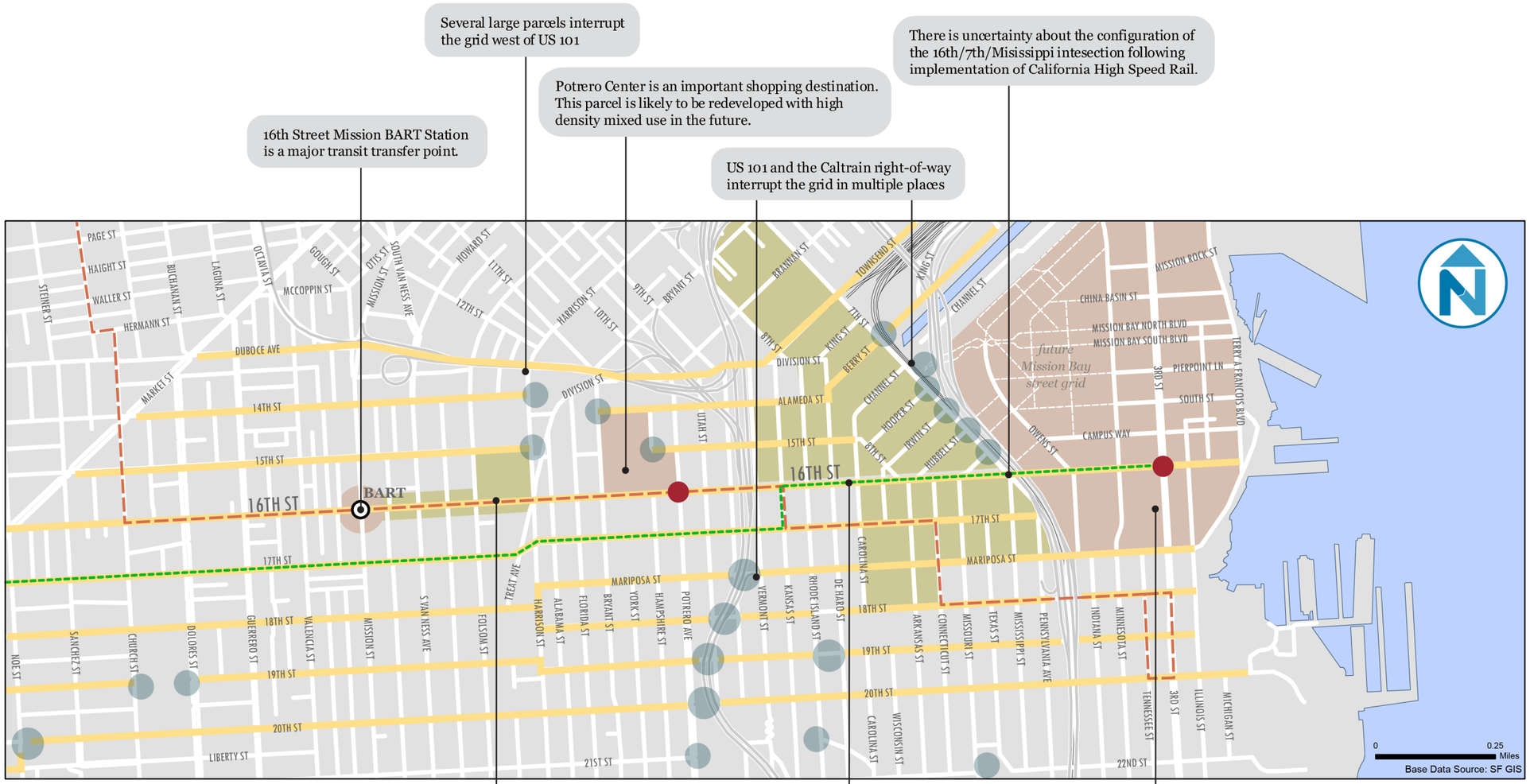


Figure ES-3 16th Street Corridor Operations Concept

The recommended alternative for 16th Street is based on a few key features, including increasing transit reliability by the creation of a median transitway; extension of sidewalks; and moving bicycle circulation to 17th Street.

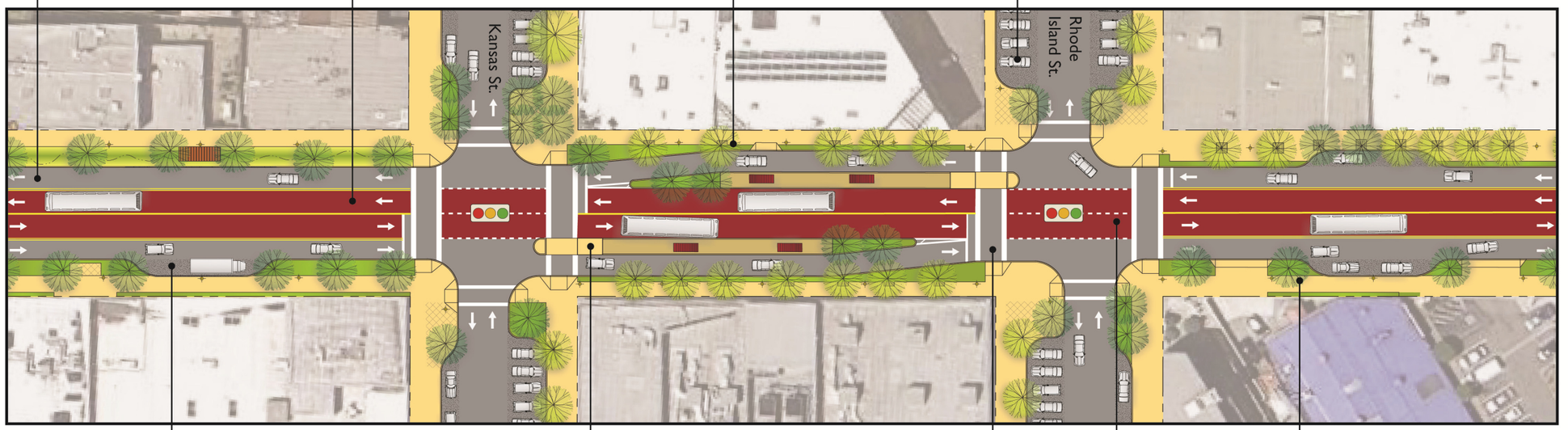
Vehicular traffic will travel in one lane in each direction. Vehicle lefts will be prohibited at most intersections, but vehicles would be able to make right turns on to and off from 16th Street. Not-in-service transit vehicles may be able to turn left where required.

The 22 Fillmore, 33 Stanyan, and potentially private shuttles will run in a median transitway in the center of 16th Street, where buses traveling in dedicated lanes and unimpeded by turning vehicles will dramatically decrease transit delays and increase reliability.

Sidewalks at transit stops will remain 10 feet wide on the stop side to accommodate the bus boarding platform.

While much of the parking on 16th Street will be removed, the maintenance of 90-degree parking on most cross streets means that a majority of the parking in the corridor will be retained. Some additional parking can be added by reconfiguring one or more cross streets for perpendicular parking.

Bike lanes will be removed from 16th Street to allow more room for transit and pedestrians. Bicycle lanes and traffic calming treatments will be added on 17th Streets.



Most parking will be removed from 16th Street, but the 18-foot wide sidewalks will allow for occasional placement of parking or loading bays. Placement of the bays will vary from block to block depending on land uses.

Passengers will board buses on median islands, raised to the level of the bus floor to speed up the boarding process. Boarding islands will be accessed via ramps rising from crosswalks. The boarding process will also be made shorter by ticket machines allowing "prepaid" boarding through all doors.

Pedestrian crossings of 16th Street will be 44 feet, approximately 25% shorter than the current condition. Crossings at the transit stops will be 53 feet, but will include an 8-foot pedestrian refuge at the boarding island.

New signals will be added Rhode island, Wisconsin, and Connecticut to protect transit and improve pedestrian connectivity.

Sidewalks along 16th Street will widen from 10 feet to 18 feet (except at and near transit stops).

50' 100'

Folsom and Howard Streets Corridor

Folsom and Howard Streets are major arterials in the South of Market area running north-east and south-west between the Embarcadero and the Mission District. For most of this distance, they function as a one-way couplet carrying large volumes of vehicles traveling during peak periods. Local transit service operates eastbound on Folsom Street with westbound service provided on Harrison Street. Folsom Street has an important community role in the western South of Market. Already home to much of the neighborhood's night life, it is envisioned as an emerging daytime neighborhood commercial district between Sixth and Ninth Streets. On the last Sunday in September, the Folsom Street Fair draws many thousands of people to the neighborhood.

The segments of Folsom and Howard between Fifth and 11th Streets have been prioritized for analysis and investment over other segments of the corridor because of expected residential and employment growth and community priority. This segment was identified as an area of need by participants in the EN TRIPS community workshops, Eastern Neighborhoods area plans process, and Western SOMA Community Task Force.

Project Objectives

In designing improvements in the Folsom Street corridor and developing a concept for east-west circulation in the South of Market, the project team was guided by the principles listed below. With a limited right-of-way, project design requires tradeoffs. The design alternatives that follow recognize the need for balance between priorities.

- **Pedestrian conditions.** *Pedestrian connectivity, comfort, and safety should be improved.*
- **The public realm.** *Open space, landscaping, and other urban design elements on Folsom Street should be upgraded.*
- **Transit legibility**. *Transit service should be consolidated on two-way streets to improve legibility where possible.*
- **Transit performance.** *Transit speed and reliability should be maintained.*
- **Bicycle conditions.** *A safe, comfortable and attractive bicycle route should be provided within the corridor.*
- **Vehicle circulation.** *The project should maintain adequate east-west vehicle capacity in the South of Market network as a whole.*
- **Parking and loading.** *Parking and loading access to businesses should be maintained.*
- **Deliverability and cost-effectiveness.** *The project should maximize cost-effectiveness and speed delivery of the highest priority improvements.*

Project Development

Based on the evaluation detailed in Chapter 5 of this report, the four most promising concepts were selected for additional analysis, design, and community input. The concepts advanced include all three of the two-way, three-lane Folsom Street configurations and a single one-way option. After detailed review of these alternatives, Alternative 5, with two-way Folsom and Howard Streets and a two-way cycletrack on Folsom, emerged as the concept that appears to provide the greatest benefits across the full range of project objectives.

In section 5.6 of this report, the three other promising alternatives are summarized. Each includes an alternative circulation concept. In addition, the findings of a detailed traffic analysis of the alternatives are provided in Appendix A. Unlike the 16th Street project, where one alternative emerged as clearly the strongest, each of these remaining Folsom/Howard alternatives is competitive with the recommended alternative. Each is a balance of priorities, differing from the other alternatives with respect to the scale of public realm improvements, connectivity for different modes, traffic impacts, transit performance, and cost. These additional options are included for stakeholder review and potential inclusion as alternatives in environmental review.

Recommended Alternative

The recommended alternative reduces crossing distances and provides signalized mid-block crossing on every block to improve pedestrian connectivity and safety. It consolidates the TEP's 27 Folsom and the 11 Downtown Connector on Folsom Street, offering eight-minute headways in both directions. By shifting westbound service from Harrison Street, the efficiency of both routes improves, and traffic modeling suggests that transit delay would not increase as a result of increased traffic congestion. A buffered two-way cycletrack on Folsom Street would offer a protected bicycle facility that improves connectivity to the Mission District and points south.

While this alternative would provide additional pedestrian space at corner bulbs and bus stops, it would not widen sidewalks on either Folsom or Howard Streets leaving Folsom with 10-foot sidewalks (Howard Street sidewalks are now 12-feet wide). However, because it would not move curb lines, this concept could be implemented at a substantially lower cost than the others. On Howard Street, a landscaped median will augment the public realm and provide pedestrian refuges.

Figure ES-5 Folsom and Howard Streets Corridor Issues and Opportunities

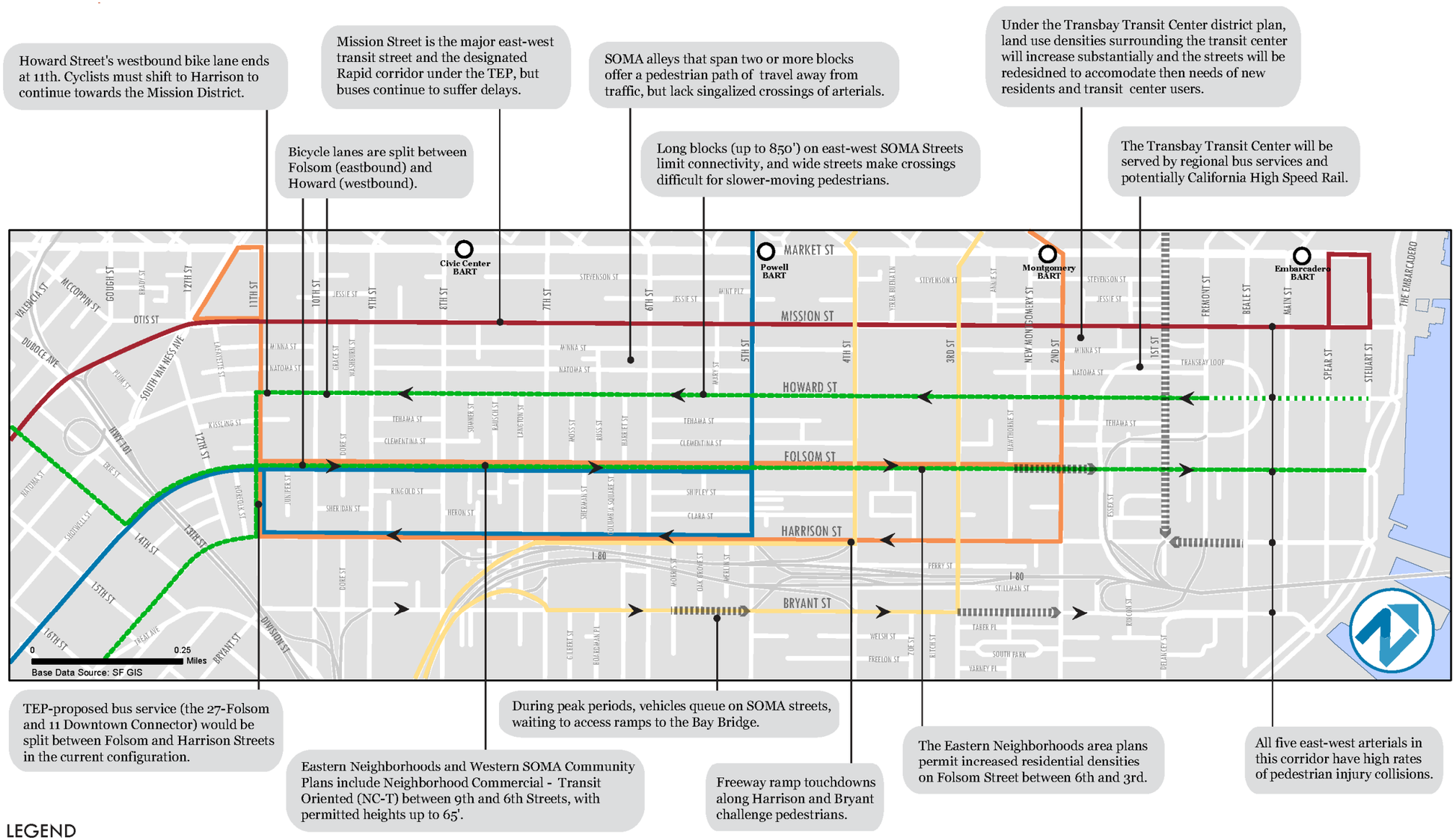


Figure ES-6 Folsom Street Operations Concept

The Transportation Concept for Folsom Street converts vehicle travel to two-way, allowing for bi-directional bus service. However, because the street's "two-plus-one" lane configuration will allow eastward travel to remain dominant, this alternative has characteristics typically associated with one-way travel, such as signal timing, traffic calming, and opportunities for mid-block crossings. The concept also includes a two-way cycletrack that will be buffered from vehicle traffic by the parking lane and a buffer area along the sidewalk edge.

"Two-plus-one" lane configuration allows for the vehicular access benefits of a two-way street while prioritizing eastward travel. This encourages slower vehicle speeds and better accommodation of bicycle speeds.

While vehicles have the option of two-way travel, traffic signals are timed to the eastbound traffic, making westbound auto travel more suited to local rather than crosstown trips.

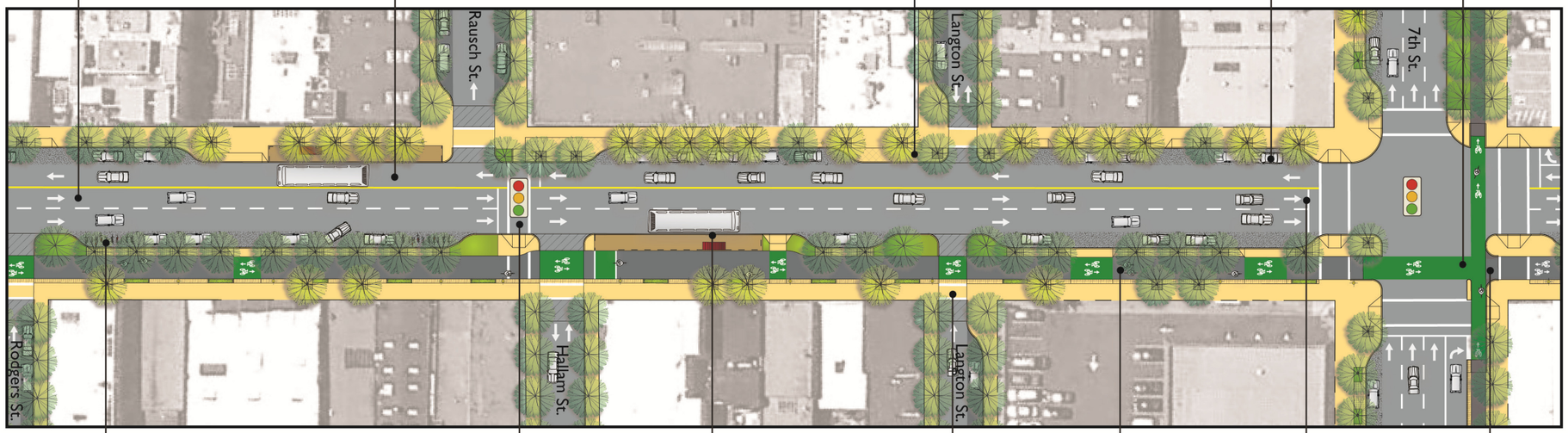
Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and more comfortable for cyclists and pedestrians.

Bulb-outs will be added to all intersections where a turn lane is not needed.

Sidewalks on both sides of Folsom Street remain 10 feet wide, but will be treated with new streetscape amenities to increase pedestrian comfort - see Streetscape/ Landscape Concept.

Parking lanes are maintained on both sides of the street, except where bulb-outs or turn lanes are required.

The pavement in areas of potential conflict between cyclists and motorists is colored green.



Some parking spaces can be repurposed as bicycle corrals to improve access to the neighborhood commercial district and other important destinations.

New signalized midblock crossings will allow easier crossing of the street between the widely spaced major cross streets.

The 27-Folsom and 11 Downtown Connector will operate eastbound and westbound on Folsom Street every 8 minutes. Riders will board eastbound buses via islands on the street side of the cycletrack.

Bus stops will be located at mid-block crossings to ensure that westbound vehicles do not block intersections while waiting behind a stopped bus.

At intersections with alleys, the alley roadway ramps up to sidewalk grade, slowing cars as they enter and exit the alleys.

A two-way cycletrack is accommodated between the parking lane and the sidewalk. The cycletrack will be primarily at sidewalk grade and have a buffer area separating it from both pedestrians and people exiting parked cars.

Vehicle left turns are restricted from most Folsom intersections, reducing the number of turn pockets required and diverting some trips to Howard, which will provide a left turn lane serving both directions of travel.

At major intersections, the cycletrack ramps down from sidewalk grade to street grade.

50' 100'

December 21, 2011

Figure ES-7 Howard Street Operations Concept

The Transportation Concept for Howard Street converts vehicle travel to two-way. However, because the street's "two-plus-one" lane configuration will allow westward travel to remain dominant, this alternative has characteristics typically associated with one-way travel, such as signal timing, traffic calming, and opportunities for mid-block crossings. A center median will allow turn pockets where needed, add a major green design element to the street, and allow for pedestrian refuges at midblock and some major street crossings.

Howard will have two west-bound lanes and one eastbound lane. A two-way configuration provides vehicle circulation options while helping to calm traffic.

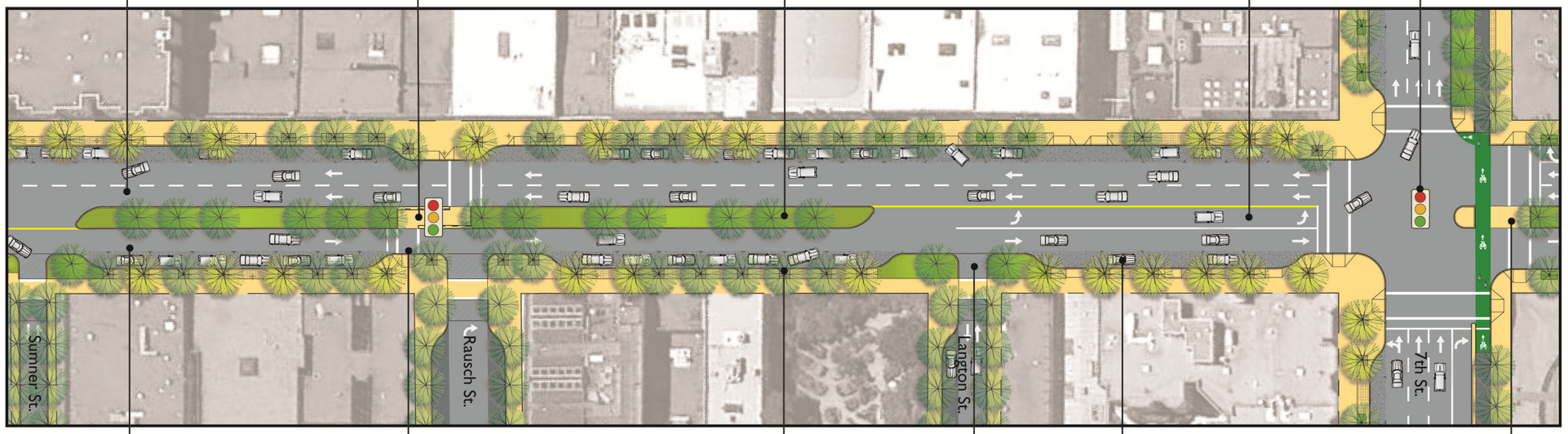
A median pedestrian refuge, as well as bulb-outs, will greatly reduce pedestrian crossing distances at mid-block crossings.

The existing west-bound bicycle lane will be removed from Howard between 5th to 11th, replaced with a new two-way cycletrack on Folsom.

Landscaped medians will be added in the middle segments of blocks.

Left turn pockets occupy the median space where needed. Convenient left turns off Howard will compensate for restricted lefts off Folsom.

Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and make the street more comfortable for pedestrians.



While vehicles have the option of two-way travel, traffic signals are timed to the westbound traffic, making eastbound auto travel more suited to local rather than crosstown trips.

New signalized midblock crossings will allow easier crossing of the street between the widely spaced major cross streets. The median refuge will allow for two-phase pedestrian crossing.

Sidewalks on both sides of Howard Street will remain 12 feet wide, but will be treated with new streetscape amenities to increase pedestrian comfort - see Streetscape/ Landscape Concept.

At intersections with alleys, the alley roadway ramps up to sidewalk grade, slowing cars as they enter and exit the alleys.

Parking lanes will be maintained on both sides of the street, except where bulb-outs or turn lanes are required.

At intersections with major cross streets, such as 7th Street, where a left turn pocket is not needed, the planted median can extend to the intersection, allowing for a pedestrian refuge in the middle of Howard Street.

50' 100'

This page intentionally left blank.

Seventh and Eighth Streets Corridor

Seventh and Eighth Street work together as a one-way couplet in the South of Market area, traveling north and south between Market Street and Townsend Street. The 19 Polk provides local transit service every 15 minutes, traveling north on Seventh Street and south on Eighth Street. Seventh and Eighth Street are designated as major arterials in the City's Congestion Management Plan Network.

These two streets share issues and opportunities that are also common to the other north-south arterials in the South of Market area. All of these streets are designed and managed to primarily carry high traffic volumes during peak periods. Improving the public realm and conditions for other modes on these streets will require some reduction in vehicle capacity. Capacity reductions will have to be carefully designed to avoid unwanted impacts on the surrounding transportation networks, particularly transit operating in mixed-flow traffic.

Seventh Street also has a special role as an Eastern Neighborhoods connector street. Unlike parallel streets, Seventh continues south of Mission Creek, traveling through Showplace Square and intersecting with the Potrero Hill grid at 16th Street. The Eastern Neighborhoods area plans indentify Seventh as a "green connector" street.

The Seventh and Eighth Street corridor has three distinct segments: Market Street to Harrison Street, Harrison Street to Townsend Street, and Townsend Street to 16th Street. The full length of Seventh Street has been designated as a "green connector" street in the Eastern Neighborhoods land use plan and will require investment in the public realm. As a first step, and as an investigation in how to address the set of issues that challenge all of the South of Market's north-south arterials north of the freeways, the Seventh and Eighth Street couplet between Market and Harrison was selected as an EN TRIPS priority project.

Project Objectives

In designing improvements in the Seventh and Eighth Street corridor, the project team was guided by the principles listed below. With a limited right-of-way, project design requires tradeoffs. The design alternatives that follow attempt to strike a balance between priorities.

- **Pedestrian conditions.** *Pedestrian connectivity, comfort, and safety should be improved.*
- **The public realm.** *Open space, landscaping, and other urban design elements should be upgraded.*
- **Transit performance.** *Transit speed and reliability should be maintained.*
- **Bicycle conditions.** *A safe, comfortable, and attractive bicycle route should be provided within the corridor.*
- **Vehicle circulation.** *The project should maintain adequate north-south vehicle capacity in the South of Market network as a whole.*
- **Parking and loading.** *Parking and loading access to businesses should be maintained.*
- **Deliverability and cost-effectiveness.** *The project should maximize cost-effectiveness and speed delivery of the highest priority improvements.*

Recommended Alternative

Based on the evaluation above, the three most promising concepts were selected for additional analysis, design, and community input. After detailed review of these options, the SFTMA recommends Alternative 2, which reduces 7th and 8th Streets to three, one-way lanes, invests in pedestrian connectivity and additional pedestrian space and adds a buffered one-way cycletrack to each street, as the concept that appears to provide the greatest benefits across the full range of project objectives.

In section 6.5 of this report, two other alternatives are summarized with the recommended alternative's key differences highlighted. In addition, the findings of a detailed traffic analysis of the alternatives are provided in Appendix A. These additional options are included for stakeholder review and potential inclusion as alternatives in environmental analysis of the project.

The recommended alternative reduces crossing distances and provides signalized, mid-block crossings on every block to improve pedestrian connectivity and safety. By maintaining one-way circulation, it allows signals to be synchronized to favor a steady progression of vehicles at a moderate speed. A buffered one-way cycletrack on each street would offer a protected space for cyclists moving north and south in the western South of Market area. It would widen sidewalks on the side of the street opposite the cycletrack providing additional space for pedestrians, landscaping, and other amenities. Investment in the public realm on Seventh Street, in particular, will help that street fulfill its role as a "green connector" as identified in the Eastern Neighborhoods area plans. Sidewalk widening would require substantial resources. However, this alternative could be easily phased with the cycletrack, bulbs, and pedestrian refuges installed in the first phase and sidewalk widening implemented in a second phase when funding becomes available.

Figure ES-9 Seventh and Eighth Streets Corridor Issues and Opportunities

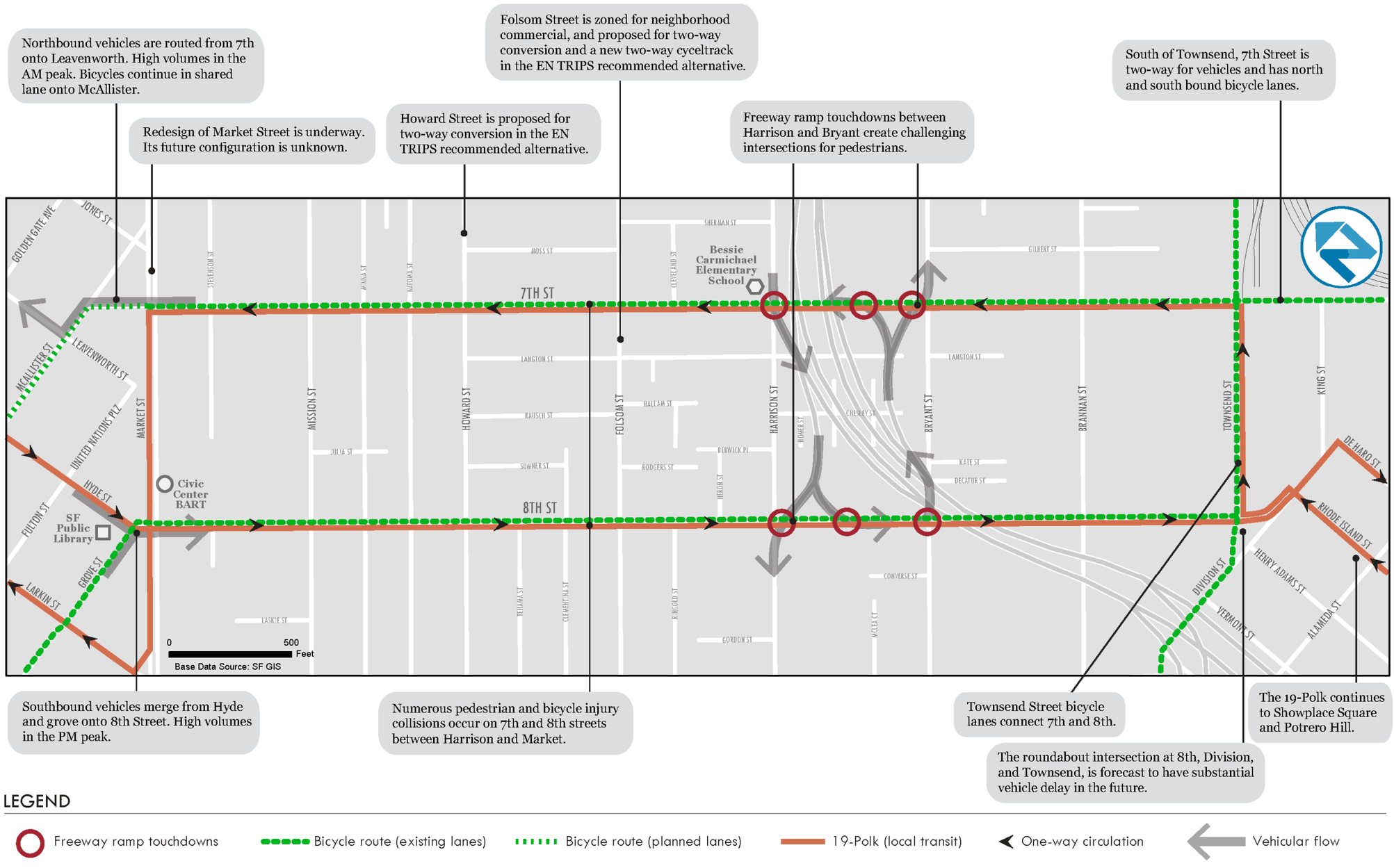


Figure ES-10 Seventh and Eighth Streets Operations Concept

The concept for 7th and 8th Streets is based on a few key features, including retention of one-way traffic but reduction to three lanes; a protected cycletrack buffered from traffic by the parking lane, and extension of sidewalks on one side of the street.

Each street will be reduced from four to three travel lanes, all going one way.

Pedestrian or landscape bulbouts will be added to all intersections where a turn lane is not needed.

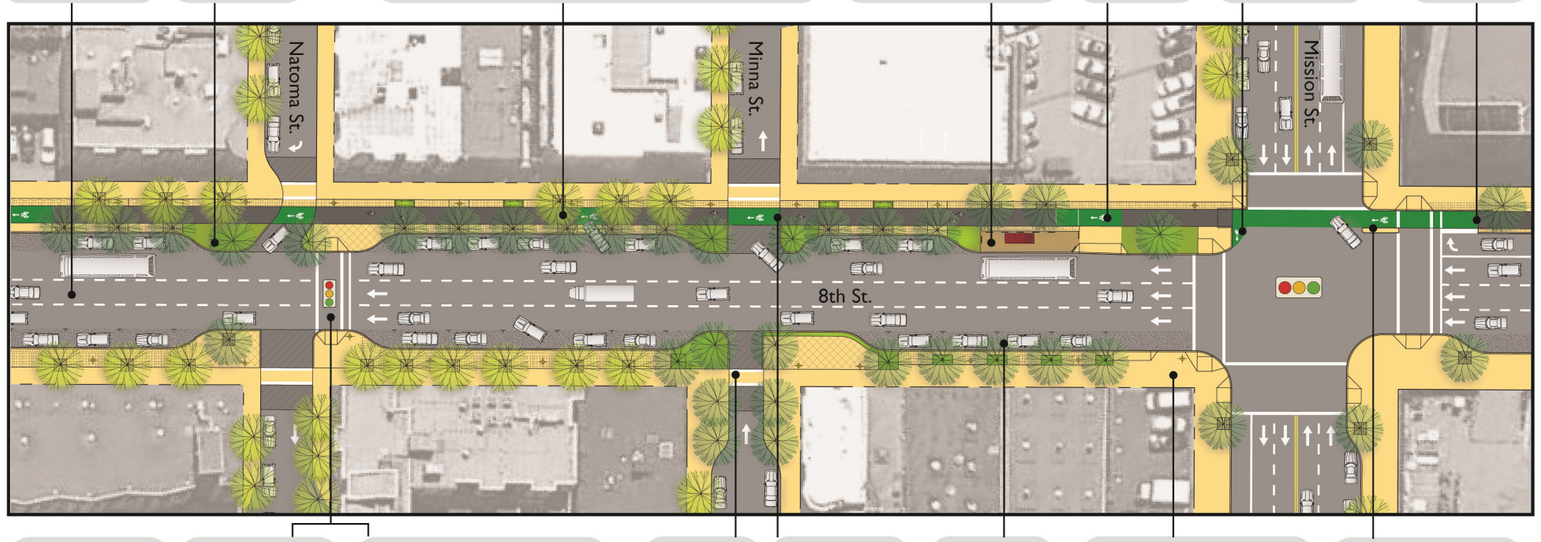
A one-way cycletrack will run on 7th and 8th Streets between the parking lane and the sidewalk. The cycletrack will be primarily at sidewalk grade and will have a buffer area from both pedestrians and people exiting parked cars.

The 19 Polk will operate northbound on 7th Street and southbound on 8th Street. On 7th Street, transit will operate on the left side of the street, and transit islands will be added.

Areas of potential conflict between cyclists and motorists are colored green.

Cyclists can turn left out of the cycletrack from "bike boxes" aligned with the right sides of major cross streets.

At major intersections, the cycletrack will ramp down from sidewalk grade to street grade.



Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and more comfortable for cyclists and pedestrians.

Pedestrian bulbouts and pedestrian refuges on the street side of the cycletrack will reduce the pedestrian roadway crossing length to only three travel lanes at midblock crossings.

Fixed-time signalized midblock crossings of 7th and 8th will allow easier crossing between widely spaced major cross streets and maintain moderate vehicle speeds.

At intersections with alleys, the alley roadway will ramp up to sidewalk grade.

Where vehicles cross the cycletrack at unsignalized alley alleys, sight lines will be maintained, turn radii will be tight, and pavement will be marked to reduce the potential for vehicel bike conflicts.

Parking lanes will be maintained on both sides of the street, except where bulb-outs or turn lanes are required.

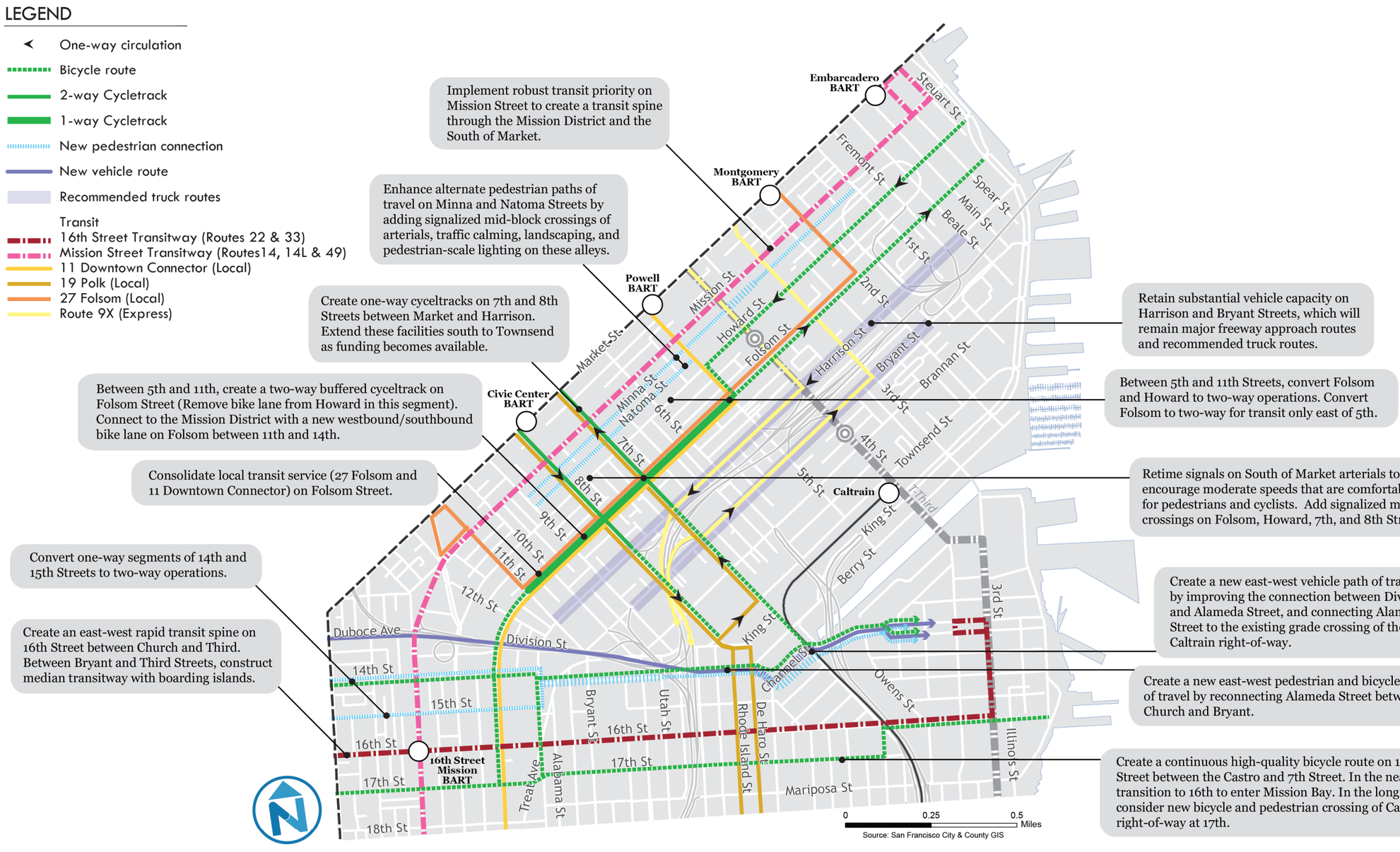
Sidewalks on the non-cycletrack side will widen from 10 to 15 feet. Sidewalks on the cycletrack side will remain 10 feet, but pedestrian refuges placed on the street side of the cycletrack will reduce pedestrian crossing distance.

At major intersections, cyclists in the cycletrack can wait at red lights in a protected area that reduces the conflict of cyclists and right-turning motorists and increases visibility of cyclists. Vehicle right turns and cyclist through travel will have separate phases.

50′ 100′

December 21 2011

Figure ES-11 EN TRIPS Priority Projects Combined Circulation Concept



NOTE: This diagram illustrates highlights of the ENTRIPS corridor project circulation concepts. Detail is provided in Chapters 4,5, and 6. Transit and bicycle routes unaffected by these proposals are not shown.

This page intentionally left blank.

A VISION FOR TRANSPORTATION IN THE EASTERN NEIGHBORHOODS

The priority projects presented in this plan were selected not only to meet pressing needs on those particular streets but also because their lessons have the potential to be applied more broadly. Along with their associated circulation concepts, the proposals advance a set of strategies for addressing the major transportation challenges that the city will face in the coming decades. Based on wider application of those strategies, this long term vision for transportation in the Eastern Neighborhoods is as follows.

- **Capacity for movement of people and goods.** In order to accommodate growing travel demand, the Eastern Neighborhoods transportation system will be reconfigured to prioritize high-capacity modes. While vehicles will remain an important mode of transportation, peak period vehicular capacity will be reduced somewhat. Major steps toward achieving this vision will include development of true rapid transit corridors for SFMTA's most important bus routes, development of a network of bicycle facilities to serve people of all ages and abilities, and strategic efforts to managing vehicle system capacity including both parking and roadway capacity.
- **Livability.** Streets in the Eastern Neighborhoods will be upgraded to meet the vision expressed in the Better Streets Plan. Specific strategies will include adding landscaping and amenities, new pedestrian spaces, enhancing pedestrian crossings, and calming traffic on arterials to speeds that are safe and comfortable for pedestrians. This effort will include particular commitment to creating livable streets in the South of Market.
- **Connectivity**. The Eastern Neighborhoods transportation networks are disrupted by multiple barriers. San Francisco will engage in a gradual, opportunistic, but fully coordinated effort to reconnect the grid and restore connectivity for all modes. Major steps will include a restored east-west grid south of Division Street; a better connected South of Market pedestrian grid; upgraded transit connectivity between Showplace Square, Potrero Hill, and downtown; complete grids in Mission Bay and Central Waterfront; and a full integration with the regional transit system.

NEXT STEPS

The SFMTA and its partner agencies will work toward implementing this vision on several tracks. The first, the City will work toward implementing the EN TRIPS priority projects. The EN TRIPS Funding and Implementation plan, to be published under a separate cover, will detail the specific steps necessary to realize the priority projects. It will include:

- A strategy for environmental review.
- Itemized project cost estimates.
- A timeline and phasing plan to ensure that the most pressing needs can be met as quickly and cost-effectively as possible.

In addition, realizing the vision will require ongoing effort through existing planning efforts and programs. As discussed in the recurring transportation challenges section of this report, the work of existing programs of the SFMTA and its partner agencies will continue to work towards meeting the needs expressed in this planning effort

Figure 1-1 EN TRIPS Study Area

Source: San Francisco Planning Department

1 PROJECT PURPOSE

1.1 INTRODUCTION

Background: The Eastern Neighborhoods Community Planning Process

San Francisco's Eastern Neighborhoods are made up of the diverse communities of the Mission District, South of Market, Central Waterfront, Showplace Square, and Potrero Hill. As home to much of the city's industrial land supply, the transformation of these neighborhoods over the last 15 years resulted in growing land use conflicts. Housing, offices, and the shops and services catering to them were competing for land with industrial businesses. The San Francisco Planning Department initiated a community planning process in 2001 with the goal of developing new zoning controls for the industrial portions of these neighborhoods. The process sought to determine how much industrial land to preserve and how much could be transitioned to a mix of uses, including housing. The planning process was then expanded to address other issues critical to creating complete neighborhoods, in both transitioning and stable areas.

The Planning Department worked with stakeholders to create plans for each neighborhood in the areas of affordable housing, transportation, parks and open space, urban design, and community facilities. Adopted in early 2009, the Eastern Neighborhoods Community Plans call for up to 10,000 units of transit-oriented housing (market-rate and affordable) and 13,000 new jobs over the next 20 years. The plans also identify at a high level the types of infrastructure improvements necessary to enhance livability, enable development intensity, and serve community needs in these changing neighborhoods. Adhering to the spirit of San Francisco's Transit First policy, the transportation investments envisioned in the plans are designed to support integrated, mixed use, transit-rich neighborhoods.

Introduction to EN TRIPS

The Eastern Neighborhoods Transportation Implementation Planning Study (EN TRIPS) begins to implement the transportation vision established in the Eastern Neighborhoods area plans. The result of a multi-agency partnership led by the San Francisco Municipal Transportation Agency (SFMTA) with the San Francisco Planning Department (Planning Department) and the San Francisco County Transportation Authority (SFCTA), this plan addresses impacts of growth and change in the Eastern Neighborhoods and surrounding areas by identifying, designing, and seeking funding for key transportation infrastructure projects.

This Final Report documents the outcomes of the EN TRIPS project. Chapter 1 identifies project objectives and reviews the relevant policy context. Chapter 2 reports forecasts for the land use and transportation changes in the coming decades, surveys transportation conditions, and identifies the key challenges and opportunities. Chapter 3 describes how this project identified and

developed key transportation and public realm infrastructure projects for the Eastern Neighborhoods, including a summary of community engagement. Chapters 4, 5, and 6 detail plans for three vital corridors in the study area, including changes to the wider transportation networks in the Eastern Neighborhoods necessary to support and accommodate the proposed projects. Chapter 7 lays out a funding and implementation of the proposed major projects. Chapter 8 identifies how ongoing efforts of the SFMTA and its partner agencies will continue to address those transportation challenges that occur throughout this large and diverse area. Finally, Chapter 9 describes next steps for developing the transportation system in the Eastern Neighborhoods.

1.2 PROJECT SCOPE AND OBJECTIVES

Project Scope

EN TRIPS addresses impacts of growth and change in the Eastern Neighborhoods by identifying, designing, and seeking funding for key transportation infrastructure projects. The study included completion of the following tasks:

1. Perform technical analysis to determine existing and future circulation needs based on land use growth and change. This analysis included a detailed traffic study focusing on the South of Market area.
2. Select a group of critical transportation projects – "priority corridors."
3. Create conceptual designs for those projects, including associated circulation change in the study area as a whole.
4. Develop funding and implementation strategy for the proposed projects.

The study took a broad perspective, identifying opportunities and constraints on the transportation networks not just in the Eastern Neighborhoods themselves, but also in the surrounding districts that share key transportation corridors.

The infrastructure projects proposed in this plan are not intended to address all of the existing and future transportation needs in the study area. Instead, the project identified and prioritized transportation needs for all modes serving the Eastern Neighborhoods, and then advanced the highest priority transportation projects that were unlikely to be met through other ongoing projects. Following adoption of this plan, the proposed projects will be moved forward into environmental review and detailed design.

Project objectives

EN TRIPS was guided by the transportation objectives established through the Eastern Neighborhoods plan. These objectives have a strong multimodal focus, recognizing the need to efficiently move people and goods through a variety of modes of transportation. Specifically, the objectives call for investing in improved transit, bicycle, pedestrian, and transit facilities and managing the impacts of private vehicle on residents and workers.

As illustrated in Chapter 2 of this plan, guiding investment in the Eastern Neighborhoods toward improved multimodal systems is recognition of simple space constraints. Large increases in population and employment are forecast – not just in the Eastern Neighborhoods themselves, but in the adjoining areas, including Mission Bay, the Transbay District, Downtown, and Bayview/Hunters Point. With this growth will come even larger increases in travel demand. With space precious in a small and densely populated City, San Francisco's roadways and parking facilities cannot be expanded to meet this additional demand. Even if they could, a vast increase in private vehicle trips would have an unwelcome impact on quality of life, both for existing and new residents and workers.

To meet the forecast transportation demand while building the healthy, vibrant, liveable neighborhoods envisioned in these plans and desired by the people who participated in the community planning process, San Francisco will have to invest in transportation facilities that move more people in less space. Achieving this vision will require more efficient transit services, bicycle facilities safe and comfortable enough to attract a larger share of trips, and complete neighborhoods with safe, attractive, well connected streets so that more daily needs to be met by walking. While private vehicles will remain an important part of this multimodal transportation system, vehicular transportation must be calm and safe, with efficiently managed parking, and adequate loading and unloading spaces to allow for efficient goods movement.

Eastern Neighborhoods Plan Transportation Objectives

1. Improve public transit to better serve existing and new development in the Eastern Neighborhoods.
2. Increase transit ridership by making it more comfortable and easier to use.
3. Establish parking policies that improve the quality of neighborhoods and reduce congestion and private vehicle trips by encouraging travel by non-auto modes.
4. Support the circulation needs of existing and new Production Distribution and Repair uses in the Eastern Neighborhoods.
5. Consider the street network in the Eastern Neighborhoods as a city resource essential to multi-modal movement and public open space.
6. Support walking as a key transportation mode by improving pedestrian circulation within the Eastern Neighborhoods and to other parts of the city.
7. Improve and expand infrastructure for bicycling as an important mode of transportation.
8. Encourage alternatives to car ownership and the reduction of private vehicle trips.
9. Facilitate movement of automobiles by managing congestion and other negative impacts of vehicle traffic.
10. Develop a comprehensive funding plan for transportation improvements.

Policy Context

In addition to the goals and policies outlined in the Eastern Neighborhoods Area Plans, other City plans and policies provide extensive input to EN TRIPS.

The San Francisco General Plan

The Transportation Element of the San Francisco General Plan establishes the overall framework for the transportation system in San Francisco. The plan addresses regional transportation, congestion management, vehicle circulation, transit, pedestrians, bicycles, parking, and goods movement. The modal networks identified in the General Plan are illustrated in the modal sections of Chapter 3 of this report. The primary policy governing allocation of transportation rights-of-way and resources in the City and County of San Francisco is the Transit First Policy (discussed in the sidebar on the opposite page).

Major Policy Initiatives

Within this policy framework, City agencies have also developed a group of major initiatives serve as both policy guidelines as well as implementation programs for broad areas of current transportation system development in the City. These initiatives are referred to throughout this plan.

- **The Countywide Transportation Plan**, created by the San Francisco County Transportation Authority and published in July 2004, is the City's blueprint for funding transportation system development and investment over the next thirty years. It is now being updated to include a program of investments through 2035. The Plan further develops and implements General Plan principles by identifying system improvements based on technical review of system performance, extensive public input on key issues and needs, and analysis of financial opportunities and constraints. http://www.sfcta.org/content/view/822/416
- **The Better Streets Plan.** The Better Streets Plan, initiated by the San Francisco Planning Department, establishes principles for the design of streets in San Francisco. EN TRIPS projects strive to adhere to these principles. http://www.sf-planning.org/ftp/BetterStreets/index.htm
- **The Transit Effectiveness Project (TEP).** TEP is a comprehensive audit of Muni service based on extensive data collection and community comment. Its final recommendations included numerous proposals to change routes and frequencies of service, as well as a package of proposed capital investments. TEP recommendations, through not yet fully implemented, will form the baseline for EN TRIPS transit system analysis and development. http://www.sfmta.com/cms/mtep/tepover.htm
- **San Francisco Bicycle Plan.** The bicycle plan is the SFMTA's principle document for guiding bicycle facilities. The near term projects specified in the bike plan will be considered the baseline bicycle network for EN TRIPS. http://www.sfmta.com/cms/bproj/bikeplan.htm
- **SF*park*.** SF*park* is the SFMTA's parking management program. The purpose of the program is to develop and implement a set of strategies to ensure that the City's on- and off-street parking system will be safe, convenient, response, accountable, and cost-effective. http://sfpark.org/

San Francisco's Transit First Policy

Introduced in 1973 and revised by voters in 1999, the Transit First Policy (Section 8A.115 of the City Charter) includes 10 principles intended to guide decision-making processes related to prioritization of transportation resources. The Transit-First Policy is designed to encourage a multimodal or "complete streets" approach to design of the City's public rights-of-way, including transit priority treatments meant to improve transit speed, reliability, and amenity for passengers. Its principles are as follows.

1. To ensure quality of life and economic health in San Francisco, the primary objective of the transportation system must be the safe and efficient movement of people and goods.
2. Public transit, including taxis and vanpools, is an economically and environmentally sound alternative to transportation by individual automobiles. Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile.
3. 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 shall strive to reduce traffic and improve public health and safety.
4. Transit priority improvements, such as designated transit lanes and streets and improved signalization, shall be made to expedite the movement of public transit vehicles (including taxis and vanpools) and to improve pedestrian safety.
5. Pedestrian areas shall be enhanced wherever possible to improve the safety and comfort of pedestrians and to encourage travel by foot.
6. Bicycling shall be promoted by encouraging safe streets for riding, convenient access to transit, bicycle lanes, and secure bicycle parking.
7. Parking policies for areas well served by public transit shall be designed to encourage travel by public transit and alternative transportation.
8. New transportation investment should be allocated to meet the demand for public transit generated by new public and private commercial and residential developments.
9. The ability of the City and County to reduce traffic congestion depends on the adequacy of regional public transportation. The City and County shall promote the use of regional mass transit and the continued development of an integrated, reliable, regional public transportation system.
10. The City and County shall encourage innovative solutions to meet public transportation needs wherever possible and where the provision of such service will not adversely affect the service provided by the Municipal Railway.

Related Plans and Projects

Within the City's framework of transportation policy and major initiatives, several agencies are working to invest in transportation and the public realm in and around the Eastern Neighborhoods. Projects range from traffic calming on individual alleyways to redevelopment plans for whole neighborhoods. Several initiatives vital to the future of the Eastern Neighborhoods are described below. Ongoing planning efforts are reviewed in more detail in the EN TRIPS Existing Conditions Report. The EN TRIPS projects aim to complement these ongoing efforts.

Neighborhood Redevelopment

- **Mission Bay Redevelopment** (Redevelopment Agency): Mission Bay is undergoing redevelopment, with new housing, mixed use, and institutional development slated to come on line over the next several years. Development will include a new UCSF hospital complex planned, as well as a new street grid and open space.
- **Pier 70 Redevelopment** (Port of San Francisco): In 2009, the Port of San Francisco completed a Draft Preferred Master Plan for Pier 70 along the Central Waterfront. The Plan seeks to transform the 69-acre site into a redeveloped neighborhood that combines substantial preservation of the area's historic maritime uses with open space and infill development . On May 11, 2010, the Port Commission endorsed the Pier 70 Master Plan and authorized two development solicitation efforts to attract private partners to realize the Plan.
- **Transit Center District Plan** (Planning): The Planning Department has created a comprehensive plan for the area around the Transbay Terminal, including mechanisms to direct increased development value to help fund the construction of the Transit Center Program and other public improvements. Final EIR and adoption hearings are schedule for 2012.

Transit

- **Transit Time Reduction Proposals** (SFMTA): The SFMTA is working to complete Environmental Review of the major transit system modifications proposed in the Transit Effectiveness Project (TEP). The Notice of Preparation (NOP) for the TEP EIR was published in November 2011, and the EIR kicked off in December.
- **Central Subway Project** (SFMTA): The Central Subway will extend the T-Third Muni Metro line under the 4th Street corridor, adding stations at Fourth and Brannan; Yerba Buena/Moscone, Union Square/Market Street, and Chinatown. The subway is under construction.
- **Van Ness Avenue and Geary Boulevard BRT** (SFCTA): Bus Rapid Transit lines are planned for the Van Ness Avenue and Geary Boulevard corridors, to improve speed and reliability of two of the city's busiest bus lines. Both projects are now in detailed design.
- **California High Speed Rail** (CHSRA): California High Speed Rail is planned to operate between Los Angeles and the Transbay Transit Center in downtown San Francisco. The train is planned to enter San Francisco in existing Caltrain right-of-way. The High Speed Rail authority sees service to San Francisco beginning in 2026. Together with High Speed Rail implementation, or separately, Caltrain may be upgraded to faster, more frequent electrified service. A timeline for this investment has not been set.

Streetscape, Traffic Calming, and Multimodal Plans

- **Better Market Street** (City and County of San Francisco, multiple agencies): Multiple City and County agencies are partnering to develop transportation and public realm improvements for Market Street in time for its scheduled repaving in 2013.
- **Western SoMa Community Plan and Western SOMA Neighborhood Transportation Plan** (Planning, SFCTA): The Western SOMA Community Task Force created a neighborhood plan that includes land use regulations and transportation and public realm improvements. It is now under environmental review. Through the Western SOMA neighborhood transportation plan, the SFCTA is working to implement aspects of the plan related to residential alleys in Western SOMA.
- **The Central Corridor Project** (Planning): The San Francisco planning department is developing land use changes and streetscape proposals for Fourth Street to complement implementation of the Central Subway.
- **Transbay Transit Center** (TJPA): Now under construction on the site of the old Transbay Terminal, the Transbay Transit Center will include a residential tower, park, and transit facility to serve transbay buses, and eventually California High Speed Rail.
- **Mission Streetscape Plan and Folsom Street Streetscape Improvement Project** (Planning, DPW): The planning department completed this plan in 2010. It provides a framework for future streetscape and traffic calming in the Mission, and proposes a road diet for Folsom Street in the Mission. The Folsom Street project is slated for implementation in 2012.
- **Second Street Streetscape Improvement** (DPW): This project will implement the San Francisco bicycle plan's proposed bike lanes on Second Street between Market and King Streets, along with bulb outs, streetscape improvements, and traffic signal upgrades.
- **Showplace Square Open Space** (Planning)**:** This plan was completed in 2010. Building off of the Eastern Neighborhoods framework, it proposes a number of new parks in Showplace Square neighborhood.
- **WalkFirst** (City and County of San Francisco, multiple agencies). The WalkFirst program is a collaborative effort between the San Francisco Department of Public Health, San Francisco Planning Department, San Francisco Municipal Transportation Agency, and San Francisco County Transportation Authority. It will identify key walking streets in San Francisco and will develop criteria to prioritize pedestrian safety improvements throughout the City. http://www.sf-planning.org/index.aspx?page=2568#downloads.

Parking and Demand Management

- **Transportation Demand Management Partnership Project.** An interagency working group comprised of the SFMTA, the SFCTA the Planning Department, and the Department of the Environment is in the process of closely coordinating travel demand management delivery in San Francisco. http://www.sfcta.org/content/view/861/438
- **SF*park* Pilot Projects** (SFMTA): The SFMTA's advanced on-street parking management program began with pilot projects in several San Francisco neighborhoods in 2010, including portions of the Mission District and the South of Market. Final evaluation of the pilot programs is scheduled for 2012.

- **SF*park* Mission Bay Parking Management Plan** (SFMTA); SFpark released a parking management plan for Mission Bay in 2011. The plan includes new parking meters for Mission Bay and surrounding areas.
- **SF*park* 17th and Folsom Area Parking Management Plan** (SFMTA): SF*park* prepared a parking management plan for the area around the proposed park at 17th and Folsom Streets in 2011.

1.3 COMMUNITY ENGAGEMENT

The SFMTA and its partner agencies relied on ongoing community input to craft the recommendations in this plan. The avenues for community input are summarized below.

Eastern Neighborhoods and Western SOMA community planning Process

Residents of the Eastern Neighborhoods have been making their voices heard for many years about the needs in their neighborhoods. In 2001, with the goal of developing new zoning controls for the industrial portions of these neighborhoods, the San Francisco Planning Department conducted a series of workshops in each area Eastern Neighborhoods planning area, where stakeholders articulated goals for their neighborhood, considered how new land use regulations might promote these goals, and created several rezoning options representing variations on the amount of industrial land to retain for employment and business activity. Starting in 2005, the community planning process expanded to address other issues critical to these communities including affordable housing, transportation, parks and open space, urban design and community facilities. Hundreds of community members attended meetings over a period of five years to deliberate and inform the land use regulations and community plan framework that came to be the Eastern Neighborhoods Area plans and Code Amendments. As discussed in chapter 2, the transportation concepts, goals, and objectives of the Eastern Neighborhoods plans were the foundation for EN TRIPS.

Clear articulation of community needs also led to the creation of the Eastern Neighborhoods public benefits framework, a system of development fees that will help to pay for needed public improvements, including for transportation and the public realm. It also led to the formations of the Eastern Neighborhoods Citizens Advisory Committee. This group, discussed further below, is responsible for prioritizing Eastern Neighborhoods public benefits fees.

The EN TRIPS project was also informed by the work of the Western SOMA community planning process. Western SOMA, carved out as a distinct planning area from the Eastern Neighborhoods, has been the focus of a Community Plan process that envisions land use regulations and transportation and public realm investments to improve livability in the neighborhood while preserving its historical character. The plan was created through a multi-year effort led by the Western SOMA Community Task Force. The task force community process includes hundreds of participants over three years, working collaboratively to craft a community-led plan. EN TRIPS corridor selection, as well as project designs and circulation concepts were directly influenced by the work of the Community Task Force and the recommendations of the Western SOMA Community Plan.

EN TRIPS Community Engagement

The outreach process for the Eastern Neighborhoods Transportation Improvements Planning Study included regular meetings with two formally assembled advisory committees – the EN TRIPS Task Force, and the Eastern Neighborhoods Community Advisory Committee (EN CAC) – study area-wide workshops, and meetings throughout the planning process as requested with multiple neighborhood groups and stakeholders throughout the large study area. In total, EN TRIPS outreach included ten Task Force meetings, two community-wide workshops, regular check-ins at the EN CAC monthly meetings, and four neighborhood and stakeholder group meetings.

The EN TRIPS Task Force

When the EN TRIPS project began, the Eastern Neighborhoods CAC had not yet been formed. In order to ensure the project had guidance from the beginning by the input of community stakeholders, an informal 'Task Force' of community representatives was convened in July 2009 with the intention of acting as an "information and communications conduit for organizing community input on the city's Eastern Neighborhoods Transportation Implementation Planning Study"

The work of the task force was facilitated by community partner Urban Ecology. With a membership drawn from areas throughout the Eastern Neighborhoods, this group reviewed early project documents, gave input on the project approach, and helped to direct the project through its existing and future conditions analyses phase. Urban Ecology maintained a blog and a project web site[1] that detailed the work of the SFMTA project team and the EN TRIPS community task force, helping to open the project process to a wider audience.

The Eastern Neighborhoods Citizens Advisory Committee

In December 2010, the work of the EN TRIPS community task force concluded. At this time, the Eastern Neighborhoods Citizens Advisory Committee (EN CAC) began to take a more active role with EN TRIPS, and the Community-wide outreach efforts were about to begin to kick off the conceptual design phase of the study. Empowered by the Eastern Neighborhoods Plans themselves, the EN CAC is the central community advisory body charged with providing input to City agencies and decision makers with regard to all activities related to implementation of the Eastern Neighborhoods Area Plans. A major role of the CAC is to provide input on the prioritization of Public Benefits monies, and updating the Public Benefits program. They are also tasked with relaying information to community members in each of the four neighborhoods regarding the status of development proposals in the Eastern Neighborhoods, and providing input to plan area monitoring efforts as appropriate.

[1] http://urbanecology.org/entrips/

The SFMTA and its partner agencies worked with the CAC periodically over more than a year while crafting the recommendations in this plan. In addition to informal collaboration, work included formal presentations and CAC input on corridor project selection and on the proposed corridor project design alternatives.

The EN TRIPS Technical Advisory Committee

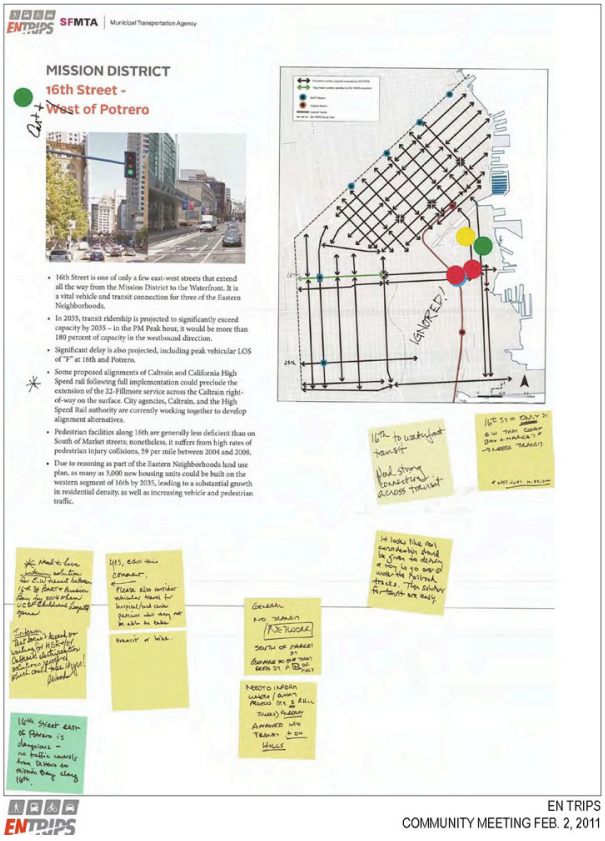
An EN TRIPS Technical Advisory Committee ('TAC") was formed to bring together stakeholder agencies with the project team to help guide the project through the planning process and to support in the review and refinement of plan concepts. The TAC gave important feedback in the final prioritization and refinement of the Priority Corridors that were carried through conceptual design for EN TRIPS.

EN TRIPS Community Workshops

In addition to this ongoing collaboration with the Task force and the CAC, the SFMTA and its partner agencies held two open community workshops in the Eastern Neighborhoods to inform and refine project proposals.

Community Workshop #1

The first of these was held on February 2nd, 2011 at the Recology Center on Seventh and Berry Streets, adjacent to Mission Bay, Showplace Square, and the South of Market. The SFMTA and its partner agencies presented findings of the project's background studies, including the Existing and Future Conditions reports to approximately 35 community stakeholders. The team gave an overview of the Existing Conditions and Future Conditions Reports findings, and presented several corridors that had been identified through technical analyses as having "high needs" in the future of the Study Area



These were presented with the goal to refine the selection to the highest priority corridor segments for the development of conceptual alternative circulation modifications and streetscape improvements for selected corridor segments.

Community members gave input about the future conditions analysis findings and on the needs, opportunities and importance of the group of identified high priority corridor segments. Much of the feedback from the community focused on concerns of issues broader than the corridors alone, such as warning that transportation improvements must be in place before future land use development occurs in the

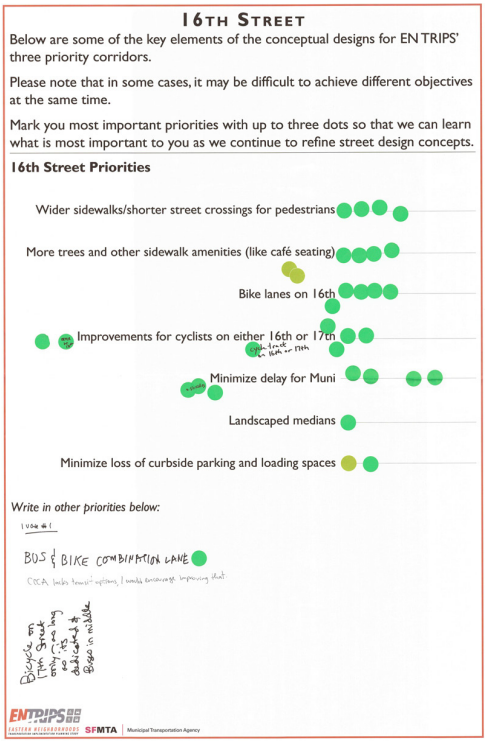
Study Area, the need to focus on the existing shuttle system, the need for enforcement of transit-only lanes, and the need for additional transit service. Feedback on the corridors highlighted community priorities that included 16th Street and Folsom Street as high priorities for investment. North-south SOMA arterials garnered similar levels of interest and concerns around pedestrian safety, bicycle access and transit service.

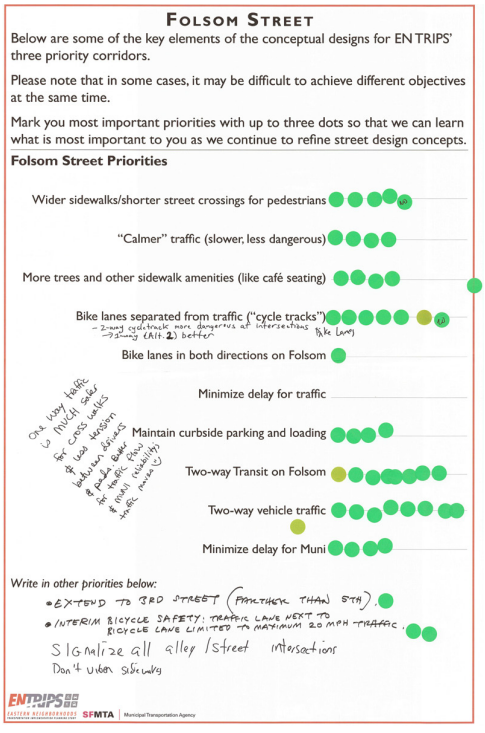
Based on community input, the project team began its preliminary refinements towards identifying the key Priority Corridors that would be moved forward into conceptual designs for transportation and public realm improvements. This also led the project team to refine the list of Eastern Neighborhoods priority corridor segments. It then advanced to the EN TRIPS TAC and the EN CAC recommendations for priority projects.

Community Workshop #2

The second community meeting was held on October 5th, 2011 at the Gene Friend Center at Sixth and Folsom Streets in the South of Market area. At that meeting, the SFMTA and project team presented the design alternatives that had been developed for three priority corridors. The meeting was highly focused, using a "round-robin" format where Community members moved between three tables, each with the alternatives for a given corridor. Further detailed presentation by the project team was provided on each concept, and the community gave feedback on the designs and voted on key priorities for each street.

Based on that feedback and further technical analysis, the SFMTA project team refined the designs and worked with its partner agencies to select and develop the conceptual transportation and streetscape improvement recommendations detailed in the remainder of this report.





Recurring themes in community feedback

The very large scale of the study area (about 3,500 acres) allowed for feedback about transportation concerns and priorities that were much broader than the focused Priority Corridors that were carried through conceptual design for EN TRIPS. Some feedback was focused on system-wide transportation needs in San Francisco, whereas other feedback was neighborhood-specific, sometimes to the level of a particular intersection.

Many of these issues were related to a similar type of transportation issue, or "recurring transportation challenges." These challenges generally touched upon a number of major themes that included pedestrian access and safety, speeding automobile traffic, transit service, the use of private shuttles, on-street vehicle parking and conflicts at freeway ramp touch-down locations. The diagram below highlights a few of these recurring transportation challenges show at the study area location where they were pointed out by the community.

Neighborhood Transportation Challenges

Many of the concerns that were raised by stakeholders and which have been identified as recurring transportation challenges impact pedestrian access and safety in the EN TRIPS Study Area. These include:

- Closed or incomplete crosswalks;
- Unmarked and un-signalized mid-block crossings throughout the South of Market;
- Modal conflicts at freeway ramps;
- Missing sidewalks; and
- Speeding traffic.

System-wide Transportation Challenges

Other concerns affect not only the EN TRIPS Study Area, but have implications City-wide. These are challenges that are likely to be addressed through the refinement of City Policy. There were several recurring policy concerns that were voiced by the community:

- Private shuttle coordination;
- South of Market traffic directionality;
- Pedestrian safety policy;
- The impacts of freeway ramps on city streets; and
- Transit Planning for new or expanded service.

Specific solutions for some of these concerns are addressed for particular locations through the EN TRIPS priority projects. Others will be addressed through ongoing SFMTA projects and programs run by the SFMTA and its partner agencies.

2 CHALLENGES AND OPPORTUNITIES

2.1 INTRODUCTION

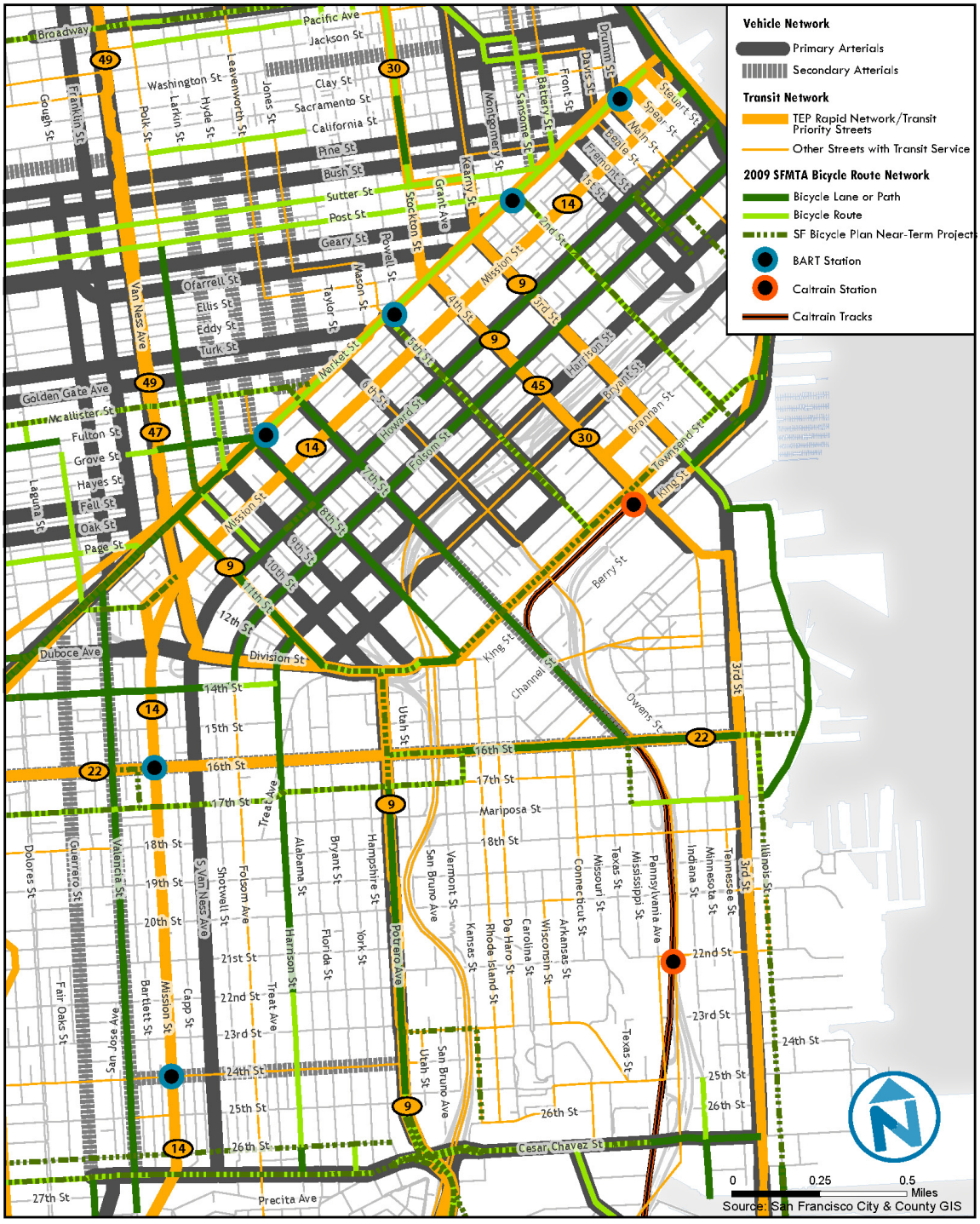
The Eastern Neighborhoods include the Mission District, South of Market, Central Waterfront, Showplace Square, and Potrero Hill. Together with neighboring districts such as Mission Bay, Rincon Hill and the Transbay District, and Downtown, the EN TRIPS study area includes nearly a quarter of San Francisco, including both fast-changing areas and stable neighborhoods.

