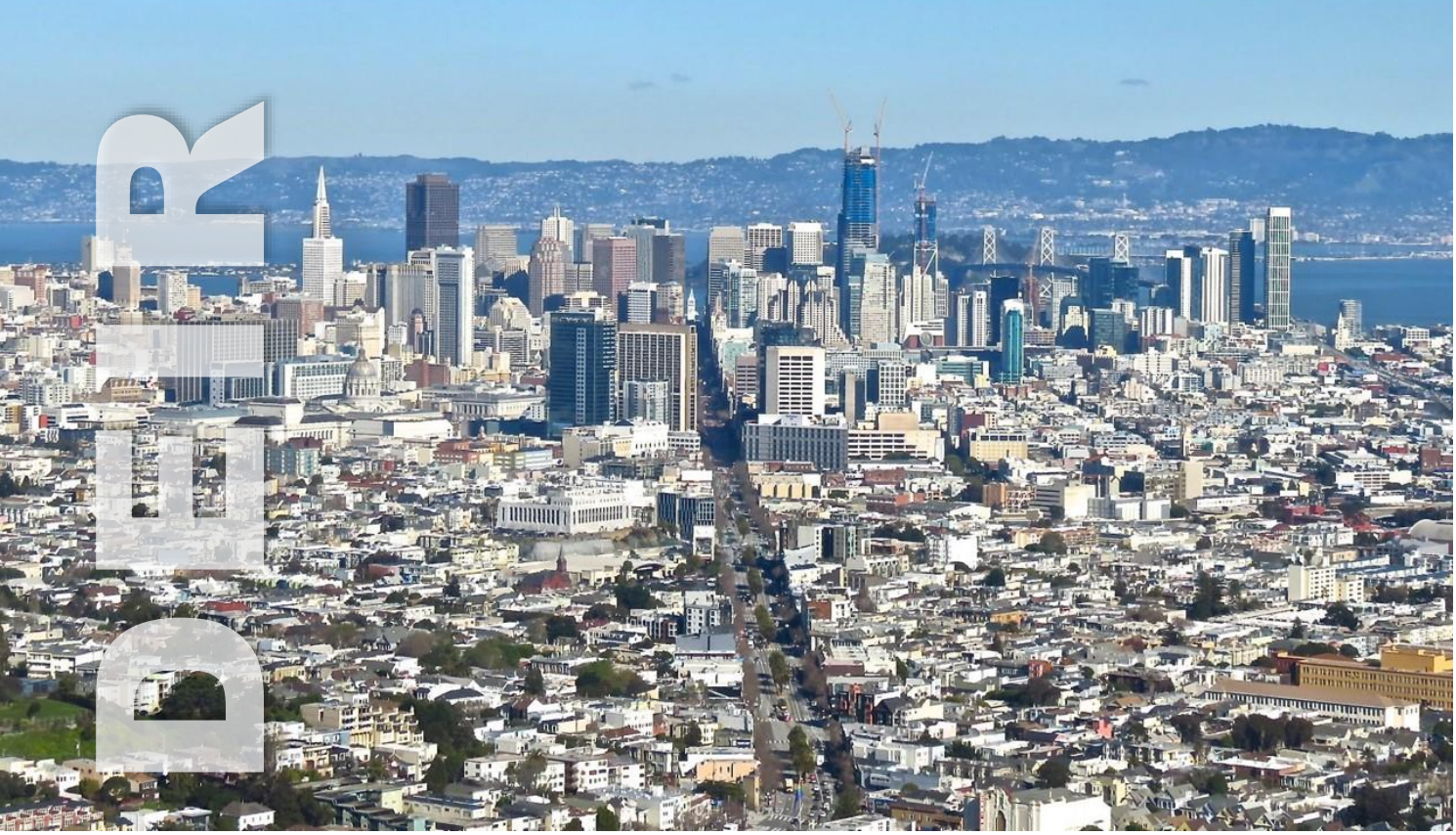

DRAFT ENVIRONMENTAL IMPACT REPORT

Better Market Street Project EIR
APPENDIX 1: SCOPING REPORT

PLANNING DEPARTMENT
CASE NO. 2014.0012E

STATE CLEARINGHOUSE NO. 2015012027

	Draft EIR Publication Date:	**February 27, 2019**
	Draft EIR Public Hearing Date:	**April 4, 2019**
	Draft EIR Public Comment Period:	**February 28, 2019 – April 15, 2019**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:

Chris Thomas, AICP | 1650 Mission Street, Suite 400 | San Francisco, CA 94103 or christopher.thomas@sfgov.org

APPENDIX 1: SCOPING REPORT (INCLUDES THE NOP AND COMMENTS RECEIVED)

FINAL

BETTER MARKET STREET ENVIRONMENTAL IMPACT REPORT (EIR) **SCOPING REPORT**

May 22, 2018

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Overview

This section provides an overview of written, oral and e-mail comments from the public and affected agencies received during the scoping period for the Better Market Street Project (proposed project) Environmental Impact Report (EIR). This summary focuses on agency and public comments on the proposed project's purpose and need; the options proposed for analysis at the time of the Notice of Preparation (NOP); and the potential environmental impact areas that will be analyzed in the EIR.

Introduction

The project sponsor, the San Francisco Department of Public Works (Public Works), in coordination with the Citywide Planning Division of the San Francisco Planning Department and the San Francisco Municipal Transportation Agency (SFMTA), proposes to redesign and provide various transportation and streetscape improvements to a 2.2-mile-long corridor, generally encompassing Market Street between Steuart Street, Octavia Boulevard, and McCoppin and Valencia streets, including Charles J. Brenham Place (the project corridor). The proposed transportation and streetscape improvements would include changes to roadway configuration and private vehicle access; traffic signals; surface transit, including Muni-only lanes, stop spacing and service, stop locations, stop characteristics, and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; and utilities.

Three possible options for the proposed project were the subject of the initial study. Alternatives 1 and 2 involved the redesign and improvement of Market Street only, while Alternative 3 would redesign and improve Mission Street in addition to providing the Alternative 1 improvements to Market Street. Alternatives 1 and 2 each had two design concepts for bicycle facilities on Market Street. As the environmental review phase progressed, subsequent to preparation of the initial study, these options, as well as the two design concepts, were refined into a single proposal that will be analyzed in the EIR.

Purpose of Scoping Process

A first step in preparing an EIR is scoping. The scoping process results in a description of the alternatives that will be analyzed and the potential environmental impact areas that will be studied, and eliminates from detailed study those issues that are not pertinent to the final decision on a proposed project. Scoping is also an effective way to gather early input from the public, affected agencies, and other interested parties. Scoping helps ensure that an EIR incorporates all issues of importance to the public and affected agencies, yet focuses only on issues important to provide a firm basis for the decision-making process.

The intent of the Better Market Street EIR scoping process is to:

- Inform affected agencies and the public about the proposed project, including compliance with CEQA requirements;
- Identify a reasonable range of transit improvement alternatives to be evaluated for the project;

- Identify potentially significant environmental impact areas that should be studied in the EIR; and
- Expand on the existing mailing list of agencies and individuals interested in the future actions related to the project and the EIR.

During the scoping period, the planning department gathered input on these issues from affected agencies and interested members of the public; this report summarizes that feedback.

Even though scoping is a distinct stage in the preparation of an EIR, public and agency involvement activities will extend throughout the entire EIR process.

Notification

The planning department took the following actions to notify affected agencies and the public about the Better Market Street Project EIR scoping period. The formal mechanism for CEQA notification is the NOP of an EIR. The NOP provides an overview of the project, the project alternatives, existing conditions, construction, environmental review topics, approvals required, the public scoping process, and contact information and the dates and times of scoping meetings. The planning department prepared a Notice of Preparation of an Environmental Impact Report and Notice of Public Scoping for the Proposed Project in January 2015.

- Notice of Availability (NOA) of the NOP was published in a newspaper of general circulation on January 14, 2015 (See Appendix A).
- A NOA was mailed to a mailing list of approximately 6,500 addresses, including other public agencies and interested parties on January 13, 2015.
- Copies of the full NOP were mailed to public agencies and interested parties on January 13, 2015 (See Appendix B).
- Copies of the full NOP were placed in the Main Library in the San Francisco Public Library system on January 14, 2015
- The scoping period and meetings were announced on the project's web site: www.bettermarketstreetsf.org and the Planning Department's website: www.sf-planning.org/bmseir
- The scoping period and meetings were announced at the Better Market Street Project Citizens Advisory Committee meeting on January 26, 2015.

Scoping Meeting

The scoping process included a public meeting held on Wednesday, February 4, 2015 at 6:00 p.m. at 1455 Market Street, Ground Floor Lobby Conference Room, San Francisco. The doors opened at 5:30 p.m. allowing for time to review enlarged poster boards of the project's location and alternatives.

Twenty-two people attended the scoping meeting. The sign-in sheets from the scoping meeting are included as Appendix D. At the meeting, the Planning Department EIR Coordinator presented information on the project in a powerpoint presentation. The presentation focused on the purpose of the meeting, an overview of the project, and the CEQA process and timeline. The project sponsor, Public

Works, described the project alternatives. After the presentations, comments were solicited. One individual from the public asked a question regarding the project. No other oral comments were received at the scoping meeting. A transcript of the scoping meeting is included as Appendix E. In addition, written comments were encouraged to be sent to the Environmental Review Officer, San Francisco Planning Department at 1650 Market Street, Suite 400, San Francisco, CA 94103 before the deadline of 5:00 p.m., February 13, 2015.

Overview of Comments on Alternatives to be Analyzed and Comments on Potential Environmental Impacts to be Studied

The purpose of the scoping period is to obtain public and agency input on the project alternatives to be analyzed, and on the potential environmental impact areas that will be studied. This section provides an overview of the public and agency comments on the proposed alternatives to be analyzed.

Eight written comment letters were provided identifying a number of concerns presented by the current three alternatives. The issue with the most comments focused on vehicular access. Specifically, entering and exiting private driveways and pedestrian drop-offs/loading and unloading at business entrances. This is followed by concerns over traffic congestion at the intersections with Market Street. There is concern over bicycle interaction and safety in conjunction with vehicles, transit and pedestrians. Several comments expressed concerns regarding access to Bay Area Rapid Transit (BART) entrances. There were no comments on the proposed plans for vehicle parking or plazas.

There were no comments on additional potential environmental impacts to be studied beyond those already identified in the Notice of Preparation.

Summary of Scoping Comments

This section summaries the comments received by both the public and affected agencies during the scoping period via letter, e-mail, written comment card, and oral testimony. The purpose of this section is to illustrate the range of comments received.

The Section is organized by the Topic areas as outlined in the Notice of Preparation, and within each topic, by the source of the comment (public agency or oral /written commentary from the public). Copies of the comments themselves are provided as Appendix C. The scoping meeting transcript is included as Appendix E.

Roadway Configuration Impacts	Comments Made by
Written Public Comments	
• Analyze an additional alternative where transit would operate in one lane in each direction on Market Street.	SPUR

Private Vehicle Access Impacts	Comments Made by
Written State Agency Comments	
• The EIR Report and the Traffic Impact Study should evaluate how the proposed changes to Market Street would affect the comparable capacity that was provided by the Central Freeway and local street system. • Use the Caltrans Guide for the Preparation of Traffic Impact Studies to analyze and prepare a TIS that is in concert with the impact studies. • Analyze potential impacts to the US 101/Octavia Boulevard and US 101/Mission Street off-ramps. Include average daily traffic, AM and PM peak hour volumes and levels of service (LOS) on affected facilities for existing, existing plus project, cumulative, and cumulative plus project scenarios. • Clearly identify the project's contribution to area traffic and any degradation to existing and cumulative LOS. • Identify mitigation for any roadway segment or intersection with insufficient capacity to maintain acceptable LOS with addition of project or cumulative traffic.	Caltrans
Written Regional Transit Agency Comments	
• Access for emergency/operational functions regarding revenue collection and service vehicles.	San Francisco Bay Area Rapid Transit District (BART)
Written Public Comments	
• Need a clear, direct route to and from the hotels for guests driving from Market Street.	Hotel Council of San Francisco
• Take into account all relevant recent and proposed changes including the closure of Annie Street for vehicles and changes proposed under the Central SoMa Plan.	The Hearst Corporation
• Significant impact on One Bush garage operation. The change in the garage operation caused by the project would negatively impact existing and future tenants by making One Bush less desirable due to undesirable vehicle arrangements for tenants and their patrons who use automobiles. • Significant impact on 1st Street traffic and other comments. First Street's primary function is as a feeder to the Bay Bridge and there are no realistic opportunities to increase the capacity of the existing four-lane First Street or to collect the existing traffic on First Street.	One Bush Street

Private Vehicle Access Impacts	Comments Made by
• Partial impossibility for use of One Bush. If the existing exit onto Market Street is eliminated, the garage can no longer be used by vehicles exceeding 6 feet 8 inches due to the existing height limitations. • Unfeasible for One Bush and commuters in general. Alternatives 1 and 3 are unworkable for One Bush due to the existing limitations. • Reconfiguration of the existing One Bush garage exit. If access to Market Street by private vehicles is prohibited, One Bush would need to build a new exit ramp in order to maintain the garage's functionality. • Proposed changes to the proposed Better Market Street Plan. Alternatives 1 and 3 should be amended with respect to private vehicle access by including an exception that would allow private vehicle access onto Market Street from the existing garage.	

Traffic Signals Impacts	Comments Made by
Written Public Comments	
• Installation of a new traffic signal at New Montgomery/Jessie Street to alleviate traffic congestion and improve pedestrian safety.	The Hearst Corporation

Surface Transit Impacts	Comments Made by
Written Regional Transit Agency Comments	
• This project may result in travel time increases for Golden Gate Transit (GGT) service which may have significant cost impact when multiplied by the thousands of trips annually and consequently, a negative impact on the District's ability to provide bus service with its existing budget. • Under Alternative 1 and 2, the increased traffic associated with turn restrictions at Market Street and the presence of a street car turnaround loop may necessitate moving the stop. • Under Alternative 3, GGT buses may need access to lanes or turns otherwise designated form Muni use in order to effectively serve its passengers.	Golden Gate Bridge Highway Transportation District
Written Public Comments	
• Analyze an additional alternative where transit would operate in one lane in each direction on Market Street. • Market street transit access: Options could be to re-route the bus lines that currently turn onto Market Street into the South of Market area, terminating at the Transbay Terminal (or as close to Transbay as possible) and/or running a frequent (1-2 minute headway) transit shuttle on Market Street.	SPUR

Surface Transit Impacts	Comments Made by
• SOMA transit access: transit priority (rapid transit service) on Mission Street or parallel streets would be evaluated, with consideration of connections to the Transbay Transit Center, Central Subway and Caltrain 4th and King station and 16th Street/24th Street BART stations.	

Pedestrian/Bicycle Facilities Impacts	Comments Made by
Written State Agency Comments	
• Analyze the potential difficulties/hazards to bicyclists/pedestrians on State facilities and their connections as a result of the proposed project. Specifically, the one-way streets near the US 101 on- and off-ramps. • Consider pedestrian, bicycling and transit performance/quality of service measures and modeling as a means of estimating the project impacts to these modes and evaluating mitigation measures and tradeoffs. Analyze secondary impacts that may result from any mitigation from traffic impacts (i.e., pedestrian and bicycle mitigation measures and safety countermeasures that would be needed to maintain and improve access to transit facilities).	Caltrans
Written Regional Transit Agency Comments	
• Convenient access to BART Station entry portals/street elevators should be a primary objective (i.e., relocation of boarding platforms, taxi and ADA van drop-off placement). • Additional portals and/or elevators on Market Street for access and emergency exits.	BART
Written Public Comments	
San Francisco Mode Share Goals and Anticipated Bicycle Volumes • The project should assume that the growth in bicycle trips will happen on Market Street. • Any changes to bicycle circulation on Market (Alternative 3) should be considered in the context of the dramatic increase in the number of bicycle trips on Market. Study the Traffic Safety Benefits of a Fully Continuous Bikeway on Market Street • Take into account the safety impact of protected bikeways for all modes. • The EIR should assume the growth of bicycle trips will happen on Market Street. • Any analysis should take into account the safety impact of protected bikeways for all modes.	SF Bicycle Coalition

Pedestrian/Bicycle Facilities Impacts	Comments Made by
Consider BART & MUNI Entrance Closure or Relocation • Provide a continuous raised bikeway the full length of Market Street irrespective of any future plans for the BART/Muni entrance. Account for future development on the full length of Market Street • Upper Market Street has numerous large residential developments planned/in progress that should be accounted for through the Market and Octavia Area Plan. • The EIR should factor these new residents, their likely transportation choices, and related impacts to bicycle volumes and safety on Market Street as part of the analysis. Surface Transit Volumes and Private Auto Use on Market Street • The dramatic increase in surface transit on Market Street should be studied as a level of service and safety impact for all road users.	
• Design of cycling and transit lanes: Options would be to place the cycle track in the center of the street or to place the transit lane in the center of the street. • This would eliminate the need to build large boarding islands in the middle of the street and would provide of a more appealing waiting area for transit passengers. Additionally, with a curbside transit lane, transit riders would not have to cross cycle traffic to reach transit vehicles. With a center-running cycle track, turn movement space for cycles would need to be carefully designed.	SPUR

Commercial and Passenger Loading Impacts	Comments Made by
Written Public Comments	
• Eliminate taxis from Market Street or allow them to continue to load/unload on Market Street. • Add taxi pickup and drop off locations on the north/south streets crossing Market Street.	SPUR
• Guests need access to designated taxi stands along Market Street, particularly Four Seasons Hotel to ensure that they have accessible/convenient transportation options. • Hotels located on/adjacent to Market Street need adequate space to load/unload supplies/ guests.	Hotel Council of San Francisco

Other Issues	Comments Made by
Written Public Comments	
• A Transportation Management Plan may be required of the developer for approval by Caltrans prior to construction where traffic restrictions/detours affect State highways. • Fully disclose the project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring for mitigation measures. Present this information in a Mitigation Monitoring and Reporting Plan. • Evaluate consistency with the City's General Plan • Any work or traffic control that encroaches onto the State right-of-way (ROW) requires an encroachment permit issued by Caltrans. • A 20-year cumulative scenario is the appropriate horizon. • Include schematic illustrations of traffic conditions.	Caltrans
• Construction activity needs to be reviewed by BART to ensure structural integrity is not compromised nor operational systems adversely impacted. • A BART permit is required for any construction along Market Street that is within the BART/Muni right of way which could affect utilities or structures. • There is potential for adverse impacts during construction with respect to access/egress of riders and to mechanical systems which could be impaired by demolition and construction activities.	BART

Appendix A

Notice of Availability

SAN FRANCISCO
PLANNING DEPARTMENT

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

PUBLIC NOTICE
Availability of Notice of Preparation of Environmental Impact Report and Notice of Public Scoping Meeting

Date:	January 14, 2015
Case No.:	**2014.0012E**
Project Title:	**Better Market Street Project**
Zoning:	Various - Market Street between Octavia Boulevard and The Embarcadero Mission Street between Valencia Street and The Embarcadero, Valencia Street between Market and McCoppin streets and 10th Street between Market and Mission streets
Block/Lot:	Various
Project Sponsor:	San Francisco Department of Public Works Simon Bertrang – 415-558-4045 Simon.bertrang@sfdpw.org
Staff Contact:	Wade Wietgrefe – 415-575-9050 wade.wietgrefe@sfgov.org

The San Francisco Planning Department has issued a notice of preparation (NOP) of an environmental impact report (EIR) and will be conducting a public scoping meeting in connection with this project, pursuant to the requirements of the California Environmental Quality Act. The NOP is available to download in English, Spanish, and Chinese language for public review and comment on the following web page (http://www.sf-planning.org/bmseir). To request that a copy of the document be mailed to you in either Spanish or Chinese, please contact our automated voicemail system for Spanish and Chinese: (415) 575-9010.

中文詢問請電：(415) 575-9010
Para información en Español llamar al: (415) 575-9010

Compact discs and paper copies of the NOP are also available at the Planning Information Center counter on the first floor of 1660 Mission Street, San Francisco. Materials referenced in the NOP are available for review at the Planning Department's office on the fourth floor of 1650 Mission Street (Call (415) 575-9050).

Information about the Better Market Street Project may also be found at the following Web page, http://www.bettermarketstreetsf.org/.

Project Description: The Project sponsor, the San Francisco Department of Public Works (Public Works), in coordination with the Citywide Planning Division of the San Francisco Planning Department and the San Francisco Municipal Transportation Agency (SFMTA), proposes to redesign and provide various transportation and streetscape improvements to the 2.2-mile segment of Market Street between Octavia Boulevard and The Embarcadero (Market Street) and potentially to the 2.3-mile segment of Mission Street between Valencia Street and The Embarcadero, as well as Valencia Street between Market and McCoppin streets and 10th Street between Market and Mission (Mission Street) as part of the proposed Better Market Street Project (Proposed Project). Proposed Project elements consist of both transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic signals; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities.

The EIR will analyze three alternatives. Based on the EIR and other analysis and comment, a project proposal within the range of these alternatives will be proposed for consideration and approval:

- Alternative 1: Market Street (Complete Street and Transit Priority Improvements)
- Alternative 2: Market Street – Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)
- Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission)

Alternatives 1 and 2 include two designs for the bicycle facilities on Market Street, Design Option A and Design Option B. Under Alternatives 1 and 2 Design Option A, an enhanced version of the existing shared vehicle and bicycle lane with painted sharrows (shared lane pavement markings) would be provided at locations where a dedicated bicycle facility is not already present. Under Alternatives 1 and 2 Design Option B, a new raised cycle track (an exclusive bicycle facility that is physically separated from motor traffic and is distinct from the sidewalk for the exclusive or primary use of bicycles) the entire length of Market Street would be provided, except at locations where the Bay Area Rapid Transit (BART)/Muni entrances or other obstructions would not allow it. Alternative 3 includes the proposed bicycle facilities on Market Street described under Alternative 1, Design Option A and adds a cycle track in both directions on Mission Street.

The Planning Department has determined that an EIR must be prepared for the Proposed Project prior to any final decision regarding whether to approve the project. The purpose of the EIR is to provide information about potential significant physical environmental effects of the Proposed Project, to identify possible ways to minimize the significant effects, and to describe and analyze possible alternatives to the Proposed Project. Preparation of an NOP or EIR does not indicate a decision by the City to approve or to disapprove the project. However, prior to making any such decision, the decision makers must review and consider the information contained in the EIR.

The Planning Department will hold a **PUBLIC SCOPING MEETING** on **Wednesday, February 4, 2015 with doors opening at 5:30 pm followed by presentation and public comment at 6:00 pm at 1455 Market Street, Ground Floor Lobby Conference Room, San Francisco**. The purpose of this meeting is to receive oral comments to assist the Planning Department in reviewing the scope and content of the environmental impact analysis and information to be contained in the EIR for the project. To request a language interpreter or to accommodate persons with disabilities at the scoping meeting, please contact the staff contact listed above at least 72 hours in advance of the meeting. Written comments will also be accepted until 5:00 p.m. on **Friday, February 13, 2015**. Written comments should be sent to Sarah B. Jones, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103. Referenced materials are available for review at the Planning Department's office on the fourth floor of 1650 Mission Street. (Call (415) 575-9050).

If you work for an agency that is a Responsible or a Trustee Agency, we need to know the views of your agency as to the scope and content of the environmental information that is relevant to your agency's statutory responsibilities in connection with the Proposed Project. Your agency may need to use the EIR when considering a permit or other approval for this project. We will also need the name of the contact person for your agency. If you have questions concerning environmental review of the Proposed Project, please contact Wade Wietgrefe at (415) 575-9050.

Members of the public are not required to provide personal identifying information when they communicate with the Commission or the Planning Department. All written or oral communications, including submitted personal contact information, may be made available to the public for inspection and copying upon request and may appear on the Planning Department's website or in other public documents.

Appendix B

Notice of Preparation

SAN FRANCISCO
PLANNING DEPARTMENT

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT AND NOTICE OF PUBLIC SCOPING MEETING

Date:	January 14, 2015
Case No.:	**2014.0012E**
Project Title:	**Better Market Street Project**
Zoning:	Various –Market Street between Octavia Boulevard and The Embarcadero Mission Street between Valencia Street and The Embarcadero and Valencia Street between Market and McCoppin streets and 10th Street between Market and Mission streets
Block/Lot:	Various
Lot Size:	Various
Project Sponsor:	San Francisco Department of Public Works Simon Bertrang – 415-558-4045 simon.bertrang@sfdpw.org
Lead Agency:	San Francisco Planning Department, Environmental Planning Division (CEQA)
Staff Contact:	Wade Wietgrefe – 415-575-9050 wade.wietgrefe@sfgov.org

PROJECT OVERVIEW

The Project sponsor, the San Francisco Department of Public Works (Public Works), in coordination with the Citywide Planning Division of the San Francisco Planning Department and the San Francisco Municipal Transportation Agency (SFMTA), proposes to redesign and provide various transportation and streetscape improvements to the 2.2-mile segment of Market Street between Octavia Boulevard and The Embarcadero (Market Street) and potentially to the 2.3-mile segment of Mission Street between Valencia Street and The Embarcadero, as well as Valencia Street between McCoppin and Market streets and 10th Street between Market and Mission streets (Mission Street) as part of the proposed Better Market Street Project (Proposed Project). Proposed Project elements consist of both transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic signals; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities.

The EIR will analyze three possible alternatives for the Proposed Project. Alternatives 1 and 2 involve the redesign and improvement of Market Street only, while Alternative 3 would redesign and improve Mission Street in addition to providing the Alternative 1 improvements to Market Street. Alternatives 1 and 2 each have two design options for bicycle facilities on Market Street. The three Proposed Project alternatives and design options are described more fully under *Project Description*. **Figure 1** shows the Proposed Project location.

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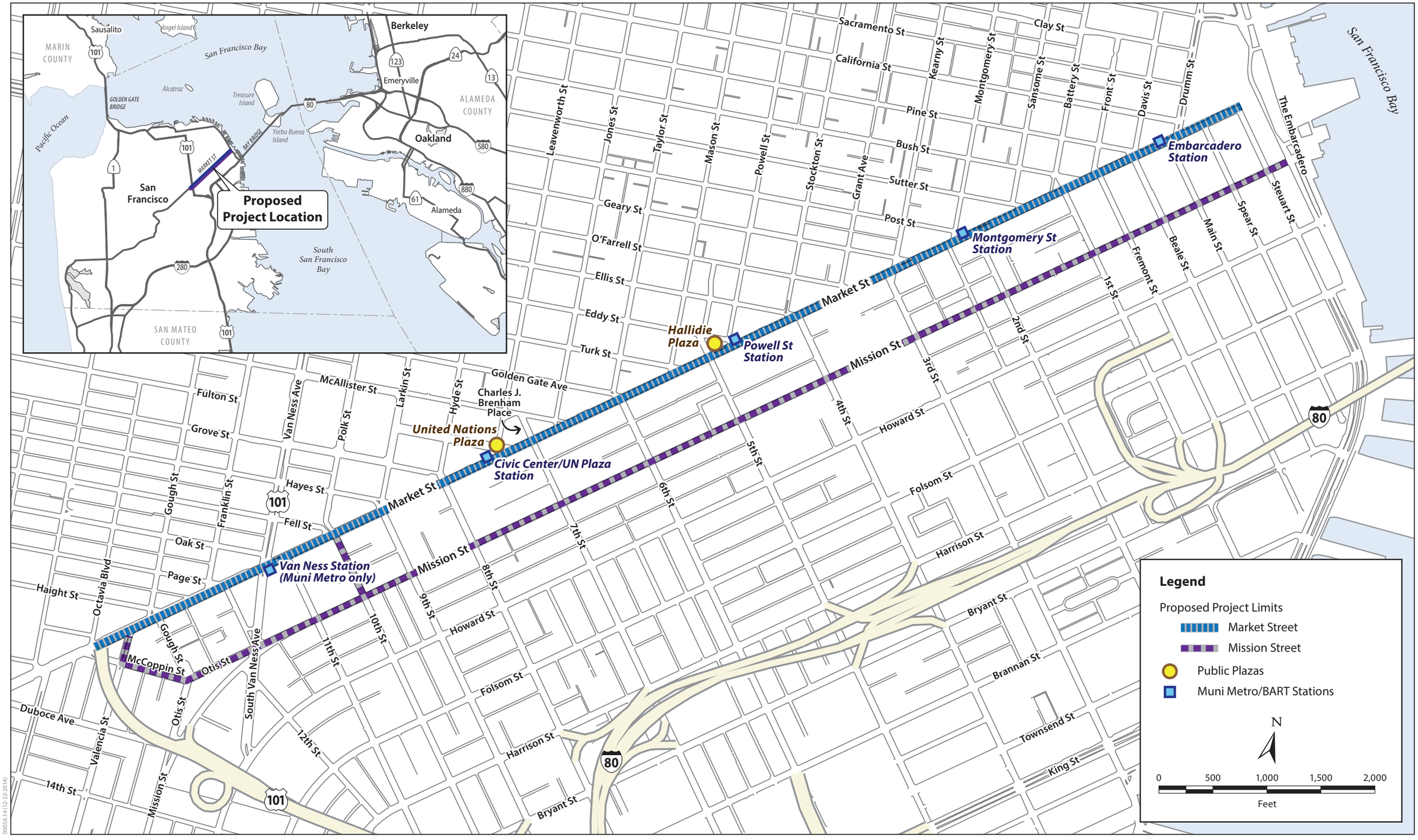

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Better Market Street Project
Case No. 2014.0012E

Figure 1
Proposed Project Location

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The purpose of the Proposed Project is to:

1. Better serve transit riders by implementing transit priority improvements and increasing surface transit capacity, speed, reliability, and accessibility;
2. Support the City of San Francisco's planned growth and economic development by redesigning Market Street to enhance its role as the City's cultural, civic, and commercial center;
3. Improve pedestrian accessibility, safety, and mobility on Market Street;
4. Encourage ongoing growth in bicycle use by providing safer bicycle facilities along one of the primary bicycle thoroughfares in the City; and
5. Maintain access for taxis and paratransit and accommodate commercial vehicle deliveries within the Project corridor.

PROJECT DESCRIPTION

The Proposed Project would redesign and provide various transportation and streetscape improvements on Market Street and potentially on Mission Street.

The EIR will analyze three alternatives. Based on the EIR and other analysis and comment, a project proposal within the range of these alternatives will be proposed for consideration and approval:

- Alternative 1: Market Street (Complete Street and Transit Priority Improvements)
- Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)
- Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission)

Alternatives 1 and 2 include two designs for the bicycle facilities on Market Street, Design Option A and Design Option B. Under Alternatives 1 and 2 Design Option A, an enhanced version of the existing shared vehicle and bicycle lane with painted sharrows (shared lane pavement markings) would be provided at locations where a dedicated bicycle facility is not already present. Under Alternatives 1 and 2 Design Option B, a new raised cycle track (an exclusive bicycle facility that is physically separated from motor traffic and is distinct from the sidewalk for the exclusive or primary use of bicycles) the entire length of Market Street would be provided, except at locations where the Bay Area Rapid Transit (BART)/Muni entrances or other obstructions would not allow it. Alternative 3 includes the proposed bicycle facilities on Market Street described under Alternative 1, Design Option A and adds a cycle track in both directions on Mission Street.

Table 1 summarizes the elements of the three alternatives and their design options, including changes to the roadway configuration; private vehicle access; traffic signals; surface transit including transit-only lanes, stop spacing, service, stop locations, stop characteristics, and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities. **Figure 2** illustrates the conceptual designs for each alternative and design option.

TABLE 1. SUMMARY OF PROPOSED PROJECT ALTERNATIVES[1]

Proposed Project Element	Alternative 1: Market Street (Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Roadway Configuration	Generally, two center lanes and two curb lanes between Franklin and Main streets (more than four lanes west of Franklin Street and only three lanes east of Main Street).	Same as Design Option A except new one-way raised cycle tracks in each direction between the curb side lanes and sidewalks.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Generally, two vehicle travel lanes with right-turn pockets at intersections. Separated bicycle facility in both directions and a floating parking lane (located between travel lane and new cycle track) on one side of the street.
Private Vehicle Access	Full private vehicle restrictions: Public transit, taxis, emergency vehicles, commercial vehicles, paratransit vehicles, and bicycles would have full access to curb lanes but other private vehicles would be prohibited between Steuart Street and Van Ness Avenue westbound and between 10th and Main streets eastbound. Existing required right-turn regulations on Market Street would also remain.		Moderate private vehicle restrictions: All private vehicles would continue to be allowed on the majority of the length of Market Street. New turn restrictions and required right-turn regulations could be added to the existing required right-turns at 6th and 10th streets.		No new private vehicle restrictions on Mission Street.
Traffic Signals	Signal timing modifications and replacements, which could include new turn signals and bicycle signals.				Signal timing modifications, which could include new turn signals and bicycle signals.

Proposed Project Element	Alternative 1: Market Street (Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Surface Transit (Transit-Only Lanes)	Transit-only lanes would be extended between 12th and Davis streets in the westbound (outbound) direction and between 12th and Main streets in the eastbound (inbound) direction – only transit and emergency vehicles would be allowed to use transit-only lanes.				The existing transit-only lanes on Mission Street would be removed.
Surface Transit (Stop Spacing and Service)	Modified transit stop spacing and new stop locations to provide both rapid service with the limited stop/express bus routes (i.e., 5L, 9L, 16X, 38L, 71L) and the F Line, and local service through the local bus routes (i.e., 2, 5, 6, 9, 19, 21, 31, 38).				All Muni, Golden Gate Transit, and SamTrans transit service would be moved to Market Street (except during Market Street event days and during unexpected events that close Market Street and those routes that would serve the new Transbay Transit Center).
Surface Transit (Stop Location)	New and relocated curbside stops and new center transit boarding islands. Modified stops would consist of 16 curb (curbside or near-curb) stops (7 inbound, 9 outbound) and 13 center boarding island stops (8 inbound and 5 outbound).	New near-curb transit boarding islands adjacent to the new cycle track and new center boarding islands. Modified stops would consist of 16 curb (curbside or near-curb) stops (7 inbound, 9 outbound) and 13 center boarding island stops (8 inbound and 5 outbound).	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Remove existing bus stops except as described above to serve new Transbay Transit Center; provide temporary bus stops for transit service rerouted to Mission Street during Market Street event days and during unexpected Market Street closures.

Proposed Project Element	Alternative 1: Market Street (Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Surface Transit (Stop Characteristics)	Transit boarding island enhancements and expansion (length and width).				Remove existing bus stops; provide temporary bus stops for transit service rerouted to Mission Street during Market Street events and during unexpected Market Street closures.
Surface Transit (Infrastructure)	Full replacement of existing Muni streetcar rail tracks to maintain state of good repair; minor adjustment to location of existing streetcar rail tracks at limited locations; replacement of traction power system and Overhead Contact System (i.e., overhead wires) to maintain state of good repair and provide additional capacity; construction of Muni F Line track loop running one-way westbound along McAllister Street between Market Street and Charles J. Brenham Place and one-way southbound along Charles J. Brenham Place between McAllister and Market streets.				Maintenance and adjustment of Overhead Contact System on Mission Street to allow use during Market Street event days and during unexpected Market Street closures.
Bicycle Facilities	Improved shared lane painted with sharrows (i.e., bicycles share widened curb lanes with vehicular traffic) except at locations where existing separated bicycle facilities already exist (i.e., existing cycle track with buffer [posts] and bicycle lanes would remain).	New raised cycle track: bicycles would be vertically separated from vehicular traffic (i.e., the new cycle track would be slightly higher than the vehicle traffic road bed).	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	New buffered cycle track on Mission Street: bicycles would be horizontally separated from vehicular traffic by a painted or physical buffer. New buffered cycle track on McCoppin Street and new contra-flow bicycle lane on Otis Street in the eastbound direction to provide bicycle network connection between Valencia and Mission streets. New cycle track connection on Valencia and 10th streets to connect bicycle facilities on Market and Mission streets.

Proposed Project Element	Alternative 1: Market Street (Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Pedestrian Facilities (Sidewalk Width)	Generally maintain existing sidewalk widths, except where the sidewalks would be narrowed (i.e., move existing curb) at locations to allow for wider center transit boarding islands or a wider shared lane; widened sidewalk at some locations.	Narrow sidewalks (i.e., move existing curb) as needed to accommodate new raised cycle track and wider center transit boarding islands; widened sidewalk at some locations.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Limited changes to sidewalk widths, except between 5th and 3rd streets where widening may occur.
Streetscapes (Elements)	Primarily 15- to 20-foot-wide unobstructed through-zones for pedestrians on sidewalks (except for 10-foot-wide through-zones west of Van Ness Avenue); new paving throughout, including complete replacement of bricks; additional bench seating, landscaping, pedestrian wayfinding signs, public art, and other elements along curb within Streetlife Zones and Streetlife Hubs.				Limited changes to streetscape, except installation of new bicycle racks.
Streetscapes (Trees)	Removal or relocation of trees limited to locations where sidewalk would be narrowed.	Removal or relocation of trees throughout where sidewalk would be narrowed to accommodate new raised cycle track.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Healthy street trees would remain while unhealthy street trees would be replaced. Planting new street trees in locations where there are existing tree wells and gaps.

Proposed Project Element	Alternative 1: Market Street (Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Streetscapes (Path of Gold Light Standards)	Relocation of light standards in limited locations where sidewalk would be narrowed.	Relocation of light standards throughout where sidewalk would be narrowed to accommodate new raised cycle track.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Not applicable.
Commercial and Passenger Loading	No loading would be allowed on Market Street with the exception of paratransit users. All loading zones on Market Street would be removed, and new commercial and passenger active loading zones would be created on adjacent cross streets and alleys.		Limited loading would be allowed on Market Street. Some loading zones on Market Street would remain, and some commercial and passenger active loading zones would be created on adjacent cross streets and alleys. Paratransit loading would continue to be allowed.		Limited loading allowed on one side of Mission Street in the floating parking lane (located between travel lane and new cycle track). Some new commercial and passenger active loading zones created on adjacent cross streets and alleys.
Vehicular Parking	No parking allowed on Market Street (i.e., existing parking spaces west of Franklin Street and east of Spear Street would be removed); removal of some parking spaces temporarily or permanently on cross streets and alleys to accommodate relocated loading zones.				One floating parking lane (located between travel lane and new cycle track) on most blocks of Mission Street. Valencia, McCoppin, Otis, and 10th streets would have parking removed to accommodate the new bicycle facilities.

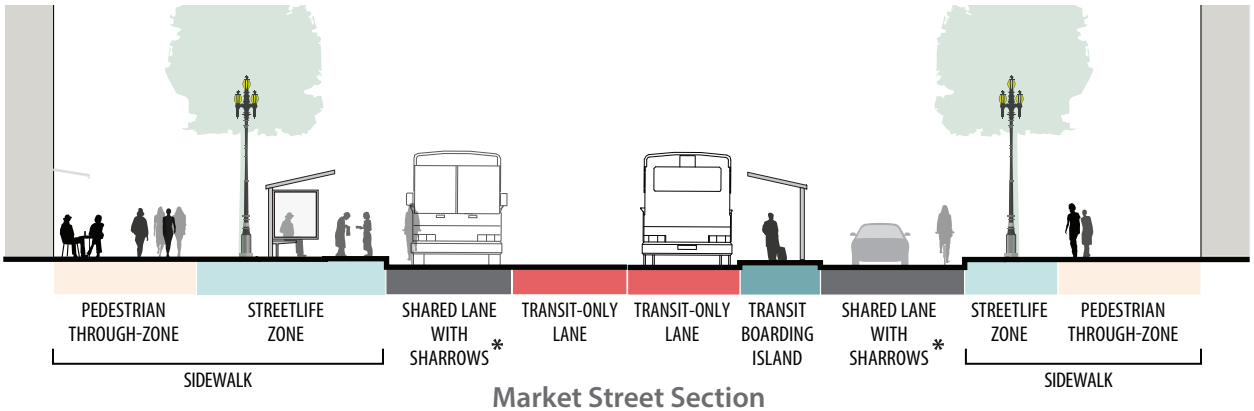
Proposed Project Element	Alternative 1: Market Street (Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Plazas	United Nations Plaza - Conceptual plans envision filling the existing fountain and creating a new outdoor pavilion with seating, a new stage, and new trees and other streetscape elements. Hallidie Plaza – Conceptual plans envision reconstructing the entire area by raising the sunken area to connect the plaza to street grade and repaving the plaza to add a new outdoor pavilion, tourist information center, and outdoor seating. The area beneath the new raised Hallidie Plaza would continue to provide transit access to the Powell Station for the underground Muni Metro and BART service.				Not applicable.
Utilities	Replacement of existing wastewater sewer lines beneath Market Street; targeted replacement of water lines and auxiliary water supply system lines as required to maintain state of good repair; targeted replacement of electrical and other utility infrastructure to maintain state of good repair.				No change to existing utilities.

Source: Public Works, Citywide Planning Division of the San Francisco Planning Department, SFMTA. 2014.

[1] The table summarizes the three alternatives and their design options. Please refer to the subsequent text and **Figure 2** for a more detailed description of changes and definitions of terms.

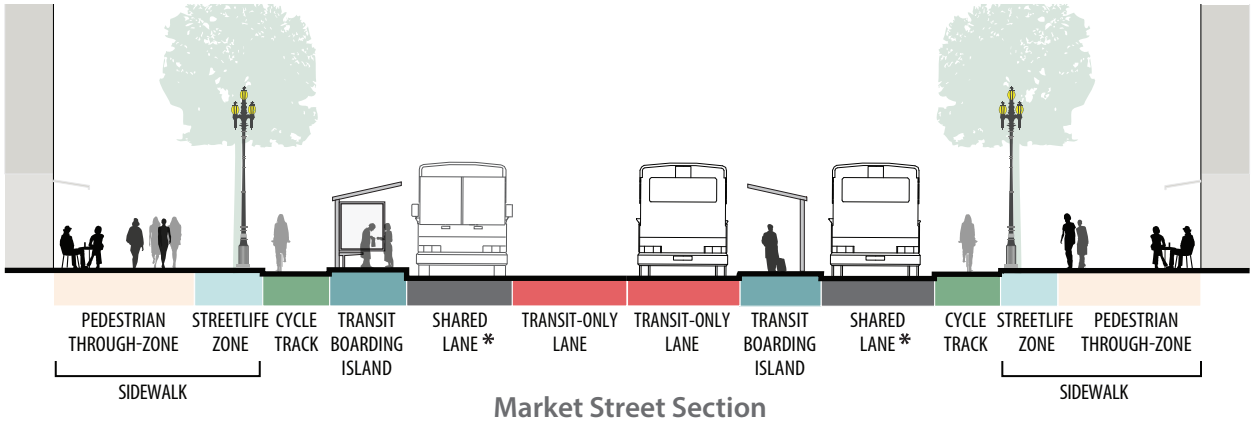
Alternative 1: Market Street (Complete Street and Transit Priority Improvements)
Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)

Design Option A



Market Street Section

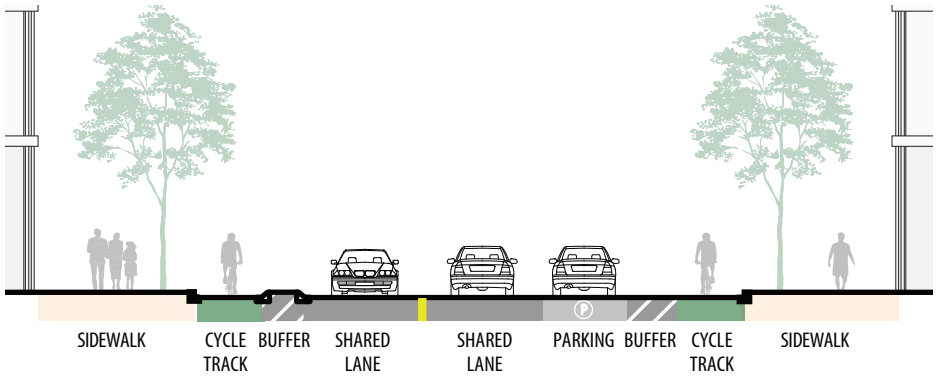
Design Option B



Market Street Section

* Under Alternative 1, the shared lane would include transit, taxis, commercial vehicles, paratransit vehicles and vehicles with ADA placards or plates. Under Alternative 2, the shared lane would also allow all other private vehicles.

Alternative 3: Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission)**



Mission Street Section

** Alternative 3 includes the same improvements to Market Street as Alternative 1, Design Option A.

Source: San Francisco Department of Public Works 2014.

Not to Scale

00056.14 (10-8-2014)

Better Market Street Project
Case No. 2014.0012E

Figure 2
Proposed Project—Conceptual Illustrations

EXISTING CONDITIONS

Roadway Configuration and Private Vehicle Access

In the South of Market area, streets that run in the northwest/southeast direction (e.g., 2nd, 3rd, and 4th streets) are generally considered north-south streets, whereas streets that run in the southwest/northeast direction (e.g., Market and Mission streets) are generally considered east-west streets.

Market Street

In general, four travel lanes exist on Market Street between Van Ness Avenue and Main Street. The blocks between Main and Steuart streets have three travel lanes. West of Van Ness Avenue, Market Street widens to as many as seven travel lanes to allow for left turn lanes north onto Franklin Street and south onto Valencia Street.

Private vehicles travelling in the eastbound direction on Market Street are required to turn right at 10th and 6th streets. Except for the transit only-lanes (see the *Surface Transit* section below for more detail), private vehicles are currently allowed to travel on Market Street. Left turn movements from Market Street are prohibited for private vehicles, except at Valencia Street in the westbound direction and Franklin and Drumm streets in the eastbound direction.