A rich multimodal transportation system serves these neighborhoods: Pedestrians, cyclists, buses private vehicles, delivery trucks, taxis, and shuttles all make use of city streets. SFMTA Transit operates a large number of local, limited, and express bus routes in addition to Muni Metro service underground. The Eastern Neighborhoods have a concentration of bicycle facilities, including both dedicated lanes and shared bike/vehicle lanes. City streets also make up a large share of the public realm, and they are out living, socializing, and living spaces in this densely populated city.

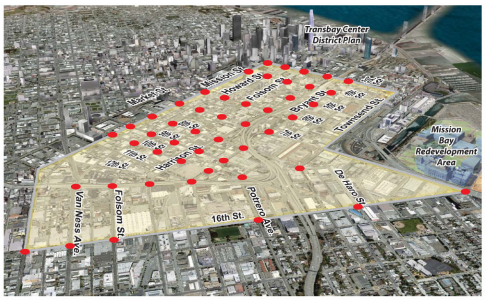
The Eastern Neighborhoods also include many of the City's connections to regional transportation systems. BART, Caltrain, and the Transbay bus systems all serve the Eastern Neighborhoods. The regional freeway system, including Interstates 80 and 280 and US 101, provide access to the Mission, the South of Market, and downtown while introducing barriers to service transportation in each of these neighborhoods. The South of Market arterial network serves to distribute this regional freeway traffic to and from the freeways to Downtown and to the North of Market network.

In the coming decades, this transportation system will be challenged by growth and change. Whole new neighborhoods will emerge, such as at Mission Bay and Pier 70. Areas of the South of Market, particularly around Transbay, will see vast increases in the number of residents and jobs. Other parts of the Eastern Neighborhoods will see more subtle change, as historically industrial areas transition to mixed use neighborhoods that include both homes and light industrial businesses. This chapter reviews in more detail the major transportation challenges and opportunities in the Eastern Neighborhoods today, and those expected in the coming decades. An understanding of these challenges is the basis for the project proposals developed in Chapters 4, 5, and 6.

Figure 2-1 Combined transportation networks



How are transportation models used in EN TRIPS?



Like other transportation planning efforts in San Francisco, the EN TRIPS project used a group of quantitative tools to help understand existing transportation conditions in the Eastern Neighborhoods, and to make educated guesses about future land use patterns and transportation conditions. These include the following:

- **ABAG population and employment forecasts.** To assess transportation and public realm needs, the project considered both existing and potential future land use patterns. Estimates of the future distribution of housing and jobs are based on forecasts by the Association of Bay Area Governments. These forecasts were adjusted by the San Francisco Planning Department, based on their knowledge of proposed development projects.
- **SF-CHAMP Travel Demand Model Forecasts.** The projections of travel behavior presented here were derived using SF-CHAMP (SF-CHAMP 4.2 / ABAG Projections 2009), the travel demand model maintained by the San Francisco County Transportation Authority (SFCTA). SF-CHAMP can be used to assess the effects of land use, socioeconomic, and transportation system changes on the performance of the local transportation system. It includes information about observed travel patterns, transportation networks, transit ridership, roadway vehicle volumes, and demographic characteristics of San Francisco residents and workers. It relies on future-year land use and socioeconomic information projected by the Association of Bay Area Governments. Using future year transportation, land use, and socioeconomic inputs, SF-CHAMP forecasts future travel demand. For additional information on SF-CHAMP, see the SFCTA web site. http://www.sfcta.org/content/category/4/67/145/
- **Traffic Modeling.** To help evaluate traffic conditions and compare project alternatives, the study team created a model of peak-hour traffic conditions in the South of Market using a traffic software application called Synchro. This software is based on procedures outlined in the Transportation Research Board's 2000 Highway Capacity Manual, and it can be used to perform capacity analysis. The models were coded with the peak hour traffic and pedestrian volumes, vehicle mix, and signal timings.

While these models can be helpful in assessing trends and comparing different project alternatives to each other, it is important to recognize that their findings represent only educated guesses about what will happen in the future. Future land use trends are uncertain, and patterns of transportation behavior can change over time in unexpected ways. Even more important for this study, the decisions and investments that the City and the region makes influence how people will travel in the future.

2.2 LAND USE CHANGE

Population change

Currently, more than half of the resident population of the Eastern Neighborhoods resides in the Mission District. With anticipated changes in land use patterns due both to changes in land use regulations and other causes, population will increase substantially in other neighborhoods.

The majority of this population growth is expected to occur in the South of Market area. Important areas of growth include the areas near Market Street between Seventh and Fifth street; the western end of the South of Market area, particularly the area west of Seventh Street between Market and Harrison; and the area along Bryant, Brannan, and Townsend streets, between I-80 and the Caltrain tracks. Very large increases in population are also anticipated in adjacent areas, including the Transit Center District and Rincon Hill.

While the South of Market and adjacent areas will see the majority of population growth, several areas of growth are projected in the rest of the study area. The largest anticipated center of new population outside the South of Market is Mission Bay, which may add up to 20,000 new residents by 2035.

The Mission District's commercial corridors, and the 16th and 17th Street corridors stretching through Potrero Hill and Showplace Square may also see notable residential development. The Central Waterfront, now very sparsely populated, may begin to develop as a residential neighborhood.

Figure 2-2 Projected Population Growth by District, 2005-2035

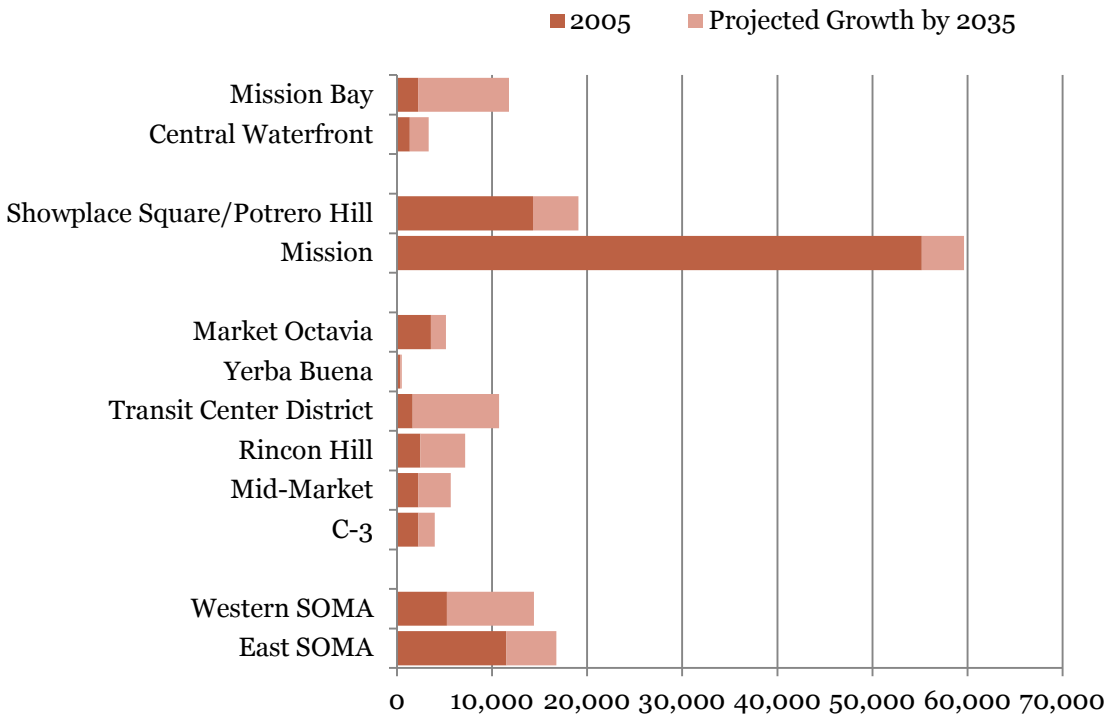
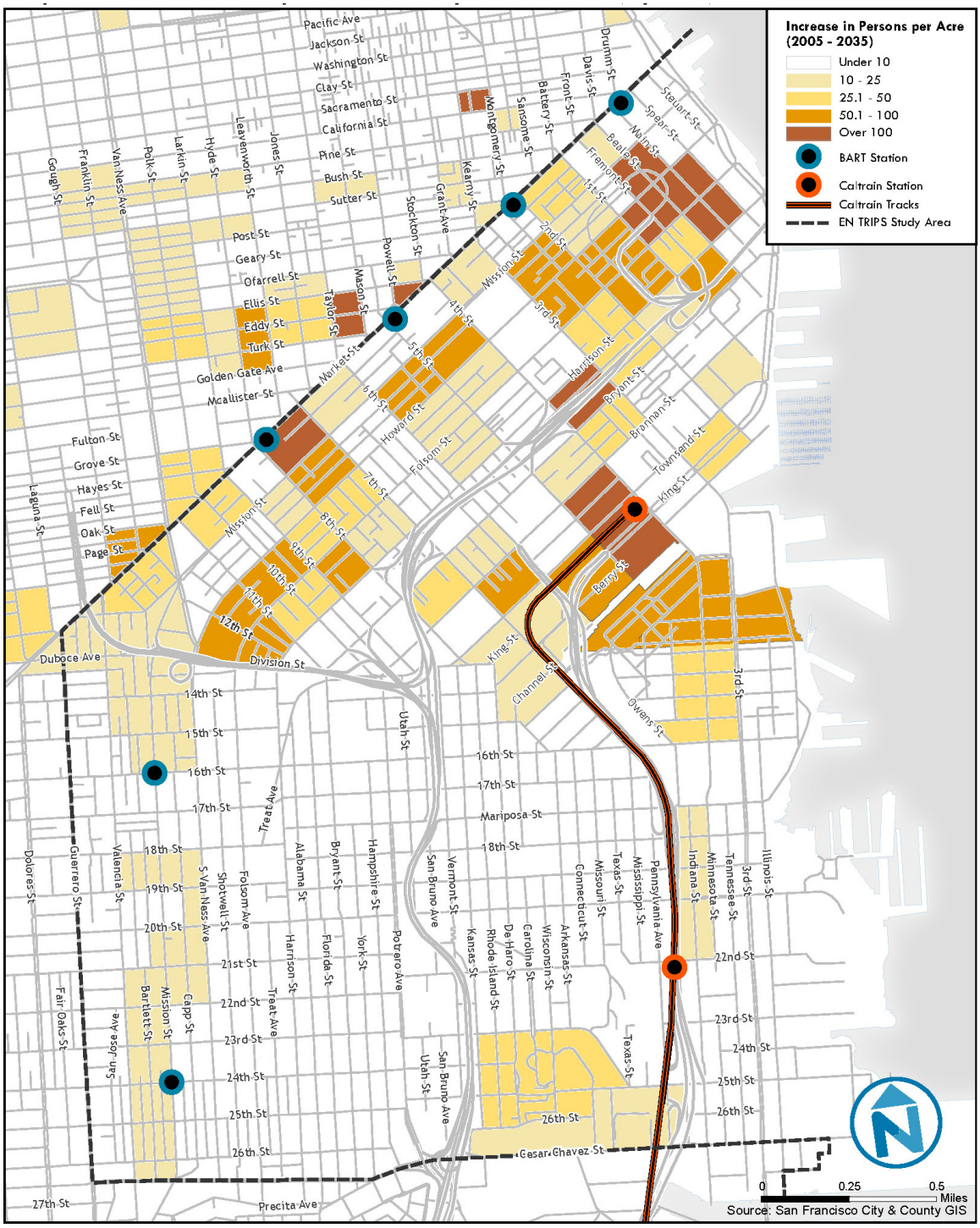


Figure 2-3 Forecast change in Population Density



Employment change

The greatest concentrations of employment in the study area are located in the areas adjacent to downtown (particularly the Transit Center District). Showplace Square, Western and Eastern SOMA, and the Mission District also have concentrations of jobs, including service and light industrial employment.

Substantial office and service employment growth is anticipated in the Transbay District, and in Eastern SOMA. Much of this growth is anticipated in Mission Bay and the Central Waterfront areas, where the expansion of UCSF Mission Bay and associate medical and research facilities, and the potential redevelopment of Pier 70 may add numerous jobs. Extending west from Mission Bay along the 16th Street corridor, employment growth is also foreseen in the southern part of Showplace Square and in the northern portion of the Mission District.

Figure 2-4 Projected Employment Growth by District, 2005-2035

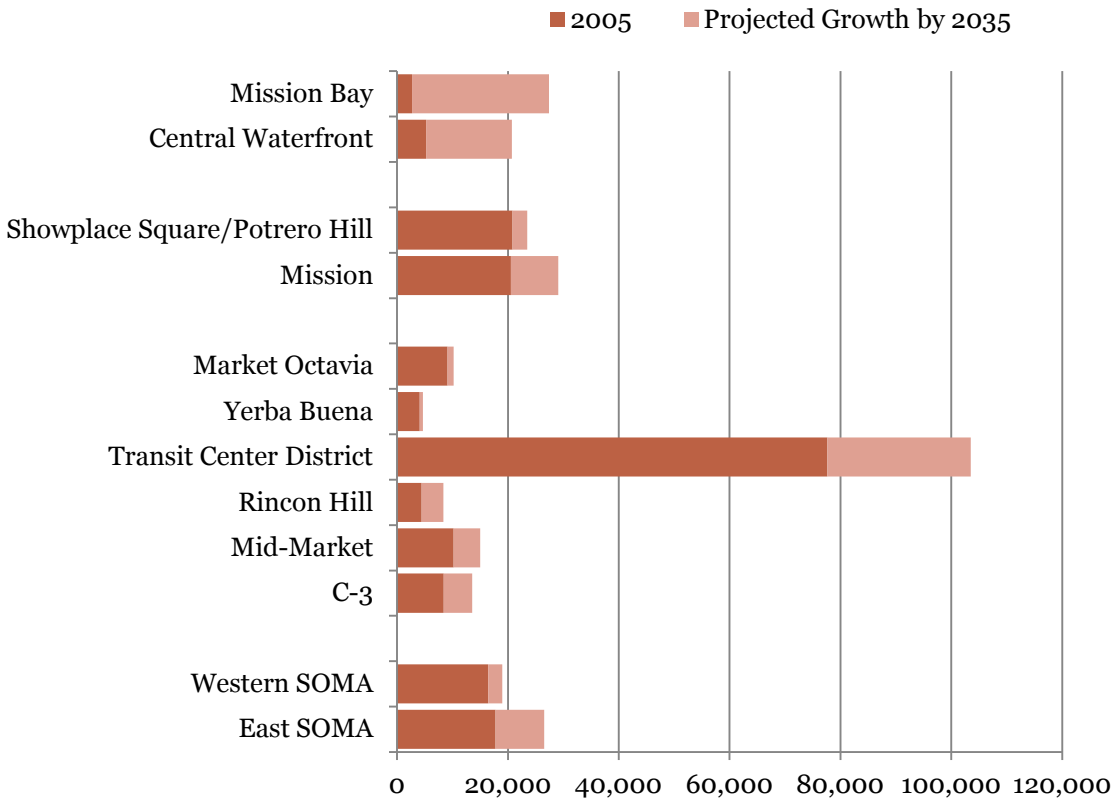
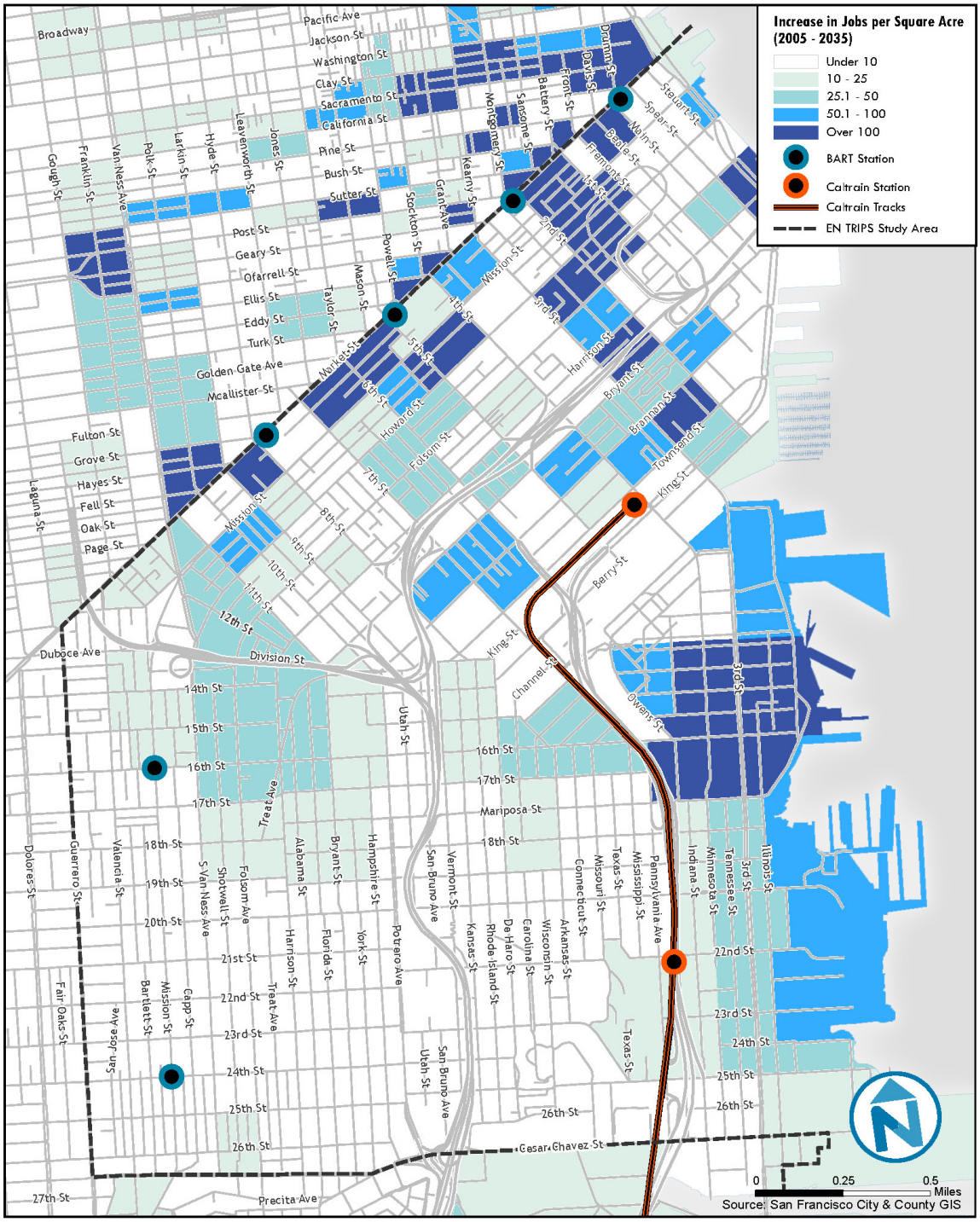


Figure 2-5 Forecast change in employment density



Transportation Demand

The City's travel demand model projects that daily trips by all modes to, from, and within the Eastern Neighborhoods could roughly double by 2035 as a result of anticipated growth.

The South of Market area could see very large increases in trips within the neighborhood, to and from downtown, and between the South of Market and each of the Eastern Neighborhoods areas. From a very low 2005 base, the Central Waterfront area (including Mission Bay) will emerge as a notable origin and destination for trips. With much smaller changes to existing land use patterns expected, the model projects that the Mission District will have modest growth in trips. Showplace Square/Potrero Hill Districts will have small but still substantial increases in travel demand.

One consequence of expanded travel demand could be large increases in motor vehicle volumes on streets throughout the study area. The model projects that mode share will remain mostly consistent between 2005 and 2035, with just a 3 percent shift from private motor vehicles to transit. A rough doubling of vehicle trips on Eastern Neighborhoods streets would have very unwelcome impacts on health and the quality of daily life in the Eastern Neighborhoods, compromising the vision for livable neighborhoods as laid out in the Eastern Neighborhoods plans. However, transportation planning choices or transportation demand management strategies will influence the number of new vehicle trips.

Accommodating most of these new trips through non-auto modes will require more efficient transit services, complete neighborhoods with safe, attractive, well connected streets so that more daily needs to be met by walking, and bicycle facilities safe and comfortable enough to attract a larger share of potential users. While private vehicles will remain an important part of this multimodal transportation system, streets must be designed to ensure that vehicular transportation is calm and safe for all street users, and parking is efficiently managed.

Figure 2-6 Projected Increase in Travel Demand

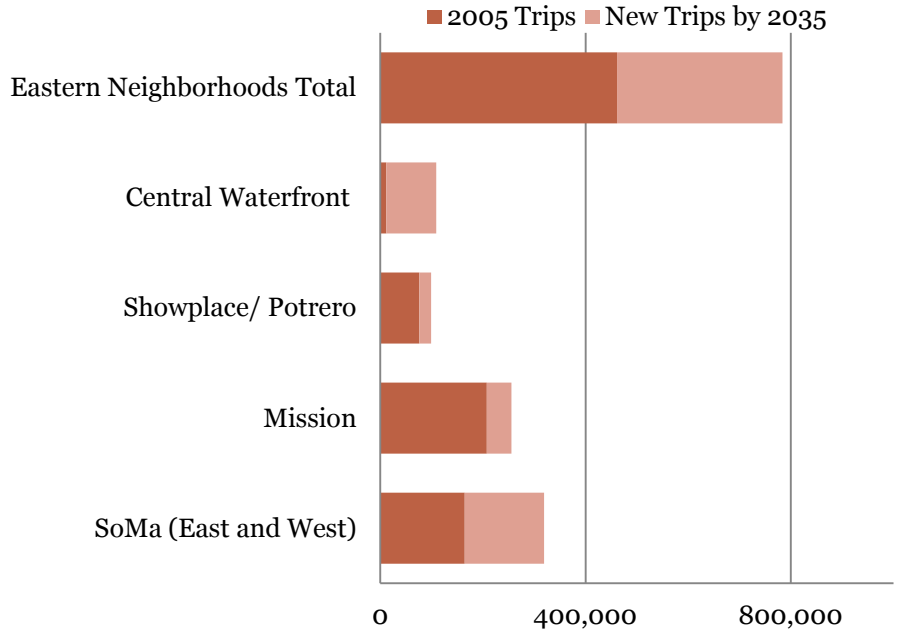
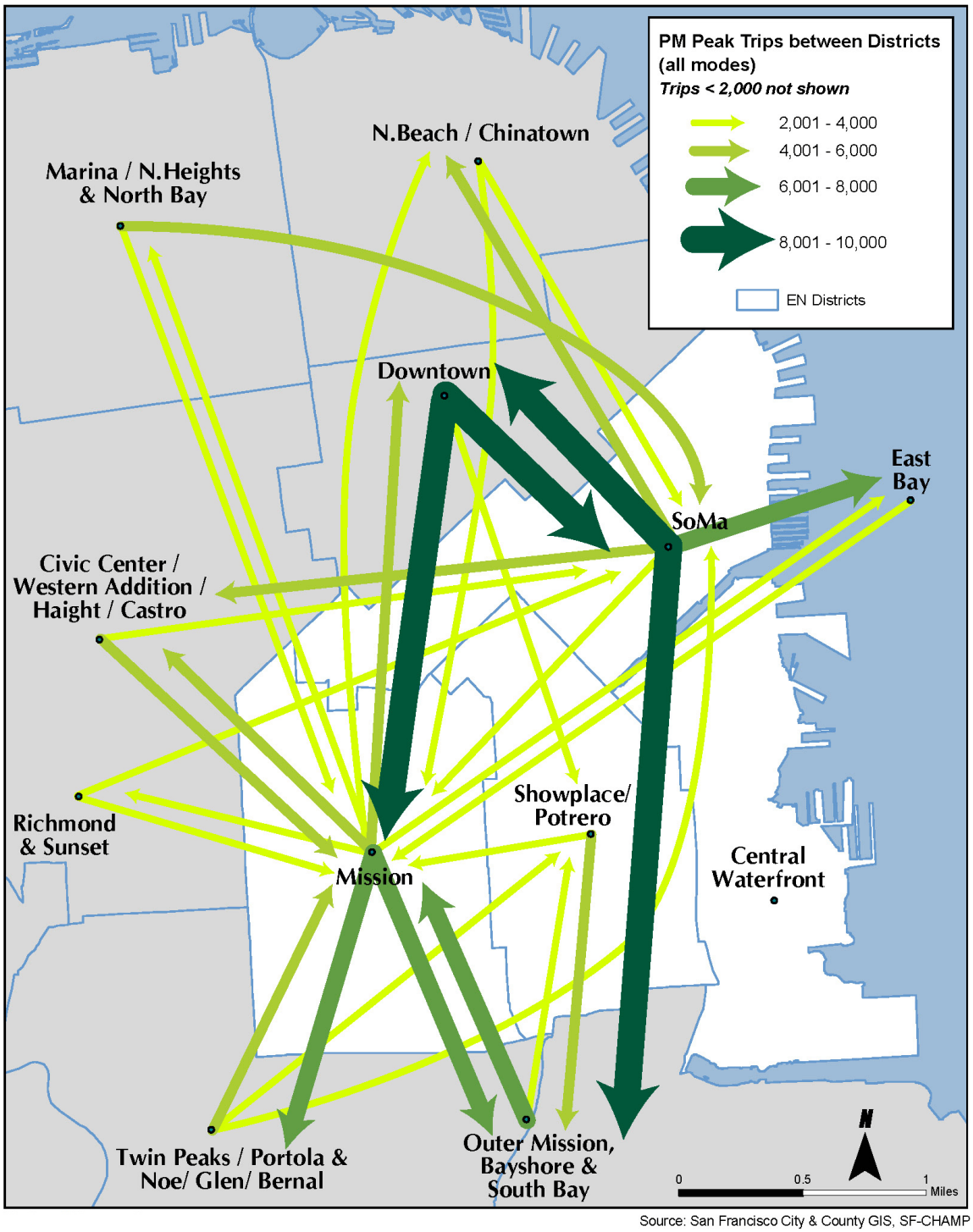


Figure 2-7 Current origins and destinations for neighborhood pairs (PM Peak)



Source: San Francisco City & County GIS, SF-CHAMP

Transit

SFMTA operates local, limited, and express bus routes in the Eastern Neighborhoods. Streets identified by the TEP for transit service are illustrated in Figure 2-8. Transit mode share in the Eastern Neighborhoods (19 percent) is equivalent to the citywide average. It is slightly higher (22 percent) in the South of Market District, which is adjacent Market Street and Downtown.

Existing challenges

Because they must contend with peak period traffic congestion, many of these routes, particularly in the denser parts of the South of Market, Downtown, and the Mission District, operate relatively slowly. In segments of several major streets, including much of Mission, 16th, and 24th Streets in the Mission District, and Mission Street South of Market, buses average less than 8 miles per hour during the PM peak period. However, not all transit delays are due to vehicle congestion. On streets including Mission Street, much of Potrero Avenue, and parts of 16th Street in the Mission, and on segments of Folsom Street and several of the north-south numbered streets in the South of Market, average peak-period bus speeds are less than half of average auto speeds.

A number of transit challenges are unique to individual neighborhoods. For example:

- The South of Market's one-way street network can make transit confusing for some users. Conversion of one or more transit streets to two-way operation could present the opportunity to consolidate transit service and improve the legibility of the overall transit network.
- The poor pedestrian connectivity in the South of Market can also make it challenging for potential riders to access the transit system. The transit and pedestrian networks in the South of Market area are discussed in detail in Chapters 5 and 6.
- There is a wide gap in east-west coverage south of 16th Street due to steep topography, a disconnected street network, and other barriers including the freeways and Caltrain tracks.
- There is also poor north-south connectivity between Showplace Square/Potrero Hill and Downtown.

Improving the efficiency of bus service, particularly on the Rapid corridors that have the most service and carry most of the passengers, is vital to the future of the Eastern Neighborhoods. A number of major improvements to the transit system in the Eastern Neighborhoods are already planned, including SFMTA Transit Effectiveness Project (TEP) changes to improve the efficiency of bus lines, the Central Subway project to extend the T-Third service through the South of Market and north to Chinatown, and the intertwined California High Speed Rail, Transbay Transit Center and Downtown Rail Extension projects.

Figure 2-8 SFMTA Transit Network (TEP Recommended)

Future challenges for transit

Transit service in the Eastern Neighborhoods will face a number of new challenges in the coming decades. Examples include:

- Demand for transit service may exceed available capacity on several routes. Even with service much more frequent than today, the city's travel demand model forecasts peak-period overcrowding in four of the six primary transit corridors: Third Street (the T–Third), Mission Street (the 49–Van Ness/Mission in the Mission District), 16th Street (the 22–Fillmore), as well as Potrero Avenue (the 9–San Bruno). (See Figure 2-9) In some cases, it may not be possible to meet the projected demand given physical constraints. On Third Street, for example, a major investment in additional capacity will already have been made (indeed, much of the increased demand projected for that corridor can no doubt be attributed to the increased capacity and quality of service the Central Subway investment would provide).
- Major new traffic delays are projected in important transit streets, including Third and Fourth Streets (affecting the 45 and the 30), on Division (affecting the 47 and the 9) and on 16th Street (affecting the 22 and the 9). Transit Priority Streets (TPS) and Bus Rapid Transit (BRT) improvements to stops including prepaid and level boarding could be used to reduce delay. However, to provide the level of capacity necessary to meet demand, it might ultimately be necessary to provide exclusively transit lanes in the most important corridors.
- Mission Bay has insufficient transit service for its planned intensity of use. The planned extension of the 22 into Mission Bay would establish important connection to Mission Bay. Howevber, care must be taken to ensure that this route can operate efficiently in a potentially congested corridor. Sixteenth Street and the 22 Fillmore are discussed in detail in Chapter 4.
- The potential exists for greatly enhanced transit demand at the Fourth and King rail station. While construction of the Transbay Transit Center and Downtown Rail Extension would mean that the station would no longer serve as the terminus for Caltrain, it is likely that service to the station would be expanded, as electrification would reduce the cost to provide service and extension to downtown would increase the demand for service. Planning for the area should take into account the potential for greatly increased demand for transit service both at the station and along feeder routes connecting to the station. In particular, bus and Muni Metro stops outside of the station might be reconfigured and/or redesigned to improve connectivity at this important hub, and a coordinated wayfinding strategy should be part of any such process.

Figure 2-9 Forecast transit line load by segment

Walking

While walking is a common mode of travel in the Eastern Neighborhoods (26 percent of daily trips), pedestrian conditions are inconsistent. Some neighborhoods have high quality pedestrian environments, with fine-grained grid patterns that offer strong connectivity and an abundance of amenities. Other areas have a variety of obstacles to pedestrian travel.

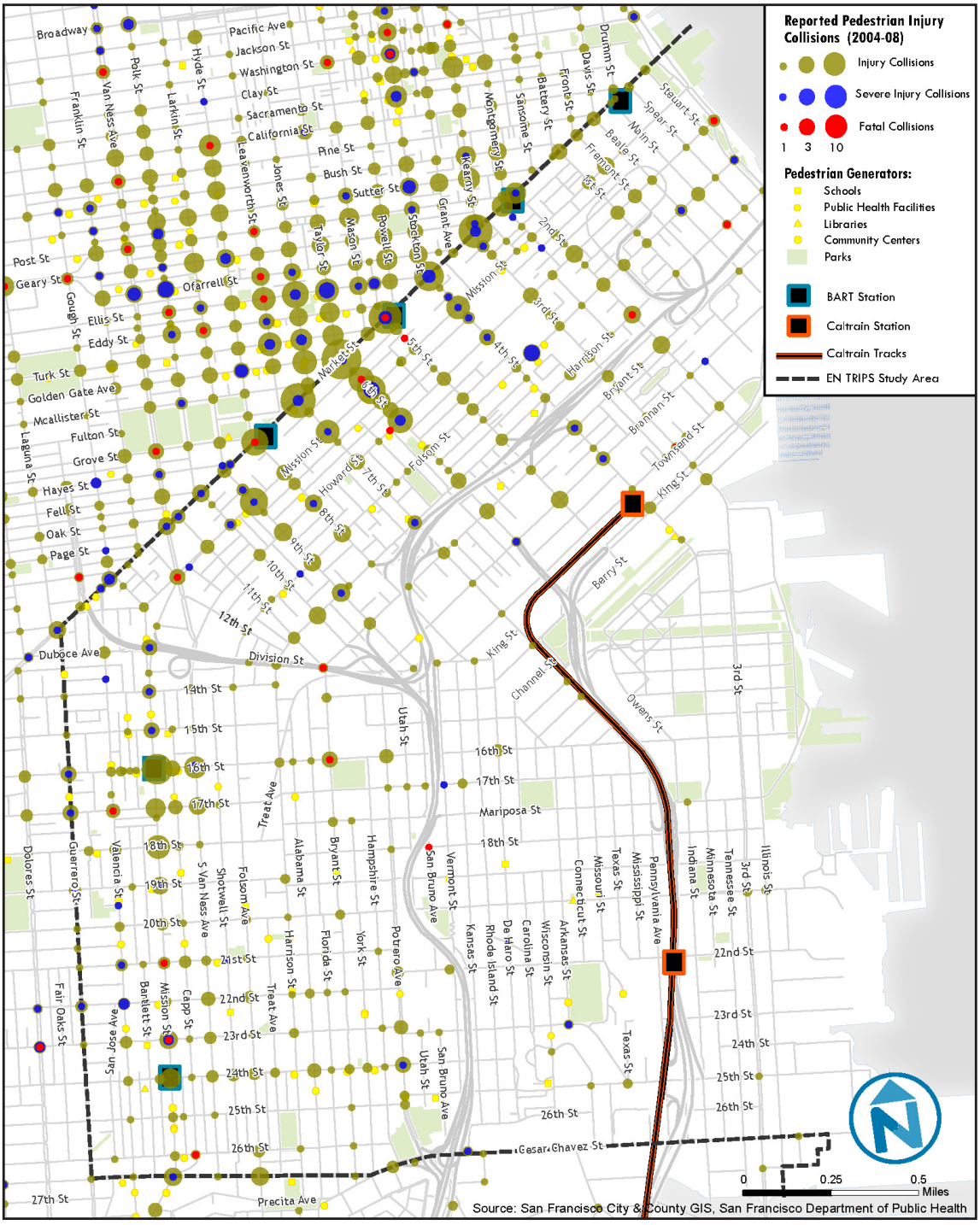
Figure 2-10 illustrates pedestrian injury collisions in the study area over a 5-year period alongside several important generator of pedestrian trips. It shows the highest concentrations of collisions along the South of Market arterials, particularly the north-south arterials, and particularly between Market and Harrison Streets. It also shows numerous collisions in the Mission District commercial corridors, and particularly around the BART stations, reflecting the high volumes of pedestrians in these areas.

Obstacles to pedestrian travel in the Eastern Neighborhoods are diverse. As discussed in detail in Chapter 4., US 101, Interstate 280, and the Caltrain tracks interrupt east-west pedestrian movement between the Mission, Potrero Hill, and the Waterfront. The Central Freeway viaduct, while not a physical barrier to movement between the Mission District and the South of Market, does create a psychological barrier. Where the Mission District grid meets the smaller Potrero grid, there are large parcels, streets jog north and south, and pedestrian paths are interrupted.

The arterial streets in the South of Market present their own unique set of challenges. Long blocks, wide crossing distances, and high vehicle volumes diminish pedestrian connectivity. At several South of Market intersections close to freeway touchdowns, crosswalks and streets with multiple turn lanes interrupt pedestrian paths of travel. Adding to these concerns, very large increases in vehicle volumes are projected in SOMA, which may aggravate the challenges that pedestrians already face. At the same time, increases in residential and employment densities could lead to a greatly increased pedestrian travel. By improving pedestrian conditions, the city has the opportunity to steer a majority of these trips toward walk trips, diverting them from some of its most constrained roadway and transit corridors. A number of alleys in the South of Market present an opportunity to improve the quality of the pedestrian experience and to expand public space.

The other neighborhoods in the study area also have pedestrian and public realm improvement needs. The Mission Streetscape Plan and the Potrero Hill Traffic Calming Plan have developed and prioritized key street improvements for those neighborhoods. The Mission Bay Redevelopment Plan, the Pier 70 Plan, and the Blue Greenway project would serve to reconnect the City with its waterfront. However, deficiencies in the Central Waterfront sidewalk network would remain. In Showplace Square, key pedestrian considerations include an incomplete sidewalk network, as well as a lack of signalized crossings at 16th Street. The difficulty of crossing 16th Street currently presents a barrier to pedestrian connections between Showplace Square and Potrero Hill.

Figure 2-10 Pedestrian Injury Collisions



Bicycling

Cycling currently accounts for an estimated four percent of trips in the Eastern Neighborhoods. However, recent SFMTA bicycle counts indicates that bicycle usage is on the rise, as counts within or adjacent to the study area have shown a 47 percent increase over the past four years.

Aside from Potrero Hill, the flat topography in the Eastern Neighborhoods is highly conducive to bicycle travel, and the myriad of routes provide strong access and connectivity. In particular, Route 45 along Valencia Street and Route 30 on Howard and Folsom Streets offer critical access between downtown and residential neighborhoods and commercial corridors to the south. Connectivity on east-west routes is more challenging, but facilities are provided on Seventh, Eighth, 14th, 16th, and 22nd Streets.

Critical gaps in the bicycle network do still exist. The adopted Bicycle Plan addresses the identified short-term existing needs. The near-term bicycle projects in the Bicycle Plan are designed to accommodate much of the immediate growth, as well as address many of the existing safety concerns. Figure 2-11 illustrates the existing and planned bicycle network. The Second and Fifth Street bicycle lanes will provide improved access to parts of the eastern South of Market and the Transbay District that will see substantial growth. These lanes will also serve to connect the Market Street corridor to the 4th and King Street Caltrain Station. Also important for providing Caltrain Station access is the Townsend Street bicycle lane, which will provide access from the east and west on a rebuilt Townsend Street.

The Eastern Neighborhoods are also home to a number of the City's high bicycle injury collision intersections and corridors. Over the last five years, five intersections within or adjacent to the study area ranked among the City's highest for bicycle injury collisions, while four of the City's top seven highest bicycle injury collision corridors were located in the study area.

The South of Market area presents particular challenges to bicyclists. The grid is dominated by one-way streets, fast moving traffic during non-peak periods, and freeways. The one-way orientation can require bicyclists to circle around very large blocks in order to reach a destination. As a shortcut, some bicyclists will ignore one-way streets and ride on the sidewalk, against traffic, or both. Given projected population and employment densities, the existing pair of bicycle lanes on Folsom and Howard Streets will become an increasingly important path of travel both for trips east and west across the South of Market, and for trips to downtown San Francisco from neighborhoods to the south.

Existing bicycle parking facilities in the study area may be a constraint to bicycling as total demand grows. Particularly in the South of Market, the Mission District, and in Mission Bay, additional bicycle parking may be required as demand grows. The Bicycle Plan will address some of the need through sidewalk racks, but additional capacity may be needed. On-street bicycle corrals offer a potential solution. Additional monitoring of bicycle parking in new developments might also be needed to ensure adequate bicycle parking facilities.

Figure 2-11 Bicycle Network

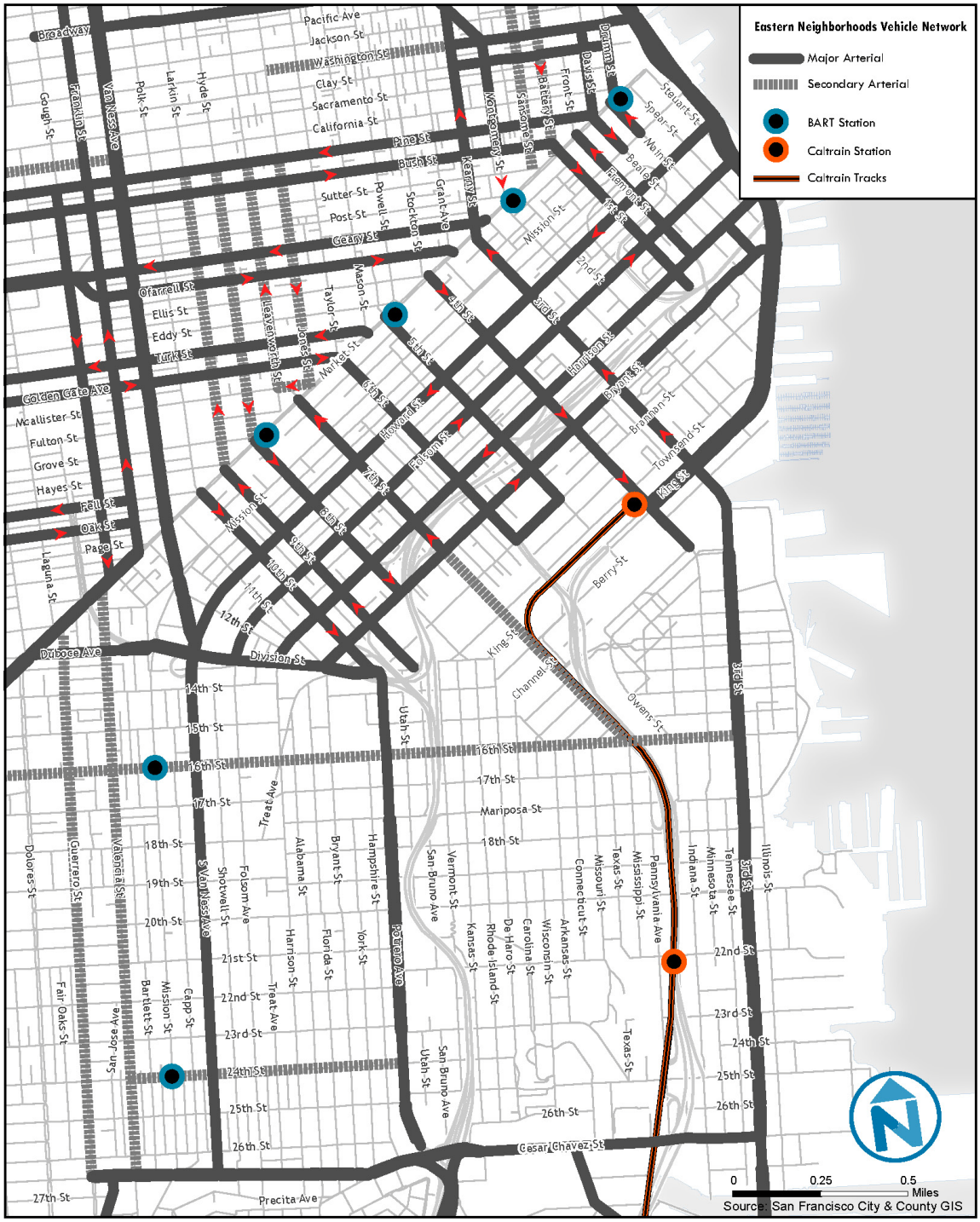
Motor Vehicle Circulation

Private vehicle travel currently represents just over half of all trips made in the study area and will continue to be an important part of the area's transportation system, even as other parts of transportation system develop. The study area is home to a diverse street typology, including a large portion of the City's freeway system and more than a dozen major arterials.

Existing challenges for motor vehicle circulation

- During the peak period, travel speeds throughout the study area slow considerably, especially in SOMA. In other parts of the study area, vehicle travel slows on Division, Mission, Guerrero, and 16th Streets during the PM peak period. The Bay Bridge currently operates at or near vehicular capacity in the peak direction during PM peak periods, resulting in queuing on local approaches. Queues are most pronounced on southbound First Street, Third Street, Fourth Street, eastbound Folsom Street, westbound Harrison Street, and eastbound Bryant Street.
- North-south streets in the South of Market area, such as, First, Third, Fourth, Sixth, Seventh, and Eighth Streets, have the highest street volumes in the area. Over 70 percent of vehicle trips in SoMa during both the AM and PM peak periods are estimated to be "pass-through" trips (origin and destination both outside of the study area), including freeway trips that do not exit into the neighborhood. Of the total pass-through vehicle trips through SOMA, approximately 40 percent use surface streets.
- Traffic from Interstate 80 is the key factor overloading the SoMa road network. Most congested intersections in the SOMA neighborhood during the PM peak hour are worsened by queues extending back from Interstate 80. During other periods of the day, high volumes of traffic from Interstate 80 result in congestion in the northbound corridors that have limited throughput capacity across Market Street.
- Barriers, including the freeways, breaks in the surface street network, and the Caltrain right-of-way, interrupt east-west vehicle travel. Sixteenth Street is the only east-west arterial that travels all the way from the Mission District to Mission Bay.
- Most of the streets in the Mission District, Potrero Hill, Showplace Square, and Central Waterfront areas are not designated as primary vehicle corridors, and on many of these streets there may be opportunities to focus on multi-modal transportation improvements. In those areas, street design plans can focus on prioritizing travel for other modes and creating quality public spaces. Automobile travel speeds through these areas could be reduced through traffic calming measures where needed, and parking could be priced to ensure availability so that drivers circling for parking do not generate additional traffic.
- Both the physical constraints of the study area and the city's Transit First policy preclude major expansions of roadway capacity as a strategy for dealing with vehicle congestion. Maintaining and improving the quality of life in the Eastern Neighborhoods will require further investment in alternatives to private vehicle travel.

Figure 2-12 Vehicle Network



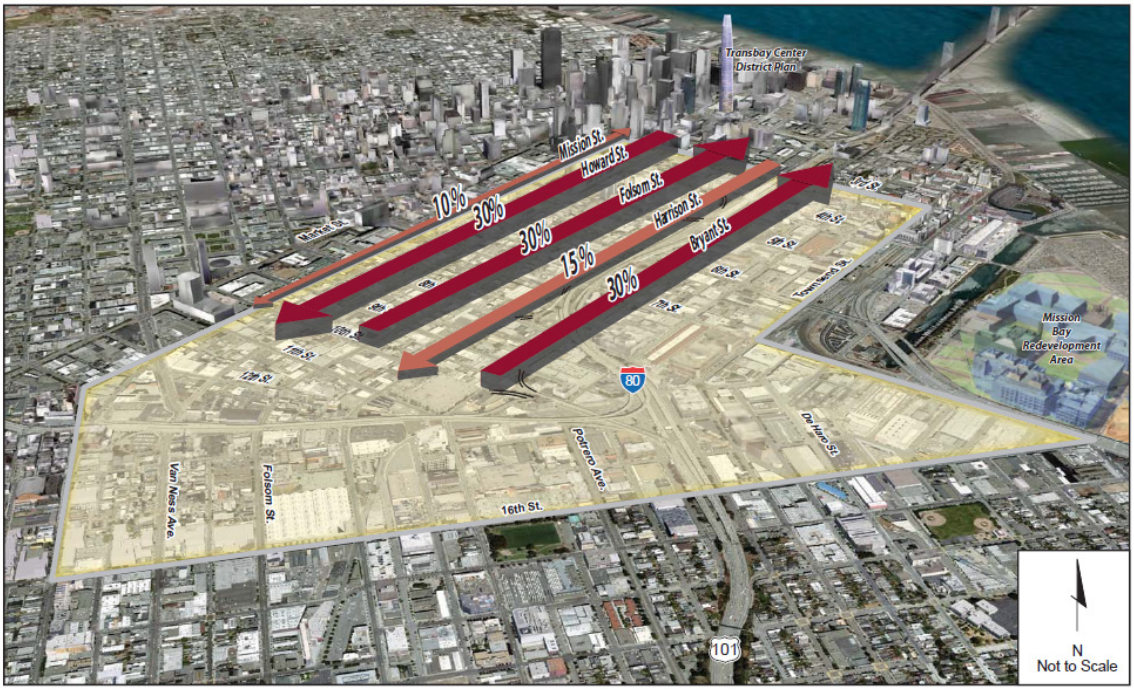
Future challenges for motor vehicle circulation

As a result of large increases in employment and population density in the study area, the travel demand model forecasts that there will be a large increase in motor vehicle travel in the Eastern Neighborhoods. Combined with a large increase in pass-through trips resulting from regional growth, vehicle volumes could increase substantially.

As illustrated in Figure 2-13, the model projects a 15 percent to 35 percent increase in PM peak hour vehicle volumes on South of Market arterial corridors, as well as major increases in vehicle volumes on segments of Third Street, 16th Street, and Cesar Chavez Street outside of the South of Market. Many neighborhood streets could also see large increases in vehicle volumes. Vehicle volume increases on this scale could have negative impacts on traffic operations. Major issues include:

- Some of the areas with the highest projected increases in vehicle volumes and traffic delays (in the South of Market and along Third Street) are the parts of the study area with the largest projected increases in population and employment density. Increased traffic would present challenges to residents, workers, and users of other transportation modes in these areas, including increased exposure to vehicle emissions and noise, increased travel delay, and increased collision risk
- Two intersections on 16th are projected to have major delays during the PM peak hour: 16th and Potrero Avenue, and 16th and Third Street.
- Expanded vehicle traffic through Showplace Square, as well as to and from Mission Bay could have major impacts on both private vehicle and transit operations. The intersection of Division/Eighth/Townsend, where there is now a traffic circle, is projected to have major delays. The intersection of 11th Street and Division is also projected to have substantial delays.
- During the PM peak hour, the projected volume increases would lead to notable new delays in the South of Market, particularly on Third Street at Mission and Fourth Street at Folsom. Harrison Street and Bryant Streets (home to the I-80 freeway approaches) will also have delays, particularly at Harrison and Fifth, Harrison at Seventh, and Bryant at Fifth.
- Three study intersections in the AM peak hour and six intersections in the PM peak hour are forecast to be highly congested. Intersections operating with delay in the AM and PM peak hour are located along streets that are generally heavily used as regional routes, such as Third, Fourth, Fifth, Bryant, Harrison, and Folsom Streets.
- The City has options for managing congestion in the Eastern Neighborhoods without creating new vehicle capacity. Potential solutions include parking management, as well as opportunities to pursue congestion pricing strategies in coordination with regional partners. Additional investment in Transportation Demand Management (TDM) strategies may also help to reduce vehicle congestion.

Figure 2-13 Forecast Increases in Peak-Period Vehicle Volumes on SOMA Arterials



Goods Movement

Goods movement is of particular importance in the Eastern Neighborhoods, where not only retail business but heavy industry and production, distribution and repair (PDR) businesses are prevalent. Delivery vehicles, ranging in size from vans to multi-axle trucks, must navigate the street network and find space to load and unload. The transportation system must accommodate the delivery needs while managing potential impacts on residents, workers, and visitors.

Along the waterfront is a complex of heavy industrial and Port of San Francisco facilities including maritime terminals, warehouses and container freight stations. These facilities rely heavily on high-capacity modes for movement of cargo and freight including oceangoing ships, trains, and semi-trucks. Light industrial and PDR establishments can be found throughout South of Market, the Central Waterfront, Showplace Square, and the Northeast Mission.PDR businesses include specialty manufacturing, food production, construction, delivery , auto repair, arts uses, and other services. These businesses are served by diverse vehicle types including large trucks, commercial vans, sport utility vehicles, and pick-up trucks. Many must rely on curbside parking spaces for loading and unloading, in alleys or on main streets.

Retail storefronts in residential neighborhoods typically rely on curbside spaces for loading and unloading, and are served by smaller vehicles. Grocery stores, “big box” chains, and other large-floorplate retail outlets are generally serviced by large trucks, often at loading docks. A major concentration of big-box retailers can be found in the vicinity of Division Street. City policy regarding goods movement includes the following:

- **Truck Routes.** While a citywide network of designated truck routes (See Figure 2-14) including highways and arterial streets is included in the General Plan, it is advisory in nature, and no signage is posted along these routes.
- **Loading facility requirements.** As part of project review, the Planning Department reviews loading facilities, access to loading facilities, and peak hour loading requirements.
- **Weight Restrictions.** Trucks using roadways under state jurisdiction may not exceed 40 tons (80,000 pounds), and San Francisco applies much more restrictive weight limits on some residential streets. Vehicles weighing in excess of three tons (6,000 pounds) are prohibited on a few streets on Potrero Hill and in the Western Mission. Through the “Overweight Corridor Program,” The SFMTA and Port of San Francisco have designated all streets near the waterfront from Pier 50 in Mission Bay to Pier 96 just south of Islais Creek Channel as appropriate for large vehicles.

Figure 2-14 Recommended Truck Routes

Parking

How San Francisco manages both on- and off-street parking resources is a major factor in shaping its transportation system. Key Issues and Opportunities for parking include:

- Almost 10,000 new units of housing are predicted in the Eastern Neighborhoods as a result of the Eastern Neighborhoods plans. Despite elimination of minimum parking requirements and the requirement for unbundled parking in parts of the plan area, most new housing will include some accessory parking, and vehicle ownership and trip generation rates may therefore be higher among new households than the existing population.
- There are 7 Residential Parking Program districts in the Eastern Neighborhoods, each with its own parking restrictions and level of demand. For example, in the "Y" Zone in SoMa's South Beach, the number of issued RPP permits is roughly twice the number of on-street parking spaces, the highest "saturation" of any zone. In the Mission, the saturation rate for its 3 RPP zones range from 96-105 percent, while the "X" RPP zone in Potrero Hill has a 49 percent saturation rate.
- The South of Market has a large amount of metered, unmetered, and off-street parking, including two city-owned parking facilities and several privately-owned parking lots and garages available to the general public. Paid publicly available parking is concentrated in the downtown financial district area.
- Parking is metered on the Mission, Valencia, and 24th Street corridors, but occupancies exceed 100 percent during peak periods and turnover is low. Vehicles often double-park on Mission Street and on the cross-streets, obstructing buses on an important transit corridor.
- On-street parking occupancies in the Showplace Square area are high, and with substantial growth predicted in this neighborhood. On-street parking in the Potrero Hill area is usually parallel to the street, and mostly unregulated.
- High on-street parking occupancy can increase the likelihood of double parking, which creates obstacles for transit and vehicle circulation. SFMTA's SF*park* program will collect data on parking occupancies, double parking, and transit delays on key Eastern Neighborhoods streets.
- Consistent with the Better Streets Plan, there may be opportunities in the Eastern Neighborhoods for the conversion of some curb parking to other uses such as landscaping; flexible uses such as temporary cafe seating; or to accommodate more pedestrian walking space, bicycle lanes and transit only lanes. The use of some existing curb parking capacity for other uses may become more feasible in the Eastern Neighborhoods once active parking management creates an appropriate balance between supply and demand.

Through the SF*park* program, SFMTA is deploying new meter technology and active parking management in several parts of Eastern Neighborhoods. These efforts are intended to improve parking availability and customer service.

Shuttles, Taxis, and Car Sharing

Taxis, shuttles, and car sharing services all offer opportunities for motorized transportation without the use of a personal private vehicle.

Most taxi stands are concentrated on the Market Street, Third Street, and Fourth Street corridors in SOMA. A review of taxi stand locations revealed that there are few stands around the study area's regional transit stops even though these stations have high walking mode shares. New taxi stands may be warranted in high demand areas, especially around regional transit stations where stands do not currently exist.

Most car share pods are located in the Mission and SOMA areas along primary transit and commercial corridors. There are a limited number of car share pods in the Potrero Hill/Showplace Square and Central Waterfront study areas. Decisions about the expansion and placement of car sharing vehicles are made by private entities, City Carshare and Zipcar. However, the City may be able to assist in providing car sharing parking spaces if high-need areas are identified.

There are a growing number of privately operated shuttle services in the study area, but primarily in the South of Market and Mission Bay. These services include "last mile" employer shuttle services, which offer the final connection to or from a passenger's transit stop and place of employment, as well as regional corporate shuttles and intra city institutional shuttles. Shuttles can be in conflict with Muni buses at bus stops. In many areas, especially residential streets where curbside space is at a premium, shuttles will often use existing Muni bus stops to pick up or unload passengers. Increased enforcement of encroachment into Muni bus stop zones by private vehicles may be needed.

Shuttles serving Downtown and South of Market destinations provide overlapping routes. Some of these shuttles may benefit from shuttle consolidation due to the overlapping nature of their routes and because many services operate below their full capacity, even during peak periods. The SFMTA and SFCTA are working with shuttle operators to develop systems for appropriate coordination.

2.3 SUMMARY OF MAJOR CHALLENGES AND OPPORTUNITIES

Major challenges and opportunities for the Eastern Neighborhoods transportation system are discussed below. The chapters that follow will propose transportation capital investments and circulation changes that will begin to address many of these issues.

Capacity for movement of people and goods

The Eastern Neighborhoods transportation system is already at or near capacity in some corridors during peak periods. As growth occurs, system capacity may be further taxed.

Vehicle travel, goods movement, and transit are all delayed by traffic congestion in some key corridors, particularly in peak periods and peak directions. While Muni Metro services and BART operate in a tunnel under Market Street (and, once complete, the Central Subway), most of the transit services in the Easter Neighborhoods operate on surface streets, in mixed-flow traffic. Today, even in designated transit-priority corridors, vital transit routes operate relatively slowly as they pass through the Eastern Neighborhoods. If vehicle congestion increases in the coming decades, transit routes operating in mixed flow traffic with face further delays. Capacity constraints are foreseen for vehicles and transit on the follow corridors:

- *South of Market arterials*. As a result of the projected growth, there will be competing demands for space on South of Market streets. In addition to new trips within the neighborhood, increased regional travel demand could lead to large increase in travel to and from the South of Market area. If current mode shares persist, the South of Market arterial network may see large increases in vehicle volumes (15 – 35 percent on major arterials), and increased congestion and delay for both transit and private vehicles at key intersections during peak times. Potentially costly delays are projected in the PM Peak on Harrison and Bryant Streets near the I-80 approaches, as well as along Third and Fourth Streets.
- *East-west travel through the central part of the study area faces capacity constraints*. With no change in mode share, Sixteenth Street could see large increases in both vehicle volumes and transit ridership. The 22 Fillmore, which is planned to be re-routed so that it travels all the way to Mission Bay, faces both potential delay from vehicle congestion as well as potential overcrowding of transit vehicles. Other east-west streets in this face a variety of interruptions that limit their usefulness for through-travel.
- *Third Street* is the primary arterial for the Central Waterfront and Mission Bay, connecting these growing areas to the South of Market and downtown. It also provides downtown access for the western side of Potrero Hill. Expected growth in travel demand between these neighborhoods may result in increased travel volumes on Third Street. This growth includes increased vehicle volumes, which are expected to generate major

delays at the intersection of Third Street and 16th Street. Growth will increase demand for the T Third light rail service, which is expected to have average loads exceeding 125 percent of total capacity during the PM peak hour. The SFMTA is currently making a major investment in this corridor with the construction of the Central Subway.

- *On Potrero Avenue and Mission Street*, vehicle congestion may increase, and vital transit services are expected to be over capacity. Mission Street is the Eastern Neighborhood's second-busiest transit corridor, after Market Street. Three major bus routes – the 14-Mission, 14L-Mission Limited, and 49-Van Ness/Mission – utilize the street. Mission is a busy street for all users, with high volumes of pedestrian traffic and a continuous strip of retail that requires access for delivery vehicles. It is a street on which vehicles often double-park, further delaying transit. Even with assumed headways much more frequent than it is currently operating, the 9 San Bruno on Potrero Avenue is expected to have average PM peak hour passenger loads of more than 125 percent of capacity.

Maintaining sufficient system capacity in growing neighborhoods will require improved alternatives to travel by private vehicle. Both the physical constraints of the study area and the City's Transit First Policy preclude major expansions of roadway capacity as a strategy for dealing with projected vehicle volumes and congestion. Achieving the stated goals for the study area will require investments in transportation facilities that can carry more people in less space. Investments could include:

- *Transit Priority*. Maintaining and improving transit speed and reliability is important to passengers, and vital for allowing SFMTA to operate the transit system in a cost-effective way. In some cases, signal priority, bus bulbs, and other transit priority street treatments will be required. Some key corridors will only be able to provide for the expected level of demand if a substantial share of the market shifts from driving to other modes, including transit. In these corridors, dedicated transit lanes will be needed to maintain fast, efficient service.
- *New bicycle facilities*. The system can accommodate some new travel demand through increased bicycle travel. New bicycle lanes planed through the San Francisco bicycle plan can help. In some cases, particularly on arterials with high volumes of vehicle traffic, protected bicycle facilities may be required to attract a larger share of the travel market.
- *Improved pedestrian access*. Complete neighborhoods with safe, attractive, well connected streets can allow more daily needs to be met by walking. The Eastern Neighborhoods plans aims to achieve a mix of land uses in emerging neighborhoods. Investment in improved pedestrian connectivity and more pedestrian-friendly streets will help to complete the vision.
- *Transportation demand management*. San Francisco already has in place a number of strategies for managing demand for vehicle travel, most notably in parking management. City and county agencies are also exploring additional TDM strategies, including expanded efforts at shuttle coordination, further coordination of employer-based trip reduction, and congestion pricing. Each of these strategies is already under study, implementation or development, but potential exists to expand their application.

The Eastern Neighborhoods remain the industrial heart of San Francisco. Even as neighborhoods change, the heavy and light industry businesses that provide nearly 30,000 jobs in Eastern Neighborhoods plan areas will continue to require delivery trucks of all kinds.

Accommodation of freight deliveries over highways and local streets is an economic imperative for the City. In districts that are transitioning from traditional industrial areas to mixed-use neighborhoods, including much of South of Market, the northeastern Mission, Showplace Square

and the Central Waterfront, resolution of tensions between established users and new residents can require a delicate balancing act of competing concerns. To ensure efficient goods movement, the City may need to establish truck routes and regulation for time of delivery that work well for business while minimizing negative impacts. It will also be important to design streets in emerging mixed-use industrial areas that provide a safe and attractive public realm without restricting the ingress and egress of trucks.

Livability

Streets in the Eastern Neighborhoods are not just ways travel – they are also places to spend time and to gather. The need to build and maintain a livable public realm (both in existing and emerging neighborhoods) is a major goal of the in the Eastern Neighborhoods area plans, and one that is further emphasized in San Francisco's Better Streets Plan.

The challenges in the transportation system decrease livability in the South of Market area. Built and operated to accommodate high volumes of regional vehicle traffic, the major arteries in the South of Market area present challenges for pedestrian travel and daily life. Traffic traveling at more moderate speeds, narrower streets and wider sidewalks, more frequently spaced street crossings, landscaping and pedestrian scale lighting on South of Market arterials would improve the quality. In addition, the South of Market area's network of alleyways already provides pedestrians space that is separated from the high vehicle volumes on the arterial streets. Investing in pedestrian amenities and improved connectivity for the alleys can also improve livability.

Areas with lower projected growth will also require pedestrian and public realm improvements. While SOMA has the most obvious needs and the greatest expected growth, in the Central Waterfront, the north east Mission, and Showplace Square streetscape and pedestrian realm improvements are called for to improve the environment for new workers and residents. Many of these needs have been catalogued recently through other ongoing planning efforts. The Mission Streetscape Plan and the Potrero Hill Traffic Calming Plan have developed and prioritized key street improvements for those neighborhoods.

Streetscape improvement opportunities are particularly apparent in the transitioning industrial areas, where pedestrian facilities may simply be lacking at present. The eventual build-out of the Central Waterfront's pedestrian grid in coordination with private development, and the completion of the Blue-Greenway could help open the City's eastern Waterfront to public enjoyment.

Even in established residential neighborhoods such as Potrero Hill and the southern parts of the Mission District, recent community planning efforts have catalogued needed pedestrian and

traffic-calming improvements. Continued efforts by diverse City agencies will be required to ensure that these projects are implemented.

Connectivity

Throughout the Eastern Neighborhoods, barriers such as elevated freeways, railroad tracks, wide arterials, and steep topography interrupt paths of travel and divide neighborhoods. In some neighborhoods, including parts of the Mission District, the street grid is fine-grained and well-connected. However, major challenges remain in other neighborhoods.

Connectivity for all modes is challenged moving east and west through the southern half of the eastern neighborhoods. At Harrison Street, where the Mission District street grid meets the smaller Potrero grid, several streets jog, and others dead-end at large parcels. Steep hillsides (in particular, both the eastern and western slopes of Potrero Hill), freeways (Interstates 80 and 280 and U.S. 101, including the Central Freeway), and the Caltrain tracks and yard north of 16th Street both define and divide the Mission District, Potrero Hill, Showplace Square, and Mission Bay. When there are few through streets, travel demand is focused on the few that do connect, which adds delay and crowding. A focused effort to reconnect the street grid in this corridor could greatly improve mobility.

In the South of Market, the wide arterial streets themselves interrupt paths of travel for pedestrians. This is particularly true where double turn lanes or missing crosswalks prevent street crossings. Freeways also can serve as barriers not just along the mainline roadway but at the touchdown points where on- and off-ramps intersect with the surface street grid, and where pedestrian crossings are often prohibited or problematic.

The regional-scale rail service investments planned for the Eastern Neighborhoods create both opportunities and connectivity challenges. To realize maximum benefit and mitigate negative impacts, there will be a need for complementary smaller-scale investments near stations and along rail corridors. It will be particularly important to invest in pedestrian amenities on corridors that provide paths of travel to important regional transit infrastructure. Townsend Street, which provides access to the Fourth and King Caltrain Station from the east and west, is an important candidate for improvement, as is Fourth Street, which provides access to that station from Market Street.

While the Eastern Neighborhoods stand to benefit greatly from the increased access to be provided by Muni's Central Subway, the Downtown Rail Extension and California High-Speed Rail, these projects also create challenges for the neighborhoods where they will be built. Local

transit and people walking or biking must be able to come and go in large numbers from the station. The project will create new barriers between communities. Examples of this type of challenge include:

- With the downtown rail extension, the Fourth and King Station will be transformed from a commuter rail terminus providing local connections to the Financial District to a major regional and local transit hub. This transformation will place increased demands on the surrounding area, including an increased demand for high-quality pedestrian access. For example, there are currently no sidewalks along Townsend Street to the west of the station, leading toward Showplace Square.
- Transit and pedestrian access to the new Transbay Transit Center from the Eastern Neighborhoods will likewise be an important issue.
- Along with Interstate 280, the existing Caltrain right-of-way forms a barrier between the Mission Bay and Showplace Square neighborhoods. Upgrading of the Caltrain corridor to accommodate high-speed rail service would require grade-separation of all intersections. Redesign of the right-of-way could provide an opportunity to improve connectivity between Mission Bay and neighborhoods to the west.

3 CORRIDOR PROJECT SELECTION

3.1 SELECTION METHOD

Responding to major land use and transportation system changes in the coming decades, the EN TRIPS project sought to develop major capital investments to improve transportation and the public realm on a small number of very important transportation corridors in the study area.

The priority projects aim not only to address major challenges for circulation and livability at the neighborhood scale, but also to address challenges for the overall Eastern Neighborhoods circulation system. While the selected projects were the focus of design effort, the EN TRIPS plan also proposes circulation changes for the surrounding transportation networks where doing so supports the project goals and helps to meet EN TRIPS project objectives. Finally, the project sought to advance corridors for which design and circulation planning work could help to inform future improvement projects for several other priority Eastern Neighborhoods corridors.

To determine which street segments to focus on, the project completed both a technical evaluation and a public engagement process. The public engagement process is described in Chapter 1. Details of the technical evaluation are provided in the EN TRIPS Circulation Alternatives and Preliminary Project-Specific Design Concepts Report, and summarized in Appendix C. It followed these steps:

1. Divide the major transportation corridors in the study area into segments with consistent function and character.
2. Assess which of these street segments fall in high growth areas.
3. Assess each segment based on need for multimodal transportation improvements.
4. Assess outliers that may represent special challenges and opportunities.
5. Of the identified corridor segments, assess opportunities for a near-term corridor improvement projects.
6. Assess capacity constraints and opportunities in the vehicle circulation network.

The evaluation yielded a group of high-priority street segments that were high priority for investment. These high priority segments were then further constrained, eliminating segments that are either improved through other projects, have immediate needs that can be addressed outside of this study process, or have major unknowns that made it impractical to design them within the timeframe of the EN TRIPS project. Considerations for each corridor segment are discussed below.

Figure 3-1 EN TRIPS Priority Corridors

3.2 HIGH PRIORITY CORRIDORS

Folsom Street and Howard Street couplet (South of Market)

Folsom and Howard Streets have been identified as high priority in this analysis, including both the segments between Second and Fifth and the segments between Fifth and Eleventh Streets.

Both streets have substandard pedestrian facilities, such as long distances between crossings (blocks east of Eighth are more than 800 feet long), and long crossings (62.5 feet on Folsom). The Fourth and Folsom Street intersection has multiple turn lanes. Folsom also has relatively high pedestrian injury collision rates of 25 and 32 per mile east and west of Fifth over the period between 2004 and 2008. Sidewalks are 10 feet wide. While east of Fifth, this condition satisfies the Better Streets Plan minimum recommended width for Downtown Commercial streets, to the west of Fifth it does not conform to the Better Streets Plan standard of 12 feet for Mixed Use streets. Forecast growth suggests that overall pedestrian volumes could be expected to rise along the full length of Folsom Street. The Folsom and Howard Street couplet form the major east-west bicycle corridor through the South of Market, and the forecast increase in vehicle volumes may challenge cyclists in this corridor. Folsom Street was also identified as a high-need corridor in the Eastern Neighborhoods Area Plans and the Western SOMA Community Plan.

Based on these needs, Folsom and Howard Streets between Fifth and Eleventh Streets were selected for an EN TRIPS priority project. Along with surrounding streets, they are discussed in detail in Chapter 5 of this report.

Townsend Street

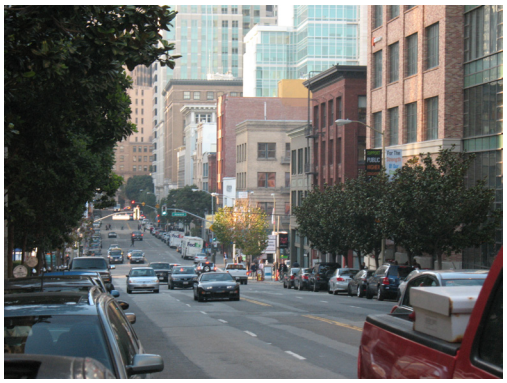
Townsend Street has inadequate pedestrian infrastructure. The north side of the street does not have sidewalks, while the sidewalks on the south side of the street are very narrow and impeded by parked vehicles, especially the motorcycle parking area adjacent to the Caltrain station. Furthermore, the lack of pedestrian amenities on these blocks, such as lighting or landscaped buffers between pedestrian, Caltrain facilities, and parked vehicles makes pedestrian travel challenging. Because this corridor represents a major access route for pedestrians wishing to get to and from the Fourth

and King Caltrain Station, its enhancement is vital to not only improving conditions for the high numbers of existing pedestrians, but also for increasing non-motorized access to regional transit services. The Third to Fifth Street segment of Townsend is projected to have substantial growth in residential density associated with the redevelopment of the rail yards site around the Caltrain station.

Townsend also provides important bicycle access to the Caltrain station. The San Francisco Bicycle Plan specifies that there should be bike lanes on this corridor. The lanes have recently been striped west of Fourth, and bicycle lanes and a travel-lane reduction benefitting pedestrians are planned to the east. Townsend is a high priority transit corridor for SFMTA Transit's Route 47. The intersection of Townsend with Division and Eighth Street, currently a traffic circle, is projected to have high levels of congestions (LOS F) in the future condition.

While all of these factors indicate that improvements to Townsend Street are necessary, the corridor is receiving additional attention as part of planning processes related to the high-speed rail and Caltrain station planned for the site of the current Caltrain station on the south side of Townsend west of Fourth. The design of any additional improvements to Townsend will be contingent on final design of the high-speed rail station. Furthermore, improvements to Townsend could be made as part of station construction. For these reasons, a design project for Townsend Street was deemed premature as part of the EN TRIPS project.

Second Street



While pedestrian conditions along Second Street are not as challenging as along some other SOMA streets, the street is zoned commercial and has suffered from a relatively high pedestrian injury collision rate of 35 injury collisions per mile between 2004 and 2008. Second Street is also the primary bicycle route between the Financial District, Rincon Hill and South Beach. Bicycle lanes are planned for Second Street as part of the San Francisco Bicycle Plan. . The rate of bicycle collisions in the north-of-Bryant segment between 2004 and 2008 was 28 per mile. While Second Street is not a designated rapid corridor for transit, SFMTA Transit Routes 11, 12, and 108 will operate along this corridor in the future condition. Second Street also has extremely high forecast growth.

While high growth makes Second Street a high priority for investment, this project is the focus of a streetscape and bicycle lane implementation effort now being advanced by the Department of Public Works.

Third and Fourth Streets (South of Market)

Third and Fourth Streets, which form a one-way couplet in the eastern South of Market area, have inadequate pedestrian facilities, high rates of growth, and important roles for three modes of transportation (transit, pedestrians, and vehicles). Both streets are important pedestrian pathways between Market Street and the Caltrain station at Fourth and King Streets, and both have high pedestrian injury collision rates. Pedestrian facilities are inadequate, with narrow sidewalks, long crossings, and restricted crossings at several intersections.

Third and Fourth Streets also work together as a crucial transit corridor that suffers from peak period delays. A major investment in transit service is already underway in this corridor, in the form of the Central Subway under Fourth Street. However, even with this investment, the T-Third light rail service is forecast to be over-capacity by 2035. Currently, the speed and reliability of 30 and 45 are poor, and forecast traffic congestion on Third and Fourth Streets could further degrade performance. Because of these challenges, both streets are strong candidates for near term improvement.

Fourth Street will very likely be the subject of a street design effort by the San Francisco Planning Department in the near future, as part of a planned rezoning associated with the construction of the Central Subway. Fourth Street will be the focus of the Planning Department's Central Corridor project. Third Street is a strong candidate for near term improvement.

Fifth Street

Fifth Street is a two-way arterial that serves multiple roles in the South of Market street network. It is an important corridor for cyclists, connecting the Union Square area to Caltrain and Mission Bay. Bicycle lanes are planned on Fifth Street, but have not yet been built. Between 2004 and 2008, the bicycle collision rate here was 39 per mile, among the highest in the evaluation. Fifth Street also has high pedestrian needs, with long crossing distances; multiple turn lanes at Bryant, a restricted crosswalk at Harrison; and narrow sidewalks. Fifth Street north of Brannan is also a transit street, with SFMTA Transit's Route 27 planned to operate in this segment. Fifth Street is a strong candidate for near term improvement.

Sixth Street

Sixth Street is another two-way arterial with a high need for improvements. While it carries large volumes of fast-moving traffic between the Interstate 280 exit ramp and the north of Market street network, Sixth Street also has high residential density and serves large numbers of pedestrians. The greatest challenge on Sixth Street is a pedestrian injury collision rate between 2004 and 2008 of 97 per mile, by far the highest among any of the segments analyzed. Sixth Street also has one of the highest rates of bicycle collisions in the study area, despite not being a designated bicycle route.

In addition to a high collision rate, Sixth Street has long crossing distances; multiple turn lanes at two intersections (Howard and Harrison); 10-foot sidewalks, high year 2035 projected traffic

volume (approximately 3,000 vehicles in the PM peak hour); and numerous intersections with alleys without signalized crossings.

Because of these factors, Sixth Street is a strong candidate for very near term improvement. However, because the primary issue with Sixth Street is a single factor (a high rate of pedestrian injury collisions) that is not directly related to larger EN TRIPS system goals, such as addressing growth and connecting EN TRIPS neighborhoods, Sixth Street is the focus of a shorter timeline effort by SFMTA to directly address pedestrian collision issues.

Seventh and Eighth Streets (South of Market)

Seventh and Eighth Streets form a one-way couplet running north and south through the Western South of Market. The northern segment of both of these streets emerged as high priority in the corridor screening, based primarily on high pedestrian and bicycle needs, and relatively high projected rates of growth.

Seventh and Eighth Streets have inadequate pedestrian facilities and high rates of pedestrian collisions comparable to other north-south SOMA arterials. Sidewalks are 10 feet, below the BSP standard of 12 feet for Mixed Use streets; and notable growth is projected (including a 145 percent increase by 2035 in residential density on Eighth). Multiple turn lanes and restricted crossings occur at Seventh and Harrison. Pedestrian injury collision rates of 35 and 29 per mile, respectively, occurred between 2004 and 2008. Participants in the EN TRIPS community workshop noted concerns about the pedestrian environment on Seventh and Eighth Streets, including conflicts between private vehicles, trucks, and pedestrians.

2035 traffic volumes are projected to be relatively high, roughly 2,000 vehicles in the PM peak hour on each street. Forecast traffic would also degrade conditions for cyclists in the bicycle lanes on Seventh and Eighth, which together make up a key north-south link for between Potrero Hill and the Civic Center area. The Western SOMA Community Plan proposed that Seventh and Eighth Streets be improved. Both Seventh and Eighth Streets are strong candidates for near-term improvement through the EN TRIPS project, both for their own sake and to provide a design template for improving one-way SOMA arterials.

16th Street

Sixteenth Street is the only east-west arterial that extends all the way from the Mission District to the eastern waterfront. As such, it is a vital vehicle and transit connection for three of the Eastern Neighborhoods, and will become even more important as Mission Bay and the waterfront develop.

While it currently turns off of 16th street at Kansas, SFMTA's Transit Effectiveness Project specifies that the 22 Fillmore will run the length of 16th Street, providing the only major east-west connection through the Mission, Showplace Square, and Potrero Hill. In 2035, demand for ridership on the 22-Fillmore is forecast to exceed capacity between Guerrero and Arkansas. Major delay is also projected, including peak vehicular traffic congestion at 16th and Potrero and at 16th and Third Streets. A large amount of growth is also forecast for the 16th Street corridor and the neighborhoods that it links together, including the Potrero Center area, the 16th and 17th Street corridors between the freeways, Showplace Square, and Mission Bay. Ensuring transit priority for the 16th Street corridor should be a priority for the EN TRIPS project.

Based on these needs, 16th Street was selected for an EN TRIPS priority project. While transit priority treatments will be required along the full length of the street, the segment between Potrero Avenue and Seventh Street was selected for focused design due to community priority. Along with circulation issues on surrounding streets, Sixteenth Street is discussed in detail in Chapter 5 of this report.

Third Street (South of King Street)

Third Street in Mission Bay and the Central Waterfront has a high degree of need for transit improvements, because of very high projected demand for the T-Third service. In 2035 forecasts, it is projected that demand for the T-Third will far exceed vehicle capacity in this segment. Current pedestrian and bicycle collision rates are very low on Third Street, due to low densities and low volumes of trips. However, the segment north of 16th Street has very high projected growth, due to employment and population growth forecast for Mission Bay. Third Street is expected to see a very large increase in vehicle volumes and major vehicle delays: For example, the intersection of Third and 16th Streets (included as part of the South of Market Circulation study) is projected to have very high levels of congestion.

A major investment has only recently been made in transit service in the corridor (the T-Third Street Muni Metro line), and this investment will be leveraged with completion of the Central Subway project in a few years. For this reason, it may not be practical for the SFMTA to invest

design effort in transit improvements along Third Street in the near term through the EN TRIPS project.

Division Street

Division Street marks the boundary between the South of Market arterial network and the Mission District, and it runs mostly underneath the Central Freeway segment of US 101. Division Street is an important east-west bicycle route, and bicycle lanes are planned. While high traffic volumes are not projected on Division, two intersections are projected to suffer from substantial vehicle delay in 2035: Bryant and Townsend/Eighth. Participants in the EN TRIPS community workshop noted that Division Street is poorly lit and feels unsafe for pedestrians and bicyclists.

Previous City plans and studies have considered removing part of the overhead Central Freeway and rebuilding Division itself, possibly as a multiway boulevard. While this idea was studied and not implemented in the past, the elevated freeway will require expensive investment if it is to be maintained over the coming years. The SFCTA will consider the future of the Central Freeway as part of the upcoming Countywide Transportation Plan.

Mission Street (South of Market)

Mission Street is a vital east-west transit corridor through the South of Market, used by both the 14 Mission and 14 Mission Limited lines, which are part of SFMTA rapid network. The segment of Mission Street between Third and Fifth has a very important overall circulation function, and important localized needs (particularly for pedestrians).

Mission is a busy pedestrian corridor with relatively long distances between crossings (blocks east of Eighth are more than 800 feet long), multiple turn lanes at the intersection of Fourth Street, and high rates of pedestrian injury collisions between 2004 and 2008: 47 per mile east of Fifth. Both transit and private vehicles are projected to have struggles with congestion delays in the Second to Fifth segments of Mission. However, overall vehicle volumes on Mission Street are projected to be somewhat lower than on other east-west SOMA arterials, in part because of planned diversion of traffic off of Mission at Second as part of the Transbay District Plan. Potential improvement projects could include investment in pedestrian facilities, as well as transit priority treatments. The Better Market Street Plan will consider the function of Mission Street in the South of Market circulation system, and its relationship to Market Street.

Mission Street (Eleventh Street to 16th Street)

The Mission District segment of Mission Street emerges as a high priority corridor primarily because of high transit needs. Muni's 14, 14L, 49, and 49L will continue to operate on this segment of Mission Street in the future condition. Demand for travel on Muni's 49 Mission-Van Ness is forecast to far exceed available capacity by 2035. EN TRIPS community meeting participants noted the need for additional express bus service on Mission Street. As compared to South of Market arterials, existing pedestrian facilities on Mission are strong.

Because of high transit demand and high volumes of traffic forecast, Mission Street requires transit priority treatments. However, the SFMTA's Transit Effectiveness Project has will consider transit priority treatments for this segment of Mission Street.

3.3 SEGMENTS IDENTIFIED FOR PRIORITY PROJECTS

Based on the assessment of needs, opportunities, and community interests, the SFMTA and its partner agencies selected five street segments on three major Eastern Neighborhoods corridors as the focus of intensive design and planning work:

- Sixteenth Street between Potrero and Bryant Streets
- Folsom and Howard Streets between Fifth and Eleventh Streets
- Seventh and Eighth Streets between Market and Harrison Streets

These street segments make up important parts of the corridors that knit the Eastern Neighborhoods together; they will bear the burden of a large share of forecast growth, and they are the focus of community interest as expressed through the Eastern Neighborhoods Community Planning Process, the EN TRIPS outreach workshop, and related planning processes. Finally, design and circulation planning work done on these streets can help to inform future improvement projects for several other priority Eastern Neighborhoods corridors.

4 16TH STREET CORRIDOR

4.1 ISSUES AND OPPORTUNITIES

Sixteenth Street is a major east-west corridor connecting the Eastern Neighborhoods and connecting the Eastern Neighborhoods to the rest of the City. In a part of the city marked by multiple barriers (including hilly terrain, US 101 and Interstate 80, and the Caltrain right-of-way), 16th Street it is the only east-west street that allows for continuous travel all the way from the Mission District to Mission Bay. It is designated as a Major Arterial in the City's Congestion Management Plan network, a Transit Priority Street recommended by the Transit Effectiveness Project, and a recommended truck route. Portions of the corridor are also included in the city's bicycle network. Substantial development is expected in several neighborhoods connected by 16th Street, including the north Mission District, Showplace Square, and Mission Bay. The 22 Fillmore currently provides transit service along 16th Street from the Castro district as far east as Kansas Street in Potrero Hill, where it turns south before continuing to Mission Bay on 17th and 18th Streets. In the future, SFMTA plans to re-route Route 22 so that it serves the full length of 16th Street to Mission Bay.

16th Street was identified as a high-need corridor in the Eastern Neighborhoods area plans, and streetscape and transit improvements to the corridor were specified as priority projects by the San Francisco Board of Supervisors. From a transportation operations perspective, 16th Street is made up of four distinct segments. They include:

- **Guerrero to South Van Ness Avenue.** In this segment, 16th Street is a busy neighborhood commercial corridor and an important path to the 16th and Mission BART station. There are two travel lanes in the westbound direction and one travel lane in the eastbound direction. Very large numbers of pedestrians use 16th Street in this segment

and in the busiest areas the interaction between high pedestrian volumes, buses, and private vehicles causes delays for all modes. This area also suffers from high rates of pedestrian injury collisions. SFMTA's 22 Fillmore route operates in this segment, while bicycle lanes run in parallel on 17th Street. The BART station at 16th and Mission is an important destination and a major transit transfer point. The parcels surrounding the BART station are zoned for, and likely to be redeveloped, with high density mixed use development at some point in the future.

- **South Van Ness Avenue to Potrero Avenue.** East of South Van Ness Avenue, 16th Street shifts to two narrow travel lanes in each direction. Land uses in this segment are less dense than the segment west of South Van Ness, and pedestrian activity is lower. The majority of intersections are unsignalized. The intersection of 16th and Potrero is forecast to have substantial traffic delays by 2035. The 22 Fillmore continues on 16th Street through this segment, and bike lanes continue on 17th Street. Potrero Center shopping center, located on the north side of 16th between Potrero and Bryant, is an important destination is this segment. This large property is likely to be redeveloped with a mix of more intensive uses at some point in the future.
- **Potrero Avenue to Seventh Street.** East of US 101, 16th Street shifts back to two lanes eastbound and one lane westbound. The 22 Fillmore turns off of 16th at Kansas Street proceeding east on 18th Street. Bicycle lanes shift from 17th to 16th at Kansas as well. This segment has been selected as the focus of the EN TRIPS corridor design project and is discussed in more detail below.
- **Seventh Street to Terry Francois Boulevard.** Just east of Seventh Street, 16th Street passes under I-280 and over the Caltrain tracks. The future configuration of this intersection is uncertain as the future alignment of Caltrain and California High Speed Rail have not been determined. This issue is discussed in more detail below. East of Seventh, 16th Street enters the Mission Bay redevelopment area and the right-of-way widens. While there are currently few people in this area, redevelopment of Mission Bay will transform this area with major investments in the street grid and large increases in residential and employment density. Currently, there is a bicycle route along 16th from Illinois Street to Third Street. From Third Street to Henry Adams Street, 16th Street has bicycle lanes.

Sixteenth Street will require transit priority treatments in all four of these segments. As an important first step toward these improvements, 16th Street between Potrero Avenue and Seventh Streets was selected for an EN TRIPS corridor segment improvement project.

16th Street Project Segment - Potrero Avenue to Seventh Street

The segment of 16th Street between Potrero Avenue and Seventh Street has been prioritized for investment above other segments of 16th Street because of expected residential growth, forecast vehicle congestion, transit capacity constraints, and community priority. This segment was identified as an area of need by participants in the EN TRIPS community workshops, stressing the importance of 16th Street as a transit corridor. Details on the Potrero to Seventh Street segment are as follows.

Land Use

Land use densities in this segment of the 16th Street corridor are currently low. However, substantial development is forecasted for the Eastern Neighborhoods. The Eastern

Neighborhoods area plans encourage housing and mixed use in the northern portion of showplace square, acknowledging an already-developing residential cluster. In the 16th and 17th Street corridors between Kansas and Seventh Streets, the plan encourages the development of new housing with somewhat increased residential density along the south side of 16th Street. In the core Showplace Square Design District between 16th and Division Streets, the plan aims to protect design-oriented businesses while encouraging retail and office development. Overall, as many as 3,000 new housing units could be built along this segment of 16th by 2035 leading to a substantial growth in residential density as well as increasing vehicle and pedestrian travel demand.

Transit

While it currently turns off of 16th street at Kansas, SFMTA's Transit Effectiveness Project specifies that the 22 Fillmore will run the length of 16th Street connecting the Castro District, the Mission District, Showplace Square, and Potrero Hill. Route 22 as a whole currently suffers from delay and poor reliability: Five-year average schedule adherence for the line as a whole is just 72.3%, and schedule adherence is 52.6% (FY2011 Service Standards Reports year-end scorecard). Forecast traffic congestion on 16th (particularly at Potrero Avenue) could further delay this route in its future alignment. In 2035, demand for ridership on the 22 Fillmore is forecast to exceed capacity between Guerrero and Arkansas. The 33 Stanyan also currently operates on 16th Street between Guerrero and Kansas and will continue to do so in the future.

Vehicle Circulation

Today, there is relatively little traffic in this segment of 16th Street. However, as new development occurs at Mission Bay and Showplace Square is redeveloped, more vehicle demand is expected. Major delay is also projected including severe congestions at 16th /Potrero and at 16th/Third. Interruptions to east-west vehicle travel on most streets in this area present challenges to circulation (illustrated in Figure 4-1). In addition to the Caltrain right-of-way, breaks in the vehicle grid occur at US 101 (18th and Mariposa Streets) and large parcel sites (for example, the Best Buy and Potrero Center parcels interrupt 14th and 15th Streets). In addition, 14th and 15th Streets are one-way for vehicle circulation between Guerrero and Folsom Streets. Transit priority on 16th Street will inevitably reduce vehicle capacity in this corridor. Therefore, it will be valuable to seek opportunities to reconnect the surrounding grid system to accommodate greater choices of routes for all modes.

Pedestrian and Bicycle Conditions

Through much of this segment, sidewalks are narrow, and there are few street trees or pedestrian amenities. Most intersections in this segment are unsignalized, leading to difficult crossings for some pedestrians. The pedestrian environment will require improvements to meet the needs of an increasing residential population. The Eastern Neighborhoods plans envision 16th Street as part of a network of 'Green Connector' streets, which feature "wider sidewalks, places to sit and enjoy, landscaping and gracious street trees that would provide linkages between larger open spaces and diffuse the recreational and aesthetic benefits of these spaces into the neighborhood."

Bicycle lanes currently exist on 16th between Kansas and Third Streets, and the San Francisco Bicycle plan proposes extending bicycle lanes to Terry Francois Boulevard on the east and Potrero Avenue on the west. West of Potrero, bicycle lanes continue on 17th Street. In order to accommodate transit priority treatments on 16th Street, it may be possible and desirable to shift bicycle lanes to 17th Street, creating a continuous bicycle corridor between the Castro and the

Caltrain right-of-way. This proposal is discussed in more detail below. Just as for vehicles, east-west pedestrian and bicycle connectivity is interrupted at numerous places between Division and 19th Streets. These interruptions are detailed in Figure 4-1.

Caltrain/I-280/California High Speed Rail right-of-way

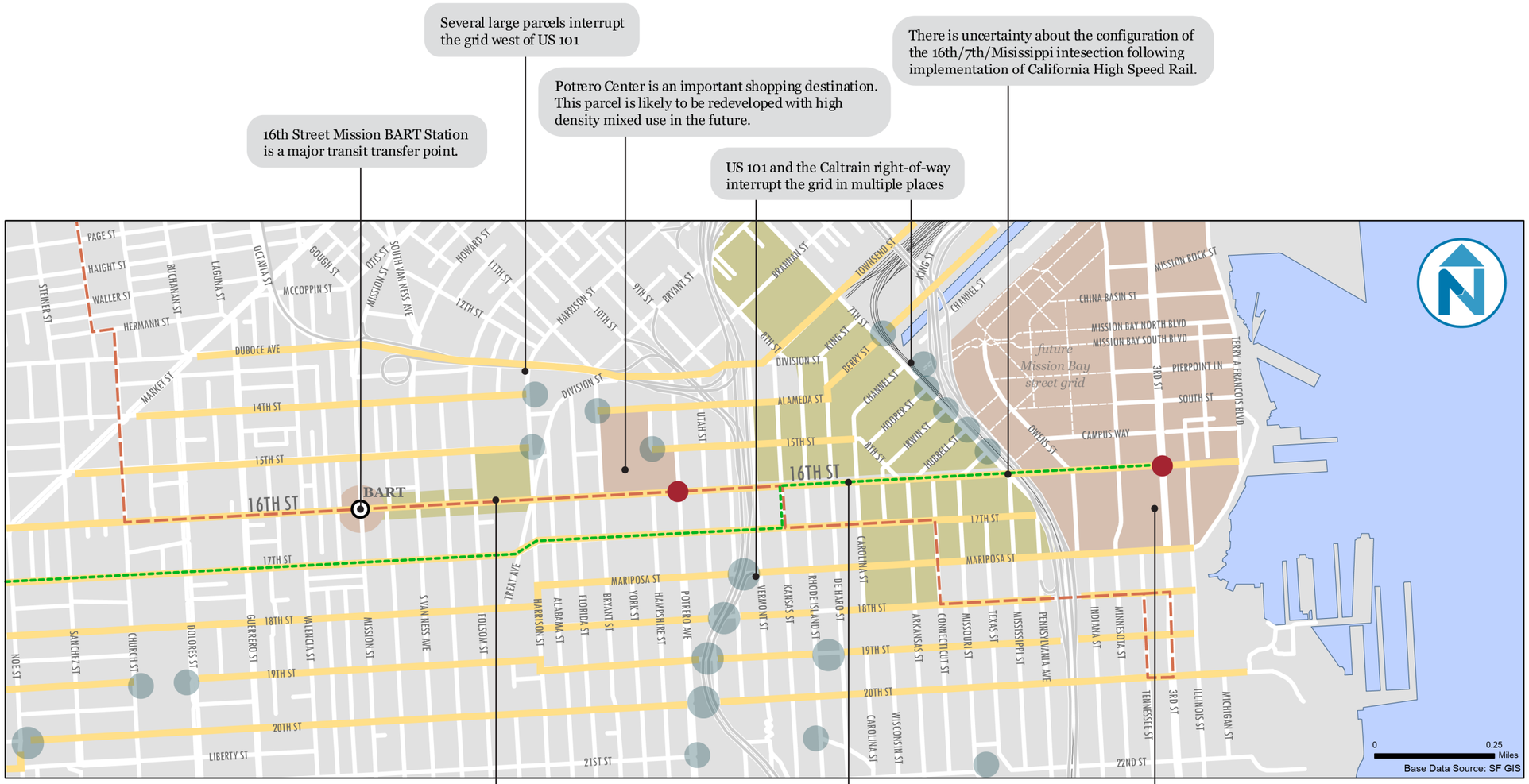
The Caltrain tracks and the I-280 freeway pass through the Eastern Neighborhoods in the same right-of-way, with the train tracks at grade and the freeway in an aerial structure. Together, this corridor presents a physical and psychological barrier for east-west circulation in the Eastern Neighborhoods interrupting 17th and 19th Streets and requiring overpasses or underpasses at several other streets. Uncertainty about the future of the Caltrain right-of-way due to the unresolved question about the future alignment of California High Speed Rail affects transportation planning in this part of the city.

16th Street crosses the Caltrain right-of-way at grade just to the east of Seventh Street and Mississippi Street and under the I-280 freeway viaduct. In the future, California High-Speed Rail may operate in this segment, and Caltrain may upgrade from its existing diesel service to more frequent electrified service. As a result of these changes, this complex intersection may change substantially in the coming decades, but its precise configuration is unknown at this time. City agencies, Caltrain, and the High Speed Rail Authority are currently working to develop alternatives. The possibilities are as follows.

- **All trains operate underground.** Both California High-Speed Rail and Caltrain could operate in a tunnel, bypassing this intersection. Vehicle circulation and bus service would encounter fewer interruptions than in the current configuration. This is the optimal configuration for east-west circulation in the Eastern Neighborhoods.
- **Some trains operate underground, some operate at grade.** In another scenario, High-Speed Rail would operate in a tunnel, and Caltrain would operate at grade. A more frequent Caltrain would cause interruptions to circulation on 16th Street. if Caltrain is electrified, it will need to grade-separated 16th Street, or the 22-Fillmore will need to be configured to "go off-wire" and return to overhead wire while in motion to avoid crossed overhead wires.
- **All trains operate at grade.** In a third scenario, both an electrified Caltrain and California High-Speed Rail would operate at grade. With as many as ten trains per hour crossing 16th Street, this arrangement would almost certainly require the City to grade-separate 16th Street from the rail right-of-way to maintain acceptable east-west circulation.

The High-Speed Rail Authority's business plan currently envisions extending service to San Francisco beginning in 2026. Given this long time horizon, it is sensible for San Francisco to proceed with plans to improve 16th Street and extend the 22 Fillmore assuming that the current configuration will remain in place for at least 15 years.

Figure 4-1 16th Street Issues and Opportunities



This page intentionally left blank.

4.2 PROJECT OBJECTIVES

In designing transportation improvements for 16th Street, the SFMTA was guided by the principles listed below. With a limited right-of-way, project design requires tradeoffs between each of these priorities, but the project alternatives attempt to strike a balance between priorities.

- **Transit performance.** *The project should maximize transit speed and reliability on 16th Street while providing a safe and comfortable waiting environment for passengers.* The project should facilitate the extension of the 22 Fillmore service to the full length of 16th Street, while protecting transit from the impacts of vehicle congestion.
- **The public realm.** *Open space, landscaping, and other urban design elements should be enhanced to upgrade 16th Street to a "green connector" street.* The project seeks to provide an enhanced public realm, upgrading the 16th Street public realm so that it serves as a "green connector" street as envisioned in the Eastern Neighborhoods land use plans. Elements include wider sidewalks, landscaping, and other amenities for the pedestrian realm, as well as storm water management facilities.
- **Pedestrian conditions.** *Pedestrian comfort and safety should be improved.* Currently, this segment has limited pedestrian facilities. Its 10 foot sidewalks fall below Better Streets Plan minimums for Mixed Use streets. There are few signalized crossings of 16th Street, and there is a history of pedestrian collisions at some unsignalized crossings. The project will seek to provide reduced crossing distances and additional signalized pedestrian crossings where appropriate.
- **Bicycle conditions.** *A safe, comfortable, and attractive bicycle route should be provided within the corridor.* Both 16th and 17th Streets currently feature Class II bicycle lanes. Because the lanes continue east on 16th only, and west on 17th only, lanes on both streets might not be necessary (grades on the streets are similar, and there is less traffic on 17th). If an alternative that did not provide lanes on 16th were to be adopted, improvements to bicycle facilities on 17th street would be made.
- **Vehicle circulation.** *The street grid as a whole should continue to accommodate east-west vehicle travel between the Mission District, Potrero Hill, Showplace Square, and Mission Bay.* This project will tolerate some reduction in vehicle capacity in order to achieve transit priority and other project goals. However, as development occurs in this part of the city, circulation on 16th Street would benefit from consideration of "grid repair," or improvements to the connectivity of parallel routes in order to provide alternatives for travel by all modes.
- **Parking and loading.** *Delivery access to businesses should be maintained and parking opportunities should be provided where possible, but parking and loading is less important than through-travel in this segment.* This segment of 16th Street has short block lengths (generally about 200 feet), and most properties also front onto side streets, so parking and loading from side streets can maintain easy access to nearly all properties in this segment. In addition, many of the cross streets in this segment have 90 degree parking, providing a large amount of on street parking. As a result, 16th Street itself provides only a small share of the total parking spaces available in the corridor as a whole.
- **Deliverability and cost-effectiveness.** *The project should maximize cost-effectiveness and speed delivery of the most crucial transit priority improvements.*

This page intentionally left blank.

4.3 ALTERNATIVES DEVELOPMENT AND EVALUATION

KEY ●●● Greatest benefit ○ Neutral ●●● Greatest impact

Full list of project alternatives

The EN TRIPS project team developed a total of nine project alternatives. These alternatives are described and evaluated for each design principle in the Figure 4-2. The project alternatives share a number of similarities. First, all of them provide dedicated transit lanes (either on the center or the side of the street), as well as other transit priority treatments such as near-level boarding and transit signal priority. All would restrict left turns for vehicles at most intersections on 16th in order to maintain capacity for through-travel. Most would remove a large share of the parking on 16th Street. It is important to note, however, that with 90 degree parking present on most side streets in this segment, the parking on 16th Street represents a relatively small share of the total parking in the corridor (most parcels on the corridor front onto at least one side street). All would require substantial public investment in transit and pedestrian facilities. Key differences between the alternatives include the placement of bicycle facilities (either 16th or 17th Street), the type of transit only lane (center or side-running), and the placement of bus stops (boarding island or curb stops).

Figure 4-2 16th Street: Full List of Project Alternatives

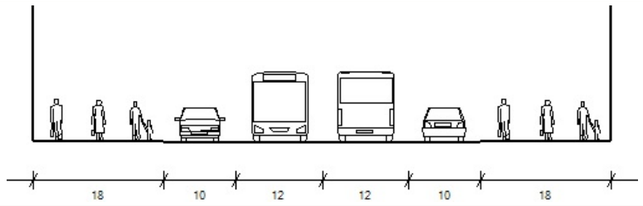
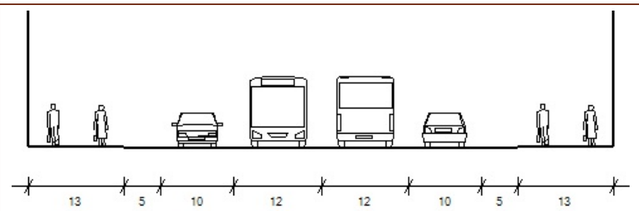
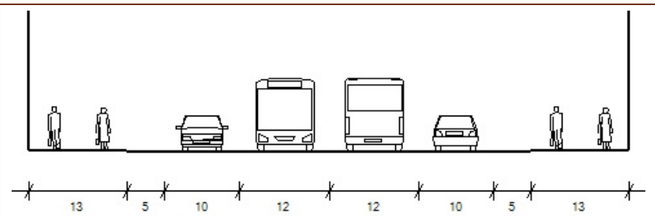
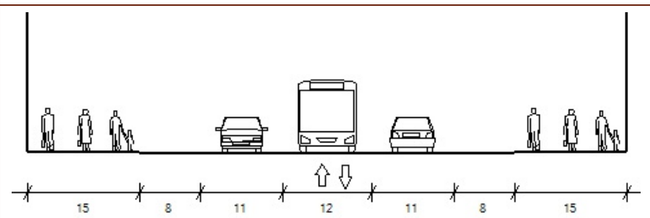
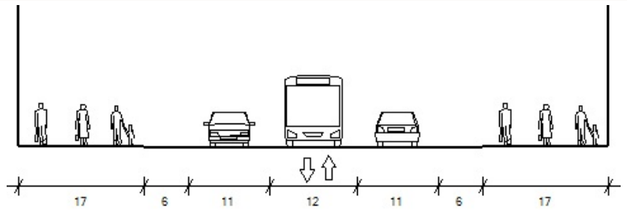
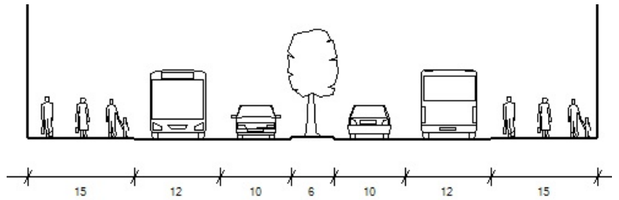
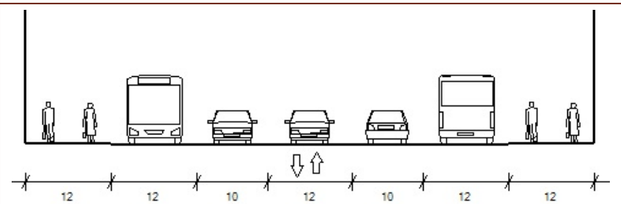
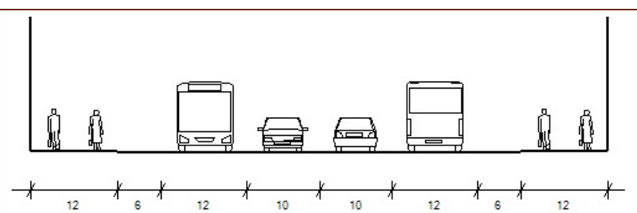
Description	Cross Section	Transit Performance	Bicycle circulation and safety	Vehicle circulation	Pedestrian circulation and safety	The public realm	Parking and loading	Cost comparison	Notes	Disposition
1 Median Transitway		●●●	○	●	●●	●●●	●	$$$	Provides strong transit priority. Removes existing bicycle lane on 16 but replaces it with an enhanced bicycle corridor on 17th. Wide sidewalks would benefit pedestrian safety and the public realm.	Carried forward – evaluated further below.
2 Median Transitway + Bike Lanes		●●●	○	●	●	●●	●●	$$$	This alternative provides most of the same advantages as Alternative 1. However, it reduces sidewalk space to maintain bicycle lanes on 16th street.	Not carried forward because bicycles can be accommodated on 17th Street in an improved facility
3 Median Transitway + Bike Lanes + Curb Stops		●●	○	●	●	●●	●●	$$$	This alternative would maintain space for wide sidewalks by foregoing transit boarding islands, instead bringing buses out of the transitway to stops at the curb.	Not carried forward because of insufficient transit performance improvement and potential bus-bike conflicts.
4 Median Queue Jump Lane + Parking		●●	○	●	●	●●	○	$$$	Provides a center "queue jump" lane that would allow transit to safely bypass traffic in either direction. Would permit both wide sidewalks and maintenance of parking lanes. Carried forward, but most appropriate for other segments of 16th.	Carried forward – evaluated further below.

Figure 4-2 16th Street: All Alternatives (Continued)

Description	Cross Section	Transit Performance	Bicycle circulation and safety	Vehicle circulation	Pedestrian circulation and safety	The public realm	Parking and loading	Deliverability and cost-effectiveness	Notes	Disposition
5 Median Queue Jump Lane + Bike Lanes		●	○	●	●	● ● ●	● ●	$$$	Identical to Alternative 4, but would provide bicycle lanes instead of parking.	Not carried forward because bicycle lanes can be accommodated on 17th Street.
6 Median bikeway		●	○	●	●	●	● ●	$$	This alternative would provide side-running transit, and would accommodate two-way travel in a 12' median. While this would be a premium facility for through-travel, it is not clear that bicycle turning movements could be safely accommodated.	Not carried forward because of uncertainty about functionality of the bicycle facility.
7 Median Green		●	○	●	● ●	● ● ●	● ●	$$$	Side-running transit lanes would provide some transit priority, but buses would wait behind right turning vehicles. Would provide for a wide landscaped median, improving streetscape.	Carried forward – evaluated further below.
8 Reversible Lane		○	○	●	○	○	● ●	$$	This alternative would provide a reversible vehicle lane on 16th, maximizing traffic capacity in the peak direction of travel. It would require overhead gantries that would negatively affect the streetscape.	Not carried forward due to low pedestrian and public realm benefit.
9 Side-Running Transit Lane + Bike Lanes		●	○	●	●	●	● ●	$$	Side-running transit lanes would provide some transit priority, but buses would wait behind right turning vehicles and potentially conflict with bicycles.	Not carried forward because bicycle lanes can be accommodated on 17th Street.

4.4 RECOMMENDED ALTERNATIVE

The EN TRIPS project team developed a total of nine project alternatives. These alternatives are described and evaluated for each design principle in the Figure 4-2. The project alternatives share a number of similarities. First, all of them provide dedicated transit lanes (either on the center or the side of the street), as well as other transit priority treatments such as near-level boarding and transit signal priority. All would restrict left turns for vehicles at most intersections on 16th in order to maintain capacity for through-travel. Most would remove a large share of the parking on 16th Street. It is important to note, however, that with 90 degree parking present on most side streets in this segment, the parking on 16th Street represents a relatively small share of the total parking in the corridor (most parcels on the corridor front onto at least one side street). All would require substantial public investment in transit and pedestrian facilities. Key differences between the alternatives include the placement of bicycle facilities (either 16th or 17th Street), the type of transit only lane (center or side-running), and the placement of bus stops (boarding island or curb stops).

Based on the evaluation above, the three most promising concepts were selected for additional analysis, design, and community input. The concepts advanced include the Median Transitway (Alternative 1), the Center Queue Jump (Alternative 4), and the Green Median (Alternative 7).

After detailed review of these options, the Median Transitway is recommended as the concept that provides the greatest benefits across the full range of project objectives. In this section, Alternative 1 has been developed in more detail. The following project elements are described and illustrated in the remainder of this section.

- **Operations Concept.** Recommendations for the design of transportation facilities are explored.
- **Circulation Concept.** A circulation concept for the corridor is presented, focusing on Sixteenth Street and the parallel east-west streets between the Mission District, Showplace Square, Potrero Hill, and Mission Bay.
- **Streetscape, landscape, and public realm improvements.** Recommendations for streetscape, landscape, and public realm improvements are presented. These improvements are integral to the project design and a necessary step towards achieving the vision for this part of the city as laid out in the Eastern Neighborhoods area plans.
- **Phasing plan.** A conceptual phasing plan for this alternative is presented at the end of this section. A more detailed funding and implementation plan will be published under a separate cover in 2012.

In section 4.5, the two other promising alternatives are summarized. It should be noted that, in the judgment of the project team, the recommended alternative is clearly the strongest concept across the range project objectives. However, these additional options are included for stakeholder review and potential inclusion as alternatives in environmental.

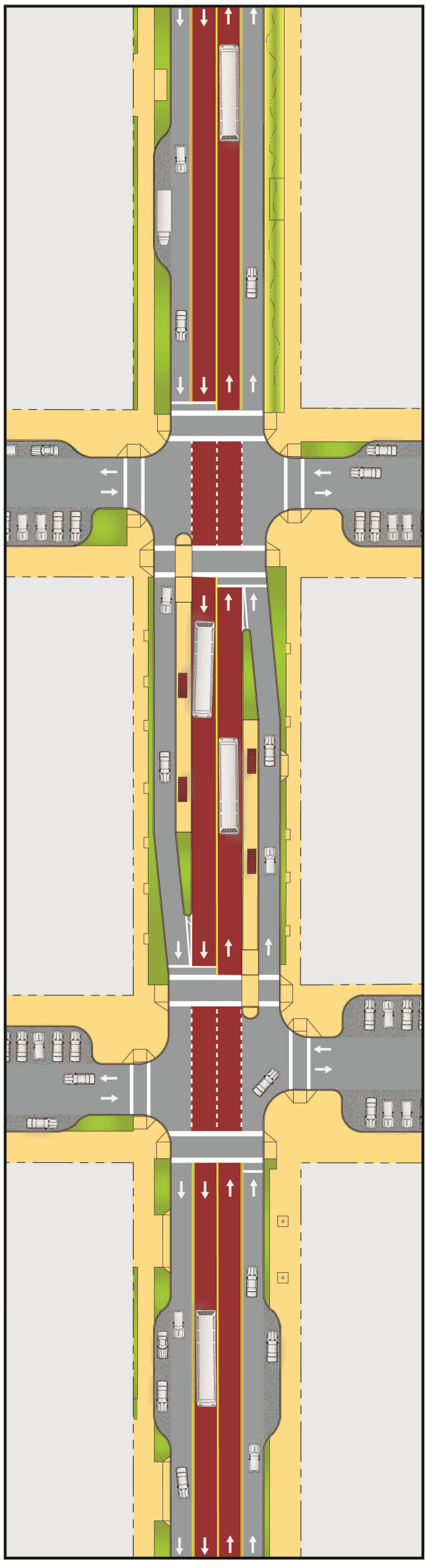
Highlights of Recommended Alternative

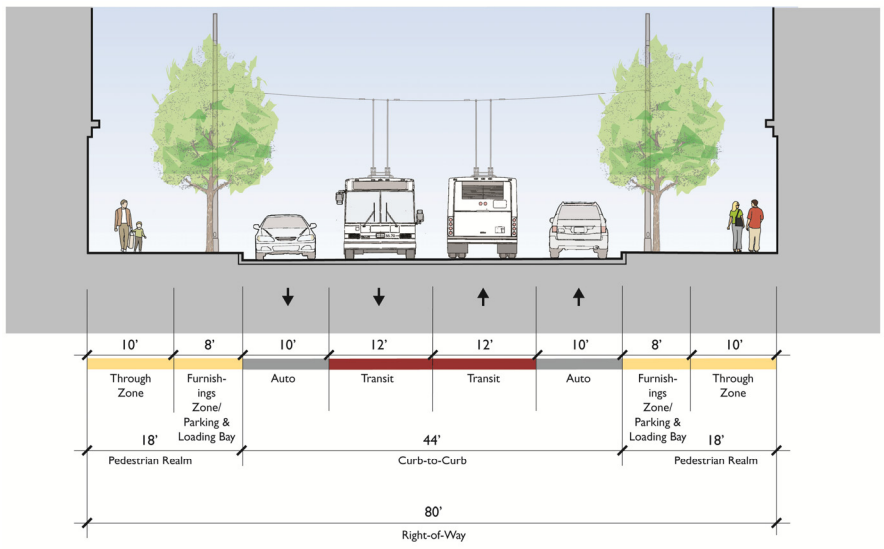
The recommended alternative would provide the strongest transit priority to the re-aligned 22 Fillmore, a service that is of vital importance to the future of the Eastern Neighborhoods as a whole. It would also substantially upgrade pedestrian conditions and improve the public realm. While it would remove a segment of bicycle lanes on Sixteenth Street, bicycles travel would be accommodated in a new high-quality bicycle facility on Seventeenth Street. While this alternative will require major public investment, it can be easily phased, with the most crucial transit priority

and pedestrian safety aspects of the project implemented first, followed by the costlier public realm improvements when funding becomes available.

Traffic impacts of the proposed transit priority treatments will be analyzed in detail as part of the TEP environmental review process. This project will maintain one lane of traffic in the eastbound direction (as today), while reducing westbound vehicle lanes from two to one. A number of factors could help offset this reduced capacity: first, a substantial increase in transit performance could reduce the demand for vehicle trips in this corridor. Second, the City can invest in reconnecting the east-west transportation grid in this part of the City, relieving some of the burden on 16th Street as the primary east-west vehicle rout. Similarly, continued efforts at Transportation Demand Management and parking management at Mission Bay could also reduce the demand for vehicle trips.

16th Street Recommended Alternative (Alternative 1, Median Transitway)





Transit operations: This proposal provides the optimum conditions for transit operations, featuring a continuous, two-lane median transitway that private vehicles could not legally enter in the priority project segment (potential treatments for other segments of 16th are discussed in the next section under the heading Circulation Concept). Future transit volumes on 16th are forecast to be quite high: 14 buses in each direction during the peak hour on Lines 22 and 33 west of Connecticut (or nearly one bus every four minutes), and 10 buses per hour on Line 22 to the east. Island stops with raised platforms enabling near-level boarding would be provided at Wisconsin Street, between Rhode Island and Kansas Streets, and at Potrero Avenue.

Vehicle circulation: 16th Street between Seventh Street and Potrero Avenue would be reconfigured to consist of one center transit-only lane and one general-purpose travel lane in each direction. Left turns would be prohibited at all intersections except Seventh Street, Vermont Street (eastbound), and San Bruno Avenue (westbound), where left-turn pockets would be provided. The reduction in vehicle capacity is forecast to increase westbound traffic congestion substantially in the future condition if no other changes are made to the network. It may be possible to replace this capacity by improving east-west connectivity elsewhere in the network, as discussed in the next section.

Bicycle conditions: Implementation of the Median Transitway alternative would be contingent on removing the existing bicycle lanes on 16th Street east of Kansas Street, replacing them with bicycle lanes on 17th Street, along with traffic calming treatments at intersections. This proposal is discussed in more detail below in the Circulation Concept section. Given the potential to provide a continuous bicycle corridor from the Castro District all the way to the Mississippi Street bicycle lanes on a street with lower forecast traffic volumes than on 16th, shifting bicycle lanes to 17th Street presents the opportunity for equal or improved bicycle facility from what is available today.

Pedestrian conditions and the public realm: This alternative includes an 18-foot pedestrian space on both sides of the street for much of the corridor. This space would be flexible – it could be used as a full 18-foot sidewalk, a landscaped section up to 8 feet in width where appropriate potentially including planter strips or double rows of trees. Wide sidewalks also provide additional opportunities for sidewalk seating. In select locations, 8-foot bays could be cut into this pedestrian space to allow for limited parking or loading on 16th Street. On blocks with bus boarding islands, the sidewalk on the bus stop side of the street would be reduced to 10 feet. Wide sidewalks at all corners would reduce pedestrian crossing distance. Crosswalks would be provided at all nonsignalized intersections.

Parking and loading: This alternative would remove the parking lanes on 16th Street between San Bruno Avenue and Potrero Avenue. It would allow for curbside loading at select locations using sidewalk cut-out bays similar to those on Market Street. Because it would maintain 90 degree parking on the cross streets (and potential convert one or more side streets from parallel parking to 90 degree parking), the loss of curb parking on 16th Street would be a relatively small share of the parking available in the corridor. The remaining parking would be managed for availability by the SFMTA's SF*park* initiative.

Cost and deliverability: The substantial benefits of this project would come at substantial cost. While construction of the median transitway (including new overhead wire, island stops, and pavement treatments) would require some expense, moving curb lines on both sides of the street would be costliest element of the project. However, this project could easily be phased: in the first phase, the median transitway and pedestrian bulb-outs could be constructed, and existing curb lines could be left in place, maintaining the parking lanes. Phase II would involve widening the sidewalks and adding additional streetscape elements and landscaping. Specific cost estimates are included in Chapter 8, Funding and Implementation.

Applicability: The SFMTA recommends that this alternative be implemented in the project segment. Further detail on this proposal is discussed in the next section.

16th Street Operations Concept (Recommended Alternative)

The recommended alternative for 16th Street is based on a few key features, including increasing transit reliability by the creation of a median transitway; extension of sidewalks; and moving bicycle circulation to 17th Street.

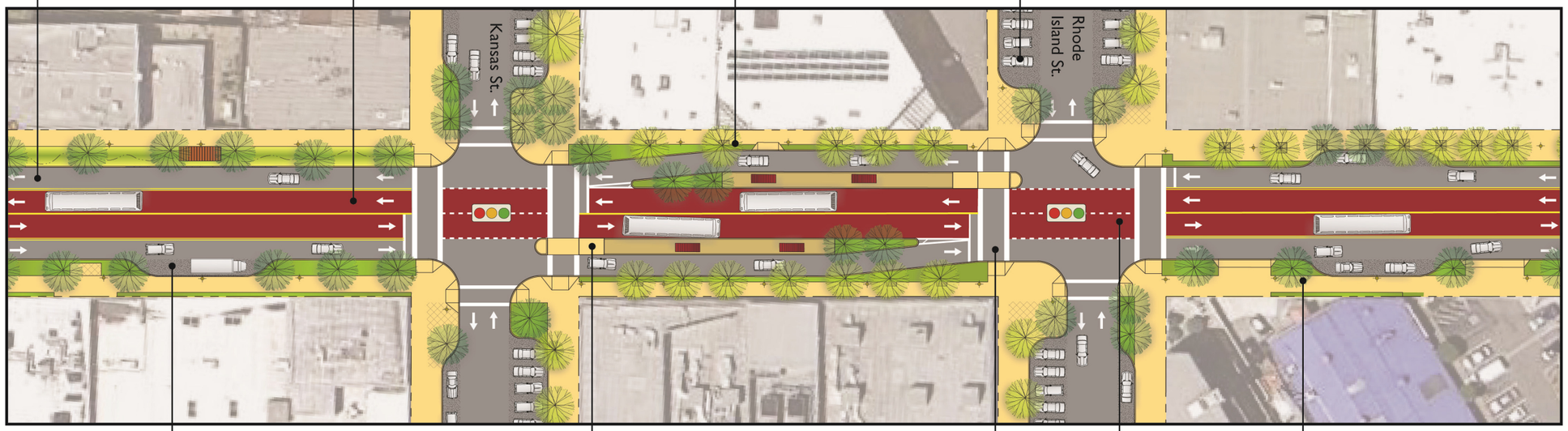
Vehicular traffic will travel in one lane in each direction. Vehicle lefts will be prohibited at most intersections, but vehicles would be able to make right turns on to and off from 16th Street. Not-in-service transit vehicles may be able to turn left where required.

The 22 Fillmore, 33 Stanyan, and potentially private shuttles will run in a median transitway in the center of 16th Street, where buses traveling in dedicated lanes and unimpeded by turning vehicles will dramatically decrease transit delays and increase reliability.

Sidewalks at transit stops will remain 10 feet wide on the stop side to accommodate the bus boarding platform.

While much of the parking on 16th Street will be removed, the maintenance of 90-degree parking on most cross streets means that a majority of the parking in the corridor will be retained. Some additional parking can be added by reconfiguring one or more cross streets for perpendicular parking.

Bike lanes will be removed from 16th Street to allow more room for transit and pedestrians. Bicycle lanes and traffic calming treatments will be added on 17th Streets.



Most parking will be removed from 16th Street, but the 18-foot wide sidewalks will allow for occasional placement of parking or loading bays. Placement of the bays will vary from block to block depending on land uses.

Passengers will board buses on median islands, raised to the level of the bus floor to speed up the boarding process. Boarding islands will be accessed via ramps rising from crosswalks. The boarding process will also be made shorter by ticket machines allowing "prepaid" boarding through all doors.

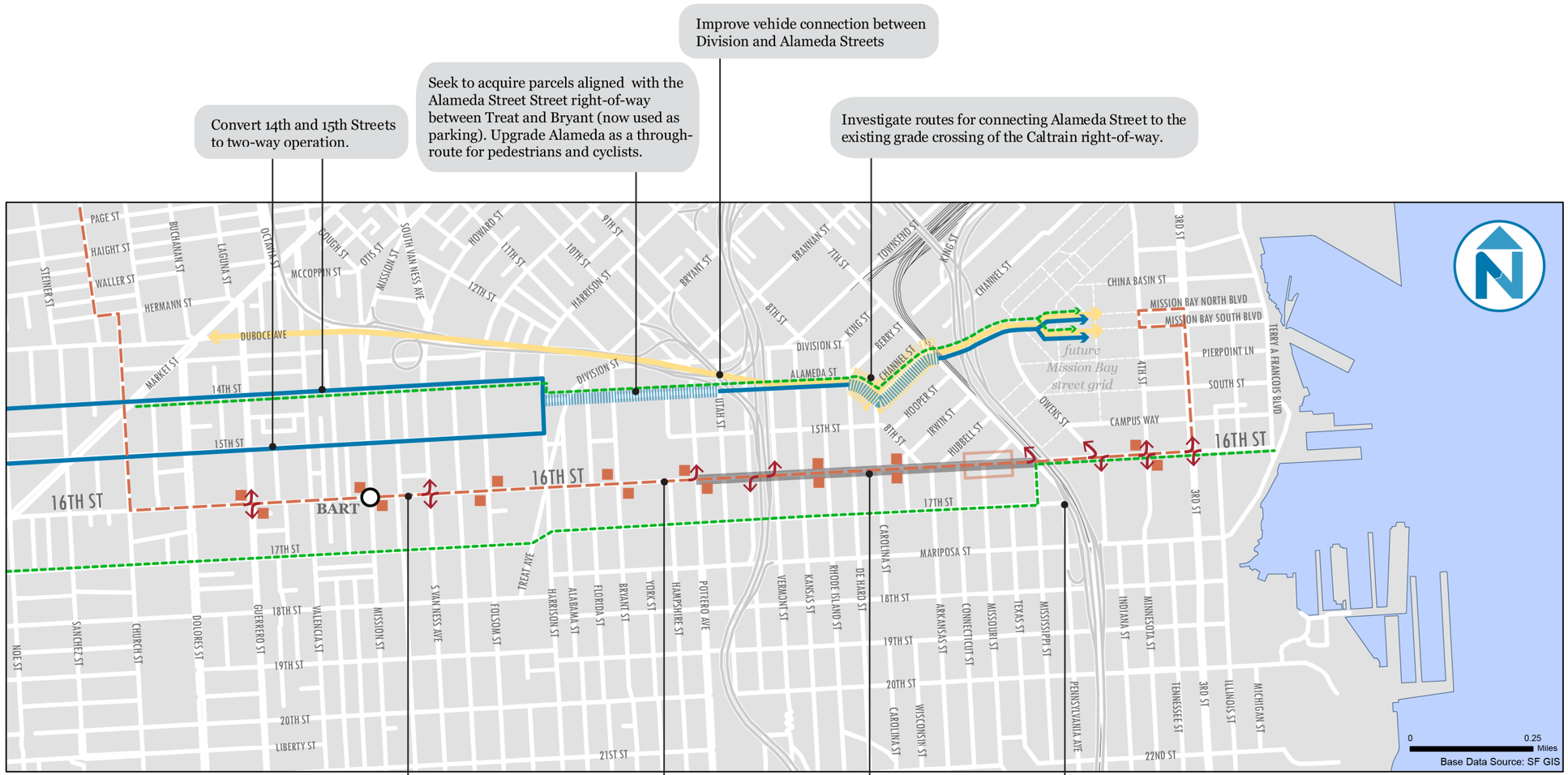
Pedestrian crossings of 16th Street will be 44 feet, approximately 25% shorter than the current condition. Crossings at the transit stops will be 53 feet, but will include an 8-foot pedestrian refuge at the boarding island.

New signals will be added Rhode island, Wisconsin, and Connecticut to protect transit and improve pedestrian connectivity.

Sidewalks along 16th Street will widen from 10 feet to 18 feet (except at and near transit stops).

50' 100'

16th Street Circulation Concept (Recommended Alternative)



This page intentionally left blank.

16th Street Corridor Circulation Concept Detail (Recommended Alternative)

This section proposes refinements to the Eastern Neighborhoods transportation networks to address the opportunities and constraints in and around the 16th Street corridor. While the proposals focus on supporting the goals of the proposed 16th Street project, they consider issues and opportunities in the surrounding corridors and the wider study area. While some of these proposed changes must be implemented at the same time as the 16th Street project, others will require further study and may be implemented later. Key elements of the proposal are discussed below. The concept is illustrated in Figure 4-3.

Transit Priority on 16th Street between Church and Third Streets

The Median Transitway treatment proposed for the Potrero to Seventh Street segment of 16th Street is part of a larger vision to provide transit priority for the full length of 16th Street, as proposed in the SFMTA's TEP. Outside of the EN TRIPS priority project segment, 16th Street transit priority could be handled as follows.

Third Street to Seventh Street

Between Third Street and Seventh Street, 16th Street would be reconfigured to consist of one center transit-only lane and one general-purpose travel lane in each direction, plus left-turn lanes at all intersections except Seventh Street and right-turn lanes eastbound at all intersections except Seventh Street, and westbound at Seventh Street. Island stops with raised platforms enabling near-level boarding would be constructed on the far side of the intersection at Fourth Street. Transit signal priority would be implemented. Bicycle lanes would be maintained.

Vehicle left turns from 16th Street will be prohibited at most intersections in the corridor. Vehicle lefts will be permitted at Vermont, San Bruno and Seventh streets. At these intersections, a left turn lane will be provided to the right of the transitway, and the turning vehicles will get a dedicated signal phase to turn across the transitway.

Potrero Avenue to Harrison Street

Between Potrero Avenue and Bryant Street, 16th Street would be reconfigured to consist of one center transit-only lane and one general-purpose travel lane in each direction. Left turn pockets would be provided in the eastbound direction at Potrero Avenue and at the central entrance to Potrero Center, and a right turn pocket would be provided in the westbound direction at Bryant Street. A mid-block traffic signal would be introduced at the central entrance to Potrero Center. Existing stops would be removed and island stops would be constructed far-side at Potrero Avenue and at Bryant Street. Curbside parking and loading would be removed from the south side of the street. Between Bryant and Harrison Streets, the median transitway would continue, with parking retained on both sides of the street.

Harrison Street to Church Street

West of Harrison Street, a different roadway configuration and different land uses introduce new constraints. There are 15-foot sidewalks on both sides of the street, which narrow the available right-of-way to 50 feet from curb-to-curb. In addition, between South Van Ness and Guerrero, 16th Street is a busy neighborhood commercial district with heavy pedestrian volumes and a

variety of small-scale retail businesses. This environment creates a higher priority for on-street parking and loading. It also suggests that there may be a greater advantage in having fewer than four lanes to create an improved pedestrian environment. There are a number of possible treatments for robust transit priority in this segment. They include:

- **Continue the median transitway.** A modified median transitway could be implemented between Bryant and Church Street. The 50-foot curb-to-curb right-of-way in this segment is sufficient to provide one outside vehicle lane in each direction, and one center transit lane in each direction while retaining a parking lane along the north side of the street. The parking lane would be removed on the south side of the street, and on both the north and south sides where necessary to make room for transit boarding islands. One or more dedicated loading spaces could be reserved on each block in the remaining parking lane, and loading spaces could also be provided near the corner on cross streets and alleys to serve business on the south side of the street. While this treatment would reduce parking access to this commercial district, this loss of parking would be balanced by substantially improved transit access. This treatment has the disadvantage of providing relatively narrow transit lanes, and of moving vehicle traffic immediately adjacent to the curb, which would reduce pedestrian comfort. Finally, it would introduce four lanes in the roadway, a less than ideal condition for a pedestrian-oriented retail corridor.
- **Provide side-running transit lanes.** During off-peak periods, the current configuration would be retained, with three mixed-flow lanes and parking lanes on both sides of the street. During peak periods, one vehicle lane in each direction would operate in the center of the street, and space for two side-running transit lanes would be provided by removing parking from one side of the street using a tow-away parking lane. While this treatment has the advantage of retaining all existing parking during off-peak periods, it provides weaker transit priority than any of the other options listed here, because buses would still have to wait behind right-turning vehicles in an environment where high pedestrian volumes can create long waits for right turns.
- **Provide a single median transit priority lane.** Such a treatment would be similar to the median queue jump concept presented in Alternative 4. However, rather than dividing the queue jump lane by direction at mid-block, it would allow buses moving in either direction to use the transit lane for up to the full length of the block to bypass traffic. Operator judgment would prevent buses travelling in opposite directions from using this center lane at the same time (as it does for vehicles using a two-way center left turn lane). Alternatively, a signal switching system (similar to those used in a single-track railroad segment) could be used to physically prevent buses traveling opposite directions from using the center lane at the same time in the same segment. Using a single median lane to provide transit priority would have the advantage of allowing 16th Street to retain wide sidewalks and on-street parking and loading on both sides of the street through this commercial district, while confining the roadway to just three lanes rather than four, which would benefit pedestrians.
- **Develop an area-wide plan to eliminate congestion-related delay on 16th Street.** Rather than providing buses with a dedicated right-of-way, a comprehensive area-wide plan using signal management, traffic diversion, perimeter traffic bottlenecks, and transit queue jumps at those bottlenecks could be used to reducing congestion delay

enough to speed transit through this segment. This strategy would have to be implemented with attention to traffic calming on 14th, 15th, and 17th Streets.

While a number of options are available, the long-term goal for this segment will be to provide an unobstructed path of travel for transit the full length of the 16th Street corridor, creating a truly "no compromise" rapid transit corridor spanning the Eastern Neighborhoods. The TEP environmental review process will evaluate options for near-term transit priority in this segment.

17th Street Bikeway

Currently, city Bicycle Route 40 runs from Third Street west on 16th to Kansas, where it turns south for one block before continuing west along 17th Street. With the exception of the single block of Kansas, it features continuous Class II on-street bicycle lanes from Mission Bay through Potrero Hill to Potrero Avenue (then again from Treat to Church Street).

In the recommended 16th Street concept, bicycle lanes east of Kansas would be removed from 16th and replaced with bicycle facilities on 17th Street, 470 feet to the south. There are two potential treatments for 17th Street between Kansas and Seventh, both worth exploring further.

Bicycle lanes. In this configuration, existing sidewalks and parking lanes would remain. Bicycle lanes would be striped on both sides of the street, leaving the remaining roadway available for two-way vehicle circulation. On the block between Kansas and De Haro Streets, where sidewalks widen to 12 feet, parking would be removed on one side of the street to enable bicycle lanes in both directions. Traffic calming measures should be applied the full length of this segment, including conversion of two-way stop intersections to four-way stops and addition of corner bulb-outs. Corner bulb-outs will be particularly important because the proposed left-turn restrictions on 16th Street will cause some eastbound drivers to divert onto 17th Street for one block. Narrowing these intersections and providing tight turning radii will encourage these drivers to navigate 17th Street slowly and safely.

Bicycle Boulevard. An alternative to striping bicycle lanes on 17th Street would be to implement bicycle boulevard treatments. Rather than dedicated lanes, cyclists would be encouraged to use the full roadway. Traffic calming, signage, and greening treatments would be applied, and traffic would be diverted from 17th Street at one or more locations. De Haro Street and/or Vermont Street present potential locations for traffic diversion.

Bicycle lanes currently extend south from 16th Street on Mississippi Street. In the near term, Bicycle Route 40 will transition from 17th to 16th Street at this point, turning to cross the Caltrain right-of-way and into Mission Bay on 16th Street. In the future, depending on the configuration of Caltrain and California High Speed Rail, the 16th/Seventh/Mississippi intersection may be challenging for cyclists to navigate. When the configuration of California High Speed rail is determined, the City should investigate adding a pedestrian and bicycle crossing of the Caltrain right-of-way into Mission Bay at the terminus of 17th Street.

On-Street Parking Management

The EN TRIPS 16th Street project will remove continuous parking lanes from both sides of 16th Street between Potrero and Seventh Street to make additional space for transit and pedestrian facilities, while maintaining parking or loading bays in strategic locations. Parking and loading needs for 16th Street will continue to be served by parking on the cross streets, most of which have 90-degree parking, so that the loss of parking on 16th Street represents a relatively small share of the overall parking supply in the corridor as a whole.

While a majority of the corridor's parking supply will be maintained, it is likely that in peak times and places, demand for free parking will exceed supply (as it does in many parts of San Francisco). It will be essential to manage parking to ensure availability, both to ensure convenient access along the corridor and so that additional vehicle traffic is not added to 16th Street by drivers circling in search of on-street parking.

Under the SF*park* Mission Bay Parking Management Strategy[1], the SFMTA has proposed to install parking meters that accept credit cards along 16th Street and each of its cross streets between Carolina and Mississippi Streets, on De Haro Street north of 16th, and on 17th Street between Carolina and Pennsylvania. These changes will support implementation of the EN TRIPS 16th Street project (although most of the meters on 16th Street itself will eventually have to be removed).

In addition to these already-proposed changes, as part of the implementation of the EN TRIPS project, SF*park* should continue to monitor parking occupancies along the full length of the 16th, and 17th Street corridors and cross streets, adding additional parking meters as necessary to ensure availability.

Grid Repair

Multiple barriers interrupt the east-west street network in the areas surrounding the 16th Street corridor. These include hilly terrain, US 101, the Caltrain right-of-way and I-280. Several streets are interrupted by large parcels near Harrison Street, where the Mission District Street grid meets the smaller Potrero Hill grid. Because 16th Street is the only continuous through-route between the Mission District and Mission Bay, it carries a large share of the east-west traffic through this part of the Eastern Neighborhoods. The demand for east-west travel in this part of the City will grow as intensity of land uses increase in the north-east Mission District, Showplace Square, and Mission Bay.

An effort to repair some of the breaks in this grid would have multiple benefits, providing the potential for alternate routes for all modes of transportation. Because the proposed project for 16th Street would remove westbound vehicle capacity on 16th and restrict left turns, providing alternate routes for vehicle travel would help support the project.

[1] http://sfpark.org/wp-content/uploads/2011/11/Draft-Mission-Bay-Parking-Management-Strategy-10.28.11.pdf

In general, the City should explore opportunities to repair the grid as development occurs in the Eastern Neighborhoods over the next 20 years. As large parcels are redeveloped at higher densities, the SFMTA and the Planning Department should work together (in collaboration with developers and property owners) to restore connections in the street grid. Policies in the Eastern Neighborhoods area plans Transportation and Built Form sections encourage breaking up larger parcels to allow for creation of new streets or mid-block alleys, and the Urban Mixed Use zoning category introduced under the Eastern Neighborhoods plans requires that redevelopment of large parcels include the addition of mid-block alleys under some circumstances. [2] The SFMTA and the San Francisco Planning Department should coordinate to ensure that these new routes are established in places where they will have the most positive impact on circulation.

The circulation concept illustrated in Figure 4-3 lays out a feasible scenario for establishing new east-west vehicle, bicycle, and pedestrian and bicycle paths of travel through the Eastern Neighborhoods to complement the transit priority treatment on 16th Street.

Potential vehicle route

A new east-west vehicle path of travel could be established as follows.

- *Upgrade the connection between Division Street and Alameda Street*. Consider the potential for a new right-of-way through the existing parking under interstate 80 at this location to create a smooth transition.
- *Investigate routes for connecting Alameda Street to the existing grade crossing of the Caltrain right-of-way, just south of Channel Street*. Once east of the Caltrain tracks, vehicles could proceed east on the planned Mission Bay Boulevard. [3]

Together, these adjustments would allow for an attractive alternate path of travel to Showplace Square and Mission Bay for eastbound vehicle trips beginning in the north Mission District and all points north and west.

Potential pedestrian and bicycle routes

A complimentary east-west vehicle path of travel for bicycles and pedestrians could be established as follows:

- *Convert 14th and 15th Streets in the Mission district to two-way operations*. In the Mission District, the City should investigate converting the existing one-way segments of

[2] San Francisco Planning Code SEC. 270.2, Special Bulk and open space requirement: Mid-block alleys in large lot development in the Eastern Neighborhoods Mixed Use, South of Market Mixed Use, C-3, C-M, and DRT Districts.

[3] Because Channel Street does not currently align cleanly with the existing grade crossing, connecting Channel Street Mission Bay Boulevard may require limited re-parceling of surrounding land. However, it would not require condemning any existing buildings.

14th and 15th Streets to two-way operation (14th is now one-way between Market and Folsom Street, and 15th is now one-way between Guerrero and South Van Ness). Both streets could be converted to one lane in each direction for vehicles. Both 14th and 15th Streets could be traffic-calmed and managed as neighborhood streets. On 14th Street, the existing eastbound bicycle lane can be maintained on a two-way street, and sharrows added in the westbound direction, creating a new two-way bicycle route in the north Mission (this recommendation also supports implementation of the Folsom and Howard Street circulation proposal discussed in Chapter 5.)

- *Establish a pedestrian and bicycle connection from 14th and 15th Streets to Alameda Street and points east.* Both 14th and 15th Streets now terminate at Harrison Street, one half-block north and south of Alameda Street, which is then further interrupted by two private parking lots associated with large parcels, before continuing west. In the near term, the City should seek to acquire the portions of these parcels that align with the Alameda Street right-of-way to create an upgraded pedestrian and bicycle connection between Harrison and De Haro Streets. Alameda Street should be maintained as a safe, comfortable, and convenient route for cyclists, pedestrians, and drivers. Combined with the proposal described above, the connection from 14th and 15th Streets to Alameda Street would allow an attractive, safe, and direct pedestrian and bicycle connection to continue east to Mission Bay and the waterfront.

- As development occurs, redevelopment of large parcels may allow for establishment of new rights-of-way such that 14th and 15th Streets also connect through for pedestrians, cyclists, and possibility vehicles as well. The open space requirements in the Eastern Neighborhoods UMU zoning, which require large parcels to be broken up with new rights-of-way when redeveloped, will facilitate progress toward this goal.

How will private shuttles operate in the 16th Street corridor?

There are numerous private shuttle services operating in the Eastern Neighborhoods study area. These include commuter shuttles connecting downtown with Showplace Square and Mission Bay, and inter-city shuttle connecting San Francisco neighborhoods with employment centers on the Peninsula. Most important for the 16th Street project, the University of California San Francisco operates frequent shuttle service in the 16th Street Corridor.

The UCSF shuttle system provides service between the 16th and Mission BART station and UCSF Mission Bay Campus every 15 minutes from 6 AM to 7:30 PM. The University's Blue, Grey, and Gold Lines also connect its Parnassus and Mission Bay campuses. The level of shuttle service in is likely to grow in future years as Mission Bay develops further.

As overall travel demand in the corridor grows, private shuttles may have an important role to play in reducing vehicle travel demand in the corridor. Once a transitway is constructed, private shuttle services may also be able to make use of this facility. However, this permission would require a citywide policy determination by the SFMTA.

Important considerations include the following:

- Speed and reliability of the 22 Fillmore will be prioritized in the corridor. The City will work with private shuttle operators, including UCSF, to ensure that the number of shuttle vehicles, their routes, and their stops do not conflict with SFMTA transit operations.

- If they do not conflict with 22 Fillmore service, shuttles operating on 16th Street may be able to travel in the transitway. While they would have to wait behind stopping SFMTA buses, they would be protected from traffic congestion.

- Transit signal priority for buses in the transitway may rely on the signalization system being able to detect approaching buses. Depending on the system for transit signal priority, it may be necessary to place transmitters aboard private shuttles wishing to operate in the transitway.

16th Street Streetscape and Landscape Concept (Recommended Alternative)

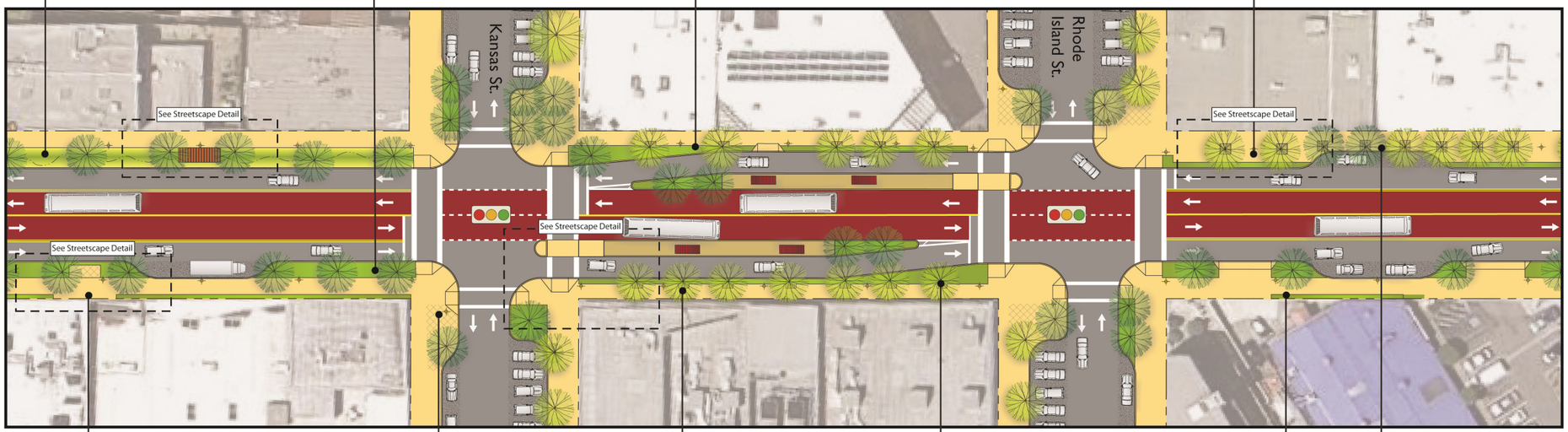
The Streetscape/Landscape Concept for 16th Street relies on the application of four different general Approaches to the streetscape and landscape depending on the particular character and function of the block. The Approaches range from a wide hardscaped area with trees in grates appropriate for areas with lots of pedestrians and retail and restaurant storefronts to a wide stormwater conveyance swale appropriate for the least active areas of the corridor. The Streetscape/Landscape Concept also relies on the incorporation of existing trees into the new streetscape design. The Approaches draw from the design guidance provided by the City of San Francisco Better Streets Plan.

Streetscape Type 3:
Full swale with boardwalk "bulb-outs" into swale, which can provide opportunities for informal pedestrian activity, bicycle parking, or other appropriate use.
Appropriate for the least active street frontages where parking or loading not needed

Streetscape Type 2:
Green corridor with landscape on both sides of sidewalk.
Appropriate for less or moderately active street frontages such as design showrooms and offices, as well as parking lots or loading areas.

Streetscape Type 4:
Landscape buffer along limited width sidewalks.
Appropriate for block faces where transit stop has restricted sidewalk width

Streetscape Type 1:
Hardscape, trees with grates, and landscape buffer
Appropriate for most active frontages such as retail or restaurant storefronts



Where building entry or active use is present, landscape strip can be broken and pedestrian space can be extended into the wider landscape area.

Bulb-outs on side streets provide a variety of public open space opportunities that will depend on the adjacent use and community needs, such as seating areas, rainwater gardens, and small community gardens.

The narrower sidewalks (10 feet) can accommodate both a 3-foot landscape strip buffering pedestrians from moving traffic and trees with grates placed over the portion of the tree pit that is in the sidewalk's through zone.

Existing trees can be accommodated in the new streetscape in most cases.

2-foot landscape strip along less active frontages can accommodate grasses or small shrubs, softening a blank building wall, separating the sidewalk from a parking or loading area, or buffering uses in a building.

New trees can be added to complete the pattern of existing trees.

50' 100'

LEGEND

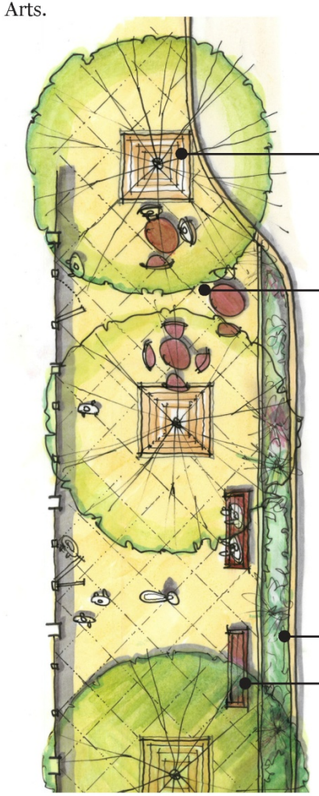
Existing tree | New tree | Public space opportunity | Planter strip | Permeable paving | Tree grate | Pedestrian Light

16th Street Streetscape and Landscape Concept Detail (Recommended Alternative)

Potential locations for this streetscape approach

Streetscape Treatment Type: *Urban Storefront*

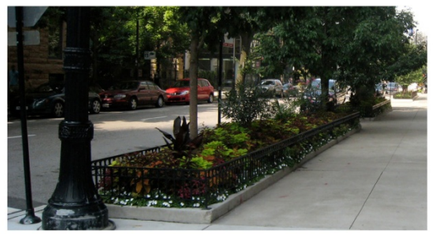
This treatment type is appropriate for 16th Street's most active frontages, such as retail or restaurants, where public entrances are frequent and some activity can extend into the pedestrian realm. Considering existing land uses in the project area, this streetscape approach is most appropriate in the three most pedestrian-intensive areas around Rhode Island Street, Potrero Avenue, and Wisconsin Street near California College of the Arts.



Existing trees are integrated in the existing 10-foot sidewalk (as shown). Rows of new trees would be planted closer to the curb. Tree pits would be covered with tree grates to expand the space for through movement.

The 16-foot wide hardscape area accommodates a variety of activities, including cafe seating and street furnishings where desired.

In absence of parking, a 2-to-3-foot planting strip creates a buffer for pedestrians from moving traffic and introduces a greening feature. The buffer can be reinforced by use of a short fence.



Alternately, the buffer planting area could be configured as a stormwater planter.

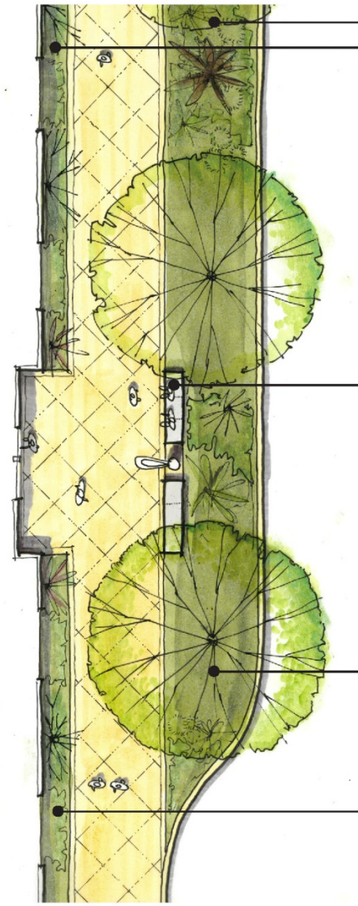
Benches provide an amenity for more active areas of the 16th Street corridor.

16th Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

Potential locations for this streetscape approach

Streetscape Treatment Type: *Green Corridor*

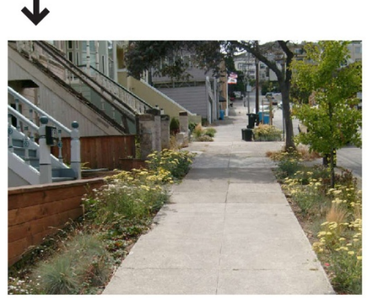
This treatment type is appropriate for less or moderately active street frontages such as design showrooms, offices, and multifamily residential buildings, which are likely to have significantly less frequent entries as compared to retail frontages. This approach is also appropriate for frontages along parking lots or other use areas dominated by cars or trucks. The *Green Corridor* treatment type is applicable to significant stretches of 16th Street located between the active pedestrian areas and transit stops.



Seating, pedestrian lighting, and other amenities can expand into the planted area to highlight and serve building entries.

Landscape in a 2-to-3-foot strip along the building facade can highlight and complement the architectural features of buildings.

The 18-foot pedestrian realm allows for landscape strips on either side of an 8-foot sidewalk to create a "green corridor" effect that buffers pedestrians from moving traffic, animates and softens the street's building facades, or screens vehicular use areas such as parking lots.