Existing bicycle facilities on Market Street include dedicated lanes and shared lanes marked with sharrows (pavement markings to indicate that the travel lane is shared with bicyclists), depending upon location (see the *Bicycle Facilities* section below for more detail).

Mission Street

The Mission Street corridor, as discussed in this document, includes portions of McCoppin, Otis, Valencia, and 10th streets. McCoppin Street terminates at the Central Freway to the west and Mission Street to the east. McCoppin Street has two travel lanes and two parking lanes. Otis Street terminates to the west and east at Mission Street. Otis Street has four travel lanes and two parking lanes. Valencia Street between Market and McCoppin streets has two travel lanes and one parking lane in each direction. Between Market and Mission streets, 10th Street has four travel lanes (one-way southbound) and one parking lane. In general, four travel lanes and two parking lanes exist on Mission Street. Except for in the transit only-lanes (see the *Surface Transit* section below for more detail), private vehicles are currently allowed to travel on Mission Street. Left turn movements from Mission Street are prohibited for private vehicles except at Steuart, Spear, Main, and Beale streets.

Existing bicycle facilities on Mission Street include a shared lane marked with sharrows in some locations (see the *Bicycle Facilities* section below for more detail). McCoppin and Otis streets have an existing bicycle lane in the westbound direction. Valencia Street has an existing bicycle lane in each direction between Market and McCoppin streets. No bicycle facilities exist on 10th Street between Market and Mission streets.

Traffic Signals

Market and Mission streets have traffic signals at most intersections.

Surface Transit

Market Street

Transit-only center lanes for surface public transit, taxis, and emergency vehicles exist between 8th Street and Van Ness Avenue in the westbound (outbound) direction and between 12th and 5th streets in the eastbound (inbound) direction. The transit-only lanes operate 24 hours a day, 7 days a week. Streetcar rail tracks exist in both directions on Market Street, serving the center lanes between Octavia Boulevard and Steuart Street.

Muni operates 18 bus routes and one streetcar line (F Line) along the surface of Market Street within the Proposed Project area (note: some bus routes travel upon, but do not stop on Market Street). Most of these surface transit routes and single line serve at least one of 17 curbside stops (8 inbound, 9 outbound) and 23 center boarding island stops (12 inbound, 11 outbound) within the Proposed Project area.

Mission Street

Transit-only lanes are generally in the curb lane in both directions on Mission Street, but vary by location and time of day. Parking on the portions of Mission Street with transit-only lanes is prohibited during specified peak hours. During nonpeak hours, transit vehicles share the two outside lanes with private vehicles and parking at the curb is generally allowed.

Muni operates three bus routes (14, 14L and 14X) along Mission Street between San Jose Avenue and Steuart Street. In addition, Golden Gate Bridge Highway and Transportation District (Golden Gate Transit) operates four routes and the San Mateo County Transit District (SamTrans) operates three routes along Mission Street within the Proposed Project area. Each of these transit routes serve at least one of the 24 curbside stops (11 inbound, 13 outbound) within the Proposed Project area.

Bicycle Facilities

Market Street

Existing bicycle facilities on Market Street include dedicated bicycle facilities, which vary from a cycle track with safe hit posts to a bicycle lane, between Gough Street and half-way between 9th and 8th streets in the eastbound direction and between 8th Street and Octavia Boulevard in the westbound direction. Sharrows are painted in the curb lanes at all other locations on Market Street to indicate that bicycles and vehicles share these lanes. Nine Bay Area Bike Share pods are located along Market Street. Bicycle racks are also located at a number of locations along Market Street.

Mission Street

McCoppin and Otis streets have an existing bicycle lane in the westbound direction. Valencia Street has an existing bicycle lane in each direction between Market and Mission streets. No bicycle facilities exist on 10th Street between Market and Mission streets. Mission Street has painted sharrows between 11th Street and South Van Ness Avenue and between The Embarcadero and Steuart Street in the westbound direction. Bicycle racks are located at numerous locations along Mission Street.

Pedestrian Facilities and Streetscapes

Market Street

Existing sidewalks on Market Street are generally wider (between 25 feet and 35 feet) east of Van Ness Avenue and narrower (closer to 15 feet) west of Van Ness Avenue. Market Street sidewalks are constructed of red bricks and have an 18-inch granite curb separating them from the roadway. Many sidewalk crossings do not contain ADA-compliant curb ramps.

A number of objects are located on the existing sidewalks, including trees, signage, newspaper kiosks and boxes, flower stands, public art, bicycle racks, self-cleaning bathrooms, advertising signs, bollards with chains at several intersection crossings, and the Path of Gold Light Standards. The Path of Gold Light Standards are decorative light poles with a three-part top, each of which contains a light globe. The Path of Gold Light Standards are a designated historic landmark identified under Article 10 of the Planning Code (Landmark No. 200) and are located between 1 Market Street and 2490 Market Street.

Mission Street

Existing sidewalks on Mission Street are narrower than on Market Street (approximately 9 to 15 feet wide within the Proposed Project area) and are generally constructed of poured-in-place concrete slabs.

Commercial and Passenger Loading

Market Street

Market Street has a limited number of designated on-street commercial and passenger loading bays. A limited number of curb cuts exist on Market Street, allowing access to off-street parking and loading facilities.

Mission Street

Mission Street has time-of-day designated on-street commercial and passenger loading zones. Some driveways currently exist along Mission Street, allowing access to off-street parking or loading facilities.

Vehicular Parking

Existing on-street metered parking is limited to a few locations on Market Street and is available on most blocks along the Mission Street corridor.

Plazas

Two existing public plazas are located adjacent to the north side of Market Street right-of-way: United Nations Plaza is located between Hyde Street and Charles J. Brenham Place; Hallidie Plaza is located between Cyril Magnin and Powell streets.

Utilities

Existing utilities along Market Street that may be affected by the Proposed Project include a brick sewer line beneath Market Street, electrical components for the streetcar Overhead Contact System, electrical conduits for the Path of Gold Light Standards and traffic signals, and other subsurface utilities beneath the Market Street right-of-way. Fire hydrants, including large fire hydrants that are part of the auxiliary water supply system (AWSS) installed following the 1906 earthquake, could also be affected by the Proposed Project.

ALTERNATIVE 1

Roadway Configuration

In general, Alternative 1 would continue to provide four travel lanes on Market Street (two center lanes and two curb lanes between Franklin and Main streets). More than four lanes west of Franklin Street and only two or three lanes east of Main Street would be provided. Alternative 1 could include a reconfiguration of some intersections, including the addition of new curb bulbouts.

With Design Option A, the existing separated bicycle facility on Market Street would remain in place. Along the rest of Market Street in the Project area, the existing shared lane painted with sharrows would be widened wherever possible, except where not feasible because of obstructions such as BART portals.

With Design Option B, a new one-way raised cycle track for bicycles would be constructed between the curb lanes and sidewalks on each side of Market Street, except where not feasible because of obstructions such as BART portals. **Figure 2** illustrates the typical roadway configuration under both design options.

Private Vehicle Access

Public transit vehicles would be permitted on the entire length of Market Street within the Project corridor. In addition to public transit vehicles, only commercial vehicles, taxis, emergency vehicles, paratransit vehicles, and bicycles would be permitted on Market Street between 10th and Main streets in the eastbound direction and between Steuart Street and Van Ness Avenue in the westbound direction. Drivers of other private vehicles (i.e., all private vehicles except commercial vehicles, taxis, paratransit vehicles, and bicycles) would be diverted to other streets in the area. These restrictions would be in place 24 hours per day, 7 days per week.

Drivers would be alerted to the vehicle restrictions through a variety of means, including education, wayfinding (e.g., signage), and enforcement. Changes to circulation on streets near Market Street would divert traffic. Circulation changes could include converting portions of streets that intersect Market Street from one-way to two-way, changing the direction of one-way streets and/or partial street closure.

Existing required right-turn regulations on Market Street would remain.

Traffic Signals

Under either design option, Alternative 1 would modify, replace, and potentially add traffic signals at Market Street intersections. Modifications would include adjustments to traffic signal timing for Market Street and could include new right-turn signals and bicycle signals. Replacement of traffic signal poles would also be required. New traffic signals could be added at intersections where existing traffic signals do not currently exist (e.g., 11th Street, Steuart Street).

Surface Transit

Under either design option, Alternative 1 would include multiple changes to surface transit on Market Street in order to further prioritize transit. The transit-only center lanes on Market Street would be extended (as indicated below in the *Transit-Only Lanes* discussion below); these lanes would be reserved for public surface transit and emergency vehicles only. Descriptions of transit-only lanes, stop spacing and service, stop location, stop characteristics, and infrastructure are provided below.

- **Transit-Only Lanes**: Under either design option, Alternative 1 would extend transit-only center lanes between 12th and Davis streets in the westbound (outbound) direction and between 12th and Main streets in the eastbound (inbound) direction. The existing and extended transit-only lanes would be reserved for public surface transit and emergency vehicles only (i.e., taxis would not be permitted in transit-only lanes along Market Street).
- **Stop Spacing and Service**: Under either design option, Alternative 1 would modify existing transit stops on Market Street. A new system of transit stop spacing and locations would be instituted to create a set of rapid stops in the center transit-only lanes and a set of local stops in the curbside lanes. The rapid stops would be used by limited stop/express bus routes 5L, 9L, 16X, 38L, and 71L and the F Line; the local stops would be used by the local bus routes 2, 5, 6, 9, 19, 21, 31, and 38. The rapid services would only stop at new transit boarding islands located near existing Muni Metro and BART stations on Market Street between Van Ness Avenue and Fremont Street. Local routes would stop more frequently than the rapid routes.
- **Stop Location**: Under Alternative 1, Design Option A, transit routes and the F Line would serve at least one of the new or relocated 16 curbside stops (7 inbound, 9 outbound) and 13 new center boarding island stops (8 inbound, 5 outbound) along Market Street.

  Under Alternative 1, Design Option B, transit routes and the F line would serve the same number of stops along Market Street as under Design Option A; however, the curbside stops would be curbside transit boarding *island* stops because the new raised cycle track would be constructed between the new curbside islands and the sidewalk.
- **Stop Characteristics**: Under either design option, Alternative 1 would increase the length and width of the relocated or replaced center transit boarding islands along Market Street to meet Americans with Disabilities Act (ADA) accessibility standards. This would include the addition of wheelchair accessible ramps to serve the F Line. Alternative 1 would add amenities such as bus shelters to the center boarding islands.
- **Infrastructure**: Under either design option, Alternative 1 would change the surface transit infrastructure. Changes would consist of replacement and/or upgrade of the existing streetcar rail tracks, the traction power system, and the Overhead Contact System (i.e., overhead wires) on Market Street to maintain state of good repair and provide additional capacity. Replacement of the traction power system and Overhead Contact System would involve replacing and upgrading all substation equipment, conduits and transformers, and power circuits. In addition, the Proposed Project would construct a new F Line track loop running one-way westbound along McAllister Street between Market Street and Charles J. Brenham Place and one-way southbound along Charles J. Brenham Place between McAllister and Market streets. None of the Proposed Project alternatives would make changes to BART or Muni Metro lines beneath Market Street.

Bicycle Facilities

Under Alternative 1, Design Option A, the existing separated bicycle facility would remain. At locations where a separated facility does not currently exist, the existing shared lane painted with sharrows would be widened to 15 feet where feasible.

Under Alternative 1, Design Option B, a new, approximately 5- to 7-foot-wide cycle track would be constructed on Market Street in each direction between the curb lanes and sidewalk. The new cycle track would be slightly raised above the adjacent curb lanes and could have different paving patterns or material to help identify the designated space for bicycles. At curbside transit stops, the new cycle track would be placed between a curbside transit boarding island and the sidewalk. **Figure 2** illustrates the bicycle facilities considered under each design option.

Under either design option, Alternative 1 would include new bicycle racks installed on the sidewalks along Market Street (i.e., within the Streetlife Zone areas, described in the *Streetscapes* section). Covered bicycle parking or bicycle storage also could be installed in areas with wider sidewalk width, such as at Streetlife Hubs.

Pedestrian Facilities

- **Sidewalk Width:** Alternative 1 would provide several changes to Market Street sidewalks. Design Option A would retain the majority of the existing sidewalk widths along Market Street, with limited sidewalk narrowing to allow for the construction of wider transit boarding islands and widened shared lanes adjacent to curbside bus stops. Design Option B would narrow the sidewalk on Market Street to allow for the construction of wider transit boarding islands and the new raised cycle track, which would require moving the existing curb inward.

  ADA-compliant curb ramps would be added. Numerous pedestrian bulbouts at intersections along and adjacent to Market Street would be added to shorten pedestrian crossing distances and improve pedestrian visibility. Alternative 1 would also add, relocate, or remove certain crosswalks at appropriate locations.

Streetscapes

- **Elements:** Under either design option, Alternative 1 would design the sidewalks east of Van Ness Avenue to generally provide a 15-foot-wide, unobstructed through-zone for pedestrians, wherever possible. In some sidewalk locations (e.g., the blocks between 5th Street and Grant Avenue), this unobstructed through-zone could be up to 20 feet wide. West of Van Ness Avenue, the sidewalk through zone would be designed to be approximately 10 feet wide.

  The curbside portion of the sidewalk would be designed as Streetlife Zones. Streetlife Zones would be located along the entire length of Market Street between the through-zone and the curb. Streetlife Zones would be wider to the east of Van Ness Avenue where the sidewalks are wider. Streetlife Zones would concentrate the objects (i.e., street furniture, trees, bicycle racks, wayfinding signs, and lighting) on the sidewalk into a band near the curb, leaving the space adjacent to the buildings as a pedestrian through zone. Streetlife Hubs would be located within the Streetlife Zones in areas where the sidewalk is wider and in which more prominent streetscape elements (e.g., kiosks, cafés, public art, or interactive installations) could be featured.

  Market Street's existing brick sidewalks would be replaced with a new paving material or materials.

- **Trees:** Under Alternative 1, Design Option A, trees would be removed or relocated in limited areas where the sidewalk would be narrowed to allow for the construction of wider transit boarding islands and widened shared lanes adjacent to curbside bus stops. Under Alternative 1,

Design Option B, trees would be removed or relocated where the sidewalk would be narrowed to allow for construction of the new raised cycle track. Under either design option, trees deemed unhealthy, hazardous or in conflict with Proposed Project design would be removed and replaced.

- **Path of Gold Light Standards:** Under Alternative 1, Design Option A, the Path of Gold Light Standards would be relocated near existing light standard locations on the sidewalk in limited areas where the sidewalk would be narrowed to allow for the construction of wider transit boarding islands and widened shared lanes adjacent to curbside bus stops. Under Alternative 1, Design Option B, the Path of Gold Light Standards would be relocated where the sidewalk would be narrowed to allow for the construction of the new raised cycle track.

Commercial and Passenger Loading

Under either design option, Alternative 1 would prohibit commercial and passenger loading on Market Street, with some exceptions. Where possible, commercial and passenger loading zones would be established on the first half-block of the cross streets north and south of Market Street and would be designated as active loading zones only (i.e., a vehicle may be stopped in the loading zone only during active loading of commercial goods or passengers). Paratransit vehicles would be able to pick up and drop off passengers on Market Street. Depending on location, a loading bay on Market Street would be considered for buildings without alley access or without an entry point within 250 feet of a cross street loading zone.

Vehicular Parking

Under either design option, Alternative 1 would remove the existing on-street parking on Market Street (i.e., existing parking spaces west of Franklin Street and east of Spear Street). The additional loading zones on cross streets and alleys described in the *Commercial and Passenger Loading* section could result in permanent or temporary (i.e., time-of-day restricted) removal of parking spaces.

Plazas

Under either design option, Alternative 1 would include the option of reconstruct United Nations Plaza (UN Plaza) and Hallidie Plaza. The conceptual plans for UN Plaza envision filling in the existing fountain and creating a new outdoor pavilion with seating; a new stage; and new trees and other streetscape elements. The conceptual plans for Hallidie Plaza envision reconstructing the entire area by raising the sunken area to connect the plaza to street grade and repaving the plaza to add a new outdoor pavilion, tourist information center, and outdoor seating. The area beneath the new raised Hallidie Plaza would continue to provide transit access to the Powell Station for the underground Muni Metro and BART service. In addition new streetscape elements could be provided at Hallidie Plaza.

Utilities

Under either design option, Alternative 1would include the replacement and/or relocation of existing sewer lines beneath Market Street. The alternatives would also include targeted replacement and/or relocation of water lines, fire hydrants, and auxiliary water supply system (AWSS) lines, including AWSS fire hydrants, along Market Street, and electrical and other utility infrastructure to maintain state-of-good repair. The new, replacement utility lines would be the same size as the existing lines and no additional

capacity would be provided. Alternative 1 would also relocate other subsurface utilities to make way for the various improvements.

ALTERNATIVE 2

Changes to roadway configuration, traffic signals, surface transit, bicycle facilities, pedestrian facilities, streetscapes, vehicular parking, plazas, and utilities on Market Street would have the same characteristics as described under Alternative 1. Changes to private vehicle access and commercial and passenger loading under Alternative 2 are described below.

Private Vehicle Access

Alternative 2 would have fewer restrictions on private vehicles traveling on Market Street than Alternative 1 would have. Public surface transit access would remain along the entirety of Market Street. All private vehicles would continue to be allowed on the majority of the length of Market Street except at locations where required right-turn regulations are proposed or where existing required right-turn regulations are present (e.g., 6th and 10th streets). At these locations, all surface transit and taxi traffic could continue traveling on Market Street, while all private vehicular traffic would be diverted from Market Street.

Commercial and Passenger Loading

Under Alternative 2, a limited number of commercial and passenger active loading zones on Market Street would remain. Alternative 2 would include the same additional loading zones on the cross streets and alleys that Alternative 1 would provide. The same exceptions described under Alternative 1 related to vehicles providing accessible services and businesses without alley or cross street access would apply.

ALTERNATIVE 3

Changes to roadway configuration, private vehicle access, traffic signals, surface transit, bicycle facilities, pedestrian facilities, streetscapes, commercial and passenger loading, vehicular parking, plazas, and utilities on Market Street would have the same characteristics as described under Alternative 1, Design Option A. Changes to Mission Street under Alternative 3 are described below.

Roadway Configuration

Mission Street would be reconfigured to include a travel lane in each direction with turn pockets at intersection corners. In addition, a buffered cycle track in each direction would be constructed. One floating parking lane would be constructed on one side of the street per block (i.e., the parking lane would be located between the travel lane and new cycle track), alternating between the north and south sides of the street as appropriate. Otis Street between South Van Ness Avenue and Gough Street generally would have two westbound traffic lanes, a westbound transit-only lane, the existing westbound bicycle lane, and a new contra-flow, parking-buffered cycle track in the eastbound direction. McCoppin Street would generally have a travel lane in each direction, the existing westbound bicycle lane, and a new eastbound cycle track. Valencia Street between McCoppin and Market streets would maintain two travel lanes in each direction, with a new cycle track connection between the Market and Mission streets facilities. Four travel lanes would remain on 10th Street between Market and Mission streets and a new cycle track connection also would be added to connect the bicycle facilities on Market and Mission streets. **Figure 2** illustrates the typical roadway configuration for Alternative 3 on Mission Street.

Private Vehicle Access

No new private vehicle restrictions would be applied to Mission Street.

Traffic Signals

Alternative 3 would add new turn lanes from Mission Street at certain intersections. New turn signals would be installed to support the new turns and existing turns. Alternative 3 would also include traffic signal timing modifications for bicycles on the new buffered cycle track along Mission Street and could include new bicycle signals and turn signals.

Surface Transit

- **Transit-Only Lanes:** Under Alternative 3, the existing transit-only lanes would be removed from Mission Street.
- **Stop Spacing and Service:** Alternative 3 would move most existing transit service provided by Muni, Golden Gate Transit, and SamTrans on Mission Street to Market Street. Some transit service may remain on Mission Street east of 1st Street to serve the new Transbay Transit Center and to serve as a layover or turnaround for some Market Street transit routes. When Market Street is closed to vehicular traffic (such as when portions of Market Street are closed for special or unexpected events), transit routes would operate along Mission Street. Examples of annual special events that close Market Street include New Year's Eve, Gay Pride Parade, Chinese New Year Parade, and Bay to Breakers, as well as periodic protests and marches such as Walk for Life and May Day March and Rally. It is estimated that Market Street is closed on approximately 10 days during an average year.
- **Stop Location:** All existing bus stops on Mission Street would be removed, with the exception of those transit routes serving the new Transbay Transit Center and layovers for some Market Street transit routes. Temporary bus stops would be provided when transit service is rerouted from Market Street to Mission Street when Market Street is closed for special and unexpected events.
- **Stop Characteristics:** As described above, all existing bus stops on Mission Street would be removed, with the exception of those transit routes serving the new Transbay Transit Center and layovers for some Market Street transit routes. Temporary bus stops would be provided when transit service is rerouted from Market Street to Mission Street when Market Street is closed for special and unexpected events.
- **Infrastructure:** Maintenance and adjustment of the Overhead Contact System on Mission Street would occur to accommodate transit use when Market Street is closed for special and unexpected events.

Bicycle Facilities

Alternative 3 would provide a new cycle track in each direction on Mission Street. The new cycle track would be separated from adjacent travel lanes or the floating parking lane by a buffer consisting of a painted median, concrete median, or other treatments. On one side of the street, the new buffer would separate the new cycle track from a new floating parking lane and would provide space for vehicle doors to open. On the other side of the street, a new buffer would be created between the new cycle track and travel lane. New bicycle facilities on McCoppin and Otis streets (in addition to the existing westbound

bicycle lane) would provide a bicycle network connection to and from Valencia and Market streets. On McCoppin Street, the new bicycle facility would consist of an eastbound cycle track. On Otis Street, the new bicycle facility would consist of a contra-flow cycle track in the eastbound direction between Gough Street and Van Ness Avenue. Contra-flow refers to a configuration where a bicycle lane would be headed in the opposite direction of vehicular direction (e.g., Polk Street contra-flow bicycle lane between Market and Grove streets). New cycle track connections also would be added on Valencia Street between McCoppin and Market streets and on 10th Street between Market and Mission streets to connect the bicycle facilities on Market and Mission streets. **Figure 2** shows the bicycle facility on Mission Street (including McCoppin and Otis streets) under Alternative 3.

Bicycle racks could be installed in the sidewalk furnishing zone along Mission Street.

Pedestrian Facilities

The sidewalk on Mission Street between 5th and 3rd streets could be widened and the planted center median between 4th and 3rd streets could be removed. Alternative 3 could also add a mid-block signalized crosswalk to the block between Yerba Buena Lane and 3rd Street on Mission Street.

Streetscapes

- **Elements:** New bicycle racks would be installed in limited locations along Mission Street.
- **Trees:** The trees on Mission Street would be assessed for health; healthy street trees would remain while unhealthy street trees would be replaced. Trees also would be planted in locations where there are existing tree wells and gaps.

Commercial and Passenger Loading

Alternative 3 would reduce the amount of commercial and passenger loading zones along Mission Street to accommodate the new buffered cycle track. Some existing designated loading spaces that would be removed could be relocated to the floating parking lane, as described in the *Vehicular Parking* section. Some new commercial and passenger loading zones could be created on adjacent cross streets and alleys.

Vehicular Parking

Under Alternative 3, the existing metered on-street parking on Mission Street would be reduced from two parking lanes to one floating parking lane to accommodate the new buffered cycle track. The single floating parking lane would be located between the vehicular travel lane and the new buffered cycle track and would alternate between the north and south sides of Mission Street as appropriate. On-street parking on Valencia Street between McCoppin and Market streets and on 10th Street between Market and Mission streets would be removed to accommodate the new cycle track connections. **Figure 2** illustrates the proposed parking configuration on Mission Street under Alternative 3.

Plazas

No changes to plazas adjacent to Mission Street are proposed.

Utilities

No changes to existing utilities on Mission Street are proposed.

CONSTRUCTION

The Proposed Project would include extensive construction work within the public right-of-way to accommodate the various transportation, streetscape, plaza, and utility improvements. Under Alternatives 1 and 2, construction along Market Street is anticipated to occur in four to five geographic phases over a 3- to 5-year period. Under Alternative 3, construction along Mission Street is anticipated to occur over a shorter period than Market Street due to fewer construction activities (1 to 2 years). Mission Street construction would occur after construction along Market Street is completed.

Each geographic phase would include multiple blocks along the length of Market Street between Octavia Boulevard and The Embarcadero, with construction activities scheduled to minimize disruption to businesses, residents, visitors, and the transportation system. Each geographic phase would be divided into three construction sub-phases. The first sub-phase would involve the closure of the curbside lanes to allow for the relocation and reconstruction of the curb along with the accompanying relocation of trees, fire hydrants, light poles, catch basins, and other utilities. This sub-phase would also allow the construction of the new center transit boarding islands and the demolition of the old islands. The center lanes would remain open to transit as the curbside lane work is completed. Once the curbside lanes are completed, the second sub-phase would involve closing the center lanes for the rail track and sewer line replacements. During this second sub-phase, the new curbside lanes would remain open to transit. Lastly, during the third sub-phase, the sidewalks would be closed for reconstruction, with the curbside lanes available for pedestrian detours and the center lanes available to serve transit. Private vehicles would be rerouted to Mission Street during construction on Market Street.

Funding for plaza improvements has not been identified at this time; construction of the plaza improvements could occur at a future point in time or could occur concurrently with construction on Market and/or Mission streets.

ENVIRONMENTAL REVIEW TOPICS

The Proposed Project could result in potentially significant environmental effects. The Environmental Planning Division of the Planning Department serves as the local Lead Agency and will prepare an Environmental Impact Report (EIR) under the provisions of the California Environmental Quality Act (CEQA) to evaluate the environmental effects of the Proposed Project. As required by the CEQA Guidelines Section 15063, an Initial Study will be prepared to identify any environmental effect determined not to be significant and to focus preparation of the EIR on those effects determined to be potentially significant. As required by CEQA, the EIR will examine the effects determined to be potentially significant, identify mitigation measures, and analyze whether identified mitigation measures would reduce the environmental impacts to a less-than-significant level. Cumulative impacts also will be discussed under each of the environmental topic sections examined. The EIR will include a project-level analysis at an equal level of detail for Proposed Project Alternatives 1, 2, and 3, as well as for a No Project Alternative. Alternatives may be refined if necessary to reduce or avoid any significant impacts identified in the EIR. The EIR will include a programmatic-level analysis of conceptual changes proposed at the plazas.

The Initial Study will include evaluation of environmental impacts related to the topics below and will identify which topics will be addressed in the EIR due to potentially significant impacts:

- Land Use and Land Use Planning
- Aesthetics
- Population and Housing
- Cultural and Paleontological Resources
- Recreation
- Transportation and Circulation
- Noise
- Air Quality
- Greenhouse Gas Emissions
- Wind and Shadow
- Utilities and Service Systems
- Public Services
- Biological Resources
- Geology and Soils
- Hydrology and Water Quality
- Hazards and Hazardous Materials
- Mineral and Energy Resources
- Agricultural and Forest Resources

APPROVALS REQUIRED

Proposed Project implementation would require numerous federal, state, and local reviews, permits, and approvals. Approvals from the following agencies are anticipated at this time.

- Federal Transit Administration
- California Department of Transportation
- Metropolitan Transportation Commission
- San Francisco Bay Area Rapid Transit District
- San Francisco Board of Supervisors
- San Francisco Planning Commission
- San Francisco County Transportation Authority
- San Francisco Department of Public Works
- San Francisco Municipal Transportation Agency
- San Francisco Public Utilities Commission
- San Francisco Historic Preservation Commission
- San Francisco Arts Commission
- San Francisco Real Estate Division
- Golden Gate Bridge Highway and Transportation District
- San Mateo County Transit District

FINDING

This Proposed Project may have a significant effect on the environment and an Environmental Impact Report is required. This determination is based upon the criteria of the State CEQA Guidelines, Sections 15063 (Initial Study), 15064 (Determining Significant Effect), and 15065 (Mandatory Findings of Significance).

PUBLIC SCOPING PROCESS

Pursuant to the State of California Public Resources Code Section 21083.9 and California Environmental Quality Act Guidelines Section 15206, a public scoping meeting will be held to receive oral comments concerning the scope of the EIR. The meeting will be held on **Wednesday, February 4, 2015 with doors opening at 5:30 pm followed by presentation and public comment at 6:00 pm at 1455 Market Street, Ground Floor Lobby Conference Room, San Francisco.** Written comments will also be accepted at this meeting and until 5:00 p.m. on **Friday, February 13, 2015**. Written comments should be sent to Sarah B. Jones, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103. To request a language interpreter or accommodation of persons with disabilities at the scoping meeting, please contact the staff contact listed on page 1 of this notice at least 72 hours in advance of the meeting.

If you work for a responsible state agency, we need to know the views of your agency regarding the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the Proposed Project. Your agency may need to use the EIR when considering a permit or other approval for this Proposed Project. Please include the name of a contact person in your agency.

Members of the public are not required to provide personal identifying information when they communicate with the Planning Commission or the Planning Department. All written or oral communications, including submitted personal contact information, may be made available to the public for inspection and copying upon request and may appear on the Planning Department's website or in other public documents.

January 14, 2015
Date

Sarah B. Jones
Environmental Review Officer

Appendix C

Comment Letters

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

RECEIVED
JAN 20 2015
CITY & COUNTY OF S.F.
PLANNING DEPARTMENT
M E A

January 14, 2015

To: Reviewing Agencies

Re: Better Market Street Project
SCH# 2015012027

Attached for your review and comment is the Notice of Preparation (NOP) for the Better Market Street Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Wade Wietgrefe
City and County of San Francisco
1650 Mission Street #400
San Francisco, CA 94103

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT
300 Lakeside Drive, P.O. Box 12688
Oakland, CA 94604-2688
(510) 464-6000

2015

Thomas M. Blalock, P.E.
PRESIDENT

Tom Radulovich
VICE PRESIDENT

Grace Crunican
GENERAL MANAGER

DIRECTORS

Gail Murray
1ST DISTRICT

Joel Keller
2ND DISTRICT

Rebecca Saltzman
3RD DISTRICT

Robert Raburn, Ph.D.
4TH DISTRICT

John McPartland
5TH DISTRICT

Thomas M. Blalock, P.E.
6TH DISTRICT

Zakhary Mallett, MCP
7TH DISTRICT

Nicholas Josefowitz
8TH DISTRICT

Tom Radulovich
9TH DISTRICT

February 13, 2015

Sarah B Jones
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Delivered by FAX and email

Re: BART District Comments on Notice of Preparation for the Better Market Street Program

Dear Environmental Review Officer:

Thank you for this opportunity to comment on the Notice of Preparation for the Better Market Street program. We are submitting the following comments for your consideration in proceeding with the environmental review process.

Overall Comments

- BART supports the overall goals of the project to provide faster and more reliable transit on Market, improve safety, comfort and mobility for pedestrians and bicyclists, and the creation of thriving public spaces.
- It is our understanding that relocation or alteration of BART Entry Portals in the corridor is not a part of this project.
- In addition to BART's commitment to provide safe and reliable transit, BART is also responsible for the structural integrity of the BART/MUNI Metro underground facilities and the operation of its systems.
- Over the life of the plan, BART and the City will continue to work together to address the need for resiliency and adaptation to environmental challenges. We are continuously developing strategies to improve system safety and security, which may result in changes to BART structures and systems.

BART Access and Capacity

- Convenient access to BART Station Entry portals and Street Elevators should be a primary objective in the development of specific designs, particularly with respect to the relocation of boarding platforms, taxi and ADA Van drop-off placement. Similarly, bicycle access to the portals/evaluator should be addressed and potential conflicts addressed and obstacles minimized.
- BART has been engaged in an ongoing analysis of station capacity and future ridership demand at the Embarcadero and Montgomery Stations which could require additional portals and/or elevators on Market Street for access and emergency egress. We would like to work with you in the development of specific designs at these stations in order to minimize the potential for conflicts between activities and/or structures to be located in the sidewalk right-of-way at these stations.

BART Operations and Safety

- The current configuration and design of the Market Street was the "finishing touch" of the reconstruction of Market Street following the construction of the BART/MUNI underground stations and trackways. The structure for these facilities is located approximately 5 feet below grade, and consequently any construction activity needs to be reviewed by BART to assure that structural integrity is not compromised nor operational systems adversely impacted. We have been working with the City to develop a strategy to replace ventilation grates in the street and will continue with this effort.

- In addition to the need to maintain access to BART/MUNI for transit riders, there is a need to consider access for emergency and operational functions such as revenue collection and service vehicles.

BART Permit

- A permit from BART is required for any construction along Market Street that is within the BART/MUNI Metro right of way which could affect utilities or structures. This requirement appears to include most of the study area. Details regarding the permit/plan review application process and drawings required for are available on the BART website at http://www.bart.gov/about/business/permits/REpermits.aspx.

Construction Impacts

- The potential for adverse impacts during construction is great both with respects to the access/egress of riders, and to mechanical systems which could be impaired by demolition and construction activities.

Thank you for the opportunity to comment on this Initial Study. Please call Val Menotti in BART Planning at (510) 287-4794 if you have any questions.

Sincerely,

Val Menotti

Val Joseph Menotti
Chief Planning & Development Officer

cc: Molly Burke, BART Government & Community Relations
Tim Chan, BART Stations Planning

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5530
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

Serious Drought.
Help save water!

February 12, 2015

SFVAR015
SF-VAR-PM VAR
SCH# 2015012027

Mr. Wade Wietgrefe
Planning Division
City and County of San Francisco
1650 Mission Street, Suite 400
San Francisco, CA 94103

Dear Mr. Wietgrefe:

Better Market Street Project – Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Better Market Street Project. The following comments are based on the Notice of Preparation.

Lead Agency
As the lead agency, the City and County of San Francisco is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures.

This information should also be presented in the Mitigation Monitoring and Reporting Plan of the environmental document, a draft of which should be included in the draft Environmental Impact Report for our review. Required roadway improvements should be in place prior to completion of the project.

Traffic Impact Study
The Central Freeway reconstruction was financed with federal emergency relief funds. Since the Central Freeway was not replaced in-kind, those funds required that the replacement facility provide comparable capacity to the original facility. The movement from the US-101/Octavia Boulevard off-ramp to Market Street to Franklin Street was intended to provide part of the comparable capacity. The Environmental Impact Report and its Traffic Impact Study should evaluate how the proposed changes to Market Street would affect the comparable capacity that was provided by the Central Freeway & local street system.

We recommend using the Caltrans *Guide for the Preparation of Traffic Impact Studies* (TIS Guide) for determining which scenarios and methodologies to use in the analysis, available at the following website <http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf>. Please ensure that a TIS is prepared providing the information detailed below:

1. Vicinity map, regional location map, and a site plan clearly showing project access in relation to nearby State roadways. Ingress and egress for all project components should be clearly identified. The State right-of-way (ROW) should be clearly identified. The maps should also include project driveways, loading bays, local roads and intersections, parking, and transit facilities.

2. Project-related trip generation, distribution, and assignment. The assumptions and methodologies used to develop this information should be detailed in the study, and should be supported with appropriate documentation.

3. Analyze the potential significant impacts to the US-101/Octavia Boulevard and the US-101/Mission Street off-ramps. Average Daily Traffic, AM and PM peak hour volumes and levels of service (LOS) on affected facilities for *existing, existing plus project, cumulative and cumulative plus project scenarios* should be included. Also, analyze diverted traffic from private vehicle restrictions to these State facilities. The analysis should clearly identify the project's contribution to area traffic and any degradation to existing and cumulative LOS. Caltrans' LOS threshold, which is the transition between LOS C and D, and is explained in detail in the TIS Guide, should be applied to all State facilities.

4. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect study area roadways and intersections. A twenty-year cumulative scenario is the appropriate time horizon.

5. Schematic illustration of traffic conditions including the project site and study area roadways, trip distribution percentages and volumes as well as intersection geometrics, i.e., lane configurations, for the scenarios described in comment #3 above.

6. The project site building potential as identified in the General Plan. The project's consistency with both the Circulation Element of the General Plan and the Congestion Management Agency's Congestion Management Plan should be evaluated.

7. Identification of mitigation for any roadway mainline section or intersection with insufficient capacity to maintain an acceptable LOS with the addition of project-related and/or cumulative traffic.

Bicycle and Pedestrian Planning

1. Analyze the potential difficulties and hazards to bicyclists and pedestrians on State facilities and their connections as a result of the proposed project. Specifically, attention is needed near the US-101 on and off-ramps as some one-way streets in the project vicinity may be a hostile environment for bicyclists and pedestrians. For example, Otis Street from US-101 (Van Ness Avenue).

2. Consider pedestrian, bicycling and transit performance or quality of service measures and modeling as a means of estimating the project impacts to these modes and evaluating mitigation measures and tradeoffs.

3. Analyze secondary impacts on pedestrians and bicyclists that may result from any mitigation for traffic impacts. The analysis should describe any pedestrian and bicycle mitigation measures and safety countermeasures that would in turn be needed as a means of maintaining and improving access to transit facilities and reducing vehicle trips and traffic impacts on State highways.

Transportation Management Plan

A Transportation Management Plan (TMP) or construction TIS may be required of the developer for approval by Caltrans prior to construction where traffic restrictions and detours affect State highways, TMPs must be prepared in accordance with California *Manual on Uniform Traffic Control Devices.* For further TMP assistance, please contact the Office of Traffic Management Plans/Operations Strategies at 510-286-4579 and see the following website: <http://www.dot.ca.gov/hq/traffops/engineering/mutcd/pdf/camutcd2014/Part6.pdf>

Encroachment Permit

Please be advised that any work or traffic control that encroaches onto the State ROW requires an encroachment permit that is issued by Caltrans. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the following address: David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. See the following website for more information: <http://www.dot.ca.gov/hq/traffops/developserv/permits>

Should you have any questions regarding this letter, please call Sherie George at 510-286-5535 or sherie.george@dot.ca.gov.

Sincerely,

PATRICIA MAURICE
Acting District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

February 11, 2015

Sarah B. Jones
Acting Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

GOLDEN GATE BRIDGE
HIGHWAY & TRANSPORTATION DISTRICT

Re: Better Market Street Project Notice of Preparation and Scoping, Case #2014.0012E

Dear Ms. Jones:

The Golden Gate Bridge, Highway and Transportation District (District) operates Golden Gate Transit (GGT) bus service that may be affected by the proposed Better Market Street Project. District staff has reviewed the Notice of Preparation and Scoping for the Better Market Street Project Environmental Impact Report (Case No. 2014.0012E) and requests that the following three concerns be addressed during the preparation of this environmental impact report (EIR).

District staff is concerned that this project may result in travel time increases for GGT service. GGT operates three routes along Mission Street that also cross Market Street at 7th and 8th streets. GGT also operates 15 routes that cross Market Street at Fremont and 1st streets and two routes that cross Market Street at 7th and 8th streets. Any travel time increase can have a significant cost impact when multiplied by thousands of trips annually, which in turn can have a negative impact on the District's ability to provide bus service with its existing budget.

Under Alternatives 1 and 2, District staff would like to know the operational impacts to GGT service at the bus stop on Charles J. Brenham Place farside Market Street. This is a very busy stop, and increased traffic associated with turn restrictions at Market Street and the presence of a streetcar turnaround loop may necessitate that the stop be moved.

Under Alternative 3, District staff would like to know the operational impacts to GGT service that is moved from Mission Street to Market Street. GGT buses may need access to lanes or turns otherwise designated for Muni use only in order to effectively serve its passengers.

Thank you for providing the District the opportunity to participate in the Better Market Street Project process. Please feel free to contact David Davenport, Associate Planner, at (415) 257-4546 or ddavenport@goldengate.org if you have any questions about these comments.

Yours sincerely,

Ron Downing
Director of Planning

c: D. Davenport, M. Palumbo

The Hearst Corporation

San Francisco Realties Division • 200 Hearst Building • 5 Third Street • San Francisco, California 94103 • 415/777-0600

February 12, 2015

VIA MESSENGER

Sarah B. Jones
Environmental Review Officer
San Francisco Planning Department
1650 Mission Street
Suite 400
San Francisco, CA 94103

Re: Better Market Street Project DEIR / Case #2014.0012E

Dear Ms. Jones:

The Hearst Corporation owns the Hearst Building and Hearst Parking Garage at 5 and 45 Third Street, respectively. We are aware that the Planning Department will be engaging in a draft EIR process for the Better Market Street Project, which may include the closure of Market Street to private vehicular traffic under Alternatives 1 and 3, elimination of right-turns onto Market Street from 3rd Street under Alternative 2 and circulation changes, such as one-way streets converted to two-way streets and/or partial street closures.

We understand that many of the improvements proposed under the Better Market Street Project would benefit the City as a whole. In the interest of being fully informed, we request that the traffic study for the Better Market Street Project take into account all relevant recent and proposed changes, including but not limited to the closure of Annie Street to vehicular traffic and other changes proposed under the Central SoMa Plan. We also request that the traffic study include a discussion of feasible mitigation and improvement measures, such as the installation of a new traffic signal at New Montgomery and Jessie Streets to alleviate traffic congestion and improve pedestrian safety.

Thank you for your consideration. Please do not hesitate to contact me with any questions.

Regards,

Brennan Zerbe
San Francisco Realties Director

cc: Martin N. Cepkauskas, Director of Real Estate, Western Properties, Hearst Corporation
Caroline Guibert Chase, Coblentz Patch Duffy & Bass, LLP

Hotel Council
OF
SAN FRANCISCO

February 12, 2015

Sarah Jones, Environmental Review Officer
Attention: Better Market Street EIR
San Francisco Planning
Department 1650 Mission Street,
Suite 400
San Francisco, CA 94103

Subject: Hotel Council Support and Comments on Better Market Street EIR

On behalf of the Hotel Council of San Francisco, I am writing in support of the Better Market Street Project and EIR. The Hotel Council staff and members have served on multiple community and citizen advisory committees related to this project and we agree the improvements planned for Market Street are much needed and overdue. Both San Francisco residents and visitors will benefit from the proposed changes which will transform Market Street into the world-class boulevard it was designed to be. We thank the San Francisco Planning Department and the San Francisco Municipal Transportation Agency for the outreach they have conducted with our industry on this project.

However, we have discussed with project planners that we have two key concerns. The first is to ensure that our hotels located on, and adjacent to, Market Street have adequate access to load and unload both supplies and even more importantly our guests. With the proposed elimination of private automobiles from Market Street, we want to ensure that guests who chose to drive an automobile have a clear and direct route to arrive and depart from our hotels. While we have had discussions with the project planners regarding this issue, it is still a top concern and priority that will need to be addressed.

Our second concern is the need for designated taxi stands. With the potential elimination of private automobiles from Market Street it is important that our visitors and residents have access to taxis. Some visitors and residents – for example, seniors or the disable – may not be able to take other modes of transportation and rely on taxis. For this reason, we are advocating for designated Taxi stands along Market Street, particularly in front of the Four Seasons Hotel to ensure that all visitors and residents have accessible and convenient transportation options.

Again, we are very supportive of the Better Market Streets Plan and look forward to our continued involvement in the project. I can be reached at kcarroll@hotelcouncilsf.org or (415) 391-5197.

Sincerely,

Kevin Carroll
Executive Director

REUBEN, JUNIUS & ROSE, LLP

February 11, 2015

Sent Via messenger and email

Sarah B. Jones
Attn: Better Market Plan EIR
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Re: Comments on Better Market Street Project
Pl. Dept. Case No. 2014.0012E
Our File No.: 6250.99

Dear Ms. Jones:

Our office represents Tishman Speyer, the owner of One Bush Street (Block 0290, Lots 011 and 012) ("**One Bush**"). Please accept this letter as comments on the Better Market Street Plan ("**Plan**") and its environmental review on behalf of Tishman Speyer.

A. Description of the One Bush Street property

One Bush is located along Market Street with additional street frontages on Sansome, Bush and Battery Streets. The building at One Bush known as the Crown Zellerbach Building was built in 1959 and was designated as a City Landmark no. 183 under Article 10 of the Planning Code on April 6, 1987. The historic landmark designation also encompasses the site surrounding the building (i.e. per the Landmark designation ordinance, the Crown Zellerbach Complex and Site), which consists of an open space plaza. More specifically, the One Bush site occupies an entire city block with 58,034 sf of lot area, and it was the first post-WWII San Francisco office building that was built in a plaza surrounded by open space, which represented a "major departure from the previous standard of lot line development."[1]

[1] Landmarks Preservation Advisory Board, final case report for the landmark designation, approved by the Planning Commision on June 4, 1981.

James A. Reuben | Andrew J. Junius | Kevin H. Rose | Daniel A. Frattin | John Kevlin
Jay F. Drake | Lindsay M. Petrone | Sheryl Reuben[1] | Tuija I. Catalano | Thomas Tunny | David Silverman
Melinda A. Sarjapur | Mark H. Loper | Jody Knight | Stephanie L. Haughey | Jared Eigerman[2,3] | John McInerney III[2]
1. Also admitted in New York 2. Of Counsel 3. Also admitted in Massachusetts

One Bush Street, Suite 600
San Francisco, CA 94104

tel: 415-567-9000
fax: 415-399-9480

www.reubenlaw.com

One Bush building is an 18-story building over two (2) below-grade parking levels with on approx. 280 vehicular entrances/exits per day, Monday through Friday. The building contains 329,111 sf of rentable office area and 7,300 sf of rentable retail area, and has received LEED Platinum for Existing Buildings -certification. The building is operated as a multi-tenant structure currently providing office space for 20 companies and approx. 1,100 employees. Most of the existing tenants are involved in customer service oriented office uses, and thus the building is also frequented by many daily visitors.

The garage entrance to One Bush is near the intersection of Bush and Battery Streets with vehicles entering the garage either via Bush or Battery Street. The exit for the garage is located near the intersection of Battery and Market Streets with vehicles exiting either onto Market or First Street. The exit includes two separate driveways; one two-way driveway onto Market Street that also serves as the entrance to the garage (with the driveway splitting near the street level into the entrance coming from Battery/Bush and the exit onto Market Street); and another separate driveway in the form of an underground tunnel for the exit into First Street across Market Street. The existing entrance and exit paths, dating back to the original construction and located primarily in the sub-grade basement, are partially located and dependent on the below-grade area for the adjacent triangular small City owned land area.

A site plan and an excerpt from a survey showing the location, entrance and exits for the garage are attached as **Exhibit A**.

B. Proposed Better Market Street Plan's impact on One Bush

The proposed Plan currently includes three alternatives, with alternative 1 ("**Alternative 1**") proposing full prohibition of private vehicles along Market Street, including the portion of Market Street occupied by One Bush, and with alternative 3 ("**Alternative 3**") copying Alternative 1 controls for Market Street in addition to proposed controls on Mission Street.

Prohibited private vehicle access on Market Street. Alternatives 1 and 3 would significantly and negatively impact the operation of the One Bush by resulting in an undue burden and inconvenience to One Bush and other commuters. Currently, vast majority (over 70-75%) of vehicles from One Bush exit onto Market Street, which under these Alternatives would be prohibited. With the implementation of Alternatives 1 and 3, a portion of the existing exit driveway would be eliminated and/or become unusable, and all vehicles exiting One Bush would be required to exit across Market Street onto First Street. The (adverse) transportation impacts caused by the implementation of Alternatives 1 and 3 of the Plan due to the changes in the garage operation described in greater detail below would need to be evaluated under the Plan EIR, unless an exception is granted for One Bush as outlined in Section D below.

REUBEN, JUNIUS & ROSE, LLP

One Bush Street, Suite 600
San Francisco, CA 94104

tel: 415-567-9000
fax: 415-399-9480

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Significant impact on One Bush garage operation. The change in the garage operation caused by the Plan would negatively impact existing One Bush tenants and visitors as well as the prospects of attracting new tenants by making One Bush less desirable due to undesirable vehicle arrangements for tenants and their patrons who use automobiles. With First Street already operating beyond its capacity at commuter hours, the Plan would cause queuing in the One Bush garage for exiting vehicles and thus would significantly increase travel times for the garage users. As a direct result of the Plan, the One Bush garage would become less appealing and would result in loss of parking and office leasing revenue to the building owner and garage operator.

Significant impact on First Street traffic and other commuters. Currently, during afternoon hours there is significant congestion along First Street, with commuters leaving the City towards the East-bound Bay Bridge. First Street's primary function is as a feeder to the Bay Bridge,[2] and there are no realistic opportunities to increase the capacity of the existing four-lane First Street or to "correct" the existing traffic nightmare on First Street. Beyond the approx. four-block distance of First Street (between Market Street and the ramp to the I-80 entrance), the congestion extends into the Market Street intersection and well past it to the North side of Market Street into Bush and Battery Streets, which feed into First Street. Alternatives 1 and 3 would result in additional congestion on the already congested First Street by forcing all vehicles from One Bush to exit into First Street regardless of their destination. The exiting of the additional vehicles, not bound for the Bay Bridge, into First Street would undoubtedly create additional bottleneck effect on First Street between Market and Mission Streets, and prior to the Market Street intersection on Bush and Battery Streets. With daily garage usage by approx. 280 vehicles, the Plan would cause a noticeable impact on First Street commuter traffic (as well as that of Bush and Battery Streets) if all One Bush vehicles are forced to exit onto First Street.

Partial impossibility for use of One Bush. The existing exit onto First Street is for the most part via a narrow underground tunnel, with a single lane designed for typical passenger vehicles only. Due to the tunnel's vertical height, which at its lowest point is 6 feet 8 inches, the First Street exit path cannot be used by many larger vehicles. If the existing exit onto Market Street is eliminated, the garage can no longer be used by vehicles exceeding 6 feet 8 inches feet in height due to the existing height limitations of the exit. Thus, as a direct result of the Alternatives 1 and 3 of the Plan, the One Bush garage will become unavailable to certain vehicles.

Unfeasible for One Bush and commuters in general. In sum, Alternatives 1 and 3 of the Plan are simply unworkable for One Bush due to existing physical limitations (i.e. leaving the garage with only one exit path, which is narrow and insufficient in height in order to accommodate all vehicles) and otherwise undesirable due operational impacts (i.e. queuing in

[2] See Rincon Hill Streetscape Master Plan, San Francisco Planning Department, May 2014, p. 15.

REUBEN, JUNIUS & ROSE, LLP

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garage, increased driving times and added congestion) as well as financial impacts (i.e. diminished demand and thereby lower revenues). Beyond impacts caused to One Bush, Alternatives 1 and 3 would also result in more wide-spread transportation impacts by making one of the worst afternoon commuter streets (First Street) even more congested for other commuters and causing additional clogging on Bush and Battery Streets.

C. Reconfiguration of the existing One Bush garage exit

Since the tunnel height for the existing First Street exit path is limited, the First Street exit cannot be used by larger vehicles. Moreover, the use of the existing First Street exit even by standard passenger vehicles would cause an undesirable effect of additional congestion on First Street, with over 70-75% of vehicles, i.e. vast majority, currently exiting the One Bush garage destined to locations other than the Bay Bridge. If Alternative 1 or 3 was adopted, One Bush would need some solution in order to provide an efficient and functional exit for all vehicles using the garage. The One Bush property could (theoretically) be altered by constructing the garage exit elsewhere to provide for an alternative exit. However, in reality such reconstruction would be extremely undesirable, e.g. due to it being very expensive as well as detrimental to the open space, which is part of the Landmark site.

One Bush has some street frontage on four different streets, however, only Sansome Street could (theoretically) be used to provide an exit point for the garage. Without stating the obvious, even today no new curb cuts are possible on Market Street, and thus the long Market Street frontage cannot be used today or with the adoption of the Plan to provide for a new exit. With respect to the other three street frontages, Bush and Battery Streets are one-way streets that currently feed into First or Market Street, and thus do not provide a viable solution if private vehicle access on Market Street is prohibited, as suggested in Alternatives 1 and 3. Therefore, only Sansome Street frontage could (theoretically) be used by constructing a driveway from the underground garage up to Sansome Street. The Sansome Street façade is, however, improved with an existing (privately owned, but publicly accessible) open space plaza. The plaza, for the most part along Sansome frontage, is not located at grade with Sansome Street, and thus any driveway from the below-grade garage to Sansome would result in a ramp/drive-way that would for the most part be on top of the existing open space plaza violating a unique publicly accessible open space in the Downtown area. The One Bush building is also not situated on the lot in a manner that would allow for the construction of an obvious path from the garage onto Sansome.

If access to Market Street by private vehicles is prohibited without any exception, One Bush would need to build a new exit ramp in order to maintain the garage's functionality. However, a new exit onto Sansome Street would be technically challenging in terms of construction and location, financially expensive and disruptive to the plaza resulting in permanent loss of open space and potentially adverse impact on a City Landmark (which

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includes not only the building, but also the surrounding site). Such (undesirable) impacts to historic resources caused by the implementation of Alternatives 1 and 3 of the Plan due to the reconstruction (if it became necessary) would need to be evaluated under the Plan EIR, unless an exception is granted for One Bush as outlined in Section D below.

If such reconstruction were required or necessary due to the adoption of Alternatives 1 and 3, the owner of One Bush would expect the City to pay for all of the costs. The Fifth Amendment of the U.S. Constitution provides that "...nor shall private property be taken for public use, without just compensation," a principle, which is also included in the California Constitution. While there are several different types of takings, the general regulatory takings governed by *Penn Central Transportation Company v. City of New York, 438 U.S. 104 (1978)* could be relevant to the impact the proposed Alternatives 1 and 3 would have on One Bush. An analysis of takings under *Penn Central* does not require physical occupation or denial of all economically beneficial use, instead, the inquiry under general regulatory takings under the *Penne Central* focuses on 1) "the economic impact of the regulation on the claimant," 2) "the extent to which the regulation has interfered with distinct investment-backed expectations," and 3) "the nature of the governmental action." According to the California Supreme Court, general regulatory takings claims are evaluated under the Penn Central test, but also against the expanded, non-exclusive 10 factors from *Kavanau v. Santa Monica Rent Control Board, 16 Cal. 4th 761 (1997)*. The *Kavanau* factors include, among others, consideration of "whether the regulation affects the existing or traditional use of the property and thus interferes with the property owner's primary expectation."

D. <u>Proposed changes to the proposed Better Market Street Plan</u>

We respectfully request, that the proposed Plan, and specifically Alternatives 1 and 3 therein, be amended with respect to private vehicle access by including an exception that would allow private vehicle access onto Market Street from the existing garage at One Bush for a distance of approx. 270 feet until Sutter Street. The overall situation and the need for such an exception are unique to One Bush, which is a Landmark site and one of the few or only sites with an existing exit onto Market Street. As a Landmark site, the garage from One Bush cannot easily be reconstructed to provide for a functional alternative to the existing vehicular exit onto Market Street without causing a significant impact on the publicly accessible open space plaza.

As outlined in this letter, the impacts caused by the implementation of the Plan on One Bush are extreme and negative however, the "expense" of providing the requested exception is very minimal. An exception is requested only for the length of approx. 270 feet on Market Street for a short distance that is not currently occupied by any cross-walks. Given the timing of the traffic lights, vehicles from One Bush could exit onto Market Street only when permitted transit and other vehicles are stopped at the First and Market traffic light for the crossing of traffic from Battery/Bush onto First Street. Please note that the existing lights are already timed this way so that it is possible to exit One Bush on a green light only when the light along Market

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Street is red and the light for vehicles crossing Market Street onto First Street is green, i.e. when the Market Street traffic is stopped, thus the granting of the exception does not require any adjustments to the traffic light operation since the lights already work in the described manner today. Therefore, the effect of vehicles exiting from One Bush to Market Street would be practically unnoticeable and would not result in any undesirable impacts to transit, bicycle or other permitted traffic on Market Street.

Including the above-mentioned exceptions from the beginning will eliminate the costly and time-consuming steps of evaluating the environmental impacts a reconfiguration of the existing garage would result in if vehicle access would no longer be allowed onto Market Street, including evaluation of historical impacts, and/or alternatively the evaluation of transportation impacts due to increased vehicular traffic from the One Bush garage onto First Street.

Thank you for your attention and consideration.

Very truly yours,

REUBEN, JUNIUS & ROSE, LLP

Tuija I. Catalano

cc: Carl Shannon, Tishman Speyer
Tony Birdsey, Tishman Speyer
Ann Akhromtsev, Tishman Speyer
Andrew Junius, Reuben, Junius & Rose

Exhibits:
Exhibit A - Site plan; excerpt of survey

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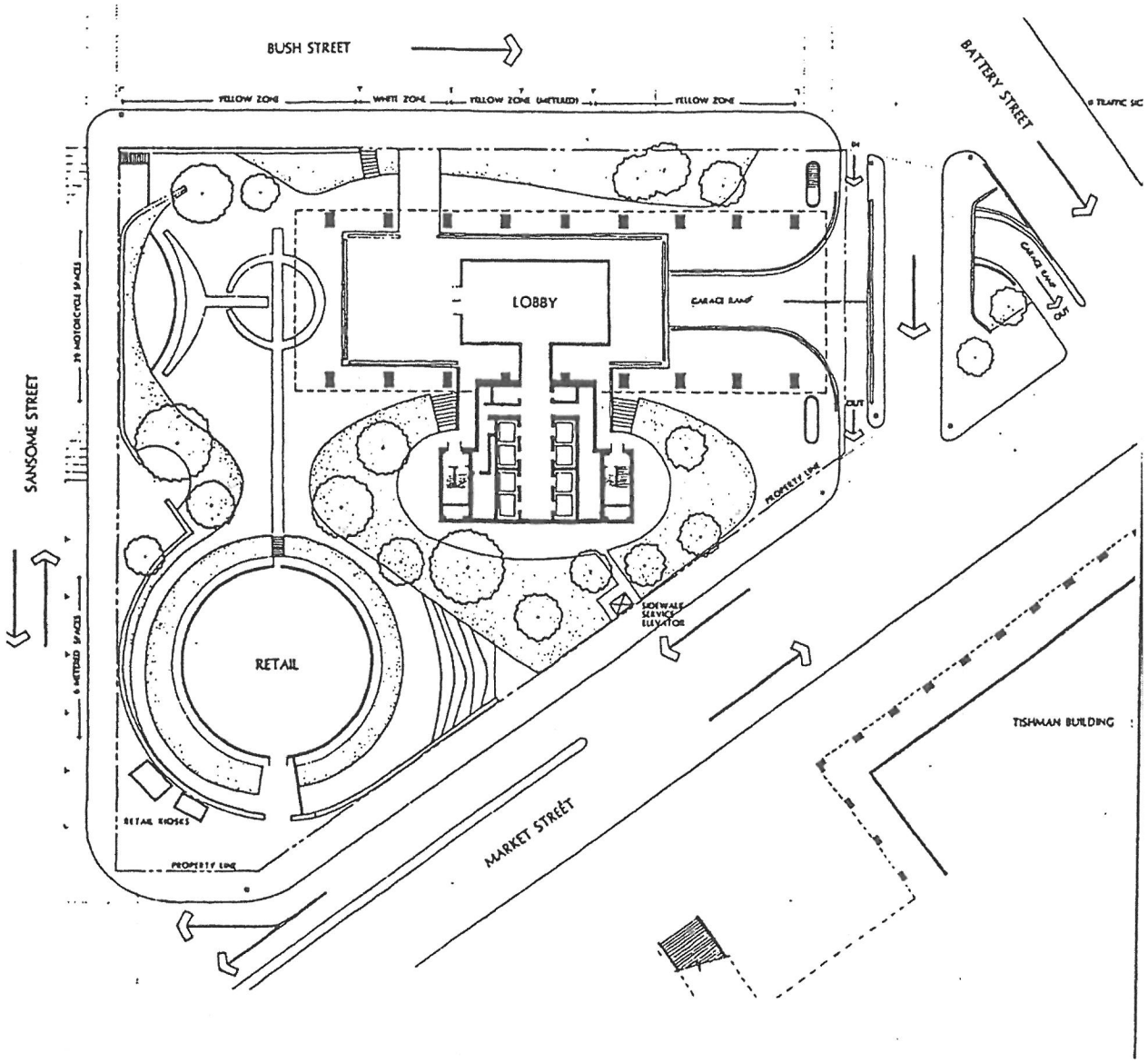
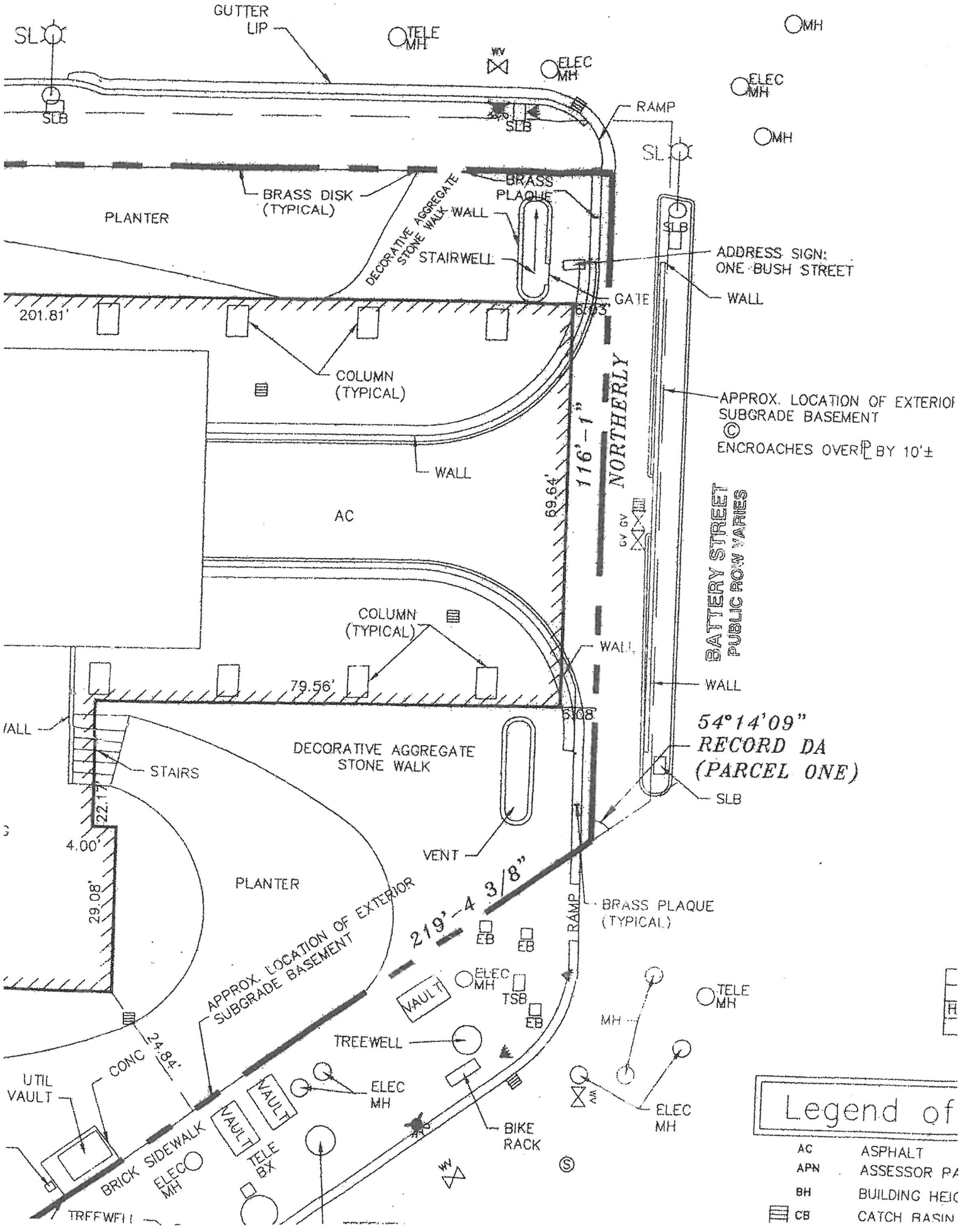
EXHIBIT A

SITE PLAN:




GUTTER LIP
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WALL
BRASS PLAQUE
STAIRWELL
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COLUMN (TYPICAL)
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DECORATIVE AGGREGATE STONE WALK
22.17'
4.00'
VENT
PLANTER
29.08'
219'-4 3/8"
RAMP
BRASS PLAQUE (TYPICAL)
EB
EB
APPROX. LOCATION OF EXTERIOR SUBGRADE BASEMENT
VAULT
ELEC MH
TSB
EB
TELE MH
MH
TREEWELL
24.84'
CONC
UTIL VAULT
VAULT
VAULT
ELEC MH
BIKE RACK
ELEC MH
BRICK SIDEWALK
ELEC MH
TELE BX
WV
TREEWELL
Legend of
AC ASPHALT
APN ASSESSOR PA
BH BUILDING HEI
CB CATCH BASIN

San Francisco Bicycle Coalition
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PROMOTING THE BICYCLE FOR EVERYDAY TRANSPORTATION

February 13, 2015

Sarah B. Jones
Environmental Review Officer
1650 Mission Street, Suite 400
San Francisco, CA 94103

RE: Better Market Street Project Notice of Preparation of an Environmental Impact Report

Dear Ms. Jones,

Please accept the following comments from the San Francisco Bicycle Coalition on the Notice of Preparation (NOP) of an Environmental Impact Report for the Better Market Street Project. We appreciate the opportunity to comment and look forward to the final results of your analysis. Below please see our comments and concerns regarding the NOP.

San Francisco Mode Share Goals and Anticipated Bicycle Volumes on Market
Market Street is already San Francisco's most popular bike route, averaging over 3,000 daily riders on weekdays. The City of San Francisco has set goals for 8% bicycle mode share by 2018 and 20% by 2020. Existing bicycle mode share in San Francisco is 3.7% and 5% on Market Street, which means by the time the Better Market Street Project is completed we could well expect nearly 10,000 daily inbound bicycle trips on Market Street.

The Better Market Street Environmental Impact Report should assume this growth in bicycle trips will happen *on* Market Street. Projects such as Safer Market Street and the Upper Market bicycle and pedestrian improvements will only further cement Market Street as the City's premiere bicycle route. Any changes to bicycle circulation on Market, such as Design Option 3 in the Better Market Street project, should be considered in the context of the dramatic increase in the number of bicycle trips on Market now and in the future.

Study the Traffic Safety Benefits of a Fully Continuous Bikeway on Market Street
Numerous studies from cities in the United States and abroad have shown that continuous and gapless protected bikeways are the most effective way to get more people riding their bikes, and that they significantly reduce collisions for all road users. As written, the Better Market Street EIR NOP states that under Design Option B, a new raised bikeway "the entire length of Market Street would be provided, except at locations where the Bay Area Rapid Transit (BART)/Muni entrances or other obstructions would not allow it." Any analysis of the proposal should take into account the safety impact of protected bikeways for all modes.

Consider BART and MUNI Entrance Closure or Relocation
Though BART and Muni entrance closures and/or realignments are outside the scope of this study, under Design Option B the Better Market Street Project currently proposes a gap in the raised bikeway on Market Street between 4th and 5th Streets that could have significant traffic safety impacts for people biking on Market Street. The Environmental Impact Report should study the benefit of providing a continuous raised bikeway the full length of Market Street irrespective of any future plans for the BART/Muni entrances. In fact, a definitive study of the safety benefits of a

continuous bikeway on Market may very well be instructive information for BART and Muni in their consideration of realigning entrances on Market Street.

Account for future development on the full length of Market Street
There are currently nearly 40 residential and commercial development projects planned in the Mid-Market corridor alone, which will bring incredible density to the project area over the coming years. We know that CEQA requires an analysis for commercial and residential growth in project areas, but it is worth reiterating that this area will be adding thousands of new homes and jobs in perhaps the most transit-rich area in the region. The Better Market Street EIR should make sure to use the latest information available on the proposed and under-construction development projects, as well as updated projections for the number of car-free or car-light households expected in these new buildings. We expect many will forgo owning a car, opting for biking, walking, and transit as primary modes of travel, and the EIR should ensure projections are based on current trends and take those expected travel modes into account.

Similarly, Upper Market Street has numerous large residential developments planned or in progress that should be accounted for through the Market and Octavia Area Plan. Again, these new residents are unlikely to own vehicles at city-average rates based on the area's premier transit and bicycle access, further cementing the need to keep Market Street the focus for bicycle infrastructure and safety. The Better Market Street EIR should factor these new residents, their likely transportation choices, and related impacts to bicycle volumes and safety on Market Street as part of the analysis.

Surface Transit Volumes and Private Auto Use on Market Street
In 2015 SFMTA will implement Safer Market Street, a data-driven safety program to restrict private automobile use on Market Street. Safer Market Street studies show that private autos are the leading actor in pedestrian, bicycle, and transit collisions on Market Street. The data also shows that reducing automobile traffic of all forms dramatically increases Muni speed and reliability while also improving pedestrian and bicycle safety and comfort.

The only proposal in the Better Market Street Project that will build on Safer Market Street learnings is Alternative 1, which proposes significant private automobile restrictions the length of Market Street, including for commercial vehicles, and will further improve Muni reliability and pedestrian and bicycle safety. Alternatives 2 and 3, however, do little to address the problem identified by Safer Market Street by either allowing continued use of Market Street by private autos (Alternative 2) or by shifting significant volumes of surface transit vehicles to Market Street (Alternative 3).

Under Alternative 2, allowing continued use by private automobiles on Market is incongruent with existing data that shows very slight and dwindling auto traffic on Market Street that still has major impacts on transit level of service and traffic safety. In particular, the traffic safety impacts of commercial loading should be studied under Alternative 2, as anyone who has studied the existing condition can attest to Market Street's suboptimal safety for all users.

Under Alternative 3, the dramatic increase in surface transit on Market Street should be studied as a level of service and safety impact for all road users. "Leapfrogging" (where people on bikes and buses continuously overtake one another) is an all too common, dangerous, and inefficient circulation pattern under existing conditions. Alternative 3 should be studied for its potential to increase this behavior, as people will continue to ride their bicycles on Market Street despite the proposed Mission bikeway, and the proposal plans to nearly double the number of buses per hour on Market Street. The Alternative 3 circulation plan has the potential to both significantly reduce the quality of transit service while creating an unsafe condition for people biking and walking on Market Street, and should be studied in detail.

Thank you for your consideration of these comments. We look forward to continued work with you to create a Market Street we can all be proud of.

Sincerely,

Noah Budnick
Executive Director
San Francisco Bicycle Coalition

SPUR
San Francisco | San Jose | Oakland

February 13, 2015

Sarah Jones
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Re: Better Market Street Project - Environmental Impact Report Scoping

Dear Ms. Jones:

Thank you for the opportunity to provide input on the Better Market Street project during the CEQA scoping period. SPUR continues to strongly support the project's goals of creating a sense of place, optimizing mobility, and fostering economic development.

In addition to the three proposed project alternatives SPUR requests that options for operating transit in only one lane in each direction on Market Street be re-considered. Such an alternative would offer the following benefits:

- Reduce environmental impact from construction
- Retain the existing sidewalk widths and curb locations, which enable retaining the locations of the historic Path of Gold light poles, AWSS hydrants, and portals to BART/Muni underground stations
- Address needs for increased transit service to the growing SOMA neighborhood
- Create a protected cycling lane the width of a traffic lane, separating bikes from motorized vehicles

This new alternative would evaluate options for the following aspects of the project:

1. Market street transit access: Options could be to re-route the bus lines that currently turn onto Market Street into the South of Market area, terminating at the Transbay Terminal (or as close to Transbay as possible) and/or running a frequent (1-2 minute headway) transit shuttle on Market Street.
2. SOMA transit access: transit priority (rapid transit service) on Mission Street or parallel streets would be evaluated, with consideration of connections to the Transbay Transit Center, Central Subway and Caltrain 4th and King station and 16th Street/24th Street BART stations.
3. Design of cycling and transit lanes: Options would be to place the cycle track in the center of the street or to place the transit lane in the center of the street. The benefit of a curbside transit lane would be eliminating the need to build large

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Gary Teague
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Mike Thériault
Jeffrey Till
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Molly Turner
Jeff Tumlin
Steve Vettel
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Allison Williams

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boarding islands in the middle of the street and the provision of a more appealing waiting area for transit passengers. Additionally, with a curbside transit lane, transit riders would not have to cross cycle traffic to reach transit vehicles. With a center-running cycle track, turn movement space for cycles would need to be carefully designed.

4. Taxi loading/unloading. Options would be to eliminate taxis from Market Street or to allow them to continue to load/unload on Market Street. In the future, we believe that there may be such a high volume of taxis and their equivalents that it will not work for them to operate on Market Street. Elimination of taxi loading/unloading on Market Street would likely need to be mitigated by adding pick up and drop off locations on the North –South streets crossing Market Street.

We understand the challenge of expanding the alternatives evaluated in the Better Market Street process. Thank you for consideration.

Sincerely,

Gabriel Metcalf
CEO

Cc:
Mayor Ed Lee
Ed Reiskin, SFMTA
Mohammed Nuru, SF Public Works
Simon Bertrang, SF Public Works
John Rahaim, SF Planning
Tilly Chang, SFCTA
Gillian Gillett, Office of the Mayor

Appendix D

Scoping Meeting Sign-in Sheets

SAN FRANCISCO
PLANNING DEPARTMENT

EIR Public Scoping Meeting Sign-In Sheet
Better Market Street Project
February 4, 2015

PRINT NAME	ADDRESS	TELEPHONE
1. DANIEL McARDLE-JAIMES	469 CLEMENTINA ST. #16 SF, CA 94103	
2. Miranda Iglesias	62 Sheridan ST. Apt#6 SF, CA 94103	415-525-7486
3. Jason Smith	50 Oak St SF CA 94102	415 503-6281
4. Kathryn W. Heumann	50 Oak St SF CA 94102	415 503-6223
5. Christopher Hranes	38 Dolores St, #504 SF	917-741-486
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SAN FRANCISCO
PLANNING DEPARTMENT

EIR Public Scoping Meeting Sign-In Sheet
Better Market Street Project
February 4, 2015

PRINT NAME	ADDRESS	TELEPHONE
1. Del Seymour	TZWACKINGTOWNS@GMAIL.COM	
2. MARLO SANDLER	SF Planning Dept 1650 Mission St SF	415 575 6835
3. Don Savio	234 V St MESS SFC A 94102	415-626-1815
4. RICH PETERSON	100 PINE ST. #1525	415 652 1974
5. BJ		
6. RUBE Warren	300 LAKESIDE Dr OAKLAND CA	510 874 7355
7. Tony Bulay	ONE BUSH SUITE 450	415 344 0635
8. Tuija Catalano	One Bush #600	415-567-9000
9. Tracy Everwine	901 Market	415-957-5985
10. NATALIE BORDOC	433 NATOMA ST	415 431 9255
11. AYDIN KOC	baybase@pacbell.net	415-255-2300
12. Ann Akhromtsev	One Bush Suite 890	415.273.7900
13. Hayley Currier	2329 Carleton St Berkeley CA 94704	
14. DARNELL STARK	75 Broadway 202 SFCA 94111	415 994-6463
15. Bruce Bernhard	1620 Arch St Berkeley	510-414-8540

SAN FRANCISCO
PLANNING DEPARTMENT

EIR Public Scoping Meeting Sign-In Sheet
Better Market Street Project
February 4, 2015

PRINT NAME	ADDRESS	TELEPHONE
1. Brenna Zelt	5 Third Street - SF CA 94103	415-777-7377
2. Sherie George	111 Grand Ave Oakland CA 9	510-286-5535
3. Tina Warren	P.O. Box 1 Feley Alameda CA	415 538-4334
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Appendix E

Scoping Meeting Transcript

In Re:

SAN FRANCISCO PLANNING DEPARTMENT

BETTER MARKET STREET PUBLIC SCOPING MEETING

February 04, 2015

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Original File FEB42015.TXT

Min-U-Script® with Word Index

SAN FRANCISCO PLANNING DEPARTMENT

BETTER MARKET STREET PUBLIC SCOPING MEETING

1455 Market Street, Ground Floor Lobby Conference Room

SAN FRANCISCO, CALIFORNIA.

February 4th, 2015 at 5:30 PM

REPORTER'S TRANSCRIPT

---oOo---

Reported by:
David A. Disbrow
CSR No. 7768

A-P-P-E-A-R-A-N-C-E-S:

Simon Bertrang: San Francisco Public Works
(415) 558-4045

Wade Wietgrefe: San Francisco Planning

Al Williams: Al Williams Consulting

---oOo---

Wednesday, February 4th, 2015

P-R-O-C-E-E-D-I-N-G-S

---oOo---

MR. WIETGREFE: Good evening. Welcome to tonight's public scoping meeting for the Better Market Street Project. My name is Wade Wietgrefe. I work for the Planning Department and I will be leading the environmental review process as required by the California Environmental Quality Act so I'm going to refer to that as CEQA and the process is for an environmental impact report and I'll call that an EIR. I'll be working with my co-workers at the Planning Department; Rick Cooper, Chris Thomas, among numerous others, and then Aaron Carter, Liz Antin, Mike Davis from ICF will be the CEQA consultants for the project. I'd also like to introduce Al Williams. He's going to help facilitate tonight's meeting when we get to the public comment portion. He's also part of the CEQA consultant team.

Representing the project's sponsor is Simon Bertrang and Kelli Rudnick from San Francisco Public Works, and Britt Tanner from the San Francisco Municipal Transportation Agency.

Before I go into this evening's agenda, just a few things to make note of: At the front

table there was a sign-in sheet. Please do sign in. We'll keep you informed throughout the CEQA process. There was an agenda for tonight's evening, a copy of this evening's power point. There were some comment and speaker forms which I'll, cards, which I'll talk about in a minute, and then there were some various items that we encourage you to take as well. The restrooms are located down the hallway to the left behind me. Please turn off the ringers on your cellphones. I just double-checked mine. So if you need to get up at any point to grab any of the materials from the back, please do so and use the aisle to my right, your left. We're going to try to keep this free for later during the public comment period.

So now to the purpose of tonight's meeting. The EIR process as required by CEQA is a very public one and this is the first step in that process. The main reason for this scoping meeting is to solicit your comments or suggestions concerning the scope and content of the EIR. This is your opportunity to assist the Planning Department by sharing any information you may have that would be useful in preparation of the EIR. Your comments could help to identify significant environmental issues, determine

Page 5

the depth of analysis appropriate to each issue or identify reasonable project alternatives. We're not here to discuss or debate your views about the proposed project but rather to receive your input on the content of the EIR that we're going to prepare.

So following this introduction the agenda for tonight is a brief presentation by Simon, representing the project sponsor, about the proposed project. Then I'm going to present about CEQA, give you a little overview on the basics, the purpose of the scoping period, and the next steps for CEQA, and so that's going to take about twenty minutes, and then the real purpose of tonight is the public comment period. We're here to listen and receive your comments and information. This is not a question and answer session. Although we may ask questions for points of clarification. If you'd like to speak during the public comment portion of this meeting, please complete a speaker card which was at the front table, and we have -- we have speaker card boxes up front and back at the refreshment table or just raise your hand and we'll come and pick them up.

Please note speakers will be given three minutes to speak. We have an official court reporter present this evening who's going to make a verbatim

Page 6

transcript of tonight's proceedings. The transcript will become part of the public record for the CEQA process. In addition to speaker cards there is also a comment form that is at the front table. You can write comments on the form and drop them off at the table near the door or at the refreshment table or up here any time throughout the meeting. You do not have to speak if you just want to submit written comments. After all speakers have commented we'll wrap up the meeting. So with that, I'm just going to turn it over to Simon Bertrang, San Francisco Public Works, who will speak to you about the proposed project.

MR. BERTRANG: Thank you, Wade. As he said, my name is Simon Bertrang. I'm with San Francisco Public Works and I am representing a large team of City and County of San Francisco agencies working on this project. Among them, San Francisco MTA, and the San Francisco Planning Department in their urban design capacity rather than in their environmental review capacity, and many other agencies.

Better Market Street is the proposal to reconstruct 2.2 miles of Market Street between Octavia Boulevard and The Embarcadero and it's a complete reconstruction so the last time this

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happened was in the 1970's when BART built the tunnels, and the MUNI Metro, BART tunnels and MUNI Metro, and built everything you see out there today; all the brick sidewalks, and all of the london plane trees you see planted there. All of that was installed in the 70's. There was some minor modifications in the 80's to bring back some surface transit but at that time Market Street was narrowed from six travel lanes to four in order to build wider sidewalks, and to build this wonderful boulevard we see out there today.

This is the City of San Francisco's proposal to rework Market Street to reallocate space on Market Street to allow us to use it in different ways during the 21st century and so our project is to propose the complete reconstruction and what we're trying to do is to achieve a number of goals. We have grouped them into five categories and if you get the Notice of Preparation, you'll see a complete description of the projects and these five goals. Basically, they break down into improvements to transit so we're trying to implement some transit priority on Market Street to increase surface transit capacity speed reliability as well as accessibility. You'll see many of our transit islands, they are not

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ADA accessible and the project is proposing to make them so. So improved transit is one of the major goals.

A second goal is to support the planned growth and economic development of San Francisco so there are a lot of projects already in the pipeline having to do with the reconstruction of the street; the redevelopment of the street. This project would support that growth by redeveloping -- by reconstructing Market Street to allow for its continued use and for more use as development increases along Market Street. Key to this and sort of buried in here is the idea that it's really our cultural, civic, and commercial center. Market Street is a very important street in San Francisco and we want to build a vital public space that has plenty of opportunities for people to use the street as a public space so that's the second goal.

The third is about pedestrians and it's really about pedestrian safety. It's also just encouraging pedestrian mobility along the street and of course accessibility so third goal, pedestrians.

Fourth, bicycles. We've seen tremendous growth in bicycling on Market Street and we want to figure out a way to build a bicycle facility that

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will make a safer bicycle facility and also encourage more bicycling.

Fifth, we want to maintain access, sort of utilitarian access to the street, in terms of taxis, paratransit, and of course commercial deliveries. We need to make sure that businesses along the street, both personal, people needing to get to those businesses, and their commercial deliveries are still able to happen along Market Street.

So here's a map. And again, I encourage you also to pick up our fact sheet, our one-page fact sheet, double-sided, the back. It provides a summary at the same level of detail that I'm giving here tonight. This shows the 2.2 miles between Octavia and The Embarcadero of -- for Market Street and you'll see one of our alternatives that we're proposing to analyze is an alternative that brings Mission Street into the mix and so -- and a parallel section of Mission Street, 2.3 miles, between Valencia Street and The Embarcadero, would also be analyzed in that alternative, and you can also see some connections back to Market Street at Tenth, and at Valencia would also be analyzed, and includes bicycle connections.

So what we're proposing is to analyze three

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alternatives. All of these alternatives include or I'll go through first the first alternative which is alternative one which is the reconstruction of Market. That will have substantial improvements to pedestrian conditions, bicycling facilities, the transit service I described, changes to transit stops, and innovations to street lighting so improvements to public space. All of the projects will include those improvements. The main thing that alternative one does in distinction of alternative two is alternative one proposes to include restrictions to private automobiles along Market Street, basically, preventing turns on to Market Street from Van Ness to The Embarcadero with a few exceptions but preventing most turns on to Market Street to reduce vehicular traffic on Market Street. What that allows us to do is to speed transit on Market Street and also increase safety for pedestrians and bicyclists.

Alternative two, it's the same project, but instead we look at well what would happen if we have a more moderate level of automobile restrictions. What if we didn't restrict as many turns on to Market Street? That will policy makers and the public to see within the EIR -- they'll be able to see what are

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the benefits of those automobile restrictions in terms of improved transit speeds and reliability, improved pedestrian safety, and what are the cons of those restrictions in terms of increased traffic on adjacent streets and at adjacent intersections. So those two alternatives are really paired and are really about understanding the book ends or the pros and cons of introducing automobile restrictions to Market Street.

Paired with that also is changes to the loading on Market Street. Right now, we have loading bays along Market Street that provide loading access at the center of blocks. Alternative one would propose to move those loading zones to the intersecting streets, so we remove the loading zone to the center block and instead put them at the intersections. Alternative two would look at a more moderate alternative where we kept most of those center loading zones.

Alternative three is the one where we bring Mission Street into the mix so we say -- we pair alternative one with the introduction of a cycle track on Mission Street.

So those are our three alternatives, but complicating things are that we have two design

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options within the first two alternatives so the Market Street alternatives have two design options and it basically boils down to how we treat the cycle track. So design option "A" which again applies to both alternative one and two would include an improved or would include basically a shared lane with two center lanes which would be transit only, MUNI only, and then we'd have two shared lanes--so four total travel lanes--and those shared lanes would be where the local buses, the commercial traffic, the taxis, the fare transit, and the bicycles all travel. And alternative two would also include a lot of private automobiles. Alternative one, those private automobiles would not be there but we have a shared lane for the cyclists.

Design option "B" says what happens if we take and create a separated cycle track, and you can see the green here, there's a 7-foot wide cycle track on either side of the street so you still have the four travel lanes that I described before. Now the shared lanes are all those vehicles I described before but without the bicycles. The bicycles have been moved to their own lane that's separated, vertically separated -- I don't know if you can see the little diagram. It's a little bit above the

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asphalt roadbed of the vehicular traffic. Transit stops on the curbside that goes behind the transit stops so you're able to separate the buses as they're pulling over to load and unload from the cyclists that are traveling down the street. Those two design options are both again embedded in alternatives one and two, and we'll be looking at both design options with both sets of automobile unloading designs.

Alternative three, again, says let's move the cycle track, let's put a cycle track on Mission Street. That would be paired with alternative one, design option "A," so it would say most automobile restrictions along Market Street and the shared lane on Market Street because we'd move the protected cycle track to Mission Street. It would not be vertically separated but there would be a buffer that would create a safe cycle track along the length of Mission Street, and when we say, "Mission," we mean Otis and McCoppin as well so it would connect all the way to Valencia.

So just to understand, most of the difference in the design options has to do with how we treat that cycle facility and these are examples from the City today. You can see a shared lane on the left with the bicycles traveling through a bus

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stop so as the buses would have to pull over the cyclists would have to go around the buses to the left versus on the right where you see a separated bicycle facility where the transit is able to stop, unload and load on to a transit island, while the cyclists are able to pass behind them without interfering with that transit movement. That is the main difference between the various design options and then again to get back to the two alternatives.

So alternative one and two are different ways of looking at vehicular circulation on Market Street itself. Both projects include all of the improvements that I described in terms of shortening crossing distance for distances for pedestrians, improving the north side intersections at Market Street to make them one-stage crossings instead of the multi-stage crossings we have today, and trying to make those intersections more diagonal at the northern end, creating fold-outs which are basically sidewalk extensions to shorten those crossing differences, new crosswalks. So all of these pedestrian improvements, improvements to the public space of Market Street, in terms of the replacement of all the brick, the planting of new trees with better subsoil conditions to actually support healthy

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trees, all of the improvements that we see on Market Street, the difference between the two alternatives is focused exclusively on what level of automobile restrictions, and what level of loading do we move to side streets.

Alternative three then brings in the 2.3 miles, Otis, McCoppin, Mission, along a parallel track and moves the Mission Street -- moves the cycle track to Mission Street which would also then require us to move the buses on Mission Street to Market Street so there -- that will be fully analyzed and that is always paired with alternative one, design option "A."

This is our schedule. We're right in the middle here of the environmental review process. We have another two years of expected movement through the EIR process with a draft EIR, and then a collection of public comments on that EIR, and the issuance of a final EIR. We can start design while the EIR process is underway but we cannot complete it until after the City has made a decision, after the EIR is completed, of which alternative, which design option to pursue and then we can start construction in 2018. That's it.

MR. WIETGREFE: Thank you, Simon. So before

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we go into the public comment period, I want to just briefly explain CEQA a little bit more to give you some insight into sort of the comments that we're looking for. CEQA applies to private and public projects that require discretionary actions so that is an individual or a decision maker has discretion whether or not to approve a project. For example, the San Francisco Board of Supervisors makes a lot of actions on various things and most of those things are subject to CEQA. So what CEQA requires is public involvement in the planning process, an examination of the physical environmental impact of the proposed project and this often requires extensive technical studies that can take many months to prepare so that's why it's really important now to get public comment on the scope potentially of those studies. It requires the avoidance or minimization of physical environmental impacts with feasible mitigation alternatives. That's a lot of jargon but I'll hopefully try to explain that in a minute.

And the basic purpose of CEQA is to provide public agency decision makers to consider and document the environmental implications of their actions prior to taking an action. As Simon mentioned, they can't, nobody can approve a project

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until CEQA is done because CEQA is intended to be an informational document.

CEQA is based on State statute so the State Legislature writes the law. It's been around for about forty years. It's based on another State agency interpreting that law so half this book is like the State law and then the other half is how the State interprets that. It's based on case law so people love to sue CEQA unfortunately, in my opinion, but it's on how the Court interprets the law as well, and then it's also based on local practices, so in San Francisco, we have the Administrative Code, Chapter 31, and we have a detailed process for following CEQA as applied here.

So what CEQA is not, it's not an approval document. I don't think that a lot of people understand that. It's just a disclosure document. No one is actually approving a CEQA document and it doesn't mean that once CEQA is done that any project actually got approved. And CEQA does not weigh in on the merits or benefits of a project. In addition, CEQA typically does not analyze the social, demographic, and economic impacts of projects.

So in the end, this is my summary of CEQA, it's unlike other single-topic environmental laws

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like the Clean Air Act, the Clean Water Act. CEQA encourages the protection of all aspects of the environment by requiring preparation of multi-disciplinary environmental impact analyses. The CEQA process will analyze eighteen environmental topics with several questions underneath each environmental topic. At the front table there was a copy of what's called an "Initial City Checklist," and that document identifies a lot of those questions or identifies all the questions that we'll analyze as part of CEQA.

So for example, particular issues in transportation, we'll look at how will the proposed project affect transit travel times. Now, Simon mentioned alternative three is going to move the buses on to Market Street so we'll analyze what the effects of that will be. For noise, we'll look at what will the effects of construction be on nearby sensitive uses. For each of these environmental topics, we use criteria to determine whether the project would result in a significant effect on the environment and this slide will hopefully illustrate that. A "Significant effect" on the environment means a substantial or potentially substantial adverse change in the environment. Before we know if there's going

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to be an impact we first have to define what we're comparing an impact to and that's called the baseline. We can't identify significant impacts if the baseline condition is poor and the project doesn't make it any worse. So for example if traffic is poor today, and the project doesn't make traffic any worse, we can't call that a significant impact.

Next we identify a threshold of significance or a significance criteria. It's what we use to determine whether there would be a significant impact or not. For example, we use a quantitative threshold for high-rise buildings to determine whether there would be significant wind impacts to pedestrians. So if we set a criteria and the project would result in an impact to the right, that's a significant impact. If the criteria is less than that it's less than significant. If you have a less than significant impact, you don't require mitigation, you don't require alternatives. However, if your project does have a significant impact then we have to try to reduce that and that's where the terms, "Mitigation" and "Alternatives" come into play. Alternatives are required when the mitigation can't push that back to less than significant.