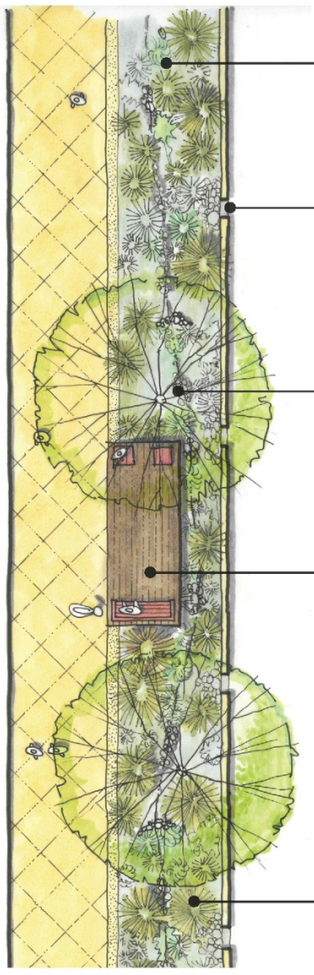
The 8-foot landscape strip with trees and shrubs or grasses/groundcovers can be constructed as a standard landscape strip or a stormwater planter.

16th Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

Potential locations for this streetscape approach

Streetscape Treatment Type: *Swale*

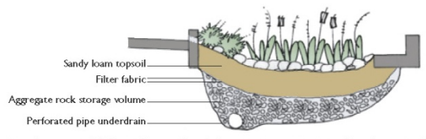
This treatment is appropriate for 16th Street's least active street frontages where parking or loading are not needed and roadway, surrounding streets, and utility configuration allows for the integration of a block-long bioswale.



Inlets funnel stormwater runoff through the curb into the swale for treatment and conveyance. Bulb-outs at the ends of the block can be configured as rain gardens to complement the swale.

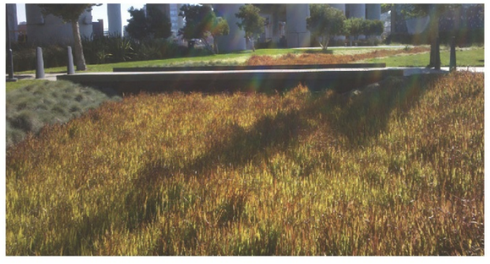
Filterstrips along the sidewalk edge, check dams, underdrains, and other details should be designed following most recent BMPs for bioswales.

Wooden "decks" can extend over the swale from the sidewalk to provide small public spaces with seating.



Swales would be planted with trees, grasses, shrubs, reeds, rushes, and other plants that can withstand dry periods and inundation.

10-foot wide bioswale acts as stormwater treatment and greening feature and buffers pedestrians from moving traffic.

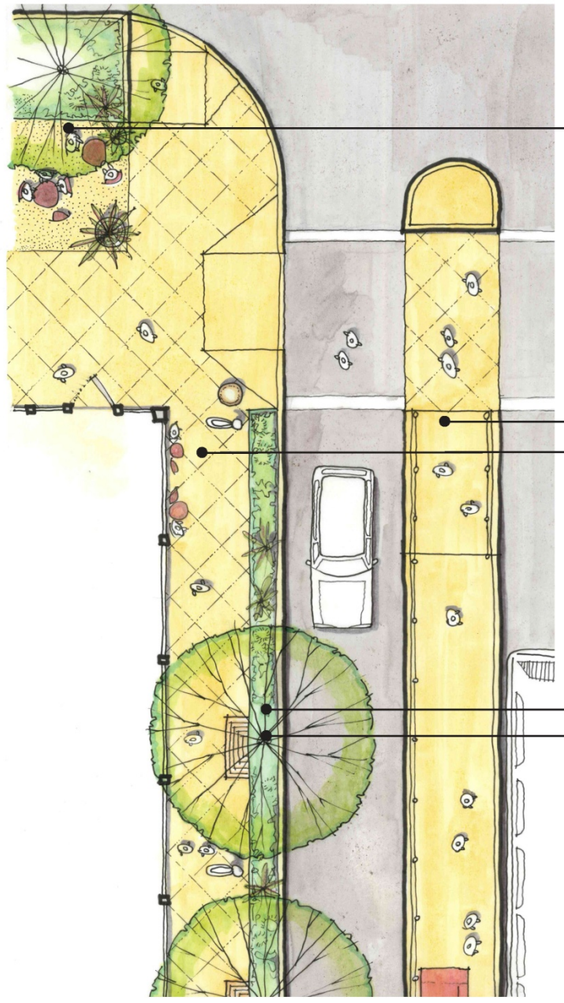


16th Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

Potential locations for this streetscape approach

Streetscape Treatment Type: *Transit Stop*

This treatment type is specific to block faces where transit stops restrict the width of the pedestrian realm to as little as 10 feet.



New bulb-outs on cross streets provide significant opportunities for creating small-scale public spaces. This is an example of how the cafe on the corner can use the adjacent space in the bulb-out for seating.

Boarding platforms are accessed by a ramps extending from pedestrian refuges.

The 7-foot through zone accommodates seating or display of merchandise along building frontages.

A planting strip creates a buffer for pedestrians from moving traffic and introduces a greening feature.

Trees, existing or new, can be integrated into this planting strip by adding a 5 foot-by-2-foot tree grate or other walkable and permeable surface without diminishing the effective sidewalk width.

16th Street Corridor Project Phasing

It is recommended that the 16th Street project be implemented in phases. In the first phase, the transitway and pedestrian bulb-outs could be constructed to provide the most crucial transit priority and pedestrian safety treatments at reasonable cost. Existing curb lines could be left in place, and parking lanes could be maintained. Bicycle facilities would be added on 17th Street and removed from 16th, and traffic calming would be implemented on 17th. It is recommended that proposed transit priority treatments also be applied between Church and Potrero during this phase.

A second phase would involve widening the sidewalks and adding additional streetscape elements and landscaping to upgrade 16th Street to a "green connector" street as funding becomes available.

Transitway treatments in Mission Bay could be implemented as development warrants. Over the long term, the proposed circulation changes and grid repair proposals should be implemented as opportunities arise. Phasing by element is outlined below. Timeframes, cost estimates, and funding sources for these improvements will be presented in the EN TRIPS Funding and Implementation Plan.

Figure 4-3 EN TRIPS 16th Street Priority Project Phasing

	Phase 1	Phase 2	Phase 3
Transitway	Install overhead wire from Kansas street to Mission Bay		
Transitway	Construct median transitway between Potrero and Seventh. (Re-stripe street and color pavement, add bus stops with raised transit boarding islands and pre-paid fares at Potrero, Rhode Island, Wisconsin.		
Signals	Retrofit all signals for transit priority		
Pedestrian/ Public realm	Install pedestrian bulb-outs at all 16th Street intersections between Potrero and Seventh	Remove parking lanes and widen sidewalks to 18 feet between Potrero and Seventh. Add landscaping and pedestrian amenities.	
Bikes	Stripe bike lanes on 17th from Kansas to Mississippi.		
Bikes	Install bulbs to knock down intersections for traffic calming from Kansas to Mississippi		

Figure 4-4 EN TRIPS 16th Street Corridor Associated Circulation Changes—Project Phasing

	Phase 1	Phase 2	Phase 3
Transit	Transit priority treatments on 16th Street between Church and Potrero. (Median Transitway between Potrero and Bryant, elsewhere various queue jump arrangements)		
Transit		Median transitway in Mission Bay	
Transit	Divert the 10 Townsend so that it intersects with 16th Street at Seventh		
Grid repair		Two-way 14th and 15th Streets between Guerrero an Folsom	
Grid repair	Connect Alameda Street between Treat and Bryant to create and new bicycle and pedestrian route.		
Grid repair			Create vehicle connection between Division and Alameda
Grid repair			Connect Alameda to the existing crossing of Caltrain ROW
Grid repair			Add 17th Street ped/bike crossing of Caltrain ROW.

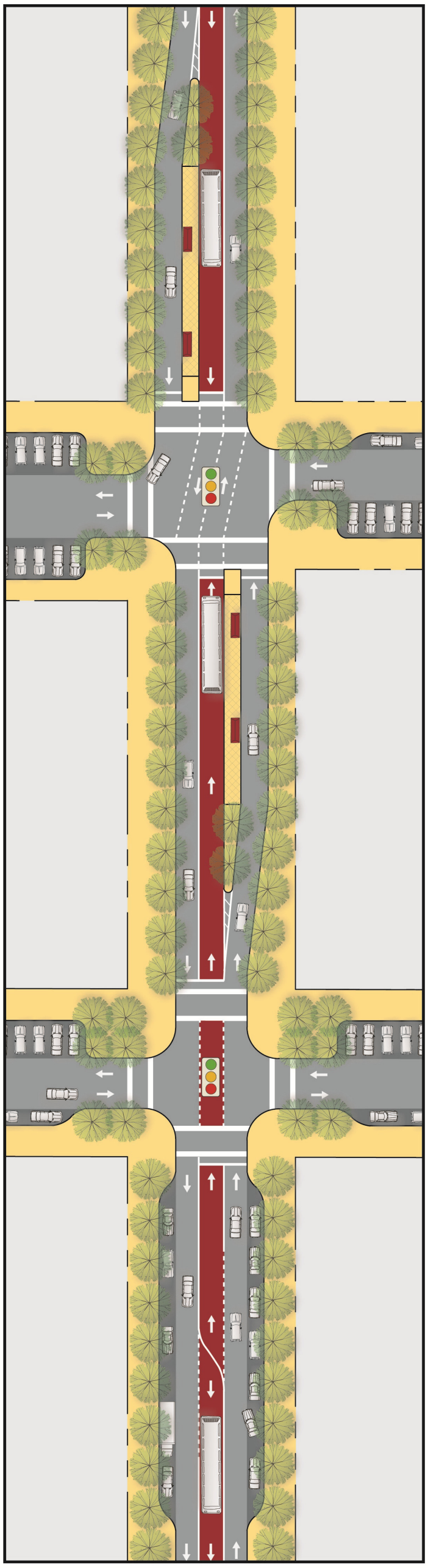
4.5 OTHER PROMISING ALTERNATIVES

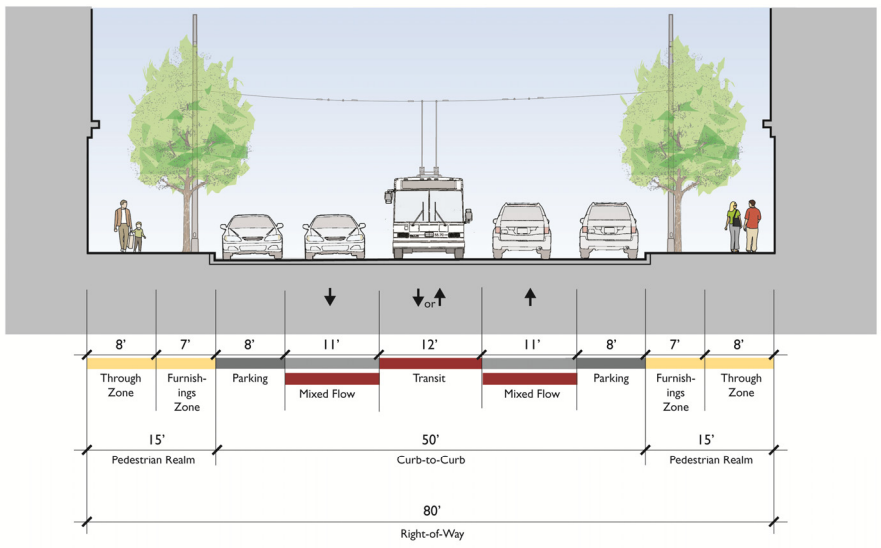
In addition to the recommended alternative described above (Alternative 5), two other concepts were selected for additional analysis, design, and community input. While the recommended alternative is clearly the strongest in judgment of the project team, these additional options are included for stakeholder review and potential inclusion as Alternatives in environmental analysis. Key differences between these concepts and the recommended alternative are summarized below.

- **Alternative 4: Center Queue Jump**. This alternative seeks to provide some of the benefits of a median transitway while requiring less space by including a center lane that could be used for "queue jump" pockets. Buses would operate primarily in the travel lane, only merging into transit-only lanes, then back into travel lanes at bus stops and otherwise as necessary to bypass traffic. This concept provides less robust transit priority than the full median transitway design. However, space saved by using only one lane for the transitway could be used to provide wide sidewalks while still maintaining continuous parking lanes.
- **Alternative 3: Green Median.** The most distinctive feature of this alternative is a 6-foot landscaped median in the center of the street, which would enhance the appearance of the street will providing a refuge for crossing pedestrians. It also includes 15-foot sidewalk on both sides of the street. This concept provides transit-only lanes on the sides of the street and transit signal priority. While this configuration offers more protection from traffic than mixed flow lanes, it is less robust than the median transitway, because vehicles can legally enter the transit lanes when turning right.

This page intentionally left blank.

Alternative 4. Center Queue Jump and Parking





Transit operations: This alternative seeks to provide the benefits of a median transitway while requiring less space by including a center lane that could be used for "queue jump" pockets. Buses would operate primarily in the travel lane, only merging into transit-only lanes, then back into travel lanes at bus stops and otherwise as necessary to bypass traffic. Transit boarding islands would be provided at the near side of intersections. While buses traveling both directions would make use of the queue jump lane, the lane would be physically divided at mid block, so at no point would it be possible for a head-on collision to occur. Buses would be provided with an advance phase at signals allowing them to bypass traffic queues. Traffic analysis conducted on the project segment suggests that at some westbound intersections during the PM peak, vehicle queue would be longer than the queue jump lane, which would cause transit delays.

Intersection in Paris featuring a center transit queue jump lane.

Vehicle circulation: As in the other alternatives, this project would remove a westbound travel lane, reducing capacity for private vehicles to one lane in each direction. This change is forecast to increase westbound traffic congestion substantially in the future condition if no other changes are made to the network. It may be possible to mitigate this impact by improving east-west connectivity elsewhere in the network, as discussed in the next section ("associated circulation changes").

Bicycle conditions: As in the other alternatives, implementation of the median queue jump project would be contingent on a policy decision to remove the existing bicycle lanes on 16th Street east of Kansas Street, replacing them with bicycle lanes on 17th Street, along with traffic calming treatments at intersections.

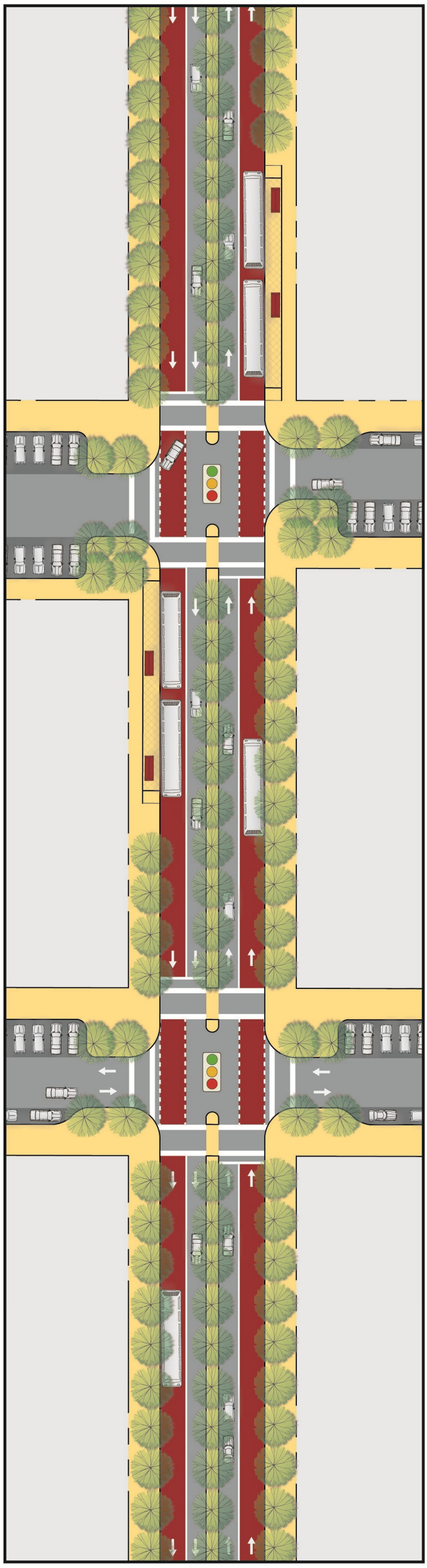
Pedestrian conditions and the public realm: This alternative includes 15-foot sidewalks on both sides of the street in additional to parking lanes. On blocks with bus boarding islands, parking lanes would be dropped and sidewalks would be widened to 22 feet. Wide sidewalks at all corners would reduce pedestrian crossing distances to just 34 feet.

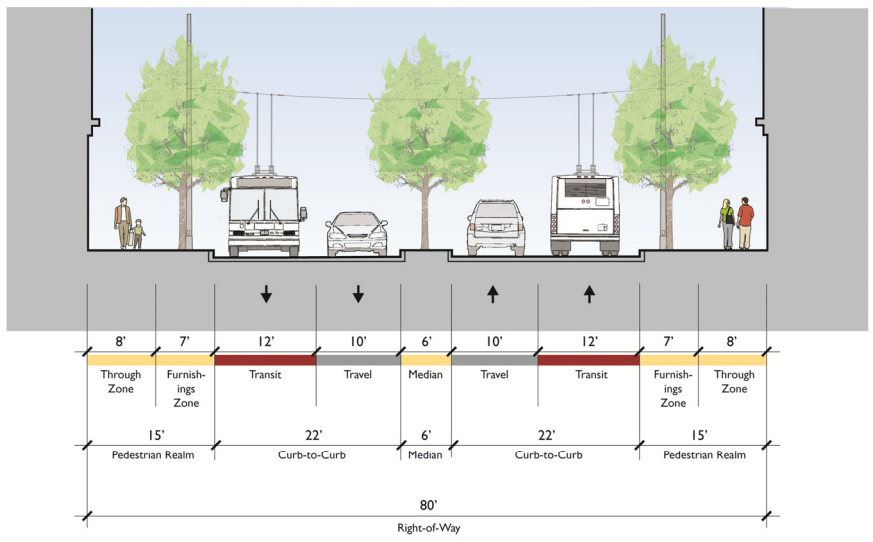
Parking and loading: This alternative would maintain the existing parking lanes except on blocks with bus stops where parking lanes would be dropped to allow for boarding islands. Parking would be managed for availability through the SFMTA's SF*park* initiative.

Cost and deliverability: As in the other proposals, the major costs of this proposal would include sidewalk widening and construction of the transitway, including new boarding islands and overhead wire. In addition, new signalization systems would have to be developed to enable the queue jump signal priority to work as intended. Because this arrangement has not yet been applied in San Francisco, it would require additional testing by City agencies.

Applicability: Traffic analysis conducted on the project segment suggests that at some westbound intersections during the PM peak, vehicle queue would be longer than the queue jump lane, which result in transit delays. It is therefore not recommended for implementation as described. However, an alternative configuration that provides buses traveling either direction to use the single transit lane the full length of the block may be a feasible treatment for 16th Street between Bryant and Church. This option is discussed in more detail in the 'Circulation Concept Detail' section.

Alternative 7. Green Median





Transit operations: This alternative provides transit-only lanes on the sides of the street and transit signal priority. While this configuration offers more protection from traffic than mixed flow lanes, it is less robust than the Median Transitway, because vehicles can legally enter the transit lanes when turning right. It is important to note that, unlike side-running transit lanes in downtown San Francisco, transit vehicles in this configuration on 16th Street would not be further delayed by vehicles entering and exiting adjacent parking lanes.

Vehicle circulation: As in the other alternatives, this project would remove a westbound travel lane, reducing capacity for private vehicles to one lane in each direction. This change is forecast to increase westbound traffic congestion substantially in the future condition if no other changes are made to the network. It may be possible to mitigate this impact by improving east-west connectivity elsewhere in the network, as discussed in the next section ("associated circulation changes"). All of the alternatives would also restrict left turns at most intersections.

Bicycle conditions: As in the other alternatives, implementation of this concept would be contingent on removing the existing bicycle lanes on 16th Street east of Kansas Street, replacing them with bicycle lanes on 17th Street, along with traffic calming treatments at intersections.

Pedestrian conditions and the public realm: The most distinctive feature of this alternative is a 6-foot landscaped median in the center of the street, which would enhance the appearance of the street will providing a refuge for crossing pedestrians. It also includes 15-foot sidewalk on both sides of the street.

Divisadero Street Green Median

Parking and loading: This alternative would remove the existing parking lanes. Unlike the Median Transitway concept, this alternative does not allow for maintenance of parking and loading bays. Remaining parking on side streets would be managed for availability under SFMTA's SF*park* initiative.

Cost and deliverability: The major costs of this proposal would include sidewalk widening and construction of the median. Median landscaping would also require ongoing maintenance.

Applicability: Because the median transitway project offers superior transit priority, this alternative has not been recommended for the project segment. However, further exploration of this concept in other parts of the 16th Street corridor is warranted.

5 FOLSOM AND HOWARD STREET CORRIDOR

5.1 ISSUES AND OPPORTUNITIES

Folsom and Howard Streets are major arterials in the South of Market area, running north-east and south-west between the Embarcadero and the Mission District. For most of this distance, they function as a one-way couplet carrying large volumes of vehicles traveling during peak periods. Local transit service operates eastbound on Folsom Street with westbound service provided on Harrison Street.

Folsom Street has an important community role in the western South of Market. Already home to much of the neighborhood's night life, it is envisioned as an emerging daytime neighborhood commercial district between Sixth and Ninth Streets. On the last Sunday in September, the Folsom Street Fair draws many thousands of people to the neighborhood.

The Eastern Neighborhoods area plans call for redesigning Folsom Street as a "Civic Boulevard," and improving Folsom was specified as a priority project by the San Francisco Board of Supervisors. The Western SOMA Community Plan also identifies the western segment of Folsom Street as a priority for improvement. Howard Street is included in this discussion because it has many of the same transportation challenges, and because the two streets work together as a pair, so that changes to Folsom may require changes to Howard.

The Folsom/Howard corridor is made up of four distinct segments. They include

- **The Embarcadero to First Street.** In this segment, both Folsom and Howard Streets are two-way for vehicle traffic (although Folsom offers westbound circulation only for buses and taxis between Fremont and Main). Land uses are primarily downtown office.

SFMTA's Route 76 uses Folsom and Howard Streets in this segment, and there is an eastbound bicycle lane on Folsom and a marked westbound bicycle route on Howard. The future site of the Transbay Transit Center is just north of Howard.

- **First Street to Fifth Street.** At First Street, Folsom and Howard shift to one-way circulation (eastbound Howard and westbound Folsom) for vehicles and bicycles. West of Second Street, the SFMTA's Route 12 and the planned 11 Downtown Connector operate eastbound on Folsom with westbound service provided on Harrison. Land uses remain primarily office, and the Moscone Center/Yerba Buena complex occupies the block between Third and Fourth Streets. Very high volumes of vehicle traffic use these segments of Folsom and Howard during peak periods traveling to and from Interstate 80.
- **Fifth Street to 11th Street.** Vehicle and bicycle circulation remain one-way in this segment. Under the TEP recommendations, bus service will be provided on Folsom by the 27 Folsom and the 11 Downtown Connector. Vehicle volumes are somewhat lower than in the segment to the east. Land uses shift to the mix of PDR, moderate-density residential enclave districts, and service businesses that characterizes the western South of Market neighborhood. The segment of Folsom Street between Sixth and Ninth Streets has been designated with neighborhood commercial zoning. This segment has been selected as the focus of the EN TRIPS corridor design project and is discussed in more detail below.
- **11th Street to Division Street.** At 11th Street, Folsom and Howard Streets curve towards due South in a transition toward the Mission District street grid. Traffic volumes are lower in this segment than they are farther east, and both streets shift back to two-way operations. The eastbound bicycle lane continues on Folsom, but the westbound bicycle corridor terminates at 11th. Just north of the Central Freeway, Howard Street forms a Y with South Van Ness Avenue. Northbound vehicle traffic traveling from the Mission District on South Van Ness Avenue feeds onto Howard Street headed eastbound, while south/westbound Howard Street traffic is diverted onto South Van Ness Avenue northbound.
- **South of Division Street/Central Freeway.** South of Division Street, Folsom Street becomes a relatively low-volume street traveling north and south through the Mission District with bus service from the 27 Folsom. It was recently converted from four lanes to three, and bicycle lanes are planned between 14th and 19th Streets (and eventually to 25th). Land uses are mostly PDR from Division to 14th Streets. South of 14th, land uses become primarily residential and service. South Van Ness is a higher volume four-lane arterial, with a mix of PDR and residential land uses.

The circulation concepts presented below include proposed changes for all of these segments of Folsom and Howard Streets along with designation of roles and priorities for the other east-west streets in the corridor. A central element and an important first step toward these area-wide improvements, the segment of Folsom and Howard Streets between Fifth and 11th Streets was selected for development as an EN TRIPS priority project.

Folsom and Howard Project Segment – Fifth to 11th

The segments of Folsom and Howard between Fifth and 11th Streets have been prioritized for analysis and investment over other segments of the corridor because of expected residential and employment growth and community priority. This segment was identified as an area of need by participants in the EN TRIPS community workshops, Eastern Neighborhoods area plans process,

and Western SOMA Community Task Force. Details of the Fifth to 11th Street segment are as follows.

Land Use

Land use densities in the segment are currently moderate with a mix of PDR, retail, and service interspersed with residential enclave districts centered on alleys. Folsom Street is also projected to see substantial growth in residential and employment density as a result of recently completed land use planning efforts. The Eastern Neighborhoods area plans permit increased residential densities on Folsom between Third and Sixth Streets with neighborhood-serving retail for the block of Folsom between Sixth and Seventh Streets. The Western SOMA Community Plan updates land use controls for Folsom Street between Seventh and Ninth Streets with Neighborhood Commercial–Transit (NC-T) zoning and heights up to 65 feet. The plan includes more restrictive mixed-use zoning for Howard Street between Seventh and Ninth.

Transit

The SFMTA currently provides transit service eastbound on Folsom in this segment by the 12 Folsom-Pacific on 20-minute headways. Westbound service is provided on Harrison Street. Under TEP recommendations, eastbound Route 27 service will be shifted from Bryant Street, and Route 12 will be discontinued if favor of the new 11 Downtown Connector service. Together, these routes will provide eastbound service at 8-minute headways. The TEP also contemplated the possibility of shifting westbound service to a two-way Folsom Street.

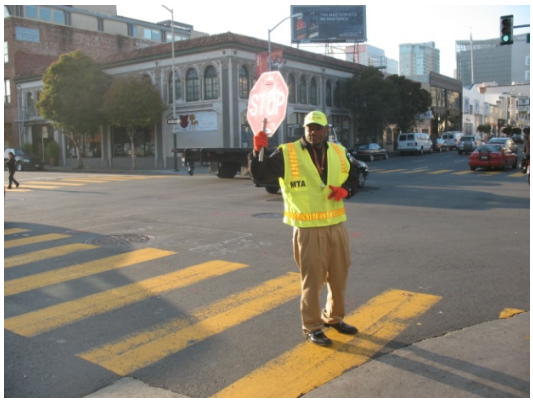
Each of these routes is designated as a local service under the TEP, and future transit ridership volumes are forecast to be relatively low. One block north of Howard, Mission Street is designated as a rapid corridor and a Transit Priority street. Mission has bi-directional transit service provided by the 14, 14x, and 14L on 4-minute headways during peak periods.

Vehicle Circulation

Working together in a one-way couple, Folsom and Howard Streets travel through the center of the western and eastern South of Market neighborhoods, connecting them to the Transbay District and downtown. With a total of seven one-way lanes of traffic capacity and lacking direct freeway access, Folsom and Howard Streets have modest peak period vehicle delays in this segment. During off-peak hours, very wide vehicle rights-of-way and relatively low traffic volumes combine to support high vehicle travel speeds that diminish pedestrian safety and comfort. Traffic volumes are forecast to grow as overall travel demand increases in the future.

Just to the south, Harrison and Bryant Streets carry high volumes of vehicle traffic and serve as the location of vehicle queues waiting to approach freeway ramps for Bay Bridge bound traffic. The north-south arterials that cross Folsom and Howard in this segment (Fifth through 10th Streets) also carry very large volumes of vehicle traffic to and from freeway ramps.

Pedestrian conditions



Like other South of Market arterials, Folsom and Howard Streets have limited pedestrian facilities. Pedestrian challenges include both wide crossing distances and long distances between street crossings. While Howard Street's twelve foot sidewalks satisfy the Better Streets Plan minimum recommended width for mixed use streets, Folsom Street's ten foot sidewalks fall below this standard. Folsom also has relatively high pedestrian injury collision rates of 25 and 32 per mile east and west of Fifth between 2004 and 2008. Some pedestrians use the South of Market's network of alleys to avoid these conditions on the major arterials. However, the alleys offer a patchwork of connectivity; when they do carry through from block to block, they lack signalized crossings at arterials.

Bicycle conditions

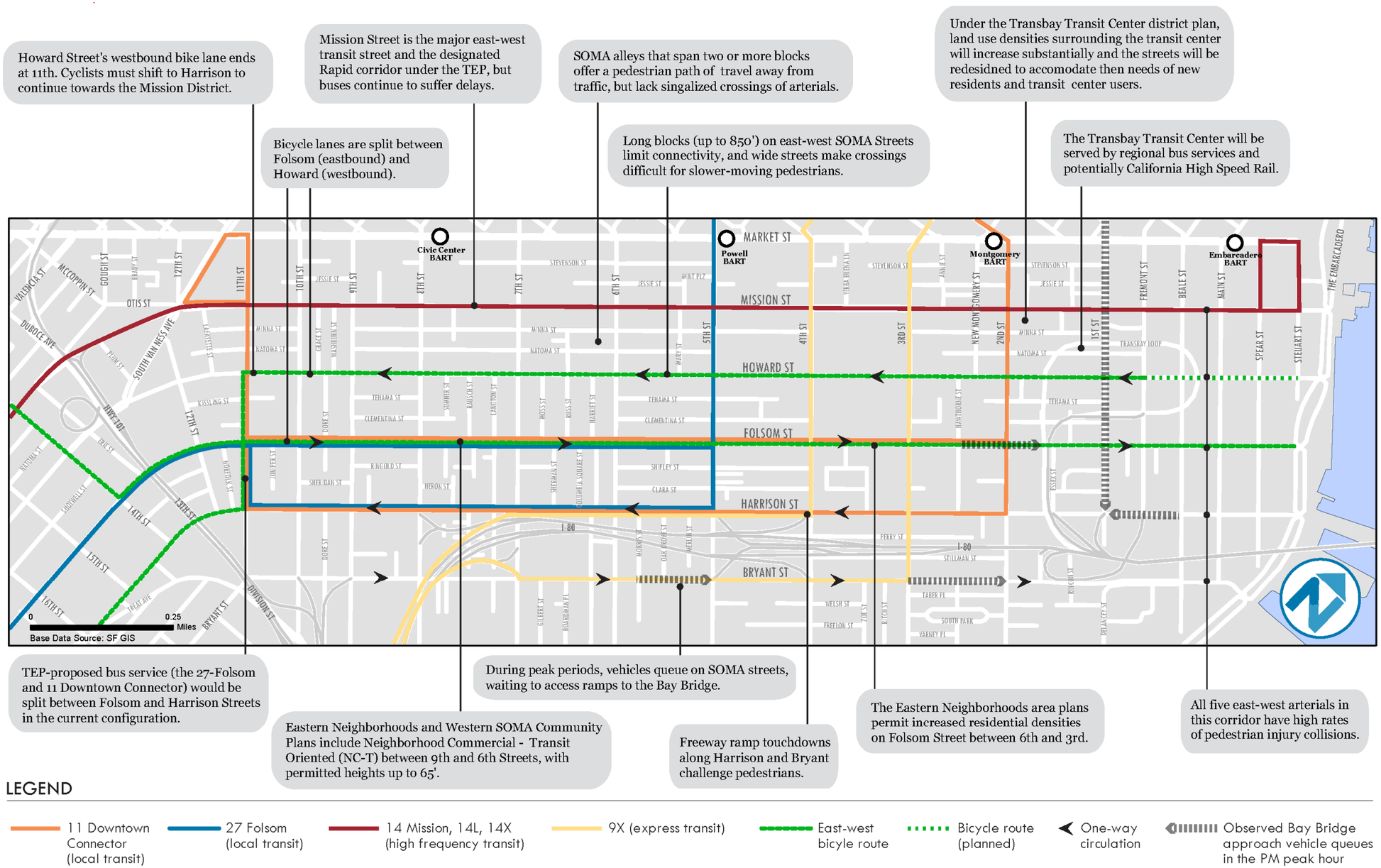
Folsom and Howard Streets also work together to provide the major east-west bicycle corridor though the South of Market. Located on relatively high-volume, high-speed vehicular streets and lacking any buffer from traffic; these facilities are used mostly by experienced cyclists and may present a challenge to inexperienced, occasional, or slower-moving cyclists. Still, this corridor is a vital link in the city's bicycle network as there is no existing or potential parallel east-west route South of Market Street or north of Townsend.

The westbound lane of Howard Street terminates at 11th Street just before Howard Street itself terminates at South Van Ness Avenue. Cyclists wishing to continue into the Mission District and points south must deviate north to Market Street or south to Harrison Street.

The Folsom Street Fair

The Folsom Street Fair is the world's largest "leather" event, and one of the largest annual public events in California. It has been hosted since 1984 on the last Sunday in September on Folsom between 7th and 12th streets. The preferred configuration of the Fair places two rows of 10-foot wide booths in the center of the street and also requires 14-feet of clear right-of-way to serve as a fire lane. This arrangement places a requirement on the minimum width of the street and influences the street design concepts that follow.

Figure 5-1 Folsom Street Corridor Issues and Opportunities



This page intentionally left blank.

5.2 PROJECT OBJECTIVES

In designing improvements in the Folsom Street corridor and developing a concept for east-west circulation in the South of Market, the project team was guided by the principles listed below. With a limited right-of-way, project design requires tradeoffs. The design alternatives that follow recognize the need for balance between priorities.

- **Pedestrian conditions.** *Pedestrian connectivity, comfort, and safety should be improved.* The project should seek to improve comfort for pedestrians while reducing the risk of collisions. To respond to pedestrian connectivity challenges such as long blocks and wide streets, the project should seek to add safe crossing points while reducing crossing distances. Folsom Street is the highest priority for pedestrian improvements, but Howard Street conditions should be improved where possible as well. Improving pedestrian connectivity on parallel routes, including alleyways, should also be explored.
- **The public realm.** *Open space, landscaping, and other urban design elements on Folsom Street should be upgraded.* The Eastern Neighborhoods area plans designate Folsom Street as a Civic Boulevard, and the Western SOMA Community Plan identifies Folsom Street as the center of an emerging neighborhood commercial district. The public realm, including pedestrian and public space, wayfinding, and landscaping should be upgraded to help Folsom Street perform these functions. In addition, the design of the street should support the Folsom Street Fair. While Howard Street does not have the same community importance, its public realm should be upgraded where possible as well.
- **Transit legibility**. *Transit service should be consolidated on two-way streets to improve legibility where possible.* The bus routes serving Folsom are currently divided by direction of travel with westbound service provided on Harrison Street. The project should consider opportunities to improve legibility for passengers and to improve access to the emerging neighborhood commercial district on Folsom by combining this service on a two-way Folsom Street (as contemplated by the TEP).
- **Transit performance.** *Transit speed and reliability should be maintained*. The TEP designates the transit routes that serve Folsom Street as Local, rather than Rapid routes. However, the project should strive to preserve at least the existing levels of transit speed and reliability. More robust transit priority should be implemented on designated transit priority streets traveling east-west through the South of Market including Mission Street.
- **Bicycle conditions.** *A safe, comfortable and attractive bicycle route should be provided within the corridor*. Bicycling should be made safer, more comfortable, and more attractive. A high priority should be placed on maintaining at least the existing bicycle quality of service in the corridor. As both vehicle and cyclist volumes may increase over time as overall travel demand grows, the project will seek to develop protected bicycle facilities and/or consolidate directions of travel.
- **Vehicle circulation.** *The project should maintain adequate east-west vehicle capacity in the South of Market network as a whole*. While the project will repurpose some vehicle space on Folsom and/or Howard Streets to improve the public realm and conditions for other modes, it should maintain enough vehicle capacity in the network as a whole so that existing South of Market vehicle volumes can continue to be accommodated with undue increases in delay for drivers and transit riders. The City will strive to accommodate any growth in travel demand in this corridor with improvements to non-auto modes.

- **Parking and loading.** *Parking and loading access to businesses should be maintained.* A number of street-fronting businesses on Folsom and Howard taking loading from the sidewalk, and costumer parking can help support the goal of a neighborhood commercial district on Folsom Street. A supply of on-street parking should be maintained although the total amount of parking spaces may be reduced to provide space for other needs. Remaining parking should be managed to ensure availability at all times.
- **Deliverability and cost-effectiveness.** *The project should maximize cost-effectiveness and speed delivery of the highest priority improvements.*

5.3 FRAMEWORK FOR EAST-WEST CIRCULATION IN THE SOUTH OF MARKET DISTRICT

Folsom and Howard Streets function in the context of the South of Market street grid and the city's wider transportation networks. In re-thinking Folsom Street, it is necessary to carefully consider and refine the roles and functions of the five major east-west arterials between Market and Brannan Streets, including Mission, Howard, Folsom, Harrison, and Bryant Streets, as well as the surrounding network of alleys.

The following framework for east-west circulation informed development of project alternatives and most of its key features are common to all of the alternatives. Circulation elements that are unique to each project alternative are detailed later in this chapter.

Mission Street

Improving transit speed and reliability is essential to accommodating the growth in travel demand forecast for the Eastern Neighborhoods. The project alternatives developed for Folsom and Howard seek to maintain enough roadway capacity such that local transit service will not be unduly slowed by traffic congestion. However, the transit service proposed for Folsom Street will continue to operate in mixed-flow traffic. As travel demand grows, the South of Market area will require an east-west corridor with the highest level of transit priority to protect it from potential increases in vehicle delay.

As recommended in the TEP, Mission Street will be the major transit priority street in this corridor. Robust transit priority should be prioritized for Mission Street, both in its Mission District and South of Market segments, with tolerance for reducing vehicular capacity or restricting vehicle turing movements if necessary to achieve transit performance goals. Consideration should be given to a median transitway treatment similar to the one envisioned by this project for 16th Street (See Chapter 4). Detailed design for transit priority on Mission Street will be carried out in future planning efforts.

Folsom and Howard Streets

The project alternatives developed below consider numerous potential configurations for Folsom and Howard Streets. However, the combined functions of the streets remain fairly consistent across the range of alternatives. Generally speaking, it is envisioned that Folsom Street will serve as the South of Market's "main street," with an emerging neighborhood commercial district supported by calmed traffic, an enhanced public realm, local transit service, and managed on-street parking.

The South of Market's major east-west bicycle facility will be on Folsom, Howard, or split between the two streets. Most alternatives envision that for at least part of its length, this facility will be physically separated from traffic to improve cyclist comfort. Local transit will be provided on Folsom Street by the 27 Folsom and the 11 Downtown Connector. In two-way alternatives, service will be bi-directional. In one-way alternatives, westbound service will be provided on Harrison Street.

Overall peak period vehicle capacity for this pair of streets will be reduced moderately from its current level, but the Folsom/Howard pair will continue to serve as major arterials in the SOMA network. The alternatives reduce total lanes of vehicle capacity from the current combined seven lanes to between four and six lanes depending on the alternative. In some cases, vehicle turning movements may be restricted.

Harrison and Bryant Streets

Harrison and Bryant Streets act as a one-way couplet carrying high volumes of traffic to and from Interstate 80. During the PM peak period, major queuing occurs at the approaches to the I-80 ramps on both streets. Harrison and Bryant Streets will continue to perform this function in the future, and the demand for vehicle travel on these streets may grow as overall travel demand increases in the coming decades.

Given the need to re-dedicate space to pedestrians, cyclists, and transit on other east-west streets in the South of Market, Harrison and Bryant Streets will be maintained as a one-way couplet at or near their current vehicle capacity and will continue to serve as major east-west vehicle routes to and from Interstate 80 during peak periods. It is recommended that the City encourage the majority of truck traffic in this corridor to make use of Harrison and Bryant Streets. In two-way Folsom alternatives, westbound transit service will be moved from Harrison Street to Folsom Street. In one-way Folsom Street alternatives, westbound service will remain on Harrison.

While vehicle circulation will remain a high priority on Harrison and Bryant, future planning efforts should focus on improving pedestrian safety and connectivity on these streets particularly around freeway ramp touchdowns.

Signal timing

For all five arterials in this corridor, it is recommended that traffic signals be used to moderate vehicle speeds and improve pedestrian connectivity. Ideally, the progression would be timed to between 12 and 15 mph, speeds that would nearly eliminate the possibility of fatal collisions with pedestrians while allowing vehicles, transit, and cyclists to travel at a regular speed. While it may not be possible to achieve the precise preferred progression speed in both the north-south and east-west directions in the South of Market, signal cycle length and progressions speeds will be reassessed for the South of Market as a whole to achieve the optimal combination of north-south and east-west progression speeds.

In the case of the imbalanced two-way Folsom and Howard Street alternatives discussed below, if it is not possible to progress signals in both directions, progression in the dominant direction of travel will be favored. Where possible, each block in this corridor should have signalized, mid-block crossing with pedestrian bulb-outs to improve pedestrian connectivity and calm vehicle traffic.

Alleys

The South of Market's network of alleyways serves several vital functions for the neighborhood. In western SOMA, they are home to numerous small PDR business as well as residential enclave districts. Further east, alleyways serve as rear loading areas for large office and other downtown uses. Throughout the neighborhood, the alleyways serve as cut-throughs and paths of travel for pedestrians, particularly those wishing to be further removed from vehicle traffic.

The alleyways serve this pedestrian circulation role despite irregular connectivity, high-speed vehicle cut-throughs, and limited pedestrian amenities. As a complement to the proposed changes to South of Market arterials, it is recommended that they City invest incrementally in the alleyways, upgrading them both as public spaces and as pedestrian travel routes.

Many SOMA alleys connect through for just one block and have limited potential as through-travel routes. However, several alleys span two or more blocks but are limited as through-travel routes by the absence of signalized crossings of arterials. For example, if properly signalized, Minna and Natoma Streets present the potential for an east-west pedestrian path of travel between Ninth and Fourth Streets (and on Minna potentially as far east as the Transbay Terminal in a long-term scenario).

To help improve pedestrian circulation, it is recommended that Minna and Natoma Streets be upgraded as a pedestrian corridor with traffic calming, signalized mid-block crossings of arterials, pedestrian-scale lighting, and landscaping added where appropriate to improve these streets as a continuous east-west pedestrian path of travel. Incremental work towards this goal has already begun with the SFCTA's Western SoMa Neighborhood Transportation Plan calling for improvements to Minna and Natoma between Seventh and Ninth Streets and new signalized mid-block crossings of Seventh and Eighth Streets.

Parking management

For all streets in this corridor, it will be essential to manage on-street parking to ensure availability both to maintain convenient access and so that additional vehicle traffic is not added to South of Market streets by drivers circling in search of on-street parking. This will be particularly important in and around the emerging neighborhood commercial district on Folsom Street.

Under the SF*park* downtown pilot project[1], the SFMTA installed new parking meters that accept credit cards along Folsom Street between First and Third Streets. As part of the implementation

[1] http://sfpark.org/wp-content/uploads/2011/11/Draft-Mission-Bay-Parking-Management-Strategy-10.28.11.pdf

of the EN TRIPS project, SF*park* should monitor parking occupancies along the full length of Mission, Folsom, Howard, Harrison, and Bryant Streets between Third and 12th, adding additional parking meters and adjusting prices as necessary to ensure availability.

Further development of the circulation concept

Distinctive features of the circulation plan for the recommended alternative are described in more detail in Section 5.5. For a short list of four other promising alternatives, major potential variations from the recommended circulation concept are discussed in Section 5.6.

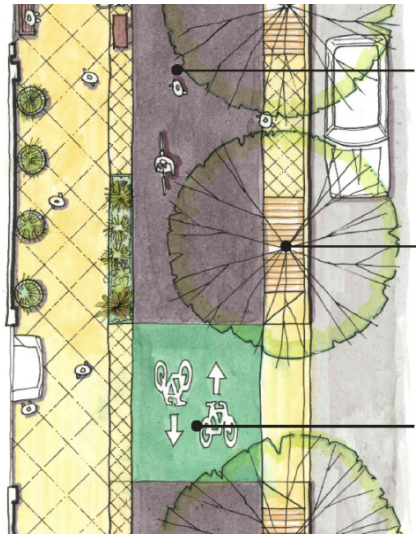
Why protected bicycle lanes?

Most of the concepts developed for Folsom and Howard Streets propose bicycle lanes that are physically buffered from traffic. They include a three to five foot buffer and a parking lane between the bicycle lane and the traffic lane. The bicycle facilities themselves can be either one-way or two-way.

Protected or separate bicycle lanes have been adopted with success in North American cities including New York, Vancouver, Portland, and Long Beach. San Francisco's first protected bicycle lane was recently approved for JFK Boulevard in Golden Gate Park. While not the right design for every street, projected bicycle lanes are particularly well suited for South of Market arterials for a number of reasons.

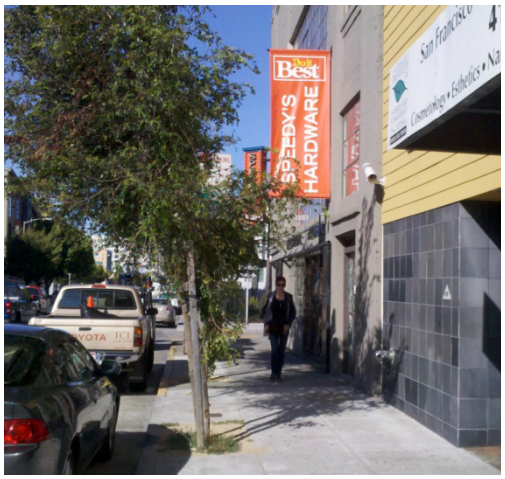
- Folsom and Howard have both high volumes of cyclists and relatively high volumes of traffic. To encourage more than just the most experienced cyclists to travel by bicycle in SOMA, some buffer from traffic will be required.
- Research has demonstrated that the best way to improve cyclist safety is to increase the number of cyclists on a given street. Protected bicycle lanes haven proven their value in attracting new cyclists.
- On streets like Folsom that have both ordinary bike lanes and bus service, conflicts between buses and cyclists can occur at stops (this is a particular concern for Folsom when the frequency of bus service increases in the future). By routing bicycle lanes behind stops in protected lanes, these conflicts can be avoided.
- Finally, when pedestrian refuges are placed in the parking lane on the street side of a protect bicycle lane, it narrows the effective street crossing distance for pedestrians. Reducing crossing distance is an important goal of the Folsom and Howard projects.

Protected bicycle lanes must be carefully designed to minimize conflicts with turning vehicles at intersections and pedestrians throughout their length. Special care must also be taken to ensure that they do not hinder universal access in any way. The facilities proposed for Folsom and Howard Streets have been designed with these goals in mind.



How can transportation support a neighborhood commercial district on Folsom Street?

Streets with various circulation patterns can support vibrant neighborhood commercial districts. Balanced two-way streets are common for commercial streets in San Francisco (Noe, Haight, and Clement Streets), but small-scale commercial also thrives on imbalanced two-way streets (Post Street in Japantown and 16th Street in the Mission District) and one-way streets (Grant Avenue in San Francisco, Telegraph Avenue in Berkeley). More important than traffic circulation patterns are ease of access, the quality of the public realm, and the character of the building stock.



A great commercial street is a great place to walk

Fundamentally, pedestrians must feel comfortable and safe. In the South of Market, improving pedestrian comfort begins with calming traffic and buffering pedestrians from moving cars. Improving connectivity by narrowing street crossing distances and adding signalized mid-block crossings will help pedestrians to access the street. Street trees, landscaping, lighting, benches, and other pedestrian amenities can help improve the public realm.

Even when all of these conditions improve, the long gaps in active street frontages that characterize Folsom Street (many of which are likely to persist under updated zoning) will make it hard for this retail district to draw pedestrians along its length as the continuous urban fabric does on streets like Clement or Valencia. Given these challenges, a number of other strategies may help support retail success on Folsom:

- **Enhance Transit.** Relatively frequent, bi-directional transit service with multiple stops along the commercial corridor can help customers get to shops and make transit users into new customers.
- **Maximize bicycle access.** High-quality bicycle facilities and plentiful bicycle parking will allow customers to access the street, and will bring many potential new customers through the neighborhood. Bicycle travel is a good way to access a corridor like Folsom where there are gaps in the urban fabric that may interrupt slower pedestrian travel.
- **Commit to parking management.** On-street parking should be managed to ensure availability. Properly priced meters will encourage turnover and shift employees and long-term parkers elsewhere, freeing up spaces for customers.
- **Add active uses to the parking lane.** Adding to the pedestrian realm through flexible use of parking lanes is particularly appropriate for a street like Folsom. Café seating or other active uses in the parking lane could help add visual interest that helps draw pedestrians along the corridor.
- **Encourage new storefronts and other active uses.** San Francisco's great neighborhood commercial streets are characterized by many businesses closely space together and facing the street. To achieve this feel, there will need to be gradual turnover in the street's building stock. NC-T zoning will help encourage dynamic use of existing buildings, but ultimately some additional permitted height and intensity of use may be required to foster a thriving commercial district on Folsom Street.

5.4 ALTERNATIVES DEVELOPMENT AND EVALUATION

KEY ●●● Greatest benefit ○ Neutral ●●● Greatest impact

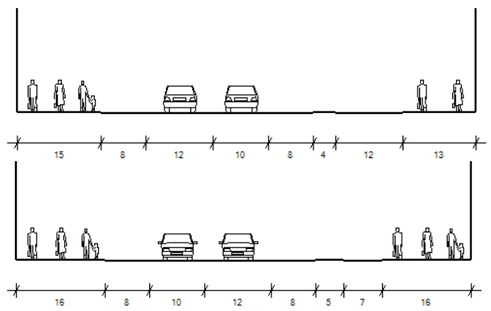
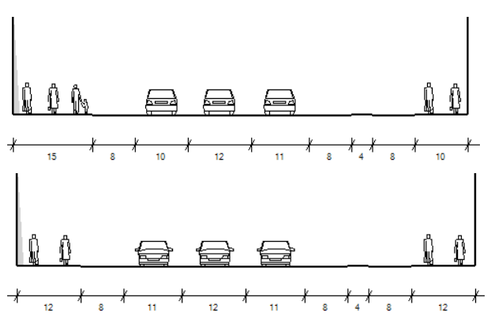
Full list of project alternatives

The SFMTA, working with other City departments, the study team and the public developed a total of eight project alternatives for Folsom and Howard Streets. These alternatives are described and evaluated for each project objective in the tables below. The project alternatives share a number of similarities. First, all of them provide reduced pedestrian crossing distances through pedestrian bulb outs; all seek to reduce vehicle speeds by progressing signals at a consistent, moderate speed. All alternatives maintain parking lanes on both streets, and most provide protected bicycle facilities. Key differences between the alternatives include the directionality of travel for vehicles and transit (there are both one-way and two-way alternatives for Folsom Street and Howard Street), the location of bicycle facilities (either on Folsom, on Howard, or split between them), and the width of sidewalks. All eight alternatives are summarized and evaluated below. In the next section, the recommended alternative is developed in detail. Finally, in Section 5.6, three other promising alternatives were evaluated in greater detail presented for comparison.

Folsom and Howard Streets: One-way alternatives

The alternatives presented on this page maintain one-way operations on Folsom and Howard Streets. Signals would be timed to favor a steady vehicle progression, and mid-block signals would be fixed-time. These alternatives vary with respect to the number of one-way lanes.

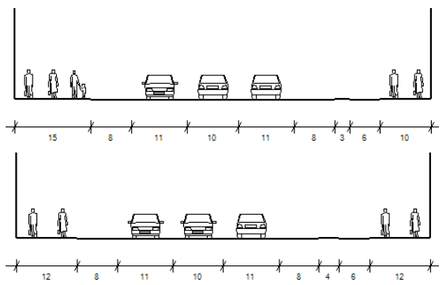
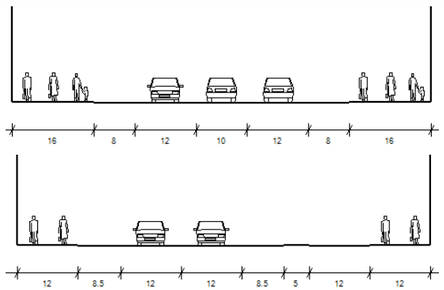
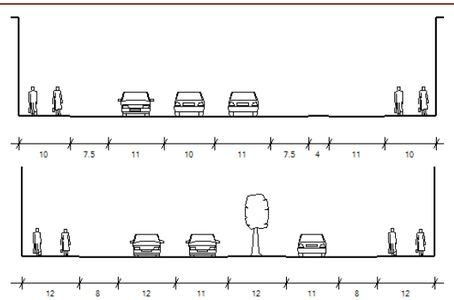
Figure 5-2 Alternatives featuring a one-way Folsom Street

	Description	Cross Section	Pedestrian conditions	The public realm	Transit performance	Transit legibility/ consolidation	Bicycle conditions	Vehicle circulation	Parking and loading	Cost comparison	Notes	Disposition
1	Folsom: One-way, two lanes, two-way cycletrack Howard: One-way, two lanes, one-way cycletrack		●●●	●●●	●	○	●●●	●	●	$$$	This alternative would narrow the roadway to two, one-way lanes on each street, providing important benefits for pedestrians, cyclists, and the public realm with 15-foot sidewalks, greatly narrowed crossing distance, wide cycletracks, and traffic calming. It would not provide for one-way circulation or consolidation of transit routes onto Folsom Street. It would require the expense of moving curblines on both streets. It is very likely that the project would be implemented on Folsom Street first, and the Howard Street project would be optional.	Carried forward
2	Folsom: One-way, three lanes, one-way cycletrack Howard: One-way, three lanes, one-way cycletrack		●●	●	○	○	●●	○	●	$$	This alternative would narrow the roadway to three one-way lanes on both Folsom and Howard Streets and provide one-way buffered bike lanes on both streets. It would provide bulb outs and mid-block crossings but widen the sidewalk on one side of Folsom rather than both sides. The net gain for pedestrians would be less, but the vehicle capacity would be higher, which would result in less transit delay. Transit would not be consolidated.	Not carried forward because Alternative 1 provides many of the same benefits with greater gain for pedestrians.

Two-way, three-lane Folsom alternatives

Each of the alternatives summarized on this page converts Folsom Street to two-way operations in order to achieve transit consolidation. In each, Folsom Street would provide two lanes eastbound and one lane westbound. Signals would be timed to favor a steady eastbound progression at moderate speed. In some cases, mid-block signals may be pedestrian-actuated. These alternatives vary with respect to the configuration of Howard Street and the placement of bicycle faculties.

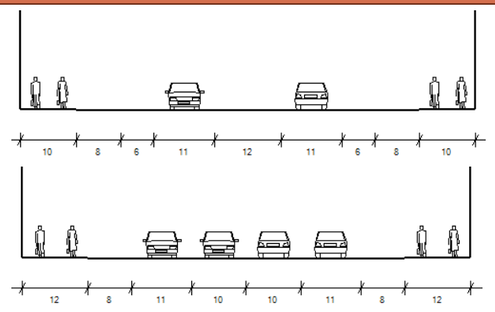
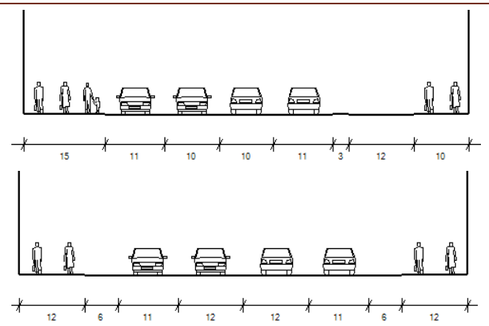
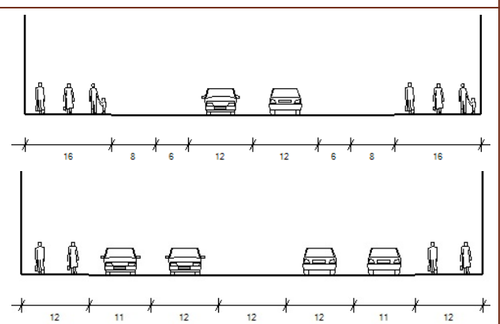
Figure 5-3 Alternatives featuring a two-way, three-lane Folsom Street

	Description	Cross Section	Pedestrian conditions	The public realm	Transit performance	Transit legibility	Bicycle conditions	Vehicle circulation	Parking and loading	Cost comparison	Notes	Disposition
3	Folsom: Two lanes EB, one lane WB with one-way cycletrack Howard: Two lanes WB, one lane EB with one-way cycletrack		●●	●●	○	●●	●●	●	●	$$	This alternative would allow for three lanes of traffic on each street plus buffered bicycle lanes. Two lanes would operate in the dominant direction of travel (eastbound on Folsom and westbound on Howard), while a third lane would operate in the opposite direction. A one-way cycletrack would be provided on each street. It allows for transit consolidation, upgraded bike facilities, six lanes of vehicle capacity to reduce transit delay, and wider sidewalks on one side of the street.	Carried forward
4	Folsom: Two lanes EB, one lane WB Howard: Two lanes WB with two-way cycletrack		●●●	●●●	●	●●	●	●	●	$$	This alternative would create a two-way Folsom Street, with two eastbound lanes and one westbound lane. Two-way travel would allow for transit service to be consolidated. All bicycle facilities would be removed from Folsom. A two-way bicycle cycletrack would be added on Howard Street, which would be narrowed to two westbound vehicle lanes. This alternative would maximize pedestrian space on a two-way Folsom Street while providing premium bicycle facilities on Howard. Howard has bicycle connectivity to the Mission District,	Carried forward
5	Folsom: Two lanes EB, one lane WB with two-way cycletrack Howard: Two lanes WB, one lane EB with center turn lane/median		●●	●	○	●●	●●●	●	●	$	This alternative would provide a two-way Folsom, with two lanes eastbound and one lane westbound. Instead of widening the Folsom Street sidewalks, it would provide a two-way cycletrack on Folsom. Howard would also be converted to two-way, with two westbound lanes, two eastbound lanes, and a landscaped median/turn lane. It would allow for transit consolidation, six lanes of vehicle capacity to maintain transit speeds, and a premium bicycle facility with optimal connectivity. While it improves pedestrian connectivity, It would not widen sidewalks and provides little new pedestrian space.	Carried forward

Folsom/Howard: Two-way, two-lane Folsom alternatives

Each of the alternatives summarized on this page converts Folsom Street to two-way operation but provides just one through-lane in each direction. These alternatives would substantially reduce vehicle capacity on Folsom, changing its role from an arterial to a neighborhood street. To maintain transit operations at an acceptable level, major diversion of vehicle traffic from Folsom would be required. To absorb part of this diversion, more capacity is provided on Howard Street.

Figure 5-4 Alternatives featuring a two-way, two-lane Folsom Street

	Description	Cross Section	Pedestrian conditions	The public realm	Transit performance	Transit legibility	Bicycle conditions	Vehicle circulation	Parking and loading	Cost comparison	Notes	Disposition
6	Folsom: one lane in each direction with center turn lane Howard: Two lanes in each direction		●●●	●	●●	●●	●	●●	●	$	This alternative would provide one through lane in each direction on Folsom Street with a center turn lane, similar to the current configuration of Valencia Street north of 15th and South of 19th. Bicycle lanes would be provided on both sides of the street. Howard Street would be converted to two lanes in each direction, absorbing some of the vehicle capacity diverted from Folsom. This alternative could slow transit and introduce conflicts between buses and cyclists at bus stops.	Not carried forward because of negative impacts on transit due to increased delay and bus-bike conflicts.
7	Folsom: One lane + peak period tow-away lane in each direction Howard: One lane + peak period tow-away lane in each direction		○	○	○	●●	●●	○	●●	$	This alternative would provide one lane in each direction and a parking lane on both sides of the street during off peak periods. During peak travel periods, parking would be eliminated and the street would offer two lanes in each direction. This traffic pattern would be in place on both Folsom and Howard, but Folsom would feature a two-way cycletrack, while Howard would feature a bike lane in each direction.	Not carried forward due to minimal upgrades to pedestrian realm during peak travel periods.
8	Folsom: one lane in each direction with bike lanes Howard: One lane + one peak period tow away lane in each direction, center turn lane/median		●●●	●●●	●●	●●	●	●	●●	$$$	This alternative would reduce Folsom to one lane in each direction at all times of day. Private vehicles would be required to turn right at every intersection, eliminating Folsom as a through-route. To compensate, Howard would be high-capacity during peak periods, with two lanes in each direction and a center turn lane. I t would have just two lanes during off-peak periods. This alternative provides total peak-period traffic capacity similar to the three-lane Folsom alternatives, but converts Folsom Street into a boulevard for bicycles and transit.	Not carried forward because of expense and because planned level of development and transit service does not justify eliminating Folsom as a vehicle through route.

This page intentionally left blank.

5.5 RECOMMENDED ALTERNATIVE

Based on the evaluation above, the four most promising concepts were selected for additional analysis, design, and community input. The concepts advanced include all three of the two-way, three-lane Folsom Street configurations and a single one-way option. After detailed review of these alternatives, Alternative 5, with two-way Folsom and Howard Streets and a two-way cycletrack on Folsom, emerged as the concept that appears to provide the greatest benefits across the full range of project objectives. The following project elements are described and illustrated in the remainder of this section.

- **Operations Concept.** Key elements of the design for Folsom and Howard Streets are explored. More detailed specifications for the design of the right-of-way for the full length of the corridor are presented in Appendix B.
- **Circulation Concept.** Circulation functions of the recommended alternative are presented, with a description of how Folsom and Howard Street would function within the circulation framework introduced in Section 5.3.
- **Streetscape, landscape, and public realm improvements.** Recommendations for streetscape, landscape, and public realm improvements are presented. These improvements are integral to the project design and a necessary step towards achieving the vision for this part of the city as laid out in the Eastern Neighborhoods area plans.
- **Phasing plan.** A conceptual phasing plan for this alternative is presented at the end of this section. More detailed phasing, costs, and funding sources will be identified in the EN TRISP Funding and Implementation Plans, to be published under a separate.

In section 5.6, the three other promising alternatives are summarized. Each includes an alternative circulation concept. In addition, the findings of a detailed traffic analysis of the alternatives are provided in Appendix A. Unlike for the Sixteenth Street project, where one alternative emerged as clearly the strongest, each of these remaining Folsom/Howard alternatives is competitive with the recommended alternative. Each is a balance of priorities, differing from the other alternatives with respect to the scale of public realm improvements, connectivity for different modes, traffic impacts, transit performance, and cost. These additional options are included for stakeholder review and potential inclusion as alternatives in environmental review.

Highlights of Recommended Alternative

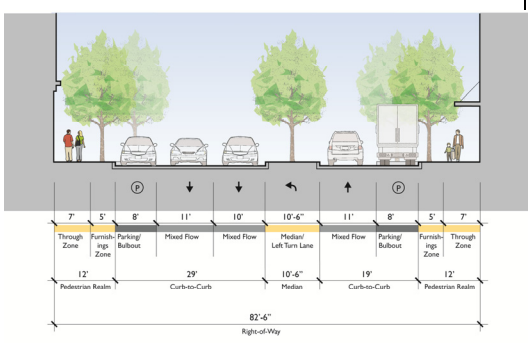
The recommended alternative reduces crossing distances and provides signalized mid-block crossing on every block to improve pedestrian connectivity and safety. It consolidates the 27 Folsom and the 11 Downtown Connector on Folsom Street, offering eight-minute headways in both directions. By shifting westbound service from Harrison Street, the efficiency of both routes improves, and traffic modeling suggests that transit delay would not increase as a result of increased traffic congestion. A buffered two-way cycletrack on Folsom Street would offer a protected bicycle facility that improves connectivity to the Mission District and points south.

While this alternative would provide additional pedestrian space at corner bulbs and bus stops, it would not widen sidewalks on either Folsom or Howard Streets leaving Folsom with 10-foot sidewalks (Howard Street sidewalks are now 12 feet wide). However, because it would not move curb lines, this concept could be implemented at a substantially lower cost than the others. On Howard Street, a landscaped median will augment the public realm and provide pedestrian refuges.

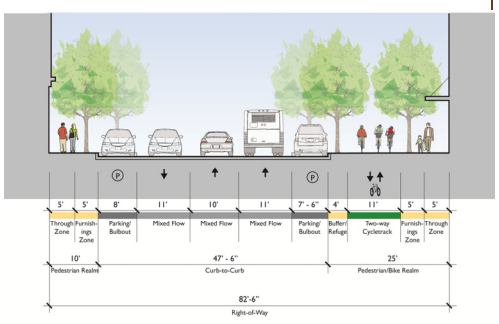
This page intentionally left blank.

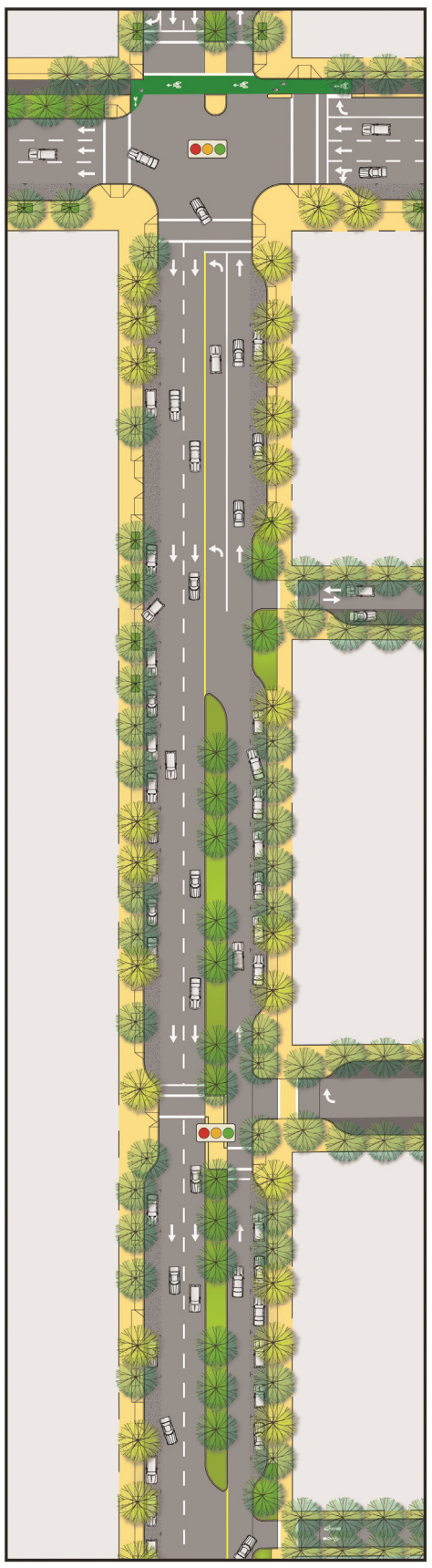
Folsom/Howard Recommended Alternative (Alternative 5)

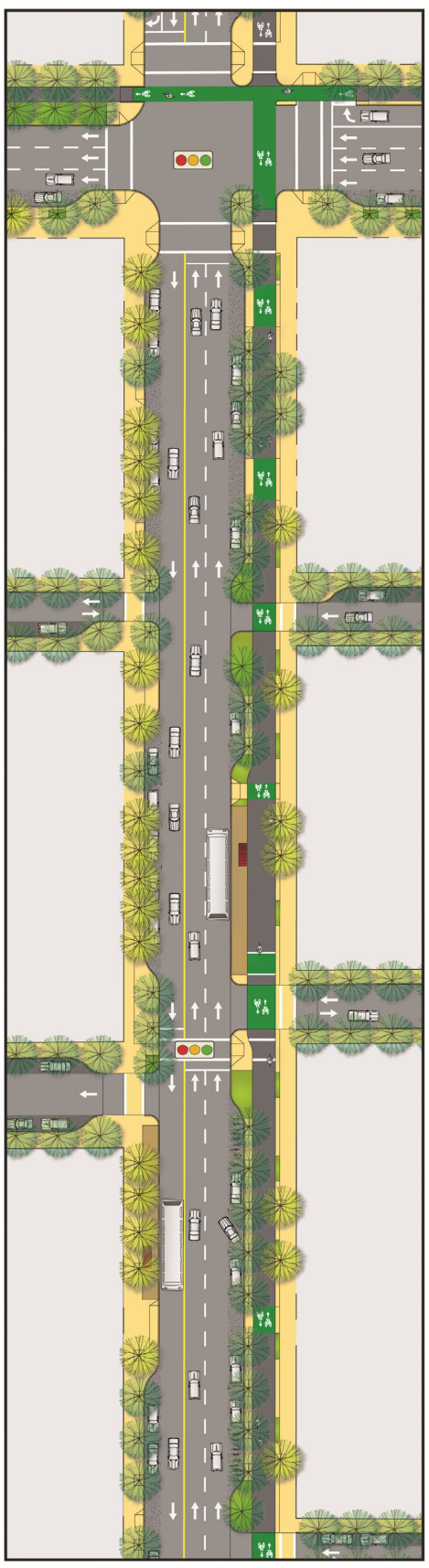
Howard Street



Folsom Street







This concept would provide a two-way Folsom Street, with two lanes eastbound and one lane westbound. Instead of widening the Folsom Street sidewalks, it would provide a two-way cycletrack. Howard Street would also be converted to two-way operations with two westbound lanes, one eastbound lane, and a landscaped median/turn lane, and no bicycle facilities. Existing curb lines would be left intact.

Pedestrian Conditions. This concept would provide pedestrian bulb-outs and signalized mid-block crossings. Unlike other alternatives, this concept would not widen sidewalks on Folsom Street. At ten feet, sidewalks would continue to fall below Better Streets Plan minimums for Mixed Use Streets. However, effective pedestrian crossing distance would begin at the edge of the cycle track well into the right-of-way. On Howard Street, existing twelve-foot sidewalks would also be maintained. In areas where left turn lanes are not necessary, the landscaped median would serve as a pedestrian refuge on Howard.

The public realm. This concept would enhance the public realm on both streets with new street trees and landscaping and provide more pedestrian space at bulb-outs and bus stops. Parts of Howard Street would be enhanced with a wide landscaped median. However, because ten foot sidewalks would be maintained on Folsom Street, this concept would have fewer opportunities for public space or landscaping than the other alternatives and may result in pedestrian crowding in the future when land use densities are higher.

Transit performance. This concept maintains three lanes of vehicle capacity in each direction avoiding additional vehicle delay that would slow eastbound buses. Westbound buses, operating in a single lane, may be somewhat slower than those operating now on Harrison Street. To ensure that these waiting vehicles do not block north-south streets, transit stops will be placed mid-block (adjacent to new signalized mid-block crossings) rather than at the far side of intersections. Bus routes would be shortened and the total number of turns would be reduced by avoiding the need to travel as far south as Harrison Street thus reducing overall transit travel time.

Transit legibility. This concept would consolidate the 27 Folsom and the 11 Downtown Connector on Folsom Street, providing bus service on eight-minute headways in each direction. Two-way service makes it easier for passengers to understand the transit system. It may also support the neighborhood commercial district by improving transit access to Folsom.

Bicycle conditions. This concept would include a two-way cycletrack on Folsom Street between Fifth and 11th Streets, providing both a protected facility and better connectivity to the Mission District and points south than either Alternative 3 or 4. Beginning at 12th Street, the protected facility would transition to Class II bicycle lanes in both directions, which would continue down Folsom Street into the Mission District.

Vehicle circulation. Folsom and Howard Streets would both be converted to two-way operations with signals designed to favor moderate speeds in the dominant direction of travel. The single-lane direction of travel would serve mostly local trips and (on Folsom) westbound buses. This concept provides enough capacity not to increase overall vehicle delay. However, buses would stop in the westbound lane on Folsom, which would require all vehicles to wait while buses load and offload passengers. Left turns would be prohibited from Folsom, except eastbound at Ninth and 11th. Instead, left-turning vehicles could be accommodated in the dedicated left turn lane on Howard Street.

Parking and loading. As in the other alternatives, parking lanes would be maintained on both sides of Folsom and Howard Streets. Parking would be removed where necessary to provide turn pockets at intersections, and to provide pedestrian and transit bulb-outs. Because this concept would have just two left turn pockets on Folsom, and none on Howard, the parking impact would be less than in any of the other alternatives.

Cost comparison. Because it does not require moving curb lines, this concept would be less expensive to implement than the other Folsom/Howard Alternatives. While raising portions of the cycletrack to sidewalk grade would require substantial investment, doing so would not necessarily require moving the existing curb and gutter. The landscaped median on Howard Street would require ongoing maintenance.

Folsom Street Operations Concept (Recommended Alternative)

The Transportation Concept for Folsom Street converts vehicle travel to two-way, allowing for bi-directional bus service. However, because the street's "two-plus-one" lane configuration will allow eastward travel to remain dominant, this alternative has characteristics typically associated with one-way travel, such as signal timing, traffic calming, and opportunities for mid-block crossings. The concept also includes a two-way cycletrack that will be buffered from vehicle traffic by the parking lane and a buffer area along the sidewalk edge.

"Two-plus-one" lane configuration allows for the vehicular access benefits of a two-way street while prioritizing eastward travel. This encourages slower vehicle speeds and better accommodation of bicycle speeds.

While vehicles have the option of two-way travel, traffic signals are timed to the eastbound traffic, making westbound auto travel more suited to local rather than crosstown trips.

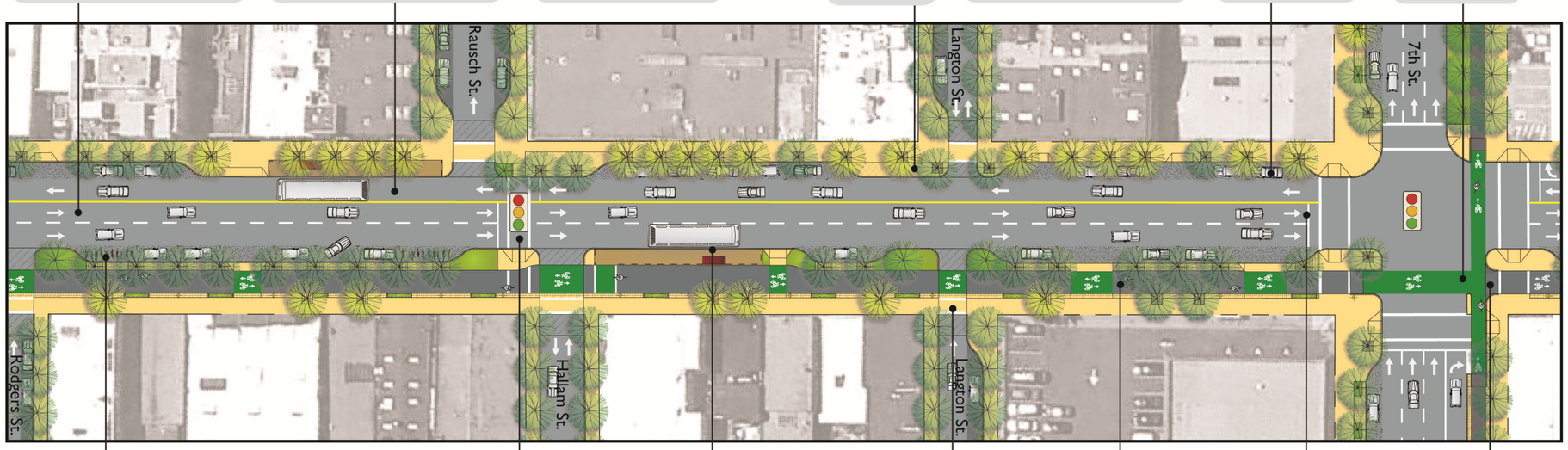
Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and more comfortable for cyclists and pedestrians.

Bulb-outs will be added to all intersections where a turn lane is not needed.

Sidewalks on both sides of Folsom Street remain 10 feet wide, but will be treated with new streetscape amenities to increase pedestrian comfort - see Streetscape/ Landscape Concept.

Parking lanes are maintained on both sides of the street, except where bulb-outs or turn lanes are required.

The pavement in areas of potential conflict between cyclists and motorists is colored green.



Some parking spaces can be repurposed as bicycle corrals to improve access to the neighborhood commercial district and other important destinations.

New signalized midblock crossings will allow easier crossing of the street between the widely spaced major cross streets.

The 27-Folsom and 11 Downtown Connector will operate eastbound and westbound on Folsom Street every 8 minutes. Riders will board eastbound buses via islands on the street side of the cycletrack.

Bus stops will be located at mid-block crossings to ensure that westbound vehicles do not block intersections while waiting behind a stopped bus.

At intersections with alleys, the alley roadway ramps up to sidewalk grade, slowing cars as they enter and exit the alleys.

A two-way cycletrack is accommodated between the parking lane and the sidewalk. The cycletrack will be primarily at sidewalk grade and have a buffer area separating it from both pedestrians and people exiting parked cars.

Vehicle left turns are restricted from most Folsom intersections, reducing the number of turn pockets required and diverting some trips to Howard, which will provide a left turn lane serving both directions of travel.

At major intersections, the cycletrack ramps down from sidewalk grade to street grade.

50' 100'

December 21, 2011

Howard Street Operations Concept (Recommended Alternative)

The Transportation Concept for Howard Street converts vehicle travel to two-way. However, because the street's "two-plus-one" lane configuration will allow westward travel to remain dominant, this alternative has characteristics typically associated with one-way travel, such as signal timing, traffic calming, and opportunities for mid-block crossings. A center median will allow turn pockets where needed, add a major green design element to the street, and allow for pedestrian refuges at midblock and some major street crossings.

Howard will have two westbound lanes and one eastbound lane. A two-way configuration provides vehicle circulation options while helping to calm traffic.

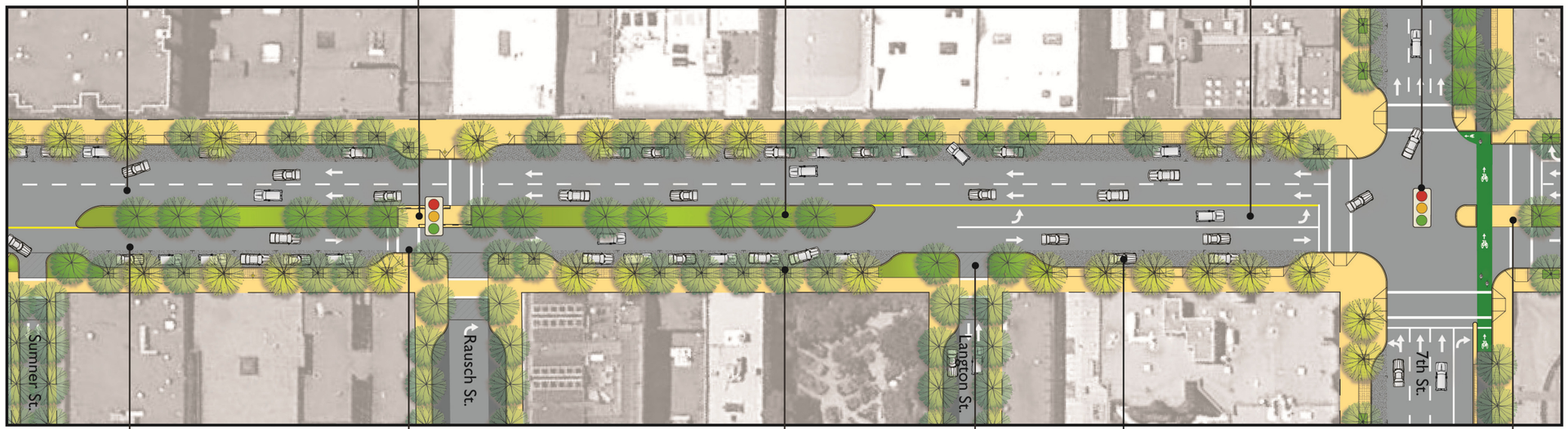
A median pedestrian refuge, as well as bulb-outs, will greatly reduce pedestrian crossing distances at mid-block crossings.

The existing westbound bicycle lane will be removed from Howard between 5th to 11th, replaced with a new two-way cycletrack on Folsom.

Landscaped medians will be added in the middle segments of blocks.

Left turn pockets occupy the median space where needed. Convenient left turns off Howard will compensate for restricted lefts off Folsom.

Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and make the street more comfortable for pedestrians.



While vehicles have the option of two-way travel, traffic signals are timed to the westbound traffic, making eastbound auto travel more suited to local rather than crosstown trips.

New signalized midblock crossings will allow easier crossing of the street between the widely spaced major cross streets. The median refuge will allow for two-phase pedestrian crossing.

Sidewalks on both sides of Howard Street will remain 12 feet wide, but will be treated with new streetscape amenities to increase pedestrian comfort - see Streetscape/ Landscape Concept.

At intersections with alleys, the alley roadway ramps up to sidewalk grade, slowing cars as they enter and exit the alleys.

Parking lanes will be maintained on both sides of the street, except where bulb-outs or turn lanes are required.

At intersections with major cross streets, such as 7th Street, where a left turn pocket is not needed, the planted median can extend to the intersection, allowing for a pedestrian refuge in the middle of Howard Street.

50' 100'

Folsom and Howard Street Corridor Circulation Concept (Recommended Alternative)

Consolidate local transit service on Folsom Street to improve system legibility and improve access to the neighborhood commercial district.

Implement robust transit priority on Mission Street to create an east-west transit spine in the south of Market.

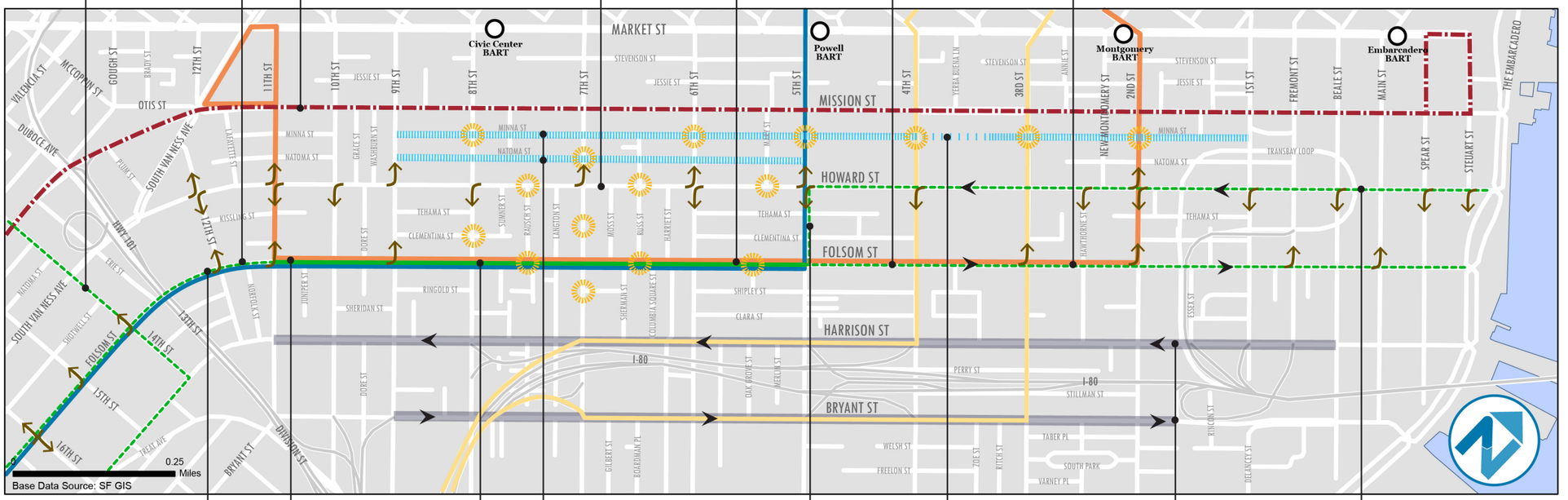
Between 11th and 5th, convert Folsom Street to two lanes eastbound and one lane westbound.

Convert 14th Street to two-way between Guerrero and Folsom, and add westbound sharrows.

Between 11th and 5th, convert Howard to two-way operation, with two lanes westbound, one lane eastbound, and a center turn-lane/landscaped median. Remove bicycle lane.

Between 4th and 5th, convert Folsom to three lanes eastbound and one lane westbound.

Between 2nd and 4th, remove a parking lane and add a westbound bus-only lane. This segment will remain one-way for vehicles.



Add a westbound/southbound bicycle lane on Folsom between 11th and 14th Streets.

Restrict lefts off of Folsom during peak periods.

Ensure implementation of 5th Street bike lanes as per the San Francisco Bicycle Plan.

Explore opportunities to improve pedestrian connectivity through the Metreon site to Yerba Buena Gardens.

Complete the proposed bike lane on Howard between Fremont and the Embarcadero.

Add a two-way buffered cycletrack on the south side of Folsom between 5th and 11th Streets.

Enhance alternate pedestrian paths of travel on Minna and Natoma Streets by adding signalized mid-block crossings of arterials, traffic calming, landscaping, and pedestrian-scale lighting on these alleys.

Retain substantial vehicle capacity on Harrison and Bryant Streets, which will remain major freeway approach routes and recommended truck routes.

LEGEND

- Permitted left off of Folsom or Howard during peak periods
- One-way circulation
- East-west bicyle route
- Cycletrack
- 11 Downtown Connector (local transit)
- 27 Folsom (local transit)
- Mission Street Transitway (rapid transit)
- 9X (express transit)
- Enhanced pedestrian path of travel
- Pedestrian actuated signalized mid-block crossing
- Recommended truck routes

Circulation Concept Detail (Recommended Alternative)

The overall framework for east-west circulation in the South of Market District between Mission and Bryant Streets is outlined in Section 5.3. This section provides detail on how circulation on Folsom and Howard would be managed under the recommended alternative.

Folsom Street transit consolidation

Consolidating both directions of transit service on Folsom Street is an important project objective and a key feature of the recommended priority project alternative. Two-way operation on Folsom would support user understanding (transit routes that operate in both directions on the same street are simpler and more "legible") and improve access to the emerging neighborhood commercial district along Folsom between Sixth and Eighth Streets.

The concept proposed for the priority project segment would convert Folsom Street between Fifth and 11th Streets to two-way operation. This would allow the 27 Folsom, which currently operates westbound on Harrison Street west of Fifth Street, to operate westbound on Folsom instead. Additional changes to Folsom Street between Second and Fifth Streets will be required to allow the current 12 Folsom and the planned 11 Downtown Connector to operate in both directions on Folsom Street. These are detailed below.

- **Folsom from 11th to Fifth.** Between Fifth and 11th streets (the EN TRIPS priority project segment), Folsom Street would accommodate two-way travel for both buses and private vehicles. There would be two eastbound travel lanes and one westbound travel lane. Westbound transit travel speed along Folsom would be somewhat slower than along Harrison. However, shifting Routes 12 and 11 in the westbound direction from Harrison to Folsom would reduce the length of each route by 1,100 feet and eliminate two required turns, potentially fully offsetting this impact. In the westbound direction, buses would stop in the single westbound travel lane, requiring vehicles to wait while transit passengers board and off-board the bus.[2] To ensure that these waiting vehicles do not block north-south travel at intersections, transit stops will be placed mid-block (adjacent to new signalized mid-block crossings) rather than at the far side of intersections.
- **Folsom from Fifth to Fourth.** Between Fourth and Fifth Streets, where retail uses predominant (and thus maintaining the on-street parking supply has higher priority), one travel lane should be converted to a westbound mixed-flow travel lane, serving both buses and private vehicles. While the two-way cycletrack would terminate at Fifth Street, an eastbound bicycle lane would continue to Second Street on the south side of the street as it does today.
- **Folsom from Fourth to Second.** Current and forecast traffic volumes on Folsom increase as one moves to the east. During the PM peak period, Folsom serves as a primary access route to the Bay Bridge. Because Bay Bridge-bound vehicles turn right at Essex Street, much of this traffic is on the south side of the street. Between Second and Third Streets, buses will avoid the Bay Bridge queue by operating in the left lane with a boarding island far-side at Third Street. This area also has more office and fewer retail

[2] If it is determined that this configuration introduces too much delay for westbound vehicles, westbound buses could instead stop at a standard curbside stop (rather than a bus bulb), at which they would pull out of the flow of traffic. Eastbound buses would continue to use a bulb stop. In this case, bus stops in both directions should be moved to the far side of intersections.

uses, and the back side of the Moscone Center/Yerba Buena complex occupies the entire north side of the block between Third and Fourth Streets. In this segment, the parking lane on the north side of the street should be removed and the space repurposed as a curbside westbound bus-only lane. Because this lane would be wider than the existing parking lane, it would be necessary to remove one of the existing eastbound travel lanes. Three eastbound travel lanes and the eastbound bicycle lane should remain. Because this westbound lane would not be open to private vehicles, this treatment would improve transit speed and reliability in this two-block segment.

Folsom Street bikeway

The recommended alternative calls for a two-way parking buffered cycletrack on Folsom Street. In this design, Folsom Street will become the primary street for bicycle travel to and from the Mission District and points south into the South of Market area, and through the South of Market as far east as Fifth Street. Eastbound bicycle travel would continue in a Class II bicycle lane on Folsom Street as far east as Second Street. Westbound cyclists between the Embarcadero and Fifth Street would continue to use the existing Howard Street bike lane. Those continuing west would transition to Folsom using the planned Fifth Street bicycle lanes.

- **Folsom Street bikeway from 11th to Fifth.** Between Fifth and 12th Streets, cyclists will travel in a buffered two-way facility on the south side of Folsom Street. In their final build-out, these facilities will be primarily at sidewalk grade, with a buffer space and a parking lane separating them from traffic. They will ramp down to street grade approaching major intersections. At curb cuts and alleyway crossings of the cycletrack, parking will be set back from the crossing a sufficient distance to ensure clear sight lines.

  The edge between the cycletrack and the sidewalk will be clearly marked with a tactile treatment to ensure that visually impaired pedestrians can recognize the boundary between pedestrian and bicycle space. At designated pedestrian crossings of the cycletrack (including mid-block crossings and bus stops), a different tactile treatment will be applied to help visually impaired individuals locate and utilize the crossing. Design treatments will be used to slow cyclists at mid-block pedestrian crossings and indicate that cyclists are entering a pedestrian space. These treatments may include a narrowing of the cycletrack, a small pedestrian refuge in the center of the cycletrack to create a horizontal diversion for cyclists in both directions, and/or pedestrian actuated flashing beacons to alert cyclists to the presence of a crossing pedestrian.
- **Bicycle Facilities east of Fifth Street.** At Fifth Street, the separated bikeway would terminate. Eastbound cyclists would continue in the existing class II bicycle lane on the south side of Folsom Street as far east as Second Street. Westbound cyclists would use the existing westbound bicycle lane on Howard Street between Second and Fifth Streets. At Fifth Street, they would use the planned Fifth Street bicycle lanes to transition from Howard Street to Folsom. To allow for this circulation pattern, the implementation of the Fifth Street bicycle lanes as specified in the San Francisco Plan is an essential component of the EN TRIPS priority project and should be prioritized.
- **Folsom street bicycle lanes from 12th to 14th Streets.** At 12th Street the buffered facility would terminate, but class II bicycle lanes would continue on both sides of Folsom Street. The existing eastbound bicycle facility would remain in place, while a south/west bound bicycle lane would be added between 12th and 14th Streets. (If it is necessary to maintain a left turn lane westbound at Division Street for traffic capacity reasons, the

Class II lane could be dropped and replaced with sharrows for a short segment approaching Division). South of Division Street, a bicycle lane could be added in the southbound direction by narrowing the existing travel lanes slightly. In this segment, the north/eastbound 27 Folsom would operate side-by-side with class II bicycle lanes. Bicycle lanes would be dropped at bus stops, and buses would merge across the bicycle lane. With low transit frequencies and only moderate volumes of cyclists, this arrangement should not present an operational problem for this segment.

- **Bicycle connectivity south of 14th Street.** Bicycle lanes are planned and will be implemented shortly on Folsom Street between 14th and 19th Streets (and eventually as far south as 25th), allowing for strong connectivity in both directions between the Mission District and the Folsom Street bikeway in SOMA. In addition, as proposed in the 16th Street Corridor section of this document under Grid Repair, 14th Street should be converted to two-way operations for both vehicles and cyclists. The existing eastbound bicycle lane would be maintained, allowing connectivity to Harrison Street bicycle lanes and points west, while westbound sharrows would be added allowing connectivity to Valencia Street bicycle lanes and points west.

Folsom and Howard vehicle circulation

The Eastern Neighborhoods area plans prioritize improvements to conditions for transit, bicycle, and pedestrian travel choices. This prioritization is essential if the Eastern Neighborhoods transportation system is to accommodate the forecasted growth in travel demand while maintaining neighborhood liveability. Given these priorities, this plan tolerates changes that increase vehicle delay where necessary to meet other project goals. However, because transit will continue to operate in mixed-flow traffic on Folsom and Howard Streets, keeping traffic delay on these streets to a manageable level during peak periods is required for effective function on east-west transit service in the South of Market District.

Today, Folsom and Howard Streets provide a total of seven lanes of vehicle capacity (four eastbound on Folsom Street and three westbound on Howard). This capacity is currently more than is required to maintain acceptable traffic conditions during peak periods and far more than is required during off-peak periods. The proposed alternative would reduce this total from seven to six lanes (two eastbound and one westbound on Howard, two eastbound and one westbound on Folsom). They would also put in place a series of accommodations for and restrictions to vehicle turning movements to support faster and more reliable transit service and to reduce conflicts with cyclists at intersections.

- **Signalization for through-traffic.** Folsom and Howard Streets should be managed to encourage moderate vehicles speeds that are safe and comfortable for pedestrians. In addition to the traffic calming that can be expected to result from converting to two-way circulation, and narrowing the roadway in places with bulb-outs, signals will be timed to favor 12-15 mph progression in the dominant direction of travel. (Depending on the configuration of mid-block signals and the progression speed chosen, it may be possible to time signals to progress at a constant speed in both directions. This possibility is discussed further below). Twelve- 15 mph vehicle speeds virtually eliminate the possibility of fatal collisions with pedestrians. Signals will be equipped with transit priority at both cross-street and mid-block signals that would hold the green phase when necessary for eastbound buses.

- **Management of right turns** . On Folsom and Howard Streets, right turns would be permitted at all intersections except those where a one-way cross street removes the possibility. At the approach to these intersections, the parking lane would be dropped, and a right turn pocket would be provided. On Howard Street, no special signalization would be required to manage right turns. On Folsom Street, there will be a two-way cycletrack on the south side of the street. To reduce conflicts between cyclists and right turning vehicles, signals would be set as follows: during the green time for through vehicles on Folsom, an initial period of time would be provided for through cyclists, with right turns prohibited. Once cyclists have cleared the intersection, cyclist through-movement would be given a red light, and vehicle right turns would be permitted. Because right turning vehicles and westbound cyclists would be facing each other at this location and passing on each other's left, it is imperative that clear sightlines be maintained and a generous raised concrete buffer be provided to remove the possibility of head-on collisions.
- **Management of left turns.** Converting Folsom and Howard Streets to two-way operations introduces the potential for left turn conflicts on both streets. When vehicles wait in the travel lane to turn left, they block through-traffic. On busy streets with few breaks in oncoming traffic, this arrangement can reduce the effective peak-period capacity of the street by one lane in each direction. As a result, most two-way streets in the South of Market either restrict left turns or provide dedicated space for left-turners to wait. For the recommended concept, left turns should be handled as follows.

  On Howard Street, a center lane will be used for a landscaped median at mid-block and for a left turn lane at intersections where required. Left turns would be permitted in both directions (except where left turns are not possible due to one-way cross streets), but no dedicated signal phase would be provided.

  On Folsom Street, no left turns would be permitted from the single westbound lane at any time of day. Eastbound lefts would be permitted from the through-lane outside of peak periods but during peak periods left turn lanes would be prohibited in the project segment except at Ninth Street. At Ninth Street, a left turn pocket would be provided by dropping the parking lane on the south side of the street in the approach to the intersection and shifting the through travel lanes to the curb. Through-traffic would shift back toward the centerline of the street in the intersection, and the parking lane would resume at the far side of the intersection.

  As a result of this configuration, most peak-period left turns in the corridor would be accommodated on Howard Street. This arrangement would have the effect of shifting a share of the corridor's trips from Folsom to Howard, freeing up some capacity and reducing delay for transit on Folsom Street.
- **Alleyway entrances and exits.** Where Folsom and Howard Streets intersect with alleyways, traffic calming treatments will be applied to benefit pedestrians and cyclists. Turning radii will be tightened with bulb-outs, and the roadway will be raised to the street grade to clearly indicate to drivers that they are entering a space where vehicle through movement is a lower priority. As at the intersection of Seventh and Minna, where this treatment is already in place, tactile treatments will be applied to indicate to visually impaired individuals that they are crossing a roadway.

Folsom and Howard Street mid-block crossings

Signalized mid-block crossings will be placed on each block. Crossings will be placed at or near the alleys when they are present. These crossings will be configured as follows.

- **Howard Street.** Signalized mid-block crossings will be situated near alleys (including Rausch, Russ, and Mary Streets). Sidewalk extensions will be added on both sides of the street to narrow crossing distances.

  Howard Street will also have a landscaped median, which will serve as a refuge to allow pedestrians to cross the street in two movements. A two-phase pedestrian crossing will allow traffic progression to be synchronized in both directions, and for the mid-block signals to be fixed time (as opposed to pedestrian-actuated). Fixed-time signals at mid-block crossings will encourage drivers to maintain a constant speed, rather than speeding up on Howard's long blocks and then waiting at major intersections.
- **Folsom Street.** On Folsom Street, signalized mid-block crossings will be added at Rausch, Russ, and Falmouth alleys. At these locations, sidewalk extensions into the parking lane would be added on the north side of the street. On the south side of the street, a pedestrian refuge would be located in the parking lane (see the Folsom Street Bikeway section for a discussion of treatments to ensure safe crossings of the cyceltrack in this location).

  Because Folsom Street would have two-way traffic but no pedestrian median refuge, it may not be possible to configure signals for steady progression in both directions. If bi-directional signal coordination is not possible, signal timing will favor eastbound progression. In this case, pedestrian actuated (rather than fixed-time) mid-block signals may be necessary to ensure that westbound buses are not unnecessarily delayed. The precise configuration of Folsom Street mid-block signals will be determined during detailed design. Whether mid-block signals are fixed-time or pedestrian actuated, transit signal priority would be provided to extend the green light phase for an approaching bus.

This page intentionally left blank.

Folsom Street Streetscape and Landscape Concept (Recommended Alternative)

The Streetscape/Landscape Concept for Folsom Street aims to achieve a "Civic Boulevard" as identified in the Eastern Neighborhoods area plan for SoMa. The design includes different but complementary approaches to the two sides of the street. On the side of the street with the cycletrack, the concept includes treatments that seek to visually and physically buffer the sidewalk-grade bicycle facility through paving patterns, landscaping, and placement of furnishings while also providing amenities and quality space for all users of the street. On the other side of the street, the design concept maintains the 10-foot wide sidewalks, but creates a uniformormity to the appearance of the streetscape by adding regularly spaced street trees, pedestrian-scale lighting, and other street furniture where appropriate. Where Folsom Street crosses alleys such as Rausch Street, bulb-outs provide opportunities for stormwater management, landscaping, and public space. This concept draws from design guidance provided by the City of San Francisco Better Streets Plan.

Where existing street trees are absent, new street trees in grates are added as a unifying design element. Trees are regularly spaced in coordination with adjacent parking spaces.

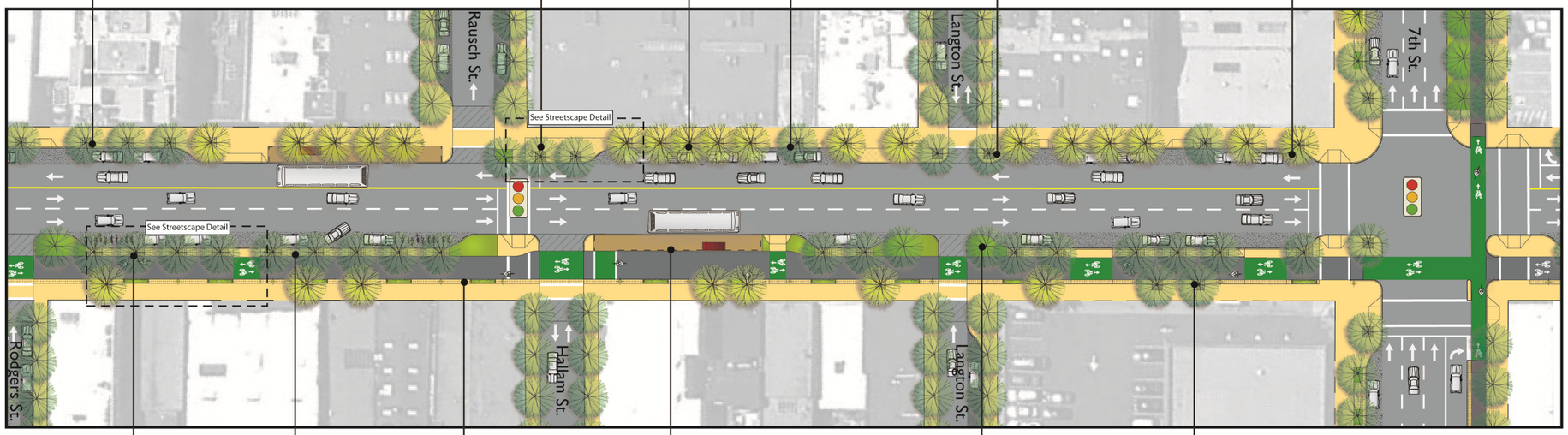
Because the sidewalks on Folsom Street will remain 10 feet wide, extended bulb-outs are the main opportunities for additional pedestrian space.

Existing trees can be accommodated in the new streetscape in most cases. Larger tree grates improve tree health.

Where existing trees remain and already occur with some regularity, new trees and tree grates "fill in" the pattern.

Trees near potential conflict points between autos and cyclists on the cycletrack will be pruned to have a 14-foot minimum clearance to their lowest branches to ensure visibility, per Better Streets Plan, while creating an entry/exit "marker" at alleys.

The parking lane can be treated with permeable paving for stormwater infiltration.



New trees are planted with grates, wood platforms, or another walkable surface in the 4-foot buffer area between the parking lane and the cycletrack. These trees create a unified look for the street.

A 4-foot area between parking spaces and the cycletrack provides room to exit parked cars and access the sidewalk safely. Treating this area with the same paving as the furnishings zone on the other side of the cycletrack creates the visual effect of a buffer bracketing the cycletrack.

A narrow strip of special paving, planter strips, occasional trees, and furnishings creates a buffer separating pedestrians from cyclists on the cycletrack, while still leaving enough clear space for "Main Street" activities like pedestrian through travel, outdoor dining, and display space.

Leaning bars along the back of the transit boarding platform provide an amenity for waiting transit riders and create a visual and physical separation of platform and cycletrack.

Bulb-out areas separated from the sidewalk by the cycletrack can be used for greening and stormwater management.

New trees on the outside of the cycletrack and those planted on the inside achieve an "allee effect". Trees on the outside should be planted with grates and staggered with the trees on the inside of the cycletrack.

50' 100'

LEGEND

Existing tree | New tree | Public space opportunity | Planter strip | Permeable paving | Tree grate | Pedestrian Light

Howard Street Streetscape and Landscape Concept (Recommended Alternative)

The Streetscape/Landscape Concept for Howard Street maintains the 12-foot wide sidewalks, but reorganizes this space through the introduction of a generous Through Zone and a Furnishings/Edge Zone that will contain regularly spaced street trees, pedestrian-scale lighting, room for people to enter and exit parked cars, and permeable paving. The centerpiece of the Howard streetscape will be a planted median, a feature unique among SoMa streets. This median will green the street, reduce the overall scale of the street to be more comfortable for pedestrians, and add a potential stormwater management (LID) feature. Like other EN TRIPS street designs for the SoMa area, the Howard streetscape design will reconfigure intersections with alleys so that pedestrian crossings of alleys are raised, and bulb-outs at alley entrances will provide a conspicuous entry/exit marker. The concept draws from design guidance provided by the City of San Francisco Better Streets Plan.

Landscaped median provides greening opportunity, human scale, and potential for stormwater management (LID).

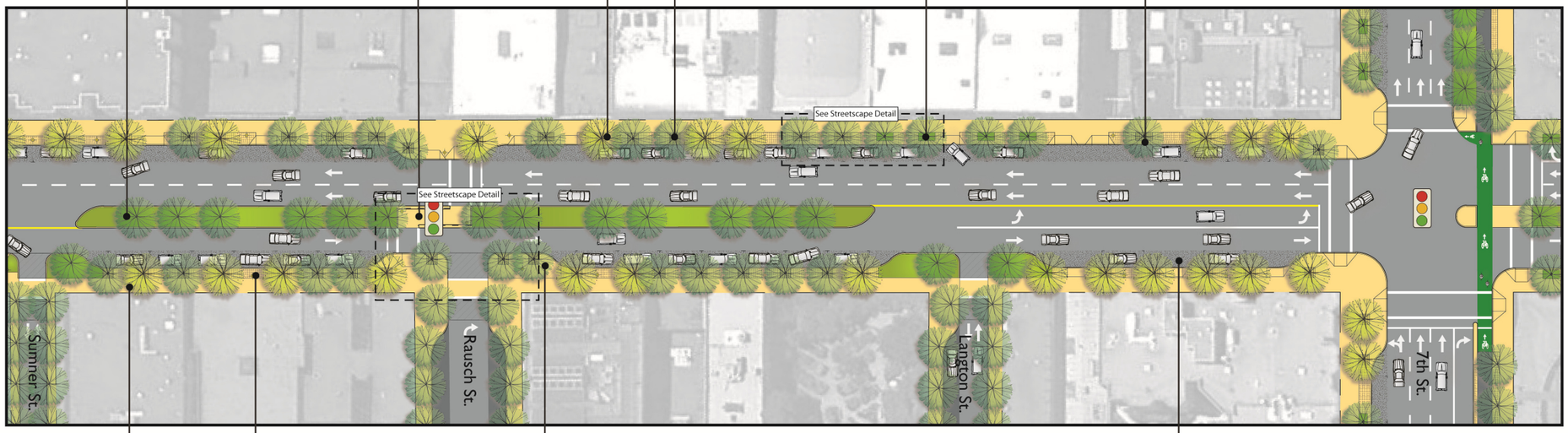
Median allows for a pedestrian refuge at the new midblock crossing.

Existing trees can be accommodated in the new streetscape in most cases. Larger tree grates improve tree health.

Where existing trees remain and already occur with some regularity, new trees and tree grates "fill in" the pattern. Trees can be in grates or in planter strips.

Where existing street trees are largely absent, new street trees in grates are added as a unifying design element. Trees are regularly spaced in coordination with adjacent parking spaces.

Where new trees are added, a paved area along the edge of the sidewalk is maintained for people entering and exiting parked cars.



The Through Zone of the sidewalk allows for pedestrian travel.

The Furnishings Zone of the sidewalk contains street trees, pedestrian lighting, and street furniture.

Bulb-outs are opportunities for public space, greening, and stormwater management (LID).

The parking lane can be treated with permeable paving for stormwater infiltration.

50' 100'

LEGEND

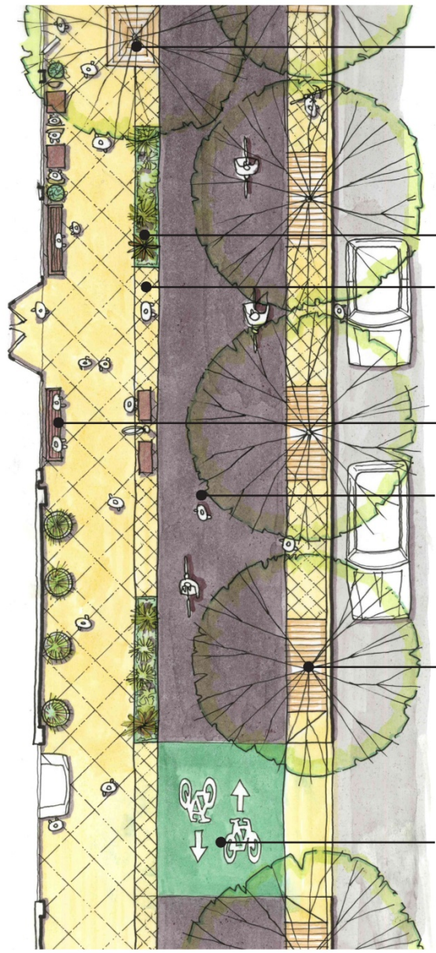
Existing tree | New tree | Public space opportunity | Planter strip | Permeable paving | Tree grate | Pedestrian Light

Folsom and Howard Street Streetscape and Landscape Concept Detail (Recommended Alternative)

Folsom Street

Streetscape Treatment Type: 10-foot Sidewalk with Cycletrack - Typical

This treatment is appropriate for the block faces of Folsom Street that include a cycletrack. This design is based on buffering the cycletrack - in part visually, in part physically - from pedestrians and parked vehicles; framing the cycletrack as a civic amenity by lining it on both sides with landscape and furnishings; and allowing enough of the sidewalk to be used for walking and activities along building frontages like dining and display.



Existing street trees can be accommodated into this streetscape. Their vitality can be increased by increasing their tree pit area and the addition of 5-foot-by-5-foot tree grates that will not diminishing the pedestrian through zone.

The pedestrian realm's furnishings zone and the edge zone both have a similar, more intricately scored paving pattern that is distinctive from the sidewalk. This creates a consistent visual buffer on both sides of the cycletrack, reducing the potential for cyclist-pedestrian collisions.

The cycletrack, at sidewalk grade, is paved with asphalt or other material that visually contrasts with the sidewalk paving.

Driveways, like other points where cyclist-motorist conflicts are possible, are treated with standard green coloring. The pedestrian realm runs through driveways, uninterrupted.

In the furnishings zone of the pedestrian realm, narrow planter strips alternate with areas for furnishings, such as pedestrian lighting and newspaper racks. Especially in Folsom Street's "Main Street" area (between 6th and 8th Streets), this zone should be carefully designed to balance space for furnishings, room for walking, and building-adjacent space used by stores and restaurants.

The concept allows room for a frontage zone where tables, seating, planters, and goods on display can be placed along the building frontages, supporting a "Main Street" character for Folsom Street.

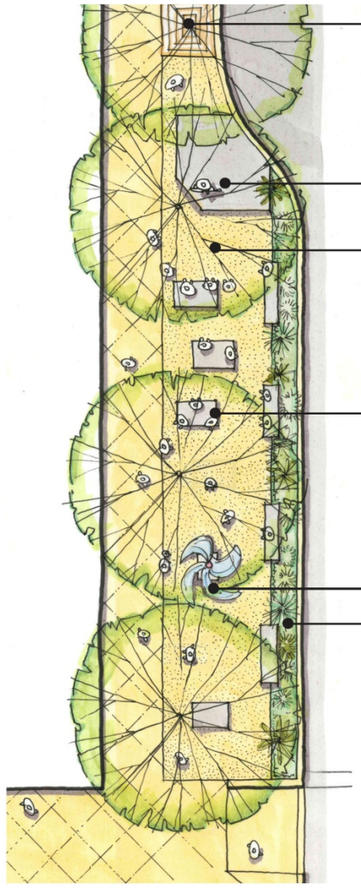
Evenly spaced street trees planted in the 4-foot buffer between the cycletrack and the parking lane are an important unifying feature of the street. Trees are accommodated in a 4-foot-by-8-foot tree grates or other treatment that allows walking across the tree pit area.

Folsom and Howard Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

Folsom Street

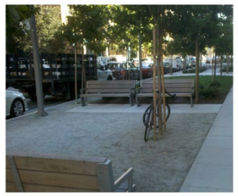
Streetscape Treatment Type: 10-foot Sidewalk at Mid-Block Bulb-Out

This treatment is appropriate where an extended bulb-out occupies a street corner and especially in areas with potentially high-foot traffic, such as this sample location at Rausch Street. The sample design uses the majority of the sidewalk and bulb-out space to create a small public space, thus addressing the need for small public spaces that serve the neighborhood expressed in the Eastern Neighborhood plans. The design includes places to sit, significant landscaping, public art, and distinctive lighting. Such small public spaces along Folsom, especially those in the street's neighborhood commercial core, should be carefully designed to support the desired "Civic Boulevard" character, here illustrated as including a small "stage" platform, seating, public art, and the buffering from traffic through landscaping.



Existing street trees can be accommodated into the new design. Their vitality improves by increasing their tree pit area and the addition of 5-foot-by-5-foot tree grates that will not diminish the through zone.

Public spaces can be made more welcoming and distinguished from the through zone of the sidewalk by paving them in a permeable, ADA-compliant surface such as decomposed granite.



Small public spaces in bulb-outs can include focal points, such as a small platform that can serve as a performance stage, "soapbox", seating, or a place to put community or food booths.

Low seat "blocks" or walls can provide places to sit in a variety of orientations.

Public art projects can express neighborhood identity.

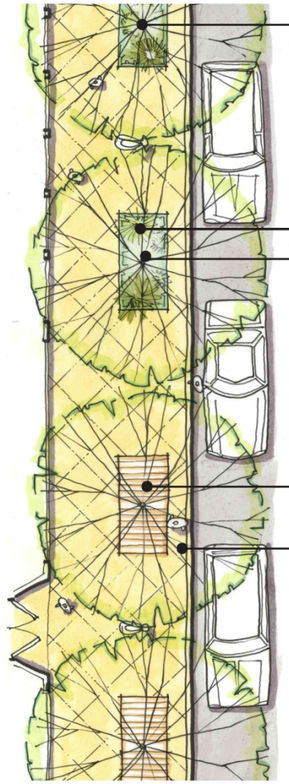
A 2-foot planter strip helps buffer small public spaces on bulb-outs from moving traffic.

Folsom and Howard Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

Howard Street

Streetscape Treatment Type: 12-foot Sidewalk - Typical

This treatment is appropriate for most block faces of Howard Street. Sidewalks will remain 12 feet wide, but the pedestrian realm can be reconfigured to incorporate existing trees and add new trees, so that regularly spaced street trees become a unifying element for the corridor's wide range of dissimilar land uses. The pedestrian realm shown in this concept accommodates pedestrian through movement and movement in and out of parked cars, allows for some use of sidewalk space by adjacent uses, and supports tree health. It is flexible in responding to varying needs for hardscape surfaces and the integration of street greening.



Regularly spaced trees will help to unify the visual appearance of the Howard streetscape.

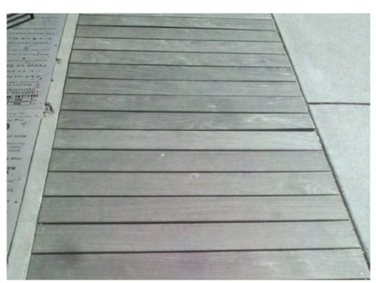
Where there is less foot traffic, tree pits can be planted with grasses and shrubs to further green the street.

Tree pits are set back from the face of curb to allow people to exit parked cars and access the sidewalk safely and comfortably.

Trees are planted in pits 4 feet wide by at least 6 feet - and up to 14 feet - long, depending on the amount of foot traffic.

Where there is more foot traffic and tree pits are shorter, tree grates can be used to expand the effective amount of walkable surface while still improving tree health.

Alternately, wooden "grates" can be placed over tree pits, or in one long continuous strip, allowing for walking, water infiltration, and healthier soils for trees.

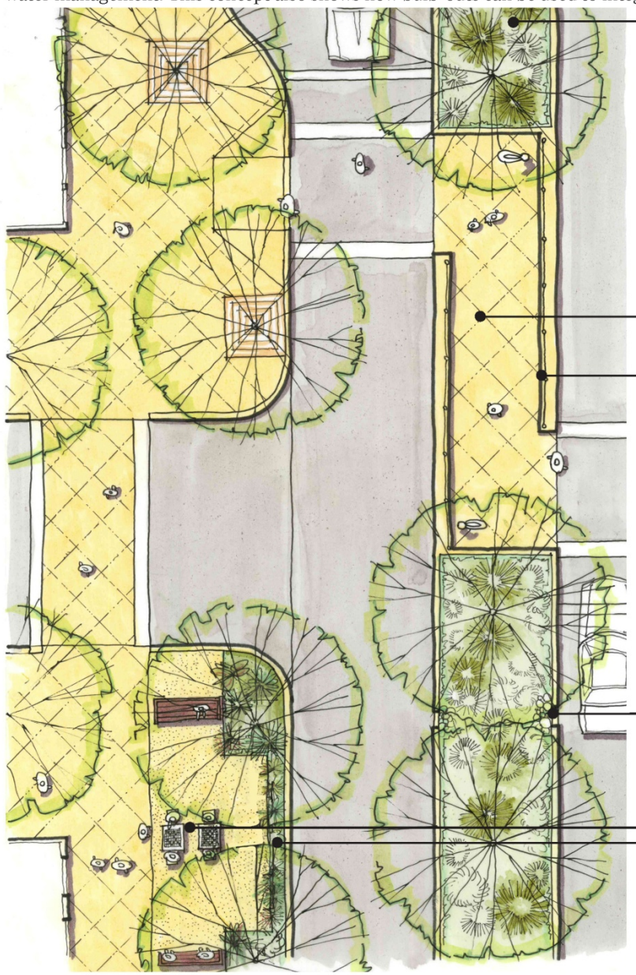


Folsom and Howard Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

Howard Street

Streetscape Treatment Type: Mid-Block Crossing

This treatment is appropriate for areas along Howard Street where a mid-block crossing occurs. This concept shows how the center median is a key feature of the streetscape, with trees and other landscaping, a pedestrian refuge, potential decorative elements such as railings and pedestrian-scale lighting, and the potential for storm-water management. This concept also shows how bulb-outs can be used to integrate small-scale public spaces.



The median can be planted with clusters or regularly spaced trees, as well as shrubs and grasses. A landscaped median will reduce the perceived width of the street and make it more comfortable to pedestrians.

The median accommodates a large refuge for pedestrians crossing Howard Street and includes pedestrian scale lighting, special paving that contrasts with the street surface, and railings.

Railings present opportunities for enriching the visual interest of the streetscape through decorative or artistic treatments.

If roadway crowning allows, the median can be designed as a LID feature for stormwater infiltration and conveyance.

Where desired and properly cared for by the community, amenities like chess tables can add interest to public small spaces in bulb-outs.

A 2-foot planter strip helps buffer small-scale public spaces in bulb-outs from moving traffic.

Folsom and Howard Street Corridor Project Phasing (Recommended Alternative)

Because the recommended alternative does not propose moving curb lines, most of its key features can be implemented quickly, once environmental review is complete and funding is available.

In this first phase, Folsom and Howard Streets would be converted to two-way operation, and the cycletrack would be implemented on Folsom between Fifth and 11th Streets. Street operations would be adjusted to allow for two-way transit between Second and Fifth Streets. A westbound bicycle lane would be striped between 11th and 14th Streets to improve connectivity to the Folsom Street cycletrack. Pedestrian bulb-outs and mid-block crossings would be added. A landscaped median would be added on Howard, and landscaping and other streetscape elements would be added to Folsom Street to enhance its role as a Civic Boulevard.

Some associated circulation changes could be delayed into a second phase following project implementation or implemented incrementally. These include upgrading of the pedestrian path of travel on Minna and Natoma and implementation of robust transit priority on Mission Street. Specific cost estimates will be included in the EN TRIPS Funding and Implementation Plan.

Figure 5-5 EN TRIPS Folsom/Howard Priority Project Phasing

	Phase 1	Phase 2
Circulation	Two-way Folsom Street between Fourth and 11th (2 lanes EB, 1 lane WB). Striping and signals.	
Circulation	Two-way Howard Street between Fifth and 11th (2 lanes WB, 1 lane EB, center turn lane). Striping and signals.	
Circulation	Re-time SOMA signals to favor moderate progression speeds on both east-west and north- arterials.	
Bikes	Stripe an 11' two-way parking-buffered cycletrack on South side of Folsom Street between Fifth and 12th.	Raise cycletrack and buffer to sidewalk grade.
Bikes	Upgrade signals to allow split right-bike through phasing.	
Transit	Construct mid-block bus bulbs.	
Pedestrian	Construct pedestrian corner bulbs with landscaping.	
Pedestrian	Add threefixed-time signalized, mid-block crossings on Folsom (Rauch, Russ, and Falmouth) and Howard (at Rauch, Russ, and Mary Streets).	
Public Realm	Add landscaping and pedestrian amenities.	
Public Realm	Add landscaped median in center turn lane on Howard between Fifth and 11th (except where left turn pockets are required).	

Figure 5-6 EN TRIPS Folsom/Howard Corridor Associated Circulation Changes — Project Phasing

	Phase 1	Phase 2
Transit	Remove curb parking on north side of Folsom between Second and Fourth Streets and replace with contraflow transit lane. Striping, signals, overhead wire.	
Bike		Two-way 14th Street between Guerrero and Folsom.
Bikes	Implement Fifth Street bicycle lanes as per SF bicycle plan.	
Bikes	Stripe westbound/southbound bicycle lane on Folsom between 11th and 14th.	
Transit		Design and implement robust transit priority for Mission Street.
Pedestrian	Upgrade Minna and Natoma between Sixth and Eighth Streets with traffic calming, landscaping, and signalized, mid-block crossings of Seventh and Eighth Streets.	
Pedestrian		Complete upgrade of pedestrian path of travel on Minna and Natoma between Ninth and Fourth Streets.

5.6 OTHER PROMISING ALTERNATIVES

In addition to the recommended alternative described in the previous section (Alternative 5), three other concepts were selected for additional analysis, design, and community input. These include a single one-way option and two additional three-lane Folsom Street options. These additional options are included for stakeholder review and potential inclusion as alternatives in environmental analysis of the project.

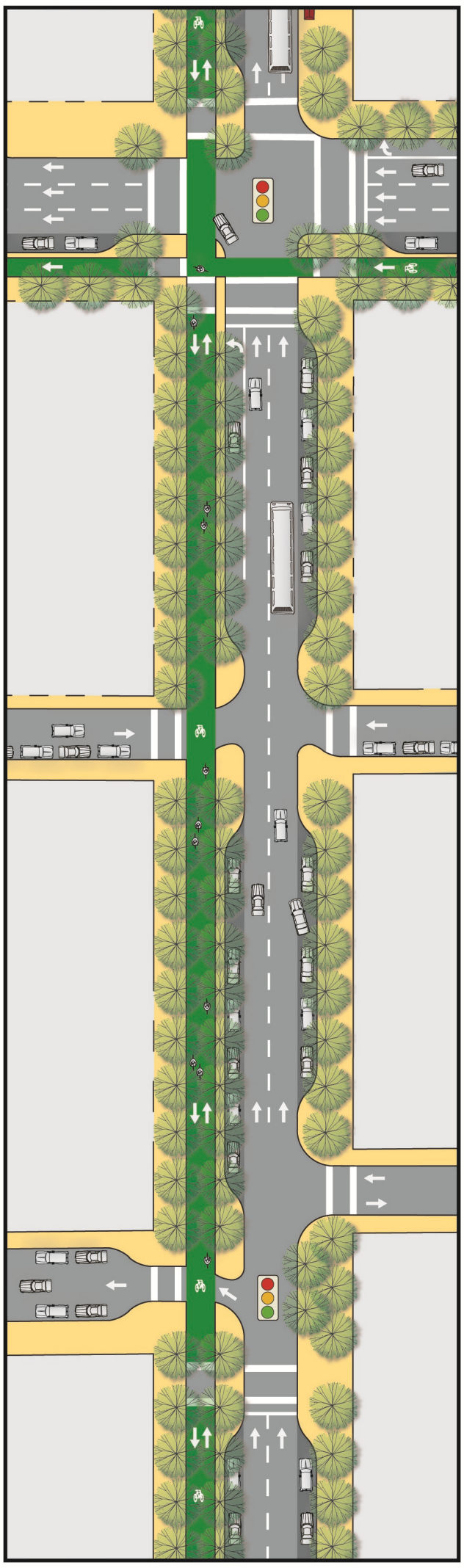
There are important policy tradeoffs between the four different alternatives. Key differences between these concepts and the recommended alternative are summarized below. In addition, the findings of a detailed traffic analysis of the four alternatives are provided in Appendix A. These alternatives merit further consideration during the environmental phase of the project.

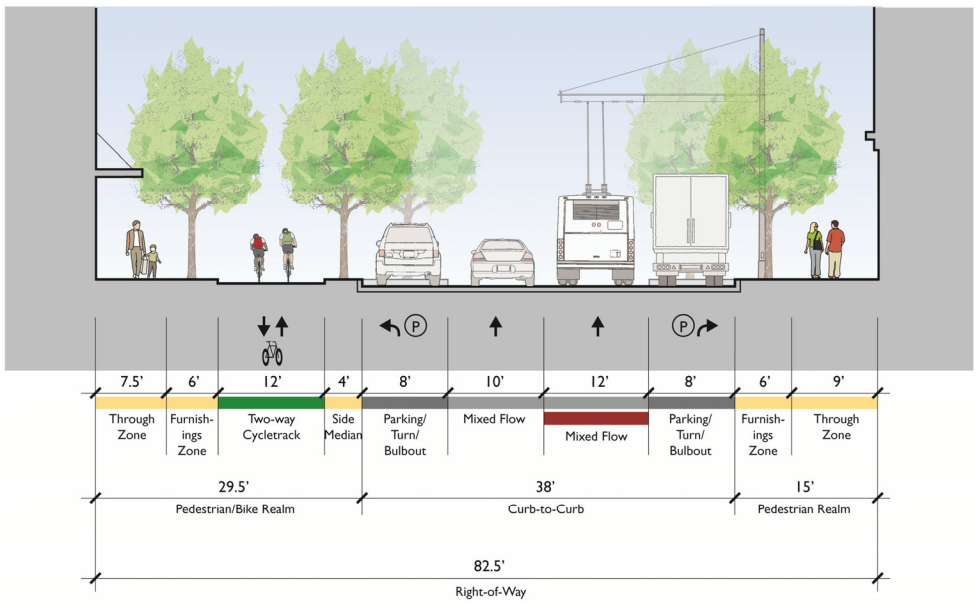
- **Alternative 1: One-way Folsom and Howard.** This alternative would narrow the roadway to two one-way lanes on each street providing important benefits for pedestrians, cyclists, and the public realm with 15-foot sidewalks, greatly narrowed crossing distance, wide cycletracks, and traffic calming. The major advantage of this alternative is that, by avoiding the turning conflicts that come with two-way streets, it allows for an acceptable amount of vehicle capacity to be retained with more than half of the street's right-of-way dedicated to non-vehicular uses. One-way circulation also allows for both streets to be coordinated for a steady progression at whatever speed is desired, and for fixed-time mid-block signals to be provided on every block. It would not allow for consolidation of transit routes onto Folsom Street. It would require the expense of moving curb lines on both streets. It is very likely that the project would be implemented on Folsom Street first, and the Howard Street project would be optional and completed in a later phase.
- **Alternative 3: Two-way Folsom and Howard with one-way cycletracks.** This alternative is very similar to the recommended alternative, providing two-way circulation on both streets. The primary difference is that it would provide a one-way cycletrack on each street, allowing for sidewalks on the non-cycletrack side of Folsom Street to be widened to 15-feet in a second phase of the project. This increase in sidewalk space would enhance the Folsom Street public realm and bring the sidewalk on that side of the street to the level recommended by the Better Streets Plan, but it would also substantially increase the cost of the project. Westbound cyclists would continue to have to divert out-of-direction from Howard Street to Harrison to reach the Mission District bicycle network. Because no turn lane would be provided on Howard, more left turn pockets would be required on Folsom, reducing parking and pedestrian bulb space while removing the parking buffer between moving vehicles and the cycletrack in some places.
- **Alternative 4: Two-way Folsom and one-way Howard, with two-way cycletrack on Howard.** This alternative provides a two-way Folsom Street that is similar to the recommended Alternative's Folsom design, but with bicycle facilities removed and sidewalks widening to 15 feet on both sides of the street. This additional space could be used for landscaping, public spaces, and other elements to greatly upgrade Folsom's public realm. The sidewalk widening would also add substantial expense to the project. Howard Street would be very similar to the Folsom Street design envisioned in Alternative 1, with two lanes of traffic and a buffered two-way cycletrack. A key advantage of this alternative is that, because Howard is unconstrained by transit operations or freeway queues east of Fifth Street, a Howard Street cyceltrack could eventually be extended all the way to the Embarcadero. However, to make this facility connect to the

Mission District on its western end, it would have to be extended down South Van Ness Avenue to 14th Street, removing parking on the east side of South Van Ness. Because it would have lower overall eastbound traffic capacity than Alternative 3 or the recommended alternative, this option would lead to some additional traffic delay (and thus additional transit delay).

Alternative 1 and 3 are summarized in brief below, and a circulation diagram is provided for each. Alternative 4 has been developed in more detail to illustrate design tradeoffs between these concepts and the recommended alternative, emphasizing the streetscape and landscape potential for a Folsom Street "Civic Boulevard" that includes wide sidewalks.

Folsom/Howard Alternative 1





This alternative maintains both Folsom and Howard as one-way streets, reducing each to two lanes. A two-way cycletrack would be provided on Folsom, and a one-way cycletrack on Howard.

Pedestrian Conditions. This concept would provide wide sidewalks on both Folsom and Howard, narrowing pedestrian crossing distance to just two lanes in many places (and no more than three lanes where turn pockets are present). As in all alternatives, it would provide signalized mid-block crossings on every block improving pedestrian connectivity on the long (850-foot) Folsom and Howard blocks. Signals would be timed to encourage steady vehicle travel, contributing to a safe and comfortable pedestrian environment. Mid-block pedestrian crossings could be operated on a fixed cycle, making crossings more convenient for some pedestrians and helping to enforce the intended progression speed.

The public realm. This alternative would result in more than half of the Folsom Street right-of-way dedicated to non-vehicular space, leaving numerous opportunities for new public spaces and landscaping. The wide bicycle facility would double as a fire lane during the Folsom Street Fair, allowing the Fair to maintain its current configuration despite the narrower street.

Transit legibility. This concept would maintain eastbound service from the 27-Folsom and 11-Downtown Connector on Folsom Street, with westbound service provided on Harrison Street. Splitting service by direction in this way makes the transit system somewhat less legible for passengers. In addition, Harrison Street, with its high volumes of fast-moving freeway-bound traffic, is a less desirable waiting environment for passengers.

Transit performance. By reducing capacity to two lanes, this concept would increase traffic delay somewhat on Folsom Street, slowing eastbound buses through this segment. Westbound buses, still operating on Harrison, would be unaffected.

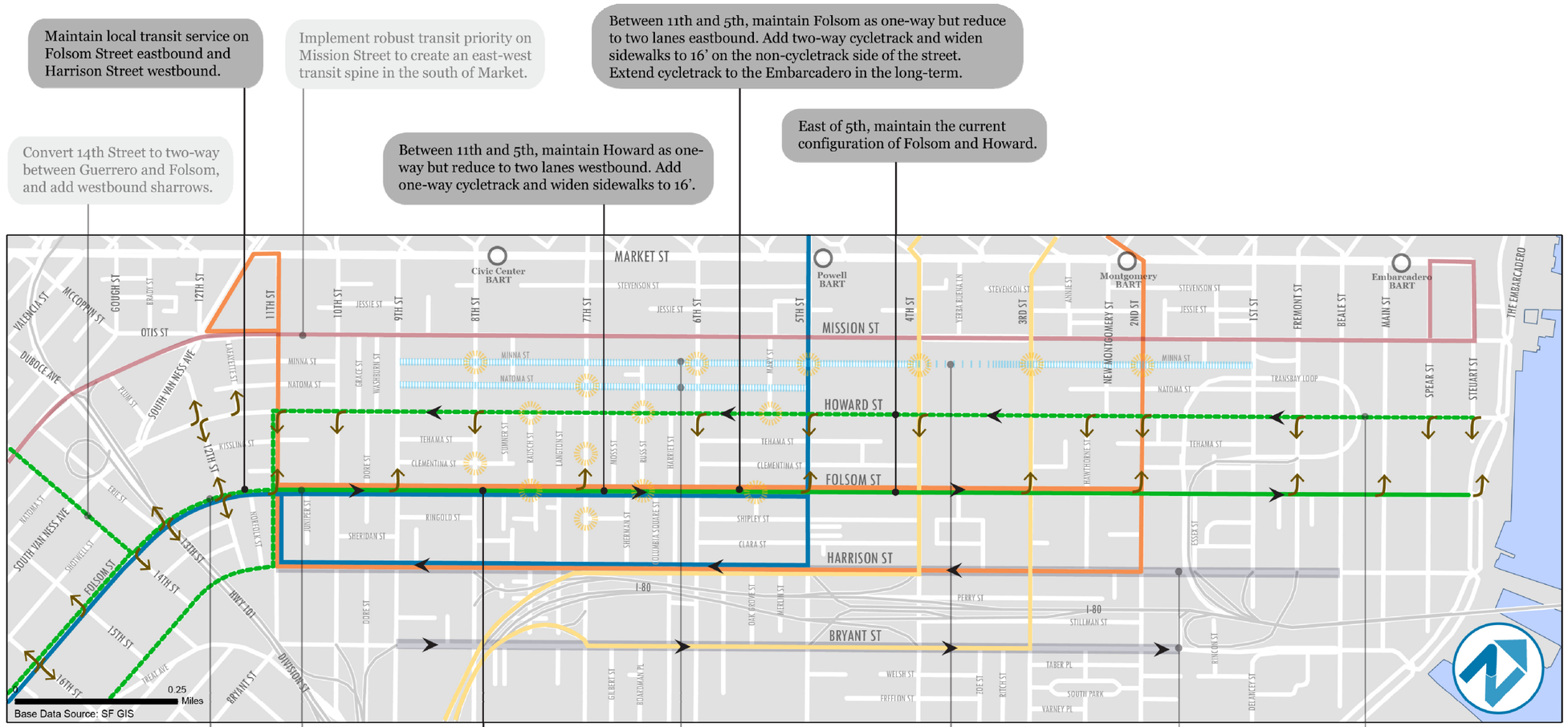
Vehicle circulation. In this concept, Folsom and Howard Streets would continue to function as a one-way couplet, reduced to two lanes in each direction with turn pockets provide at intersections. This change would reduce vehicle capacity and increase delay somewhat. Unlike the two-way alternatives, this configuration would not require any new restrictions to vehicle left turn movements.

Bicycle conditions. This alternative would provide wide buffered bicycle lanes with a two-way cycletrack on Folsom Street. It would also provide the best bicycle connectivity of any alternative: It would provide a strong two-way connection to the Mission District bicycle network, and unlike the recommended alternative, this alternative would allow a two-way protected bicycle facility to be continued all the way to the Embarcadero on Folsom Street. (This differs from the recommended alternative which, because it must accommodate two-way transit on Folsom, must shift westbound bicycle facilities to Howard at Fifth Street.) If the project were implemented on Howard as well, an additional one-way cycletrack could be added, although this facility would have poor Mission District connectivity.

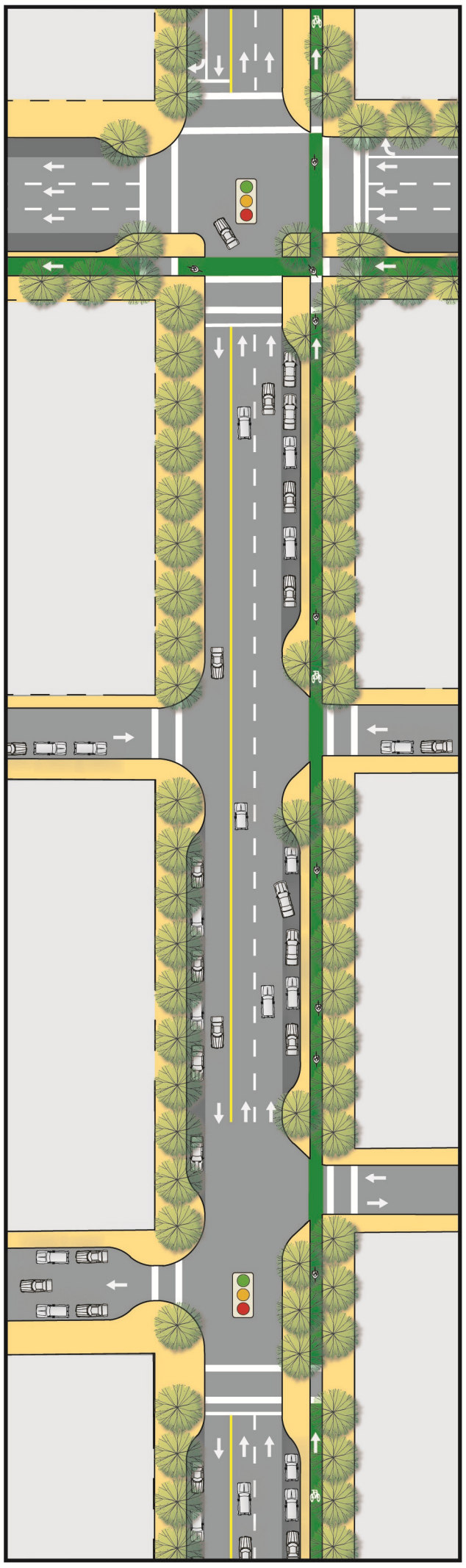
Parking and loading. As in the other alternatives, parking lanes would be maintained on both sides of Folsom and Howard Streets. Parking would be removed where necessary to provide turn pockets at intersections and pedestrian and transit bulb-outs.

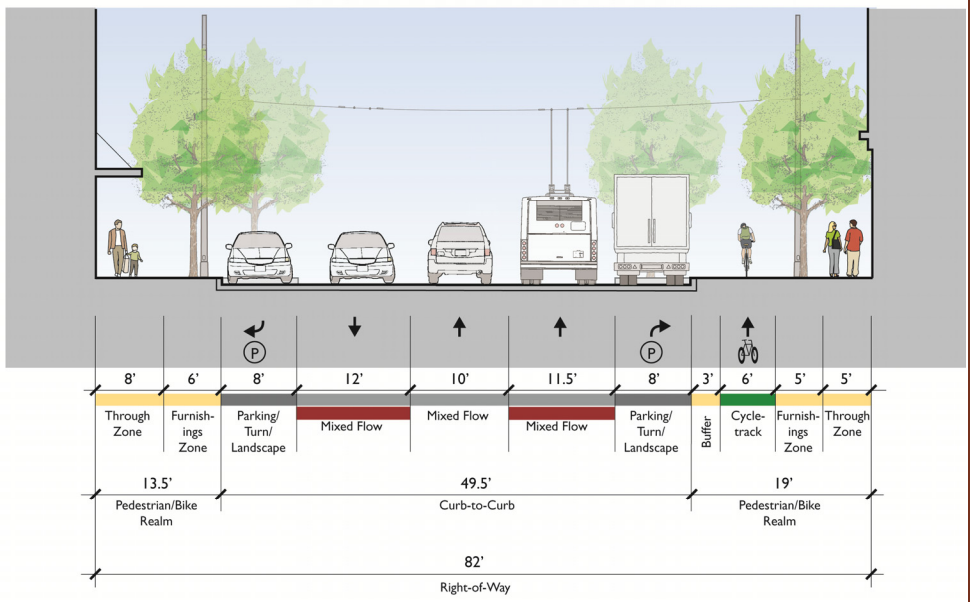
Cost comparison. This project would require moving the curb lines along one side of Folsom Street, a large expense. It would not require major changes to signalization as would the two-way alternatives. It is expected that the Folsom Street project would be implemented first. On Howard Street, which is a lower community priority for improvement, the project could be implemented later or not at all. The fact that the changes to Folsom proposed in this alternative do not require changes to Howard Street makes it among the most feasible and implementable Folsom Street projects.

Figure 5-7 Folsom/Howard Alternative 1 Circulation Concept



Folsom/Howard Alternative 3





This alternative provides two-way vehicle circulation on both Folsom and Howard, a one-way protected bicycle lane on each street, and wider sidewalks on one side of Folsom.

Pedestrian Conditions. This alternative would widen the Folsom Street sidewalk to 15 feet on one side, leaving the existing curb line intact on the cycletrack side of the street. It would narrow pedestrian crossing distances, though not as much as Alternative 1. It would also provide pedestrian bulb-outs and signalized mid-block crossings. Signals would be timed to favor moderate vehicle speeds in the dominant direction of travel. However, mid-block signals may have to be pedestrian-actuated, rather than fixed-time.

The public realm. This concept would widen the sidewalk on one side of Folsom Street creating additional room for landscaping or public spaces. With a somewhat narrower cycletrack buffer than other alternatives, it does not provide as many opportunities for landscaping.

Transit performance. Because it maintains three lanes of vehicle capacity in each direction, this alternative is not forecast to increase vehicle delay, and would thus not further delay eastbound buses as compared to the current configuration. Westbound buses, operating in a single lane, may be somewhat slower than those operating now on Harrison Street. However, bus routes would be shortened and the total number of turns would be reduced by avoiding the need to travel as far south as Harrison Street, thus reducing overall transit travel time and operating costs.

Transit legibility. This alternative would consolidate the 27 Folsom and the 11 Downtown Connector on Folsom Street, providing bus service on eight-minute headways in each direction. Two-way service makes it easier for passengers to understand the transit system. It may also draw more transit passenger to Folsom Street, supporting the commercial district.

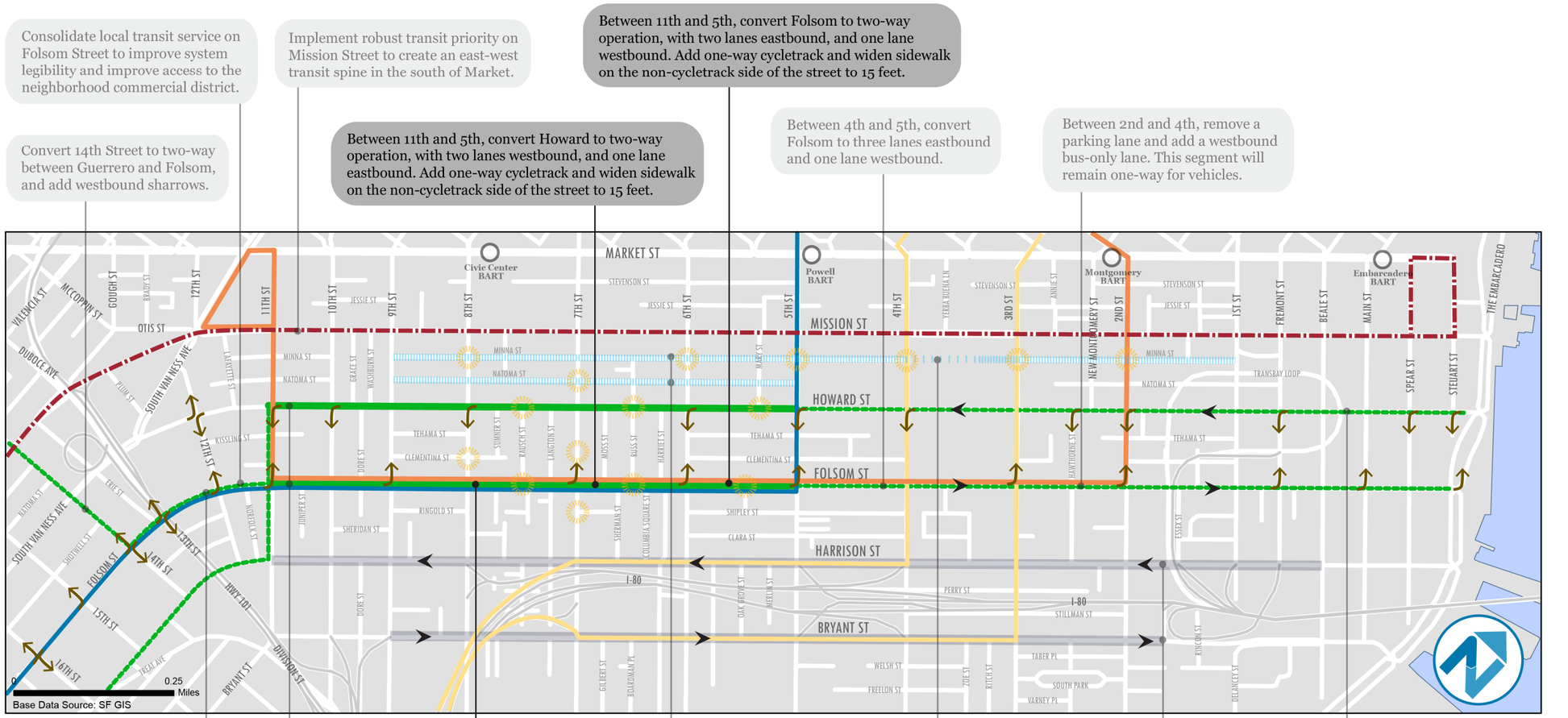
Vehicle circulation. In this concept, both Howard and Folsom would be converted to two-way operations. Folsom Street would have two lanes eastbound and one lane westbound, with Howard Street the reverse. Signals would be timed to favor moderate speeds in the dominant direction of travel. The single-lane direction would serve mostly local trips and on Folsom, westbound buses. By maintaining three lanes in each direction, this alternative provides a similar level of vehicle capacity to what is available today. However, buses would be stopping in the westbound lane on Folsom, which would require all vehicles to wait while buses load and offload passengers. Left turns would be prohibited for vehicles traveling eastbound on Howard or westbound on Folsom. For the dominant direction of travel, left turn pockets would be provided where necessary by shifting the through-travel lanes to the curb.

Bicycle conditions. This alternative would provide one-way, buffered bicycle lanes – eastbound on Folsom Street, westbound on Howard. While these facilities would offer more comfortable facilities than what exists today, there is some concern that one-way facilities, particularly on a two-way street, would encourage some cyclists to ride against the specified direction of travel. The split facilities would not require westbound cyclists to transition from Howard to Folsom Street at 5th, as the recommended alternative does. However, the existing one-way Howard Street bicycle lane has poor connectivity on its western end. To improve this condition, a southbound bicycle facility could be added to South Van Ness Avenue between Howard and 14th Street.

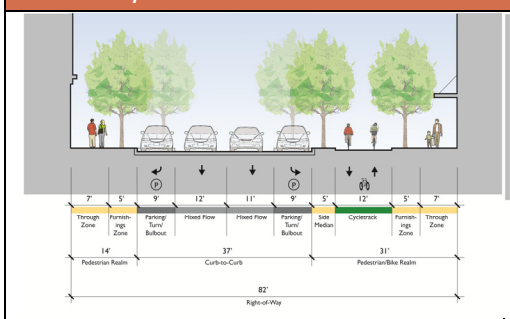
Parking and loading. As in the other alternatives, parking lanes would be maintained on both sides of Folsom and Howard Streets. Parking would be removed where necessary to provide turn pockets at intersections, pedestrian and transit bulb-outs.

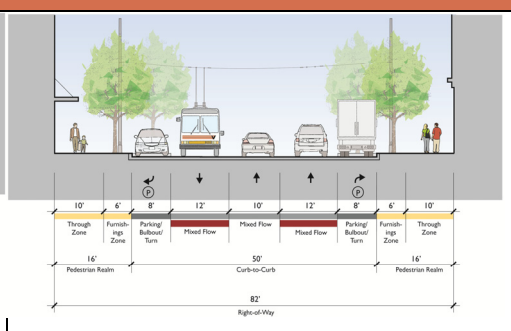
Cost comparison. This project would require moving the curb line along one side of Folsom Street, a major expense. It would also require major changes in signalization to achieve two-way circulation on both streets. Finally, this alternative requires major changes to both Folsom and Howard Streets. An advantage of this alternative is that it could be easily phased: in an initial phase, the two-way conversion could be implemented and the cycletrack, bulb outs, and bus bulbs added. The sidewalk could be widened in a second phase when funding becomes available.