So this is not showing up green but this --

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I'm not going to go over this in detail. Simon explained this a little bit in his presentation and there's -- it's in the power point, it's on the poster board back there, but I'll highlight just a couple things. The first step of the EIR process is what's happening right now. We issued a Notice of Preparation on January 14th and there's a 30-day public comment period. NOP is also available on the back table and I encourage you to take one if you haven't already. And then over the next several months the Planning Department will issue, will prepare and issue several documents to the public, including responding to public comments following the draft EIR period which you see in the middle. So please notify the Planning Department if you want to stay up-to-date regarding release of these documents.

And then the last step in the CEQA process would be certification of the EIR, and again, certification doesn't mean that the project is approved but rather the individual decision makers will use that EIR when deciding what project that they ultimately may or may not approve. So before we open up the meeting for public comment, if anyone is interested in submitting comments, they can submit them here tonight or they could submit them to the

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Planning Department by 5 p.m. Friday, February 13th, to the address listed on the agenda or the NOP, and you can also contact me if you have any questions about the environmental review process.

So now to the public comment period. Do we have a sense of how many speaker cards --

MR. WILLIAMS: There are none --

MR. WIETGREFE: -- none so far.

MR. WILLIAMS: We don't have any so far.

MR. WIETGREFE: Would anyone like to speak?

I can put you on the spot right now. I was going to give a whole spiel about this. Well, I'll just go through this just in case you guys decide you want to speak. Speakers will be limited to three minutes. I understand that you may have more to say than three minutes allows so please just consider your verbal comments a summary of the comments that you may also provide in written -- as you see, we have a court reporter here so they'll become part of the official transcript. And again, the purpose of this process is to gather information about the environmental review. It's not to weigh in about the merits of the project so you can speak separately if -- to Simon about the merits of the projects and the project-sponsored team. I'm sure he'd be happy to

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speak to you about that. So I'm going to turn it over to Al Williams. He'll help facilitate if we do have speakers at this portion of the meeting.

MR. WILLIAMS: Thank you, very much.

MR. WIETGREFE: Thank you.

MR. WILLIAMS: Okay.

MR. WIETGREFE: Just one other item. There's a Planning Department General Feedback form -- we're always looking for feedback on how we interact with the public and so there -- that's also at the front table and we really encourage you to fill that out.

Thank you.

MR. WILLIAMS: Okay. Good evening everyone again. We're at the public comment period. Anyone, as I said, there are no speaker cards left in the -- put in the box so if there is someone who would like to speak, I'd ask you to come up this aisle, kind of come up to the podium, offer your comment. Marsha Maloof, our assistant here will be assisting me I, should say, in this process. So we will -- she'll let us know when you get to the one-minute point. You have three minutes for your entire comment so when you get passed your two minutes, we'll let you know. So any speakers at this point?

SPEAKER: I would like to know if the green

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lane for the bicycles are going to be taking away part of the sidewalk that the pedestrians use? Are you going to be cutting into the sidewalks to make those lanes?

MR. BERTRANG: The short answer is yes.

That's exactly the difference between design option "A" and "B." Design option "A," with the shared lane, would reduce the sidewalk lane less than design option "B" would so -- it's more detailed than that but if you're looking for a one-word answer the answer is yes.

MR. WIETGREFE: And just as a reminder, it's not really intended to be a Q and A forum. We can close the public comment period if no one wants to talk and then we can speak with you afterwards if you have specific questions.

MR. WILLIAMS: Any other public comment?

(No response)

MR. WILLIAMS: Seeing and hearing none then I guess we can close the official public comment period. There are forms in the back as well that can be used to provide written comments if you care to this evening. As Wade pointed out, you can submit them later on but they are the opportunity during the public comment period to provide additional comment.

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MR. BERTRANG: I will stay around if you have questions.

MR. WILLIAMS: Okay. Well, thank you all very much for coming and good night.

(Whereupon the foregoing proceedings were concluded.)

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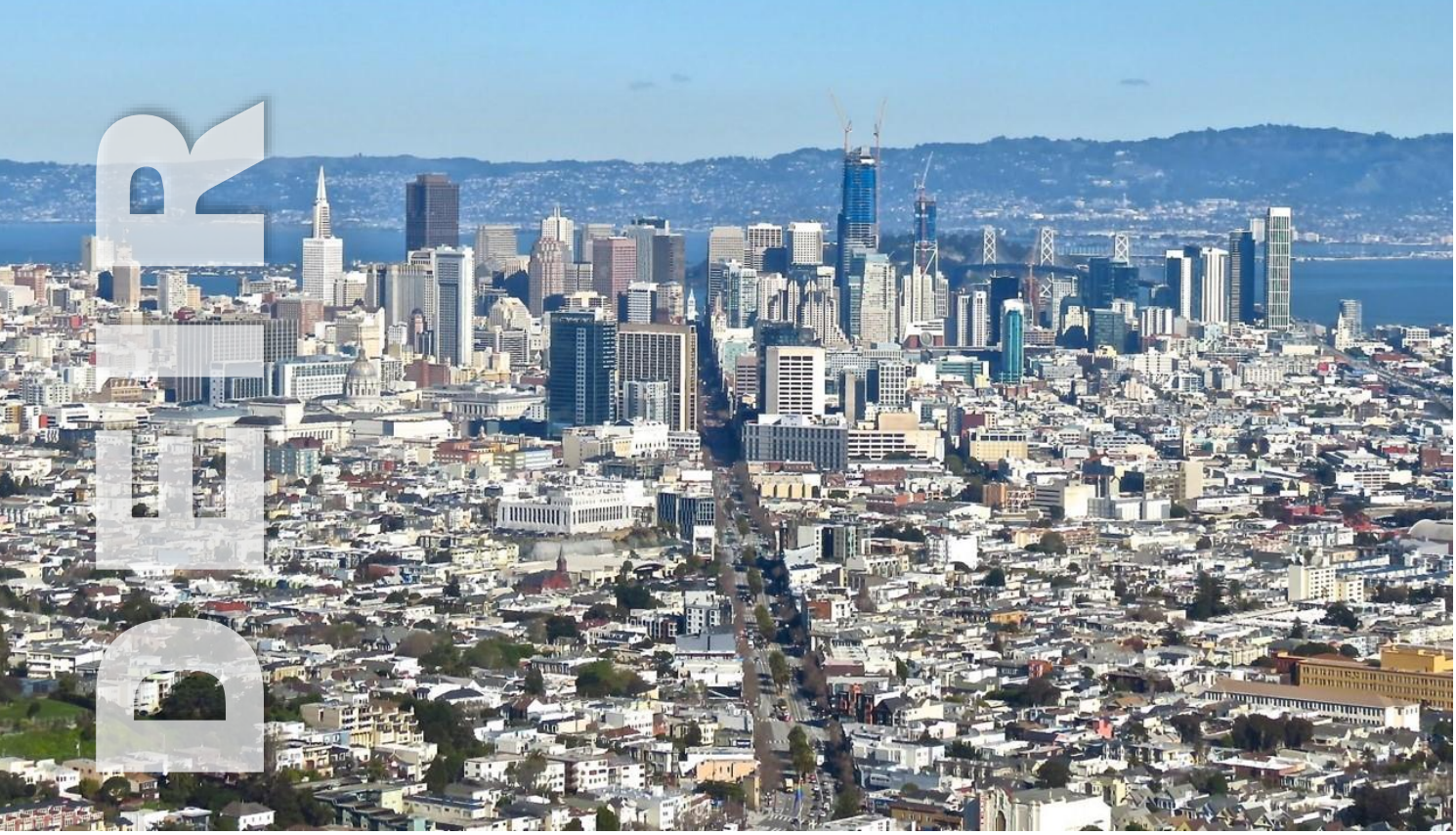

DRAFT ENVIRONMENTAL IMPACT REPORT

Better Market Street Project EIR
APPENDIX 2: INITIAL STUDY

PLANNING DEPARTMENT
CASE NO. 2014.0012E

STATE CLEARINGHOUSE NO. 2015012027

	Draft EIR Publication Date:	**February 27, 2019**
	Draft EIR Public Hearing Date:	**April 4, 2019**
	Draft EIR Public Comment Period:	**February 28, 2019 – April 15, 2019**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:

Chris Thomas, AICP | 1650 Mission Street, Suite 400 | San Francisco, CA 94103 or christopher.thomas@sfgov.org

APPENDIX 2: INITIAL STUDY

SAN FRANCISCO
PLANNING DEPARTMENT

Notice of Availability of Initial Study

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

Date:	March 30, 2016
Case No.:	**2014.0012E**
Project Title:	**Better Market Street Project**
Zoning:	Various - Market Street between Octavia Boulevard and The Embarcadero Mission Street between Valencia Street and The Embarcadero, Valencia Street between Market and McCoppin streets and 10th Street between Market and Mission streets
Block/Lot:	Various
Project Sponsor:	San Francisco Public Works Simon Bertrang – 415-558-4045 Simon.bertrang@sfdpw.org
Staff Contact:	Chris Thomas – 415-575-9036 christopher.thomas@sfgov.org

This notice is to inform you of the availability of the environmental review document concerning the proposed project as described below. The document is an Initial Study, containing information about the possible environmental effects of the proposed project. The Initial Study documents the determination of the Planning Department that the proposed project may have a significant effect on the environment, and an Environmental Impact Report (EIR) is required. Preparation of an Initial Study does not indicate a decision by the City to carry out or not to carry out the proposed project. This Notice of Availability is available to download in English, Spanish, and Chinese language for public review web page (http://www.sf-planning.org/sfceqadocs). To request that a copy of the document be mailed to you in either Spanish or Chinese, please contact our automated voicemail system for Spanish and Chinese:

中文詢問請電: (415) 575-9010 Para información en Español llamar al: (415) 575-9010

Project Description: The Project Sponsor, San Francisco Public Works (Public Works), in coordination with the Citywide Planning Division of the San Francisco Planning Department and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement the Better Market Street Project. The Initial Study analyzes three possible alternatives and two design options for the Proposed Project. Alternatives 1 and 2 would redesign and provide various transportation and streetscape improvements to a 2.2-mile-long corridor generally encompassing Market and Mission Streets between The Embarcadero, Octavia Boulevard, and McCoppin and Valencia streets, including Hallidie and United Nations Plaza, and Charles J. Brenham Place (the Project corridor). Alternatives 1 and 2 each have two design options for bicycle facilities on Market Street. Alternative 3 would redesign and provide improvements to the 2.3-mile segment of McCoppin, Otis, and Mission streets between Valencia Street and The Embarcadero, as well as 10th Street between Market and Mission streets (Mission Street), in addition to providing the Alternative 1 improvements to Market Street. Each alternative consists of both transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic signals; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities.

The analysis provides an evaluation of the environmental effects of each alternative and design option. Based on the Initial Study, EIR, and other analysis and comment, one of the alternatives and design

options, or some combination of these alternatives and design options, will be proposed for consideration and approval.

- ***Alternative 1:*** Market Street (Complete Street and Transit Priority Improvements)
- ***Alternative 2:*** Market Street – Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)
- ***Alternative 3:*** Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission)

The key differences between Alternatives 1 and 2 relate to private vehicle access and commercial and passenger loading. Alternative 1 would restrict private vehicles on Market Street between Steuart Street and Van Ness Avenue in the westbound direction and between 10th and Main streets in the eastbound direction. Alternative 1 also would not allow commercial or passenger loading on Market Street, with the exception of paratransit users. Loading zones would be relocated from the existing bays along Market Street to on-street zones along adjacent side streets or parallel alleys. Alternative 2 would place fewer restrictions on private vehicles traveling on Market Street, with private vehicles allowed on more sections of Market Street than Alternative 1. In addition, fewer loading zones would be removed from Market Street under Alternative 2.

Alternatives 1 and 2 also include two design options for the bicycle facilities on Market Street, Design Option A and Design Option B. Under Alternatives 1 and 2, Design Option A, an enhanced version of the existing shared vehicle and bicycle lane along with painted sharrows (shared lane pavement markings) would be provided at locations where a dedicated bicycle facility is not already present. Under Alternatives 1 and 2, Design Option B, a new raised cycle track (i.e., a bicycle facility that is vertically separated from motor vehicle traffic and is for the exclusive or primary use of bicycles) would be provided the entire length of Market Street, except at locations where BART/Muni entrances or other obstructions do not allow it. Alternatives 1 and 2, Design Option B also would add a new protected cycle track on Valencia Street between Market and McCoppin streets.

Alternative 3 would provide the same modifications to Market Street as described under Alternative 1, Design Option A. However, Alternative 3 also would include modifications to Mission Street; Mission Street would be reconfigured to include one travel lane in each direction (with right-turn pockets where feasible), as well as a new protected cycle track in each direction. A new protected cycle track on McCoppin Street and a new contra-flow bicycle lane on Otis Street in the eastbound direction also would be provided to connect the bicycle network between Valencia and Mission streets. A new protected cycle track connection on 10th Street also would be added to connect facilities on Market and Mission streets. Alternative 3 also would relocate all existing transit service provided by Muni, Golden Gate Bridge Highway and Transportation District (Golden Gate Transit), and the San Mateo County Transit District (SamTrans) on Mission Street west of the new Transbay Transit Center to Market Street.

The Initial Study is available to view or download from the Planning Department's Negative Declarations and EIRs web page (http://www.sf-planning.org/sfceqadocs). Paper copies are also available at the Planning Information Center (PIC) counter on the ground floor of 1660 Mission Street, San Francisco. If you have questions concerning environmental review of the proposed project, contact the Planning Department staff contact listed above. Information about the Better Market Street Project may also be found at the following Web page, http://www.bettermarketstreetsf.org/. Any person may review the Initial Study. Public comments on the Initial Study and the Draft EIR will be accepted upon release of the Draft EIR. Written comments should be addressed to Sarah B. Jones, Environmental Review Officer, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103, or emailed to sarah.b.jones@sfgov.org.

Better Market Street Project

Initial Study

Planning Department Case No. 2014.0012E

State Clearinghouse No. 2015012027

March 30, 2016

City and County of San Francisco

Planning Department

SAN FRANCISCO
PLANNING DEPARTMENT

Written comments should be sent to Sarah B. Jones, Environmental Review Officer, San Francisco Planning Department, 1650 Mission Street, Suite 400, San Francisco, CA 94103 or Sarah.B.Jones@sfgov.org.

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Glossary

Included as an attachment

Acronyms and Abbreviations

2010 Clean Air Plan	Bay Area 2010 Clean Air Plan
AB	Assembly Bill
AB 939	California Integrated Waste Management Act of 1989
ABAG	Association for Bay Area Government
ADA	Americans with Disabilities Act
ADL	aerially deposited lead
ADMP	Asbestos Dust Mitigation Plan
APE	area of potential effect
AQTR	Air Quality Technical Report
ARB	California Air Resources Board
ASA	Archaeological Sensitivity Assessment
AWSS	auxiliary water supply system
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Blue Book	San Francisco's Regulations for Working in San Francisco Streets – 8th Edition
BMPs	Best Management Practices
BRT	Bus Rapid Transit
Building Code	San Francisco Building Code
CAC	Community Advisory Committee
Cal/OSHA	California Occupational Safety and Health Administration
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CGS	California Geological Survey
CH_4	methane
City	City and County of San Francisco
CO_2	carbon dioxide
CO_2E	carbon dioxide-equivalent
Cortese	Hazardous Waste and Substances Sites
CRHR	California Register of Historic Resources
DOE	San Francisco Department of Environment
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EO	Executive Order
FARR	Final Archeological Resources Report

FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
g	gravity
General Plan	San Francisco General Plan
GHG Reduction Strategy	Strategies to Address Greenhouse Gas Emissions
GHGs	greenhouse gases
Golden Gate Transit	Golden Gate Bridge Highway and Transportation District
HRE	Historic Resource Evaluation
LUST	Leaking Underground Storage Tank
Market Street	The 2.2 miles of Market Street between Octavia Boulevard and Steuart Street, as well as Valencia Street between Market and McCoppin streets, McAllister Street between Market Street and Charles J. Brenham Place, Charles J. Brenham Place between Market and McAllister streets, and several adjacent streets intersecting both north and south of Market Street, including Gough Street, Page Street, 12th Street, Fell Street, Hayes Street, 9th Street, Grove Street, Hyde Street, 8th Street, 7th Street, Jones Street, Golden Gate Avenue, Taylor Street, 6th Street, Turk Street, Mason Street, 5th Street, Ellis Street, 4th Street, Stockton Street, O'Farrell Street, Kearney Street, Montgomery Street, 2nd Street, Sutter Street, Battery Street, Bush Street, 1st Street, Beale Street, Main Street, Drumm Street, Spear Street, and Steuart Street, north and south of Market Street.
MBTA	Migratory Bird Treaty Act
Mission Street	The 2.3 miles of McCoppin, Otis, and Mission streets between Valencia Street and The Embarcadero, as well as 10th Street between Market and Mission streets.
mph	miles per hour
MRZ-4	Mineral Resource Zone 4
MSW	municipal solid waste
$MTCO_2E$	million metric tons of carbon dioxide equivalent
MWh	megawatt-hours
N_2O	nitrous oxide
NFIP	National Flood Insurance Program
NOA	Notice of Availability
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NWIC	Northwest Information Center
Planning Code	San Francisco Planning Code
Planning Department	San Francisco Planning Department
POP	Proof of Payment
Project	Better Market Street Project

Proposed Project or Project	Better Market Street Project
Public Works	San Francisco Public Works
RCRA	Resource Conservation and Recovery Act of 1976
RPD	San Francisco Recreation and Park Department
RPS	Renewables Portfolio Standard
SamTrans	San Mateo County Transit District
SB	Senate Bill
SFCTA	San Francisco County Transportation Authority
SFDPH	San Francisco Department of Public Health
SFFD	San Francisco Fire Department
SF*go*	San Francisco County Transportation Authority's Congestion Management Program, and Advanced Technology/Information Systems Transit Signal Priority
SFHA	special flood hazard area
SFMTA	San Francisco Municipal Transportation Agency
SFPD	San Francisco Police Department
SFPUC	San Francisco Public Utilities Commission
SFUSD	San Francisco Unified School District
SMP	site-specific mitigation report
SoMa	South of Market
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TASC	Transportation Advisory Staff Committee
TIS	Transportation Impact Study
UN Plaza	United Nations Plaza
USGS	United States Geological Survey
UST	Underground Storage Tanks

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Initial Study
Better Market Street Project
Planning Department Case No. 2014.0012E
State Clearinghouse No. 2015012027

A. PROJECT DESCRIPTION

A.1. Introduction

The Project Sponsor, San Francisco Public Works (Public Works), in coordination with the Citywide Planning Division of the San Francisco Planning Department (Planning Department) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to implement the Better Market Street Project (Proposed Project or Project). The Initial Study analyzes three possible alternatives for the Proposed Project. Based on the Initial Study, subsequent environmental review, and other analysis and comment, a project proposal within the range of these alternatives will be proposed for consideration and approval.

Alternatives 1 and 2 would redesign and provide various transportation and streetscape improvements to a 2.2-mile-long corridor generally encompassing Market and Mission Streets between The Embarcadero, Octavia Boulevard, and McCoppin and Valencia Streets, including Hallidie and United Nations Plaza, and Charles J. Brenham Place (the Project corridor). For a more complete description of the Project location, please refer to the *Project Description*. Alternatives 1 and 2 each have two design options for bicycle facilities on Market Street. Alternative 3 would redesign and provide improvements to the 2.3-mile segment of McCoppin, Otis, and Mission streets between Valencia Street and The Embarcadero, as well as 10th Street between Market and Mission streets (Mission Street), in addition to providing the Alternative 1 improvements to Market Street. Each alternative consists of both transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic signals; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities. The three alternatives and design options are described more fully under A.4. Alternatives and Design Options.

Project Background

The Proposed Project has been developed through careful consideration of integrated design drivers and priorities within the City, as well as an extensive public outreach process in defining such priorities. The Proposed Project was first considered in the early 2000's under the San Francisco County Transportation Authority (SFCTA), focusing on a series of near-term, low-cost improvements to Market Street to improve the user experience for transit users, bicyclists, and

pedestrians while still accommodating necessary motor vehicle traffic.[1] The Proposed Project then progressed into a "complete streets" project with the goals of decreasing transit travel time, improving pedestrian circulation and safety, creating a safer and more inviting bicycle route, and accommodating necessary motor vehicle trips. Public Works, SFMTA, and the Planning Department also became involved during this conceptual, preliminary phase. As the Proposed Project development process further progressed and initial public comments were heard, the agencies determined that the Proposed Project should address the long-term needs of the Project corridor, in addition to the near-term improvements needed, to enhance the safety and accessibility of all users of the roadway. In consideration of the existing operation of the Project corridor and the public outreach process, several key design drivers were identified in December 2011, including improving mobility, enhancing access and the public realm experience, reducing conflict and friction between travel modes, establishing a unique identity, and integrating actions with form, street, and function. These initial design drivers formed the basis for the conceptual designs considered as part of the Proposed Project.[2]

Phase I

Formal public outreach for the Proposed Project's conceptual design began in early 2011 as part of Phase I. Phase I involved a public visioning process and conceptual planning and design phase. People from both the immediately adjacent neighborhoods and all over the City provided broad input through a series of coordinated workshops, online comments, social media, and other outreach venues. Three rounds of public outreach workshops and webinars were conducted from May 2011 to July 2013. Public notices for the workshops and webinars were distributed throughout the City. The public notices included, but were not limited to, press releases; postcards and flyers (in several languages) published as posters and bus cards; public service announcement videos aired on SF Gov TV; over 1,000 postcards hand-distributed; multi-language bus posters placed in bus shelters on Market Street; Better Market Street email newsletter blasts distributed to over 5,000 people per round; hand-written notices sent to property owners along Market Street; workshop announcements posted via social media; and announcements and updates provided on the Better Market Street website at *www.bettermarketstreetsf.org*.

The first round of public outreach included a series of public workshops and webinars, as well as public participation surveys and focused on building momentum for the Proposed Project, soliciting input on perceptions of Market Street, and discussing the vision and goals and how the public can effectively engage in the development process. A second round of public workshops and webinars were held in July 2012 to showcase the proposed improvements along Market Street and collect public feedback. The purpose of the second round was to continue to engage the public, present updated information, present improvements suggested for the design options,

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1 San Francisco County Transportation Authority. *Market Street Action Plan*. February 24, 2004. Available at http://www.sfcta.org/transportation-planning-and-studies/current-research-and-other-projectsstudies/market-street-studies. Accessed June 1, 2015.

2 Perkins+Will Consultant Team. *Integrated Findings & Design Drivers, Better Market Street Existing Conditions & Best Practices*. December 7, 2011. This document is on file and available for public review as part of Case File No. 2014.0012E.

and outline specific impacts and trade-offs for themes. Major themes included concepts for bicycle facilities, public space, and efficient management of public and private transportation. Major concerns included safety along Market Street for pedestrians and bicyclists and an overall sense of security along the corridor. A third round of workshops were held in July 2013, with the objective of discussing the conceptual design proposals, highlighting conceptual designs that came directly from public feedback in the prior two rounds, and demonstrating the trade-off decisions to be considered in the conceptual design. The Mission Street option also was introduced during the third round of public workshops (in the fall of 2012) to address constraints associated with providing adequate space for all users of Market Street.

A Community Advisory Committee (CAC) was established during Phase I outreach to provide feedback between the Project team (i.e., Public Works, SFMTA, and the Planning Department) and local residents, business owners, and community representatives. An expanded CAC has been selected for Phase II outreach (discussed further below) and generally meets once a month.

Through the community outreach process, several design priorities were established in coordination with the Proposed Project's goals and publicly-identified design drivers. Based on the design priorities and design drivers, such as improving pedestrian and bicyclist mobility and safety, and improving transit speed, reliability, and capacity, 17 potential Project corridor design concepts were identified for consideration. The 17 design concepts were evaluated by the interagency team at that time (Public Works, SFMTA, Planning Department, San Francisco County Transportation Authority, and San Francisco Public Utilities Commission [SFPUC]) based on their consistency with the Proposed Project goals and compatibility with community-identified design priorities. Of the 17 design concepts evaluated, three were selected to move forward in the design process. The remaining 14 design concepts substantially conflicted with the Proposed Project goals and design priorities and were removed from further consideration.

Phase II

Phase II is currently under way and involves the environmental review phase and preliminary engineering. Using the three design concepts identified under Phase I, the Project team developed three alternatives for the Proposed Project for evaluation under Phase II. The three alternatives for the Proposed Project (discussed in more detail under the *Project Characteristics* section below) were informed by the design priorities and developed to meet the following objectives.

- Provide faster and more reliable surface public transit for all users along Market Street between Octavia Boulevard and The Embarcadero.
- Maximize surface public transit system capacity in the Project corridor to support planned housing and job growth in the Project corridor consistent with adopted land use plans.
- Improve pedestrian safety, comfort, and mobility along and across Market Street from Octavia Boulevard to The Embarcadero.
- Maintain appropriate pedestrian capacity along and across Market Street from Octavia Boulevard to The Embarcadero.

- Improve safety, comfort, and mobility of bicyclists along the length of the Project corridor.
- Increase bicycle traffic capacity along the length of the Project corridor.
- Reduce friction and conflicts between transit, taxis, commercial vehicles, private vehicles, bicyclists, and pedestrians.
- Maintain access for taxis and paratransit and accommodate commercial deliveries.
- Enhance the public realm experience and stimulate economic development by increasing the liveliness, comfort, and attractiveness of the pedestrian experience along Market Street from Octavia Boulevard to The Embarcadero.
- Increase the diversity of activities by introducing more opportunities for social and public engagement on the sidewalk and in the plazas along Market Street from Octavia Boulevard to The Embarcadero.
- Create an integrated design, based on universal design principles, that enhances the accessibility for all users including pedestrians, cyclists, and transit riders along the Project corridor.
- Celebrate Market Street's historic role as a corridor for mobility, growth, and change on a civic scale.

A Notice of Preparation (NOP) of an Environmental Impact Report (EIR) and Notice of Public Scoping Meeting for the Proposed Project were published on January 14, 2015. The notices were circulated to each Responsible and Trustee Agency to indicate the Environmental Planning Division of the Planning Department's intention to prepare an EIR for the Proposed Project. The notices also were published in accordance with Chapter 31 of the San Francisco Administrative Code, with notices published in the newspaper, circulated to owners of all real property, and to the extent practicable, the residential occupants within 300 feet of all exterior boundaries of the Project corridor, as well as the Planning Department's neighborhood organization list and individuals having requested notification. The Notice of Availability of the NOP was distributed to over 6,500 addresses and copies of the NOP were placed in the Main Library in the San Francisco Public Library system.

Pursuant to State of California Public Resources Code Section 21083.9 and California Environmental Quality Act (CEQA) Guidelines Section 15206, a public scoping meeting was conducted on Wednesday, February 4, 2015 at 5:30 p.m. at 1455 Market Street. Oral and written comments concerning the scope of the EIR were accepted at this meeting. Written comments also were sent to the San Francisco Planning Department and were accepted through February 13, 2015. Twenty-two people attended the scoping meeting. Eight written comment letters were submitted, identifying concerns relative to roadway configuration, private vehicle access, traffic signals, surface transit, pedestrian/bicycle facilities, and commercial and passenger loading impacts.

The Phase II scoping process will inform affected agencies and the public about the Proposed Project, identify a reasonable range of alternatives to be evaluated, identify potentially significant environmental impact areas that should be studied, and may expand on the existing mailing list of agencies and individuals interested in the future actions related to the Proposed Project and environmental studies.

Overview of Analysis

This Initial Study has been prepared in accordance with CEQA Guidelines Section 15063, which provides for preparation of an Initial Study to determine if a project may have a significant effect on the environment. The Initial Study analyzes three possible alternatives and two design options for the Proposed Project at an equal level of detail. Based on the Initial Study, subsequent environmental review and other analysis and comment, a project proposal consisting of one of the alternatives and design options, or some combination of the alternatives and design options, will be proposed for consideration and approval. The analysis in this Initial Study discusses the direct and indirect environmental effects of the three alternatives and two design options for the Proposed Project, including both construction-related and long-term operational impacts. The three alternatives and two design options are described more fully under *Project Characteristics*.

In accordance with CEQA Guidelines Section 15130, this Initial Study also evaluates the cumulative effects of the Proposed Project in combination with other past, present, and reasonably foreseeable future projects that are anticipated to occur through 2040, the horizon year for the analysis.

The analysis is intended to disclose the environmental effects of the three alternatives and two design options for the Proposed Project. This Initial Study also provides the basis for preparation of the future Project EIR. The Initial Study assists in the preparation of the EIR by focusing only on the effects determined to be potentially significant, identifying the environmental effects determined not to be significant, and explaining the reasons for determining that potential effects would not be significant.

Relationship to Other Projects

The Proposed Project contains a specific set of transportation and streetscape improvements that aim to achieve the project objectives mentioned above. The project sponsor is also pursuing other separate projects and programs that would support some of these project objectives as well. These include major capital initiatives such as the construction of the Central Subway; state of good repair investments; operational improvements such as improved speed, reliability, and accessibility for Muni routes and enforcement of transit-only lanes; safety improvements; traffic signal priority network enhancements for transit; and land use planning.

Major capital initiatives intersecting the Project corridor include Central Subway, Van Ness Bus Rapid Transit (BRT), Geary Corridor BRT, the 2nd Street Improvement Project, the 6th Street Improvement Project, and streetscape improvements to Polk Street.

The Central Subway Project, approved in 2008, will extend the existing Muni Metro T Line from the 4th and King streets Caltrain station to Chinatown and provide stations in the SoMa Area, Union Square, and Chinatown. The new Muni Metro line will be located on 4th Street, crossing under both Market and Mission streets within the Better Market Street Project limits. Construction began in 2010 and is expected to continue through 2018. The Central Subway's estimated opening date is in 2019.

The Van Ness Avenue BRT Project will introduce transit improvements at the Market Street and Van Ness Avenue intersection, including new high-quality bus stations and shelters and transit

signal priority for buses crossing Market Street. Construction of the Van Ness Avenue BRT Project is anticipated to begin in 2016 and end in 2019.

The Geary Corridor BRT Project includes enhanced bus service and street conditions on Geary Boulevard from Market Street to 35th Avenue, including improvements similar to those proposed under the Van Ness BRT Project. Construction of the Geary Corridor BRT Project is anticipated to begin in 2017 and end in 2019.

The streetscape improvements on 2nd, 6th, and Polk streets are intended to enhance the pedestrian experience, improve bicycle and transit mobility, and support commercial activity. The 2nd Street Improvement Project extends from Market Street to King Street, the 6th Street Improvement Project extends from Market Street to Harrison Street, and the Polk Street improvements extend from McAllister Street to Union. Streetscape improvements to Polk Street are anticipated to begin in 2016 and end in 2018. These streetscape improvements also support the City's Vision Zero program (described below), which seeks to eliminate all traffic deaths in the City by 2024. Circulation changes on Eddy and Ellis streets include new two-way street conversions and turning movement restrictions. The Better Market Street Project will integrate the designs from these major capital initiatives to ensure consistency.

State of good repair investments within the Project corridor include replacing aging traffic signals on Market Street and the Transit Signal Priority program. The Transit Signal Priority program is an ongoing effort to reduce transit travel time and improve transit reliability. The MTA currently has transit signal priority at 150 intersections and is working to expand transit signal priority to 600 intersections by 2016. Other ongoing maintenance improvements include replacing the aging communication infrastructure and enhancing transit operations and maintenance, which is part of several Muni-related programs to keep vehicles in a state of good repair and enhance transit operations. These operational improvement investments were anticipated to begin in 2015 and end in 2019.

SFMTA has a number of planned and funded operational improvements, including the Muni Forward program (formerly known as the Transit Effectiveness Project) and increased enforcement. The Muni Forward program is a citywide project that is intended to improve speed, reliability, and accessibility for Muni routes through capital investments, service changes, and increased preventative maintenance. The Muni Forward program addresses service improvements, such as the creation of new routes, changes in the alignment of existing routes, the elimination of underused routes or route segments, headway and service hour changes, and changes to the mix of local/limited/express service on several routes. Service-related capital improvements include the Transfer and Terminal Point Improvements (i.e., new overhead wiring and poles, bypass rails, expansion of transit zones, and sidewalk modifications to accommodate passenger interchanges), overhead wire expansions, and the installation of new accessible platforms to improve system accessibility. The Muni Forward program also includes upgraded transit passenger information and communication systems that provide real-time arrival displays at major bus stops, along with shelters and streetlight upgrades. Roadway designs that prioritize transit also would be implemented. The Muni Forward program elements will be implemented on Market Street and the Better Market Street Project design will integrate with the planned improvements.

Several safety projects also are under way within the Better Market Street Project vicinity, including Vision Zero. The City's Vision Zero program seeks to eliminate all traffic deaths in the City by 2024. Approximately 40 projects, inclusive of those noted above and the Safer Market Street Project, have been identified to represent the type of work that will be completed to support Vision Zero on prioritized high-injury corridors throughout the City, and it is anticipated that at least 24 projects will be completed in the next two years. The Safer Market Street project includes improvements designed to increase the safety of pedestrians and bicyclists on Market Street between 3rd and 8th streets, such as turn restrictions to and from Market Street, new transit-only lanes, and new painted safety zones. The Vision Zero projects could create an expanded network of safety and streetscape improvements that connect with the Project corridor.

The City's 2011 $248 million Road Repaving and Street Safety Bond Program also involves improving City infrastructure, such as repaving streets, pedestrian and bicycle safety improvements, traffic flow improvements, and ADA upgrades. Streets intersecting the Project corridor are part of the bond program.

Land use plans in the vicinity of the Project corridor include the Transbay Center District Plan, the Civic Center Public Realm Plan, Eastern Neighborhoods Area Plan, Market and Octavia Neighborhood Plan, Western South of Market (SoMa) Community Plan, and the Central SoMa Community Plan. The Transbay Center District Plan is a land use and urban design plan for the new Transbay Transit Center on Mission Street and surrounding land south of Market Street to Folsom Street, between Steuart Street and 3rd Street. The Civic Center Public Realm Plan, which is roughly bounded by Franklin Street, Golden Gate Avenue and Market Street, is an interdepartmental project which will create a comprehensive, long-term vision for improvements to the streets and public spaces in the San Francisco Civic Center, including Civic Center Plaza and United Nations Plaza. The Eastern Neighborhoods Area Plan encompasses the Mission, Central Waterfront, East South of Market and Showplace Square/Potrero Hill neighborhoods and includes transitioning a portion of the existing industrial areas in these four neighborhoods to mixed use zones that encourage new housing, as well as maintaining key nodes for Production, Distribution, and Repair districts. The land use changes in the Eastern South of Market neighborhood within the Plan area would intersect with the Project corridor near Mission Street. The Market and Octavia Neighborhood Plan considers the general area within a short walking distance of Market Street between Van Ness Avenue and Church Street, intersecting the western portion of the Project corridor. The Market and Octavia Neighborhood Plan focuses infill development to enhance the established land use pattern and character and concentrates new uses where access to transit and services best enable people to be less reliant on automobiles. The Western SoMa Community Plan, located between Mission and Townsend streets and 4th and 13th streets, includes new planning policies and controls for land use, urban form, building height and design, street network, and open space to maintain the mixed-use character of the Plan area and preserve existing housing, while encouraging new residential and resident-serving uses. Similarly, the Central SoMa Plan provides a community vision that includes changes to zoning, height limits, and streets and open space for the southern portion of the Central Subway rail corridor, between Market and Townsend streets and 2nd and 6th streets.

Each of the aforementioned land use plans' environmental analyses contained future projections of employment and residential population growth. These projections are taken into account in the cumulative analysis. However, the land use plans would not by themselves result in physical land use changes. Rather, projects that implement the plans would result in changes on

individual sites within the plan areas, including changes in the use of existing buildings, additions, new construction, and demolition. Some individual land use projects in these plan areas are reasonably foreseeable. In addition to these land use projects in these plan areas, there are other individual projects in the vicinity of the Proposed Project that are reasonably foreseeable. **Table 1** summarizes land use projects within the vicinity of the Project corridor that were known (i.e., filed development applications) to the Planning Department as of October 2015.

TABLE 1. REASONABLY FORESEEABLE LAND USE PROJECTS IN THE PROJECT CORRIDOR VICINITY

Case Number	Address	Project Summary
2005.1101E_3	2 New Montgomery Street	Convert 25 hotel rooms to residential use and construct new 17-story addition (to 680-feet-tall) with 125 dwelling units.
2006.1523E_5	50 1st Street	New 61-story, 850-foot-tall building with 34 stories of office and a potential 5-story street-level urban room or atrium below 22 stories containing 124 dwelling units.
2007.0604E	1145 Mission Street	New 6-story building with 25 dwelling units and ground-floor retail.
2009.0159E_3	1540 Market Street	Demolition of existing 4-story building and construction of 37-story, 435-foot-tall building with 180 dwelling units.
2011.0409E	925 Mission Street (5M)	Substantial development of office, retail, residential, cultural, educational, and open space uses in the southwest quadrant of 5th and Mission Streets, including buildings 50 to 470 feet in height.
2012.0673E	119 7th Street	New 8-story, 85-foot-tall building with 39 dwelling units and ground-floor retail.
2012.0678E	19-25 Mason Street & 2-16 Turk Street	Replacement of existing parking lot with 12-story, 120-foot-tall building with 155 dwelling units and ground-floor retail.
2012.0877E-5	1546-1564 Market Street	Demolition of three existing buildings and construction of 12-story, 120-foot-tall building with approximately 109 dwelling units and 5,010 square feet of ground-floor retail.
2012.1531E	361 Turk Street and 145 Leavenworth Street	Construction of two 8-story, 80-foot-tall, group housing buildings with 234 group housing rooms.
2013.0154E	Moscone Center Expansion	Increase in size of Moscone Center from about 945,200 gross square feet to 1,156,300 gross square feet.
2013.0276E_3	350 Mission Street	New 30-story, 455-foot-tall building resulting in 420,000 square feet of office space, plus retail and parking.
2013.0511E	1125 Market Street	New 12-story, 120-foot-tall building with 164 dwelling units, ground-floor retail, and parking.
2013.1005E	22 Franklin Street	Demolition of existing auto body shop and construction of 8-story, 85-foot-tall mixed-use building with 24 dwelling units and ground-floor retail along Franklin.
2013.1049E	950 Market Street	Demolition of five structures and construction of 180-foot-tall mixed-use building with 316 residential units, a 310-room hotel with banquet, meeting, and sky lounge facilities, 24,000 square feet of convention office space, and 15,000 square feet of ground floor retail space.
2013.1179E	1700 Market Street	Construction of 8-story, 85-foot-tall residential building with 48 dwelling units and ground-floor commercial.

Case Number	Address	Project Summary
2013.1690E	1075 Market Street	Demolition of existing commercial building and construction of 8-story, 90-foot-tall mixed-use building with 99 units and 7,500 square feet of retail space.
2013.1753E	1066 Market Street	Replacement of 2-story building and parking lot with 14-story, 120-foot-tall building containing up to 330 dwelling units and about 1,885 square feet of retail space on Market Street.
2014.0241E	1028 Market Street	Replacement of 2-story commercial building with 13-story, 120-foot-tall mixed-use building with 186 dwelling units and ground-floor retail.
2014.0408E	1053 - 1055 Market Street	Replacement of existing commercial building with 10-story, 90-foot-tall, 155-room tourist hotel.
2014.0409E	1740 Market Street	Replacement of existing commercial building with 9-story, 85-foot-tall building with 110 dwelling units and ground-floor retail on Market Street.
2014.0484E	1699 Market Street	Replacement of 2-story industrial/commercial building with 9-story, 85-foot-tall building with 160 dwelling units and 4,500 square feet of ground-floor retail.
2014.0926ENV	1270 Mission Street	Replacement of single-story commercial building and surface parking lot with 13-story, 120-foot-tall mixed-use building with 199 dwelling units.
2014.1121ENV	1601 Mission Street	Replacement of gas station and car wash with 11-story, 120-foot-tall mixed-use building with 200 dwelling units and 10,400 square feet of retail space.
2014-000362ENV	1500 – 1580 Mission St	Partial demo of two commercial buildings and construction of a 380-foot-tall, 550-unit residential building with approximately 550 units and a 260-foot-tall tower with approximately 463,300 square feet of office/permit center space for City and County of San Francisco.
2015.004568ENV	10 South Van Ness Avenue	Replacement of an auto dealership with 40-story, 400-foot-tall building with 767 dwelling units and 20,600 gross square feet of retail/commercial space.

These area plans and individual projects will variously add residents, office and retail space, and employees and visitors throughout the Project corridor.

A.2. Project Location

The Project corridor is located along the boundary of or within several northeast quadrant neighborhoods of the City and County of San Francisco, specifically, the Western Addition, Mission, Downtown/Civic Center, South of Market, and Financial District neighborhoods.[3]

[3] This document references neighborhoods as defined by Planning Department neighborhood groups map: *http://www.sf-planning.org/index.aspx?page=1654*. These neighborhood names are not exhaustive and some sub-areas within these neighborhoods have additional names, including Hayes Valley, Union Square, and the Tenderloin.

Figure 1 illustrates the Proposed Project location and neighborhood boundaries. The Project corridor consists of two segments.

- ***Market Street:*** The 2.2 miles of Market Street between Octavia Boulevard and Steuart Street, as well as Valencia Street between Market and McCoppin streets, McAllister Street between Market Street and Charles J. Brenham Place, Charles J. Brenham Place between Market and McAllister streets, and several adjacent streets intersecting both north and south of Market Street, including Gough Street, Page Street, 12th Street, Fell Street, Hayes Street, 9th Street, Grove Street, Hyde Street, 8th Street, 7th Street, Jones Street, Golden Gate Avenue, Taylor Street, 6th Street, Turk Street, Mason Street, 5th Street, Ellis Street, 4th Street, Stockton Street, O'Farrell Street, Kearney Street, Montgomery Street, 2nd Street, Sutter Street, Battery Street, Bush Street, 1st Street, Beale Street, Main Street, Drumm Street, Spear Street, and Steuart Street.
- ***Mission Street:*** The 2.3 miles of McCoppin, Otis, and Mission streets between Valencia Street and The Embarcadero, as well as 10th Street between Market and Mission streets.

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is largely under the jurisdiction of Public Works and SFMTA. Public Works maintains authority over excavation in the right-of-way, street design, and the official grade of streets within San Francisco. Section 8A.102 of the San Francisco Charter grants SFMTA the exclusive authority to adopt regulations that control the flow and direction of motor vehicle, bicycle, and pedestrian traffic and to design, select, locate, install, operate, maintain, and remove all official traffic control devices, signs, roadway features and pavement markings that control the flow of traffic on streets and highways within City jurisdiction. Other Proposed Project elements would be implemented on public land under the jurisdiction of other public agencies (i.e., City and County of San Francisco Department of Real Estate – portions of Hallidie Plaza; Van Ness Avenue – California Department of Transportation). Refer to Section B, *Project Setting*, for more information regarding existing conditions.

A.3. Project Overview

The Project Sponsor, Public Works, in coordination with the Citywide Planning Division of the Planning Department and SFMTA, proposes to redesign and provide various transportation and streetscape improvements to Market Street and, potentially, to Mission Street. All proposed changes would be implemented on public land and the majority of the various Proposed Project elements would be implemented within the operational public right-of-way and existing transportation corridor. These elements of the Proposed Project are discussed under Alternatives and Design Options below. A detailed environmental review of these elements follows in Section D and E.

Refer to the *Glossary* for definitions of terms.

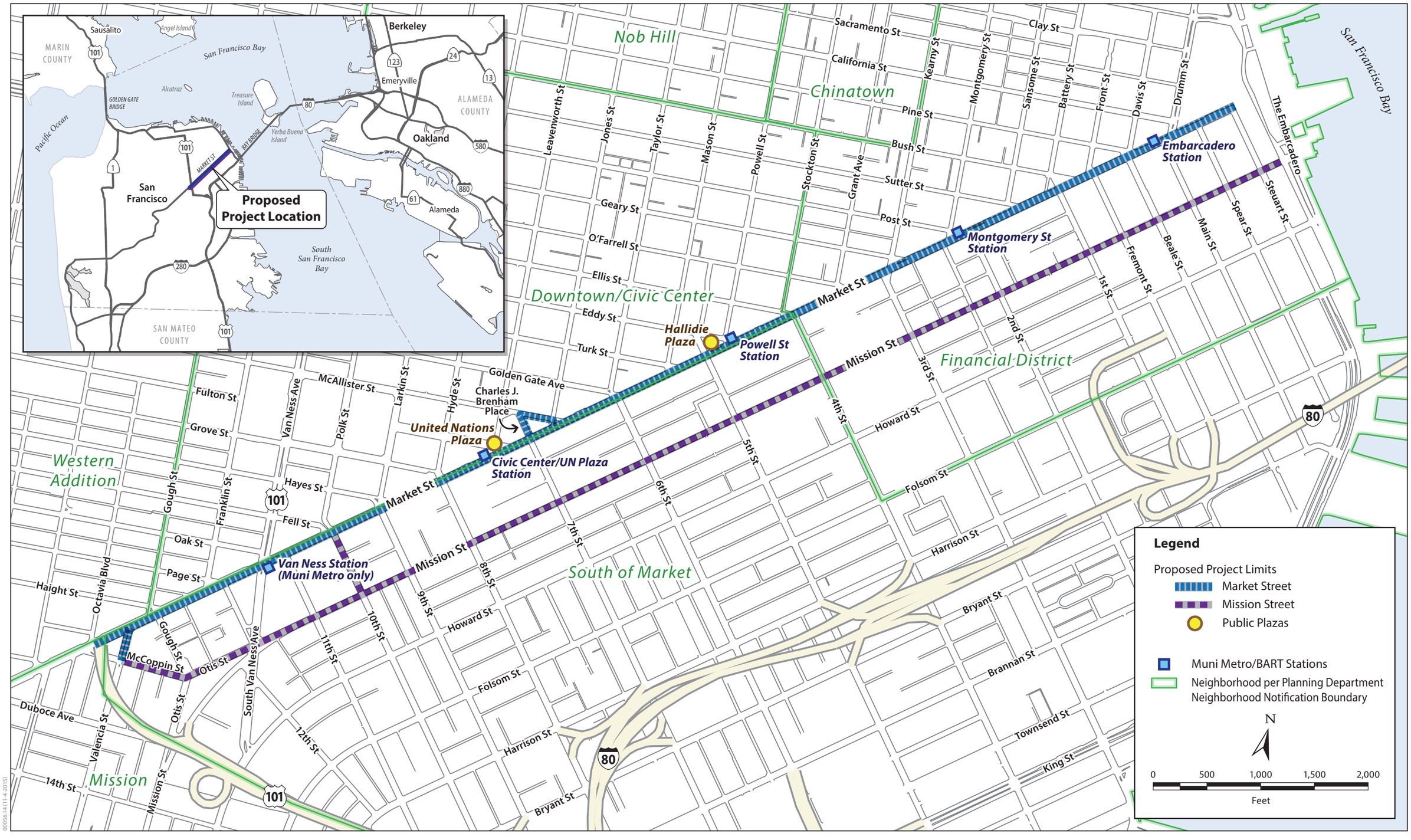

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Figure 1
Proposed Project Location

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A.4. Alternatives and Design Options

The Initial Study and EIR analyze three alternatives and two design options. The analysis provides an evaluation of the environmental effects of each alternative and design option. Based on the Initial Study, EIR, and other analysis and comment, one of the alternatives and design options, or some combination of these alternatives and design options, will be proposed for consideration and approval.

- ***Alternative 1:*** Market Street (Complete Street and Transit Priority Improvements)
- ***Alternative 2:*** Market Street – Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)
- ***Alternative 3:*** Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission)

The key differences between Alternatives 1 and 2 relate to private vehicle access and commercial and passenger loading. Alternative 1 would restrict private vehicles on Market Street between Steuart Street and Van Ness Avenue in the westbound direction and between 10th and Main streets in the eastbound direction. Alternative 1 also would not allow commercial or passenger loading on Market Street, with the exception of paratransit users. Loading zones would be relocated from the existing bays along Market Street to on-street zones along adjacent side streets or parallel alleys. Alternative 2 would place fewer restrictions on private vehicles traveling on Market Street, with private vehicles allowed on more sections of Market Street than Alternative 1. In addition, fewer loading zones would be removed from Market Street under Alternative 2.

Alternatives 1 and 2 also include two design options for the bicycle facilities on Market Street, Design Option A and Design Option B. Under Alternatives 1 and 2, Design Option A, an enhanced version of the existing shared vehicle and bicycle lane along with painted sharrows (shared lane pavement markings) would be provided at locations where a dedicated bicycle facility is not already present. Under Alternatives 1 and 2, Design Option B, a new raised cycle track (i.e., a bicycle facility that is vertically separated from motor vehicle traffic and is for the exclusive or primary use of bicycles) would be provided the entire length of Market Street, except at locations where BART/Muni entrances or other obstructions do not allow it. Alternatives 1 and 2, Design Option B also would add a new protected cycle track on Valencia Street between Market and McCoppin streets.

Alternative 3 would provide the same modifications to Market Street as described under Alternative 1, Design Option A. However, Alternative 3 also would include modifications to Mission Street; Mission Street would be reconfigured to include one travel lane in each direction (with right-turn pockets where feasible), as well as a new protected cycle track in each direction. A new protected cycle track on McCoppin Street and a new contra-flow bicycle lane on Otis Street in the eastbound direction also would be provided to connect the bicycle network between Valencia and Mission streets. A new protected cycle track connection on 10th Street also would be added to connect facilities on Market and Mission streets. Alternative 3 also would relocate all existing transit service provided by SFMTA Golden Gate Bridge Highway and Transportation District (Golden Gate Transit), and the San Mateo County Transit District (SamTrans) on Mission Street west of the new Transbay Transit Center to Market Street.

Table 2 summarizes the elements of the three alternatives and the two design options, specifically, changes to the roadway configuration; private vehicle access; traffic controls; surface transit including transit-only lanes, stop spacing, service, stop locations, stop characteristics, and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities. **Figure 2** illustrates the conceptual cross section designs for each alternative and design option.

Alternative 1

Roadway Configuration

In general, Alternative 1 would continue to provide four travel lanes on Market Street (two center lanes and two curb lanes between Franklin and Main streets). More than four lanes west of Franklin Street and only two or three lanes east of Main Street would be provided. Alternative 1 could include a reconfiguration of some intersections, including the addition of new curb bulbouts.

With Design Option A, the existing separated bicycle facility on Market Street would remain in place. Along the rest of Market Street in the Project area, the existing shared lane painted with sharrows would be widened, except where not feasible because of obstructions such as BART portals.

With Design Option B, a new one-way raised cycle track for bicycles would be constructed between the curb lanes and sidewalks on each side of Market Street, except where not feasible because of obstructions such as BART portals. A new protected cycle track also would be constructed on Valencia Street between Market and McCoppin streets.

Private Vehicle Access

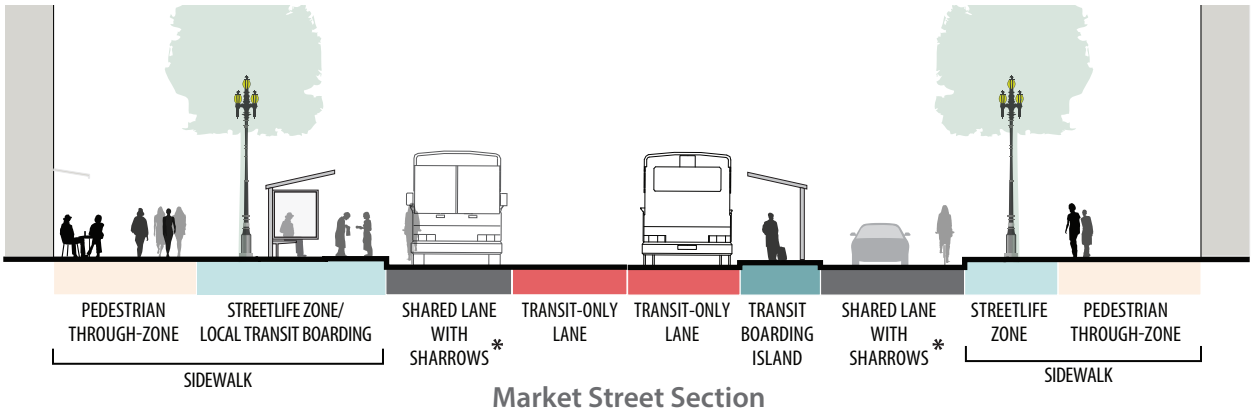
Market Street

Public transit vehicles would be permitted on the entire length of Market Street within the Project corridor. In addition to the public transit vehicles, only commercial vehicles, taxis, emergency vehicles, paratransit vehicles, and bicycles would be permitted on Market Street between 10th and Main streets in the eastbound direction and between Steuart Street and Van Ness Avenue in the westbound direction. Drivers of other private vehicles (i.e., all private vehicles except commercial vehicles, emergency vehicles, taxis, paratransit vehicles, and bicycles) would be diverted to other streets in the area. These restrictions would be in place 24 hours per day, 7 days per week. Therefore, the curb lanes in these segments would generally be shared by transit vehicles, taxis, bicycles, and other permitted vehicles.

Drivers would be alerted to the vehicle restrictions through a variety of means, including education, wayfinding (e.g., signage), and enforcement. Existing required private vehicle right-turn regulations on Market Street would remain.

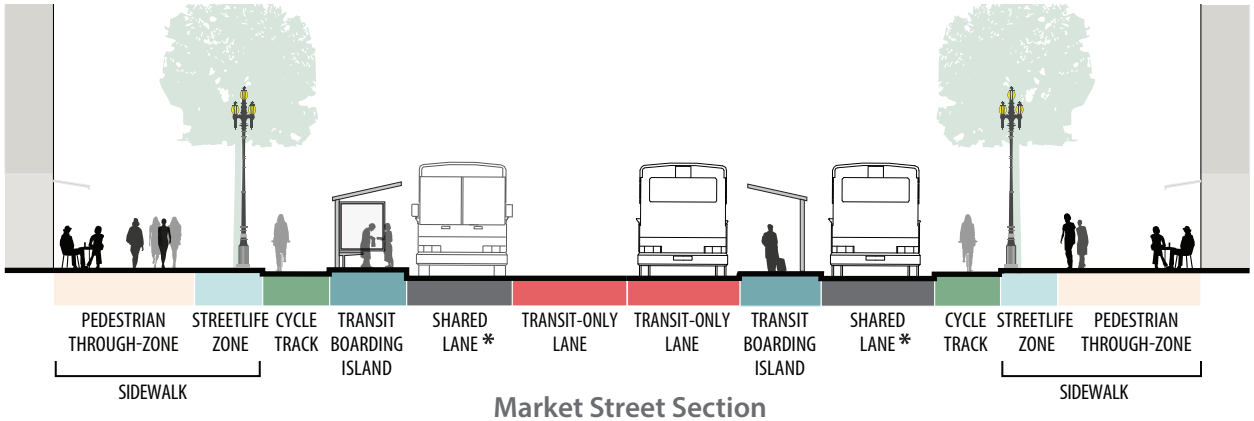
Alternative 1: Market Street (Complete Street and Transit Priority Improvements)
Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)

Design Option A



Market Street Section

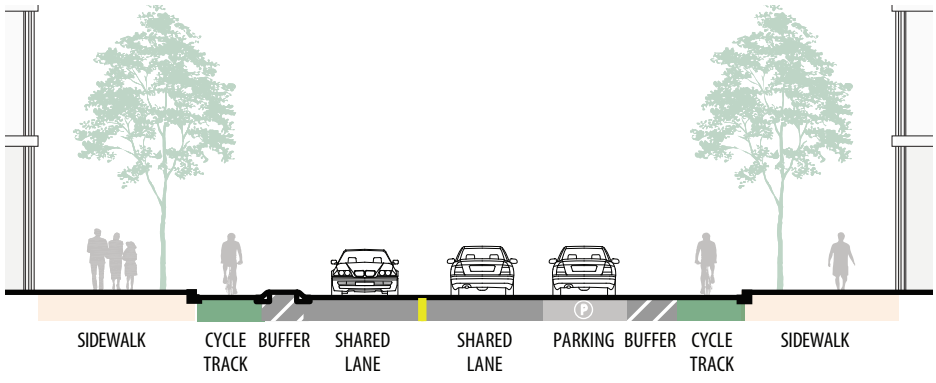
Design Option B



Market Street Section

* Under Alternative 1, the shared lane would include transit, taxis, paratransit vehicles, and commercial vehicles. Under Alternative 2, the shared lane would also allow other private vehicles for the portions of Market Street without new vehicular restrictions.

Alternative 3: Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission)**



Mission Street Section

** Alternative 3 includes the same improvements to Market Street as Alternative 1, Design Option A.

Source: San Francisco Public Works, 2014.

Not to Scale

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Figure 2
Proposed Project—Conceptual Illustrations

TABLE 2. SUMMARY OF THE THREE ALTERNATIVES FOR THE PROPOSED PROJECT[1]

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Roadway Configuration	Generally, two center lanes and two curb lanes between Franklin and Main streets. More than four lanes west of Franklin Street and only three lanes east of Main Street.	Same as Design Option A except new one-way raised cycle tracks in each direction on Market Street between the curb side lanes and sidewalks, and a new protected cycle track on Valencia Street between Market and McCoppin streets.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Generally, two vehicle travel lanes with right-turn pockets at intersections. Separated bicycle facility in both directions (and a protected cycle track on 10th Street between Mission and Market streets) and a floating parking lane (located between travel lane and new protected cycle track) on one side of the street.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Private Vehicle Access	Full private vehicle restrictions: Public transit, taxis, emergency vehicles, commercial vehicles, paratransit vehicles, and bicycles would have full access to curb lanes but other private vehicles would be prohibited between Steuart Street and Van Ness Avenue westbound and between 10th and Main streets eastbound. Existing required right-turn regulations on Market Street would also remain. Circulation changes would be made to McAllister Street between Market Street and Charles J. Brenham Place, Charles J. Brenham Place between Market and McAllister streets, and several adjacent streets intersecting both north and south of Market Street, including Gough Street, Page Street, 12th Street, Fell Street, Hayes Street, 9th Street, Grove Street, Hyde Street, 8th Street, 7th Street, Jones Street, Golden Gate Avenue, Taylor Street, 6th Street, Turk Street, Mason Street, 5th Street, Ellis Street, 4th Street, Stockton Street, O'Farrell Street, Kearney Street, Montgomery Street, 2nd Street, Sutter Street, Battery Street, Bush Street, 1st Street, Beale Street, Main Street, Drumm Street, Spear Street, and Steuart Street.		Moderate private vehicle restrictions: All private vehicles would continue to be allowed on the majority of the length of Market Street. A Transportation Impact Study will determine if new turn restrictions and required right-turn regulations should be added to the existing required right-turns at 6th and 10th streets. Circulation changes would be made to McAllister Street between Market Street and Charles J. Brenham Place, Charles J. Brenham Place between Market and McAllister streets, and several adjacent streets intersecting both north and south of Market Street, including Gough Street, Page Street, 12th Street, Fell Street, Hayes Street, 9th Street, Grove Street, Hyde Street, 8th Street, 7th Street, Jones Street, Golden Gate Avenue, Taylor Street, 6th Street, Turk Street, Mason Street, 5th Street, Ellis Street, 4th Street, Stockton Street, O'Farrell Street, Kearney Street, Montgomery Street, 2nd Street, Sutter Street, Battery Street, Bush Street, 1st Street, Beale Street, Main Street, Drumm Street, Spear Street, and Steuart Street.		Private vehicle restrictions for eastbound private vehicles on Mission Street between 1st and Beale streets. Southbound left-turn movements from 1st Street onto Mission Street and northbound right-turn movements from Fremont Street onto Mission Street would be prohibited for private vehicles.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Traffic Controls	Signal timing and control modifications and relocations, which could include replacement traffic signals, new turn signals, stop signs, and bicycle signals.				Signal timing modifications, which could include new turn signals and bicycle signals.
Surface Transit (Muni-Only Lanes)	Transit-only lanes would be extended between 12th and Davis streets in the westbound (outbound) direction and between 12th and Main streets in the eastbound (inbound) direction. Only transit and emergency vehicles would be allowed to use transit-only lanes.				Eastbound transit-only lane between 1st and Beale streets on Mission Street. The remaining existing transit-only lanes on Mission Street would be removed.
Surface Transit (Stop Spacing and Service)	Modified transit stop spacing and new stop locations to provide both Rapid service with the Rapid and express bus routes (i.e., 5R, 9R, 7R, 7X, 38R as well as the F Line), and to provide local service through the local bus routes (i.e., 2, 5, 6, 7, 9, 19, 21, 31, 38, L Owl, N Owl). In addition, bus routes 14, 14R, and 14X would continue to have drop-off only stops at Market Street and Steuart Street, and bus routes 81X, 10 and 11 (proposed to replace portions of route 12 in Muni Forward route changes) would continue to run on Market Street but would not stop. AC Transit bus routes 800 and 822 would also continue to stop on Market Street. Changes to F Line service on Market Street as a result on the new F Line track loop on McAllister Street and Charles J. Brenham Place.				All Muni, Golden Gate Bridge Highway and Transportation District, and San Mateo County Transit District transit service west of the new Transbay Transit Center would be moved to Market Street (except during Market Street event days and during unexpected events that close Market Street).
Surface Transit (Stop Location)	New, relocated and modified stops consisting of 16 curbside stops (7 inbound, 9 outbound) and 12 center boarding island stops (7 inbound and 5 outbound – see Figure 3).				Remove existing bus stops west of the new Transbay Transit Center; provide temporary bus stops for transit service rerouted to Mission Street during Market Street event days and during unexpected Market Street closures.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Surface Transit (Stop Characteristics)	Transit boarding island enhancements and expansion (length and width). Curbside stops would be located along the curb.	Transit boarding island enhancements and expansion (length and width). The new raised cycle track would be constructed between the curbside *island* stops and the sidewalk.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Remove existing bus stops; provide temporary bus stops for transit service rerouted to Mission Street during Market Street events and during unexpected Market Street closures.
Surface Transit (Infrastructure)	Full replacement of existing Muni streetcar rail tracks to maintain state of good repair; minor adjustment to location of existing streetcar rail tracks at limited locations; replacement of traction power system and Overhead Contact System (i.e., overhead wires) to maintain state of good repair and provide additional capacity; construction of Muni F Line track loop running one-way westbound along McAllister Street between Market Street and Charles J. Brenham Place and one-way southbound along Charles J. Brenham Place between McAllister and Market streets.				Maintenance and adjustment of Overhead Contact System on Mission Street to allow use during Market Street event days and during unexpected Market Street closures.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Bicycle Facilities	Widened shared lane where possible and painted with sharrows (i.e., bicycles share widened curb lanes with vehicular traffic) except at locations where existing separated bicycle facilities already exist (i.e., existing cycle track with buffer [posts] and bicycle lanes would remain).	New raised cycle track on Market Street. Bicycles would be vertically separated from vehicular traffic (i.e., the new raised cycle track would be slightly higher than the vehicle traffic road bed). New protected cycle track connection on Valencia Street between Market and McCoppin streets.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	New protected cycle track on Mission Street: Bicycles would be horizontally separated from vehicular traffic by a painted or physical buffer. New protected cycle track on McCoppin Street and new contra-flow bicycle lane on Otis Street in the eastbound direction to provide bicycle network connection between Valencia and Mission streets. New protected cycle track connection on 10th streets to connect Market and Mission streets facilities.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Pedestrian Facilities (Sidewalk Width)	Generally maintain existing sidewalk widths, except where the sidewalks would be narrowed (i.e., move existing curb) at locations to allow for wider center transit boarding islands or a wider shared lane; widened sidewalk including bulbouts to shorten crossing distances at some locations.	Narrow sidewalks (i.e., move existing curb) as needed to accommodate new raised cycle track and wider center transit boarding islands; widened sidewalk including bulbouts to shorten crossing distances at some locations.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Limited narrowing of sidewalk widths, except between 5th and 3rd streets where widening may occur.
Streetscapes (Elements)	Generally 15- to 20-foot-wide through zones for pedestrians on sidewalks (except for 10-foot-wide through zones west of Van Ness Avenue); new paving throughout (i.e., complete replacement of bricks with new paving types); additional seating, planting, pedestrian wayfinding signs, public art, and other elements along curb within Streetlife Zones and Streetlife Hubs.				Limited changes to streetscape, except installation of new bicycle racks.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Streetscapes (Trees)	Removal or relocation of trees limited to locations where sidewalk would be narrowed to accommodate wider center transit boarding islands. May also include removal of trees deemed unhealthy, hazardous or in conflict with design.	Removal or relocation of trees throughout where sidewalk would be narrowed to accommodate wider center transit boarding islands and the new raised cycle track. May also include removal of trees deemed unhealthy, hazardous or in conflict with design.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Healthy street trees would remain while unhealthy street trees would be replaced. Planting new street trees in locations where there are existing empty tree wells and gaps.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Streetscapes (Path of Gold Light Standards)	Relocation of light standards in limited locations where sidewalk would be narrowed to accommodate new transit boarding islands. Removal of one light standard due to the elimination of one island at the intersection of Turk Street and Mason Street.	Relocation of light standards throughout where sidewalk would be narrowed to accommodate new transit boarding islands and the new raised cycle track. Removal of one light standard due to the elimination of one island at the intersection of Turk Street and Mason Street.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	Not applicable.
Commercial and Passenger Loading	No loading would be allowed on Market Street with the exception of paratransit users. All loading zones on Market Street would be removed, and new commercial and passenger loading zones would be created on adjacent cross streets or on parallel alleys or streets.		Limited loading would be allowed on Market Street. Some loading zones on Market Street would remain, and some commercial and passenger active loading zones would be created on adjacent cross streets or on parallel alleys or streets. Paratransit loading would continue to be allowed.		Limited loading allowed on one side of Mission Street in the floating parking lane (located between travel lane and new protected cycle track). Some new commercial and passenger active loading zones created on adjacent cross streets and alleys.

Proposed Project Element	Alternative 1: Market Street Complete Street and Transit Priority Improvements)		Alternative 2: Market Street - Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)		Alternative 3: Market Street + Mission Street (Complete Street and Transit Priority Improvements on Market plus Bicycle Facility Improvements on Mission) (*Note: This column describes only Mission Street improvements. Market Street improvements would be the same as under Alternative 1, Design Option A.*)
	Design Option A	**Design Option B**	**Design Option A**	**Design Option B**	
Vehicular Parking	No parking allowed on Market Street (i.e., existing parking spaces west of Franklin Street and east of Spear Street would be removed); removal of some parking spaces part-time or all day on cross streets and alleys to accommodate relocated loading zones.	Same as Design Option A on Market Street. Valencia Street between Market and McCoppin streets would have some parking removed to accommodate the new protected cycle track.	Same as Alternative 1, Design Option A.	Same as Alternative 1, Design Option B.	One floating parking lane (located between travel lane and new protected cycle track, alternating between the north and south side of the street depending on the block) on most blocks of Mission Street. McCoppin, Otis, and 10th streets would have some parking removed to accommodate the new bicycle facilities.
Utilities	Replacement of existing wastewater lines beneath Market Street; targeted replacement of water lines and auxiliary water supply system lines as required to maintain state of good repair; targeted replacement of electrical and other utility infrastructure to maintain state of good repair.				No change to existing utilities.

Source: Public Works, Citywide Planning Division of the San Francisco Planning Department, SFMTA. 2015.

[1] The table summarizes the three alternatives and their design options. Please refer to the subsequent text and **Figure 2** for a more detailed description of changes and definitions of terms.

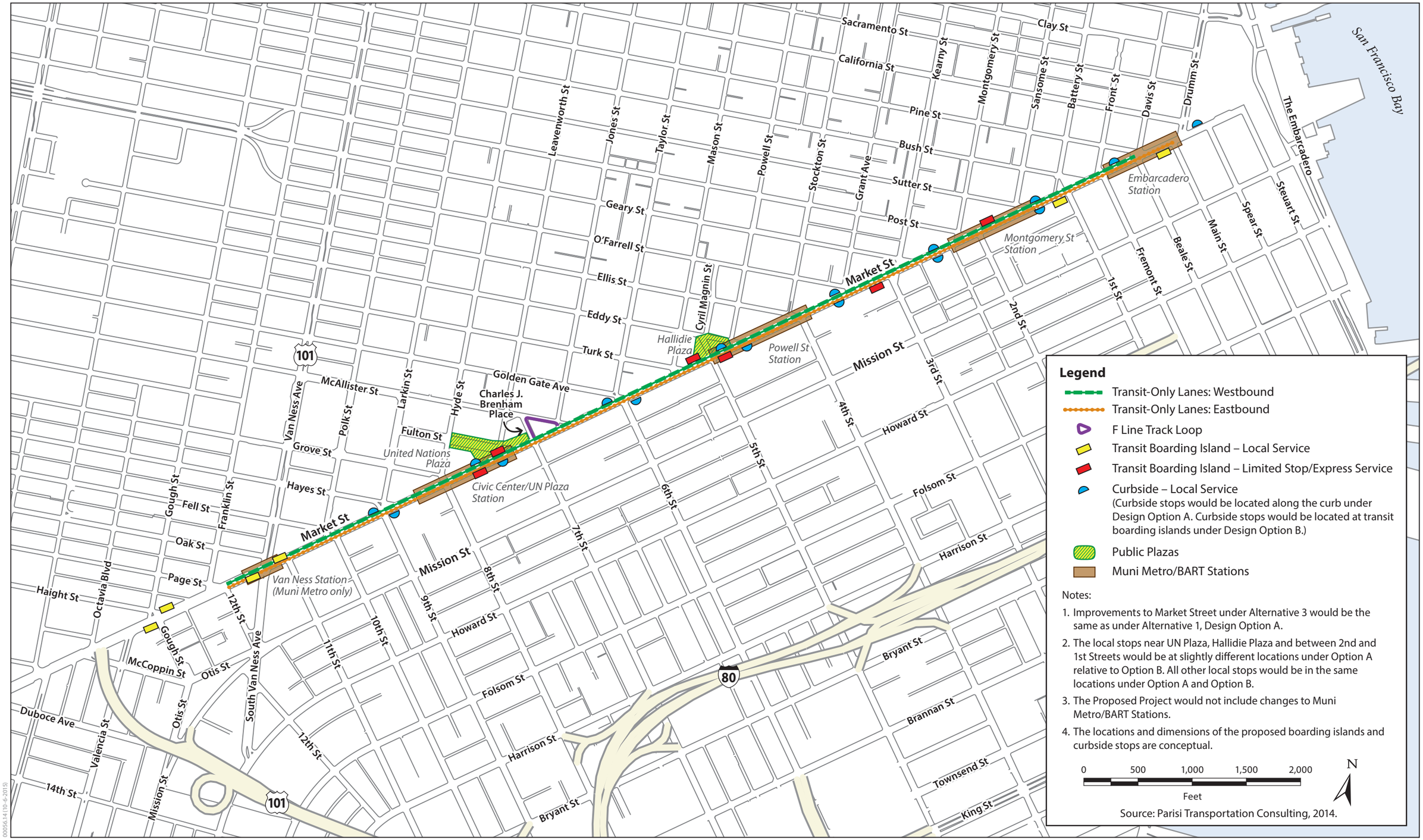

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Figure 3
Market Street Surface Transit – Alternatives 1 and 2

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Intersecting Streets

Changes to circulation could include converting portions of streets that intersect Market Street from one-way to two-way, changing the direction of one-way streets and partial street closure. Changes also would be made to left- and right-turn movements by private vehicles from the intersecting streets onto Market Street.

Traffic Controls

Under either design option, Alternative 1 would include signal timing and control modifications and relocations at Market Street intersections. Modifications would include adjustments to traffic signal timing for Market Street and could include new right-turn signals and bicycle signals. In addition to new traffic signal poles along Market Street, the relocation of traffic signal poles would also be required. New traffic signals could be added at intersections where existing traffic signals do not currently exist (i.e., 11th Street and Steuart Street). Northbound 12th Street at Market Street would become stop-sign controlled.

Surface Transit

Under either design option, Alternative 1 would include multiple changes to surface transit on Market Street in order to further prioritize transit. The transit-only center lanes on Market Street would be extended (as indicated in the Muni-Only Lanes discussion below); these lanes would be reserved for Muni and emergency vehicles only. Descriptions of transit-only lanes, stop spacing and service, stop location, stop characteristics, and infrastructure are provided below.

- **Muni-Only Lanes**: Under either design option, Alternative 1 would extend the existing transit-only center lanes between Davis and 12th streets in the westbound (outbound) direction and between 12th and Main streets in the eastbound (inbound) direction. **Figure 3** illustrates the location of the transit-only center lanes. The existing and extended transit-only lanes would be reserved for Muni and emergency vehicles only. Taxis would not be permitted in Muni-only lanes along Market Street.
- **Stop Spacing and Service:** Under either design option, Alternative 1 would modify existing transit stops on Market Street. A new system of transit stop spacing and locations would be instituted to create a set of rapid stops in the center transit-only lanes and a set of local stops in the curbside lanes. The rapid stops would be used by express bus routes 5R, 9R, 7R, 7X, and 38R and the F Line; the local stops would be used by the local bus routes 2, 5, 6, 7, 9, 19, 21, 31, and 38. In addition, bus routes 14, 14R, and 14X would continue to have drop-off only stops at Market Street and Steuart Street, and bus routes 81X, 10 and 11 (proposed to replace portions of route 12 in Muni Forward route changes) would continue to run on Market Street but would not stop. The rapid services would stop only at new transit boarding islands located near existing Muni Metro and BART stations on Market Street between Van Ness Avenue and 1st Street. Local routes would stop more frequently than the rapid routes. These changes would also affect late-night bus service provided by Muni's N and L Owl routes and AC Transit 800 and 822. Implementation of the new counter-clockwise F Line track loop on McAllister Street, and Charles J. Brenham Place would result in F Line service changes, because F Line trains would have the ability to switch from running westbound to running eastbound using the new loop. The F Line loop is further discussed under *Infrastructure*.

- **Stop Location:** Under either design option, transit routes would serve at least one of the new, relocated or modified stops along Market Street: 16 curbside stops (7 inbound, 9 outbound) or 12 center boarding island stops (7 inbound, 5 outbound). **Figure 3** shows the locations of the proposed surface transit stop locations.

- **Stop Characteristics**: Under either design option, Alternative 1 would increase the length and width of the relocated or replaced center transit boarding islands along Market Street to meet Americans with Disabilities Act (ADA) accessibility standards. Wheelchair-accessible ramps would be constructed to serve the F Line. Alternative 1 also would add amenities such as bus shelters to the center boarding islands.

  Under Alternative 1, Design Option A, the curbside stops would be located along the curb. Under Alternative 1, Design Option B, the curbside stops would be at the same locations as Design Option A, but would be curbside transit boarding *islands* because the new raised cycle track would be constructed between the new curbside islands and the sidewalk.

- **Infrastructure**: Under either design option, Alternative 1 would change the surface transit infrastructure. Changes would consist of replacement or upgrade of the existing streetcar rail tracks, the traction power system, and the Overhead Contact System on Market Street to maintain state of good repair and provide additional capacity. Replacement of the traction power system and Overhead Contact System would involve replacing and upgrading all substation equipment, conduits and transformers, and power circuits.

  In addition, the Proposed Project would construct a new F Line track loop running one-way westbound along McAllister Street between Market Street and Charles J. Brenham Place and one-way southbound along Charles J. Brenham Place between McAllister and Market streets.

  None of the three alternatives for the Proposed Project would make changes to BART or Muni Metro lines in the subway beneath Market Street.

Bicycle Facilities

Under Alternative 1, Design Option A, the existing dedicated bicycle facility would remain on Market Street. At locations where a dedicated facility does not currently exist, the existing shared lane painted with sharrows would be widened to 15 feet where feasible.

Under Alternative 1, Design Option B, a new, approximately 5- to 9-foot-wide raised cycle track would be constructed on Market Street in each direction between the curb lanes and sidewalk. The new raised cycle track would be slightly raised above the adjacent curb lanes and could have different paving patterns or material to help identify the designated space for bicycles. At curbside transit stops, the new raised cycle track would be placed between a curbside transit boarding island and the sidewalk. A new protected cycle track also would be constructed on Valencia Street between Market and McCoppin streets.

Under either design option, Alternative 1 would include new bicycle racks installed on the sidewalks along Market Street within the Streetlife Zone areas, described in the *Streetscapes*

section. Covered bicycle parking or bicycle storage also could be installed in areas with wider sidewalks, such as at the Streetlife Hubs (also discussed in the *Streetscapes* section).

Pedestrian Facilities

- **Sidewalk Width:** Alternative 1 would provide several changes to Market Street sidewalks. Design Option A would retain the majority of the existing sidewalk widths along Market Street, with limited sidewalk narrowing to allow for the construction of wider transit boarding islands and widened shared lanes adjacent to curbside bus stops. Design Option B would narrow the sidewalk on Market Street to allow for the construction of wider transit boarding islands and the new raised cycle track.

  ADA-compliant curb ramps would be added. Numerous pedestrian bulbouts at intersections along and adjacent to Market Street would be added to shorten pedestrian crossing distances and improve pedestrian visibility. Alternative 1 would also add, relocate, or remove certain crosswalks at appropriate locations.

Streetscapes

- **Elements:** Under either design option, Alternative 1 would design the sidewalks east of Van Ness Avenue to generally provide a 15-foot-wide through (i.e., walking) zone for pedestrians, wherever possible. In some sidewalk locations (e.g., the blocks between 5th Street and Grant Avenue), this through zone could be up to 20 feet wide. West of Van Ness Avenue, the sidewalk through zone would be approximately 10 feet wide.

  The curbside portion of the sidewalk would be designed as Streetlife Zones. Streetlife Zones would be located along the entire length of Market Street between the through zone and the curb. The width of the Streetlife Zones would vary based on the sidewalk width, the pedestrian volumes, and other criteria. Streetlife Zones would concentrate the objects (i.e., street furniture, trees, bicycle racks, wayfinding signs, and lighting) on the sidewalk into a zone adjacent to the curb, leaving the space adjacent to the buildings as a pedestrian through zone. Streetlife Hubs would be located within the Streetlife Zones in areas where the sidewalk is wider and in which more prominent streetscape elements (e.g., kiosks, cafés, public art, or interactive installations) could be featured.

  Local environmental conditions including wind and shadow would also be a factor in the location of the individual streetscape elements such as benches and the Streetlife Hubs. Some sections of Market Street can be quite windy and, in San Francisco's climate, the most pleasant spaces for the public to enjoy social interaction and community life along Market Street are sunny and sheltered. The Proposed Project's streetscape elements would be located to take advantage of the local environmental conditions and, where possible, to help ameliorate windy conditions by adding street-level "roughness" that disperses stronger winds.

  Market Street's existing brick sidewalks would be replaced with new paving material or materials.

- **Trees:** Under Alternative 1, Design Option A, trees would be removed or relocated in limited areas where the sidewalk would be narrowed to allow for the construction of wider transit boarding islands and widened shared lanes adjacent to curbside bus stops.

Under Alternative 1, Design Option B, trees would be removed or relocated where the sidewalk would be narrowed to allow for construction of the wider center transit boarding islands and the new raised cycle track. Under either design option, trees deemed unhealthy, hazardous, or in conflict with Proposed Project design would be removed and replaced, if feasible. Therefore, the Proposed Project could result in the removal of all trees along Market Street between Octavia and Steuart streets under either design option. Any tree that is removed would be replaced, if feasible.

- **Path of Gold Light Standards:** The Path of Gold Light Standards is a designated historic landmark consisting of 327 33-foot-high lampposts along both sides of Market Street from the Ferry Building to Octavia Boulevard. Under Alternative 1, Design Option A, the Path of Gold Light Standards would be relocated near existing light standard locations on the sidewalk in limited areas where the sidewalk would be narrowed to allow for the construction of wider transit boarding islands and widened shared lanes adjacent to curbside bus stops. Under Alternative 1, Design Option B, the Path of Gold Light Standards would be relocated where the sidewalk would be narrowed to allow for the construction of the wider center transit boarding islands and the new raised cycle track.

Commercial and Passenger Loading

Under either design option, Alternative 1 would prohibit commercial and passenger loading on Market Street. Where possible, commercial and passenger loading zones would be established on the first half-block of the cross streets north and south of Market Street or on parallel alleys or streets that provide loading access at the rear of properties. These new zones would be designated for active loading only (i.e., a vehicle may be stopped in the loading zone only during active loading or unloading of commercial goods or passengers). Paratransit vehicles would be able to pick up and drop off passengers on Market Street. Depending on location, a loading bay on Market Street would be considered for buildings without rear street or alley access or without an entry point within 250 feet of a cross street loading zone.

Vehicular Parking

Under either design option, Alternative 1 would remove the existing on-street parking on Market Street (i.e., existing parking spaces west of Franklin Street and east of Spear Street). The additional loading zones on cross streets and on rear alleys and streets described in the *Commercial and Passenger Loading* section could result in part-time (i.e., time-of-day restricted) or all-day removal of parking spaces. Under Design Option B, some on-street parking on Valencia Street would be removed in order to provide room for new protected cycle track between Market and McCoppin streets.

Utilities

Under either design option, Alternative 1 would include the replacement and relocation of approximately one-third of the existing sewer lines beneath Market Street. Alternative 1 also would include targeted replacement or relocation of water lines, fire hydrants, and auxiliary water supply system (AWSS) lines, including AWSS fire hydrants, along Market Street, and electrical and other utility infrastructure to maintain state of good repair or to match proposed movement of the curb. The new, replacement utility lines would be the same size as the existing

lines and no additional capacity would be provided. Alternative 1 also would relocate other subsurface utilities to make way for the various improvements.

Alternative 2

Changes to roadway configuration, traffic controls, surface transit, bicycle facilities, pedestrian facilities, streetscapes, vehicular parking, and utilities on Market Street would have the same characteristics as described under Alternative 1. Changes to private vehicle access and commercial and passenger loading under Alternative 2 are described below.

Private Vehicle Access

Market Street

Alternative 2 would have fewer restrictions on private vehicles traveling on Market Street than Alternative 1 would have. Surface public transit access would remain along the entirety of Market Street. All private vehicles would continue to be allowed on portions of the length of Market Street except at locations where required right-turn regulations are proposed or where existing required right-turn regulations are present (e.g., 6th and 10th streets). At these locations, all public transit, commercial, paratransit and emergency vehicle traffic could continue traveling on Market Street, while all private vehicular traffic would be diverted from Market Street.

Intersecting Streets

Similar to Alternative 1, changes to circulation under Alternative 2 could include converting portions of streets that intersect Market Street from one-way to two-way, changing the direction of one-way streets and partial street closure. Changes also would be made to permit left- and right-turn movements by private vehicles from the intersecting streets onto Market Street.

Commercial and Passenger Loading

Under Alternative 2, a limited number of commercial and passenger active loading zones on Market Street would remain. Alternative 2 would include the same additional loading zones on the cross streets and rear alleys and streets that Alternative 1 would provide. The same exceptions described under Alternative 1 related to vehicles providing paratransit services would apply. Depending on location, a loading bay on Market Street would be considered for buildings without rear alley or street access or without an entry point within 250 feet of a cross street loading zone.

Alternative 3

Changes to roadway configuration, private vehicle access, traffic controls, surface transit, bicycle facilities, pedestrian facilities, streetscapes, commercial and passenger loading, vehicular parking, plazas, and utilities on Market Street would have the same characteristics as described under Alternative 1, Design Option A. Changes to Mission Street under Alternative 3 are described below.

Roadway Configuration

Mission Street would be reconfigured to include a travel lane in each direction with right-turn pockets at intersections, where applicable. In addition, a new protected cycle track in each

direction on Mission Street and a protected cycle track on 10th Street between Mission and Market streets would be constructed. One floating parking lane would be striped on one side of the street per block (i.e., the parking lane would be located between the travel lane and new protected cycle track), alternating between the north and south sides of the street as appropriate. Otis Street between South Van Ness Avenue and Gough Street would have two westbound traffic lanes, a westbound transit-only lane, the existing westbound bicycle lane, and a new contra-flow, parking-protected cycle track in the eastbound direction. Contra-flow refers to a configuration in which bicycles travel in the opposite direction of vehicles. McCoppin Street would have a travel lane in each direction, and a new parking-protected one-way cycle track in each direction. Four travel lanes would remain on 10th Street between Market and Mission streets and a new protected cycle track connection on each side of the street (one southbound and one contra-flow northbound) also would be added to connect the Market and Mission streets facilities. **Figure 2** illustrates the typical roadway configuration for Alternative 3 on Mission Street.

Private Vehicle Access

A transit-only lane would be located on Mission Street in the eastbound direction between 1st and Beale streets. Only transit vehicles and bicycles would permitted to travel eastbound on this segment of Mission Street. Eastbound private vehicles would be required to turn right onto 1st Street from Mission Street. Southbound left-turn movements from 1st Street onto Mission Street and northbound right-turn movements from Fremont Street onto Mission Street would be prohibited.

Traffic Controls

Alternative 3 would add new turn lanes from Mission Street at certain intersections. New turn signals would be installed to support the new turn lanes and existing turn lanes from Mission Street, and to separate bicycle traffic from turning vehicles. Alternative 3 would also include traffic signal timing modifications for bicycles on the new protected cycle track along Mission Street and could include new bicycle signals and turn signals.

Surface Transit

- **Transit-Only Lanes:** A transit-only lane would be located on Mission Street in the eastbound direction between 1st and Beale streets. The remaining existing transit-only lanes would be removed from Mission Street.
- **Stop Spacing and Service:** Alternative 3 would relocate all existing transit service provided by Muni, Golden Gate Transit, and SamTrans on Mission Street west of the new Transbay Transit Center to Market Street. Some Market Street transit routes may use Mission Street as a layover or turnaround. When Market Street is closed to vehicular traffic (such as when portions of Market Street are closed for special or unexpected events), transit routes would operate along Mission Street. Examples of annual special events that close Market Street are New Year's Eve, Gay Pride Parade, Chinese New Year Parade, and Bay to Breakers. These annual events plus periodic protests and marches such as Walk for Life and May Day March and Rally close Market Street on approximately 10 days during an average year.

- **Stop Location:** All existing bus stops on Mission Street west of the new Transbay Transit Center would be removed. Temporary bus stops would be provided when transit service is rerouted from Market Street to Mission Street when Market Street is closed for special and unexpected events.
- **Stop Characteristics:** As described above, all existing bus stops on Mission Street would be removed west of the new Transbay Transit Center. Temporary bus stops would be provided when transit service is rerouted from Market Street to Mission Street when Market Street is closed for special and unexpected events.
- **Infrastructure:** Maintenance and adjustment of the Overhead Contact System on Mission Street would be performed to accommodate transit use when Market Street is closed for special and unexpected events.

Bicycle Facilities

Alternative 3 would provide a new protected cycle track in each direction on Mission Street. The new protected cycle track would be separated from adjacent travel lanes or the floating parking lane by a buffer consisting of a painted median, concrete median, or other treatments. On one side of the street, the new buffer would separate the new protected cycle track from a new floating parking lane and would provide space for vehicle doors to open and persons to enter and exit the parked vehicle. On the other side of the street, a new buffer would be created between the new protected cycle track and travel lane. New bicycle facilities on McCoppin and Otis streets (in addition to the existing westbound bicycle lane along Otis Street) would provide a new bicycle network connection to and from Valencia and Market streets. On McCoppin Street, the new bicycle facility would consist of a parking-protected one-way cycle track in each direction. On Otis Street, the new bicycle facility would consist of a contra-flow protected cycle track in the eastbound direction between Gough Street and Van Ness Avenue. As explained in the *Roadway Configuration* section above, contra-flow refers to a configuration in which bicycles travel in the opposite direction of vehicles (e.g., Polk Street contra-flow bicycle lane between Market and Grove streets). On 10th Street, the new bicycle facility would consist of a southbound one-way protected cycle track and a northbound contra-flow protected cycle track between Market and Mission streets to connect the bicycle facilities. **Figure 2** shows the bicycle facility on Mission Street (including on McCoppin, Otis, and 10th streets) under Alternative 3.

Bicycle racks could also be installed on the sidewalk along Mission Street.

Pedestrian Facilities

The sidewalk on Mission Street between 5th and 3rd streets could be widened, and the planted center median between 4th and 3rd streets could be removed. Alternative 3 could also add a mid-block signalized crosswalk to the block between Yerba Buena Lane and 3rd Street on Mission Street.

Streetscapes

- **Elements:** New bicycle racks would be installed in limited locations along Mission Street.
- **Trees:** The trees on Mission Street would be assessed for health; healthy street trees would remain while unhealthy street trees would be replaced. The Proposed Project also would add trees in locations where there are existing tree wells and gaps.

Commercial and Passenger Loading

Alternative 3 would reduce the amount of commercial and passenger loading zones along Mission, Otis, McCoppin, and 10th streets to accommodate the new protected cycle track. Some existing designated loading spaces that would be removed could be relocated to the floating parking lane, as described in the *Vehicular Parking* section. Some new commercial and passenger loading zones could be created on adjacent cross streets and alleys.

Vehicular Parking

Under Alternative 3, the existing metered on-street parking on Mission Street would be reduced from two parking lanes to one floating parking lane to accommodate the new protected cycle track. The single floating parking lane would be located between the vehicular travel lane and the new protected cycle track and would alternate between the north and south sides of Mission Street as appropriate. On-street parking on McCoppin Street between Valencia and Gough streets and on 10th Street between Market and Mission streets would be removed to accommodate the new protected cycle track connections. **Figure 2** illustrates the proposed parking configuration on Mission Street under Alternative 3.

Utilities

No changes to existing utilities on Mission Street are proposed.

Plaza Components

In addition to these three alternatives, modifications to UN and Hallidie plazas discussed below have been analyzed in this document at a conceptual level, based on the design information available as of the date this document was prepared. The design concepts may be further developed once funding mechanisms for the redesign and rebuilding of the plazas are identified, and Public Works, in coordination with the Planning Department, will determine if additional environmental review is warranted.

The conceptual plans for UN Plaza envision filling in the existing fountain and creating a new outdoor pavilion with a new seating area with tables and benches, as well as new trees and other streetscape elements. Minor excavation activities are assumed to be required to support the new outdoor pavilion and new trees. If new lighting elements are included as part of the redesign of UN Plaza, such lighting would be consistent with the type of pedestrian streetscape lighting utilized at public spaces around San Francisco. This lighting would consist of downward facing light fixtures that would be selected to efficiently direct light to pedestrian pathways and active uses within the plaza area. **Figure 4** illustrates the conceptual design for UN Plaza.

Source: San Francisco Public Works, 2015.