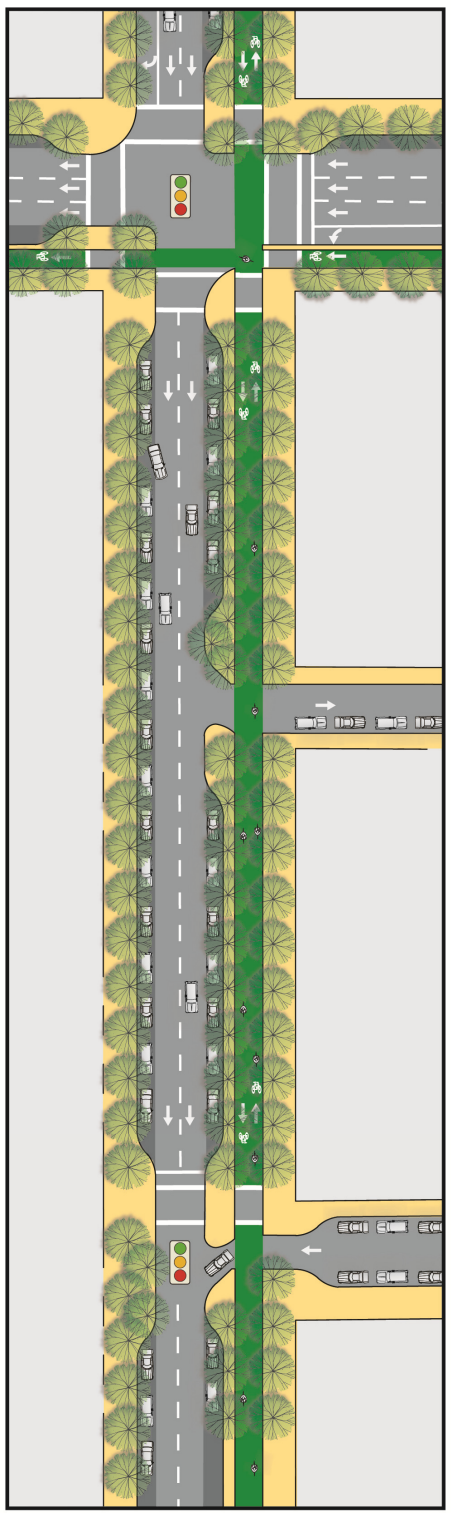
Figure 5-8 Folsom/Howard Alternative 3 Circulation Concept

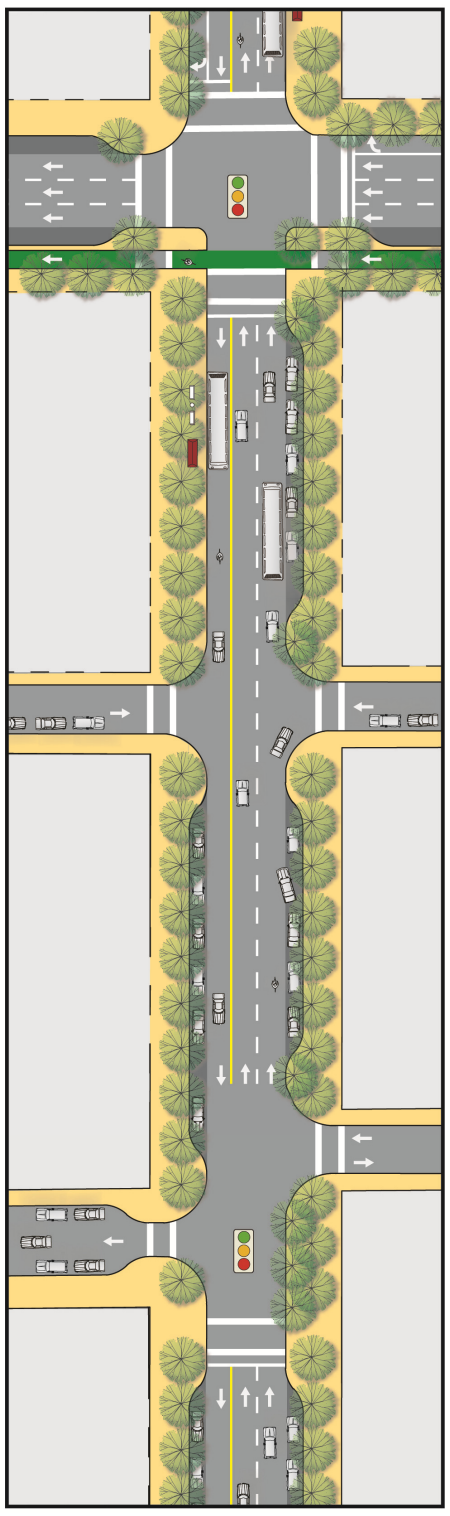


Folsom/Howard Alternative 4









This alternative provides two-way vehicle circulation on Folsom while maintaining a one-way Howard. It moves all bicycle facilities to a two-way cycletrack on Howard, repurposing space on Folsom to provide wide (16') sidewalks on both sides of the street. A circulation concept, transportation operations concept, and landscape concept are provided on the pages that follow.

Pedestrian Conditions. As in the other alternatives, this concept would provide pedestrian bulb-outs and signalized mid-block crossings. Signals would be timed to favor a 12-15 mph vehicle progression in the dominant direction of travel. On Howard Street, this alternative would look much like Alternative 1, narrowing crossing distances to just two lanes and providing fixed-time mid-block signals. However, to reduce costs, the Howard Street project would likely be implemented without widening the sidewalks.

The public realm. With very wide sidewalks on Folsom Street, this alternative would provide ample room for landscaping and public spaces with a somewhat narrower cycletrack buffer than other alternatives. A wide cycletrack buffer on Howard Street would provide opportunities for landscaping and public spaces.

Transit legibility. Like Alternatives 3 and 5, this concept would consolidate the 27 Folsom and the 11 Downtown Connector on Folsom Street, providing bus service on eight-minute headways in each direction. Two-way service makes it easier for passengers to understand the transit system. It may also draw more transit passengers to Folsom Street supporting the commercial district.

Transit performance. Because this concept includes two eastbound lanes (rather than three, as in alternatives 3 and 5), it could result in some additional vehicle delay, thus slowing eastbound buses somewhat. Westbound buses, operating in a single lane, may be somewhat slower than those operating now on Harrison Street. To ensure that these waiting vehicles do not block north-south streets, transit stops will be placed mid-block (adjacent to new signalized mid-block crossings), rather than at the far side of intersections. As in Alternatives 3 and 5, bus routes would be shortened by avoiding the need to travel as far south as Harrison Street, thus reducing overall transit travel time.

Bicycle conditions. This concept would remove all bicycle facilities from Folsom, instead providing a wide buffered two-way cycletrack on Howard Street. A key advantage of this facility is that it could eventually be extended east all the way to the Embarcadero, rather than terminating at 5th Street. Its major drawback is poor connectivity on its western end, where Howard intersects with South Van Ness Avenue. To maintain acceptable bicycle connectivity to the Mission District and points south, a narrow (10') two-way cycletrack could be extended south on the east side of South Van Ness Avenue to 14th Street, removing curb parking on one side of that block. If 14th Street were converted to two-way operations (as proposed in the 16th Street Corridor Circulation Concept), this facility would then connect to the Mission District bicycle network.

Vehicle circulation. As in Alternatives 3 and 5, Folsom Street would be converted to two-way operations, with two lanes eastbound and one lane westbound. Signals would be timed to favor moderate speeds in the dominant direction of travel. Howard Street would remain one-way westbound but would be reduced to two lanes. With reduced vehicle capacity, delay would increase somewhat during the peak period. On Folsom, buses would stop in the westbound lane, which would require all vehicles to wait while buses load and offload passengers. Left turns would be prohibited for vehicles traveling eastbound on Howard or westbound on Folsom. Eastbound on Folsom, left turn pockets would be provided where necessary by removing parking and shifting the through-travel lanes to the curb.

Parking and loading. Parking lanes would be maintained on both sides of Folsom and Howard Streets. Parking would be removed where necessary to provide turn pockets at intersections, and to private pedestrian and transit bulb-outs. Because more left turn pockets would be required in this alternative than in Alternative 5, the parking impact would be greater.

Cost comparison. This project would require moving the curb line along both sides of Folsom Street, a significant expense. It would also require major changes to signalization on both streets. The project could be implemented without moving curb lines on Howard Street. Phasing this concept would be more complex than phasing Alternative 3.

Folsom Street Operations Concept (Alternative 4)

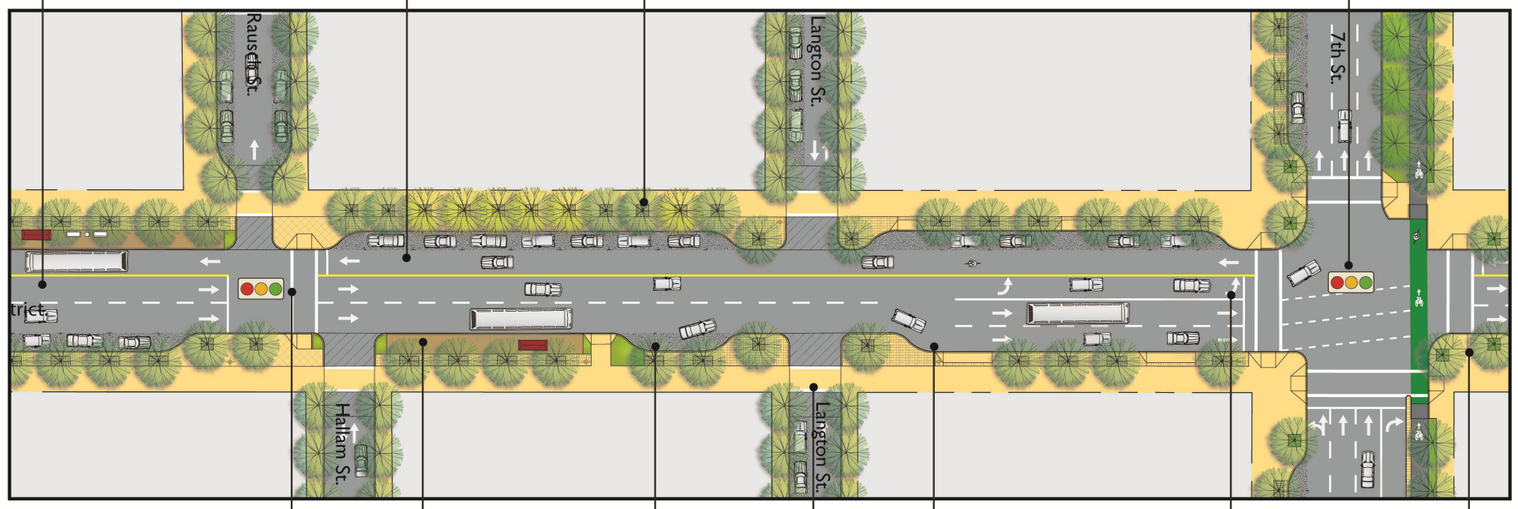
The Transportation Concept for Folsom Street converts vehicle travel to two-way, allowing for bi-directional bus service. However, because the street's "two-plus-one" lane configuration will allow eastward travel to remain dominant, this alternative has characteristics typically associated with one-way travel, such as signal timing, traffic calming, and opportunities for mid-block crossings. The concept also widens both sidewalks to 16 feet to create the Civic Boulevard environment specified by the Eastern Neighborhood plans. This design concept removes bike lanes from Folsom Street, but a two-way protected cycletrack is added to Howard Street.

"Two-plus-one" lane configuration allows for the vehicular access benefits of a two-way street while prioritizing eastward travel. This encourages slower vehicle speeds and better accommodation of bicycle speeds.

While vehicles have the option of two-way travel, traffic signals are timed to the eastbound traffic, making westbound auto travel more suited to local rather than crosstown trips.

Sidewalks on both sides of Folsom Street are widened to 16 feet, enhancing Folsom's role as a Civic Boulevard. See Streetscape/ Landscape Concept.

Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and more comfortable for cyclists and pedestrians.



New signalized midblock crossings will allow easier crossing of the street between the widely spaced major cross streets.

The 27-Folsom and 11 Downtown Connector will operate eastbound and westbound on Folsom Street every 8 minutes. Riders will board eastbound buses via islands on the street side of the cycletrack.

Bus stops will be located at mid-block crossings to ensure that westbound vehicles do not block intersections while waiting behind a stopped bus.

Parking lanes are maintained on both sides of the street, except where bulb-outs or turn lanes are required.

At intersections with alleys, the alley roadway ramps up to sidewalk grade, slowing cars as they enter and exit the alleys.

Bulb-outs provide quality additional pedestrian space. Where bulb-outs are located, the pedestrian realm is 24 feet wide.

Left turn pockets occur on Folsom where needed; Through lanes shift to the right.

Bulb-outs will be added to all intersections where a turn lane is not needed.

Howard Street Operations Concept (Alternative 4)

The Transportation Concept for Howard Street maintains one-way traffic, but reduces the number of lanes to two. The one-way travel allows signal timing, traffic calming, and opportunities for mid-block crossings. The concept also includes a two-way cycletrack that will be buffered from vehicle traffic by the parking lane and a buffer area along the sidewalk edge.

Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and more comfortable for cyclists and pedestrians.

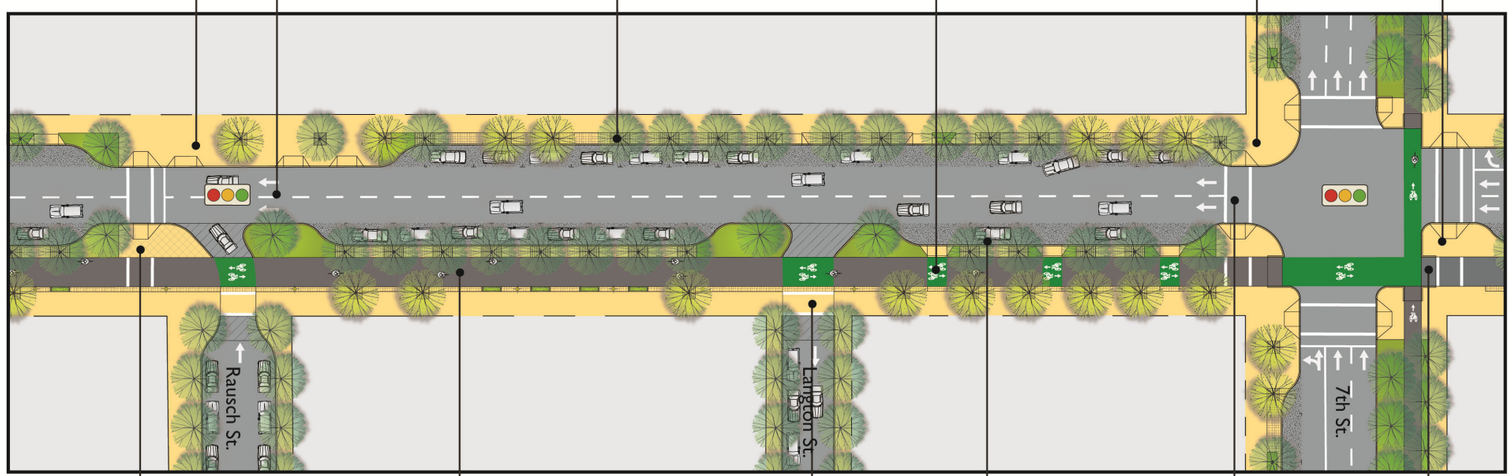
The reduction of auto travel to two lanes going a single direction will allow traffic signal timing to encourage safer vehicle speeds and accommodate bicycle speeds.

Howard Street sidewalks remain 12 feet wide, but will be treated with new streetscape amenities to increase pedestrian comfort - see Streetscape/ Landscape Concept.

The pavement in areas of potential conflict between cyclists and motorists is colored green.

One-way traffic eliminates the need for some turning move-ments, leaving more space for pedestrians.

Bulb-outs will be added to all intersections where a turn lane is not needed.



New signalized midblock crossings will allow easier crossing of the street between the widely spaced major cross streets.

A two-way cycletrack on Howard Street takes the place of bike lanes on Folsom and Howard. A Howard Street bikeway could be extended east to the Embarcadero, but parking removal would be required on South Van Ness for this facility to connect to the Mission District.

At intersections with alleys, the alley roadway ramps up to sidewalk grade, slowing cars as they enter and exit the alleys.

Parking lanes are maintained on both sides of the street, except where bulb-outs or turn lanes are required.

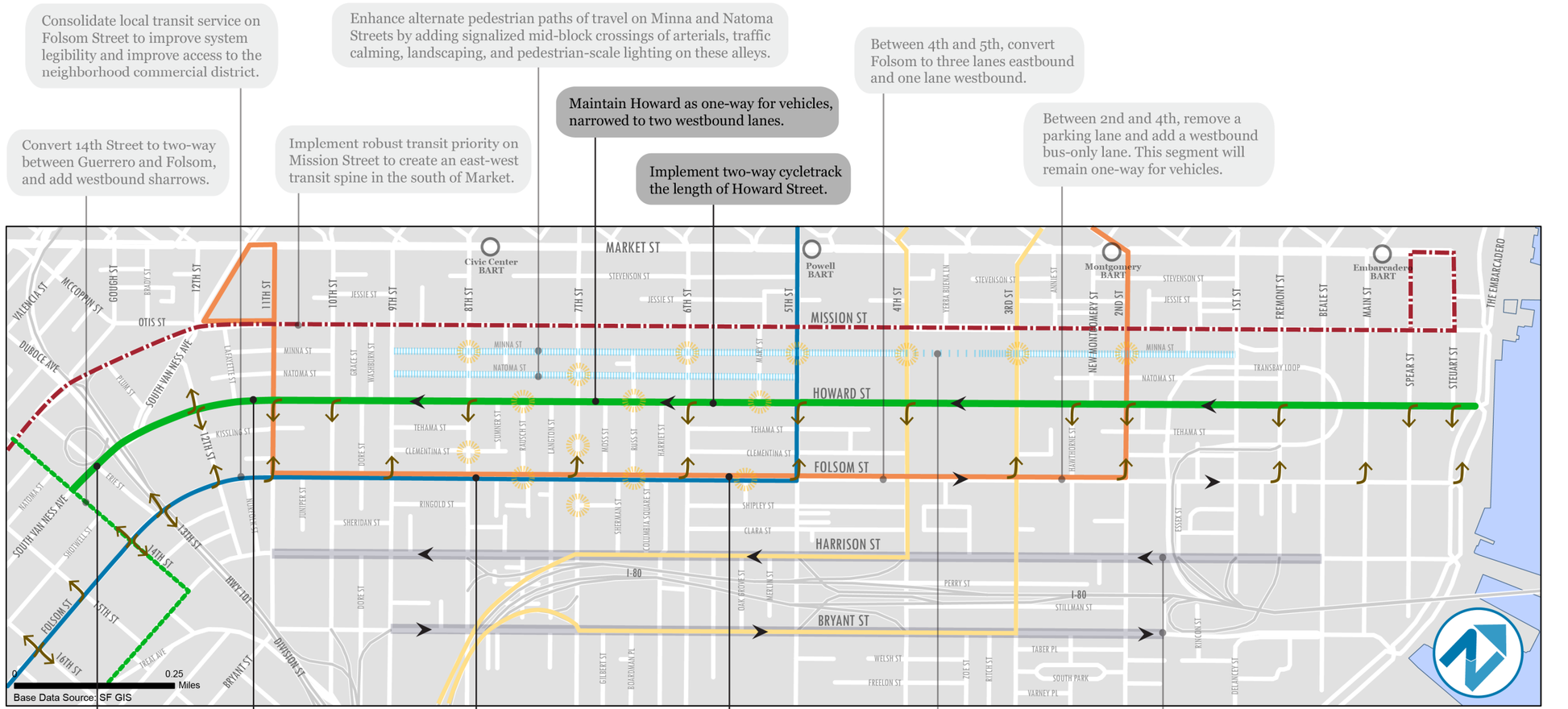
Potential for very short, two lane pedestrian crossings.

At major intersections, the cycletrack ramps down from sidewalk grade to street grade.

LEGEND

Existing tree | New tree | Public space opportunity | Planter strip | Permeable paving | Tree grate | Pedestrian Light

Folsom and Howard Street Corridor Circulation Concept (Alternative 4)



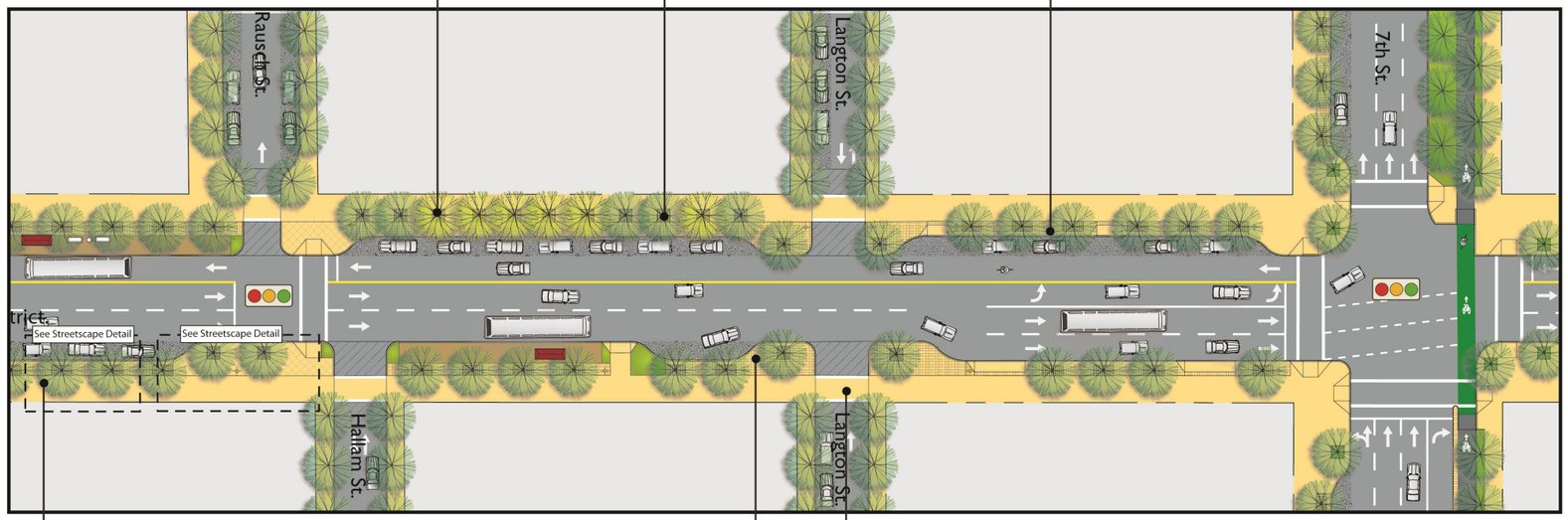
Folsom Street Streetscape and Landscape Concept (Alternative 4)

The Landscape/Streetscape Concept for Folsom Street is based on the much wider pedestrian realm. 16-foot sidewalks on both sides of the street can accommodate the range of activities occurring on a neighborhood "Main Street," including a wide through zone, a wide furnishings zone for trees and other plantings and street furniture, and a frontage zone along buildings for seating, planters, and display. The addition of bulb-outs creates the opportunity for quality public spaces along Folsom Street.

Existing trees can be kept in the new design. In this situation, the trees bisect the sidewalk and make for a wide furnishings zone, or else a secondary through zone. Existing trees should be placed in tree grates, which allow for enough soil volume without excessively pinching the through zone. An 8-foot through zone should be maintained where feasible.

Where a substantial line of new trees exists, new trees can "fill in" this pattern of existing trees.

New tree plantings occur in tree pits that can be 4 or 6 feet wide, and can be planted with other grasses and shrubs, while leaving enough room to exit parked cars.



A 16-foot pedestrian realm has ample space to accommodate the various uses of the sidewalk, including a through zone that allows a comfortable amount of clear space for walking as well as seating or display along buildings; and a furnishings zone with a more textured and/or permeable paving treatment that allows for furnishings, landscape, and room for exiting parked cars.

Bulb-outs at intersections with SoMa Alleys like Langton Street provide a variety of public open space opportunities that will depend on the adjacent use and community needs, such as seating areas, rainwater gardens, and small community gardens.

At intersections with SoMa Alleys, the alley roadway ramps up to sidewalk grade to create minimal interruption of Folsom Street's pedestrian realm.

LEGEND

Existing tree | New tree | Public space opportunity | Planter strip | Permeable paving | Tree grate | Pedestrian Light

Howard Street Streetscape and Landscape Concept (Alternative 4)

The Streetscape/Landscape Concept for Howard Street includes different but complementary approaches to the two sides of the street. On the side of the street with the cycletrack, the concept includes treatments that seek to visually and physically buffer the sidewalk-grade bicycle facility through paving patterns, landscaping, and placement of furnishings while also providing amenities and quality space for all users of the street. On the other side of the street, the design concept maintains the 12-foot wide sidewalks, but creates a uniformormity to the appearance of the streetscape by adding regularly spaced street trees, pedestrian-scale lighting, and other street furniture where appropriate. Where Folsom Street crosses alleys such as Rausch Street, bulb-outs provide opportunities for stormwater management, landscaping, and public space. This concept draws from design guidance provided by the City of San Francisco Better Streets Plan.

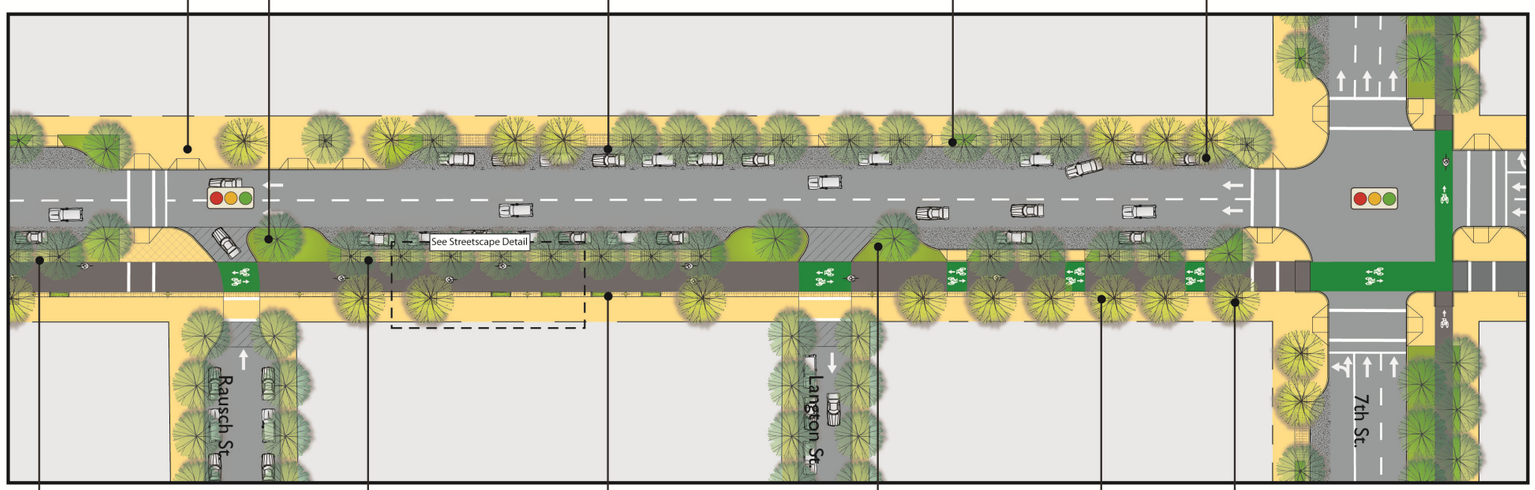
Extended bulb-outs are the main opportunities for additional pedestrian space.

Trees near potential conflict points between autos and cyclists on the cycletrack will be pruned to have a 14-foot minimum clearance to their lowest branches to ensure visibility, per Better Streets Plan, while creating an entry/exit "marker" at alleys.

Where existing trees remain and already occur with some regularity, new trees and tree grates "fill in" the pattern.

Where existing street trees are absent, new street trees in grates are added as a unifying design element. Trees are regularly spaced in coordination with adjacent parking spaces.

The parking lane can be treated with permeable paving for stormwater infiltration.



New trees are planted with grates, wood platforms, or another walkable surface in the 4-foot buffer area between the parking lane and the cycletrack. These trees create a unified look for the street.

A 4-foot area between parking spaces and the cycletrack provides room to exit parked cars and access the sidewalk safely. Treating this area with the same paving as the furnishings zone on the other side of the cycletrack creates the visual effect of a buffer bracketing the cycletrack.

A narrow strip of special paving, planter strips, occasional trees, and furnishings creates a buffer separating pedestrians from cyclists on the cycletrack.

Bulb-out areas separated from the sidewalk by the cycletrack can be used for greening and stormwater management.

New trees on the outside of the cycletrack and those already existing on the inside achieve an "allee effect".

Existing trees can be accommodated in the new streetscape in most cases. Larger tree grates improve tree health.

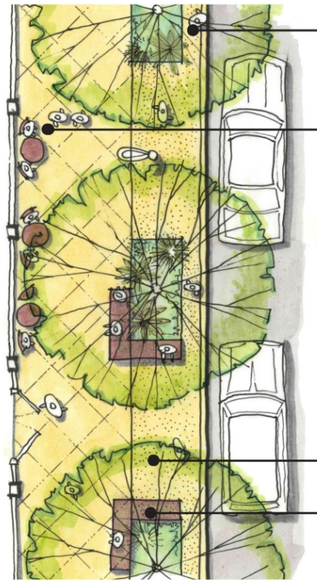
LEGEND

Existing tree | New tree | Public space opportunity | Planter strip | Permeable paving | Tree grate | Pedestrian Light

Folsom and Howard Street Streetscape and Landscape Concept Detail (Alternative 4)

Streetscape Treatment Type: 16-foot Sidewalk - Typical

This treatment is appropriate for most block faces of Folsom Street. The 16-foot pedestrian realm generously accommodates a balance of multiple needs in a strongly urban setting: it accommodates pedestrian through movement and movement in and out of parked cars, provides a significant amount of flexibility in how adjacent uses can utilize sidewalk space in the frontage and furnishing zones, provides opportunities for the integration of small-scale public spaces and street greening, and supports tree health.

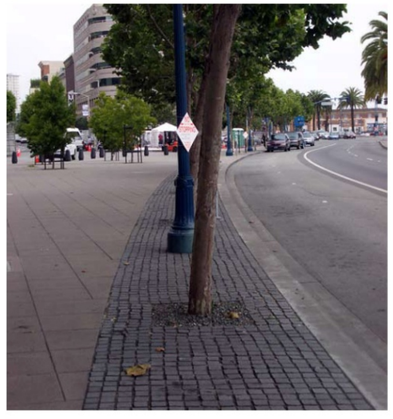


A 9-to-10-foot through zone allows generous space for walking as well as cafe seating, display, window shopping, or other uses along building frontages.

Informal seating walls wrap around tree pits that can be planted with shrubs and grasses.

An edge zone allows space for people to enter and exit parked cars.

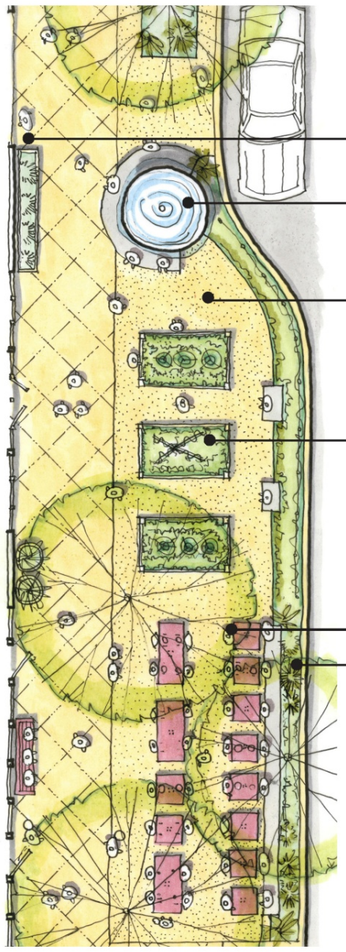
A 4-to-5-foot furnishings zone can accommodate trees, other landscape, pedestrian lights, and other street furniture. The furnishings zone's surface is a permeable material such as decomposed granite or cobblestones to reduce impermeable surfaces and to improve tree health.



Folsom and Howard Street Streetscape and Landscape Concept Detail (Alternative 4) (Continued)

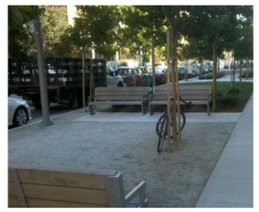
Streetscape Treatment Type: 16-foot Sidewalk at Mid-Block Bulb-Out

This treatment is appropriate where an extended bulb-out occupies a street corner and especially in areas with potentially high-foot traffic. Where bulb-outs occur in this alternative for Folsom Street, there is approximately 24 feet of width to the pedestrian realm, enough space to accommodate a range of activities. This design demonstrates how businesses such as restaurants can use the space of the bulb-out in a way that it also functions as a small public space with seating and landscaping. Such small public spaces along Folsom Street, especially those in the street's neighborhood commercial core, should be carefully designed to support the desired "Civic Boulevard" character.



In addition to the usable space of the bulb-out, the 16-foot sidewalk is wide enough to allow for seating, planters, and display along the frontages of buildings.

Public spaces can be made more welcoming and distinguished from the through zone of the sidewalk by paving them in a permeable, ADA-compliant surface such as decomposed granite.



Where desired and properly cared for by a community, a rainwater harvesting tank can provide water for landscaping or gardens and can be designed as a public art piece that expresses neighborhood identity.

Where desired and properly cared for by a community group or an adjacent business such as a restaurant, the bulb-out can accommodate raised planter beds for herbs or vegetables.

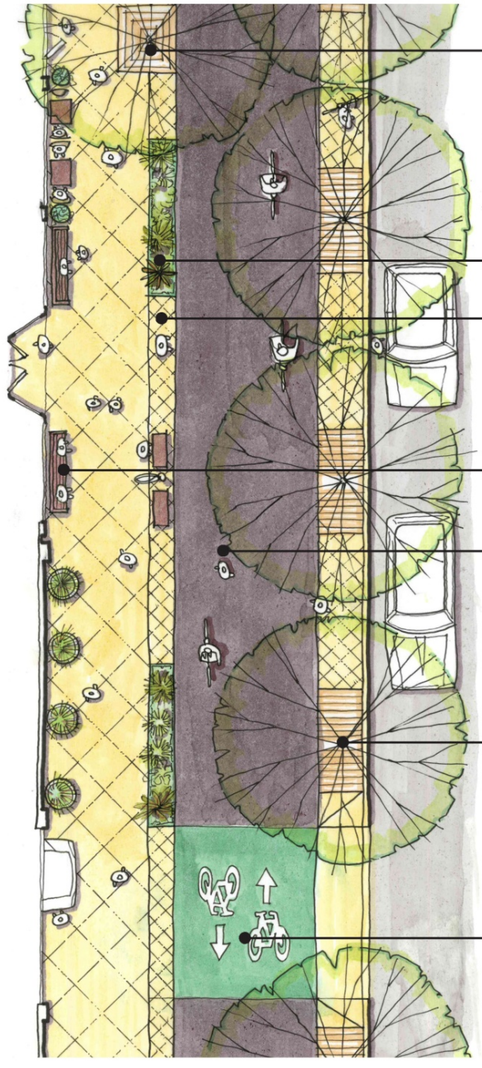
The bulb-out provides generous space for outdoor restaurant seating.

A 2-foot planter strip helps buffer small public spaces on bulb-outs from moving traffic.

Folsom and Howard Street Streetscape and Landscape Concept Detail (Alternative 4) (Continued)

Streetscape Treatment Type: 12-foot Sidewalk with Cycletrack - Typical

This treatment is appropriate for the block faces of Howard Street that include a cycletrack. This design is based on buffering the cycletrack - in part visually, in part physically - from pedestrians and parked vehicles; framing the cycletrack as a civic amenity by lining it on both sides with landscape and furnishings; and allowing enough of the sidewalk to be used for walking and activities along building frontages like dining and display.



Existing street trees can be accommodated into this streetscape. Their vitality can be increased by increasing the tree pit area and the addition of 5-foot-by-5-foot tree grates that will not diminishing the pedestrian through zone.

The pedestrian realm's furnishings zone and the edge zone both have a similar, more intricately scored paving pattern that is distinctive from the sidewalk. This creates a consistent visual buffer on both sides of the cycletrack, reducing the potential for cyclist-pedestrian collisions.

The cycletrack, at sidewalk grade, is paved with asphalt or other material that visually contrasts with the sidewalk paving.

Driveways, like other points where cyclist-motorist conflicts are possible, are treated with standard green coloring. The pedestrian realm runs through driveways, uninterrupted.

In the furnishings zone of the pedestrian realm, narrow (2-to-4-foot) planter strips alternate with areas for furnishings, such as pedestrian lighting and newspaper racks.

The concept allows room for a frontage zone where tables, seating, planters, and goods on display can be placed along the building frontages.

Evenly spaced street trees planted in the 4-foot buffer between the cycletrack and the parking lane are an important unifying feature of the street. Trees are accommodated in a 4-foot-by-8-foot tree grates or other treatment that allows walking across the tree pit area.

6 SEVENTH AND EIGHTH STREET CORRIDOR

6.1 ISSUES AND OPPORTUNITIES

Seventh and Eighth Street work together as a one-way couplet in the South of Market area, traveling north and south between Market Street and Townsend Street. The 19 Polk provides local transit service every 15 minutes, traveling north on Seventh Street and south on Eighth. Seventh and Eighth Street are designated as major arterials in the City's Congestion Management Plan Network.

These two streets share issues and opportunities that are also common to the other north-south arterials in the South of Market area. All of these streets are designed and managed to carry high traffic volumes during peak periods. Improving the public realm and conditions for other modes on these streets will require some reduction in vehicle capacity. Capacity reductions will have to be carefully designed to avoid unwanted impacts on the surrounding transportation networks, particularly transit operating in mixed-flow traffic.

Seventh Street also has a special role as an Eastern Neighborhoods connector street. Unlike parallel streets, Seventh continues south of Mission Creek, traveling through Showplace Square and intersecting with the Potrero Hill grid at 16th Street. The Eastern Neighborhoods area plans indentify Seventh as a "green connector" street.

The Seventh and Eighth Street corridor has three distinct segments. They include:

- **Market Street to Harrison Street.** In this segment, Seventh and Eighth Streets are busy one-way arterials. They carry large volumes of vehicle traffic between the north of Market network and the Interstate 80/US 101 South ramps. They have one-way local bus service provided by the 19 Polk and one-way bike lanes. Sidewalks are ten feet wide. This

segment has been selected as the focus of the EN TRIPS corridor design project and is discussed in more detail below.

- **Harrison Street to Townsend Street.** Between Harrison and Bryant, Interstate 80 on- and off-ramps touch down on both streets. South of these touchdowns, vehicle volumes are far lower than north of the freeways (although vehicle capacity remains the same). One-way bicycle lanes and local transit service continue.
- **Townsend Street to 16th Street.** Eighth Street terminates at a roundabout where it intersects with Townsend, Division, and Henry Adams Streets. Seventh Street continues as a two-way street, running south and east beside the Caltrain right-of-way. It has bicycle lanes on both sides of the street, but sidewalks on just one side. Seventh Street terminates at a complex intersection with 16th Street and Mississippi Streets, just west of the Caltrain tracks and Interstate 280. The future of this intersection is uncertain and discussed in more detail in Sixteenth Street chapter.

The full length of Seventh Street has been designated as a "green connector" street in the Eastern Neighborhoods land use plan and will require investment in the public realm. As a first step, and as an investigation in how to address the set of issues that challenge all of the South of Market's north-south arterials north of the freeways, the Seventh and Eighth Street couplet between Market and Harrison was selected as an EN TRIPS priority project.

Project Segment – Market Street to Harrison Street

The segments of Seventh and Eighth Streets between Market and Harrison Streets have been prioritized for investment above other parts of the corridor because this segment exemplifies many of the challenges that face other South of Market north-south arterials north of the freeways: high rates of pedestrian and bicycle injury collisions, a bare public realm, high volumes of traffic during peak periods, and high vehicle speeds during off-peak periods. Seventh and Eighth Streets were also prioritized for improvement in the Western SOMA Community Plan. Major issues include

Land Use

Land uses surrounding Seventh and Eighth Streets include a mix of offices, PDR business, and large institutions. Stable residential enclave districts can also be found in the surrounding alleys. Seventh and Eighth Streets cut through the portion of the western South of Market where substantial new development is forecast as the result of recent zoning changes. They also intersect with Market Street in the Mid-Market area, which the City has prioritized for economic development in the coming decades. Trinity Plaza, a large apartment complex at Eighth and Market, is slated for redevelopment with 1,900 housing units. The block of Folsom Street between Seventh and Eighth is envisioned as the core of an emerging neighborhood commercial district.

Transit

The 19 Polk provides local transit service southbound on Eighth and northbound on Seventh at 15-minute headways during peak periods. North of Market Street, Route 19 continues through Pacific Heights to the Marina District. South of Townsend, it continues through Showplace Square and into Potrero Hill. Civic Center BART station, which has an entrance on Market Street between Seventh and Eighth, is a major trip attractor and transit transfer point.

Vehicle Circulation

Like nearly all of the other north-south arterials in the South of Market area, Seventh and Eighth Streets carry vehicle traffic to and from a regional freeway. Interstate 80 westbound on and off ramps touch down at both streets between Bryant and Harrison Streets, and thousands of commuters, visitors, and delivery vehicles travel daily between these ramps and the north-of-Market arterial network. The dominant direction of travel is northbound on Seventh during the A.M. peak and southbound on Eighth during the P.M. peak. Because of this role, Seventh and Eighth Street often have vehicle delays during peak periods but have far more capacity than is needed most of the day. With few vehicles using four one-way lanes on long blocks during off-peak times, speeding is common. Vehicles feed onto Eighth Street from Hyde and Grove Streets, which meet just north of Market. Seventh Street continues for just a short segment on the north side of Market Street, but signals and turn lanes facilitate northbound vehicles making a smooth (and often high-speed) transition from Seventh to McAllister and finally onto Leavenworth.

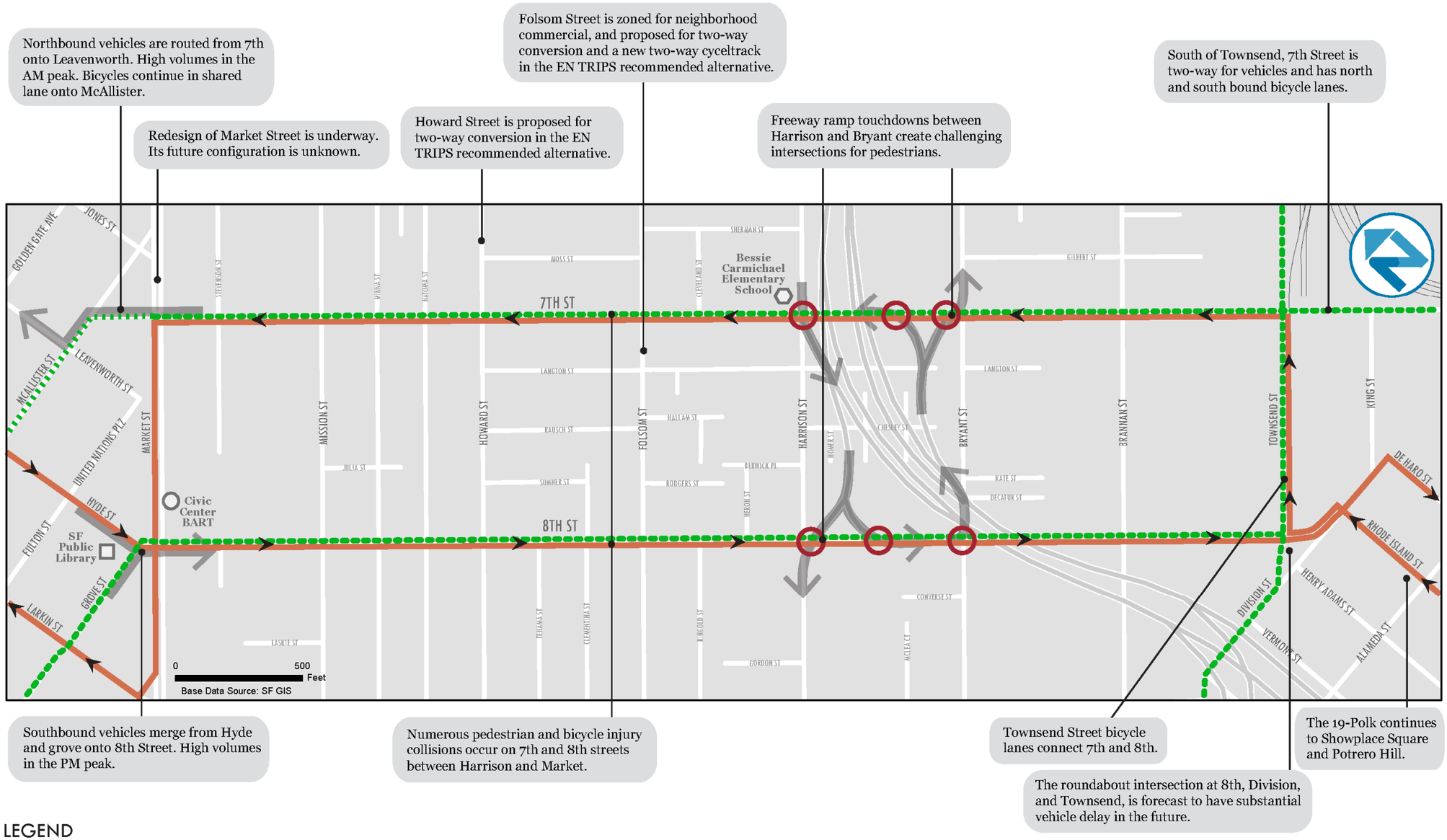
Pedestrian and Bicycle Conditions

The Eastern Neighborhoods area plans envision upgrading the Seventh Street public realm so that it serves as a "green connector" street. However, there are currently few amenities for pedestrians. Sidewalks are 10 feet, which is below Better Streets Plan standards for Mixed Use streets. Crossing distances are wide, and although block lengths are not as long as on east-west arterials, they are longer than is optimal for pedestrians. As on most other north-south SOMA arterials north of Harrison, both streets have high rates of pedestrian injury collisions. Freeway touchdowns limit pedestrian comfort, particularly at Harrison Street.

Seventh and Eighth Streets each have a one-way Class II bike lane, which together make up a key north-south link for cyclists between Potrero Hill through the South of Market area and into the Civic Center area. There are currently high rates of vehicle-cyclist collisions on both streets, and the forecast increases in traffic conditions would further degrade conditions for cyclists.

This page intentionally left blank.

Figure 6-1 Seventh and Eighth Street Issues and Opportunities



This page intentionally left blank.

6.2 PROJECT OBJECTIVES

In designing improvements in the Seventh and Eighth Street corridor, the project team was guided by the principles listed below. With a limited right-of-way, project design requires tradeoffs. The design alternatives that follow attempt to strike a balance between priorities.

- **Pedestrian conditions.** *Pedestrian connectivity, comfort, and safety should be improved.* The project should seek to improve comfort for pedestrians while reducing the risk of collisions. To respond to pedestrian connectivity challenges such as long blocks and wide streets, the project will seek to add mid-block crosswalks while reducing pedestrian crossing distances.
- **The public realm.** *Open space, landscaping, and other urban design elements should be upgraded.* The public realm including pedestrian and public space, wayfinding, and landscaping should be upgraded on Seventh and Eighth Streets. Public realm investments should be prioritized for Seventh Street because of its designated role as a "green connector" street.
- **Transit performance.** *Transit speed and reliability should be maintained.* The TEP designates the 19 Polk as a Local rather than Rapid route. However, the project should strive to preserve at least the existing levels of transit speed and reliability and improve transit service where possible. Where possible, the project should look for opportunities to consolidate bi-directional transit service on two-way streets.
- **Bicycle conditions.** *A safe, comfortable, and attractive bicycle route should be provided within the corridor.* Bicycling should be made safer, more comfortable, and more attractive with a priority placed on reducing collisions. As both vehicle volumes and demand for cycling may increase over time as overall travel demand grows, the project will seek to develop protected bicycle facilities and/or consolidate directions of travel.
- **Vehicle circulation.** *The project should maintain adequate north-south vehicle capacity in the South of Market network as a whole.* While the project will repurpose some vehicle space on Seventh and Eighth Streets to improve the public realm and conditions for other modes, it should maintain enough vehicle capacity in the network as a whole so that existing South of Market vehicle volumes can continue to be accommodated with undue increases in delay for drivers and transit riders.
- **Parking and loading.** *Parking and loading access to businesses should be maintained.* A supply of on-street parking should be maintained on Seventh and Eighth Streets although the total amount of parking spaces may be reduced to provide space for other needs. Remaining parking should be managed to ensure availability at all times.
- **Deliverability and cost-effectiveness.** *The project should maximize cost-effectiveness and speed delivery of the highest priority improvements.*

This page intentionally left blank.

6.3 ALTERNATIVES DEVELOPMENT AND EVALUATION

KEY ●●● Greatest benefit ○ Neutral ●●● Greatest impact

Full list of project alternatives

The SFMTA developed a total of six project alternatives for Seventh and Eighth Streets. These alternatives are described and evaluated for each project objective in the tables that follow. Several of these concepts are very similar to projects developed for Folsom and Howard Streets. These similarities result from the fact that the two sets of streets have the same overall right-of-way dimensions (82.5 feet) and many similar functions. All of these alternatives provide reduced pedestrian crossing distances through pedestrian bulb outs, maintain parking lanes on both streets, and provide bicycle facilities. As with Folsom and Howard, key differences between the alternatives include the directionality of travel for vehicles and transit (there are both one-way and two-way alternatives), the type of bus facilities, the location and type of bicycle facilities, and the width of sidewalks. All six alternatives are summarized and evaluated below. In the next section, the recommended alternative is developed in detail. Finally, in Section 6.5, three other promising alternatives that were evaluated in detail are presented for comparison.

Figure 6-2 Seventh and Eighth Streets: Full List of Project Alternatives

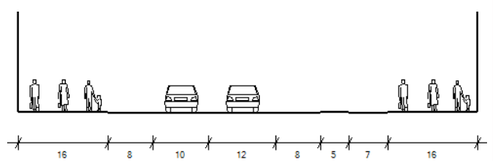
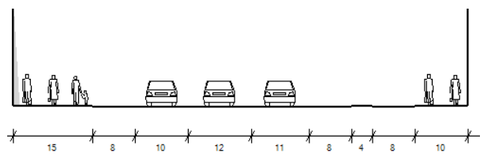
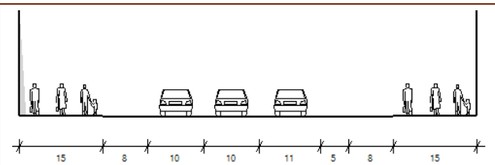
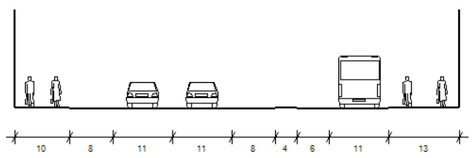
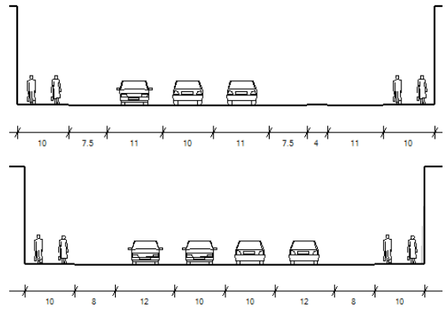
	Description	Cross Section	Pedestrian conditions	The public realm	Transit performance	Transit legibility/ consolidation	Bicycle conditions	Vehicle circulation	Parking and loading	Cost comparison	Notes	Disposition
1	Seventh and Eighth Streets: one-way, two lanes, one-way cycletrack		●●●	●●●	●	○	●●●	●	●	$$$	This concept would narrow the roadway to two, one-way lanes on each street and provide important benefits for pedestrians, cyclists, and the public realm with 15-foot sidewalks, greatly narrowed crossing distance, wide cycletracks, and traffic calming. It would not provide for two-way circulation or allow for consolidation of transit routes. It would require the expense of moving curblines on both streets.	Not carried forward due to impact of forecast traffic queues on cross streets including Market.
2	Seventh and Eighth Streets: one-way, three lanes, one-way cycletrack		●●	●	○	○	●●	○	●	$$	This concept would narrow the roadway to three, one-way lanes on both Seventh and Eighth Streets and provide one-way buffered bike lanes on both streets. It would provide bulb outs and mid-block crossings but widen the sidewalk on one side of each street rather than both sides. The net gain in pedestrian space would be less than Alternative 1, but the vehicle capacity would be higher, which would result in less transit delay and less impacts on adjacent streets.	Carried forward, recommended alternative.
3	Seventh and Eighth Streets: one-way, three lanes, one-way bike lane		●●	●●	○	○	●	○	●	$$	Like Alternative 2, this concept would narrow the roadway to three, one-way lanes on both Seventh and Eighth Streets. It differs from Alternative 2 in that it would provide a Class II bike lane on each street instead of a cycletrack, and widen the sidewalk to 15 feet on both sides providing additional benefit for pedestrians and the public realm.	Not carried forward due to lack of improvement to cycling conditions.

Figure 6-3 Seventh and Eighth Streets: All Alternatives (Continued)

	Description	Cross Section	Pedestrian conditions	The public realm	Transit performance	Transit legibility/ consolidation	Bicycle conditions	Vehicle circulation	Parking and loading	Cost comparison	Notes	Disposition
4	Seventh and Eighth Streets: two lanes with buffered bike lane and busway		●	● ●	● ●	○	●	● ●	●	$$	This alternative would provide two one-way vehicle lanes and two parking lanes. In a buffered space outside the parking lane, it would provide a wide shared bus/bike lane. This alternative would provide a high level of transit priority. However, on a set of streets with moderate planned transit frequencies (15-minute headways), this may not be the most efficient use of street space.	Not carried forward due to impact of forecast traffic queues on cross streets and an over-emphasis on transit priority.
5	Seventh: two lanes EB, one lane WB with two-way cycletrack Eighth: two lanes WB, two lanes WB		○	●	●	● ●	● ● ●	● ●	●	$	This alternative would provide two-way circulation on Seventh and Eighth Streets. Seventh Street would have two lanes northbound, one lane southbound, and a two-way cycletrack. Eighth Street would have two lanes in each direction and no bike facilities. Transit would be consolidated on Eighth Street. Sidewalks would remain at 10 feet. This alternative improves bicycle connectivity and consolidates transit. However, it would not improve the pedestrian realm on Eighth Street. Reduced capacity could lead to substantial traffic impacts on other streets, including Market.	Evaluated further and proposed for further consideration if the City can lower vehicle travel demand in this corridor through TDM or diversion.
6	Seventh and Eighth Streets: two lanes EB, one lane WB with one-way cycletrack		● ●	● ●	● ●	● ●	● ●	● ●	●	$$	This alternative would allow for three lanes of traffic on each street plus buffered bicycle lanes. Two lanes would operate in the dominant direction of travel (northbound on Seventh and Southbound on Eighth), while a third lane would operate in the opposite direction. A one-way cycletrack would be provided on each street. It allows for transit consolidation but would not improve bicycle connectivity like Alternative 5 and has less total vehicle capacity.	Not carried forward. However, recommended Alternative 2 could be converted to this configuration if the City can lower vehicle travel demand in this corridor through TDM or diversion.

6.4 RECOMMENDED ALTERNATIVE

Based on the evaluation above, the three most promising concepts were selected for additional analysis, design, and community input. After detailed review of these options, the SFTMA recommends Alternative 2, which reduces Seventh and Eighth Streets to three, one-way lanes, invests in pedestrian connectivity and additional pedestrian space, and adds a buffered one-way cycletrack to each street, as the concept that appears to provide the greatest benefits across the full range of project objectives.

In this section, Alternative 2 has been developed in more detail. The following project elements are described and illustrated in the remainder of this section.

- **Operations Concept.** Recommendations for the design of transportation facilities are explored. More detailed specifications for the design of the right-of-way for the full length of the corridor are presented in Appendix B.
- **Circulation Concept.** The circulation pattern for the recommended alternative is presented.
- **Streetscape, landscape, and public realm improvements.** Recommendations for streetscape and landscape improvements are presented. These improvements are integral to the project design and a necessary step towards achieving the vision for this part of the city as laid out in the Eastern Neighborhoods plan.
- **Phasing plan.** A conceptual phasing plan for this alternative is presented at the end of this section. More detailed cost estimates, timetables, and funding sources will be presented in the EN TRIPS Funding and Implementation Plan, to be published under a separate cover.

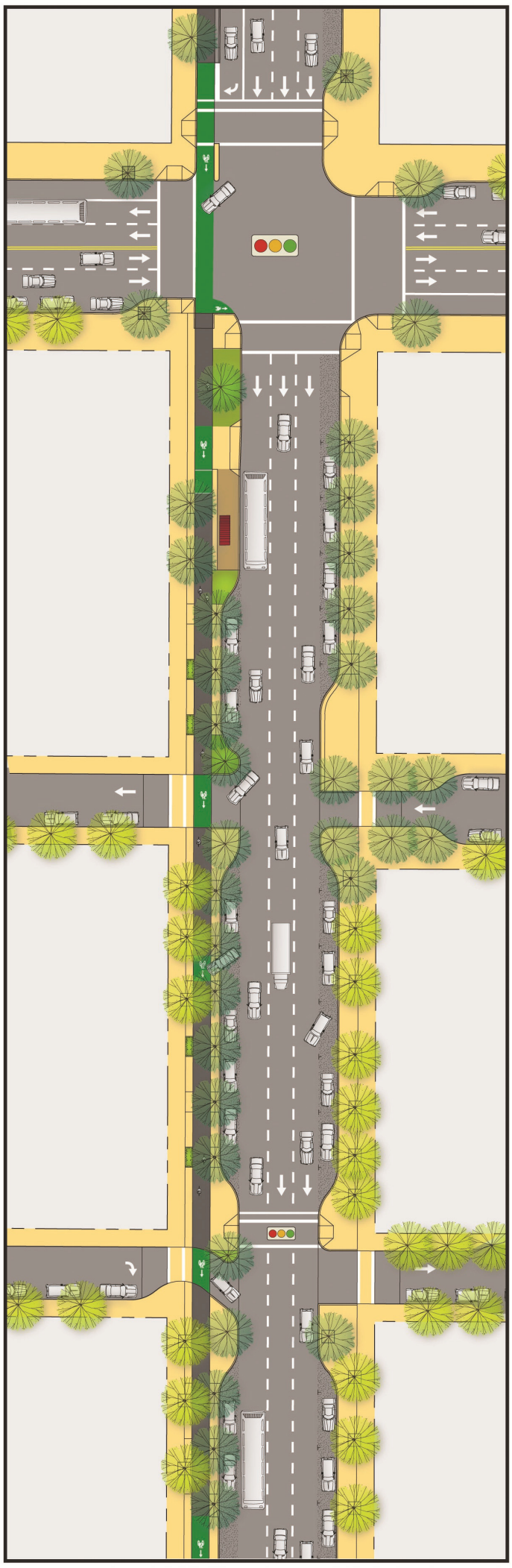
In section 6.5, two other alternatives are summarized with the recommended alternative's key differences highlighted. In addition, the findings of a detailed traffic analysis of the alternatives are provided in Appendix A. These additional options are included for stakeholder review and potential inclusion as alternatives in environmental analysis of the project.

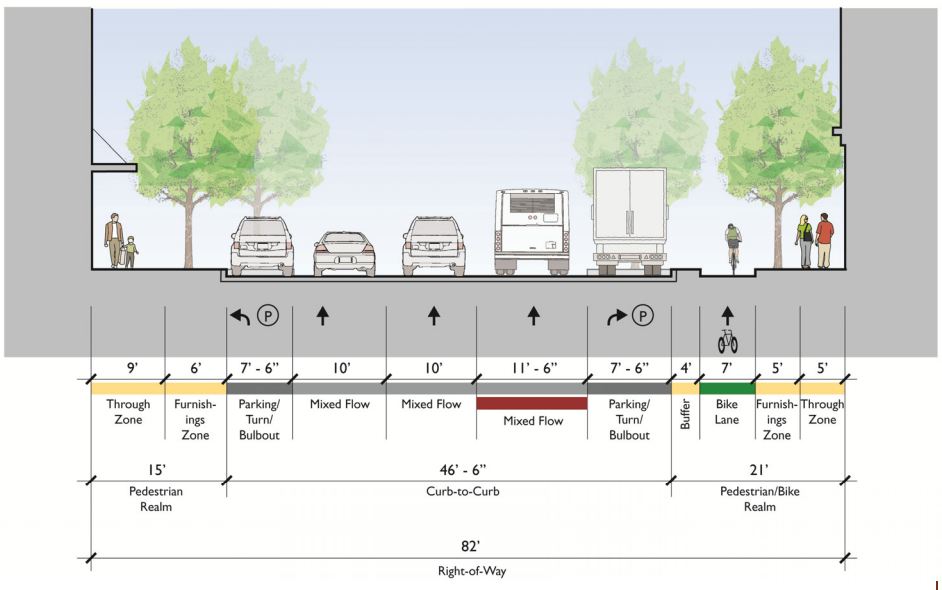
Highlights of Recommended Alternative

The recommended alternative reduces crossing distances and provides fixed-time signalized, mid-block crossings on most blocks to improve pedestrian connectivity and safety. By maintaining one-way circulation, it allows signals to be synchronized to favor a steady progression of vehicles at a moderate speed. A buffered one-way cycletrack on each street would offer a protected space for cyclists moving north and south in the western South of Market area. It would widen sidewalks on the side of the street opposite the cycletrack providing additional space for pedestrians, landscaping, and other amenities. Investment in the public realm on Seventh Street, in particular, will help that street fulfill its role as a "green connector" as identified in the Eastern Neighborhoods area plans. Sidewalk widening would require substantial resources. However, this alternative could be easily phased, with the cycletrack, bulbs, and pedestrian refuges installed in the first phase and sidewalk widening implemented in a second phase when funding becomes available.

This page intentionally left blank.

Seventh and Eighth Street Recommended Alternative (Alternative 3)





This alternative maintains both Seventh and Eighth as one-way streets, reducing each to three lanes. A one-way cycletrack would be added on each street, and the sidewalk would be widened on the side of the street opposite the cycletrack.

Pedestrian conditions. In this concept, signals would be timed to encourage steady vehicle travel speeds of 18 miles-per-hour contributing to a safer and more comfortable pedestrian environment. For each street, this concept would widen the sidewalk on one side to provide substantially more pedestrian space and add pedestrian bulbs and pedestrian refuges to further narrow crossing distances. It would add several mid-block crossings with fixed-time signals at key locations. Together, these changes would improve pedestrian connectivity and help to reduce the high pedestrian injury collision rates on these streets.

The public realm. Both the wider sidewalk and the cycletrack buffer space would provide new opportunities for landscaping, while the sidewalk could include pedestrian amenities and small public spaces. Public realm investments would be prioritized on Seventh Street to help it serve the “green connector” street role assigned in the Eastern Neighborhoods area plans.

Transit legibility. This concept would maintain southbound service from the 19 Polk on Eighth Street and northbound service on Seventh. Splitting service by direction in this way makes the transit system somewhat less legible for passengers than consolidating transit on a two-way street.

Transit performance. By maintaining three lanes of traffic capacity, this concept is not forecast to cause vehicle delay greater than the current configuration, so vehicle congestion would not delay buses operating in mixed-flow traffic. In addition, the project would improve northbound transit performance by constructing boarding islands on the west side of Seventh Street, allowing buses to travel in the left lane and thus avoiding right-turning vehicle queues that commonly occur at Folsom Street.

Vehicle circulation. In this concept, Seventh and Eighth Streets would continue to function as a one-way couplet, reduced to three lanes in each direction, with turn pockets provided at intersections. Unlike two-way alternatives, this configuration will not otherwise change vehicle circulation patterns and will not require any new restrictions to vehicle left turn movements. Modeling suggests that vehicle delay would not increase as compared to the current configuration.

Bicycle conditions. This alternative would provide buffered, one-way bicycle lanes on both streets to improve cyclist comfort. These facilities would be at street grade in the first phase of the project but would be brought up to sidewalk grade in a second phase.

Parking and loading. As in the other alternatives, parking lanes would be maintained on both sides of Seventh and Eighth Streets. Parking would be removed where necessary to provide turn pockets at intersections and provide pedestrian and transit bulb-outs.

Cost comparison. This project would require moving the curb lines along one side of each street, a large expense. Construction of transit boarding islands on Seventh Street would require additional investment, as would raising the cycletrack to sidewalk grade.

Seventh and Eighth Street Operations Concept (Recommended Alternative)

The concept for 7th and 8th Streets is based on a few key features, including retention of one-way traffic but reduction to three lanes; a protected cycletrack buffered from traffic by the parking lane, and extension of sidewalks on one side of the street.

Each street will be reduced from four to three travel lanes, all going one way.

Pedestrian or landscape bulbouts will be added to all intersections where a turn lane is not needed.

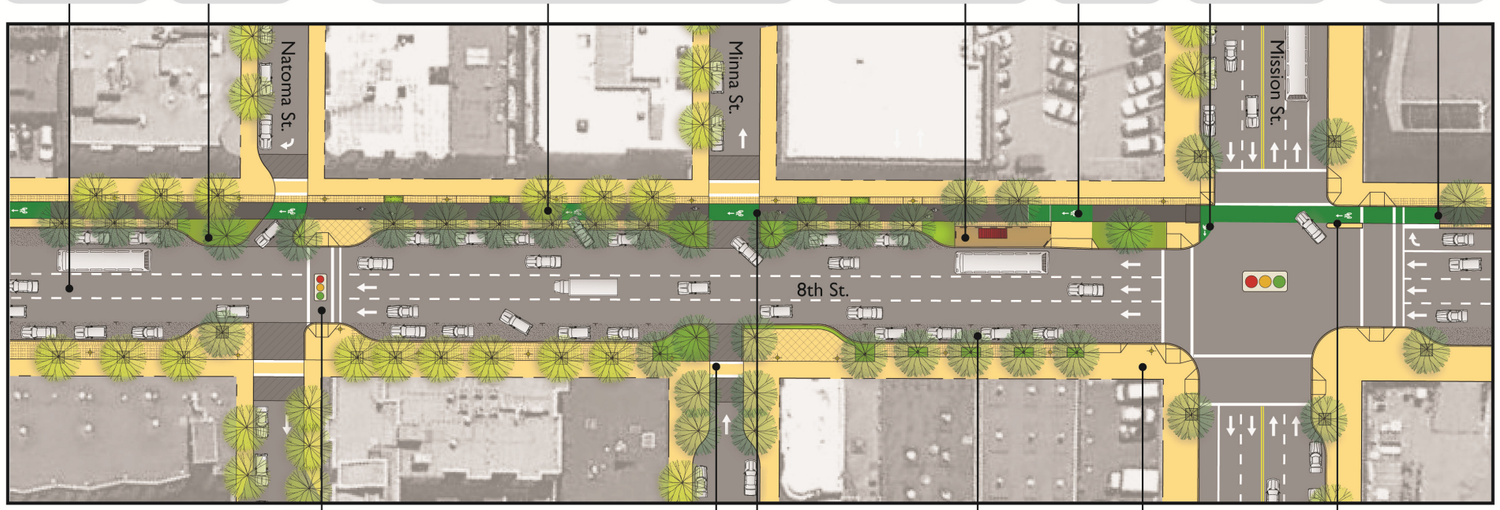
A one-way cycletrack will run on 7th and 8th Streets between the parking lane and the sidewalk. The cycletrack will be primarily at sidewalk grade and will have a buffer area from both pedestrians and people exiting parked cars.

The 19 Polk will operate northbound on 7th Street and southbound on 8th Street. On 7th Street, transit will operate on the left side of the street, and transit islands will be added.

Areas of potential conflict between cyclists and motorists are colored green.

Cyclists can turn left out of the cycletrack from "bike boxes" aligned with the right sides of major cross streets.

At major intersections, the cycletrack will ramp down from sidewalk grade to street grade.



Signals will be timed to allow for a continuous 12-15 mile-per-hour progression to encourage vehicle travel speeds that are safer and more comfortable for cyclists and pedestrians.

Pedestrian bulbouts and pedestrian refuges on the street side of the cycletrack will reduce the pedestrian roadway crossing length to only three travel lanes at midblock crossings.

Fixed-time signalized midblock crossings of 7th and 8th will allow easier crossing between widely spaced major cross streets and maintain moderate vehicle speeds.

At intersections with alleys, the alley roadway will ramp up to sidewalk grade.

Where vehicles cross the cycletrack at unsignalized alley alleys, sight lines will be maintained, turn radii will be tight, and pavement will be marked to reduce the potential for vehicel bike conflicts.

Parking lanes will be maintained on both sides of the street, except where bulb-outs or turn lanes are required.

Sidewalks on the non-cycletrack side will widen from 10 to 15 feet. Sidewalks on the cycletrack side will remain 10 feet, but pedestrian refuges placed on the street side of the cycletrack will reduce pedestrian crossing distance.

At major intersections, cyclists in the cycletrack can wait at red lights in a protected area that reduces the conflict of cyclists and right-turning motorists and increases visibility of cyclists. Vehicle right turns and cyclist through travel will have separate phases.

50′ 100′

December 21 2011

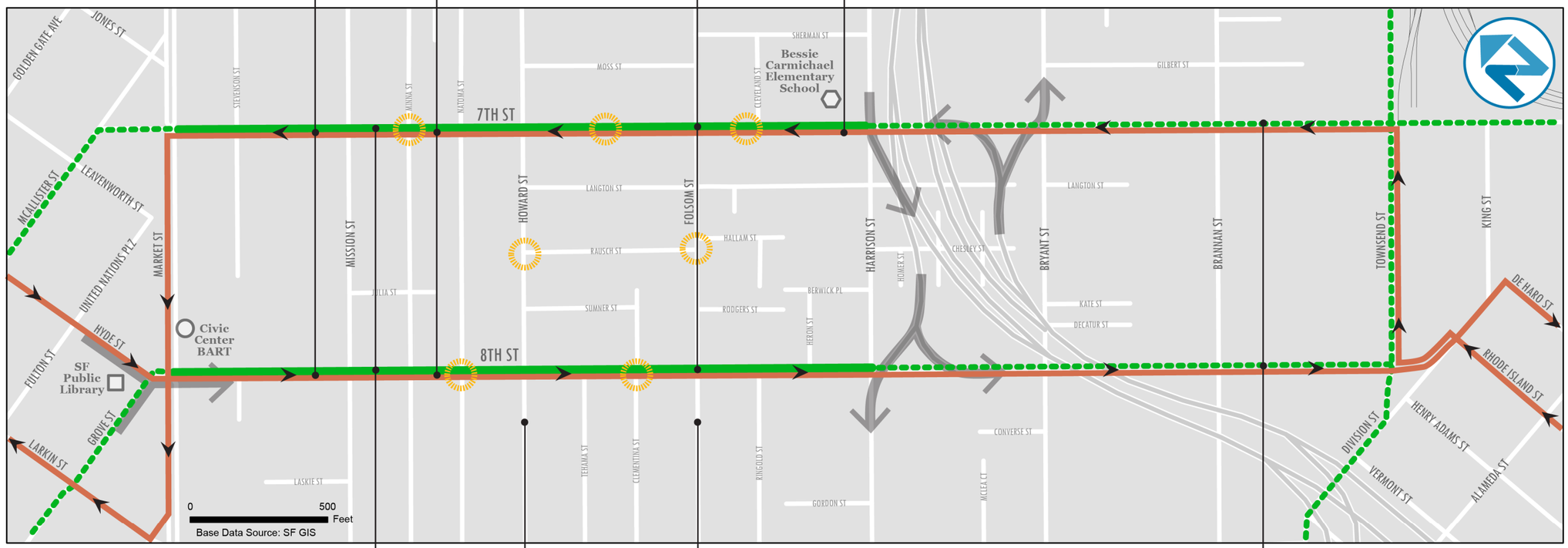
Seventh and Eighth Street Circulation Concept (Recommended Alternative)

Install pedestrian bulbs and new landscaping on 7th and 8th north of Harrison. Prioritize landscape and public realm improvements on 7th Street, which is identified as a 'green connector' street in the Eastern Neighborhoods area plans.

Reduce 7th and 8th Streets to three one-way lanes between Market and Harrison. Widen sidewalks to 15 feet on non-cycletrack side of the street.

Install transit boarding island and move bus service to the west side of 7th Street, north of Harrison to avoid right turn queues at Folsom.

Install bike boxes to insure safe bicycle crossings where Folsom and 7th/8th cycletracks intersect.



Install a buffered one-way cycletrack northbound on the east side of 7th and southbound on the west side of 8th.

Folsom and Howard Streets are proposed for two-way conversion in EN TRIPS priority project. Folsom will have a two-way cycletrack.

Extend cycletracks to Townsend as development warrants and funding is available.

LEGEND

New mid-block crosswalk | Bicycle route | One-way cycletrack | 19-Polk (local transit) | One-way circulation | Vehicular flow

This page intentionally left blank.

Seventh and Eighth Street Circulation Concept Detail (Recommended Alternative)

Unlike the two-way concept recommended for Folsom Street, the recommend alternative for Seventh and Eighth Streets requires few changes to the wider circulation networks in the South of Market. Transit routes will remain unchanged, though the northbound 19 Polk will shift to the left lane on Seventh Street. Vehicle, bicycle, and pedestrian connectivity will be affected as follows.

Vehicle circulation

Today, Seventh and Eighth Streets provide a total of eight lanes of vehicle capacity (four northbound on Seventh and four southbound on Eighth). This capacity is currently more than is required to maintain acceptable traffic conditions during peak periods and far more than is required during off-peak periods. The recommended alternative will reduce this total from eight to six, one-way lanes. Unlike the two-way concept proposed for Folsom and Howard Streets, this concept will not require new restrictions on turning movements. Traffic signals will be used as follows.

- **Signalization for through-traffic.** Signals will be timed to favor a moderate progression for all vehicles, a speed that virtually eliminates the possibility of fatal collisions with pedestrians. Fixed-time (rather than pedestrian-actuated) signals at mid-block crossings will encourage drivers to maintain a constant speed. Ideally, the progression on Seventh and Eighth Streets will be timed to between 12 and 15 mph, speeds that will nearly eliminate the possibility of fatal collisions with pedestrians while allowing vehicles, transit, and cyclists to travel at a regular speed. Signal cycle length and progressions speeds will be re-timed for the South of Market as a whole to achieve the optimal combination of north-south and east-west progression speeds.
- **Management of right turns.** Right turns will be permitted at all intersections except those where a one-way cross-street removes the possibility. At the approach to a right turn intersection, the parking lane will be dropped and a right turn pocket will be provided. On both streets, the cycletrack will be on the right side of the street. To reduce conflicts between cyclists and right turning vehicles, signals will be set as follows: during the green time for through vehicles, an initial period of time will be provided for through cyclists with right turns prohibited. Once cyclists have cleared the intersection, cyclist through-movement will be given a red light, and vehicle right turns will be permitted. To further protect cyclists from right-turning vehicles, vehicle stop bars will be set back five feet from the crosswalk, and cyclists will be given space behind a raised buffer at the front of the crosswalk (see Operations Concept).
- **Management of left turns**. As with right turns, left turns off of these one-way streets will be permitted at all intersections except those where a one-way cross-street removes the possibility. At the approach to a left turn intersection, the parking lane will be dropped, and a left turn pocket will be provided.
- **Alleyway entrances and exits.** Where Seventh and Eighth Streets intersect with alleyways, traffic calming treatments will be applied. Turning radii will be tightened with bulb-outs, and the roadway will be raised to the street grade to clearly indicate to drivers that they are entering a space where vehicle through movement is a lower priority. As at the intersection of Seventh and Minna, where this treatment is already in place, tactile

treatments will be applied to indicate to visually impaired individuals that they are crossing a roadway.