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Figure 4
UN Plaza Conceptual Illustration

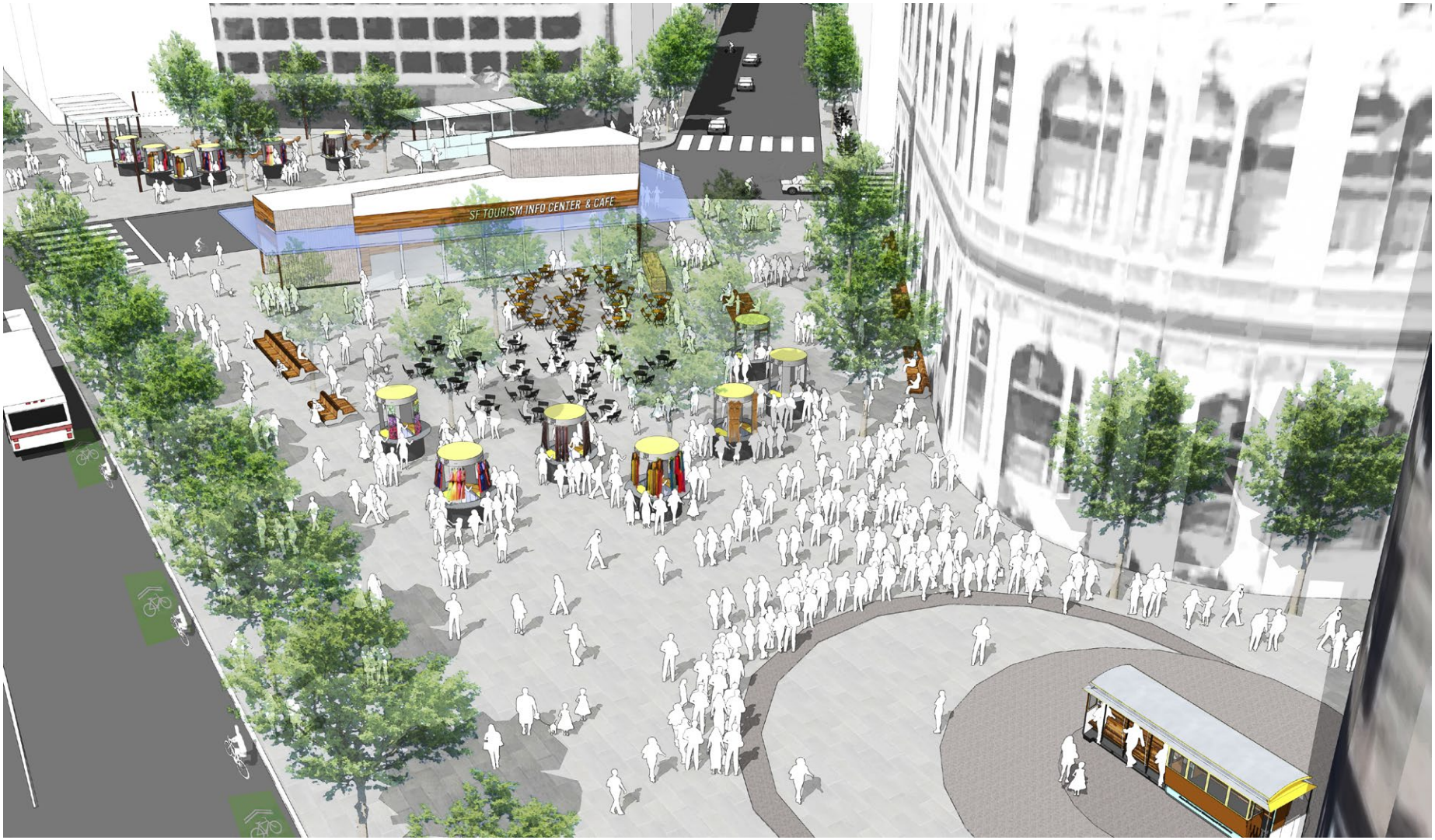
The conceptual plans for Hallidie Plaza envision redesigning and rebuilding the entire area by decking over the sunken portion to create a street-level plaza, repaving the entire plaza and adding a new outdoor pavilion with new seating areas and new kiosks. A new structure would replace the existing uses in the plaza area, assumed to be used as a tourist information center, as well as other streetscape elements. The area beneath the new decked Hallidie Plaza would continue to provide access to the Powell Street Station for the underground Muni Metro and BART transit services. An elevator would be located near the new structure to provide access to the Powell Street Station transit services. Improvements to the escalators would also be included with the plaza modifications. As with UN Plaza, if new lighting elements are included as part of the redesign of Hallidie Plaza, such lighting would be consistent with the type of pedestrian streetscape lighting utilized at public spaces around San Francisco. This lighting would consist of downward facing light fixtures that would be selected to efficiently direct light to pedestrian pathways and active uses within the plaza area. **Figure 5** illustrates the conceptual design for Hallidie Plaza.

No changes to plazas adjacent to Mission Street are proposed as part of this Project.

A.5. Project Construction and Phasing

The Proposed Project would include construction within the operational public right-of-way to accommodate the various transportation, streetscape, plaza, and utility improvements. Construction activities are anticipated to commence in 2018 pending the completion of environmental review and acquisition of funding sources. Under Alternatives 1 and 2, construction along Market Street is anticipated to occur in four or five geographic phases over a 3- to 5-year period. Under Alternative 3, construction along Mission Street is anticipated to occur over a shorter period (1 to 2 years) than on Market Street because of fewer construction activities. Mission Street construction would occur after construction along Market Street is completed. Construction of the Proposed Project could occur simultaneously with other projects and programs being pursued by the City at locations within the Project corridor (see Relationship to Other Projects above).

Each geographic phase would consist of multiple blocks along the length of Market Street between Octavia Boulevard and The Embarcadero, with construction activities scheduled to minimize disruption to businesses, residents, visitors, and the transportation system. Each geographic phase would be divided into three construction sub-phases. The first sub-phase would involve the closure of the curbside lanes to allow for the relocation and reconstruction of the curb along with the accompanying removal, relocation and/or replacement of trees, and relocation of fire hydrants, light poles, catch basins, and other utilities. This sub-phase would also allow the construction of the new center transit boarding islands and the demolition of some of the existing transit islands. The center lanes would remain open to public transit while the curbside lane work is completed. Once the curbside lanes are completed, the second sub-phase would involve closing the center lanes for the rail track and sewer line replacements. During this second sub-phase, the new curbside lanes would remain open to public transit. Lastly, during the third sub-phase, the sidewalks would be closed for reconstruction, with the curbside lanes available for pedestrian detours and the center lanes available to serve public transit. Private



Source: San Francisco Public Works, 2015.

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Figure 5
Hallidie Plaza Conceptual Illustration

vehicles and bicycles would be rerouted from Market Street during construction. Funding for the plaza improvements has not been identified at this time; plaza improvements could be constructed at a future point in time or concurrently with construction on Market and Mission streets.

The Project sponsor will prepare a construction management plan that addresses issues of circulation (traffic, pedestrians, and bicycle), safety, parking, and other project construction in the area. The construction management plan will be reviewed by the City's Transportation Advisory Staff Committee (TASC), which consists of representatives from SFMTA, Public Works, and the Fire, Police, and Planning Departments.

Construction of the Proposed Project would require the temporary closure of sidewalks to allow for their reconstruction. These temporary closures would be subject to review and approval by the TASC. TASC review would also take into consideration other construction projects in the vicinity.

During construction on Market and Mission streets, access would be maintained to all buildings and businesses. There would be open and responsive communication between Public Works construction managers. Public Works would provide periodic updates to community members, and property and business owners and would address concerns on a case-by-case basis to minimize disruptions. This would require meetings between the local community and businesses and the City and the general contractor. Public Works construction managers would work with the general contractor to ensure coordination with the City and the local community and businesses regarding anticipated traffic disruptions, delivery schedules, customer and residential parking, and access.

Construction protocols for sidewalk closures would follow the City's *Regulations for Working in San Francisco Streets – 8th Edition* (also known as the "Blue Book"), including minimizing disruptions by monitoring the following restrictions and conditions.

- General job site safety and housekeeping by contractors.
- Safe path of travel.
- Parking restrictions (permitted/non-permitted).
- Dust controls.
- Construction staging and storage of materials and equipment.
- Night noise permits – noise levels (day and night).
- General traffic flow.
- General construction blight.

Holiday restrictions apply to the Project area on both Market and Mission streets. No work would be allowed during the holiday moratorium, from the day after Thanksgiving to January 1, inclusive of these days. All openings in the street and in the sidewalk must be closed by backfilling and paving or by plating over, to provide safe and adequate passage for bicyclists, motorists, and pedestrians.

Construction of Alternatives 1, 2, and 3 would generally require excavation to a depth of 12 to 18 inches for streetscape, sidewalk, and travel lane construction. New light signals would require excavation to a depth of 12 feet, curb cuts would require excavation to a depth of 3 feet, new or replacement tree wells would require excavation to a depth of 4 feet, and the replacement of water and the AWSS would require excavation to a depth of 5 feet or deeper if there are conflicts with other utilities or the rail track. Alternatives 1 and 2 would also include the replacement of sewer lines along a portion of Market Street which would require excavation to a depth of 12 to 15 feet, the relocation of light standards which would require excavation to a depth of 12 feet, and the replacement of the rail tracks which would require excavation to a depth of two feet, and the replacement of signal conduit and water lines would require excavation to a depth of 3.5 feet. Rebuilding UN and Hallidie plazas would require excavation for foundations to a depth of up to 80 feet below street level at UN Plaza and 110 feet below street level at Hallidie Plaza.

A.6. Project Approvals

Proposed Project implementation would require numerous federal, state, and local reviews, permits, and approvals. **Table 3** lists the anticipated environmental-related permits and approvals that will be needed in advance of certifying the Proposed Project's CEQA document. **Table 4** lists the anticipated recommendations that may take place prior to or after the CEQA document certification process.

TABLE 3. ANTICIPATED PERMIT AND APPROVALS NECESSARY FOR CERTIFICATION OF THE CEQA DOCUMENT

Agency	Approval or Permit
San Francisco Board of Supervisors	Approval of the Preferred Project Approval of Sidewalk Legislation Approval of Encroachment Permit Program to facilitate streetlife zone activity
San Francisco Public Works	Recommended approval of Preferred Project Approval of tree removal and replanting in public right-of-way Approval of construction period encroachment permits Approval of nighttime construction work, as needed
San Francisco Municipal Transportation Agency	Recommended approval of Preferred Project Approval of changes to each transit route and stop location Approval of certain parking and traffic measures in accordance with the San Francisco Transportation Code Special Traffic Permit for instances where work would not comply with Blue Book regulations or traffic routing specifications in a City Contract
San Francisco Planning Commission or Planning Department	Approval of General Plan Referral

Agency	Approval or Permit
San Francisco Public Utilities Commission	Approval of stormwater control plan Approval of erosion and sediment control plan Approval of construction runoff permit application A batch discharge permit is required by the SFPUC (per the 2009 Keep it on Site Guide) for release of any construction wastewater, including groundwater, into the City's combined sewer system. Permit from the Wastewater Enterprise Collection System Division for discharges to the combined sewer system National Pollutant Discharge Elimination System (NPDES) Permit for construction activities will be required and is issued by the SFPUC. This includes contractor's preparation of a Stormwater Pollution Prevention Plan (SWPPP)
San Francisco County Transportation Authority Board	Approval of some funding sources
San Francisco Historic Preservation Commission or Planning Department	Approval of Certificates of Appropriateness, if applicable, regarding work to Planning Code designated districts or landmarks.
California Department of Transportation	Temporary Encroachment Permit for construction activities Permanent Encroachment Permit for modifications within the Van Ness Avenue and Central Freeway rights-of-way

TABLE 4. ANTICIPATED RECOMMENDATIONS THAT MAY PROCEED PRIOR TO OR AFTER CERTIFICATION OF THE CEQA DOCUMENT

Committee/Commission	Recommendation or Approval
San Francisco Capital Planning Committee	Recommendation to Board of Supervisors regarding and prior to the issuance of any long term financing for the Proposed Project
San Francisco Arts Commission	Approve the designs of public structures and the design and location of works of art
San Francisco Transportation Advisory Staff Committee	Review of construction management plans and review of temporary lane and sidewalk closures
Federal Transit Administration	Funding approvals and completion of National Environmental Policy Act documentation, as applicable
Metropolitan Transportation Commission	Approval of Air Quality Conformity Determination for National Environmental Policy Act documentation, as applicable

B. PROJECT SETTING

General Context

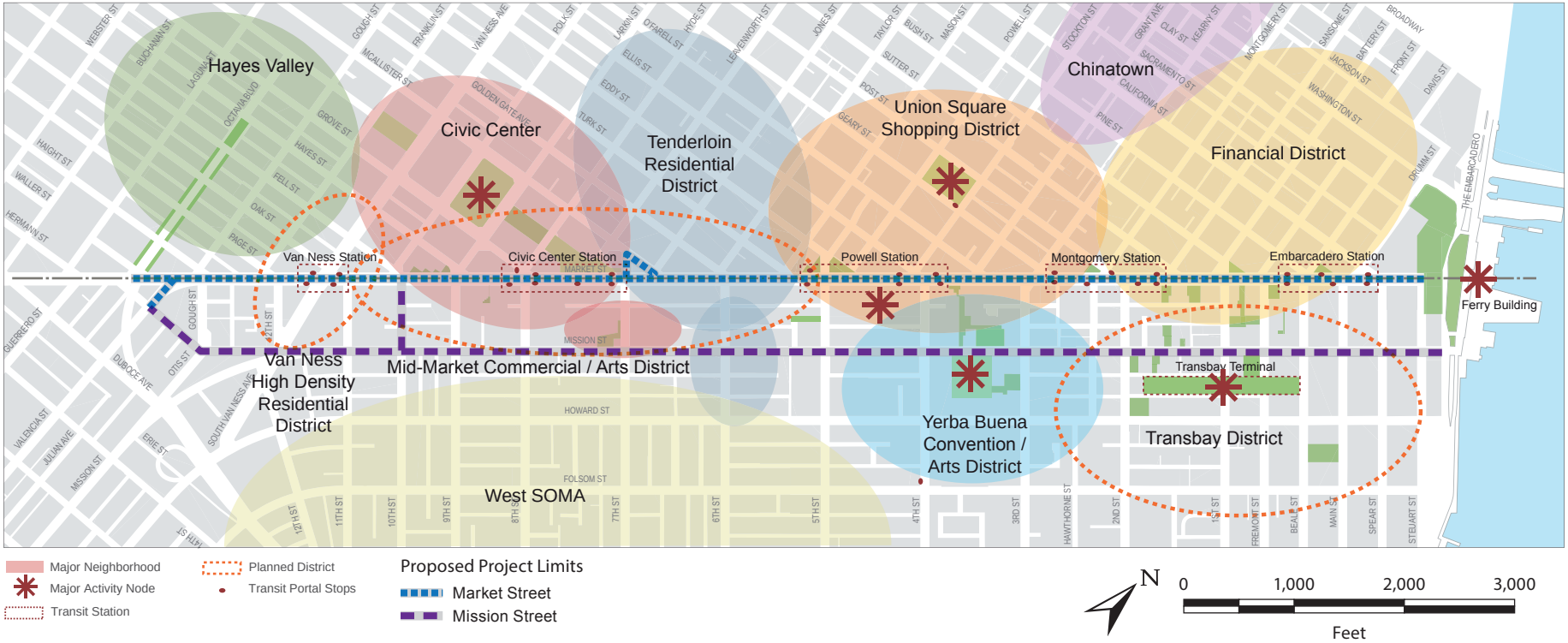
The existing functional and physical characteristics of the Project corridor, including land use, transportation and circulation, and streetscape elements, were thoroughly described in the *Better Market Street Existing Conditions & Best Practices* documents prepared for the Proposed Project in 2011[4] and are briefly summarized as follows. As indicated by **Figure 6**, the Project corridor crosses and is adjacent to several distinct districts and neighborhoods. As discussed below, Market Street and Mission Street share certain functional and physical characteristics in some areas, and differ in others.

Market Street

Market Street is a major city street and a significant regional destination, functioning as the backbone of San Francisco's public, and BART's regional, transportation systems, a significant bicyclist commute route, and a major retail portal, serving a population both within and outside the city. Market Street may be divided into five key districts from Steuart Street to Octavia Boulevard, with distinct land uses, transportation and circulation characteristics, and physical form: the Financial District (from Drumm Street to Kearny Street); the Union Square Shopping District (Montgomery Street to Taylor Street); the Tenderloin District (from Mason Street to Larkin Street); the Civic Center District (from Jones Street to Franklin Street); and the Hayes Valley (from Van Ness Avenue to Buchanan Street)).

Currently, land use distribution along Market Street is primarily commercial, with few residential uses in many of the districts. The majority of Muni and BART riders travel either to the Civic Center or the Financial District, areas that have the highest concentration of employment density in the city. Although Market Street is predominantly a transit- and pedestrian-oriented street, it also has considerable cross-traffic and, at its eastern end, is affected by peak flows of automobiles traveling to and from the Bay Bridge. The contrasting grid layout and block structure east and west of Market Street complicate traffic patterns and pedestrian movements.

[4] San Francisco Department of Public Works et al. *Better Market Street Existing Conditions & Best Practices*. December 7, 2011. These documents are on file and available for public review as part of Case File No. 2014.0012E.



Source: San Francisco Public Works, 2011.

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Figure 6
Districts and Centers

Mission Street

The easternmost part of Mission Street, passing through the southern portion of the Financial District, aligns with the character of Market Street one block to the north. Of the varying sections of Mission Street in the Project area, the easternmost part of Mission Street has the highest density of weekday daytime use and is characterized by high-rise office towers, hotels, and condominium projects. The largest project in this area, the Transbay Terminal Center between 1st and 2nd streets, will substantially increase the number of trips in the immediate area. To the west along Mission Street is the Yerba Buena District that includes the Metreon, the Yerba Buena Center for the Arts, SF Museum of Modern Art, Moscone Center, the Children's Creativity Museum, and several other retail, arts and cultural institutions. The Yerba Buena District and the adjacent Retail District on Market Street compose the most active area within the Project corridor on weekends. Farther west is the West SOMA neighborhood, where Mission Street is adjacent to the Mid-Market/Tenderloin and Civic Center Districts on Market Street.

Roadway Configuration and Private Vehicle Access

Figure 7 shows the major traffic routes through the Project corridor. Because of the historic street structure in San Francisco, the streets north and south of Market Street are configured as offset street grids, whereby the streets south of Market Street do not directly align with the streets north of Market Street. In the South of Market area, streets that run in the northwest/southeast direction (e.g., 2nd, 3rd, and 4th streets) are generally considered north-south streets, whereas streets that run in the southwest/northeast direction (e.g., Market and Mission streets) are generally considered east-west streets.

Market Street

In general, four travel lanes exist on Market Street between Van Ness Avenue and Main Street. The blocks between Main and Steuart streets have three travel lanes. West of Van Ness Avenue, Market Street widens to as many as seven travel lanes to allow for left turn lanes north onto Franklin Street and south onto Valencia Street. Valencia Street between Market and Mission streets has two travel lanes and one parking lane in each direction.

Private vehicles travelling eastbound on Market Street are required to turn right at 10th and 6th streets. Except for the transit-only lanes (see the *Surface Transit* section below for more detail), private vehicles are currently allowed to travel on Market Street. Left turn movements from Market Street are prohibited for private vehicles, except at Valencia Street in the westbound direction and Franklin and Drumm streets in the eastbound direction.

Existing bicycle facilities on Market Street consist of dedicated lanes or shared lanes marked with sharrows, depending upon location (see the *Bicycle Facilities* section below for more detail). Valencia Street has an existing bicycle lane in each direction between Market and McCoppin streets.

Source: San Francisco Public Works, 2011.

00056.14 (11-9-2015)

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Figure 7
Major Traffic Routes

Mission Street

McCoppin Street has two travel lanes and two parking lanes. Otis Street has four travel lanes and two parking lanes. Between Market and Mission streets, 10th Street has four travel lanes (one-way southbound) and one parking lane. In general, four travel lanes and two parking lanes exist on Mission Street. Except for in the transit-only lanes (see the *Surface Transit* section below for more detail), private vehicles are currently allowed to travel on Mission Street. Left turn movements from Mission Street are prohibited for private vehicles except at Steuart, Spear, Main, and Beale streets.

Existing bicycle facilities on Mission Street consist of a shared lane marked with sharrows in some locations (see the *Bicycle Facilities* section below for more detail). McCoppin and Otis streets have an existing bicycle lane in the westbound direction. 10th Street between Market and Mission streets has a shared lane marked with sharrows in the southbound direction.

Traffic Controls

Market and Mission streets have traffic signals at most intersections.

Surface Transit

Market Street

Transit-only center lanes for surface public transit, taxis, and emergency vehicles exist between 8th Street and Van Ness Avenue in the westbound (outbound) direction and between 12th and 5th streets in the eastbound (inbound) direction. The transit-only lanes operate 24 hours a day, 7 days a week. Streetcar rail tracks exist in both directions on Market Street, serving the center lanes between Octavia Boulevard and Steuart Street.

Muni operates 20 bus routes and one streetcar line (F Line) along the surface of Market Street during the evening peak hour within the Project area (note: some bus routes travel upon, but do not stop on, Market Street). Most of these surface transit routes and the single streetcar line serve at least one of 17 curbside stops (8 inbound, 9 outbound) and 23 center boarding island stops (12 inbound, 11 outbound) within the Project area. In addition to the 20 evening peak hour bus routes, Muni operates two late night bus routes on Market Street.

Mission Street

Transit-only lanes are generally in the curb lane in both directions on Mission Street, but transit-only lane operations vary by location and time of day. Parking on the portions of Mission Street with transit-only lanes is prohibited during specified peak hours. During nonpeak hours, transit vehicles share the two outside lanes with private vehicles and parking at the curb is generally allowed.

Muni operates three bus routes (14, 14R, and 14X) along Mission Street between San Jose Avenue and Steuart Street. In addition, Golden Gate Transit operates four routes and SamTrans operates three routes along Mission Street within the Project area. Each of these transit routes serves at least one of the 23 curbside stops (11 inbound, 12 outbound) within the Project area.

Bicycle Facilities

Market Street

Market Street has dedicated bicycle facilities, which vary from a protected cycle track with safe hit posts to a bicycle lane, between Gough Street and half-way between 9th and 8th streets in the eastbound direction and between 8th Street and Octavia Boulevard in the westbound direction. Sharrows are painted in the curb lanes at all other locations on Market Street to indicate that bicycles and vehicles share these lanes. Valencia Street has an existing bicycle lane in each direction between Market and McCoppin streets. Nine Bay Area Bike Share pods are located along Market Street. Bicycle racks are also located at a number of locations along Market Street.

Mission Street

McCoppin and Otis streets have an existing bicycle lane in the westbound direction. 10th Street between Market and Mission streets has a shared lane marked with sharrows in the southbound direction. Mission Street has painted sharrows between 11th Street and South Van Ness Avenue and between The Embarcadero and Steuart Street in the westbound direction. Bicycle racks are located at numerous locations along Mission Street.

Pedestrian Facilities and Streetscapes

Market Street

Existing sidewalks on Market Street are generally wider (between 25 feet and 35 feet) east of Van Ness Avenue and narrower (closer to 15 feet) west of Van Ness Avenue. Market Street sidewalks are constructed of red bricks and generally have an 18-inch wide granite curb separating them from the roadway. Many sidewalk crossings do not contain ADA-compliant curb ramps.

A number of objects are located on the existing sidewalks, including trees, signage, newspaper kiosks and boxes, flower stands, public art, bicycle racks, self-cleaning bathrooms, advertising signs, bollards with chains at several intersection crossings, AWSS hydrants, and the Path of Gold Light Standards. The Path of Gold Light Standards consists of decorative light poles with a three-part top, each of which contains a light globe. The Path of Gold Light Standards is a designated historic landmark identified under Article 10 of the Planning Code (Landmark No. 200) and is located between 1 Market Street and 2490 Market Street.

Mission Street

Existing sidewalks on Mission Street are narrower than on Market Street (approximately 9 to 15 feet wide within the Project area) and are generally constructed of poured-in-place concrete slabs.

Commercial and Passenger Loading

Market Street

Market Street has a limited number of designated on-street commercial and passenger loading bays. A limited number of curb cuts exist on Market Street, allowing access to off-street parking and loading facilities.

Mission Street

Mission Street has time-of-day designated on-street commercial and passenger loading zones. Some curb cuts currently exist along Mission Street, allowing access to off-street parking or loading facilities.

Vehicular Parking

Existing on-street metered parking is limited to a few locations on Market Street and is available on most blocks along Mission Street.

Utilities

Existing utilities along Market Street include a brick sewer line beneath Market Street, electrical components for the streetcar Overhead Contact System, electrical conduits for the Path of Gold Light Standards and traffic signals, and other subsurface utilities beneath the Market Street right-of-way. Fire hydrants, including large fire hydrants that are part of the AWSS installed following the 1906 earthquake, also are located within the Project corridor.

Plazas

Two existing public plazas are located adjacent to the north side of Market Street right-of-way: UN Plaza is located between Hyde Street and Charles J. Brenham Place; Hallidie Plaza is located between Mason and Powell streets.

C. COMPATIBILITY WITH EXISTING ZONING AND PLANS

	Applicable	*Not Applicable*
Discuss any variances, special authorizations, or changes proposed to the Planning Code or Zoning Map, if applicable.	☒	☐
Discuss any conflicts with any adopted plans and goals of the City or Region, if applicable.	☒	☐
Discuss any approvals and/or permits from City departments other than the Planning Department or the Department of Building Inspection, or from Regional, State, or Federal Agencies.	☒	☐

San Francisco Planning Code and Zoning Map

Section 203 of the San Francisco Planning Code (Planning Code) states that the Planning Code shall not limit the construction, installation or operations by any public agency of any street or transportation line, or of incidental appurtenances to any of the foregoing when located in a street, alley, or other right-of-way. The modifications proposed for the streets and sidewalks within the Project corridor, as well as portions of UN and Hallidie plazas, would occur within the existing operational public right-of-way and would therefore not be subject to the Planning Code and require variances, special authorizations, or changes to the Planning Code or Zoning Map. Modifications on those portions of UN and Hallidie plazas that are owned by the City (and not in the operational public right-of-way) are zoned as Public and are subject to the Planning Code and

Zoning Map. However, because the proposed uses at UN and Hallidie plazas would continue the current land uses at these locations and other changes would generally be consistent with the Public designation, modifications to the plazas are not anticipated to require variances, special authorizations, or changes to the Planning Code or Zoning Map.

Plans and Policies

San Francisco General Plan

The San Francisco General Plan (General Plan), which provides general policies and objectives to guide land use decisions, contains some policies that relate to physical environmental issues. The General Plan contains 10 elements (Commerce and Industry, Recreation and Open Space, Housing, Community Facilities, Urban Design, Environmental Protection, Transportation, Air Quality, Community Safety, and Arts) that set forth goals, policies and objectives for the physical development of the City. Any conflict between the Proposed Project and policies that relate to physical environmental issues are discussed in Section E below. The compatibility of the Proposed Project with General Plan policies that do not relate to physical environmental issues will be considered by decision-makers as part of their decision whether to approve or disapprove the Proposed Project.

Proposition M – The Accountable Planning Initiative

In November 1986, the voters of San Francisco approved Proposition M, the Accountable Planning Initiative, which added Section 101.1 to the Planning Code to establish eight Priority Policies. These policies, and the topics of the Evaluation of Environmental Effects addressing the environmental issues associated with the policies, are: (1) preservation and enhancement of neighborhood-serving retail uses; (2) protection of neighborhood character (Question 1c, Land Use); (3) preservation and enhancement of affordable housing (Question 3b, Population and Housing, with regard to housing supply and displacement issues); (4) discouragement of commuter automobiles (Questions 5a, b, f, and g, Transportation and Circulation); (5) protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership (Question 1c, Land Use); (6) maximization of earthquake preparedness (Questions 14 a-d, Geology, Soils, and Seismicity); (7) landmark and historic building preservation (Question 4a, Cultural Resources); and (8) protection of open space (Questions 9a and b, Wind and Shadow, and Questions 10a and c, Recreation).

Prior to issuing a permit for any project that requires an Initial Study under the California Environmental Quality Act (CEQA), and prior to issuing a permit for any demolition, conversion, or change of use, and prior to taking any action that requires a finding of consistency with the General Plan, the City is required to find that the project or legislation would be consistent with the Priority Policies.

The compatibility of the Proposed Project with Proposition M objectives and policies that do not relate to physical environmental issues will be considered by decision-makers as part of their decision whether to approve or disapprove the Proposed Project. Any potential conflicts identified as part of the process would not alter the physical environmental effects of the Proposed Project.

Additional City Plans and Policies

Additional City policies, plans, and programs that encompass parts of the Project area or are applicable to the Proposed Project include the San Francisco Bicycle Plan, Better Streets Plan, Complete Streets Policy (Public Works Code Section 2.4.13), Vision Zero SF (the City's road safety policy), Transit First Policy (Charter Section 8A.115), Climate Action Plan For San Francisco, San Francisco County Transportation Authority's Congestion Management Program, and Advanced Technology/Information Systems Transit Signal Priority (SF*go*). The compatibility of the Proposed Project with the above policies, plans and programs that do not relate to physical environmental issues will be considered by decision-makers as part of their decision whether to approve or disapprove the Proposed Project. Any potential conflicts identified as part of the process would not alter the physical environmental effects of the Proposed Project.

Regional Plans and Policies

The five principal regional planning agencies and their over-arching policy-plans to guide planning in the nine-county bay area include the Association for Bay Area Governments' (ABAG's) Projections 2013, the Bay Area Air Quality Management District's (BAAQMD's) Bay Area 2010 Clean Air Plan (2010 Clean Air Plan), the Metropolitan Transportation Commission's Regional Transportation Plan – Transportation 2035, the San Francisco Regional Water Quality Control Board's San Francisco Basin Plan, and the San Francisco Bay Conservation and Development Commission's San Francisco Bay Plan. Many of these plans and policies include programs and policies related to the implementation of projects and improvements intended to better manage and improve various transportation modes within the existing City right-of-way. Because of the constraints of the existing public right-of-way, the City balances the needs of all transportation modes that share the right-of-way including bicycles, pedestrians, transit, and vehicles. Conflicts between plans that focus on a particular mode within the City right-of-way may arise. However, many of the plans and policies include language that indicates that implementation of programs or capital improvements would be coordinated with Public Works improvements, including the Proposed Project.

Approvals and Permits

See **Table 3** and **Table 4** in Section A.6 for a list of the anticipated environment-related permits and approvals.

D. SUMMARY OF ENVIRONMENTAL EFFECTS

The Proposed Project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

☐ Land Use	☒ Air Quality	☐ Biological Resources
☐ Aesthetics	☐ Greenhouse Gas Emissions	☐ Geology and Soils
☐ Population and Housing	☒ Wind and Shadow	☐ Hydrology and Water Quality
☒ Cultural Resources	☐ Recreation	☐ Hazards/Hazardous Materials
☒ Transportation and Circulation	☐ Utilities and Service Systems	☐ Mineral/Energy Resources
☒ Noise	☐ Public Services	☐ Agricultural and Forest Resources
		☒ Mandatory Findings of Significance

This Initial Study examines the Proposed Project to identify potential effects on the environment. For each item on the Initial Study checklist, the evaluation has considered the impacts of the Proposed Project both individually and cumulatively. All items on the Initial Study Checklist that have been checked "Potentially Significant Impacts" indicate that the Proposed Project could result in significant impact. All items on the Initial Study Checklist that have been checked a "Less than Significant Impact with Mitigation Incorporated," "Less than Significant Impact," "No Impact" or "Not Applicable," indicate that, upon evaluation, staff has determined that the Proposed Project could not have a significant adverse environmental effect relating to that issue. A discussion is included for those issues checked "Less than Significant Impact with Mitigation Incorporated" and "Less than Significant Impact" and for most items checked with "No Impact" or "Not Applicable." For all of the items checked "No Impact" or "Not Applicable" without discussion, the conclusions regarding potential significant adverse environmental effects are based upon field observation, staff experience and expertise on similar projects, and/or standard reference material available within the Planning Department's Environmental Planning Division. For each checklist item, the evaluation has considered the impacts of the Proposed Project both individually and cumulatively. The items checked above have been determined to result in "Potential Significant Impacts" and checklist questions within those items will be discussed in the EIR.

Assembly Bill 52 and Public Resources Code Sections 21080.3.1 and 21080.3.2

On September 25, 2014, Governor Brown signed Assembly Bill 52 (AB 52) formally establishing a new requirement under CEQA for lead agencies to offer Native American tribes with an interest in tribal cultural resources located within its jurisdiction the opportunity to consult on CEQA documents. Tribal cultural resources are those resources that meet the definitions in Public Resources Code Section 21074. Tribal cultural resources are defined as sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are also either (a) included or determined to be eligible for inclusion in the

California Register of Historical Resources or (b) included in a local register of historical resources as defined in Public Resources Code Section 5020.1(k). AB 52 applies to projects for which a lead agency has issued a Notice of Intent to adopt a Negative Declaration or a NOP of an EIR on or after its effective date of July 1, 2015. The NOP for the proposed project was issued on January 14, 2015. Therefore, the proposed project is not subject to the requirements of PRC Sections 21080.3.1 and 21080.3.2.

E. EVALUATION OF ENVIRONMENTAL EFFECTS

Alternatives 1, 2, and 3 would include the construction and operation of similar transportation, infrastructure, and utility improvements. The footprint for Alternatives 1 and 2 consists primarily of Market Street. The footprint for Alternative 3 is larger, because it includes both Market and Mission streets. However, for many of the environmental topics discussed below, the environmental impacts under Alternative 3 would be the same as those impacts for Alternatives 1 and 2 because the impact discussion is not dependent upon location and footprint. Therefore, unless otherwise stated, the impact discussions apply to Alternatives 1, 2, and 3.

On the other hand, there are some environmental topics described below where the location and/or footprint under Alternative 3 could result in greater impacts compared with Alternatives 1 and 2. In these cases, the difference is stated at the outset of the analysis and the impact discussions analyze how environmental impacts would vary among Alternatives 1, 2, and 3.

The modifications to UN and Hallidie plazas are analyzed in this document at a conceptual level based on the design information available as of the date this document was prepared. The design concepts may be further developed once funding mechanisms for the redesign and rebuilding of the plazas are identified, and Public Works, in coordination with the Planning Department, will determine if additional environmental review is warranted.

E.1. Land Use

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
1.	**LAND USE AND LAND USE PLANNING— Would the project:**					
a)	Physically divide an established community?	☐	☐	☒	☐	☐
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐	☐
c)	Have a substantial impact upon the existing character of the vicinity?	☐	☐	☒	☐	☐

Impact LU-1: The Proposed Project would not physically divide an established community. (Less than Significant)

Construction of the Proposed Project may temporarily hinder access to local business, but not to a level that would physically divide an established community. As described in Section A.5, construction along Market Street is anticipated to occur in four or five geographic phases over a 3- to 5-year period under Alternatives 1 and 2. Under Alternative 3, construction along Mission Street is anticipated to occur over a 1- to 2-year period. Construction within each geographic phase would be scheduled to minimize disruption to businesses, residents, visitors and the transportation system. Access to all buildings and businesses would be maintained throughout construction, however as described in Section A.5, the temporary closures of the center and curbside lanes and the sidewalk during construction could result in detours to access buildings. Although construction may result in detours, those detours would be temporary and construction phasing would limit locations where detours are necessary.

The Proposed Project is intended to redesign and provide various transportation and streetscape improvements to Market Street and potentially Mission Street (under Alternative 3), as well as the redesign and rebuilding of UN and Hallidie Plazas. A majority of the various Proposed Project elements would be implemented within the City's existing street grid and existing operational public right-of-way. The Proposed Project consists of both transportation and streetscape improvements to provide faster and more reliable surface public transit; improve pedestrian and bicyclists' safety, comfort, and mobility; and includes the redesign and rebuilding of UN and Hallidie plazas. Implementation of any of the alternatives and design options would represent a continuation of the existing land uses in the Project corridor. Operation of the Proposed Project would not alter the established street grid, create new streets, or demolish existing buildings. The Proposed Project would not permanently close any streets or sidewalks, and the redesign and rebuilding of UN and Hallidie Plazas would not result in substantial changes to pedestrian circulation or access through these areas.

While circulation changes would be made to streets intersecting Market Street, access to, from, and across Market Street would be maintained within the Project area. Consequently, the Proposed Project does not include any elements that would indirectly result in the physical division of an existing neighborhood. Therefore, for each alternative and design option, the Proposed Project would have no impact on the physical division of an established community.

This topic will not be analyzed further in the EIR.

Impact LU-2: The Proposed Project would not conflict with applicable land use plans, policies, or regulations of an agency with jurisdiction over the project (including but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is largely under the jurisdiction of Public Works and SFMTA. The Proposed Project would not substantially conflict with any applicable land use plan, policy, or regulation such that an adverse physical change would result (see Section C, Compatibility with Existing Zoning and Plans). Environmental plans and policies are those, like the Bay Area Air Quality Management District *2010 Clean Air Plan*, which directly address environmental issues and/or contain targets or standards, which must be met in order to preserve or improve characteristics of the City's physical environment.

The conceptual plans for UN Plaza envision filling in the existing fountain and creating a new outdoor pavilion with a new seating area with tables and benches, as well as new trees and other streetscape elements. UN Plaza is located within the Civic Center Historic District, which is listed under Article 10 of the Planning Code. The proposed modifications to UN Plaza may be considered a Major Modification as defined in Article 10 and therefore would require Certificates of Appropriateness prior to approval and construction (see Section 7. Additional Provisions for Certificates of Appropriateness and Section 8. Significance of Individual Buildings to the Historic District, Part 3. Noncontributory). Certificates of Appropriateness require the Planning Department to report and recommend findings to the Historic Preservation Commission (HPC). The HPC will approve, disapprove, or approve with modifications Certificates of Appropriateness within the Civic Center Historic District [Article 10, Section 1006.4 (d)].

The conceptual plans for Hallidie Plaza envision redesigning and rebuilding the entire area by decking over the sunken portion to create a street-level plaza, repaving the entire plaza and adding a new outdoor pavilion with new seating areas and new kiosks. Hallidie Plaza is located within the Kearny-Market-Mason-Sutter Conservation District, which is listed under Article 11 of the Planning Code. The proposed modifications to Hallidie Plaza may be considered a Major Modification as defined in Article 11 (see Section 1111.1. Determination of Minor and Major Alterations and Section 7. Standards and Guidelines for Review of New Constructions and Certain Alterations of the Planning Code).

Refer to Section 4, *Cultural Resources*, for a discussion regarding the evaluation of historic architectural resource impacts to be included in the EIR. Modifications to UN Plaza and Hallidie Plaza described above would not constitute new uses and, therefore, would not conflict with any applicable land use plans, policies or regulations.

Furthermore, the Proposed Project would not conflict with the General Plan policies that relate to physical environmental issues. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie Plazas, the Proposed Project would not conflict with applicable land use plans, policies, or regulations of an agency with jurisdiction over the project and adopted for the purpose of avoiding or mitigating environmental effect and impacts would be less than significant.

This topic will not be analyzed further in the EIR.

Impact LU-3: The Proposed Project would not have a substantial impact on the existing character of the vicinity. (Less than Significant)

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is largely under the jurisdiction of Public Works and SFMTA. The Proposed Project would not introduce any new land uses. Rather, Proposed Project elements consist of both transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic controls; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities. Many of these elements currently exist (e.g., transit stops, transit boarding islands, bicycle facilities, etc.) and are some of the many components that contribute to the creation of neighborhood character. The Proposed Project's changes to these elements would be relatively minor in the overall scheme of San Francisco's transportation system and the many other physical elements that define a neighborhood's character (e.g., size and architectural style of buildings, type of land uses). While changes in surface transit and the associated infrastructure as a result of the Proposed Project could affect how users perceive the Project corridor, these changes would not substantially affect the existing character of the Project corridor and would ultimately result in character enhancements via improved streetscapes and decreased traffic congestion. Furthermore, redesign and rebuilding of UN and Hallidie plazas would result in a continuation of the existing land uses in these areas. Therefore, for each alternative, including redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact on the existing character of the vicinity of the Project corridor. Impacts related to character-defining features of cultural resources are described in Topic 4, *Cultural Resources*. As described under *Impact CP-1* in Topic 4, *Cultural Resources*, the potential cultural resource impacts of the Proposed Project, including how alterations to historic resources might affect a scenic public setting, will be analyzed in the EIR.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-LU-1: The Proposed Project, in combination with past, present, or reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to land use or land use planning. (Less than Significant)

Cumulative impacts occur when impacts from a project combine with similar impacts from other past, present, or reasonably foreseeable projects in a similar geographic area. The geographic context for cumulative land use impacts is any proposed development that is within the Project

corridor. The Proposed Project would be implemented in this larger context that includes the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. Proposed building projects along and near the Project corridor are listed in **Table 1** in Section A.1. The character of the Project corridor will change in the future as development occurs in accordance with the General Plan and under the area plans discussed in Section A.1. Some of these projects would require modifications, variances, or exceptions to Planning Code requirements or General Plan land use designations. In regards to impacts on local businesses, construction of the reasonably foreseeable projects listed in **Table 1** may periodically and locally hinder access within a given project's vicinity. As described in Section A.5, temporary travel, parking lane, or sidewalk closures are coordinated with the City in order to minimize the impacts on local traffic and businesses. In general, lane and sidewalk closures are subject to review and approval by the TASC, an interdepartmental committee, including representatives of the Police, Public Works, Planning, and Fire Departments and SFMTA Muni Operations. Project sponsors must prepare a construction management plan that addresses issues of circulation (traffic, pedestrians, and bicycle), safety, parking, and other project construction in the area. The construction management plan is reviewed by the TASC. Construction-related trucks are required to use designated freight traffic routes to access project sites.

The Project Sponsor would be required to prepare a construction management plan addressing, to the maximum extent feasible, issues of congestion and access. Although the cumulative effect of multiple construction projects in the Project corridor could result in occasional conflicts with vehicles, transit, pedestrians and bicyclists using the surrounding streets and hinder access to local businesses, such effects would be temporary and localized, and would not result in a significant cumulative impact.

In a broader land use context, the Proposed Project objectives include maximizing surface public transit system capacity and improving the safety and comfort of pedestrians and bicyclists in the Project corridor, all of which would support planned housing and job growth consistent with adopted land use plans. As stated above, the Proposed Project would not result in significant land use and planning impacts because the Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would not physically divide an establish community, it would not introduce any new land uses, and it would not conflict with any applicable land use plan, policy, or regulation that would result in an environmental impact. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable land use impact.

This topic will not be analyzed further in the EIR.

E.2. Aesthetics

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
2.	**AESTHETICS—Would the project:**					
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment which contribute to a scenic public setting?	☐	☐	☒	☐	☐
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties?	☐	☐	☒	☐	☐

Design and aesthetics are, by definition, subjective and open to interpretation by decision makers and members of the public. In determining whether an impact is significant under CEQA, the question is whether a project would affect the environment of persons in general, not whether a project would affect particular persons. Therefore, a project would be considered to have a significant adverse effect on visual quality under CEQA only if it would cause a substantial and demonstrable negative change in the physical environment that affects the public in one or more ways.

The focus of this analysis is on impacts caused by alterations to the physical environment that would result from the Proposed Project. The Proposed Project elements that would result directly in physical changes pertinent to aesthetics involve construction of above-grade transportation infrastructure elements, including traffic controls; surface transit stop infrastructure (e.g., bus shelters and signage); bicycle facilities; pedestrian facilities; streetscapes; and utilities.

Impact AE-1: The Proposed Project would not have a substantial adverse effect on a scenic vista. (Less than Significant Impact)

Distant street-level scenic vistas in densely developed San Francisco are typically defined, directed, and framed along view corridors created by streets. The City's General Plan identifies the importance of protecting major views in the City with particular attention to views of open space and water. The Urban Design Element of the General Plan includes a map titled "Street Areas Important to Urban Design and Views" which identifies particular street segments throughout the City possessing street views of important buildings, streets that define the City

form, or streets that extend the effect of public open space.[5] The map identifies Market Street as having "Street View of Important Building" and as one of the "Streets that Define the City Form." Proposed turn signals, stop signs, bicycle signals, bus shelters, and ADA-accessible ramps could result in minor obstructions of views. All other physical improvements constructed as part of the Proposed Project would be at- or below-grade and would not affect views. As such, the Proposed Project would result in less-than-significant impacts on street views from Market Street as well as from surrounding street views.

The Proposed Project would be located within an existing transportation corridor and UN and Hallidie plazas. All construction and staging would occur within the operational public right-of-way. Construction activities would be temporary and relatively short-term in duration. The permanent elements of the alternatives and design options that are being considered would be consistent with the existing urban environment and with the type and scale of the existing transportation facilities within the Project corridor. Therefore, construction and implementation of the Proposed Project would not have the potential to result in significant aesthetic impacts to a scenic vista.

At the state level, the California Scenic Highway Program identifies highways of outstanding natural beauty. No highways in San Francisco are designated under this program. Therefore, this topic is not applicable to the Proposed Project.

This topic will not be analyzed further in the EIR.

Impact AE-2: The Proposed Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment which contribute to a scenic public setting. (Less than Significant)

Scenic resources are the visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, or other features) which contribute to a scenic public setting. All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way. The operational public right-of-way does not include scenic resources which contribute to a scenic public setting. The operational public right-of-way does include street trees and other vegetation that are sparsely interspersed amongst the other features of this highly urban transportation corridor.