Transit

On 8th Street, transit service will be unchanged. The 19 Polk will continue to operate southbound on the west side of the street. On Seventh Street, the northbound Route 19 will be shifted from the east to the west side of the street (the left side, from the perspective of the northbound bus) north of Harrison Street, and transit boarding islands (similar to the one now in use on Seventh near Market Street) will be constructed for loading and unloading passengers.

Bicycle circulation

The recommended priority project alternative calls for a one-way, buffered cycletrack on each street. South of Harrison Street, the existing Class II bicycle lanes will remain, and the circulation pattern for cyclists will not change. A signal progression between 12 and 15 mph will allow many cyclists to progress at a constant speed without hitting a red light.

In their final build-out, these facilities will be primarily at sidewalk grade with a buffer space and a parking lane separating them from traffic. They will ramp down to street grade approaching major intersections. At curb cuts and alleyway crossings of the cycletrack, parking will be set back from the crossing a sufficient distance to ensure clear sight lines.

The edge between the cycletrack and the sidewalk will be clearly marked with a tactile treatment to ensure that visually impaired pedestrians can recognize the boundary between pedestrian and bicycle space. At designated pedestrian crossings of the cycletrack (including mid-block crossings and bus stops), a different tactile treatment will be applied to help visually impaired individuals locate and utilize the crossing. Design treatments will be used to slow cyclists at mid-block pedestrian crossings and indicate that cyclists are entering a pedestrian space. These treatments may include a narrowing of the cycletrack and/or pedestrian actuated flashing beacons.

Southbound cyclists wishing to continue south toward Showplace Square will continue to transition from Eighth to Seventh using the Townsend Street bike lanes. Northbound on Seventh, the cycletrack buffer will terminate mid-way between Mission and Market and as they do today, cyclists will transition into mixed-flow traffic approaching Market Street. Cyclists continuing northbound toward McAllister will stay in the shared center lane until clear of the right turn lane onto Leavenworth, where the westbound McAllister bike lane will begin.

Pedestrian connectivity

This proposal will improve pedestrian connectivity by placing mid-block crossings with fixed-time traffic signals on each block. Where alleys exist, crossings will be placed at or near the alley.

On the non-cylcetrack side of each street, sidewalk extensions into the parking lane will be added at mid-block crossings and at corners where turn lanes are not required. On the cycletrack side of the street, a pedestrian refuge will be placed in the parking lane.

Care must be taken to insure that the cycletrack does not impede movement for pedestrians, especially those with disabilities. In the project's first phase, ramps down to the street grade will be added to allow wheelchair crossing to the pedestrian refuge, and the cycletrack will be colored to indicate a point of potential pedestrian/bicycle conflict. In the second phase, the cycletrack will be raised to sidewalk grade, street furniture will be maintained at the existing curb line, and paint

and/or raised markings will be added to clearly delineate the boundary between pedestrian and bicycle space. Color will continue to mark points of potential pedestrian-bicycle conflict. At mid-block crossings and bus stops, a tactile treatment will indicate to visually impaired pedestrians that there is a safe crossing.

This page intentionally left blank.

Seventh and Eighth Street Streetscape and Landscape Concept (Recommended Alternative)

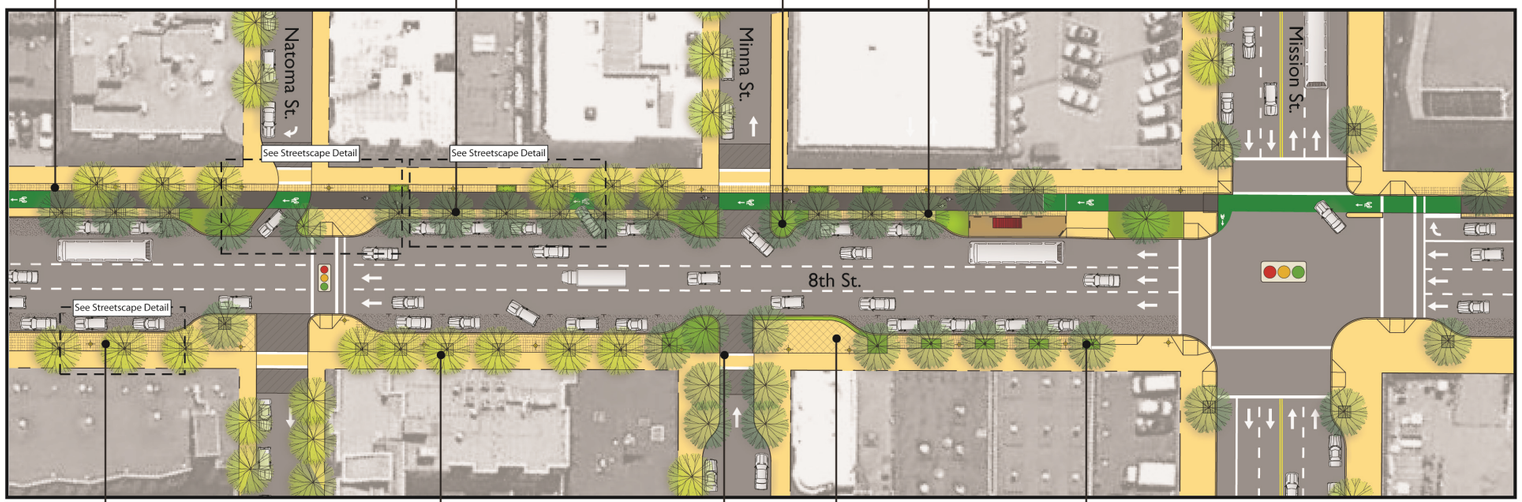
The Streetscape/Landscape Concept for 7th and 8th Streets is based around different but complementary approaches to the two sides of the street. On the side of the street with the cycletrack, the streetscape supports the bicycle facility by using paving, landscape, and furnishings to buffer and warn pedestrians and motorists exiting their cars of cyclists riding on the cycletrack, which is at sidewalk grade. On the other side of the street, the streetscape design makes the most of the 15-foot sdewalk width by allowing ample space for walking, furnishings, dining and display, and exiting parked cars. Meanwhile, where 7th and 8th streets cross "SoMa Alleys" such as Minna and Natoma Streets, bulb-outs provide opportunities for stormwater management, landscape features, and public space. This concept draws from the design guidance provided by the City of San Francisco Better Streets Plan.

Special paving, planter strips, occasional trees, and furnishings create a buffer separating pedestrians from cyclists using the cycletrack.

New trees are planted with grates, wood platforms, or another walkable surface in the 4-foot buffer area between the parking lane and the cycletrack. These trees create a unified look for the street while existing trees on the other side of the cycletrack can remain.

Trees near potential conflict points between autos and cyclists on the cycletrack can be pruned to have a 14-foot minimum height of lowest branch to ensure visibility, per Better Streets Plan, while creating a gateway element for alleys.

A 4-foot area between parking spaces and the cycletrack allows people enough room to exit parked cars and access the sidewalk safely. Treating this area with the same paving as the furnishings zone on the other side of the cycletrack creates the effect of a unified buffer on both sides of the cycletrack.



The wider, 15-foot sidewalk can be divided into a through zone that allows a comfortable amount of clear space for walking as well as seating or display along buildings; and a furnishings zone with a more textured and/or permeable paving treatment that allows for furnishings, landscape, and room for exiting parked cars.

Where trees are already present, the width of the furnishings zone can be adjusted to align with the existing trees. Tree grates can allow for enough soil volume without excessively pinching the through zone. An 8-foot through zone should be maintained where feasible.

At intersections with SoMa Alleys, the alley roadway ramps up to sidewalk grade to create minimal interruption of 7th and 8th Streets' pedestrian realm.

Bulb-outs at intersections with SoMa Alleys like Minna Street provide a variety of public open space opportunities that will depend on the adjacent use and community needs, such as seating areas, rainwater gardens, and small community gardens.

In order to maximize the width of the through zone while allowing for businesses to place cafe seating or display, against their buildings, new tree plantings occur in 4' x 6' or 4' x 8' tree pits that can be planted with other grasses and shrubs, while leaving enough room to exit parked cars.

50' 100'

LEGEND

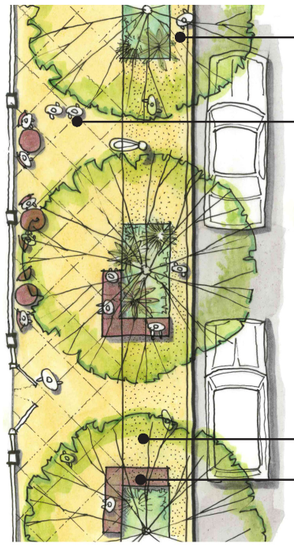
Existing tree
New tree
Public space opportunity
Planter strip
Permeable paving
Tree grate
Pedestrian Light

Seventh and Eighth Street Streetscape and Landscape Concept Detail (Recommended Alternative)

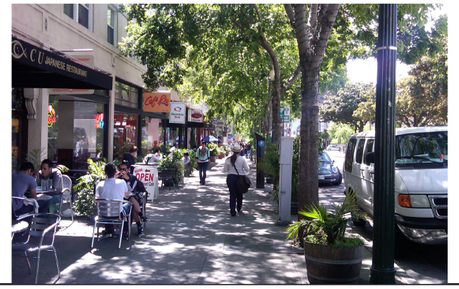
7th and 8th Streets

Streetscape Treatment Type: 15-foot Pedestrian Realm - No Cycletrack

This treatment is appropriate for the block faces of 7th and 8th Streets without the cycletrack. The 15-foot pedestrian realm accommodates a balance of multiple needs in a strongly urban setting: it accommodates pedestrian through movement and movement in and out of parked cars, allows for use of space by adjacent uses, provides opportunities for the integration of small-scale public spaces and street greening, and supports tree health.



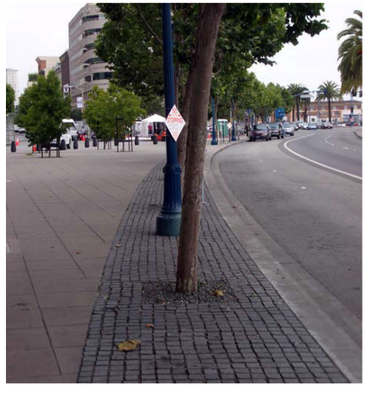
A 9-foot through zone allows generous space for walking as well as cafe seating, display, window shopping, or other uses along building frontages.



Informal seating walls wrap around tree pits also planted with shrubs and grasses.

An edge zone allows space for people to enter and exit parked cars.

A 4-foot furnishings zone can accommodate trees, other landscape, pedestrian lights, and other street furniture. The furnishings zone's surface is a permeable material such as decomposed granite or cobblestones to reduce impermeable surfaces and to improve tree health.

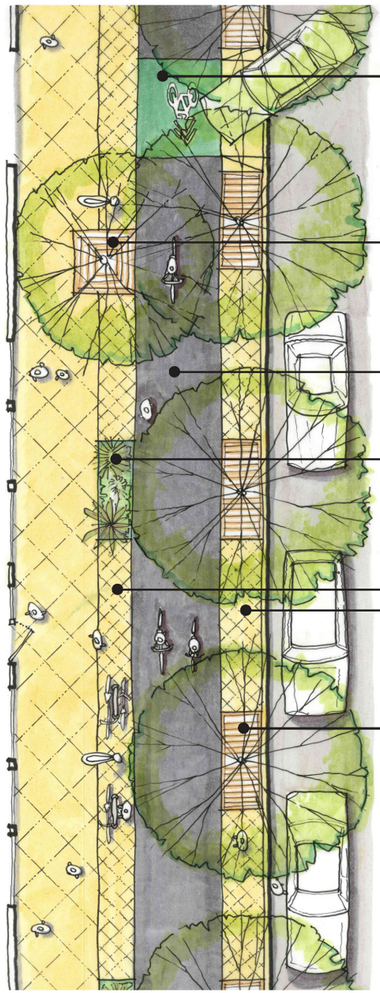


Seventh and Eighth Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

7th and 8th Streets

Streetscape Treatment Type: 10-foot Sidewalk with Cycletrack

This treatment is appropriate for the block faces of 7th and 8th Streets that include a cycletrack. This design is based on buffering the cycletrack - in part visually, in part physically - from pedestrians and parked vehicles as well as on framing the cycletrack as a civic piece of infrastructure by lining it on both sides with landscape and furnishings that double as streetscape amenities.



Existing street trees can be accommodated into this streetscape. Their vitality can be increased by increasing their tree pit area and the addition of 5-foot-by-5-foot tree grates that will not diminishing the pedestrian through zone.

In the furnishings zone of the pedestrian realm, 4-foot-by-8-foot planter strips alternate with areas for furnishings, such as pedestrian lighting and bicycle racks.

Evenly spaced street trees planted in the 4-foot buffer between the cycletrack and the parking lane are an important unifying feature of the street. Trees are accommodated in a 4-foot-by-8-foot tree grate or other treatment that allows walking across the tree pit area.

Driveways, like other points where cyclist-motorist conflicts are possible, are treated with standard green coloring. The pedestrian realm runs through driveways, uninterrupted.

The cycletrack, at sidewalk grade, is paved with asphalt or other material that visually contrasts with the sidewalk paving.

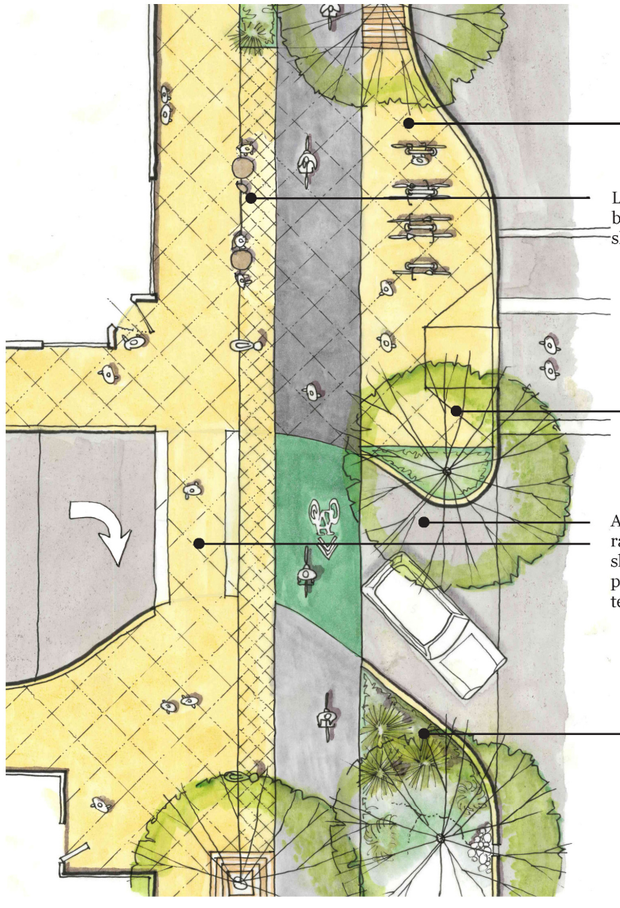
The pedestrian realm's furnishings zone and the edge zone both have a similar, more intricately scored paving pattern that is distinctive from the sidewalk. This creates a consistent visual buffer on both sides of the cycletrack, reducing the potential for cyclist-pedestrian collisions.

Seventh and Eighth Street Streetscape and Landscape Concept Detail (Recommended Alternative) (Continued)

7th and 8th Streets

Streetscape Treatment Type: Alley Intersection with Cycletrack

This treatment is appropriate where the cycletrack side of 7th and 8th Streets meets an alley cross street, such as Minna or Natoma Streets. The streetscape here is designed to ensure safety of pedestrians, bicyclists, and motorists, and to make the most of the civic potential of these locations by expanding the pedestrian realm, introducing signalized mid-block crossings (where warranted), visually highlighting alley entries/exits, and adding street greening elements.



Like at this laundromat, cafe seating can be placed in the furnishings zone, but it should be back from the cycletrack.

At the entrance to the alley, the roadway ramps up to the level of the sidewalk, slowing down vehicles while providing a pedestrian alley crossing that is not interrupted by a grade or material change.

While the presence of the cycletrack reduces the accessibility of the bulb-out space from the sidewalk, it can be used for bike parking or other street furnishings. Where new mid-block crossings are introduced, this spaces accommodates waiting pedestrians and cyclists.

Trees in the bulb-out space on either side of the alley function as a alley entry/exit "markers".

Landscaping in bulb-outs between the roadway and the cycletrack discourage crossing 7th/8th in locations where no mid-block crossing is provided. These areas can also be used as rain gardens to infiltrate runoff.

Seventh and Eighth Street Phasing Plan

It is recommended that the Seventh and Eighth Street project be implemented in phases. In the first phase, the cycletrack and pedestrian bulbs will be added, transit boarding islands built, and travel lanes will be reduced from four to three. In the second phase, the sidewalk opposite the cycletrack will be widened to 15 feet. Specific implementation steps and cost estimates are will be detailed in the EN TRIPS Funding and Implementation Plan, to be published under a separate cover.

Figure 6-3 EN TRIPS Folsom/Howard Priority Project Phasing

	Phase 1	Phase 2
Circulation	Reduce Seventh and Eighth Street to three, one-way lanes each.	
Circulation	Re-time signals to favor 12-15 mph vehicle progression on both streets.	
Bike	Stripe two-way, parking-buffered cycletrack on Seventh and Eighth Streets.	Raise cycletrack and buffer to sidewalk grade.
Bike	Upgrade signals to allow split vehicle right turn/bike through phasing.	
Transit	Construct mid-block transit boarding islands (right side of Eighth, left side of Seventh).	
Pedestrian	Construct pedestrian corner bulbs/pedestrian refuges with landscaping.	Widen sidewalk on non-cycletrack side of both streets to 15 feet. Add landscaping and pedestrian amenities.
Pedestrian	Add three pedestrian-actuated signalized, mid-block crossings on Seventh and Eighth.	

6.5 OTHER PROMISING ALTERNATIVES

In addition to the recommended alternative described above (Alternative 2), two other concepts were selected for additional analysis, design, and community input prior to selection of a recommended alternative. These include a one-way option that differs only slightly from the recommended alternative and a two-way concept that introduces more substantial circulation changes. These additional options are described and illustrated below for stakeholder review and potential inclusion as alternatives in environmental analysis of the project.

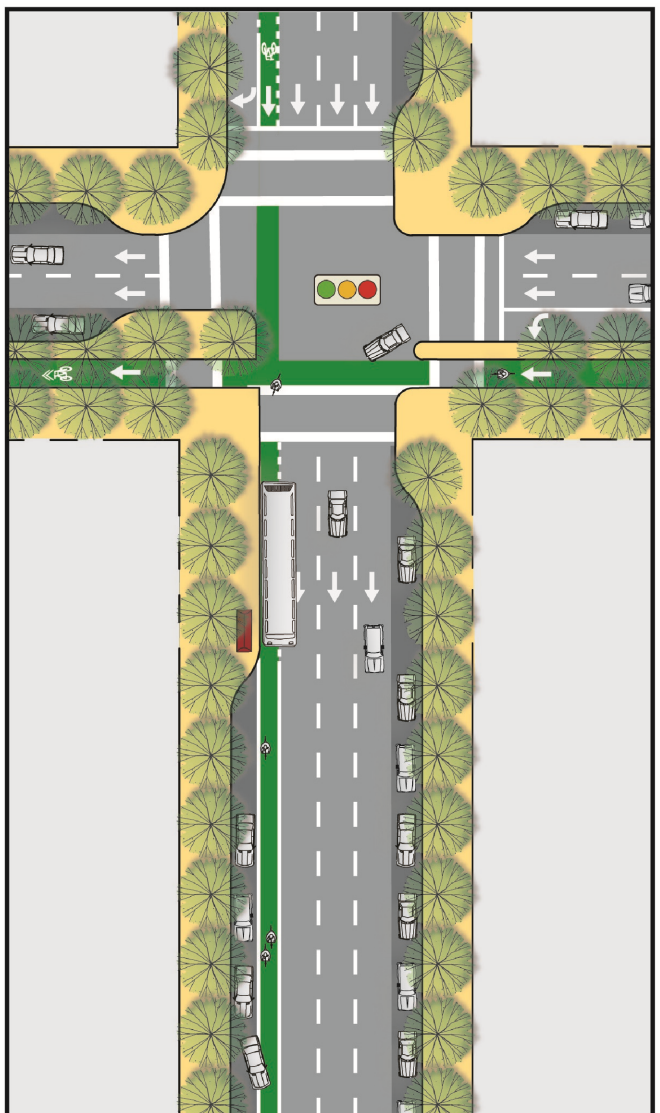
Key differences between these concepts and the recommended alternative are summarized below. In addition, the findings of a detailed traffic analysis of the four alternatives are provided in Appendix A.

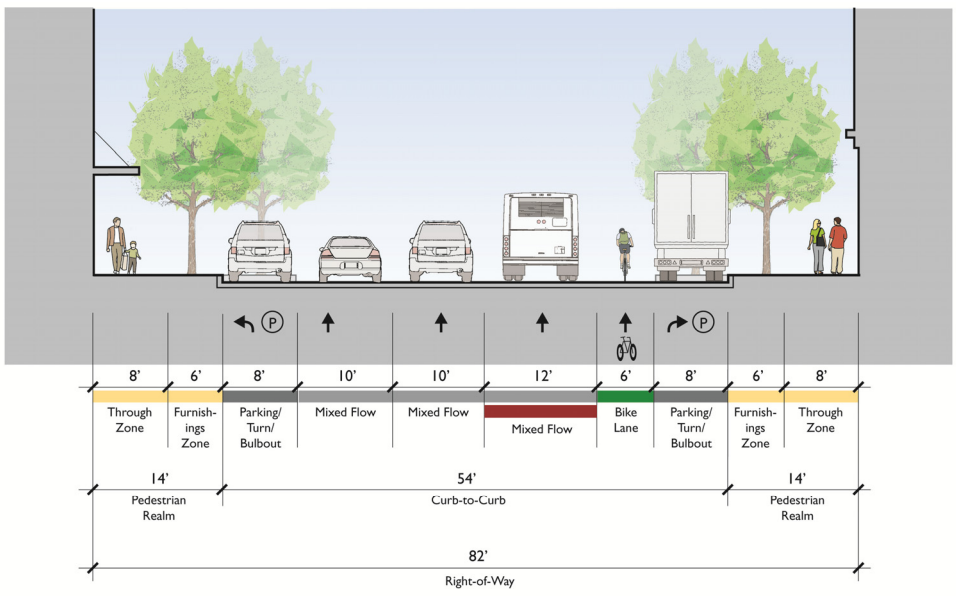
- **Alternative 3: One-way with wide sidewalks.** Like Alternative 2, this concept would narrow the roadway to three, one-way lanes on both Seventh and Eighth Streets, and make no other changes to wider circulation networks. It differs from Alternative 2 only in that it would provide a Class II bike lane on each street instead of a cycletrack and widen the sidewalks to 15 feet on both sides, providing additional benefit for pedestrians and the public realm and further emphasizing Seventh Street as a "green connector" street.

- **Alternative 5: Two-way Seventh and Eighth with bicycles on Seventh and transit on Eighth.** This alternative would provide two-way circulation on Seventh and Eighth Streets while minimizing project costs by keeping curb lines intact. Seventh Street would be configured like the recommended Folsom Street alternative with two lanes northbound, one lane southbound, and a two-way cycletrack. Eighth Street would have two lanes in each direction and no bike facilities. Transit would be consolidated on Eighth Street. Sidewalks would remain at 10 feet. This alternative improves bicycle connectivity and consolidates transit. However, it would do nothing to improve the pedestrian realm on Eighth Street, which would have two lanes of traffic in each direction, with no bicycle facilities or added pedestrian space. Because of the degree to which it reduces vehicle capacity, this alternative would likely cause very long vehicles queues if present vehicle volumes persist. Vehicle queues in the P.M. peak would regularly backup from Eighth and Mission across Market Street, potentially disrupting transit service. However, this alternative offers enough benefits (including shorter, more efficient transit routes and better bicycle connectivity) that it could be revisited in the environmental review process as part of a scenario that includes more robust TDM assumptions.

Each alternative is presented more fully below.

Seventh and Eighth Street Alternative 3





This concept maintains both Seventh and Eighth as one-way streets, reducing each to three lanes. As today, a one-way bicycle lane would be provided on each street, and the sidewalk would be widened to 15 feet on both sides of the street.

Pedestrian Conditions. The principal advantage of this concept is that it would provide a great deal of new sidewalk space, which could be used to accommodate higher pedestrian volumes, add landscaping, pedestrian amenities, and small public spaces. Like other alternatives, it would also add pedestrian bulbs and refuges to further narrow crossing distances, time signals to encourage steady vehicle progression at moderate speed, and signalized, mid-block crossings at key locations.

The public realm. The wide sidewalks would provide generous space for landscaping, pedestrian amenities, and small public spaces. Public realm investments would be prioritized on Seventh Street to help it serve the “green connector” street role assigned in the Eastern Neighborhoods area plans.

Transit legibility. Like the recommended alternative, this concept would maintain southbound 19 Polk service on Eighth Street and northbound service on Seventh. Splitting service by direction in this way makes the transit system somewhat less legible for passengers then consolidating transit on a two-way street.

Transit performance. Like the recommended alternative, implementation of this concept is not excepted to further delay buses operating in mixed-flow traffic. It would improve northbound transit performance by constructing boarding islands on the west side of Seventh Street, allowing buses to travel in the left lane and thus avoiding right-turning vehicle queues that commonly occur at Folsom Street.

Vehicle circulation. Like the recommended alternative, Seventh and Eighth Streets in this concept would continue to function as a one-way couplet, reduced to three lanes in each direction, with turn pockets provided at intersections.

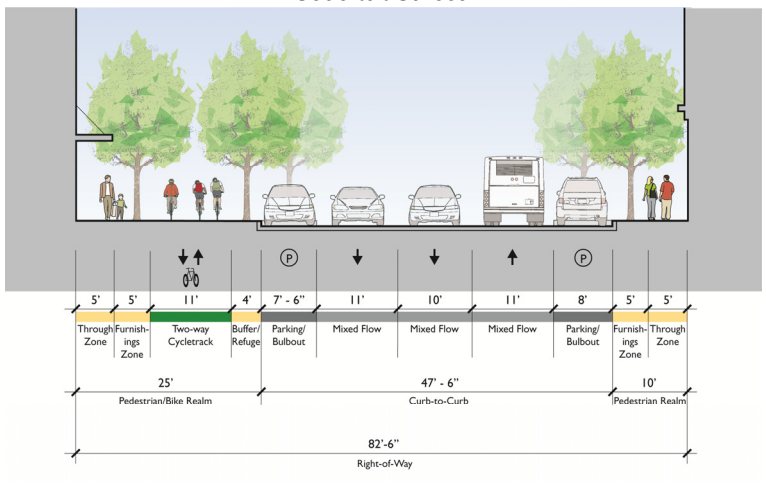
Bicycle conditions. This alternative would maintain the existing present condition for cyclists, with a Class II bicycle lane on each street. Because it does not improve conditions for cyclists, this concept fails to meet a major project objective.

Parking and loading. As in the other alternatives, parking lanes would be maintained on both sides of Seventh and Eighth Streets. Parking would be removed where necessary to provide turn pockets at intersections and pedestrian and transit bulb-outs.

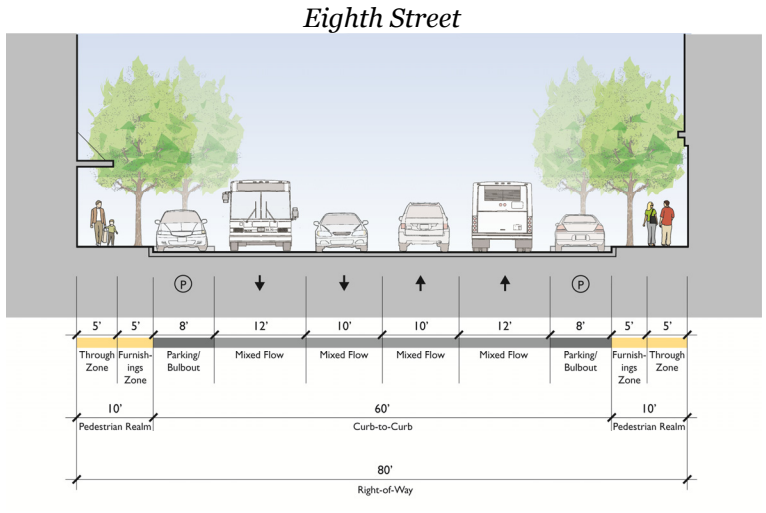
Cost comparison. This project would require moving the curb lines along both sides of each street, a large expense. Construction of transit boarding islands on Seventh Street would require additional investment.

Seventh and Eighth Street Alternative 5

Seventh Street



Eighth Street



This concept would provide two-way circulation on Seventh and Eighth Streets. Seventh Street would have two lanes northbound, one lane southbound, and a two-way cycletrack. Eighth Street would have two lanes in each direction, with two-way transit service and no bike facilities. Sidewalks would remain at 10 feet. The principle advantage of this concept is that it consolidates directions of travel for cyclists and transit on the street that provides the strongest connectivity for each mode. Its principle disadvantage is that with no additional policy change, it would likely increase delay greatly for transit and vehicles.

Pedestrian conditions. This concept would not widen sidewalks on either street. On Seventh Street, it would reduce crossing distances by introducing pedestrian refuges on the street side of the cycletrack and adding signalized, mid-block crossings. On Eighth Street, four vehicle lanes would be maintained and improvements for pedestrians would be minimal.

The public realm. This concept would allow for additional landscaping and bulbs on Seventh but minimal public realm improvements on Eighth.

Transit. By consolidating bus service on Eighth Street, this concept not only improves legibility through bi-directional transit service but also prevents the 19 Polk from having to divert out-of-direction to go northbound on Seventh Street, which would reduce travel time and operating costs for SFMTA. However, by reducing vehicle capacity and introducing left turn conflicts, modeling suggests that this alternative would increase delays substantially for vehicles and transit operating in mixed-flow lanes. In forecasts using current vehicle volumes, queues from Eighth and Mission would reach back to Market Street potentially disrupting Market Street transit service as well. Ideas for managing this traffic impact are discussed below under vehicle circulation

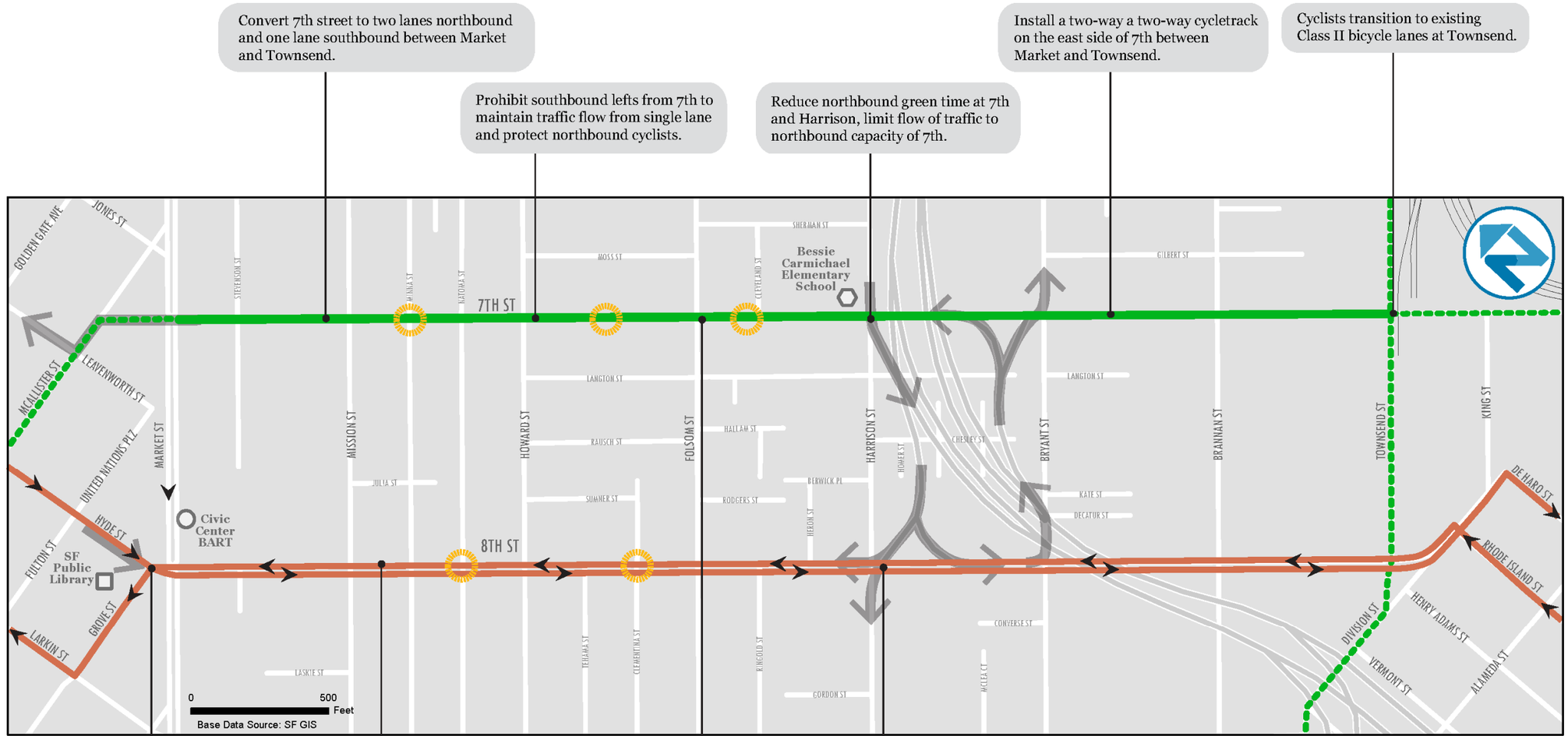
Vehicle circulation. In this concept, vehicles would travel north and south on both Seventh and Eighth Streets. On Seventh, there would be two northbound lanes and one southbound lane. Southbound lefts from the single lane would be prohibited in order to maintain traffic flow and protect cyclists traveling north in the cycletrack from left turning vehicles. To manage northbound vehicle demand, the City could consider limiting signal time for northbound vehicles at Harrison and/or Folsom Street, limiting flow through those intersections to the capacity of the downstream intersections. Doing so would cause vehicles to queue back toward the freeway, perhaps to the main line of I-80. Similarly, the City could manage southbound traffic by limiting the capacity of Hyde Street. Any vehicle backup that occurred would then queue north of Market Street, thereby avoiding impacts on Market Street transit service.

Bicycle conditions. This alternative would provide wide buffered bicycle lanes with a two-way cycletrack on Seventh Street. This facility would have optimal connectivity to the Seventh Street bicycle lanes that continue on Seventh Street south of Townsend, and to the McAllister bike lanes north of Market.

Parking and loading. As in the other alternatives, parking lanes would be maintained on both sides of Seventh and Eighth Streets. Parking would be removed where necessary to provide turn pockets at intersections and pedestrian and transit bulb-outs.

Cost comparison. This project would not require moving the curb lines, which would reduce its cost compared to other alternatives. It would require major changes to signalization.

Figure 6-4 Seventh and Eighth Street Alternative 5 Circulation Concept

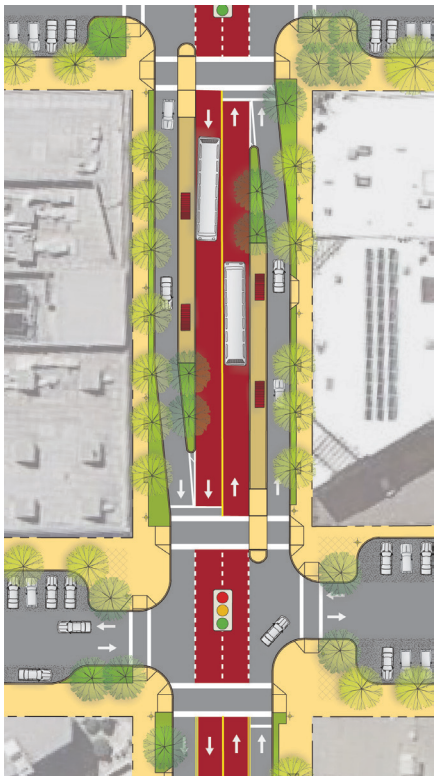


7 MOVING FORWARD

7.1 A VISION FOR TRANSPORTATION AND THE PUBLIC REALM IN THE EASTERN NEIGHBORHOODS

The priority projects presented in this plan were selected not only to meet needs on individual streets, but also because their lessons have the potential to be applied more broadly. Along with their associated circulation concepts, the projects advance a set of strategies for addressing the major transportation challenges that the city will face in the coming decades. Based on wider application of those strategies to address recurring transportation challenges, this chapter introduces a long-term vision for transportation and the public realm in the Eastern Neighborhoods.

Capacity for Movement of People and Goods



Roadway capacity for private vehicles in the Eastern Neighborhoods cannot be expanded to meet future transportation demand. In order to allow efficient movement of people and goods while maintaining and enhancing livable neighborhoods, most of the forecast growth will have to be accommodated by prioritizing modes of travel that can move more people in less space. This is not a matter of ideology, but geometry: it takes up more than ten times as much roadway area to move a person in a private car than by any other mode of transportation. While vehicles will remain an important mode of transportation, peak period vehicular capacity will be reduced somewhat in order to increase streets' ability to move people and goods. Vehicles will move at safe and moderate speeds, and curb space will be carefully managed to ensure that private vehicle parking does not negatively affect other modes and delivery vehicles have efficient access to businesses. Major steps toward achieving this vision will include:

Create "no compromise" rapid transit corridors

In the future Eastern Neighborhoods transportation system, SFMTA transit services will be fast, reliable, and cost-effective. The key to this strategy will be a commitment to transit priority for the most important major transit corridors. On these streets, measures to reduce delay and ensure

the reliability of transit service will be implemented to maximize the movement of people, even if they require reductions in vehicular capacity. Bicycle facilities will be designed so they do not compete with transit on these streets; as proposed for 16th Street in this plan, high-quality, well-connected bicycle facilities will be provided on parallel corridors. Sixteenth Street, Mission Street and the T Third corridor (operating on the surface of Third Street south of Bryant Street and then in a tunnel to the north) will be primary transit spines for the Eastern Neighborhoods: these corridors will be upgraded to the highest level of transit priority for their full length.

In many cases the optimal configuration for transit will be similar to the median transitway concept that this plan proposes for 16th Street, where transit vehicles have their own right-of-way and are unimpeded by turning or parking vehicles. As transit efficiencies are achieved, savings can be reinvested by increasing service levels on these and other core routes. In the long run, the other designated 'rapid' transit corridors in the study area, including Third and Fourth Streets in the South of Market, Potrero Avenue, Division Street, and Townsend Street should be considered for this highest level of transit priority.

Establish a network of bicycle facilities to serve people of all ages and abilities

Establishing a fully connected network of bicycle routes as outlined in the San Francisco Bicycle Plan is a vital step toward allowing bicycle trips to serve more of the area's transportation demand. Facilities should be designed so that people of all ages and abilities feel comfortable using them.

On major arterial streets, it will sometimes be necessary to physically buffer cyclists from moving vehicles. The bicycle facilities developed for Folsom, Seventh, and Eighth Streets in this plan work toward this goal. Eventually, separated facilities should be extended to encompass longer segments of these corridors, and other arterial corridors in the South of Market may become strong candidates for separated bikeways as demand grows. Separated bicycle lanes must always be carefully designed so that they don't compromise safe and comfortable use of streets by people with disabilities.

Some important corridors should evolve into neighborhood greenways, where pedestrians and cyclists are prioritized and traffic is calmed and/or diverted to other streets. The 17th Street bikeway described in Chapter 4 of this report is a strong candidate for such a treatment. The Mission Creek Bikeway and Blue Greenway along the Eastern Waterfront will create fully separated multi-use pathways.

Manage vehicle system capacity

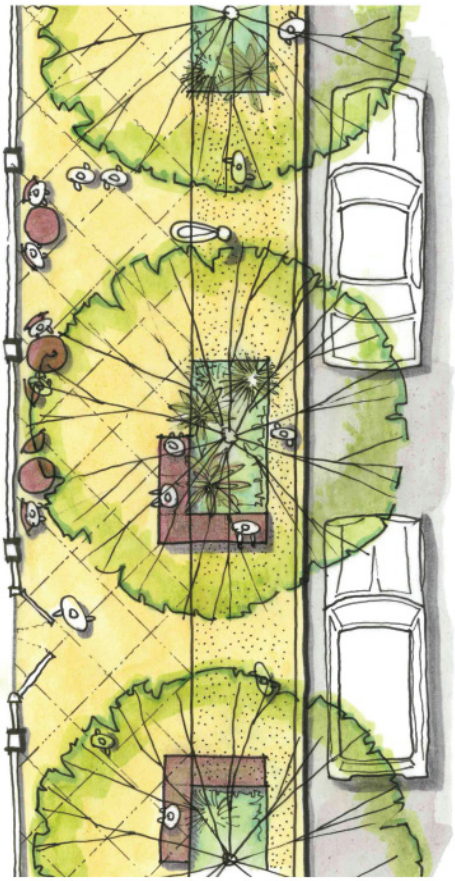
Private vehicles will remain an important mode of transportation in the Eastern Neighborhoods, but careful system management will reduce impacts on livability and travel by other modes. The two keys to this approach will be managing parking capacity and roadway capacity.

- *Parking management.* Pricing strategies will be used to manage the demand for on-street and publicly available off-street parking. Appropriately priced parking spaces will be easy to find, so drivers don't use valuable roadway capacity circling for parking. Curb space will be made available for parking and loading where necessary for businesses. The SFMTA's SF*park* initiative has begun this work through a pilot program in the South of Market and new parking management plans at Mission Bay and the 17th and Folsom area. These efforts will be expanded into high demand areas throughout the Eastern Neighborhoods.

- *Roadway capacity management.* In the long run, the City may also consider a pricing approach to managing roadway capacity. In the interim, however, when it is necessary to reduce vehicle network capacity to make additional space for other uses, capacity reductions will be implemented strategically so that they do not negatively affect other modes or diminish livability. For example, strategic road diets, signal-retiming, and transit-only lanes on the North of Market arterials may be used to meter traffic flows southbound across Market Street in the PM peak, allowing the City to add pedestrian space, bicycle facilities, and transit priority on the South of Market number streets without the risk of disrupting transit service on Market.

Livability

The pedestrian and public realm will be enhanced to make the Eastern Neighborhoods better places to walk and healthier, safer, and more delightful places to live. Streets will also contribute to a healthier natural environment by managing stormwater. While the 'green connector' streets and the 'civic boulevard' identified in the Eastern Neighborhoods plans, are priorities for upgrades, streets throughout the Eastern Neighborhoods can benefit from these types of investments.



Prioritize the pedestrian

Pedestrian facilities will be upgraded such that, in combination with the complete neighborhoods envisioned in the Eastern Neighborhoods land use plans, more of neighborhood residents' daily travel needs can be met by walking. In accordance with the Better Streets Plan vision, improvements will include improved sidewalks and crossings, lighting, landscaping, and amenities on streets. These investments are an essential and fully integrated part of the transportation system.

In developing a new street grid for the historically industrial areas, including parts of SOMA, Showplace Square, and the Central Waterfront, Better Streets Plan principles will be applied.

Commit to safe, healthy, and humane streets in the South of Market

South of Market arterial streets, most of which are now prioritized for vehicle through-travel, will be upgraded so that they are more hospitable places to walk, bike, take transit, and spend time. An essential part of this effort will be retiming SOMA signals to favor vehicle speeds that are compatible with pedestrian safety and comfort. The city will undertake an effort to retime north-south and east-west South of Market signals in a comprehensive way, targeting moderate vehicle progression speeds. The addition of mid-block signals on SOMA's long blocks as envisioned in Chapters 5 and 6 of this report will both improve pedestrian safety and connectivity and help to

encourage vehicle progression through the network at safe speeds. While this plan proposes specific locations for new signals, the same treatment can be applied elsewhere in the South of Market. Freeway ramp touchdowns intersections, particularly those along Harrison and Bryant streets, will be prioritized for traffic calming and perhaps eventual reconfiguration.

Besides Folsom, Howard, Seventh, and Eighth streets, the numbered streets from Second to Sixth are all high priority for investment. Because improving livability on the north-south SOMA arterials will require repurposing space on streets that are already at or near capacity for vehicles during peak periods, these projects must be carefully coordinated with efforts to manage vehicular system capacity. Brannan Street, an east-west SOMA street that currently has low volumes of traffic and is undesignated in any of the City's major transportation networks, can be retrofitted with an improved pedestrian realm as development occurs in the southern parts of SOMA. SOMA alleys will also be upgraded to better serve as pedestrian spaces. An important complement to the Folsom Street corridor project will be a focused economic development effort to foster a neighborhood commercial district for the South of Market on Folsom Street.

Invest in Eastern Neighborhoods streets as public spaces and stormwater management facilities

The Eastern Neighborhoods Area Plans describe an overall deficiency of public open space serving neighborhoods. The East SoMa Plan, for example, states the need for an additional 4.2 acres. The plans recognize that small open spaces with street rights-of-way are one way of achieving this goal. Meanwhile, the Open Space Vision for San Francisco emphasizes local-serving open spaces that serve the needs of their immediate area communities. Building on the Better Streets Plan, Eastern Neighborhoods streets will also help to manage stormwater as it collects in street rights-of-way. Specific approaches to small public spaces and stormwater management are summarized on the next two pages.

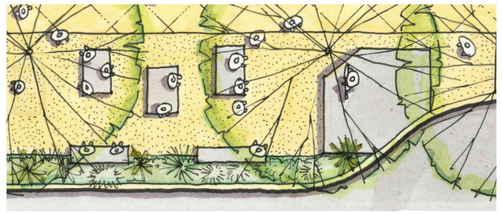
Small Public Spaces for Eastern Neighborhoods Streets

The EN TRIPS project presents several different ways public space can be integrated into the Eastern Neighborhoods' street rights-of-way. These concepts emphasize major streets such as the three corridors studied, but they could be modified to apply to a variety of streets and locations within the Eastern Neighborhoods area.

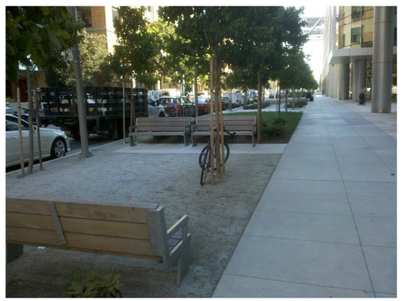
Context-sensitive public spaces. Land uses in the Eastern Neighborhoods vary dramatically, sometimes within the same block. Likewise, the needs for public space among people associated with these different land uses also varies. While a more residential enclave may have the need and community resources to care for a pocket park or community garden (below left), an area heavy in employment may desire a place for food trucks to park and/or for workers to sit and eat (right). While solitary or smaller seating areas may be appropriate for quieter areas (below right), spaces for gathering or performance may be appropriate for more active streets (below center).

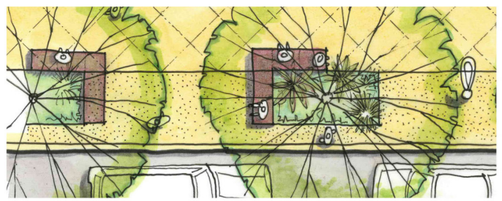
Flexibility in public spaces. The mixed-use nature of the Eastern Neighborhoods creates the need for flexibility in use of public space. This flexibility could be between daytime use for workers and evening and weekend use for residents, but could also be between vehicular uses such as loading and repair and people uses.

Extended bul-outs. Bulb-outs at street intersections and mid-block crossings can reduce street crossing distances, but they are also the excellent opportunities for public space in most street rights-of-way. Particular opportunities encountered in the EN TRIPS planing process include intersections of major streets and alleys in SoMa, and where 90-degree parking creates the opportunity for a deep bulb-out, such as at many intersecting streets with 16th Street.

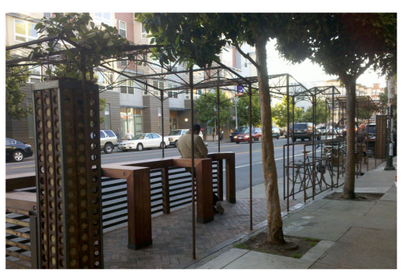


Use of the Furnishings zone. Within the typical street cross section, the furnishings zone is often wide enough to accommodate public space uses such as seating, landscaping, and alternative paving treatments. This approach should be taken particularly in more active pedestrian areas like Folsom Street or 8th Street.





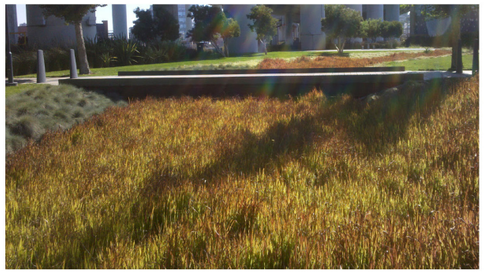
Flexible use of parking lane. The parking lane provides opportunities to expand the public space of the street, especially on streets that will not be rebuilt or extensively landscaped. Uses of the parking lane could include seating, landscape, restaurant use, or bicycle parking.



Stormwater Management on Eastern Neighborhoods Streets

The EN TRIPS project presents several different ways stormwater management or Low Impact Development (LID)* can be integrated into the Eastern Neighborhoods' street rights-of-way. These improvements not only help covey, slow, filter and absorb rainwater runoff, but also soften the street environment by reducing the amount of impermeable paved surface, provide space for greening, and complement public space. These concepts should be considered with the built conditions of underground utilities and road crowning to determine the best approach. For more information on stormwater management, see Better Streets Plan Chapter 6.2.

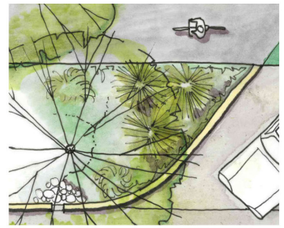
Stormwater management tools for every size. Because of their variation in street type and surrounding land use, Eastern Neighborhoods streets present many opportunities to integrate stormwater management, but they vary in their size and shape. While some streets and their contexts present the opportunity for a major piece of stormwater management infrastructure (right), other streets' opportunities are smaller rain gardens, planters (below), or permeable paving.

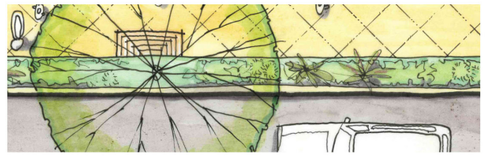


Stormwater management infrastructure serves other functions. In the Eastern Neighborhoods, as in other places, LID features and treatments can provide additional benefits users of a given street. These include buffering from moving traffic, an attractive street environment (right), or integration with public space (below).

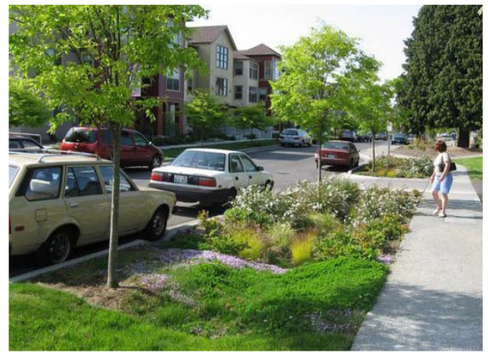
* LID is a landscape-based approach to on-site stormwater management that prioritizes the use of Best Management Practices (BMPs) integrated into a building, site or street to treat stormwater and detain stormwater runoff. BMPs are strategies or structural devices used to reduce volume, peak flows, and/ or pollutant concentrations of stormwater runoff through one or more of the following processes: evapotranspiration, infiltration, detention, filtration and biological and chemical actions.

Bioretention in strategic locations along active streets. Bioretention is a good approach for many of the Eastern Neighborhoods' most active streets because it can occur in a variety of forms to suit small spaces, and it adds landscape to streets. Opportunities include bulb-outs, especially those that are less accessible to pedestrians, such as bulb-outs separated from the sidewalk by a cycletrack (right above), and flow-through planters in the furnishings zone (right below).





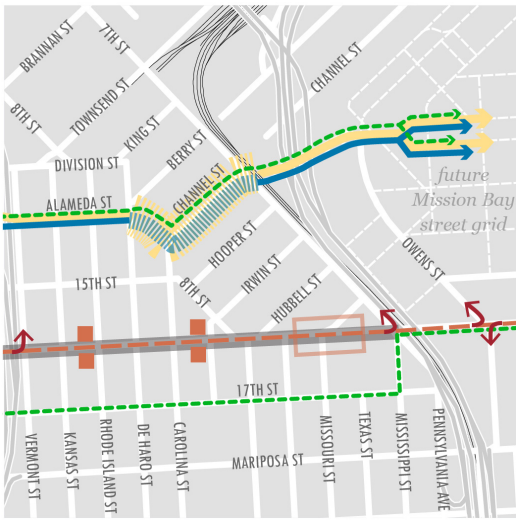
Swales in less constrained areas. Some Eastern Neighborhoods streets have long stretches where no vehicular access is needed and parking is not as in demand as it is in other parts of San Francisco. These areas could be candidates for swales, which collect and convey stormwater, while filtering the water before it is discharged (right). Medians, such as that planned for Howard Street, may also be designed to accommodate swales (below).



Permeable paving. Different parts of streets present opportunities for permeable surfaces. A furnishings zone paved with permeable pavers, cobblestones, or decomposed granite (above right) can provide more water to trees. Additionally, the parking lane can be treated with a permeable material such as pavers, permeable concrete or permeable asphalt (below right).

Connectivity

The Eastern Neighborhoods transportation networks are disrupted by multiple barriers. While some of these barriers, such as Potrero Hill's steep topography, are here to stay, others can be overcome. San Francisco will engage in a gradual, opportunistic, but fully coordinated effort to reconnect the grid and improve connectivity for all modes.



Improve east-west connectivity between Division and Mariposa Streets.

The future transportation system in the Eastern Neighborhoods will provide additional paths of travel between the Mission District and Mission Bay. Fourteenth, Alameda and 15th Streets will be made continuous east of Harrison Street as development occurs. Seventeenth Street will become a continuous high-quality bicycle route between the Castro and Mission Bay. These continuous corridors will improve access for all modes and reduce pressure on 16th Street as the primary through street. Crossings of the I-280 right-of-way will be improved: at a minimum, this will include improved connectivity between Mission Bay and streets to the west using either the existing crossing at Channel Street or a relocated crossing connecting to Mission Bay Boulevard. Strategic new crossings could also be added, such as a pedestrian and bicycle bridge at 17th Street. In the long-term future, this corridor may be transformed more fully: through the California High Speed Rail project, rail service may be transitioned underground. The City may ultimately consider removing parts of the I-280 freeway viaduct and transitioning vehicles to an at-grade boulevard. While a variety of approaches to this corridor will be considered, east-west connectivity between the Eastern Neighborhoods will be a major goal.

Add connections in the South of Market and Central Waterfront pedestrian grids

Pedestrian connectivity in the South of Market will be substantially upgraded. Arterial streets will be narrowed, and signalized mid-block crossings added to ensure that arterials are not a barrier to pedestrian travel. Intersections with freeway-ramp touchdowns will be retrofitted to ensure that they do not interrupt pedestrian paths of travel. Chapter 5 of this plan proposes continuing to upgrade Minna and Natoma alleys as continuous pedestrian paths of travel. In the long-term future, Minna Street may offer an uninterrupted path from Ninth Street all the way to the Transbay Transit Center.

The network of sidewalks between I-280 and Illinois Street, now marked by numerous gaps and obstructions, will be upgraded to a fully connected network as development occurs. In Mission Bay and at Pier 70, redevelopment will create entirely new pedestrian networks. Along with new open space and completion of the Blue Greenway, these new grids will help open the eastern Waterfront to public enjoyment.

Upgrade transit connectivity between Showplace Square, Potrero Hill, and downtown.

As development occurs in Showplace Square and along the 16th and 17th Street corridors in Potrero Hill, it may become necessary to create a more robust transit connection between these

areas and downtown neighborhoods including the Financial District and Union Square. Currently, Route 10 Townsend provides a direct connection; however, it is a relatively slow, infrequent bus service, and the TEP recommended that it be realigned to the east. The 19 Polk provides similar service along the Seventh and Eighth Street corridors to Market Street in the Civic Center area, where connections can be made to routes serving downtown. Reconfigured service (perhaps connecting directly to downtown via the Mission Street transitway), enhanced transit priority, and additional frequency will be considered as development and demand warrant.

Integrate fully with the regional transit system.

The Eastern Neighborhoods transportation system will provide efficient access to upgraded and expanded regional transit hubs. To achieve this objective, Market Street will be reinforced and upgraded in its role as San Francisco's transit spine, ensuring the strongest possible link between SFMTA bus lines and BART. Pedestrian paths of travel and transit connections to the Transbay Transit Center will be reinforced by full implementation of the Transit Center District Plan. To maximize connectivity to the Fourth and King rail station, the City will complete the Central Subway, upgrade the pedestrian environment on Fourth Street between Market and King, and add new sidewalks and pedestrian amenities on Townsend Street. It may also be necessary to implement transit priority treatments for the 47 Townsend on both Division and Townsend Streets (including potential reconfiguration of the Eighth-Townsend-Division traffic circle). Enhanced east-west connectivity, re-alignment of the 22 Fillmore, and improvements to 16th Street as proposed in Chapter 4 of this plan will help connect Mission Bay and Showplace Square to the 16th Street Mission BART station.

7.2 NEXT STEPS

The SFMTA and its partner agencies will work toward this vision on several tracks. In the first, the City will work toward implementing the EN TRIPS priority projects. The EN TRIPS Funding and Implementation plan, to be published under a separate cover, will detail the specific steps to be taken to realize the priority projects. It will include:

- A strategy for environmental review.
- Itemized project cost estimates.
- A timeline and phasing plan to ensure that the most pressing needs can be met as quickly and cost-effectively as possible.

In addition, realizing the vision will require ongoing effort through existing planning programs. SFMTA and its partner agencies will continue to work towards meeting the needs expressed in this planning effort.

APPENDIX A

EN TRIPS Project Alternatives
Operations and Circulation Analysis

EN TRIPS Project Alternatives Operations and Circulation Analysis

This Appendix summarizes the circulation and operational analysis of the EN TRIPS corridor project alternatives. Fehr & Peers has reviewed the proposed corridor alternatives for Folsom, Howard, 7th and 8th Streets for the following four issues, which also correspond to the five sections of this memorandum:

1. Traffic Impacts
2. Network Impacts
3. Transit Delay
4. Signal Timing

The following corridor project alternatives were analyzed for this task:

TABLE 1: CORRIDOR PROJECT ALTERNATIVES

Alternative	Description
Folsom and Howard Streets	
1	1-Way: 2 Lanes + Buffered Bike Lane
3	2-Way: 2 Lanes one way, 1 Lane other + Buffered Bike Lane
4	1-Way/2-Way: 2 Lanes one way + 1 Lane other (Folsom), 2 Lanes one way + Cycletrack (Howard)
5*	2-Way: 2 Lanes one way, 1 Lane other + Buffered Bike Lane, + Turn Pockets
7th and 8th Streets	
1	1-Way; 2 Lanes + BusWay and Cycle Track (7/8)
2*	1-Way; 3 Lanes + Cycle Track (7/8)
3	1-Way; 3 Lanes + Bike Lane (7/8)
5	2-Way: 2 Lanes SB + 2 Lanes NB (8); 1 Lane SB + 2 Lanes NB (7)

Note: *Recommended Alternative

Source: Nelson\Nyygard, 2011

TRAFFIC IMPACTS

Each of the proposed corridor project alternatives was analyzed to determine how they would affect traffic operations along the study roadway segments. Traffic impacts were evaluated using the weighted average volume-to-capacity (v/c) ratio and delay over each corridor. The overall weighted average was used to allow each of the Alternatives to be evaluated based on how they affected corridor-wide conditions. Calculations were completed using Synchro analysis software[1].

[1] Peak hour Synchro models were developed for each Project Alternative. Synchro is a sophisticated traffic software application that is based on procedures outlined in the Transportation Research Board's *2000 Highway Capacity Manual* and used to optimize traffic signal timing and perform capacity analysis. Synchro models were coded with the existing and forecast peak hour traffic and pedestrian volumes, vehicle mix, and signal timings. Adjustments to the Synchro models were made to account for specific attributes of each Project Alternative, i.e. lane configurations (one-way vs. two-way

To be conservative, all existing and future forecasted traffic on the roadways was assumed to remain within the roadway system – that is, no traffic on Howard, Folsom, 7th or 8th Streets was assumed to divert to adjacent roadways because of proposed capacity reductions. In Alternatives where one-way roadway couplets were converted to two, two-way roadways, traffic was assumed to split between the two roadways in the couplet proportional to the capacity available. For example in Alternatives 3 and 5, one-third of eastbound traffic on Folsom Street would divert to the new eastbound lane on Howard Street and two-thirds would remain on Folsom Street since two-thirds of the total eastbound capacity would remain.

Tables 2A to **C** and **3A** to **C** present change in corridor delay and v/c ratios, with existing and future volumes, respectively, for each of the corridors under each Alternative. As shown in the Tables, v/c and delay increases under all Alternatives. Delay and v/c would generally increase more substantially on Howard and Folsom since the proposed Alternatives would generally reduce capacity more on those streets (with the exception of 7th/8th Alternatives 1 and 5). The v/c ratio and delay in the northbound/southbound direction on 7th and 8th Streets would increase slightly under Alternatives 2 and 3, whereas Alternatives 1 and 5 would lead to larger increases because of the overall capacity reduction.

traffic), integration of turn prohibitions, integration of turn pockets at intersections, etc. A figure showing the intersections included in the Project Alternative Synchro models is included on the last page of this memorandum.

TABLE 2A: HOWARD AND FOLSOM CORRIDOR DELAY AND VOLUME-TO-CAPACITY RATIOS (EXISTING VOLUMES)

Alternative	Volume-to-Capacity Ratio			Delay (in seconds)		
	Intersection	EB	WB	Intersection	EB	WB
Howard						
Existing Config.	0.73	--	0.56	25	--	15
Alt. 1	0.81	--	0.68	28	--	17
Alt. 3	0.80	0.63	0.45	34	16	29
Alt. 4	0.72	--	0.51	27	--	11
Alt. 5	0.87	0.74	0.43	46	26	23
Folsom						
Existing Config.	0.73	0.65	--	12	11	--
Alt. 1	0.90	1.01	--	24	39	--
Alt. 3	0.80	0.67	0.42	14	15	31
Alt. 4	0.90	1.01	0.40	26	41	11
Alt. 5	0.69	0.60	0.40	14	14	14

Note: All Folsom/Howard Alternatives assume implementation of 7th/8th recommended alternative.
Source: Fehr & Peers, 2011

TABLE 2B: 7TH AND 8TH STREETS CORRIDOR DELAY AND VOLUME-TO-CAPACITY RATIOS (EXISTING VOLUMES)

Alternative	Volume-to-Capacity Ratio			Delay (in seconds)		
	Intersection	NB	SB	Intersection	NB	SB
7th						
Existing Config.	0.71	0.83	--	15	14	--
Alt. 1	0.95	1.29	--	74	>80	--
Alt. 2	0.76	0.94	--	31	42	--
Alt. 3	0.76	0.94	--	31	42	--
Alt. 5	1.17	1.61	1.55	>80	>80	>80
8th						
Existing Config.	0.77	--	0.95	32	--	42
Alt. 1	0.99	--	1.36	>80	--	>80
Alt. 2	0.79	--	0.95	30	--	40
Alt. 3	0.79	--	0.95	30	--	40
Alt. 5	0.93	1.20	0.82	>80	>80	35

Note: All 7th/8th Alternatives assume implementation of Folsom/Howard recommended alternative.
Source: Fehr & Peers, 2011

TABLE 3A: HOWARD AND FOLSOM CORRIDOR DELAY AND VOLUME-TO-CAPACITY RATIOS (FUTURE VOLUMES)

Alternative	Volume-to-Capacity Ratio			Delay (in seconds)		
	Intersection	EB	WB	Intersection	EB	WB
Howard						
Existing Config.	0.83	--	0.71	36	--	18
Alt. 1	0.94	--	0.91	52	--	43
Alt. 3	1.05	0.90	0.70	54	55	35
Alt. 4	0.81	--	0.63	43	--	12
Alt. 5	1.11	0.89	0.56	69	56	29
Folsom						
Existing Config.	0.87	0.80	--	22	14	--
Alt. 1	1.11	1.26	--	>80	>80	--
Alt. 3	1.02	0.84	0.64	38	21	54
Alt. 4	1.12	1.26	0.53	79	>80	24
Alt. 5	0.87	0.75	0.53	33	18	17

Note: All Folsom/Howard Alternatives assume implementation of 7th/8th recommended alternative.
Source: Fehr & Peers, 2011

TABLE 3B: 7TH AND 8TH STREETS CORRIDOR DELAY AND VOLUME-TO-CAPACITY RATIOS (FUTURE VOLUMES)

Alternative	Volume-to-Capacity Ratio			Delay (in seconds)		
	Intersection	NB	SB	Intersection	NB	SB
7th						
Existing Config.	0.88	1.07	--	39	75	--
Alt. 1	1.25	1.57	--	>80	>80	--
Alt. 2	1.03	1.25	--	74	>80	--
Alt. 3	1.03	1.25	--	74	>80	--
Alt. 5	1.49	2.03	1.93	>80	>80	>80
8th						
Existing Config.	0.90	--	1.12	63	--	98
Alt. 1	1.17	--	1.61	>80	--	>80
Alt. 2	0.97	--	1.12	>80	--	>80
Alt. 3	0.97	--	1.12	>80	--	>80
Alt. 5	1.28	2.43	0.96	>80	>80	55

Note: All 7th/8th Alternatives assume implementation of Folsom/Howard recommended alternative.
Source: Fehr & Peers, 2011

NETWORK IMPACTS

To assess the potential for the corridor project alternatives to divert traffic from the project streets and impact adjacent streets, Fehr & Peers reviewed vehicle queues and turn restrictions resulting from implementation of the alternatives. **Table 4** summarizes the 95th percentile vehicle queues on Folsom, Howard, 7th and 8th Streets under each Alternative.

Alternatives 1 through 5 would reduce capacity. As shown in **Table 4**, eastbound and westbound vehicle queues on Folsom and Howard would increase, substantially for some Alternatives; however, queues would not exceed available storage length on Folsom or Howard Street. Under Alternative 5, southbound vehicle queues on 7th Street at Howard Street would extend 1,067 feet, which is longer than the block between Howard and Mission Streets. Also under alternative 5, northbound vehicle queues on 8th Street at Folsom and Howard Streets would extend 673 feet and 597 feet, respectively, and affect upstream intersections (e.g., Harrison). Since most southbound traffic would be headed to the I-80 on-ramp at 8th Street, some traffic may divert from 7th Street to 8th Street. Likewise, most of the northbound vehicle queue on 8th Street would be from traffic coming from the freeway off-ramp at 7th Street; therefore, if diversion occurred, it would remain in the couplet and not divert to adjacent streets (e.g., 9th Street or 6th Street).

TABLE 4: VEHICLE QUEUE LENGTHS[1] (COMBINED ALTERNATIVES)[4]

Roadway	Approach	Intersection	Block Length (ft)	Existing Queue (ft)	Alternative 1 (7th/8th)		Alternative 2 (7th/8th)		Alternative 3 (Folsom/Howard)		Alternative 4 (Folsom/Howard)		Alternative 5 (Folsom/Howard)	
					Lanes	95th PCT (ft)	Lanes	95th PCT (ft)	Lanes	95th PCT (ft)	Lanes	95th PCT (ft)	Lanes	95th PCT (ft)
Howard	WB	7th Street	860	21	2	32	2	337[2,3]	2	41	2	32	2	336[3]
		8th Street	860	34	2	22	2	374	2	90	2	22	2	144
	EB	7th Street	860	-	1	462[3]	-	-	-	--	1	462[3]	1	701[3]
		8th Street	580	-	1	141[2]	-	-	-	-	1	141[2]	1	378[3]
Folsom	WB	7th Street	860	-	1	150	-	-	1	203	1	150	1	150
		8th Street	860	-	1	271	-	-	1	265	1	271	1	371[3]
	EB	7th Street	860	79	2	25	2	201[2,3]	2	66[2]	2	25	2	25
		8th Street	580	45[2]	2	246[2]	2	324[2,3]	2	174[2,3]	2	246[2]	2	394[3]
7th Street	NB	Folsom	580	40[2]	2	290[2,3]	3	210[2]	3	144[2]	3	31[2]	2	152
		Howard	580	13[2]	2	12[2]	3	235[2]	3	23[2]	3	12[2]	2	207
	SB	Folsom	580	-	-	-	-	-	-	-	-	-	1	549[3]
		Howard	580	-	-	-	-	-	-	-	-	-	1	**1067[3]**
8th Street	NB	Folsom	580	-	-	-	-	-	-	-	-	-	2	**673[3]**
		Howard	580	-	-	-	-	-	-	-	-	-	2	**597[3]**
	SB	Folsom	580	19[2]	2	18[2]	3	7[2]	3	9[2]	3	16[2]	2	266
		Howard	580	280[2,3]	2	**794[3]**	3	447[3]	3	442[3]	3	484[3]	2	306[3]

Notes:

Bold indicated that 95th percentile queue length is longer than block length

[1] Queue lengths based on cumulative volumes

[2] Volume for 95th percentile queue is metered by upstream signal

[3] 95th percentile volume exceeds capacity, queue may be longer (queue shown is maximum after two cycles)

[4] All Alternatives shown with corresponding recommended alternative

Source: Fehr & Peers, 2011

TRANSIT DELAY

As part of the proposed Alternatives, transit lines on Howard, Folsom, 7th and 8th Streets would be consolidated onto certain transit priority streets. All streets would have new transit stop amenities to reduce bus stop dwell time, such as bus curb extensions and prepaid boarding stations. Therefore, the net increase in transit delay would be roughly equivalent to the net increase in vehicle delay for each of the corridors. In some cases, the effect may be negligible, since the bus stop amenities may decrease transit delay, but the change in roadway configuration may increase vehicle delay.

SIGNAL TIMING

The approach taken to signal timing along 7th, 8th, Howard, and Folsom Streets is as follows. First, the link speeds on these streets in the Synchro model were reduced to 18 mph within the study area. Following this, the signal timing for all midblock crossings was set to pre-timed with the reference phase changed from the pedestrian phase to the through-traffic phase (e.g. southbound through, westbound through). For all midblock crossings, yellow time for the pedestrian phase was set to two seconds and the flash-don't walk phase reduced by two seconds accordingly. To ensure consistency throughout the model, volumes were added at each midblock crossing adhering to the principle of conservation of flow. Thus, the volume entering the block at the upstream intersection would be carried through to the midblock intersection without any losses. Similarly, volumes at the downstream intersection could also be carried through to the midblock crossing without any losses. The final step was the optimization of the offsets at each intersection along 7th, 8th, Howard, and Folsom Streets. Each intersection was optimized individually, with each street being optimized in turn.

CONTRAFLOW WESTBOUND FOLSOM TRANSIT LANE (2ND TO 5TH)

The recommended alternative for Folsom Street would convert the roadway to two-way operations between 5th and 11th Streets. This would allow Muni Route 27, which currently operates westbound on Harrison Street west of 5th Street, to operate westbound on Folsom instead[2]. It would also allow current Route 12 and the Transit Effectiveness Project-recommended Route 11[3] to operate westbound on Folsom between 5th and 11th Streets. However, unless Folsom Street is reconfigured east of 5th Street, both Route 12 and future Route 11 would be unable to operate westbound on Folsom between 2nd and 5th Streets. Indeed, Muni might choose to forego westbound operations on Folsom altogether rather than have buses travel three blocks on Harrison before "doubling back" to Folsom[4].

Current and projected traffic volumes on Folsom increase as one moves to the east. During the PM peak period, Folsom serves as a primary access route to the Bay Bridge. Vehicles turn right at Essex Street, so much of this traffic is on the right side of the street. Between 2nd and 3rd Streets, Muni avoids the Bay Bridge queue by operating in the left lane, with a boarding island far-side at 3rd Street.

---

[2] Line 27 currently operates eastbound on Bryant Street, but the Transit Effectiveness Project recommended eastbound operation on Folsom.

[3] Line 12 would be discontinued upon introduction of Line 11.

[4] Alternately, Lines 12 and 11 could operate westbound on Howard between 2nd and 5th, but this would reduce access to and from areas to the south and would lengthen travel times, as two additional turns would be required, including a left turn from Howard onto 5th.

Preliminary traffic analysis was done to determine the potential impact to delay and capacity the conversion of one of the eastbound travel lanes into a transit-only lane would have on auto and transit delay along Folsom Street between 2nd Street and 5th Street.

As shown in **Table 5**, the project would cause a minimal increase v/c along Folsom Street, primarily because the eastbound Folsom Street approach at 5th Street would have a left-turn pocket to allow through vehicles to bypass vehicles queued to make a turn onto northbound 5th Street. A similar change would occur at 2nd Street. The changes to these approaches would decrease overall delay along the corridor slightly. The other intersections between 2nd and 5th Streets would experience increases in eastbound delay. Overall, westbound transit would experience about 11 seconds of delay per intersection along the corridor between 2nd and 5th Streets, which is less than one minute of total delay for the segment.