Under Alternatives 1 and 2, some existing street trees on Market Street would be relocated in locations where sidewalks would be narrowed. In addition, Alternatives 1 and 2 would include the replacement and/or removal of some trees deemed unhealthy, hazardous or in conflict with design. Therefore, the Proposed Project could result in the removal of all trees along Market Street between Octavia and Steuart streets under either design option. Any tree that is removed would be replaced, if feasible. Under Alternative 3, healthy street trees on Mission Street would

[5] San Francisco Planning Department Map. n.d.. Street Areas Important to Urban Design and Views. Available on the Planning Department's Web site at http://www.sf-planning.org/ftp/General_Plan/images/I5.urban_design/urb_street_areas_important_to_perception_of_city.pdf. Accessed on August 21, 2015.

remain while unhealthy street trees would be replaced and new street trees would be planted in locations where there are existing empty tree wells and gaps. Redesign and rebuilding of UN and Hallidie Plazas would include the addition of trees to those public spaces. Overall, the Proposed Project would result in fewer street trees relative to the existing condition. As described under *Impact BI-4* in Topic 13, *Biological Resources*, the Planning Department, Department of Building Inspection, and Public Works have established guidelines to ensure that the Urban Forestry Ordinance governing the protection of trees is implemented. This ordinance aims to optimize the public benefits of trees on the City's streets and public places, including enhancement of the visual environment, by recognizing that trees are an essential part of the City's aesthetic environment and that the removal of important trees should be addressed through appropriate public participation and dialogue. The ordinance also includes uniform criteria for the designation of landmark trees, which included consideration of the age, size, shape, species, location, historical association, visual quality, and other contribution to the City's character. There are no landmark trees along the Proposed Project corridor.[6] Although the Proposed Project would result in a net decrease in the number of street trees in the Project corridor, compliance with the established guidelines would ensure that the goal of optimizing the public benefits of the trees would be achieved and impacts would be less than significant.

As described under *Impact CP-1* in Topic 4, *Cultural Resources*, the potential cultural resource impacts of the Proposed Project, including how alterations to historic resources might affect a scenic public setting, will be analyzed in the EIR.

This topic will not be analyzed further in the EIR.

Impact AE-3: The Proposed Project would not substantially degrade the existing visual character or quality of the site and its surroundings. (Less than Significant)

The character and visual quality of the public realm in the densely developed Project area is primarily defined by varied land uses and the visual character and quality of the buildings that bound and visually enclose the streets. The Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would not result in the construction of any buildings or structures that could have a substantial adverse effect on existing visual character or quality of the public realm (e.g., an office tower that could block views or be architecturally different in character than existing development). Proposed Project elements, with the exception of the redesign and rebuilding of UN and Hallidie plazas, consist of both transportation and streetscape improvements. Elements of the surface transportation network (e.g., cycle track and Muni vehicles) are not typically considered prominent visual features within the streetscape compared to a fixed feature (e.g., an architecturally significant building). In addition, in an urban setting, the surface transportation network elements are typically considered unobtrusive and utilitarian features that contribute to the visual character and quality of the public realm, which would be the case in the Project area.

[6] San Francisco Public Works. n.d. "Services A-Z, Trees, Significant and Landmark Trees." Available at: http://www.sfdpw.org/index.aspx?page=663. Accessed on March 24, 2015.

Although construction of the Proposed Project elements may affect the existing visual character or quality of areas while they are under construction, such effects would be temporary and would not substantially degrade the visual environment in any permanent or long-term sense.

Modifications to UN Plaza would result in the addition of a new above ground outdoor pavilion with a new seating area with tables and benches, as well as new trees and other streetscape elements. As discussed under *Impact AE-2*, these changes are consistent with current uses of this space, and would result in minimal visual intrusions into the existing landscape relative to the surrounding environment. Similarly, the conceptual plans for Hallidie Plaza envision redesigning and rebuilding the entire area by decking over the sunken portion to create a street-level plaza, repaving the entire plaza and adding a new outdoor pavilion with new seating areas and new kiosks. A new structure also would be added to the plaza area, assumed to be used as a tourist information center, as well as other streetscape elements. These changes are consistent with current uses of the space and would result in minimal visual intrusions into the existing landscape relative to the surrounding environment.

The Proposed Project would not fundamentally change any of the physical components of the transportation network in a way that would substantially degrade the visual character of the associated streets and neighborhoods. Rather, typical of existing physical features of the surface transit network, the Proposed Project elements would be visually unobtrusive and similar to existing transportation and streetscape features that currently exist within the Project corridor. These changes would consist of familiar and accepted visual features in the Project area's dense and varied visual environment. For each alternative and design option, the Proposed Project elements would not degrade the visual quality of an existing neighborhood.

While implementation of the Proposed Project would alter the location and pattern of surface transit (including bicycle flow and private vehicle access) within the Project corridor, these changes would not have a significant impact on the visual character of the Project area under CEQA. Therefore, such changes to surface transit and private vehicle access would not be considered a significant impact related to aesthetics under CEQA.

The Path of Gold Light Standards are a defining visual character of Market Street, as viewed from the street-level perspective as well as from higher-elevation landscape perspectives from such viewpoints as Twin Peaks and Corona Heights Park. Each alternative would result in the need to relocate some of the Path of Gold Light Standards in limited locations along Market Street where sidewalks would be narrowed, shifting them north or south of their current locations. These shifts in location would range from a few feet to up to fifteen feet. Where the standards would be shifted by more than a few feet, adjacent standards would also be shifted a few feet in the same direction with the objective of diminishing the visual effect of the relocation of any individual standard. In addition, one standard at Turk Street and Mason Street would be removed entirely as a result of the island being eliminated.

As viewed from a street level perspective, particularly at night when the standards are lit, the Path of Gold Light Standards provide a linear visual sight line along Market Street. Although the standards are a linear visual resource, the sight line from any individual street-level perspective is interrupted by numerous obstacles along every block of Market Street including street trees, traffic signals and sign posts, overhead wiring and poles, streetlights (other than the standards), kiosks, and other street fixtures. This visual landscape renders it difficult to view the standards in

a straight line for more than one or two blocks, negating the visual effect of the relocation of any individual light standard. With respect to the removal of the standard at Turk Street and Mason Street, there are currently intermittent gaps in the standards where major street crossings exist. The removal of this one light standard would be consistent with other major street crossings without a standard, such as at the intersection of Geary Street and Kearney Street at Market Street. From a street-level perspective, the Proposed Project would not substantially degrade the visual quality of the Path of Gold Light Standards.

From the viewpoints of Twin Peaks (approximately 10,500 feet to the west of the Project corridor) and Corona Heights Park (approximately 6,500 feet to the west), the Path of Gold appears as a brilliant linear pathway heading east when lit at night. From Corona Heights Park, the perspective of the Path of Gold is also slightly skewed, limiting the view to about a third of the overall length of Market Street due to the intrusion of tall buildings. At a distance of 6,500 feet or 10,500 feet, a shift of several adjacent standards north or south of their current location or the removal of any individual light standard would not be perceptible. Therefore, from a landscape perspective, the Proposed Project would not substantially degrade the visual quality of the Path of Gold Light Standards.

Based on the analysis above, for each alternative and design option, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact on the existing visual character or quality of the site and its surroundings.

This topic will not be analyzed further in the EIR.

Impact AE-4: The Proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties. (Less than Significant)

A majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is lit by an existing system of street lights that is maintained by the SFPUC. Each alternative would include new signals as well as signal timing and control modifications and relocations, which could create a new or relocated source of light. Traffic signals would be installed pursuant to specifications in the California Manual on Uniform Traffic Control Devices. However, the signals would be installed at roadway intersections and would not be visually obtrusive in the context of existing urban street lights and therefore they would not substantially interfere with day or nighttime views.

Outdoor lighting sources such as floodlights, spot lights, and/or headlights associated with construction equipment and hauling trucks typically accompany nighttime construction activities. Increased nighttime lighting effects would occur throughout the duration of construction of the Proposed Project. Construction lighting would be focused on the particular area undergoing work and would be limited to the duration of construction activities. Light and glare impacts resulting from construction of the Proposed Project would be less than significant.

As discussed above, each alternative would include the relocation of The Path of Gold Light Standards in limited locations along Market Street where sidewalks would be narrowed. However, as each alternative would relocate The Path of Gold Light Standards rather than construct new light standards, this Proposed Project element would not create a new source of light. Furthermore, street lights are a typical element of the urban streetscape. The limited

relocation of the Path of Gold light standards would not increase the potential for light and glare and therefore would not degrade day or nighttime views.

Each alternative would include transit boarding island enhancements and expansion (length and width), as well as amenities such as bus shelters to the center boarding islands. However, these Proposed Project elements would replace existing transportation features. While the location of some of these elements, such as bus shelters, would be slightly different relative to the existing condition, these would not be new additions to the Project corridor, therefore the Proposed Project would not increase the potential for light and glare and therefore would not degrade day or nighttime views.

The redesign and rebuilding of UN and Hallidie plazas may include the addition of new lighting elements to these areas. If new lighting elements are included as part of the redesign of either plaza, such lighting would be consistent with the type of pedestrian streetscape lighting utilized at public spaces around the City of San Francisco. This lighting would consist of downward facing light fixtures that would be selected to efficiently direct light to pedestrian pathways and active uses within the plaza area. Such lighting would be designed to minimize the potential to introduce new sources of light and glare; therefore the redesign and rebuilding of UN and Hallidie plazas would not substantially interfere with day or nighttime views.

Therefore, for each alternative and design option, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact related to light and glare.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-AE-1: The Proposed Project, in combination with past, present, or reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to aesthetics. (Less than Significant)

The geographic context for cumulative aesthetic impacts is any proposed development that is within the Project corridor. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which will replace existing structures with new residential, commercial, retail, and hotel uses. The visual character of the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in aesthetic impacts typically relate to the scale (height and bulk) of proposed buildings constructed, especially in the context of the existing surrounding development. There are development projects proposed along the full extent of the Project corridor, each of which would contribute to changes to the visual character of the Project corridor and would in some instances introduce new visual obstructions, changes to scenic vistas, and new sources of light and glare that could degrade day and nighttime views.

As described in the discussion for *Impact AE-1* through *Impact AE-4*, implementation of the Proposed Project would not have a significant adverse impact related to aesthetics, including scenic resources, scenic vistas, visual character and quality, and light and glare. Physical

alterations to the physical environment associated with the Proposed Project alternatives and design options would include the construction of visually unobtrusive improvements within the existing operational public right-of-way, such as above-grade transportation infrastructure elements, including traffic controls; surface transit stop infrastructure (e.g., bus shelters and signage); bicycle facilities; pedestrian facilities; streetscapes; and utilities. Such improvements would maintain the existing land uses of the transportation network in the Project corridor and, with the exception of new light signals and some new streetscape elements, would replace existing features.

As discussed above, the redesign and rebuilding of UN and Hallidie plazas would result in a continuation of existing use in these areas. Although the new design may include new structures at either or both plazas, these structures would not introduce substantial new visual intrusions. Furthermore, no substantial new sources of light and glare would be included that could interfere with day or nighttime views. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable aesthetic impact.

This topic will not be analyzed further in the EIR.

E.3. Population and Housing

Topics:		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
3.	**POPULATION AND HOUSING— Would the project:**					
a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐	☐
b)	Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing?	☐	☐	☐	☒	☐
c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	☐

Impact PH-1: The Proposed Project would not induce substantial population growth, either directly or indirectly. (Less than Significant)

Population

In general, a project would be considered growth-inducing if its implementation would result in a substantial population increase, employment increase, or new development that might not

occur if the project were not implemented. Population growth can be induced directly through the construction of new homes and businesses that attract new residents and employees from other areas of the City, or from outside the City. Although the Proposed Project would not result in increased residential population or introduce new commercial, office, or industrial uses into the City, the Proposed Project objectives include maximizing surface public transit system capacity in the Project corridor to support planned housing and job growth consistent with adopted land use plans. Specifically, the Proposed Project is intended to enhance the transit capacity of the transportation network to carry passengers more efficiently, to maintain an appropriate pedestrian capacity, and to increase bicycle traffic capacity within the Project corridor. Implementation of the Project would accommodate current demand and future development and population growth that has already been planned for and anticipated within City and regional population growth projections. The Proposed Project is not anticipated to shift travel patterns in the City in any fundamental way such that growth would occur in neighborhoods where it is not otherwise anticipated.

Population growth can also be induced indirectly through the extension of roads or other infrastructure (e.g., water, wastewater, electrical lines) to previously unserved areas. Population growth may also be indirectly stimulated by improvements to existing infrastructure, such as the paving of a gravel road, or through economic stimulation such as enhanced amenities (e.g., new or upgraded recreation or park facilities). Although the Proposed Project would not include any new transit lines that would bring transit riders to unserved areas, the Proposed Project is anticipated to enhance transit capacity and carry more passengers more efficiently within the Project corridor. The Proposed Project would not extend or improve existing roads, utilities, or other infrastructure beyond the extent of the current operational public right-of-way or outside of the Project corridor. It would not substantially alter existing or induce new development because transit service already exists in the Project corridor. As described above, the Proposed Project would accommodate current demand and future development and population growth that has already been planned for and anticipated within City and regional population growth projections. Based on the above analysis, direct and indirect population growth impacts resulting from the Proposed Project under each alternative and design option would be less than significant.

This topic will not be analyzed further in the EIR.

Employment

Construction of the Proposed Project would result in temporary construction-related employment opportunities, which would span several phases over a period of several years (3 to 5 years for Alternatives 1 and 2, and an additional 1 to 2 years for Alternative 3). An increase in population related to construction employment would not be substantial because the Proposed Project would consist of relatively small, short-term activities that are expected to be performed by existing contractors in the Bay Area that typically bid on public works projects and which are familiar with construction requirements and procedures in the City. Furthermore, the Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Construction of a new pavilion at UN and/or Hallidie Plazas or a visitor center at Hallidie Plaza could result in some new employment opportunities to staff these facilities.

However, the number of new full-time equivalent employees at all facilities combined would likely be less than ten, which is a negligible increase relative to the overall labor market within San Francisco and is anticipated to be able to be accommodated by the current employment pool. Based on the above analysis, employment-related growth impacts resulting from the Proposed Project under each alternative and design option would be less than significant.

This topic will not be analyzed further in the EIR.

Impact PH-2: The Proposed Project would not displace existing housing units or create demand for additional housing, or displace substantial numbers of people, necessitating the construction of replacement housing. (No Impact)

A majority of the various Proposed Project elements would be implemented within the operational public right-of-way and would result in a continuation of the existing transportation and public land uses. Thus, the Proposed Project would not have the potential to displace existing housing or persons. As described under *Impact PH-1*, the Proposed Project would not result in increased residential population or introduce new commercial, office, or industrial uses into the City. The Proposed Project would include some minor new development at UN and/or Hallidie Plazas that could generate a small amount of new employment opportunities, however this increased employment is negligible and is not anticipated to trigger the demand for additional housing. Furthermore, the primary objectives of the Proposed Project include increasing the capacity and efficiency of the transit system. Thus, the Proposed Project would help accommodate current and future demand for transporting persons to and from places of employment and their residences, reducing the localized impact of the high demand for both employment and housing. Therefore, for each alternative and design option, the Proposed Project would have no impact related to the displacement of housing units or substantial numbers of people or the creation of demand for additional housing.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-PH-1: The Proposed Project in combination with other past, present, or reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to population and housing. (Less than Significant)

The geographic context for cumulative population and housing impacts is any proposed development that is within the Project corridor. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which will replace existing structures with new residential, commercial, retail, and hotel uses, many of which would increase the demand for employment and housing in an already highly constrained urban environment.

As discussed above, the Proposed Project would not displace housing, would not generate substantial new sources of employment that could trigger the need for constructing additional housing, and would not extend or improve infrastructure to a previously unserved area. Given that the primary objectives of the Proposed Project include increasing the capacity and efficiency of the transit system, the Proposed Project would help accommodate current and future demand for transporting persons to and from places of employment and their residences, reducing the

localized impact of the high demand for both employment and housing. Therefore, the Proposed Project would not contribute to a cumulatively considerable significant population and housing impact.

This topic will not be analyzed further in the EIR.

E.4. Cultural Resources

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
4.	**CULTURAL RESOURCES—Would the project:**					
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code?	☒	☐	☐	☐	☐
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐	☐
c)	Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐	☐

For the purposes of this Initial Study, the term "historic resource" refers to buildings, structures, objects, sites, landscapes, and historic districts. The term is used to distinguish such resources from archaeological resources. Both historic architectural resources (Topic 4a) and archaeological resources (Topic 4b) may also be considered "historical resources" under CEQA.

Impact CP-1: The Proposed Project could cause a substantial adverse change in the significance of a historical resource. (Potentially Significant)

The Proposed Project would be implemented within an urban area. All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is largely under the jurisdiction of Public Works and SFMTA. Proposed Project elements consist of both transportation and streetscape improvements that could have potentially significant impacts on cultural resources, including historic resources. Properties eligible for the CRHR are historic resources for the purposes of CEQA.

Each alternative and design option would include the relocation of some portions of The Path of Gold Light Standards in limited locations, and in one location would involve the removal of one standard. The Path of Gold Light Standards is a designated historic landmark identified under Article 10 of the Planning Code (Landmark No. 200) and is located between 1 Market Street and

2490 Market Street within the Project corridor. In addition, each alternative would include targeted replacement or relocation of AWSS lines, including AWSS fire hydrants, along Market Street to maintain state of good repair. The AWSS lines are a known historic resource. Both the Path of Gold Light Standards and the AWSS lines are potentially eligible for listing in the CRHR. The Path of Gold Light Standards are considered historic resources for the purposes of CEQA because they are locally listed as designated historic landmark identified under Article 10 of the Planning Code.

The Proposed Project also includes the redesign and rebuilding of UN and Hallidie plazas. UN Plaza is located within the boundaries of the Civic Center Historic District, which is listed under Article 10 of the Planning Code and is considered a historic resource for the purposes of CEQA. The proposed modifications to UN Plaza may be considered a Major Modification as defined in Article 10 and therefore would require Certificates of Appropriateness prior to approval and construction (see Section 7. Additional Provisions for Certificates of Appropriateness and Section 8. Significance of Individual Buildings to the Historic District, Part 3. Noncontributory). Certificates of Appropriateness require the Planning Department to report and recommend findings to the HPC. The HPC will approve, disapprove, or approve with modifications Certificates of Appropriateness within the Civic Center Historic District [Article 10, Section 1006.4 (d)].

Hallidie Plaza is located within the Kearny-Market-Mason-Sutter Conservation District, which is listed under Article 11 of the Planning Code. The proposed modifications to Hallidie Plaza may be considered a Major Modification as defined in Article 11 (see Section 1111.1. Determination of Minor and Major Alterations and Section 7. Standards and Guidelines for Review of New Constructions and Certain Alterations of the Planning Code). The HPC will approve, disapprove, or approve with modifications Certificates of Appropriateness within the Kearny-Market-Mason-Sutter Conservation District (Article 11) as either Compatible Rehabilitation (Section 1113) or Compatible Replacement Building [Section 1109(c)] along with findings in support of its decision.

Evaluation will be required to determine if UN and Hallidie plazas are potentially eligible for listing in the California Register of Historic Resources or the National Register of Historic Places and whether the proposed modifications to these plazas would have any impacts.

A CEQA study area will be defined that encompasses properties within the Project corridor that have the potential to be impacted by the Proposed Project. The properties within the CEQA study area, which include those discussed above amongst others that have yet to be evaluated, will be assessed for eligibility for listing in the CRHR in a Historic Resource Evaluation (HRE). The HRE will describe general existing conditions, including known historic resources, within the CEQA study area. The Planning Department will review and prepare its own response to the HRE in a Historic Resource Evaluation Response (HRER). The EIR will summarize information in the HRE and the HRER.

Impact CP-2: The Proposed Project could cause a substantial adverse change in the significance of an archaeological resource or disturb human remains. (Less than Significant with Mitigation)

The Archaeological Sensitivity Assessment (ASA) prepared for the Proposed Project involved a record search, review of historical maps, coordination with the San Francisco archaeologist,

Native American consultation, and a detailed desktop geomorphic assessment.[7] Several prehistoric archaeological resources are recorded or documented within the archaeological area of potential effect (APE), including three within the Market Street area and one within the Mission Street area. In addition, historic-period archaeological resources (e.g., buried ships and wharves) are documented within the APE, including three unknown/unnamed ships and the Market Street Wharf in or near Market Street, and four possible buried ships beneath Mission Street (Byron, Trescott, Panama, and Callao).

In general, much of the Project work along Market Street would be conducted within the confines of the street itself, at limited depths of approximately 12 inches to 3 feet. A subset of Project activities, such as sewer replacement and installation of new or relocated light signals and Path of Gold lights standards could exceed a depth of 12 to 15 feet. The soil in the eastern portion of the Project area is primarily composed of anthropogenic fill material where extensive cutting of dunes and mechanically shifting of sand towards the Bay is well documented. An exception to this, however, is the area of UN Plaza, which is considered sensitive for historic-era human remains related to the Yerba Buena Cemetery. Other areas of Market Street, such as along mid-Market (4th Street to Civic Center), have already undergone substantial excavation for the construction and installation of utilities, BART, and Muni facilities, including much of the area of Hallidie Plaza. Mitigation Measure M-CP-1 lists the steps to be taken in the event of an accidental discovery so as to avoid any potential adverse effect on buried or submerged historical resources as defined in CEQA Guidelines Sections 15064.5(a) and (c). Based on the above analysis, and with implementation of Mitigation Measure M-CP-1, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact on the significance of an archaeological resource or human remains.

This topic will not be analyzed further in the EIR.

> **Mitigation Measure M-CP-1: Archeological Resources** The Project Sponsor shall distribute the Planning Department archeological resource "ALERT sheet" to the Project prime contractor; to any Project subcontractor (including demolition, excavation, grading, foundation, and pile driving contractors); and to utilities involved in soils disturbing activities within the Project site. Prior to any soils disturbing activities being undertaken, each contractor shall be responsible for ensuring that the ALERT sheet is circulated to all field personnel, including machine operators, field crew, pile drivers, and supervisory personnel. The Project Sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractors, and utilities) to the ERO confirming that all field personnel have received copies of the ALERT Sheet.
>
> Should any indication of an archeological resource be encountered during any soils disturbing activity, the Project Head Foreman and/or Project Sponsor shall immediately notify the ERO and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO has determined what additional measures should be undertaken.

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7 ICF International, *Archaeological Sensitivity Assessment for the Better Market Street Project*, October 2015.

If the ERO determines that an archeological resource may be present within the Project site, the Project Sponsor shall retain the services of an archaeological consultant from the pool of qualified archaeological consultants maintained by the Planning Department archaeologist. The archeological consultant shall advise the ERO as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require specific additional measures to be implemented by the Project Sponsor.

Measures might further include: preservation in situ of the archeological resource; an archaeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Environmental Planning Division guidelines for such programs. The ERO may also require that the Project Sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions.

The project archeological consultant shall submit to the ERO a Final Archeological Resources Report (FARR) that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to the ERO for review and approval. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning Division of the Planning Department shall receive one bound copy, one unbound copy, and three CDs containing an unlocked, searchable PDF of the FARR, along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.

Cumulative Impacts

Impact C-CP-1: The Proposed Project, in combination with other past, present and reasonably foreseeable future projects in the vicinity of the Project corridor, could considerably contribute to significant impacts related to cultural resources, including historic resources. (Potentially Significant)

The geographic context for cumulative cultural resource impacts is any proposed development that is within or adjacent to the Project corridor. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of

the Project corridor, some of which will replace existing structures with new residential, commercial, retail, and hotel uses. The construction of new buildings or other substantial structures will have the potential to result in visual disruption to or demolition of historic resources.

The Proposed Project would include changes to the built environment resulting from the construction and relocation of streetscape elements that could impair historic resources within the vicinity of the Project corridor. Therefore, implementation of the Proposed Project, in combination with past, present or reasonably foreseeable projects within and adjacent to the Project corridor could result in cumulatively significant impacts on cultural resources. The potential cumulative impacts on historic resources will be described and analyzed in the EIR.

Impact C-CP-2: The Proposed Project, in combination with other past, present and reasonably foreseeable future projects in the vicinity of the Project corridor, could considerably contribute to significant impacts related to cultural resources, including prehistoric resources. (Less than Significant with Mitigation)

The geographic context for cumulative cultural resource impacts is any proposed development that is within or adjacent to the Project corridor. Project-related impacts on archeological resources and human remains are site-specific and generally limited to the proposed project's construction area. As noted above, the sub-surface soil within the project corridor has been subject to extensive previous disturbance. Further, the depth of excavation necessary to implement the proposed project would be about 12 inches to three feet along Market Street and 12 to 15 feet for those Path of Gold light standards that may be moved. As noted above, Mitigation Measure M-CP-1 provides the steps to be taken in the event of an accidental discovery so as to avoid any potential adverse effect on buried or submerged historical resources as defined in CEQA Guidelines Sections 15064.5(a) and (c). For these reasons, the proposed project, in combination with other past, present, and reasonably foreseeable future projects, would not contribute to a cumulatively considerable impact on archeological resources and human remains.

This topic will not be analyzed further in the EIR.

E.5. Transportation and Circulation

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
5.	**TRANSPORTATION AND CIRCULATION— Would the project:**					
a)	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐	☐
b)	Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐	☐
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?	☐	☐	☐	☐	☒
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?	☒	☐	☐	☐	☐
e)	Result in inadequate emergency access?	☒	☐	☐	☐	☐
f)	Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☒	☐	☐	☐	☐

The Project corridor is not located within an airport land use plan area or in the vicinity of a private airstrip. The Proposed Project would not interfere with air traffic patterns. Thus, Topic 5c is not applicable to the Proposed Project and this topic will not be analyzed in this Initial Study, the Transportation Impact Study (TIS), or the EIR.

Alternative 3 would result in greater construction activities and potentially greater transportation and circulation impacts due to the inclusion of Mission Street. As a result, the environmental impacts of the three alternatives would not be the same with regard to transportation and circulation. This will be described and analyzed in the EIR.

Impact TR-1: The Proposed Project could have a substantial adverse effect on transportation and circulation, including measures of effectiveness for the performance of the circulation system; congestion management programs; hazards due to a design feature; emergency access; and policies, plans, and programs related to public transit, bicycle, and pedestrian facilities. (Potentially Significant)

Proposed Project elements consist of both transportation and streetscape improvements that could have potentially significant impacts on various aspects of the transportation and circulation network, including measures of effectiveness for the performance of the circulation system; congestion management programs; emergency access; and policies, plans, and programs related to public transit, bicycle, and pedestrian facilities, and would result in changes to the transportation system that could substantially increase hazards.

A TIS will be prepared for the Proposed Project. The TIS will examine existing transportation and circulation conditions and assess the Proposed Project's potential impacts on the transportation network. The TIS also will examine potential conflicts with performance measures of the circulation system, considering both transit and non-motorized travel and relevant components of the circulation system. Impacts on emergency access also will be evaluated, along with the potential for changes to the transportation system resulting in substantial increases in hazards. The EIR will summarize information in the TIS, which will identify the potential transportation and circulation impacts.

Cumulative Impacts

Impact C-TR-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, could result in a cumulatively considerable contribution to significant impacts related to transportation and circulation. (Potentially Significant)

The geographic context for cumulative transportation and circulation impacts includes any transportation and development project that could impact the transportation and transit network within or intersecting the Project corridor. The Proposed Project would occur in this larger context that includes other transportation and development projects within and surrounding the Project corridor. The transportation elements and circulation patterns within and surrounding the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above. Some of these changes will likely result in significant impacts to the transportation and circulation system.

The Proposed Project would include changes to the built environment that would result in changes to surface traffic patterns, bicycle and pedestrian circulation, and under Alternative 3 changes to surface transit, any of which could have potentially significant impacts on various aspects of the transportation and circulation network. Therefore, implementation of the Proposed Project, in combination with past, present or reasonably foreseeable projects in the vicinity of the Project corridor, could result in a cumulatively considerable contribution to significant impacts related to transportation and circulation. The potential cumulative transportation and circulation impacts will be described and analyzed in the TIS and EIR.

E.6. Noise

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
6.	**NOISE—Would the project:**					
a)	Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐	☐
b)	Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐	☐
c)	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐	☐
d)	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐	☐
e)	For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	☐	☐	☐	☐	☒
f)	For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☐	☒
g)	Be substantially affected by existing noise levels?	☐	☐	☐	☒	☐

The Project corridor is not located within an airport land use plan area or within 2 miles of any public airports or public use airports that have not adopted land use plans. The Project corridor also is not located in the vicinity of a private airstrip. Each alternative and design option would not expose people residing or working in the area to excessive noise levels from a public airport, public use airport, or private airstrip. Thus, Topics 6e and 6f are not applicable to the Proposed Project and these topics will not be analyzed in the EIR.

Alternative 3 would result in greater construction activities and different operational traffic patterns due to the inclusion of Mission Street. As a result, the environmental impacts of the three alternatives would not be the same with regard to noise. This will be described and analyzed in the EIR.

Impact NO-1: The Proposed Project could result in exposure of persons to or generation of noise levels in excess of standards, exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels, a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the Proposed Project, and a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the Proposed Project. (Potentially Significant)

Each alternative and design option would include construction activities, changes to surface traffic patterns, and under Alternative 3 would include changes to surface transit. The Proposed Project would also include the redesign and rebuilding of UN and Hallidie plazas. Although the Proposed Project would not increase overall traffic volumes, it would result in a redistribution of surface traffic on local streets. This redistribution of surface traffic could result in a permanent increase in traffic noise on some streets while simultaneously reducing traffic noise on other streets. These changes could result in the exposure of people to noise levels or vibration levels in excess of City of San Francisco noise standards. In addition, project construction could result in the exposure of people to a substantial temporary increase in noise during the construction activity periods. The potential noise impacts of the three alternatives and two design options, along with redesign and reconstruction of UN and Hallidie plazas, will be described and analyzed in the EIR. The noise analysis will describe general existing noise and vibration conditions in the Project area, describe noise and vibration standards and ordinances applicable to both construction and operation of the Proposed Project, and identify where the Proposed Project could result in sensitive receptors being exposed to excessive noise and vibration including exposure to substantial temporary or permanent increase in noise and significant noise impacts.

Impact NO-2: The Proposed Project would not be substantially affected by existing noise levels. (No Impact)

The Proposed Project would not introduce any new noise-sensitive uses, such as residential or commercial uses. Reconstruction and rebuilding of UN and Hallidie plazas would introduce a new pavilion at UN and/or Hallidie plazas and a visitor center at Hallidie Plaza, however these changes would represent a continuation of the existing public outdoor land uses at these locations and would not expose sensitive receptors to a new or existing noise source. Therefore, the Proposed Project would not be substantially affected by existing noise levels and no impact would result.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-NO-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, could result in a cumulatively considerable contribution to significant impacts related to noise. (Potentially Significant)

The geographic context for cumulative noise impacts includes any transportation and development project that could impact the transportation and transit network within or intersecting the Project corridor. The Proposed Project would occur in this larger context that includes other transportation and development projects within and surrounding the Project

corridor. The noise and vibration characteristics within and adjacent to the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above. Some of these changes will likely result in significant noise and vibration impacts.

The Proposed Project would include changes to the built environment that would result in changes to surface traffic patterns and, under Alternative 3, changes to surface transit. The Proposed Project would also include the redesign and rebuilding of UN and Hallidie plazas. Changes to surface traffic patterns and surface transit (under Alternative 3) resulting from the Proposed Project could result in potential noise and vibration impacts as a result of the redistribution of traffic patterns. Therefore, implementation of the Proposed Project, in combination with past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, could result in a cumulatively considerable contribution to significant impacts related to noise. The potential cumulative noise impacts will be described and analyzed in the EIR.

E.7. Air Quality

Topics:		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
7.	**AIR QUALITY—Would the project:**					
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐	☐
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐	☐
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐	☐

Alternative 3 would result in greater construction activities and different operational traffic patterns due to the inclusion of Mission Street. As a result, the environmental impacts of the three alternatives for the Proposed Project would not be the same with regard to air quality. This will be presented in the EIR.

Impact AQ-1: The Proposed Project could conflict with or obstruct implementation of the applicable air quality plan, violate an air quality standard or contribute substantially to an existing or projected air quality violation, result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment, and expose sensitive receptors to substantial pollutant concentrations. (Potentially Significant)

The San Francisco Bay Area Air Basin encompasses San Francisco, Alameda, Contra Costa, San Mateo, Santa Clara, and Napa counties, and includes parts of Solano and Sonoma counties. Although air quality in the air basin has generally improved over the last several decades, the basin experiences elevated levels of ozone and particulate matter. The Bay Area Air Quality Management District (BAAQMD) is the primary regulatory agency in the Bay Area responsible for planning, implementing, and enforcing federal and state ambient air quality standards. These standards are established in regulations implementing the federal Clean Air Act and the California Clean Air Act.

In an effort to identify areas of San Francisco most adversely affected by sources of toxic air contaminants, San Francisco partnered with the BAAQMD to conduct a citywide health risk assessment based on an inventory and assessment of air pollution and exposures from mobile, stationary, and area sources within San Francisco. Areas with poor air quality, termed the "Air Pollutant Exposure Zone," were identified based on health-protective criteria that considers estimated cancer risk, exposures to fine particulate matter, proximity to freeways, and locations with particularly vulnerable populations. A majority of the Project area is located within the Air Pollutant Exposure Zone.

The Air Pollutant Exposure Zone was used as the basis in approving a series of amendments to the San Francisco Environment and Administrative Codes, generally referred to as the Clean Construction Ordinance, or Environment Code Section 25 (Ordinance 28-15, effective April 19, 2015). The purpose of the Clean Construction Ordinance is to protect the public health, safety and welfare by requiring contractors on City public works projects to reduce diesel and other particulate matter emissions generated by construction activities. For projects located within the Air Pollutant Exposure Zone, including the Proposed Project, the Clean Construction Ordinance requires construction equipment to meet or exceed Tier 2 standards for off-road engines and operate with the most effective ARB verified diesel emission control strategy.

To assess the potential air quality impacts that may result from construction and operation of each alternative, an Air Quality Technical Report (AQTR) will be prepared as part of the EIR for the Proposed Project. Most or all of the Proposed Project construction activities would be short-term activities that would not be expected to emit large amounts of air pollutants; however, this will be evaluated in more detail in the EIR, including compliance with the Clean Construction Ordinance. For operational activities, the AQTR will rely on information from the TIS to determine whether the Proposed Project would result in increased emissions from transportation-related sources.

In most of the Bay Area, transportation-related sources account for the majority of air pollutant emissions. The EIR will summarize information from the AQTR, which will identify the potential construction and operational air quality impacts.

Impact AQ-2: The Proposed Project would not create objectionable odors affecting a substantial number of people. (Less than Significant)

Odor impacts could result from siting new odor sources such as a wastewater treatment plant, a landfill or composting facility, a refinery or chemical plant, or a food processing facility, near existing sensitive receptors. Odor impact also could result from placing new receptors near an existing odor source. During construction, diesel exhaust from construction equipment would generate some odors. However, construction-related odors would be temporary and would not persist upon completion of the Project. The Proposed Project would not involve siting any new facilities that would generate substantial odors, and would not involve construction of new facilities to house new residents or attract new employees to a location with existing odor sources. Therefore, the Proposed Project would have a less-than-significant impact with respect to objectionable odors affecting substantial numbers of people.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-AQ-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable future projects in the vicinity of the Project corridor, could result in a cumulatively considerable contribution to significant impacts related to air quality. (Potentially Significant)

Regional air pollution is by its very nature largely a cumulative impact, thus the geographic context for air quality impacts is the San Francisco Bay Area Air Basin. The Proposed Project would occur in this larger context that includes transportation and development projects throughout the air basin. Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts.

The Proposed Project could result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment. Therefore, implementation of the Proposed Project, in combination with past, present or reasonably foreseeable projects, could result in a cumulatively considerable contribution to significant impacts related to air quality. The potential cumulative air quality impacts will be described and analyzed in the AQTR and the EIR.

E.8. Greenhouse Gas Emissions

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
8. GREENHOUSE GAS EMISSIONS— Would the project:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐	☐

Greenhouse Gas (GHG) emissions and global climate change represent cumulative impacts. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the combination of GHG emissions from past, present, and future projects have contributed and will contribute to global climate change and its associated environmental impacts.

The BAAQMD has prepared guidelines and methodologies for analyzing GHGs. These guidelines are consistent with CEQA Guidelines Sections 15064.4 and 15183.5 which address the analysis and determination of significant impacts from a proposed project's GHG emissions. CEQA Guidelines Section 15064.4 allows lead agencies to rely on a qualitative analysis to describe GHG emissions resulting from a project. CEQA Guidelines Section 15183.5 allows for public agencies to analyze and mitigate GHG emissions as part of a larger plan for the reduction of GHGs and describes the required contents of such a plan. Accordingly, San Francisco has prepared *Strategies to Address Greenhouse Gas Emissions* (GHG Reduction Strategy)[8] which presents a comprehensive assessment of policies, programs, and ordinances that collectively represent San Francisco's Qualified GHG Reduction Strategy in compliance with CEQA guidelines. The actions outlined in the strategy have resulted in a 14.5 percent reduction in GHG emissions in 2010 compared to 1990 levels, exceeding the year 2020 reduction goals outlined in the BAAQMD's 2010 Clean Air Plan, Executive Order S-3-05,[9] and Assembly Bill 32 (also known as the Global Warming Solutions Act.)[10,11].

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[8] San Francisco Planning Department, *Strategies to Address Greenhouse Gas Emissions in San Francisco*, 2010. The final document is available online at: *http://www.sf-planning.org/index.aspx?page=2627*.

[9] Executive Order S-3-05, sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million $MTCO_2E$); by 2020, reduce emissions to 1990 levels (estimated at 427 million $MTCO_2E$); and by 2050 reduce emissions to 80 percent below 1990 levels (approximately 85 million $MTCO_2E$).

[10] San Francisco Department of Environment (DOE), *San Francisco Climate Action Strategy, 2013 Update*.

[11] The *Clean Air Plan*, Executive Order S-3-05, and Assembly Bill 32 goals, among others, are to reduce GHGs in the year 2020 to 1990 levels.

Given that the City's local GHG reduction targets are more aggressive than the State and Region's 2020 GHG reduction targets and consistent with the long-term 2050 reduction targets, the City's Greenhouse Gas Reduction Strategy is consistent with the goals of EO S-3-05, AB 32, and the Bay Area 2010 Clean Air Plan. Therefore, proposed projects that are consistent with the City's Greenhouse Gas Reduction Strategy would be consistent with the goals of EO S-3-05, AB 32, and the Bay Area 2010 Clean Air Plan, would not conflict with these plans, and would therefore not exceed San Francisco's applicable GHG threshold of significance.

The following analysis of the Proposed Project's impact on climate change focuses on the Proposed Project's contribution to cumulatively significant GHG emissions. Given the analysis is in a cumulative context, this section does not include an individual Project-specific impact statement.

Impact C-GG-1: The Proposed Project would generate greenhouse gas emissions, but not at levels that would result in a significant impact on the environment or conflict with any policy, plan, or regulation adopted for the purpose of reducing greenhouse gas emissions. (Less than Significant)

Individual projects contribute to the cumulative effects of climate change by directly or indirectly emitting GHGs during construction and operational phases. Typically, direct operational emissions include GHG emissions from new vehicle trips and area sources (natural gas combustion). Typically, indirect emissions include emissions from electricity providers, energy required to pump, treat, and convey water, and emissions associated with waste removal, disposal, and landfill operations.

The Proposed Project would increase activity in the Project area by providing various transportation and streetscape improvements to Market Street and potentially to Mission Street. The Proposed Project is anticipated to result in the increased use of transit and potential reduction of private vehicle travel in the City. The Proposed Project would result in transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic controls; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities. It is anticipated these changes would facilitate existing transit operations and enhance transit capacity, as well as increase bicycle and pedestrian travel. The Proposed Project would also result in changes to surface traffic patterns, however it would not generate any new vehicle trips. Construction activities would result in temporary increases in GHG emissions.

The Proposed Project would be subject to and required to comply with several regulations adopted to reduce GHG emissions as identified in the GHG Reduction Strategy. The regulations that are applicable to the Proposed Project include the Commuter Benefits Ordinance, Emergency Ride Home Program, Healthy Air and Clean Transportation Ordinance, Clean Construction Ordinance, Green Building Requirements for City Buildings, Construction and Demolition Debris Recovery, Resource Conservation Ordinance, Construction Recycled Content Ordinance, Stormwater Management Ordinance and Construction Pollution Prevention, Indoor Air Quality, and Environmentally Preferable Purchasing Ordinance.

These regulations, as outlined in San Francisco's *Strategies to Address Greenhouse Gas Emissions*, have proven effective, as San Francisco's GHG emissions have been measurably reduced from 1990 emissions levels, demonstrating that the City has met and exceeded EO S-3-05, AB 32, and the Bay Area 2010 Clean Air Plan GHG reduction goals for 2020. The Proposed Project was determined to be consistent with San Francisco's GHG Reduction Strategy.[12] Other existing regulations, such as those implemented through AB 32, will continue to reduce a project's contribution to climate change. Therefore, the Proposed Project's GHG emissions would not conflict with state, regional, and local GHG reduction plans and regulations, and, thus, the Proposed Project's contribution to GHG emissions would not be cumulatively considerable. Consequently, the Proposed Project would result in a less-than-significant impact with respect to GHG emissions.

In addition to complying with the City's regulations, the 2008 Green Building Ordinance requires that all City Departments prepare an annual department-specific climate action plan. The Proposed Project would be consistent with the Climate Action Plan prepared by Public Works, which is described below.

San Francisco Department of Public Works 2013 Climate Action Plan. Public Works most recently updated its Climate Action Plan (CAP) in March 2014[13] (using data from the 2012–2013 fiscal year). The goal of the Public Works CAP is to reduce departmental CO_2e emissions 15 percent by 2012, 20 percent by 2013, and 25 percent by 2017–2018 to help meet the City's CO_2e emission goals. Between fiscal year 2008–2009 and fiscal year 2012–2013, Public Works' carbon emissions fell. In fiscal year 2012–13 there was an increase of emissions from the previous two fiscal years and it was above the 2008 baseline level. This rise in CO_2 emissions was mainly due to an increase in the consumption of gasoline fuel. Public Works' total carbon emissions for fiscal year 2012–13 was approximately 5,464.43 metric tons, approximately 285.81 metric tons (approximately 5 percent) over its goal of emitting less than 5,178.62 metric tons. This is over the baseline of 5,038.35 metric tons of CO_2 emissions in fiscal year 2008–2009. Public Works' 2013–2015 Strategic Plan[14] includes Objective 1C, which is includes the following outcomes/targets.

- Outcome/Target 1C.1: Increase sidewalk landscaping permits by 5 percent each fiscal year
- Outcome/Target 1C.2: Increase open space square footage and convert hardscape to softscape
- Outcome/Target 1C.3: Identify and implement materials, manufacturing and/or construction methods that reduce carbon emissions

Currently, Public Works is reducing GHG emissions by:

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[12] Greenhouse Gas Analysis: Compliance Checklist. August 4, 2015. This document is on file and available for public review as part of Case File No. 2014.0012E.

[13] San Francisco Department of Public Works, 2014 Climate Action Plan: Updated March 2014, March 2014, available at http://sfenvironment.org/sites/default/files/fliers/files/sfe_cc_2014_dpw_cap_fy1213.pdf, accessed on March 9, 2015.

[14] San Francisco Department of Public Works, Strategic Plan FY12 - 13 / FY14 - 15, available at http://www.sfdpw.org/modules/showdocument.aspx?documentid=2606, accessed on March 9, 2015.

- Reducing Energy Use
    - Conserving energy in our facilities
    - Installing more energy efficient lamps / lights in our buildings and infrastructure (tunnels and underpasses)
    - Reducing fuel use in vehicles
    - Consolidating and reducing computer servers and printer
    - Promoting alternatives to employee commuting (walking, biking and public transportation)
- Conserving water
    - Installing drought resistant plants and water efficient irrigation systems
    - Increase permeable surface through Pavement to Parks and sidewalk landscaping programs
- Reducing Waste
    - Installing and monitoring recycle compost and trash bins at each work site.
    - Encouraging use of virtual warehouse and reuse of building materials
    - Enhancing green purchasing
    - Reviewing and implementing use of alternative construction methods and sustainable and recycled materials
- Ensuring all Public Works building designed, managed, maintained and construction projects strive to meet LEED Gold Standards.
- Sequestering Carbon (taking GHG out of the air)
    - Maintaining 40,000 street trees
    - Creating Street Parks
    - Supporting urban gardening and gleaning programs
    - Greening infrastructure

The Proposed Project would be consistent with Outcome/Target 1C.1 and 1C.2 of Public Works' 2013–2015 Strategic Plan because the Project could decrease the amount of existing impervious areas on Market Street with additional landscaping in the Streetlife Zones and Streetlife Hubs. In addition, the Proposed Project would be consistent with Outcome/Target 1C.3 because any new construction method identified and implemented by Public Works pursuant to Outcome/Target 1C.3 would be applied to construction of the Proposed Project.

E.9. Wind and Shadow

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
9. WIND AND SHADOW—Would the project:					
a) Alter wind in a manner that **substantially** affects public ar**e**as?	☒	☐	☐	☐	☐
b) Create new shadow in a manner that substantially affects outdoor recreation facilities or other public areas?	☐	☐	☒	☐	☐

Impact WS-1: The Proposed Project could alter wind in a manner that substantially affects public areas. (Potentially Significant)

The final design of the Market Street sidewalks (that is, the removal and replacement of street trees and the addition of street furniture and public art) has not yet been determined. The conceptual plans for UN Plaza envision filling in the existing fountain and creating a new outdoor pavilion with a new seating area with tables and benches, as well as new trees and other streetscape elements. The conceptual plans for Hallidie Plaza envision redesigning and rebuilding the entire area by decking over the sunken portion to create a street-level plaza, repaving the entire plaza and adding a new outdoor pavilion with new seating areas and new kiosks. A new structure also would be added to the plaza area, assumed to be used as a tourist information center, as well as other streetscape elements. Because these proposed changes to the Market Street sidewalks and the UN and Hallidie plazas have not been finalized, it is not known if they may increase wind conditions such that a wind hazard for pedestrians may result. The potential wind impacts of the three alternatives and two design options, along with the redesign and reconstruction of UN and Hallidie plazas, will be described and analyzed in the EIR. The wind analysis will describe existing wind conditions on Market Street and the UN and Hallidie plazas, and identify locations, if anywhere, that the Proposed Project could result in wind hazards for pedestrians.