TABLE 5: FOLSOM STREET CORRIDOR DELAY AND VOLUME-TO-CAPACITY RATIOS

	Net Change Over Existing Configuration					
	Volume-to-Capacity Ratio			Delay (in seconds)		
	Intersection	EB	WB	Intersection	EB	WB
Folsom (Existing Volumes)						
2nd	+0.06	+0.17	+0.02	-4	-6	+12
3rd	+0.04	+0.09	+0.04	+14	+28	+11
4th	+0.10	+0.22	+0.03	+15	+31	+22
5th	-0.03	-0.19	+0.61	-41	-88	+16
Folsom (Weighted Average)						
	+0.02	+0.07	+0.34	-4	-8	+11

Source: Fehr & Peers, 2011

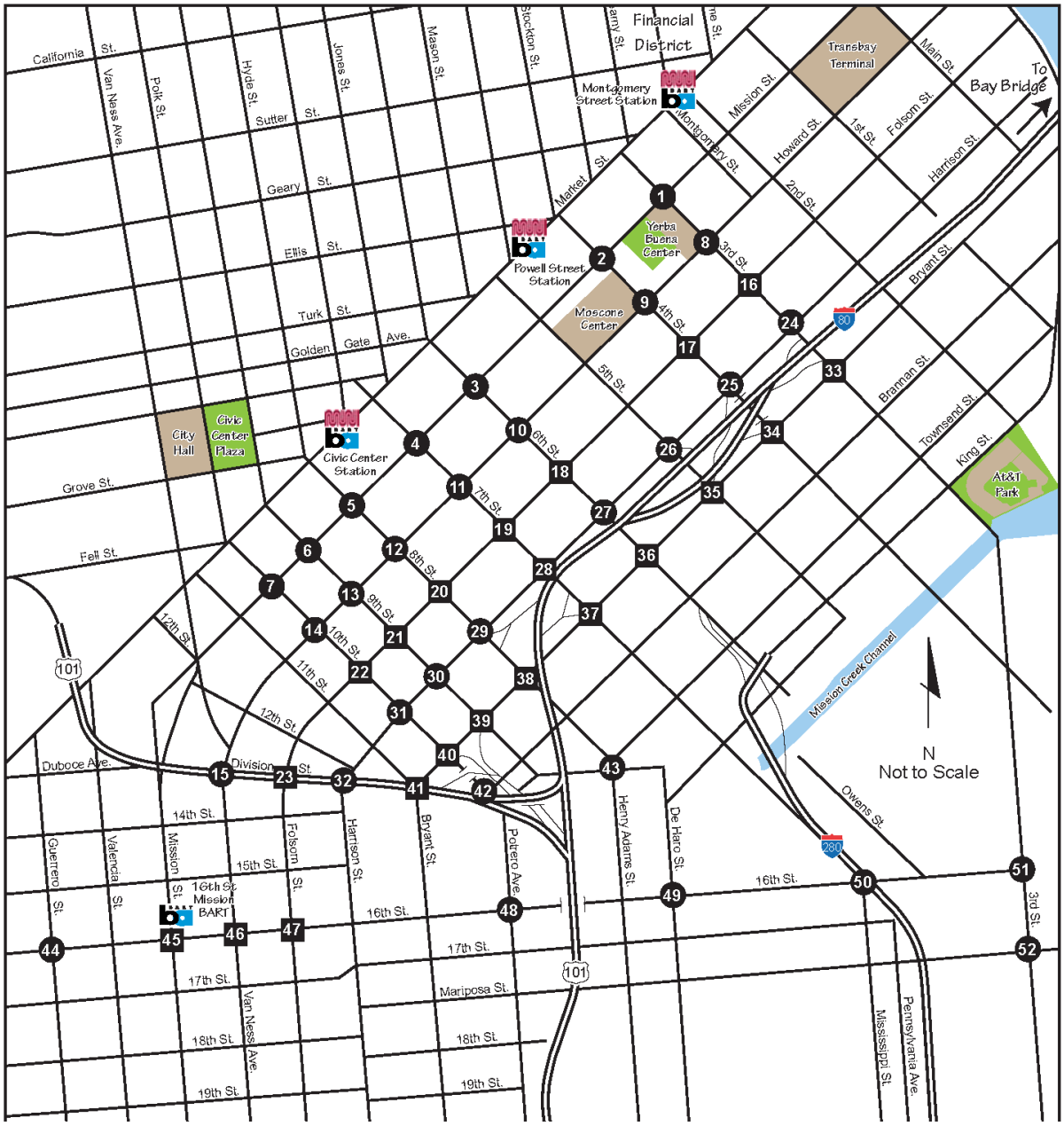
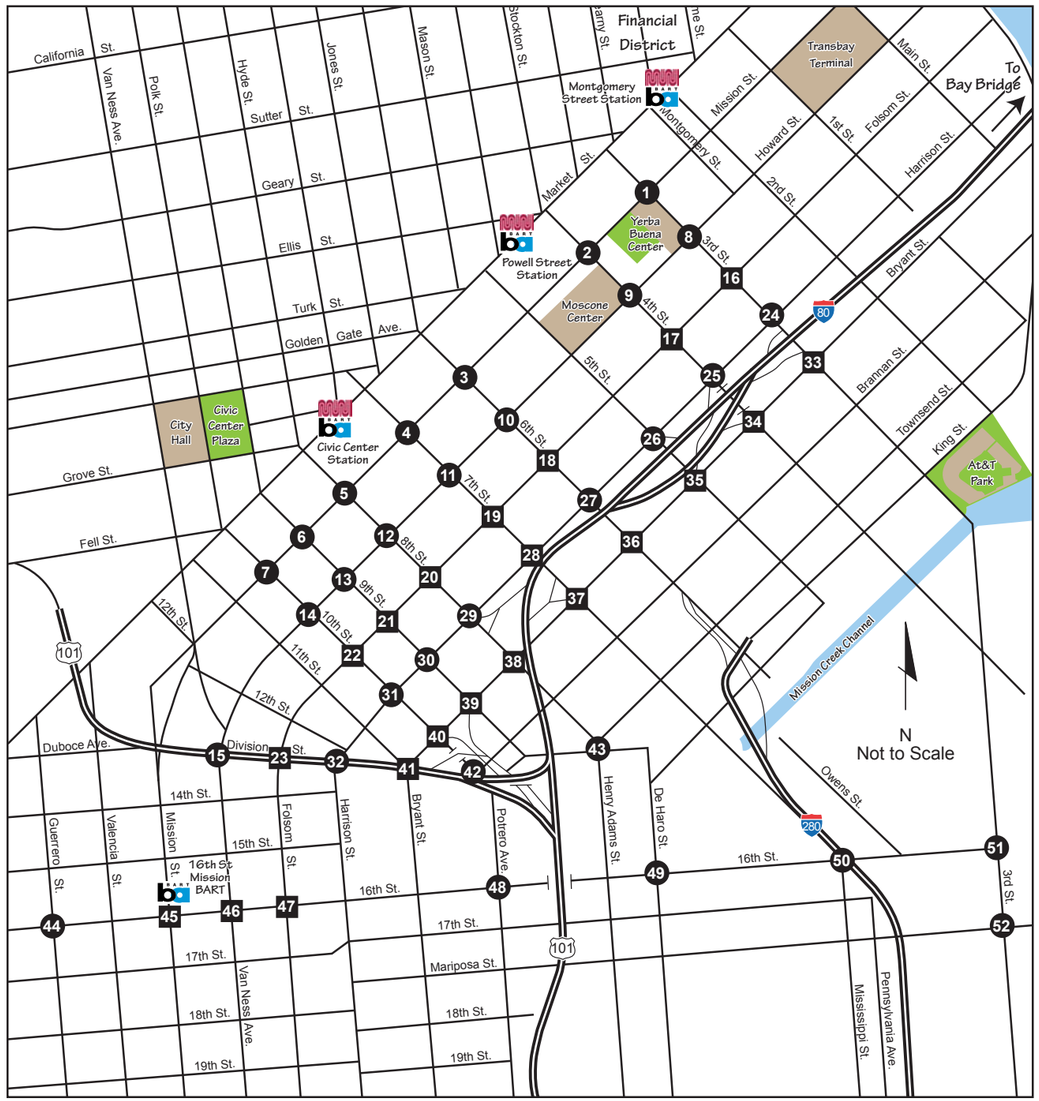
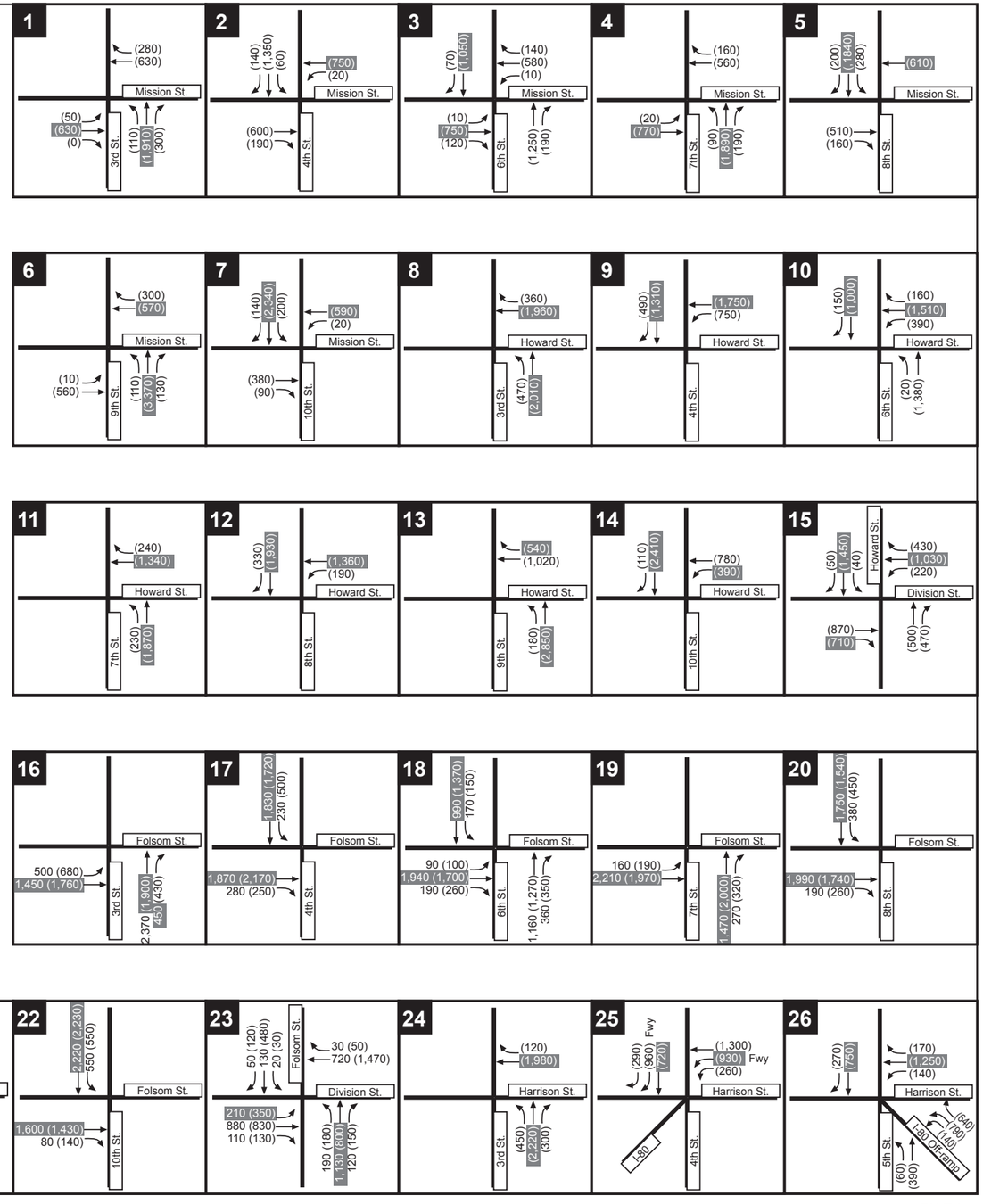


Figure 1: Study Intersections included in Project Alternative Synchro Models.
Source: Fehr & Peers, 2011

APPENDIX B

EN TRIPS Traffic Study





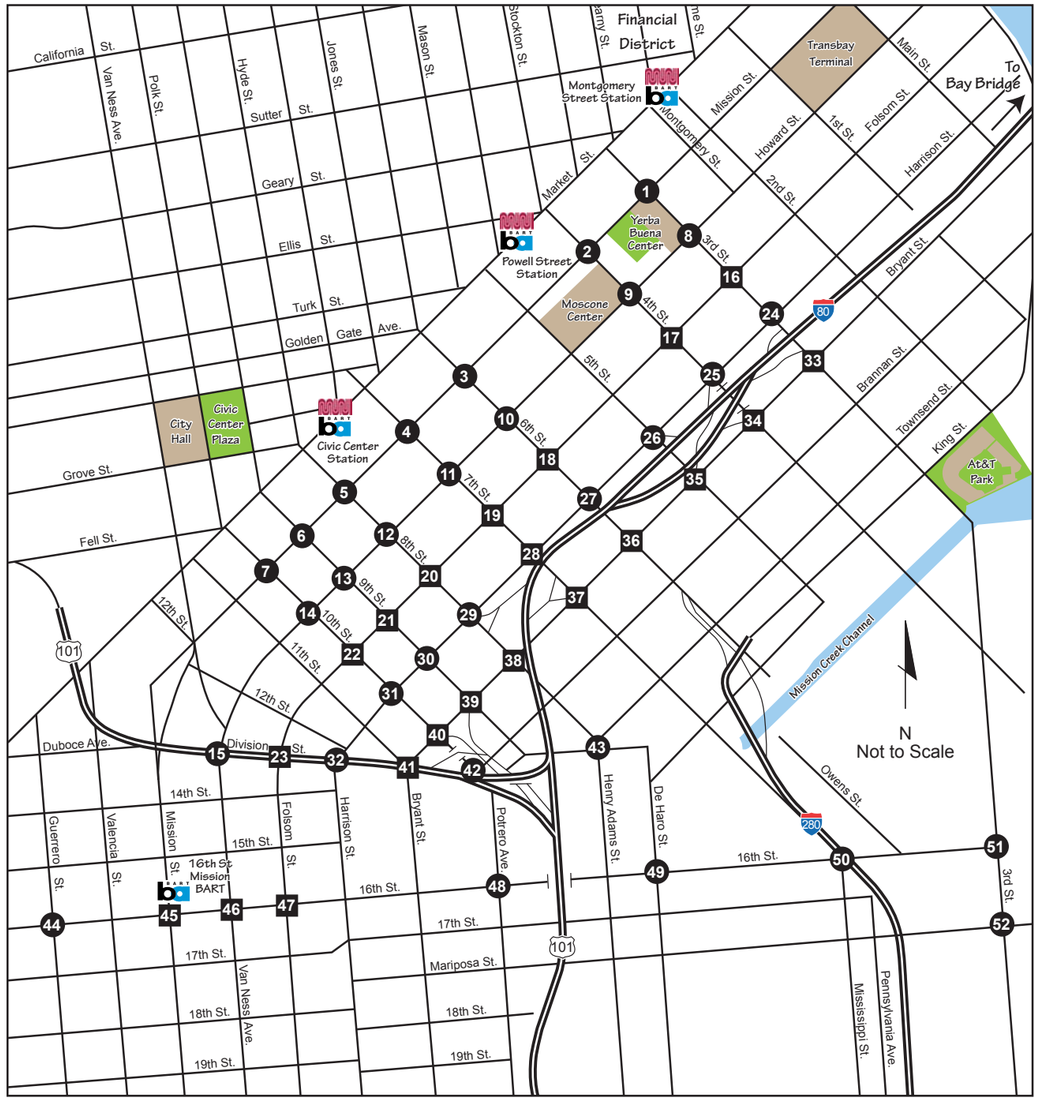
LEGEND:

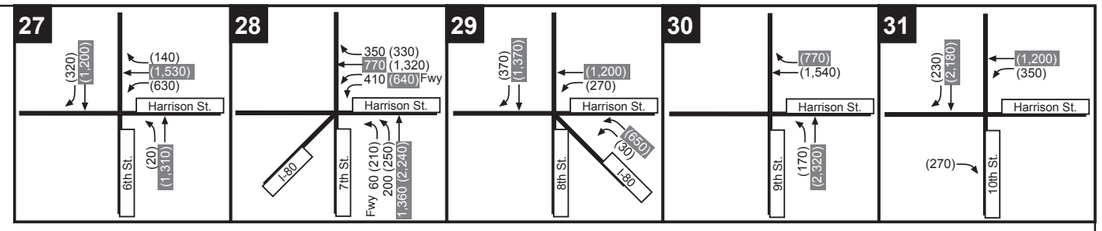
- 16 = AM and PM Peak Hour Study Intersection
- 1 = PM Peak Hour Study Intersection
- Fwy = Freeway On-ramp Movement
- XX (YY) = AM (PM)
- = Critical Movement

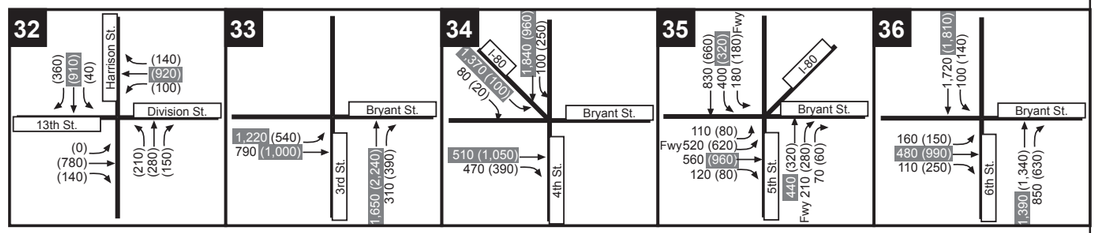
FEHR & PEERS
TRANSPORTATION CONSULTANTS

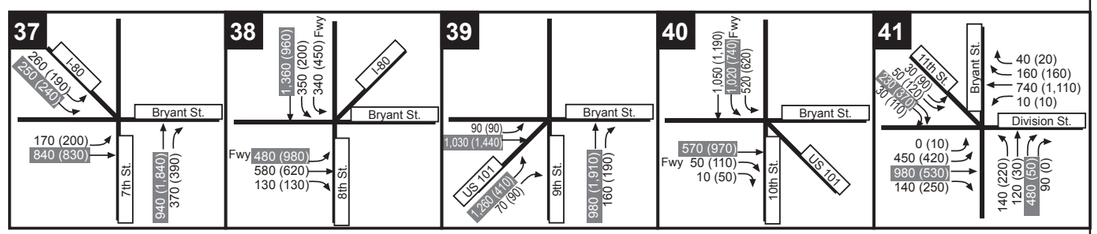
EN Trips

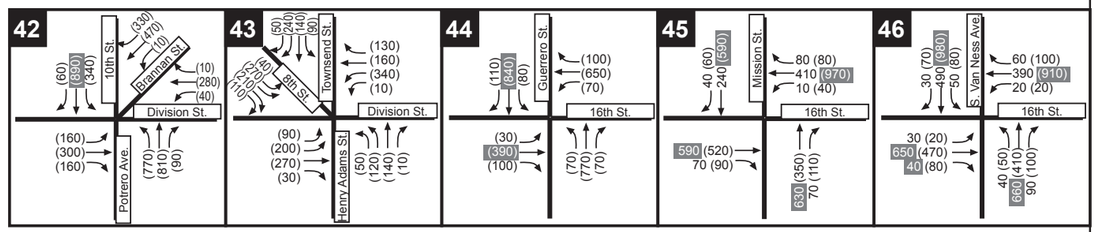
FUTURE YEAR (2035) PEAK HOUR TRAFFIC VOLUMES

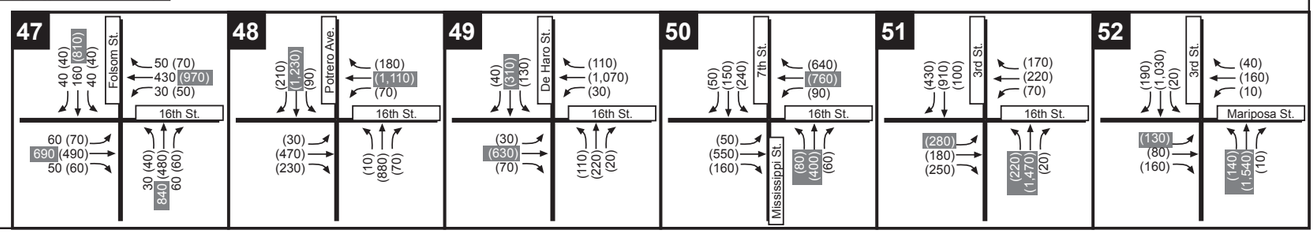












LEGEND:

- 16 = AM and PM Peak Hour Study Intersection
- 1 = PM Peak Hour Study Intersection
- Fwy = Freeway On-ramp Movement
- XX (YY) = AM (PM)
- = Critical Movement

FEHR & PEERS
TRANSPORTATION CONSULTANTS

EN Trips

FUTURE YEAR (2035) PEAK HOUR TRAFFIC VOLUMES

TABLE B-1

EXISTING AND FUTURE YEAR (2035) COMPARISON

Intersection[1]	Peak Hour	Existing		Future Year	
		Delay (V/C)[2]	LOS[3]	Delay (V/C)	LOS
1. Mission Street/3rd Street	PM	45	D	53	D
2. Mission Street/4th Street	PM	**60**	**E**	**>80 (1.17)**	**F**
3. Mission Street/6th Street	PM	24	C	36	D
4. Mission Street/7th Street	PM	25	C	34	C
5. Mission Street/8th Street	PM	27	C	43	D
6. Mission Street/9th Street	PM	25	C	53	D
7. Mission Street/10th Street	PM	25	C	35	C
8. Howard Street/3rd Street	PM	29	C	**75**	**E**
9. Howard Street/4th Street	PM	33	C	42	D
10. Howard Street/6th Street	PM	15	B	21	C
11. Howard Street/7th Street	PM	3	A	4	A
12. Howard Street/8th Street	PM	52	D	**>80 (0.86)**	**F**
13. Howard Street/9th Street	PM	30	C	**76**	**E**
14. Howard Street/10th Street	PM	25	C	29	C
15. Howard Street/13th Street/South Van Ness Avenue	PM	25	C	32	C
16. Folsom Street/3rd Street	AM	**63**	**E**	**>80 (1.43)**	**F**
	PM	**79**	**E**	**>80 (1.47)**	**F**
17. Folsom Street/4th Street	AM	41	D	**68**	**E**
	PM	36	D	**>80 (1.05)**	**F**
18. Folsom Street/6th Street	AM	13	B	33	C
	PM	11	B	19	B
19. Folsom Street//7th Street	AM	14	B	22	C
	PM	9	A	**58**	**E**
20. Folsom Street/8th Street	AM	9	A	14	B
	PM	4	A	5	A
21. Folsom Street/9th Street	AM	23	C	46	D
	PM	23	C	**63**	**E**
22. Folsom Street//10th Street	AM	19	B	30	C
	PM	14	B	15	B
23. Folsom Street//13th Street	AM	26	C	**72**	**E**
	PM	16	B	**>80 (2.42)**	**F**
24. Harrison Street/3rd Street	PM	37	D	**68**	**E**
25. Harrison Street/4th Street	PM	46	D	**>80 (1.24)**	**F**
26. Harrison Street/5th Street	PM	**>80**	**F**	**>80 (1.36)**	**F**
27. Harrison Street/6th Street	PM	20	C	28	C
28. Harrison Street/7th Street	AM	10	B	13	B
	PM	20	C	**76**	**E**

TABLE B-1

EXISTING AND FUTURE YEAR (2035) COMPARISON

Intersection[1]	Peak Hour	Existing		Future Year	
		Delay (V/C)[2]	LOS[3]	Delay (V/C)	LOS
29. Harrison Street/8th Street	PM	45	D	**>80 (1.0)**	**F**
30. Harrison Street/9th Street	PM	12	B	17	B
31. Harrison Street/10th Street	PM	13	B	15	B
32. Harrison Street/13th Street	PM	14	B	30	C
33. Bryant Street/3rd Street	AM	51	D	**65**	**E**
	PM	37	D	**>80 (0.94**	**F**
34. Bryant Street/4th Street	AM	**>80**	**F**	**>80 (1.34)**	**F**
	PM	25	C	**55**	**E**
35. Bryant Street/5th Street	AM	41	D	**>80 (1.99)**	**F**
	PM	**68**	**E**	**>80 (1.73)**	**F**
36. Bryant Street/6th Street	AM	11	B	20	C
	PM	11	B	18	B
37. Bryant Street/7th Street	AM	17	B	21	C
	PM	21	C	**>80 (0.96)**	**F**
38. Bryant Street/8th Street	AM	13	B	30	C
	PM	10	A	10	B
39. Bryant Street/9th Street	AM	23	C	33	C
	PM	38	D	**>80 (0.77)**	**F**
40. Bryant Street/10th Street	AM	10	A	11	B
	PM	16	B	18	B
41. Bryant Street/11th Street/Division Street	AM	**>80**	**F**	**>80 (1.59)**	**F**
	PM	**72**	**E**	**>80 (2.03)**	**F**
42. Brannan Street/10th Street/Division Street	PM	34	C	**>80 (1.14)**	**F**
43. Townsend Street/8th Street/Division Street/Henry Adams[4]	PM	**>50**	**F**	**>50**	**F**
44. Guerrero Street/16th Street	PM	15	B	28	C
45. Mission Street/16th Street	AM	16	B	28	C
	PM	10	A	14	B
46. South Van Ness Avenue/16th Street	AM	11	B	12	B
	PM	12	B	16	B
47. Folsom Street/16th Street	AM	12	B	13	B
	PM	14	B	18	B
48. Potrero Avenue/16th Street	PM	19	B	**>80 (1.15)**	**F**
49. De Haro Street/16th Street	PM	15	B	30	C
50. 7th Street//16th Street	PM	46	D	**>80 (1.00)**	**F**
51. 3rd Street/16th Street	PM	23	C	**>80 (1.00)**	**F**
52. 3rd Street/Mariposa Street	PM	24	C	**>80 (0.83)**	**F**

APPENDIX C

Preliminary Corridor Segment Screening Methodology

APPENDIX C. CORRIDOR SEGMENT SCREENING METHODOLOGY

To determine which street segments in the study area should be the focus of near-term corridor improvement projects, each eligible major transportation corridor in the study area was screened based on the following procedure:

1. Divide the major transportation corridors in the study area segments with consistent function and character.
2. Assess which corridor segments fall in high growth areas.
3. Score each segment based on need for bicycle, pedestrian, and transit improvements.
4. Assess outliers that may represent special challenges and opportunities.
5. Of the 'high growth,' 'high need', and 'outlier' corridor segments, identify opportunities for a near-term corridor improvement projects.
6. Assess capacity constraints and opportunities in the vehicle circulation network.

These steps are outlined in more detail below.

IDENTIFICATION OF MAJOR TRANSPORTATION CORRIDOR SEGMENTS

The project team considered for near-term corridor improvement projects only those streets that are part of one of the city's modal transportation networks as designated through existing policy. These networks are as follows, and are illustrated in Figure C-1:

- Vehicular Network (San Francisco General Plan)
- Truck Routes (SFMTA recommended Truck Routes)
- Bicycle Network (San Francisco Bicycle Plan)
- Transit Priority Streets (SFMTA Transit Effectiveness Project)

For the initial assessment of corridor needs by mode, the streets that belong to one or more of these networks were then divided into segments that have a cohesive character and function. To divide segments, the study team considered:

- *Modal priorities:* for example, some segments of a particular street have transit service, while others do not.
- *Directionality:* where street segments change directionality (for example, shift from one-way to two-way operations), the character of the street changes.
- *Consistency:* Where possible, segments of adjacent and parallel streets are divided at roughly the same point in order to maintain consistency across segments.

The outcome of this balance of priorities is as follows: In the South of Market area, most of the east-west streets (Mission through Brannan) are divided into three parts: a Transbay/Financial District segment from the Embarcadero to either Second or Third street, where the streets have mostly two-way operations; a short mid-Market segment where the streets shift to one-way operations (roughly between Third and Fifth streets); and a longer Western South of Market segment, stretching roughly from Fifth Street to Division Street. King Street, which is much shorter, has been assessed as a single segment. Outside of the South of Market area, most of the North-South streets are divided at 16th Street. Most of the east-west streets have been divided at Potrero Avenue. In Potrero Hill, the analysis considers the full length of any street that has transit service. Based on these designations, the major circulation corridor segments used in the initial needs analysis are listed in Figures C-1 and C-2.

Once the initial needs and growth analyses were completed (Steps 2 and 3), the extents of several corridors segments were further refined in Steps 4 and 5 to respond to specific needs and opportunities. The refined project extents, along with the reasons for refinement, are discussed in more detail below.

Figure C-1 South of Market Area Corridor Segments

Corridor	Segment
SOMA	
East-West	
Mission	Embarcadero - Third
	Third-Fifth
	Fifth - Eleventh
Howard	Embarcadero - Third
	Third-Fifth
	Fifth - Division
Folsom	Embarcadero - Second
	Second-Fifth
	Fifth - Eleventh
Harrison	Embarcadero - Second
	Second-Seventh
	Seventh - Division
Bryant	Embarcadero - Second
	Second-Seventh
	Seventh - Division
Brannan	Embarcadero - Second
	Second-Fifth
	Fifth - Division
Townsend	Embarcadero - Third
	Third-Fifth
	Fifth - Eighth
King	Emb - Fourth
North-South	
Second	N of Bryant
	S of Bryant
Third	N of Bryant
	S of Bryant
Fourth	N of Bryant
	S of Bryant
Fifth	N of Brann
	S of Brann
Sixth	N of Brann
	S of Brann
Seventh	N of Bryant
	S of Bryant
Eighth	N of Bryant
	S of Bryant
Ninth	All
Tenth	All
Eleventh	All

Figure C-2 Mission, Potrero Hill/Showplace Square, and Central Waterfront Corridor Segments

Corridor	Segment
Outside of SOMA	
East-West	
16th	West of Potrero
	East of Potrero
17th	West of Potrero
	East of Potrero
24th	All
26th	All
Cesar Chavez	West of Potrero
	East of Potrero
Division	All
18th	San Bruno to Third
North-South	
Third	King - 16th
	S of 16th
Fourth	King - 16th
	S of 16th
Illinois	N of Mariposa
	S of Marioposa
Guerrero	N of 16th
	S of 16th
Valencia	N of 16th
	S of 16th
Mission	N of 16th
	S of 16th
S Van Ness	N of 16th
	S of 16th
Folsom	N of 16th
	S of 16th
Harrison	N of 16th
	S of 16th
Potrero	N of 16th
	S of 16th
Connecticut	All
Wisconsin	All
De Haro	16th to 23rd
Rhode Island	16th to 25th

IDENTIFICATION OF CORRIDOR SEGMENTS LOCATED IN HIGH GROWTH AREAS

EN TRIPS aims to make transportation investments that address the needs resulting from projected growth in the study area as permitted under the recently adopted land use plans. To address this study goal, each corridor segment was ranked based on forecast growth in residential and employment density by 2035.[1] For each corridor segment, the mean increase in employment (jobs per square acre) and population (persons per square acre) was calculated for the areas adjacent to the corridor segment. The resulting values were then ranked and grouped by quartiles. The quartile scores for population and for employment growth were then added together, to give an overall growth score between 2 and 8.

Figure C-3 shows those segments in the South of Market area that had a growth score of at least six out of eight. This ranking shows that forecast growth in employment and population is widespread in the South of Market area. While the greatest increases in residential density will occur in the Transbay Terminal area, there will also be substantial growth in the western South of Market and around the Caltrain Station. This widespread growth suggests the need for a comprehensive approach to upgrading the area.

[1] Employment and residential densities are given for the base year 2005 and for the future year 2035 in the SF CHAMP travel demand model based on the ABAG 2009 projections. For this analysis, base year densities for each variable are subtracted from the 2035 projected density in each Transportation Analysis Zone (TAZ). Growth forecasts in the 16th and 17th Street corridors were updated at San Francisco Planning Department direction to reflect know pipeline development projects.

Figure C-3 High Growth Corridor Segments – South of Market Area

Corridor	Segment	Growth in Residential Density	Growth in Employment Density	Growth Sum
SOMA				
East-West				
Mission	Emb – Third	3	4	**7**
	Third-Fifth	3	4	**7**
	Fifth - Eleventh	4	4	**8**
Howard	Emb - Third	4	4	**8**
	Third-Fifth	3	4	**7**
	Fifth - Division	3	3	**6**
Folsom	Emb - Second	4	4	**8**
	Second-Fifth	3	4	**7**
Harrison	Emb - Second	4	3	**7**
Bryant	Emb - Second	3	3	**6**
	Second-Seventh	3	3	**6**
Brannan	Second-Fifth	4	3	**7**
Townsend	Emb - Third	3	3	**6**
	Third-Fifth	4	3	**7**
King	Emb - Fourth	4	2	**6**
North-South				
Second	N of Bryant	4	4	**8**
Third	N of Bryant	4	4	**8**
	S of Bryant	2	4	**6**
Fourth	N of Bryant	3	3	**6**
	S of Bryant	4	3	**7**
Fifth	S of Brann	4	2	**6**
Sixth	N of Brann	3	3	**6**
	S of Brann	4	2	**6**
Eighth	N of Bryant	4	2	**6**
Eleventh	All	3	3	**6**

Figure 2-6 lists high-growth segments outside of the South of Market area. Third Street and Fourth Streets make up a particularly high growth corridor, with large population increases expected in the Central Waterfront area, as well as substantial population and employment growth expected through the redevelopment of Mission Bay.

The 16th Street corridor east of Potrero Street will also see major growth. Substantial new residential density is expected at the Potrero Center site at the corner of 16th and Potrero, as well as new residential density between 16th and 17th in Potrero Hill, as much of this corridor now permits residential buildings of 4-6 floors. Notable new employment density is also forecast in Showplace Square. Finally, the growth expected through redevelopment of Mission Bay has major implications for 16th Street, as 16th is the only east-west arterial linking directly to Mission Bay.

Figure C-4 High Growth Corridor Segments - Mission, Potrero Hill/Showplace Square, and Central Waterfront

Corridor	Segment	Growth in Residential Density	Growth in Employment Density	Growth Sum
Outside of SOMA				
East-West				
16th	East of Potrero	2	4	**7**
North-South				
Third	King - 16th	4	4	**8**
Fourth	King - 16th	4	4	**8**
	S of 16th	2	4	**6**

Growth scores for all segments are provided in Figures C-7 and C-8.

Figure C-5 Growth Score by Eastern Neighborhoods Corridor Segment – South of Market

Corridor	Segment	Growth in Residential Density	Growth in Employment Density	Growth Sum
SOMA				
East-West				
Mission	Emb - Third	3	4	**7**
	Third-Fifth	3	4	**7**
	Fifth - Eleventh	4	4	**8**
Howard	Emb - Third	4	4	**8**
	Third-Fifth	3	4	**7**
	Fifth - Division	3	3	**6**
Folsom	Emb - Second	4	4	**8**
	Second-Fifth	3	4	**7**
	Fifth - Eleventh	3	2	**5**
Harrison	Emb - Second	4	3	**7**
	Second-Seventh	3	2	**5**
	Seventh - Division	4	1	**5**
Bryant	Emb - Second	3	3	**6**
	Second-Seventh	3	3	**6**
	Seventh - Division	2	1	**3**
Brannan	Emb - Second	1	3	**4**
	Second-Fifth	4	3	**7**
	Fifth - Division	3	2	**5**
Townsend	Emb - Third	3	3	**6**
	Third-Fifth	4	3	**7**
	Fifth - Eighth	3	2	**5**
King	Emb - Fourth	4	2	**6**
North-South				
Second	N of Bryant	4	4	**8**
	S of Bryant	2	3	**5**
Third	N of Bryant	4	4	**8**
	S of Bryant	2	4	**6**
Fourth	N of Bryant	3	3	**6**
	S of Bryant	4	3	**7**

Corridor	Segment	Growth in Residential Density	Growth in Employment Density	Growth Sum
Fifth	N of Brann	2	3	**5**
	S of Brann	4	2	**6**
Sixth	N of Brann	3	3	**6**
	S of Brann	4	2	**6**
Seventh	N of Bryant	3	2	**5**
	S of Bryant	3	1	**4**
Eighth	N of Bryant	4	2	**6**
	S of Bryant	2	2	**4**
Ninth	All	1	2	**3**
Tenth	All	3	2	**5**
Eleventh	All	3	3	**6**

Figure C-6 Growth Score by Eastern Neighborhoods Corridor Segment – Mission, Potrero Hill/Showplace Square, and Central Waterfront

Corridor	Segment	Growth in Residential Density	Growth in Employment Density	Growth Sum
Outside of SOMA				
East-West				
16th	West of Potrero	2	2	**4**
	East of Potrero	2	4	**7**
17th	West of Potrero	1	2	**3**
	East of Potrero	1	3	**4**
24th	All	1	2	**3**
26th	All	1	2	**3**
Cesar Chavez	West of Potrero	1	1	**2**
	East of Potrero	2	1	**3**
Division	All	2	2	**4**
18th	San Bruno to Third	1	3	**4**
North-South				
Third	King - 16th	4	4	**8**
	S of 16th	1	4	**5**
Fourth	King - 16th	4	4	**8**

	S of 16th	2	4	**6**
Illinois	N of Mariposa	1	4	**5**
	S of Mariposa	1	4	**5**
Guerrero	N of 16th	2	1	**3**
	S of 16th	1	1	**2**
Valencia	N of 16th	2	1	**3**
	S of 16th	2	1	**3**
Mission	N of 16th	2	1	**3**
	S of 16th	2	1	**3**
S Van Ness	N of 16th	2	1	**3**
	S of 16th	2	1	**3**
Folsom	N of 16th	1	1	**2**
	S of 16th	1	1	**2**
Harrison	N of 16th	1	1	**2**
	S of 16th	1	1	**2**
Potrero	N of 16th	1	1	**2**
	S of 16th	1	1	**2**
Connecticut	All	1	2	**3**
Wisconsin	All	2	2	**4**
De Haro	16th to 23rd	2	2	**4**
Rhode Island	16th to 25th	2	2	**4**

RATING BICYCLE, PEDESTRIAN, AND TRANSIT IMPROVEMENT NEEDS FOR EACH CORRIDOR SEGMENT

To allow for consistent screening of segments, the project team developed a set of transportation performance measures, which were used to rank the corridor segments and to identify high priority segments. These measures were grouped by mode of transportation, and included criteria related to need for bicycle, pedestrian, and transit improvements. While vehicle circulation need was not considered as a stand-alone category in this stage of the screening, several measures were included related to vehicles, including vehicle volume and vehicle delay.

Most of the quantitative data for this evaluation was drawn from the city's travel demand model, SF CHAMP 4.1 (ABAG projections 2009), which provided estimates of present vehicle and transit conditions, as well as forecasts for 2035. Detailed analysis of vehicle travel in the South of Market area and on 16th Street was performed by the EN TRIPS study team through the South of Market Circulation Study.

For each mode of transportation, four performance measures were chosen. Each measure was given a normalized "score" of 1-4, where a score of 4 represents the greatest need for

improvement and 1 represents the lowest need, compared with the other segments in the study area. The four normalized scores for each mode were then added together and normalized again by mode, and then added together to reach an overall multimodal need score. This technique makes it possible to equitably assess transportation need using a range of variables that are each measured differently. The performance criteria are:

Transit Score

- *Transit Priority Category*
  - *Highest Priority*. Highest Priority transit streets are those that have been designated as part of the TEP Rapid network. These segments were assigned a score of 4.
  - *High Priority*. High Priority Transit streets are those that are served by transit but not designated as part of the TEP rapid network. These segments were assigned a score of 2.
  - *Moderate priority*. These segments are not served by transit. They were assigned a score of 1.
- *Projected PM transit volume:* In this category, segments are ranked based on their projected PM period transit volume in 2035 as forecast using the SF CHAMP model. Segments are given a score from 1-4 based on the quartile they fall into in this rating.
- *Projected transit capacity constraint:* In this category, segments are ranked based on the maximum transit load during the PM period in 2035 as forecast by the SF CHAMP model. The maximum load is the share of transit vehicle capacity utilized on the busiest line. In some cases, the projected transit demand exceeds the available vehicle capacity. Segments are given a score from 1-4 based on the quartile they fall into in this rating.
- *Traffic delay:* Traffic delay can also delay transit vehicles. In this category, segments are ranked based on forecast traffic delay in 2035, based on the average approach delay for all intersections in the segment.[2] Traffic delay data is only available for those segments that were part of the South of Market circulation study – these segments were given a score from 1-4 based on the quartile they fall into in this rating. Segments outside the study area were given a placeholder score of 1.

Pedestrian Score

- *Pedestrian Priority Category*
  - *Highest Priority*. Highest Priority pedestrian streets are those that have neighborhood commercial zoning, downtown commercial zoning, or are important paths to rail transit stations.[3] These segments were assigned a score of 4.
  - *High Priority*. High Priority pedestrian streets are those that have residential zoning but do not meet the criteria listed above for highest priority. These segments were assigned a score of 2.

[2] The SOMA circulation study was completed for this study by Fehr and Peers using SF CHAMP model outputs updated using current traffic counts for designated intersections. More information on this analysis is available in the EN TRIPS Existing and Future Conditions Reports.

[3] Streets segments marked as important paths to rail transit include: Market Street; Third Street; Fourth Street in SOMA; Townsend Street; Eighth Street North of Folsom; Second Street North of Folsom; 16th, 24th, and Mission Street in the Mission District, and 22nd Street.

  - *Moderate Priority*. Segments that do not meet the criteria for Highest or High Priority are assigned a score of 1.

- *Pedestrian injury collisions 2004 – 2008*. In this category, segments are ranked based on the number of pedestrian injury collisions that occurred at or near intersections along the segment between 2004 and 2008, divided by the length of the segment in miles, to arrive at a number of collisions per mile. The data source is the San Francisco Department of Public Health's pedestrian collision data set. Segments are given a score from 1-4 based on the quartile they fall into in this rating.
- *Projected residential density of adjacent areas*. Areas with high residential densities are likely to have high pedestrian volumes. In this category, segments are ranked according to the average of the 2035 residential densities of the adjacent transportation analysis zones. The data source is ABAG Projections 2009.
- *Existing pedestrian facilities below standard*. This category represents a count of deficient pedestrian facilities in the segment. Segments that include none of these deficiencies were given a score of 1. The presence of any of these conditions anywhere on the segment raised the score by 1, with a maximum score of 4. Pedestrian facilities observed include the following:
  - *Sidewalk width*. The Better Streets Plan and the Downtown Plan designate a minimum sidewalk width for each of several types of streets. When the sidewalk width on a segment does not meet this standard, this is noted as a deficiency.
  - *Closed crosswalks and multiple turn lanes*. Crosswalks should be marked and useable by pedestrians in all legs of an intersection. When all legs of an intersection do not have open, marked crosswalks, this condition is noted as a deficiency. Multiple vehicle turn lanes can present a challenge to the safety and comfort of pedestrians. When multiple turn lanes are present in any intersection along the segment, this condition is noted as a deficiency.
  - *Block length*. The Better Streets Plan sets a standard of 500 feet between street crossings for pedestrians. Blocks longer than this that lack mid-block crossings can present a challenge to safe and comfortable pedestrian travel. If a segment has blocks longer than 500 feet without crossings, this condition is noted as a deficiency.

Bicycle Score

- *Bicycle Priority Category*
  - *Highest Priority*. Highest Priority bicycle streets are those that have or will have bicycle lanes or paths as specified in the San Francisco Bicycle Plan. These segments were assigned a score of 4.
  - *High Priority*. High Priority bicycle streets are those that are designated as bicycle routes in the San Francisco Bicycle Plan. These segments were assigned a score of 2.
  - *Moderate Priority*. High Priority bicycle streets are those that are not specified as bicycle lanes or routes in the San Francisco Bicycle Plan. These segments were assigned a score of 1.
- *Bicycle collisions 2004 – 2008:* In this category, segments are ranked based on the number of reported bicycle collisions that occurred along the segment between 2004 and 2008, divided by the length of the segment in miles, to arrive at a number of collisions per mile. The data source is the SFMTA's bicycle collisions dataset. Segments are given a score from 1-4 based on the quartile they fall into in this rating.

- *Completeness of bicycle facilities*. Some corridor segments have been designated for a bicycle path or route in the San Francisco Bicycle Plan, but the specified improvements have not yet been implemented. These corridors are high priority for improvement. If a segment is planned for a bike path that has not yet been completed, it is assigned a score of 4 in this category. If a segment is planned for a bike route that has not yet been marked, it is assigned a score of 2 in this category. All other segments are assigned a score of 1.
- *Projected PM vehicle volume:* High vehicles volumes can present an obstacle for cyclists both in terms of the risk of collisions, and the perception of safety. In this category, segments are ranked based on the projected PM period vehicle volumes 2035. For segments in the South of Market circulation study area, the vehicle volumes are based upon current counts and analysis using Synchro software. For all other segments, values are based on the projected volume at the midpoint of the segment from the SF CHAMP travel demand model. Segments are given a score from 1-4 based on the quartile they fall into in this rating.

High Priority Segments

Using the evaluation method described above, transit, pedestrian, and bicycle need scores were assigned for each corridor segment. The scores are summarized in Figure C-7. For this analysis, segments with multimodal scores in the top quartile were considered “high need.”

This ranking of multimodal needs was assessed alongside other important considerations discussed elsewhere in this analysis, such as expected growth in residential and employment density, and opportunities related to other ongoing plans and projects.

Figure C-7 Modal Need Score for Eastern Neighborhoods 'High Multimodal Need' Segments

Corridor	Segment	Ped Sum	Bike Sum	Transit Sum	Bike, Ped Transit Sum
SOMA					
East-West					
Mission	Third-Fifth	12	8	15	35
Folsom	Second-Fifth	14	11	8	33
	Fifth - Eleventh	15	11	6	32
Townsend	Third-Fifth	13	11	10	34
	Fifth - Eighth	9	12	11	32
North-South					
Second	N of Bryant	13	14	6	33
Third	N of Bryant	14	9	13	36
Fourth	N of Bryant	15	8	10	33
Fifth	N of Brann	13	16	7	36
Sixth	N of Brann	15	10	7	32
Seventh	N of Bryant	14	10	12	36
Eighth	N of Bryant	12	12	8	32
Outside of SOMA					
East-West					
16th	West of Potrero	12	10	13	35
Division	All	6	15	11	32
North-South					
Mission	N of 16th	13	10	13	36
	S of 16th	13	6	13	32

There are widespread needs in the South of Market area. Among the east-west arterials, the segment of Mission Street between 3rd and 5th Streets stands out with high needs for pedestrians and transit riders. The full length of Folsom Street has high needs both for pedestrians and cyclists. Townsend, which is currently an unaccepted street, lacks adequate facilities and has high needs for pedestrians, cyclists, and transit. Nearly all of the north-south SOMA arterials have have a high degree of need for improvement north of the freeway. Most of these streets have narrow sidewalks and limited amenities for pedestrians, as well as high volumes of fast-moving traffic. Second and Fifth Streets are designated bicycle routes, but lanes have not yet been striped. Transit needs stand out on Seventh and Third Streets.

The range of needs on a large number of South of Market arterials, combined with widespread growth in population and employment density in this area, suggest the need for a comprehensive approach to upgrading multimodal facilities in this area. EN TRIPS will respond by recommending improvements to a representative east-west corridor and a representative north-south corridor in SOMA as a first step toward comprehensive upgrades for the SOMA as a whole.

Outside of the South of Market, Division Street stands out with high needs for cyclists and pedestrians. Mission Street in the Mission District has high needs for both for transit and pedestrians. Finally, Sixteenth Street has major needs across all modes. While the segment of 16th Street west of Potrero Avenue segment scores highly in this analysis due to existing high volumes of pedestrian activity, the entire corridor has needs for vehicle, pedestrian, and bicycle travel. More detail on the specific modal needs of each 'high need' segment is provided in the Step 4 section of this memo. The scores for all segments are summarized in Figures 5 and 6 below.

ASSESSMENT OF OUTLIER SEGMENTS

The first three steps of this analysis prioritized streets that have major needs across multiple modes. In Step 4, we gave special attention to those street segments that stand out because they have a particularly urgent need in just one performance measure.

Pedestrian and Bicycle Collisions

Streets in the South of Market area present a number of major challenges for pedestrians. Figures C-8 and C-9 illustrate pedestrian and bicycle collisions on South of Market street segments. These figures show that, with their high volumes of fast-moving traffic, wide rights-of-way, long blocks, and numerous intersections with alleyways, the north-south numbered streets in the South of Market have high rates of pedestrian injury collisions. The north-of-the-freeway segments of these streets, with much higher pedestrian volumes, have far more collisions than the southern segments. Of this group, however, Sixth Street stands out with by far the highest number of pedestrian collisions (97 pedestrian collisions per mile). The next highest street segment is Ninth Street, with 56 collisions per mile.

In addition to the challenges faced on all north-south SOMA streets, Sixth Street may have a high rate of collisions because of the high speeds of traffic traveling to and from the Interstate 280 ramp, and because of the high volumes of pedestrians traveling to and from the single room occupancy hotels that line the northern part of the corridor. This condition suggests that Sixth Street is a particularly strong candidate for very near term pedestrian safety improvements through the ongoing activities of SFMTA's Liveable Streets program. As of October 2011, planning for these improvements is underway.

Transit Service and Capacity

In the multimodal need assessments outlined above, transit capacity utilization is scored by quartile. However, as discussed in the EN TRIPS future conditions report, several Muni routes in the study area are projected to have ridership demands that far exceed the available transit vehicle capacity during the PM peak period.

As illustrated in Figure C-10, the routes with PM peak period loads projected to be in excess of 1.25 (125% of capacity) are: the T-Third (both on the surface in Mission Bay and in the Central Subway); the 47 Van Ness Mission (on the northern Mission District segment of Mission Street);

the 9 San Bruno (in the northern segment of Potrero Avenue); and the 22 Fillmore (in the Mission District segment of 16th Street).

Of these streets with transit capacity constraints, 16th Street and Mission Street are also identified as 'high need' corridors in the multimodal screening. Sixteenth Street transit capacity constraints are particularly notable from the perspective of EN TRIPS because of the vital role that the 22 Fillmore plays providing transit service to link high growth areas in the Mission, Potrero Hill, Showplace Square, and Mission Bay.

Figure C-8 Pedestrian and Bicycle Collisions on South of Market North-South Streets (2004 – 2008)

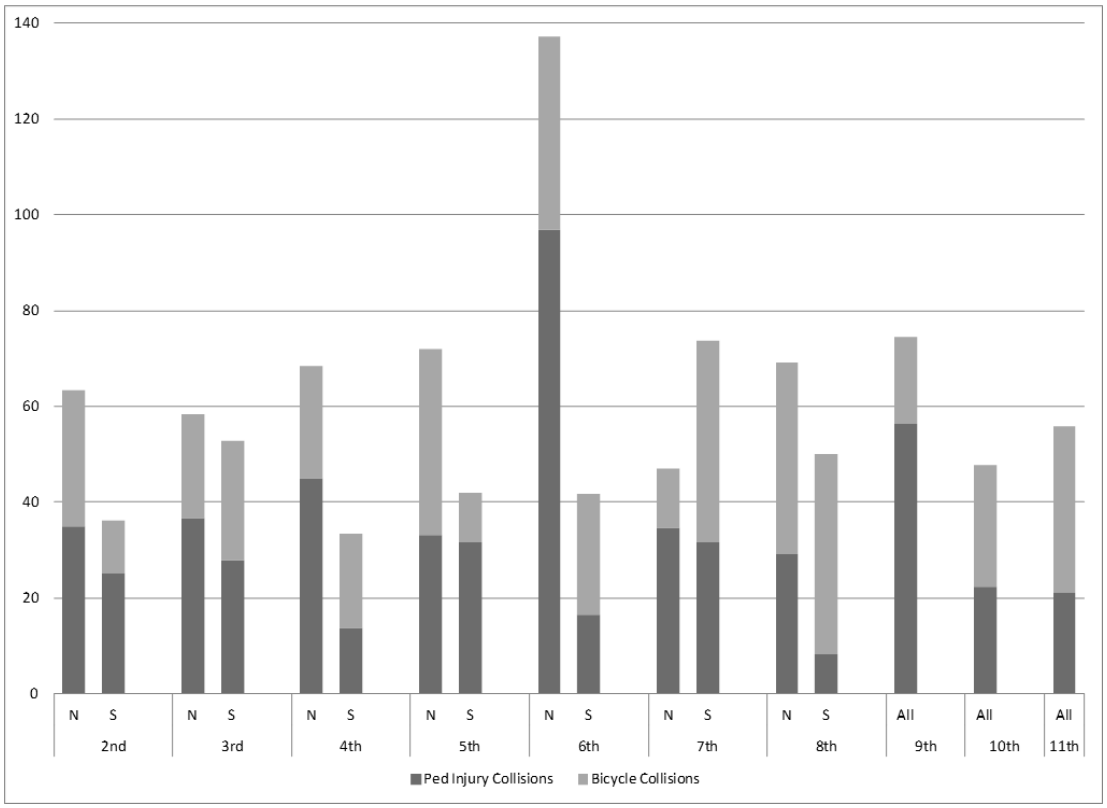
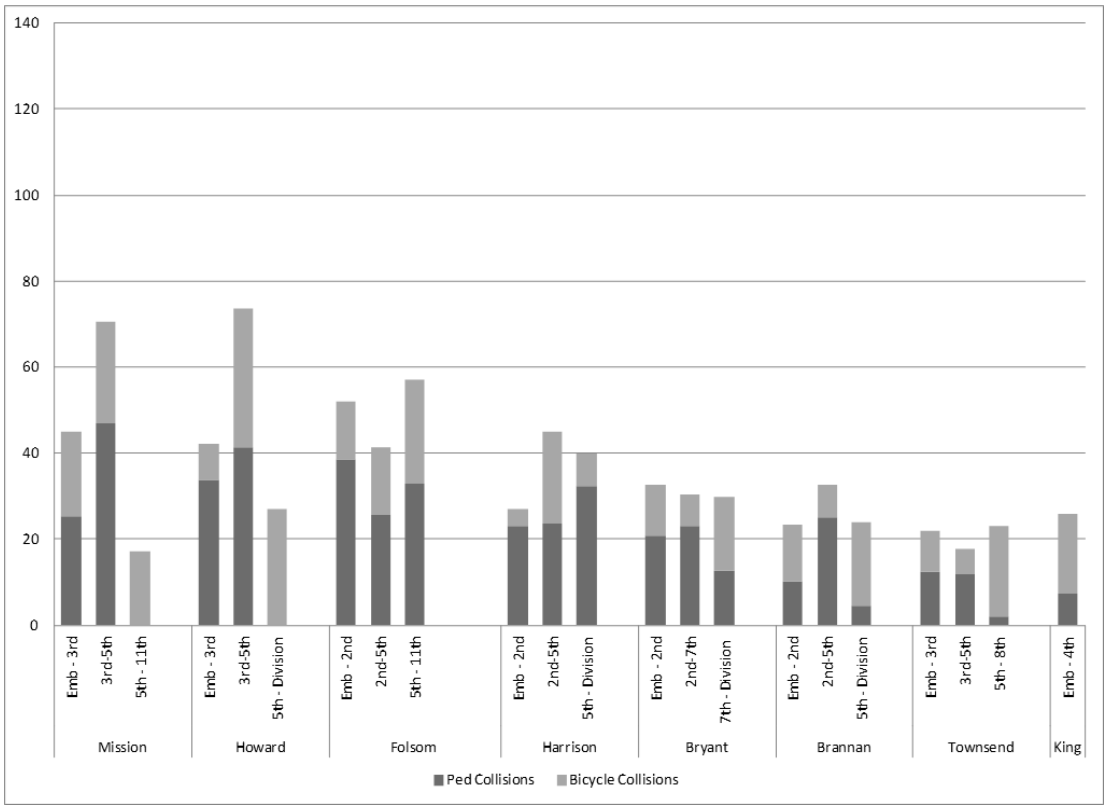


Figure C-9 Pedestrian and Bicycle Collisions on South of Market East-West Streets (2004 – 2008)



IDENTIFICATION OF CAPACITY CONSTRAINTS AND OPPORTUNITIES IN THE VEHICLE CIRCULATION NETWORK

Building on the screening process described above, in Step 6 we assessed the vehicle circulation network in the South of Market area. Based on a comparison of 2035 forecast vehicle volumes and roadway capacity, this assessment identifies street segments forecast to have vehicle demand in excess of available roadway capacity during peak travel periods, as well as segments that may have vehicle capacity than demand. Those segments with excess vehicle capacity may present particularly good opportunities to repurpose some space for use by other modes.

Volume over Capacity (V/C)

The analysis considered the relationship between vehicle volume (the peak hour vehicle demand in a particular direction), and capacity (the number of vehicles that can be accommodated by a particular approach or roadway based on a number of factors). Roadway capacity depends upon the number of travel lanes, signal timing, tow-away lanes, and other factors. A V/C of less than 1.0 represents an approach that is below capacity, a V/C of 1.0 represents “at-capacity” operations, and a V/C greater than 1.0 represents “breakdown”, i.e. stop-and-go operations.

The study team calculated V/C ratios for the forecast year (2035) for the majority of intersection approaches in the study area bounded by 3rd Street, Mission Street, 10th Street, and Bryant Street. The results are summarized in the tables below for north-south and east-west corridors.

Figure C-10 Forecast Volume/Capacity for North-South Corridors (2035)

V/C for North-South Corridors	10th (one-way)	9th (one-way)	8th (one-way)	7th (one-way)	6th (two-way)		4th (one-way)	3rd (one-way)
	SB	NB	SB	NB	NB	SB	SB	NB
Mission	0.96	1.09	1.09	0.86	0.93	1.04	0.81	0.94
Howard	0.88	1.21	1.33	0.87	0.72	0.82	0.95	1.19
Folsom	0.91	1.19	0.83	1.22	0.74	--	0.93	1.65
Harrison	0.72	0.95	1.32	1.27	0.72	1.06	1.11	0.98
Bryant	0.69	1.39	0.65	1.27	0.7	1.15	1.07	1.45

Tenth Street and northbound Sixth Street appear, on aggregate, to have the most roadway capacity available based on a comparison of V/C rations. On aggregate, Third Street appears to be the most oversubscribed north-south roadway in the study area.

Figure C-11 Forecast Volume/Capacity for North-South Corridors (2035)

V/C for East-West Corridors	Mission St (two-way)		Howard (one-way)	Folsom (one-way)	Harrison (one-way)	Bryant (one-way)
	EB	WB	WB	EB	WB	EB
10th	0.72	1.14	0.66	0.72	0.86	0.76
9th	0.99	0.98	0.51	0.82	0.77	0.78
8th	0.87	1.04	0.62	0.82	1.3	0.59
7th	1.23	0.85	0.79	0.7	0.69	0.8
6th	1.12	0.88	0.99	0.95	0.92	0.64
4th	1.05	1.65	0.97	1.24	--	--
3rd	1.47	1.03	1.15	1.41	1.31	0.55

As shown in the Figure C-10, all of the study roadways in the vicinity of Third and Fourth Streets are forecast to be either at or above capacity. Howard Street, Folsom Street, and Bryant Street appear to have excess capacity. Additionally, intersections that included freeway on- or off-ramps generally appear to have higher V/C ratios.

Screenline Comparisons

The study team also performed 'screenline' analysis to determine where excess vehicle capacity may exist in the South of Market vehicle network as a whole in the forecast year. A screenline is a predetermined boundary that can be used to group several segments together for the purposes of determining aggregate volume/capacity for several streets at once.

Screenline locations were selected to capture vehicle demand entering, exiting, and midway through the study area. For the north-south corridors, screenlines on Mission Street and Harrison Street, both from Tenth Street to Sixth Street, respectively and Harrison Street from Third Street to Fourth Street were selected. For the east-west Corridors, Third Street, Sixth Street, and Ninth

Street, all between Mission Street and Bryant Street, respectively were selected. Tables summarizing the development of the screenline v/c aggregation are shown below for both the North-South and East- West corridors and further summarized graphically in Figures 16 and 17.

It is important to note that, although screenline analysis is useful for assessing a general aggregate V/C ratio for a certain segment, there can be considerable variation in the independent V/C approaches that comprise the aggregate. For example the eastbound Mission Street screenline is 0.98, but its component v/c ratios from Mission Street, Folsom Street, and Bryant Street are 1.47, 1.41, and 0.55, respectively.

Further, it is important to note that this analysis represents a dynamic, rather than static condition. Drivers make decisions about which route to take through the street network based on traffic conditions, among other factors. If street configuration and/or traffic conditions change on any one street, drivers may respond to this change with changes to their choice of route.

SUMMARY OF CAPACITY ANALYSIS FINDINGS

This analysis finds that all the study roadways in the vicinity of Third and Fourth Streets are forecast to be either at or above capacity during the PM peak in 2035. Howard Street, Folsom Street, and Bryant Street appear to have excess capacity west of Fifth Street.

For the north-south SOMA arterials, the western SOMA street network appears to have some available capacity in the northbound direction at Harrison Street and at Mission Street screenlines. In the southbound travel direction, this portion of the street network is forecast to be above capacity at Mission Street, but just under capacity at Harrison Street. In the eastern SOMA area, the network is well above capacity in the southbound direction, but has capacity available in the northbound direction. This reflects the PM peak period commute pattern, with drivers traveling towards the freeway.

For the east-west SOMA arterials, the network appears to have available capacity in both directions for screenlines in the western SOMA area. At the Third Street screenline, however, vehicle volumes are forecast to be well above capacity in the westbound direction.

These findings suggest that changes could be made to streets in several parts of the SOMA street network without major disruption to vehicle circulation. It is important to note that while forecasts of traffic conditions are one important factor in choosing corridor improvement projects, a forecast that vehicle volumes may exceed available capacity does not necessarily rule out a corridor improvement project for that street segment.

Figure C-12 Forecast Volume/Capacity for South of Market Screenlines

Screenline	Cross-Street	Segment V/C	Aggregate V/C	Segment V/C	Aggregate V/C
SOMA					
East-West		**EB**		**WB**	
3rd	Mission	1.47	0.98	1.03	1.19
	Howard	--		1.15	
	Folsom	1.41		--	
	Harrison	--		1.31	
	Bryant	0.55		--	
6th	Mission	1.12	0.84	0.88	0.94
	Howard	--		0.99	
	Folsom	0.95		--	
	Harrison	--		0.92	
	Bryant	0.64		--	
9th	Mission	0.99	0.82	0.98	0.69
	Howard	--		0.51	
	Folsom	0.82		--	
	Harrison	--		0.77	
	Bryant	0.78		--	
North-South		**NB**		**SB**	
Mission	6th	0.93	0.98	1.04	1.02
	7th	0.86		--	
	8th	--		1.09	
	9th	1.09		--	
	10th	--		0.96	
Harrison	3rd	0.98	0.98	--	1.11
	4th	--		1.11	
Harrison	6th	0.72	0.98	1.06	0.93
	7th	1.27		--	
	8th	--		1.32	
	9th	0.95		--	
	10th	--		0.72	

EN TRIPS PRELIMINARY CORRIDOR SCREENING - INDICATORS OF NEED BY MODE

Mode/Category	Indicator	Unit	Data Source
Pedestrian	Pedestrian priority category	Category Based on Zoning	San Francisco zoning code
	Pedestrian injury collisions (2004 - 2008)	Quartile	DPH dataset
	2035 Projected residential density (adjacent TAZ's)	Quartile	ABAG Projections 2009
	Existing pedestrian facilities below standard (sidewalk width below BSP plan standard; closed crosswalks or multiple turn lanes; blocks >500 ft with no crossing.	Count of conditions present	Observation
Bicycle	Bicycle priority	Category based on SF Bicycle Plan	SF Bicycle Plan
	Bicycle collisions (2004 - 2008)	Quartile	SFMTA dataset
	Proposed bicycle facility incomplete	Category based on SF Bicycle Plan	SF Bicycle plan
	Projected PM vehicle volume (2035)	Quartile	SF CHAMP 4.1 and Fehr and Peers model
Transit	Transit priority category	Category based on SF TEP	SF TEP
	Projected PM transit volume	Quartile	SF CHAMP 4.1
	Transit capacity constraint	Quartile	SF CHAMP 4.1
	Traffic delay	Quartile	SF CHAMP 4.1 and Fehr and Peers model

EN TRIPS PRELIMINARY CORRIDOR SCREENING – MODAL PRIORITY CLASSIFICATIONS

Most of the corridors in the study area play important circulation roles for multiple modes of transportation. In order to properly consider the demands on each street segment, we have assigned to each a priority level for each mode.

In addition to motor vehicle, transit, pedestrian, and bicycle through travel, many of these streets also play important roles as living environments and public gathering places for residents, workers, and visitors the Eastern Neighborhoods.

Modal priority classifications are as follows:

Mode	Highest Priority	High Priority	Moderate Priority
Motor Vehicle	▪ General Plan Major Arterial	▪ General Plan Secondary Arterial	▪ All other streets
Transit	▪ TEP Rapid Network	▪ Served by transit	▪ All other streets
Freight	▪ General Plan Major or Secondary Arterial ▪ SFMTA Designated Freight Traffic Route ▪ Industrial Zoning (M1 or M2)	▪ Light Industrial Zoning (All PDR, SLR, SLI)	▪ All other streets
Bicycles	▪ Bicycle lane or path in the SF Bicycle Plan	▪ Bicycle Route in the SF Bicycle Plan	▪ All other streets
Pedestrian	▪ Neighborhood Commercial Zoning (All NC) ▪ Paths to Transit: Market Street; Third Street; Fourth Street in SOMA; Townsend Street; Eighth Street North of Folsom; Second Street North of Folsom; 16th, 2Fourth, and Mission Streets near Mission District BART stations, 2Second Street	▪ Residential Zoning (RH, RM, RC, RTO, RED) ▪ South of Market Alleys ▪ Mission Bay	▪ All Other Streets

EN TRIPS PRELIMINARY CORRIDOR SCREENING – DETAILED EVALUATION

Corridor	Segment	Ped Priority	Ped Injury Collisions	2035 Residential Density	Ped facilities below standard	Ped Sum		Bike Priority	Bike Collisions	Proposed Facility Incomplete	Vehicle volume	Bike Sum		Transit Priority Category	Transit Volume	PM Peak Transit Capacity Constrained (2035)	Traffic Delay	Transit Sum		Bike, Ped Transit Sum		Overall Ped-Bike-Transit Quartile
SOMA																						
East-West																						
Mission	Emb - Third	4	3	2	1	**10**		1	3	4	2	**10**		4	3	2	1	**10**		30		3
	Third-Fifth	4	4	1	3	**12**		1	3	1	3	**8**		4	4	3	4	**15**		35		4
	Fifth - Eleventh	4	1	4	2	**11**		1	2	1	3	**7**		4	4	2	2	**12**		30		3
Howard	Emb - Third	4	4	4	2	**14**		4	1	1	2	**8**		1	1	1	1	**4**		26		2
	Third-Fifth	4	4	2	3	**13**		4	4	1	4	**13**		1	1	1	1	**4**		30		3
	Fifth - Division	1	1	4	3	**9**		4	3	1	3	**11**		1	1	1	1	**4**		24		2
Folsom	Emb - Second	4	4	4	1	**13**		4	2	1	2	**9**		2	1	1	1	**5**		27		3
	Second-Fifth	4	3	4	3	**14**		4	2	1	4	**11**		2	1	1	4	**8**		33		4
	Fifth - Eleventh	4	4	3	4	**15**		4	3	1	3	**11**		2	2	1	1	**6**		32		4
Harrison	Emb - Second	1	3	4	2	**10**		1	1	1	3	**6**		1	1	1	1	**4**		20		1
	Second-Seventh	1	3	3	4	**11**		1	3	1	3	**8**		1	3	1	1	**6**		25		2
	Seventh - Division	1	3	3	4	**11**		1	1	1	3	**6**		1	1	1	1	**4**		21		1
Bryant	Emb - Second	2	2	3	1	**8**		1	2	1	1	**5**		1	1	1	1	**4**		**17**		**1**
	Second-Seventh	1	3	2	4	**10**		1	1	1	3	**6**		2	2	1	4	**9**		**25**		**2**
	Seventh - Division	1	2	1	4	**8**		1	2	1	3	**7**		1	1	1	2	**5**		**20**		**1**
Brannan	Emb - Second	2	2	3	2	**9**		1	2	1	1	**5**		1	1	1	1	**4**		18		1
	Second-Fifth	1	3	3	3	**10**		1	1	1	2	**5**		1	1	1	1	**4**		19		1
	Fifth - Division	1	1	1	4	**7**		1	3	1	2	**7**		1	1	1	1	**4**		18		1
Townsend	Emb - Third	4	2	2	3	**11**		4	2	4	2	**12**		2	3	2	1	**8**		31		3
	Third-Fifth	4	2	4	3	**13**		4	1	4	2	**11**		4	3	2	1	**10**		34		4
	Fifth - Eighth	4	1	1	3	**9**		4	3	4	1	**12**		4	3	3	1	**11**		32		4
King	Emb - Fourth	4	1	3	2	**10**		4	2	1	4	**11**		2	1	1	1	**5**		26		2
North-South														0								
Second	N of Bryant	4	4	3	2	**13**		4	4	4	2	**14**		2	2	1	1	**6**		33		4
	S of Bryant	1	3	2	2	**8**		4	2	4	2	**12**		2	2	2	1	**7**		27		3
Third	N of Bryant	4	4	3	3	**14**		1	3	1	4	**9**		4	3	3	3	**13**		36		4
	S of Bryant	4	3	2	4	**13**		1	3	1	4	**9**		4	2	2	1	**9**		31		3
Fourth	N of Bryant	4	4	3	4	**15**		1	3	1	3	**8**		4	3	1	2	**10**		33		4
	S of Bryant	4	2	4	4	**14**		1	3	1	3	**8**		4	2	1	1	**8**		30		3
Fifth	N of Brann	4	4	2	3	**13**		4	4	4	4	**16**		4	1	1	1	**7**		36		4
	S of Brann	1	3	4	3	**11**		4	2	4	2	**12**		1	1	1	1	**4**		27		3
Sixth	N of Brann	4	4	3	4	**15**		1	4	1	4	**10**		4	1	1	1	**7**		32		4
	S of Brann	1	2	2	4	**9**		1	3	1	1	**6**		1	1	1	1	**4**		19		1
Seventh	N of Bryant	2	4	4	4	**14**		4	2	1	3	**10**		4	2	3	3	**12**		36		4
	S of Bryant	1	3	2	3	**9**		4	4	1	3	**12**		2	2	2	1	**7**		28		3
Eighth	N of Bryant	1	3	4	4	**12**		4	4	1	3	**12**		4	2	1	1	**8**		32		4
	S of Bryant	1	1	1	3	**6**		4	4	1	2	**11**		1	2	1	1	**5**		22		2
Ninth	All	1	4	1	4	**10**		1	2	1	4	**8**		1	1	1	3	**6**		24		2
Tenth	All	1	2	2	4	**9**		4	3	1	4	**12**		1	1	1	1	**4**		25		2
Eleventh	All	1	2	2	3	**8**		4	4	1	2	**11**		4	4	3	1	**12**		31		3

Corridor	Segment	Ped Priority	Ped Injury Collisions	2035 Residential Density	Ped facilities below standard	Ped Sum		Bike Priority	5 Year Bike Collisions	Proposed Facility Incomplete	Vehicle volume	Bike Sum		Transit Priority Category	Transit Volume Ratio	PM Peak Transit Capacity Constrained (2035)	Traffic Delay	Transit Sum		Total		Overall Ped-Bike-Transit Quartile
Outside of SOMA																						
East-West																						
16th	West of Potrero	4	4	2	2	**12**		4	4	1	1	**10**		4	4	4	1	**13**		35		4
	East of Potrero	1	1	1	2	**5**		1	1	4	1	**7**		4	3	4	3	**14**		26		2
17th	West of Potrero	4	4	2	2	**12**		1	3	4	1	**9**		1	1	3	1	**6**		27		3
	East of Potrero	1	1	1	2	**5**		4	1	1	4	**10**		2	1	1	1	**5**		20		1
24th	All	4	3	3	1	**11**		1	3	1	3	**8**		2	3	4	1	**10**		29		3
26th	All	2	2	3	1	**8**		1	1	4	4	**10**		1	1	1	1	**4**		22		2
Cesar Chavez	West of Potrero	2	3	3	2	**10**		4	2	4	1	**11**		1	1	1	1	**4**		25		2
	East of Potrero	1	1	1	2	**5**		4	1	4	4	**13**		1	1	1	1	**4**		22		2
Division	All	1	2	1	2	**6**		4	3	4	4	**15**		4	3	3	1	**11**		32		4
18th	San Bruno to Third	2	1	1	1	**5**		1	1	4	1	**7**		2	1	1	1	**5**		17		1
North-South																						
Third	King - 16th	4	1	2	2	**9**		1	1	1	1	**4**		4	4	4	4	**16**		29		3
	S of 16th	4	1	1	1	**7**		1	1	1	1	**4**		4	4	3	4	**15**		26		2
Fourth	King - 16th	4	1	2	1	**8**		4	1	4	1	**10**		1	1	1	1	**4**		22		2
	S of 16th	4	1	1	2	**8**		1	1	1	4	**7**		1	1	1	1	**4**		19		1
Illinois	N of Mariposa	1	1	1	1	**4**		4	1	4	2	**11**		1	1	1	1	**4**		19		1
	S of Mariposa	4	1	1	2	**8**		4	1	4	1	**10**		1	1	1	1	**4**		22		2
Guerrero	N of 16th	2	3	4	2	**11**		1	4	1	1	**7**		1	1	1	1	**4**		22		2
	S of 16th	2	2	3	3	**10**		1	2	1	2	**6**		1	1	1	1	**4**		20		1
Valencia	N of 16th	4	3	4	1	**12**		4	4	1	2	**11**		2	1	2	1	**6**		29		3
	S of 16th	4	2	3	1	**10**		4	4	1	4	**13**		1	1	1	1	**4**		27		3
Mission	N of 16th	4	4	4	1	**13**		1	4	1	4	**10**		4	4	4	1	**13**		36		4
	S of 16th	4	4	4	1	**13**		1	3	1	1	**6**		4	4	4	1	**13**		32		4
S Van Ness	N of 16th	1	4	2	1	**8**		1	4	1	1	**7**		1	1	1	1	**4**		19		1
	S of 16th	2	3	4	1	**10**		1	2	1	2	**6**		1	1	1	1	**4**		20		1
Folsom	N of 16th	1	1	1	1	**4**		1	4	1	1	**7**		2	1	1	1	**5**		16		1
	S of 16th	2	2	3	1	**8**		1	1	1	4	**7**		2	1	1	1	**5**		20		1
Harrison	N of 16th	1	2	1	1	**5**		4	4	1	3	**12**		1	1	1	1	**4**		21		1
	S of 16th	2	1	3	1	**7**		4	2	1	1	**8**		1	1	1	1	**4**		19		1
Potrero	N of 16th	1	2	1	1	**5**		1	4	1	1	**7**		4	4	4	1	**13**		25		2
	S of 16th	2	2	2	1	**7**		1	2	1	1	**5**		4	4	4	1	**13**		25		2
Connecticut	All	2	1	1	2	**6**		1	1	1	1	**4**		2	1	2	1	**6**		16		1
Wisconsin	All	2	1	1	2	**6**		1	1	1	1	**4**		2	1	1	1	**5**		15		1
De Haro	16th to 23rd	2	1	1	1	**5**		1	1	1	1	**4**		2	1	2	1	**6**		15		1
Rhode Island	16th to 25th	2	1	1	1	**5**		1	1	1	1	**4**		2	1	1	1	**5**		14		1