Impact WS-2: The Proposed Project would not create new shadow that substantially affects outdoor recreation facilities or other public areas. (Less than Significant)

To protect certain public open spaces from shadows cast by new structures, San Francisco voters passed Proposition K in 1984, codified as Section 295 of the Planning Code. Section 295 applies to structures exceeding 40 feet in height and restricts casting of new shadow upon public spaces under the jurisdiction of the Recreation and Park Commission during the period between one hour after sunrise and one hour before sunset, year round. No new shadow is allowed on these protected spaces unless the Planning Commission and the Recreation and Park Commission find the impact to be insignificant. In addition, Section 147 of the Planning Code addresses potential shadow impacts that may occur with structures exceeding 50 feet in height to certain public or publicly accessible open spaces in the Downtown Commercial Districts that are also within the Project corridor.

Under all three alternatives, the Proposed Project would not result in the construction of any buildings or structures of significant height such that significant shading would result on public open spaces, including those under the jurisdiction of the Recreation and Park Commission. Sections 295 and 147 of the Planning Code do not apply to the Proposed Project because no structures are proposed that would be in excess of the minimum height thresholds 40 and 50 feet, respectively. Proposed turn signals, stop signs, bicycle signals, bus shelters, Path of Gold Light standards, ADA-accessible ramps, and other physical improvements constructed as part of the Proposed Project would not be of sufficient height and bulk to cast substantial shadows. In addition, the redesign and rebuilding of UN and Hallidie plazas would include structures no greater than 15 feet in height and would lack the bulk to cast substantial shadows. New trees and other landscape features are not considered permanent structures and, therefore, their shadows are excluded from consideration. Because of the limited height and bulk of the proposed shadow-casting elements, any new shadows produced as a result of the Proposed Project, including the shadows produced as a result of the redesign and rebuilding of UN and Hallidie plazas, would be minimal. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact related to shadows on outdoor recreation facilities and other public areas.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-WS-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, could considerably contribute to cumulative impacts related to wind. (Potentially Significant)

The geographic context for cumulative wind impacts is any proposed development that is within the Project corridor. The Proposed Project would occur in a larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. The character of the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

As described in the discussion for *Impact WS-1*, implementation of the Proposed Project may have potential wind impacts. Therefore, implementation of the Proposed Project, in combination with past, present or reasonably foreseeable projects in the vicinity of the Project corridor, could result in a cumulatively considerable contribution to significant impacts related to wind. The potential cumulative wind impacts will be described and analyzed in the EIR.

Impact C-WS-2: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to shadow. (Less than Significant)

The geographic context for cumulative shadow impacts is any proposed development that is within the Project corridor. The Proposed Project would occur in a larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. The character of the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in shadow impacts typically relate to the height of proposed buildings constructed and the proximity of the building to public open spaces. There are development projects proposed along the full extent of the Project corridor, which in some instances would create new shadows on outdoor recreation facilities or on public open spaces. As described in the discussion for *Impact WS-2*, implementation of the Proposed Project would not have a significant adverse impact related to shadow. Section 295 of the Planning Code does not apply to the Proposed Project because no structures are proposed that would be in excess of the minimum height thresholds. As such, physical alterations to the physical environment associated with the Proposed Project alternatives and design options would not include the construction of structures of sufficient height and bulk to cast substantial shadows. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not contribute considerably to a cumulative shadow impact.

This topic will not be analyzed further in the EIR.

E.10. Recreation

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
10. RECREATION—Would the project:					
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	☐	☐	☒	☐	☐
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐	☐
c) Physically degrade existing recreational resources?	☐	☐	☒	☐	☐

The San Francisco Recreation and Park Department (RPD) manages and operates more than 220 parks, playgrounds, and open space areas throughout the City. The RPD recreation facilities include 25 recreation centers, nine swimming pools, five golf courses, and more than 300 athletic fields, tennis courts, and basketball courts. Regional parks within and near the City and under the jurisdiction of the National Park Service include the Golden Gate National Recreation Area, which has open space areas such as Ocean Beach and Baker Beach in San Francisco and the Marin Headlands north of the City, and the Presidio of San Francisco.

Table 5 lists the 14 street-level parks and public plazas located within one block of the Project corridor that would be accessible to park users in the Project area. UN and Hallidie plazas, along with the Mechanics Monument Plaza at Market and First Streets, are the only street-level parks and public plazas within the Proposed Project limits. Mechanics Monument Plaza at Market and Bush Streets is constructed completely within the public right-of-way and is therefore under the jurisdiction of Public Works.

TABLE 5. PARKS AND STREET-LEVEL PLAZAS IN PROJECT AREA

Name	Type	Location	Ownership
Sue Bierman Park	Park	Washington and Clay streets	Public
Justin Herman Plaza	Plaza	1 Market Street	Public
One Bush Plaza	Plaza	Market and Sansome streets	Private
McKesson Plaza	Plaza	Market and Montgomery streets	Private
Beale Street Plaza	Plaza	Beale Street	Public
Yerba Buena Gardens	Park	750 Howard Street	Public
Mechanics Monument Plaza	Plaza	Market and 1st streets	Public
Jessie Square	Park	Mission and Jessie streets	Public
Union Square	Plaza	Powell and Geary streets	Public
Hallidie Plaza	Plaza	Powell and Market streets	Public
Father Alfred E. Boeddeker Park	Park	Jones and Eddy streets	Public
United Nations Plaza	Plaza	Market and Hyde streets	Public
Civic Center Plaza	Park/Plaza	Larkin and Grove streets	Public
Sgt. John Macauly Park	Mini-Park	Larkin and O'Farrell streets	Public

Impact RE-1: The Proposed Project would not result in the increased use of existing neighborhood or regional parks or other recreation facilities such that substantial physical deterioration would result or be accelerated. (Less than Significant)

Increased recreational facility or park use in a community is usually driven by the addition of new users, typically new residents, and to a lesser degree, by new workers. As described in Topic 1, *Land Use and Land Use Planning*, and Topic 3, *Population and Housing*, the Proposed Project would not result in an increase in population, housing, or residents, and would not generate population that would exceed what has already been anticipated and planned for in City and regional population growth projections through 2035. Overall, improvements to and redesign of existing transportation, streetscape, and utility infrastructure would not generally increase the use of existing parks or other recreation facilities. Any increased employment during the construction phase of the Proposed Project would be temporary and likely to draw from the regional workforce. Thus, these construction workers would not be expected to result in a perceptible increase in the use of City recreation facilities. In addition, because construction of the Proposed Project would be implemented over several phases, rather than one more intensive construction phase (Alternatives 1 and 2: 3 to 5 years, Alternative 3: an additional 1 to 2 years), the Proposed Project would not result in a substantial increase in local employment from construction workers that could otherwise lead to increased park usage.

The Proposed Project would modify transit stop spacing and add new stop locations along the Project corridor. In addition, conceptual-level elements would include design options to improve UN and Hallidie plazas, as well as improve streetscapes and pedestrian and bicycle facilities within the Project corridor. Redesign and rebuilding of UN, Hallidie, and Mechanics Monument plazas could temporarily displace recreational users of the plazas during construction activities. As shown in **Table 5**, there are 11 other public plazas or parks within the Project area, providing ample recreational opportunities for any users that may be temporarily displaced as a result of construction activities. Furthermore, it is unlikely that construction would occur for all three of these public plazas at the same time. Given the abundance and proximity of these alternative recreational facilities, it is anticipated that these plazas and parks could capture the temporary

displacement from these three plazas without any substantial physical deterioration of the facilities.

While the Proposed Project would not directly improve or limit access to recreational facilities, the changes to surface transit services would indirectly alter access to some parks and recreational facilities by relocating stops, requiring use of alternate routes, or providing different travel times. These changes may make traveling to some parks and recreation facilities more convenient and, therefore, result in an incremental increase in usage. On the other hand, the proposed changes may require users to walk farther or perhaps transfer in order to access a facility. The enhanced pedestrian and bicycle facilities provided under each alternative also would provide enhanced access within the Project corridor, which could provide improved connections to nearby recreational facilities. The majority of transit riders, pedestrians, and cyclists along the Project corridor are primarily existing residents and workers who may already frequent recreational facilities. However, the Proposed Project also would include the redesign and rebuilding of UN and Hallidie plazas, including creating new outdoor pavilions with seating and other streetscape elements. The majority of visitors to these plazas are primarily existing residents and workers who may already frequent these plazas. As such, implementation the Proposed Project would not result in a marked difference in the overall use of the parks and recreational facilities.

The changes in access to City and regional parks and recreational facilities as a result of the Proposed Project would not substantially increase the use of any of these facilities such that substantial physical deterioration would result or be accelerated. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact with respect to the increased use of existing neighborhood or regional parks or other recreation facilities.

This topic will not be analyzed further in the EIR.

Impact RE-2: The Proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. (Less than Significant)

The Proposed Project objectives include improving pedestrian and bicycle safety, comfort, and mobility along and across the Project corridor. All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which are largely under the jurisdiction of Public Works and SFMTA.

The Proposed Project also would include the redesign and rebuilding of UN and Hallidie plazas, including creating new outdoor pavilions with seating and other streetscape elements. The improvements to the plazas, which consist of filling in the existing fountain and creating a new outdoor pavilion at UN Plaza and decking over the sunken area and creating a street-level plaza at Hallidie Plaza, could result in increased or more active use of these plazas after the completion of construction activities. Although no new recreational facilities would be constructed as part of the Proposed Project, the proposed bicycle and pedestrian facilities and plaza designs would result in expanded passive recreational opportunities that are directly related to this major transportation corridor.

In addition, as described in *Impact RE-1*, construction and implementation of the Proposed Project would not result in a marked difference in the overall use of the parks and recreational facilities. Consequently, the Proposed Project would not substantially increase demand for or use of other recreational facilities such that increased user demand would require the construction of new recreational facilities or the expansion of existing facilities. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would not result in the construction of other recreational facilities that would themselves have a physical environmental impact and the impact to recreational facilities would be less than significant.

This topic will not be analyzed further in the EIR.

Impact RE-3: The Proposed Project would not result in the degradation of recreational resources. (Less than Significant)

As described in *Impact RE-2*, all of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way. Although the Proposed Project would make changes to public plazas, including redesign and rebuilding of UN, Hallidie, and Mechanics Monument plazas, as well as other spaces that are used for passive recreation, the Proposed Project would not result in permanent physical degradation of recreational resources. The Proposed Project would provide more opportunities for social and public engagement on the sidewalk and in other public spaces in the right-of-way along Market Street through the introduction of Streetlife Zones and Hubs. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact with respect to the degradation of recreational resources.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-RE-1: The Proposed Project in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to recreation. (Less than Significant)

The geographic context for cumulative recreational impacts is any proposed development that is within the Project corridor. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. Use of recreational facilities is anticipated to increase as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in recreational impacts typically relate to the addition of residential uses or recreational facilities. There are development projects proposed along the full extent of the Project corridor, some of which would introduce new residents and new recreational facilities resulting in impacts on existing recreational resources.

As described in the discussion for *Impact RE-1* through *Impact RE-3*, implementation of the Project would not have a significant adverse impact related to recreation. The Proposed Project would result in a continuation of existing transportation land uses and public use of the plazas. As such,

implementation of the Proposed Project would not add residents to the Project area beyond those already accounted for in estimated growth projections, and any increase in employment or increased usage during construction and implementation of the Proposed Project is anticipated to be negligible. While the Proposed Project would indirectly result in altered access to parks and recreational facilities, it would not result in a change in usage that would lead to deterioration of any such facilities. Therefore, the Proposed Project, in combination with past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable recreation impact.

This topic will not be analyzed further in the EIR.

E.11. Utilities and Service Systems

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
11. UTILITIES AND SERVICE SYSTEMS— Would the project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐	☐
d) Have sufficient water supply available to serve the project from existing entitlements and resources, or require new or expanded water supply resources or entitlements?	☐	☐	☒	☐	☐
e) Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐	☐

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐	☐

Impact UT-1: The Proposed Project would not exceed the wastewater treatment requirements of the Regional Water Quality Control Board. (Less than Significant)

The City's combined sanitary sewer and stormwater system (combined sewer system) collects, transports, and treats sanitary sewage and stormwater runoff in the same facilities. Discharges to federal and state waters are governed by two NPDES permits, one of which is the 2014 Bayside Permit (NPDES Permit No. CA0037664).

The Project corridor is located within the Bayside drainage area, which is one of the two drainage areas in the City.[15] The Project corridor is not located within the Oceanside drainage area. The Project corridor is also located within the Channel drainage basin, which is one of the City's eight major drainage basins from which the wastewater and stormwater runoff is collected and conveyed to treatment plants through various trunk sewers and transport structures.[16]

All wastewater and stormwater flows that emanate from the Bayside drainage area are subject to the 2014 Bayside Permit, issued and enforced by the San Francisco Bay Regional Water Quality Control Board. The 2014 Bayside Permit specifies discharge prohibitions, dry-weather effluent limitations, wet-weather effluent performance criteria, receiving water limitations, sludge management practices, and monitoring and reporting requirements for the Southeast Water Pollution Control Plant (which treats discharge from the Project corridor), the North Point Wet-Weather Facility, and the Bayside Wet-Weather Transport/Storage and Diversion Structures. During wet weather, the capacity at the Southeast Water Pollution Control Plant is supplemented by the North Point Wet-Weather Facility and the Bayside Wet-Weather Transport/Storage and Diversion Structures, a series of storage/transport boxes located around the perimeter of the City.[17]

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15 San Francisco is roughly divided into two major drainage areas: the Oceanside and Bayside areas, which are further divided into eight drainage basins. San Francisco Public Utilities Commission. 2030 Sewer System Master Plan: Task 500, Technical Memorandum No. 501 Collection System Modeling. December 2010. Pp. 2-1. Available at: http://sfwater.org/modules/showdocument.aspx?documentid=595. Accessed on February 16, 2015.

16 San Francisco Water Power Sewer. Map. Available at: http://www.sfwater.org/modules/showdocument.aspx?documentid=3971. Accessed on February 16, 2015.

17 The storage/transport boxes provide treatment that consists of settling and screening of floatable materials inside the boxes and that is equivalent to primary treatment at the wastewater treatment

During wet-weather events, when flows exceed the capacities of the treatment plants, wet-weather facilities, and transport/storage structures, the combined stormwater and wastewater are discharged into either the San Francisco Bay or the Pacific Ocean.[18] Discharges from the nearshore combined sewer discharge structures occur only when the storm flow exceeds the combined storage capacity of the transport/storage structures, the capacity of the pumping facilities, and the treatment capacity of the wet-weather facilities. The Bayside Permit prohibits overflows from the combined sewer overflow structures during dry weather, and requires wet-weather overflows to comply with the nine minimum controls specified in the federal Combined Sewer Overflow Control Policy.

The Proposed Project would result in ground disturbance of an area greater than 5,000 square feet and would require preparation of a Stormwater Control Plan that would be reviewed and approved by the SFPUC. Construction of the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, could create some construction-related impacts on stormwater flows that would be controlled through implementation of the Stormwater Control Plan. A signed maintenance agreement to ensure proper care of the necessary stormwater controls would also be required. Compliance with the City's Stormwater Management Ordinance (Ordinance No. 83-10) would require the Proposed Sponsor to maintain, reduce, or eliminate the existing volume and rate of stormwater runoff discharged from the Project. To achieve this, the Proposed Project would implement and install appropriate stormwater management systems that would retain runoff on-site, promote stormwater reuse, and limit (or eliminate altogether) site discharges from entering the combined sewer collection system. This in turn would limit the incremental demand on both the collection system and wastewater facilities resulting from stormwater discharges and minimize the potential for upsizing or constructing new facilities.

However, for each alternative and redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would comply with existing regulations regarding stormwater Best Management Practices (BMPs) and Public Works permit requirements. To protect the water quality of San Francisco Bay and the Pacific Ocean, and to enhance the function of the City's sewer systems, the Stormwater Management Ordinance requires all new and redevelopment projects that disturb 5,000 square feet or more of ground surface, or surface over water, to comply with the Stormwater Design Guidelines and manage a portion of their stormwater onsite.

Runoff from construction sites is a major source of stormwater contaminants. Construction sites are required to implement BMPs to keep pollutants, such as dirt and debris, out of the City's combined sewer system and sensitive local water bodies. All construction sites must submit an Erosion and Sediment Control Plan as well as a Construction Runoff Permit Application to SFPUC for review and approval. Sites that plan to conduct non-routine, episodic, batch, or other temporary discharges to the City's combined sewer system must obtain a Batch Wastewater Discharge Permit from SFPUC.

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plants. San Francisco Public Utilities Commission. *San Francisco Sewer System Master Plan*. March 2010. Pp. 2-7. Available at: http://www.gestaltgraphics.com/docs/SFSSSummary.pdf. Accessed on February 16, 2015.

18 San Francisco Public Utilities Commission. *San Francisco Sewer System Master Plan*. March 2010. Pp. 2-12. Available at: http://www.gestaltgraphics.com/docs/SFSSSummary.pdf. Accessed on February 16, 2015.

On November 17, 2013 the San Francisco Board of Supervisors adopted the Construction Site Runoff Ordinance (Ordinance No. 260-13) amending the Public Works Code to protect water quality by controlling the discharge of sediment or other construction pollutants from construction sites and preventing erosion and sedimentation due to construction activities. This ordinance would apply to the Proposed Project, and construction contractors would be required to comply with these requirements.

Certain Proposed Project elements (e.g., the construction of widened center transit boarding islands and bulbouts, as well as plaza redesign and rebuilding) would make some physical changes that could require stormwater catch basins and sewer lines to be relocated or reconstructed. Proposed Project elements that would not involve in-street construction (e.g., new signals, signal timing and control modifications and relocations, and removal or relocation of trees) would have no impact on storm and wastewater infrastructure. Modifications to UN and Hallidie plazas would be subject to the Construction Site Runoff Ordinance and, to the extent applicable, the Stormwater Design Guidelines. The closure of some existing sewer lines and installation of new sewer lines would be performed in accordance to the Public Works specifications and the San Francisco Public Works Code (Article 2.4, Section 2.4.13(7)). These regulations also require that transit projects within the public right-of-way incorporate low-impact design stormwater facilities consistent with Stormwater Design Guidelines to the maximum extent practical and feasible. It is unlikely that low-impact design measures are feasible to implement as part of the Proposed Project due to the constrained subsurface conditions beneath the right-of-way, however such measures would be incorporated where feasible. Although the Proposed Project would include the relocation and reconstruction of stormwater catch basins and sewer lines, it would not introduce any new land uses or other changes which could cause the Proposed Project to exceed the wastewater treatment requirements of the Regional Water Control Board.

Because runoff during construction would be treated in accordance with BMPs and the stormwater and sewer infrastructure would be relocated and rebuilt pursuant to the Public Works Code, the Proposed Project would have a less-than significant impact related to exceeding wastewater treatment requirements.

This topic will not be analyzed further in the EIR.

Impact UT-2: The Proposed Project would not require or result in the construction of new, or the expansion of existing, water, wastewater treatment or stormwater drainage facilities; or result in a determination that the wastewater treatment provider has inadequate capacity to serve the Proposed Project. (Less than Significant)

Water

San Francisco's water supply system is owned and operated by SFPUC, which supplies water to the City and County of San Francisco and to Santa Clara, Alameda, San Mateo, and Tuolumne counties.

Construction of certain Proposed Project elements (e.g., surface transit infrastructure improvements and streetscape elements proposed under Design Options A and B) would likely include the use of water for dust control in compliance with Article 21 of San Francisco Public

Works Code, which requires the use of reclaimed water, well water or groundwater.[19] Such compliance would eliminate any short-term potable water demand as a result of the Proposed Project.

As described in Topic 1, *Land Use and Land Use Planning*, and Topic 3, *Population and Housing*, the Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project would not substantially increase water use based on population or employment. Consequently, the Proposed Project would not exceed the increase in water use anticipated in the *2010 Urban Water Management Plan* for the City.

Because the Proposed Project would not substantially increase water demand and the Proposed Project would not require the construction of new or expanded water supply treatment facilities, the Proposed Project would have a less-than-significant impact on water supply facilities.

This topic will not be analyzed further in the EIR.

Wastewater and Stormwater

The City's combined sewer system collects, transports, and treats sanitary sewage and stormwater runoff in the same facilities. Stormwater runoff comprises the primary source of total flows collected, conveyed, and eventually treated at the City's treatment facilities. Implementation of the proposed improvements on Market and Mission Streets would not alter wastewater or stormwater flows in the City. Redesign and rebuilding of the UN and Hallidie plazas could alter stormwater flows. However, the plazas are currently completely impervious. Redesign and rebuilding of the plazas would not increase the amount of impervious area, and it may decrease the amount of impervious areas depending upon the landscaping features that are incorporated during subsequent design. Therefore, the amount of stormwater flowing to the combined sewer system would not increase, and may decrease. As described in Topic 1, *Land Use and Land Use Planning*, and Topic 3, *Population and Housing*, the Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project would not generate a substantial increase in wastewater based on population or employment.

The Proposed Project would include both transportation and streetscape improvements, including changes to roadway configuration and private vehicle access; traffic signals; surface transit, including transit-only lanes, stop spacing, service, stop location, stop characteristics and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; plazas; and utilities. The Proposed Project would be implemented within an urban area and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way (which, in general, is already paved

[19] If there is no non-potable water available, an exception can be made by the General Manager of the Water Department pursuant to section 1102 of Article 21.

surface). Because nearly all of the improvements would be constructed within paved roadways, existing sidewalks, and existing paved plazas, and would replace existing non-permeable surfaces, the improvements would not increase the amount of impervious surfaces and the Proposed Project would not substantially increase the amount of stormwater runoff. The Proposed Project would not result in a substantial change in surface permeability or an alteration of the Project area topography, which could result in increased runoff. No increase in the amount of stormwater drainage would be anticipated as a result of the Proposed Project.

The Proposed Project would include the closure of some existing sewer lines and installation of new sewer lines beneath Market Street. In addition, certain Proposed Project elements (e.g., the construction of widened center transit boarding islands, narrowed sidewalks, and bulbouts) would make some physical changes that could require stormwater catch basins be relocated or reconstructed. The closure and installation of storm drains and sewers would be performed in accordance to the Public Works specifications and the San Francisco Public Works Code (Article 2.4, Section 2.4.13(7)).

Based on the above analysis, the Proposed Project would not substantially increase stormwater flow or wastewater generated and the Proposed Project would not require construction of new wastewater, and stormwater collection, conveyance, or treatment facilities, although minor changes to existing stormwater collection facilities may be required. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact on wastewater treatment and stormwater drainage facilities and would not result in a determination by the SFPUC that it has insufficient capacity to continue providing wastewater treatment.

This topic will not be analyzed further in the EIR.

Impact UT-3: The Proposed Project would have sufficient water supply available from existing entitlements and would not require new or expanded water supply resources or entitlements. (Less than Significant)

SFPUC provides an average of approximately 265 million gallons per day of water to approximately 2.5 million people in San Francisco, Santa Clara, Alameda, San Mateo, and Tuolumne Counties.[20] Approximately 96 percent of the water provided to San Francisco is supplied by the SFPUC Regional Water System, which is made up of water from the Hetch Hetchy Reservoir and Bay Area reservoirs in the Alameda Creek and Peninsula watersheds.[21] The City is currently served by this adequate water delivery infrastructure.

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20 San Francisco Public Utilities Commission. *2010 Urban Water Management Plan for the City and County of San Francisco*. Pp. 7, 14, 22-25. June 2011. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2014.0012E and available at: http://sfwater.org/modules/showdocument.aspx?documentid=1055. Accessed February 16, 2015.

21 San Francisco Public Utilities Commission. *2010 Urban Water Management Plan for the City and County of San Francisco*. Pp. 22-25. June 2011. Groundwater and recycled water make up the remainder of the SFPUC supplies to the City.

As described in *Impact UT-2*, the amount of potable water used during construction of the Proposed Project would be minimal because Article 21 of the Public Works Code requires use of non-potable or recycled water at construction sites. As described in Topic 1, *Land Use and Land Use Planning*, and Topic 3, *Population and Housing*, the Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project would not result in an increase in water demand based on population or employment. The Proposed Project would not generate additional demand for water that would exceed available water resources. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact on water supply resources.

This topic will not be analyzed further in the EIR.

Impact UT-4: The Proposed Project would be served by a landfill with sufficient permitted capacity to accommodate the Proposed Project's solid waste disposal needs, and the Proposed Project would comply with federal, state, and local statutes and regulations related to solid waste. (Less than Significant)

In September 2015, the City approved an Agreement with Recology, Inc., for the transport and disposal of the City's municipal solid waste (MSW) at the Recology Hay Road Landfill in Solano County. The City began disposing its MSW at Recology Hay Road Landfill in January 2016, and that practice is anticipated to continue for approximately nine years, with an option to renew the Agreement thereafter for an additional six years. San Francisco had a goal of 75 percent solid waste diversion by 2010, which it exceeded at 80 percent diversion, and has a goal of 100 percent solid waste diversion or "zero waste" to landfill or incineration by 2020. San Francisco Ordinance No. 27-06 requires mixed construction and demolition debris to be transported by a Registered Transporter and taken to a Registered Facility that must recover for reuse or recycling and divert from landfill at least 65 percent of all received construction and demolition debris. The San Francisco Green Building Code also requires certain projects to submit a Recovery Plan to the Department of the Environment demonstrating recovery or diversion of at least 75 percent of all demolition debris. San Francisco's Mandatory Recycling and Composting Ordinance No. 100-09 requires all properties and everyone in the city to separate their recyclables, compostables, and landfill trash. The Hay Road Landfill is permitted by Solano County and the California Department of Resources Recycling and Recovery (CalRecycle) to accept up to 2,400 tons per day of MSW for disposal, to receive up to 620 vehicles per day (averaged over a seven-day period), and to operate up to 24 hours per day, seven days per week.

The Proposed Project would be subject to the City's Mandatory Recycling and Composting Ordinance, which requires all San Francisco residents and commercial landlords to separate their refuse into recyclables, compostables, and trash, thereby minimizing solid waste disposal and maximizing recycling. The Proposed Project would also be subject to the City's Construction and Demolition Debris Recovery Ordinance, which requires all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of the material from landfills.

The California Integrated Waste Management Act of 1989 (AB 939) requires municipalities to adopt an Integrated Waste Management Plan to establish objectives, policies, and programs related to waste disposal, management, source reduction, and recycling. San Francisco Ordinance No. 27-06 requires a minimum of 65 percent of all construction and demolition debris to be recycled and diverted from landfills. As noted, San Francisco had a goal of 75 percent solid waste diversion by 2010 and a goal of 100 percent solid waste diversion by 2020. San Francisco diverted 80 percent of its solid waste in 2010.[22] San Francisco Ordinance No. 100-09 requires everyone in San Francisco to separate their solid waste into recyclables, compostables, and trash.

Construction of the Proposed Project would generate construction debris and waste. The excavated soil and debris would be transported off-site to the Hay Road Landfill. The Proposed Project would be required to comply with the Resource Efficiency and Green Building Ordinance (San Francisco Environment Code, Chapter 7). The Green Building Ordinance requires all demolition and new construction projects to prepare a Construction and Demolition Debris Management Plan designed to recycle construction and demolition materials to the maximum extent feasible, with a goal of 75 percent diversion. Construction contract specifications for the Proposed Project would include the requirement that the contractor prepare a Construction and Demolition Debris Management Plan to recycle demolition or other construction waste to the maximum extent possible, with a goal of 75 percent diversion. The Proposed Project would be subject to and would comply with San Francisco Ordinance No. 27-06, Zero Waste Goal, the Green Building Ordinance, and all other applicable statutes and regulations related to solid waste. Therefore, the construction debris and waste generated by the Proposed Project would be expected to comply with published federal, state, and local statutes and regulations related to solid waste.

As described in Topic 1, *Land Use and Land Use Planning*, and Topic 3, *Population and Housing*, the Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project would not generate substantial solid waste based on population or employment. However, construction of the Proposed Project would generate construction debris and waste. Based on the above analysis, for each alternative, the Proposed Project would be accommodated by the existing landfill and would have a less-than-significant impact on solid waste facilities. In addition, the Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would comply with federal, state, and local statutes and regulations related to solid waste and impacts would be less than significant.

This topic will not be analyzed further in the EIR.

[22] San Francisco Department of the Environment. 2012. *Mayor Lee Announces San Francisco Reaches 80 Percent Landfill Waste Diversion, Leads All Cities in North America.* Available: http://www.sfenvironment.org/news/press-release/mayor-lee-announces-san-francisco-reaches-80-percent-landfill-waste-diversion-leads-all-cities-in-north-america. Accessed: February 4, 2015.

Cumulative Impacts

Impact C-UT-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to utilities and service systems. (Less than Significant)

The geographic context for cumulative utilities impacts is any proposed development that is within the service areas of the utilities providers. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the service areas of the utilities providers, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. The demand for water, generation for wastewater, generation of stormwater, and generation of solid waste would increase in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in utilities impacts typically relate to the inclusion of substantial residential uses as well as substantial new sources of temporary or permanent employment. There are development projects proposed within the service areas of the utilities providers that would contribute to an increase in the demand for water, generation of wastewater, generation of stormwater, and generation of solid waste.

As described in the discussion for *Impact UT-1* through *Impact UT-4*, implementation of the Proposed Project would not have a significant adverse impact related to utilities and service systems. The Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable utilities impact.

This topic will not be analyzed further in the EIR.

E.12. Public Services

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact	Not Applicable
12. PUBLIC SERVICES— Would the project:					
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any public services such as fire protection, police protection, schools, parks, or other services?	☐	☐	☒	☐	☐

Public Service impacts are assessed by determining whether a project would result in the need to increase or alter service in such a way that would necessitate construction of new facilities or alteration of existing facilities that, in turn, would have an adverse impact on the physical environment. As described in Topic 3, *Population and Housing*, the Proposed Project is not anticipated to generate an increase in population that could drive demand for public services. Rather, the Proposed Project elements have been designed to serve the existing and anticipated transit needs.

Public service impacts related to parks, open spaces, and other recreation resources are analyzed in Topic 10, *Recreation*. As described in *Impact TR-1* in Topic 5, *Transportation and Circulation*, impacts related to emergency access will be evaluated in the TIS and summarized in the EIR.

Impact PS-1: The Proposed Project would not result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives. (Less than Significant)

Overall, improvements to and redesign of existing transportation, streetscape, and utility infrastructure would not generally result in substantial adverse physical impacts associated with new or physically altered governmental facilities.

Police Protection

The San Francisco Police Department (SFPD) provides police protection services in the City. **Table 6** lists the police stations in the vicinity of the Project corridor.

TABLE 6. POLICE DISTRICT STATIONS IN THE VICINITY OF THE PROJECT CORRIDOR

District Stations	Address
Tenderloin	301 Eddy Street
Southern	850 Bryant Street[a]
Mission	630 Valencia Street
Northern	1125 Fillmore Street
Central	766 Vallejo Street

Note:

[a] The Southern District Station is scheduled to move into the Public Safety Building at 1300 3rd Street in 2016.

Construction of the Proposed Project could generate a temporary increase in demand for traffic control during the construction phase. Construction on certain streets within the City is required to have police personnel on-site, generally stipulated as part of a Special Traffic Permit, which is issued by the SFMTA. A Special Traffic Permit is required for any work that does not comply with the regulations in the *Regulations for Working in San Francisco Streets* manual or the Traffic Routing Specifications in a City Contract. Because the construction-related police services (if needed) would be temporary in duration and sporadic in nature, the Proposed Project would not result in the need for altered or new police facilities. Therefore, this impact would be less than significant.

As described in Topic 3, *Population and Housing*, the Proposed Project would not result in increased residential population or introduce new commercial, office, or industrial uses into the City. Therefore, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would not generate demand for new police services based on population or employment. SFPD bases its estimates of need for additional facilities on the number and types of calls for service, types and times of traffic and pedestrian flow patterns, and operational hours of uses within each Police District area.[23] Because the Proposed Project would not include new transit routes and no new population or employment would be added, it is not expected that the Proposed Project would result in a substantial increase in police service hours that would generate a need for new or physically altered police facilities.

SFMTA has a Security, Investigations and Enforcement Unit that provides overall security and enforcement services for the agency. The Security Operations Unit consists of the Proof of Payment (POP) Group, Investigations, Muni Transit Assistance Program, and a work order with SFPD, including a contract for private security guards at all transit facilities. The POP Group administers fare inspections on all transit revenue vehicles and in the subway and on designated platforms and bus stops. The Investigations Group is responsible for handling special investigations of workplace policy violations, graffiti prevention and abatement, and Muni-related crime statistics. The Muni Transit Assistance Program provides community-based staff to

23 San Francisco Planning Department. *Transit Center District Plan and Transit Tower Final Environmental Impact Report*. P. 546. May 24, 2012.

ride transit lines with high incidences of graffiti and juvenile disturbances to assist with enforcement.

The Enforcement Unit consists of the General Enforcement, Special Events, Enforcement and Enforcement Administration. The General Enforcement Group oversees enforcement activities related to street sweeping, residential permit parking, meters, improperly used disabled placards, booting and towing vehicles and removing abandoned vehicles. The Special Events Enforcement Group oversees and manages the parking enforcement needs and requirements for the various city special events by enforcing parking restrictions at such events, and by directing traffic flow prior to and after such events conclude.

The Emergency Preparedness Unit provides agency-wide leadership in coordinating efforts and initiatives designed to maintain a high level of awareness and readiness and response to emergencies including acts of terrorism. This unit also provides liaison and coordination functions with Bay Area regional transit agencies, City and County of San Francisco departments, and state and federal emergency management officials and agencies.

All of the above-described functions within SFMTA ensure that reliance on SFPD services is minimized, particularly for relatively minor issues such as traffic management during special events and security at the UN and Hallidie plazas. In addition, the Proposed Project would not increase the need for SFMTA's security and enforcement services.

The additional police hours required as a result of the Proposed Project would not necessitate new or altered police facilities. Based on the above analysis, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would result in a less-than-significant impact on police protection services.

This topic will not be analyzed further in the EIR.

Fire Protection and Emergency Services

The San Francisco Fire Department (SFFD), headquartered at 698 Second Street, provides fire suppression and emergency medical services to the City. SFFD consists of three divisions, which are subdivided into 10 battalions and 42 active stations located throughout the City. The SFFD headquarters are scheduled to move to the Public Safety Building at 1300 3rd Street in 2016.

Construction of the Proposed Project could generate a temporary increase in demand for fire protection service during the construction phase because construction activities could increase the potential for accidental on-site fires from such sources as the operation of construction equipment and the use of flammable construction materials. Because the construction-related fire protection services (if needed) would be temporary in duration and sporadic in nature, the Proposed Project would not result in the need for altered or new fire facilities, and its impact would, therefore, be less than significant.

As described in Topic 3, *Population and Housing*, the Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project would not generate a substantial demand for new fire protection services based

on population or employment. The Proposed Project would not result in a substantial increase in demand for fire protection services such that new or physically altered fire protection facilities would be required. Construction of the Proposed Project would require temporary detours and lane closures on existing roadways along the Project corridor, which could impact emergency response times and service standards. The temporary closures and circulation changes would temporarily alter the route that emergency service providers would take to respond to an emergency call and could increase emergency response times. As described under *Impact TR-1* in Topic Section 5, *Transportation and Circulation,* the TIS will evaluate impacts on emergency access, including emergency response times, and the EIR will summarize information in the TIS.

The Proposed Project would not generate demand for new fire suppression and emergency medical services or require an increase in SFFD staff. Based on the above analysis, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would result in less-than-significant impacts on fire protection and emergency services.

This topic will not be analyzed further in the EIR.

As described under *Impact TR-1* in Topic 5, *Transportation and Circulation*, the TIS will evaluate impacts on emergency access and the EIR will summarize information in the TIS.

Schools

The San Francisco Unified School District (SFUSD) operates San Francisco's public schools. SFUSD managed 129 schools during the 2013–2014 academic year, including 72 elementary schools, 12 middle schools, 19 senior high schools, 13 preschools, and 13 charter schools, with a total enrollment of more than 57,000 students.[24] In the years to come, SFUSD anticipates that elementary school and middle school enrollment will grow, but high school enrollment is expected to decline due to the declining birth rates of the 1990s. Additional schools are under consideration in fast-growing areas of San Francisco (e.g., Mission Bay, Treasure Island, and Bayview Hunters Point), but no final decisions have been made. A list of all SFUSD schools and their addresses is available at the SFSUD website.[25]

The demand for additional school facilities is driven largely through the increase in residential population in a community. As described in Topic 3, *Population and Housing*, the Proposed Project would result in a continuation of existing transportation, land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project would not generate a substantial demand for new school facilities based on population or employment. Although an increase in construction workers is anticipated during the construction of the Proposed Project, it would be a temporary increase. The Proposed Project would likely draw from a regional workforce, and would not result in the indirect need for new school facilities. Based on the above analysis, for each

[24] San Francisco Unified School District. "SFUSD Profile." Available at: http://www.sfusd.edu/en/aboutsfusd/sfusd-profile.html. Accessed on February 16, 2015.

[25] San Francisco Unified School District. n.d. "All Schools." Available at: http://www.sfusd.edu/en/schools/all-schools.html. Accessed on February 16, 2015.

alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would result in less-than-significant impacts on school services.

This topic will not be analyzed further in the EIR.

Other Services

The demand for public services such as libraries is driven largely through the increase in residential units and population in a community. As described in Topic 3, *Population and Housing*, the Proposed Project would not result in increased residential population or introduce new commercial, office, or industrial uses into the City. Therefore, the Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would not generate demand for new public services based on population or employment. Although an increase in construction workers is anticipated during the construction of the Proposed Project, it would be a temporary increase, would likely draw from a regional workforce, and would not result in an adverse impact on other services. Based on the above analysis, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would result in less-than-significant impacts on other services.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-PS-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to public services. (Less than Significant)

The geographic context for cumulative utilities impacts is any proposed development that is within the service areas of the public service providers. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. The demand for public services within the service areas of the public service providers will increase in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in public service impacts typically relate to the inclusion of substantial residential uses as well as substantial new sources of temporary or permanent employment. There are development projects proposed within the service areas of the public service providers that would contribute to an increase in the demand for police protection, fire protection and emergency services, schools, and other services.

As described in the discussion for *Impact PS-1*, implementation of the Proposed Project would not have a significant adverse impact related to public service. The Proposed Project would result in a continuation of existing transportation land uses, and public spaces at the plazas, and would not introduce new commercial, office, or industrial uses into the City that could have the potential to result in substantial new sources of temporary or permanent employment. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable public service impact.

This topic will not be analyzed further in the EIR.

E.13. Biological Resources

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
13.	**BIOLOGICAL RESOURCES— Would the project:**					
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐	☐
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒	☐
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒	☐
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐	☐
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐	☐
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☐	☒

There are no adopted habitat conservation or natural community conservation plans within the City. Therefore, Topic 13f is not applicable to the Proposed Project and this topic will not be analyzed in the EIR.

Impact BI-1: The Proposed Project would not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species or on any riparian habitat or other sensitive natural community. (Less than Significant)

The Project corridor is characterized as heavily urbanized with minimal landscaping located at existing buildings, sidewalk planter boxes, and roadway median strips as well as non-native tree species that do not support or provide habitat for rare or endangered species. Hayes Creek is a subterranean stream previously altered by infrastructure projects located within the vicinity of the Project corridor.[26] Under Alternatives 1 and 2, trees on Market Street would be removed or relocated where sidewalks would be narrowed. In addition, Alternatives 1 and 2 would include the removal of trees deemed unhealthy, hazardous, or in conflict with design. Therefore, the Proposed Project could result in the removal of all trees along Market Street between Octavia and Steuart streets under either design option. Any tree that is removed would be replaced, if feasible. Under Alternative 3, healthy street trees on Mission Street would remain while unhealthy street trees would be replaced and new street trees would be planted in locations where there are existing empty tree wells and gaps. Overall, there would be fewer trees due to implementation of the Proposed Project. The street trees along the Project corridor are non-native ornamental species and none of the street trees is considered a special-status species.[27]

The closest known occurrences of a special-status species are the Peregrine falcons, which are known to nest near Van Ness Avenue within the vicinity of the Project corridor (and are currently nesting on the 33rd floor of the PG&E building at 77 Beale Street, between Market and Mission streets). Peregrine falcons have been in the Project area since the 1980s and numerous projects have been implemented in the Project area since that time without adversely affecting peregrine falcons.[28,29] Consequently, it is not anticipated that the Proposed Project would affect peregrine falcons. Although the Proposed Project is not anticipated to affect peregrine falcons nesting within or adjacent to the Project corridor, the replacement and/or removal of trees throughout the Project corridor could temporarily disturb other avian species nesting in these trees; such disturbance could occur for the duration of construction.

The Recreation and Park Department has identified 31 natural areas that support an array of native habitats and species in the City.[30] The natural area closest to the Project corridor, Corona Heights Park, is located approximately 1 mile west of the Project corridor. Because of this distance, it is not anticipated that the Proposed Project would impact this natural area. All of the

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[26] Oakland Museum of California, Creek and Watershed map of San Francisco, 2007.

[27] Shaw, Darnell. Personal Communication. E-mail regarding tree surveys on March 31, 2015 to Jessica Viramontes, ICF International.

[28] The Santa Cruz Predatory Bird Research Group. "Peregrine FAQ." Available at: www2.UCSC.edu/scpbrg/pefafaq.html. Accessed on February 18, 2015.

[29] Atlas Obscura. "San Francisco's Peregrine Falcons." Available at: www.atlasobscura.com/places/san-francisco-peregrine –falcons. Accessed on February 18, 2015.

[30] San Francisco Recreation & Parks. 2006. "Significant Natural Resource Areas." February 2006. Available at: http://sfrecpark.org/wp-content/uploads/SNRAMP_Final_Draft/SNRAMP_ExecSummary.pdf. Accessed on: February 16, 2015.

various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which does not support riparian habitat or other sensitive natural communities.

Therefore, for each alternative and design option, the Proposed Project would have no impact on riparian habitat or other sensitive natural communities. The Proposed Project would have a less-than-significant impact on candidate, sensitive, or special-status species due to the removal and/or replacement of trees throughout the Project corridor.

This topic will not be analyzed further in the EIR.

Impact BI-2: The Proposed Project would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including marsh, vernal pool, and coastal wetland) through direct removal, filling, hydrological interruption, or other means. (No Impact)

Because of the extent of urban development and sub-surface filling in the Project area, there are no federally protected wetlands within the Project area.[31] Consequently, construction and operation of the Proposed Project would not affect federally protected wetlands.

This topic will not be analyzed further in the EIR.

Impact BI-3: The Proposed Project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)

There are approximately 400 resident and migratory species of birds in San Francisco, due to the diverse habitats of the Bay Area and its position on a coastal migration path known as the Pacific Flyway. Birds and active nests are protected by the California Fish and Game Code or the Migratory Bird Treaty Act (MBTA) (16 U.S. Code, Section 703).

Tall structures and features have the potential to interfere with the movement of resident and migratory species of birds. Each of the three alternatives for the Proposed Project would include signal timing and control modifications and relocations, which could include new turn signals, stop signs, and bicycle signals. Each alternative would include relocation, and removal in limited locations, of the Path of Gold light standards on Market Street where the sidewalk would be narrowed to accommodate new transit boarding islands and the new raised cycle track. All of the proposed additions to the Project corridor consist of features, such as traffic signals, that already exist in the landscape; no portion of the project would result in taller structures or other features than those which already exist in the Project corridor. Furthermore, in the dense urban setting of the Project corridor, traffic signals, light standards, and the proposed structures at UN and Hallidie Plaza are common elements of the existing environment, and these elements of the Proposed Project would not create new hazards to birds or interfere with their migration.

[31] Wetlands are a subset of "waters of the United States" and receive protection under Section 404 of the Clean Water Act.

As discussed under *Impact BI-1*, each alternative would involve the removal of trees based on the health of the trees and conflicts with the Proposed Project design. The requirements of the MBTA and California Fish and Game Code would apply to all tree and vegetation removal activities associated with the Proposed Project. The MBTA and California Fish and Game Code require that removal of tree and vegetation occur outside of the migratory bird nesting season (February 1–August 31), or if tree and vegetation must occur during the migratory bird nesting season that a qualified wildlife biologist conduct a survey for migratory bird nests and implement relocation or protection measures in the event that a nest is found. In the event that surveys for nesting migratory birds are required, such surveys must occur within 3 days of vegetation removal; this may require multiple nest surveys depending upon the timing of tree removal and/or replacement throughout the Project corridor. Public Works and construction contractors retained to conduct the removal and/or replacement of trees would be required to implement these provisions. Given the responsibility of Public Works and contractors to implement applicable provisions of the MBTA and California Fish and Game Code, impacts to migratory birds would be less than significant.

This topic will not be analyzed further in the EIR.

Impact BI-4: The Proposed Project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant)

The Planning Department, Department of Building Inspection, and Public Works have established guidelines to ensure that the Urban Forestry Ordinance governing the protection of trees is implemented. Public Works Code Section 8.02-8.11 requires disclosure and protection of landmark, significant, and street trees (collectively "protected trees") located on private and public property. A landmark tree has the highest level of protection and must meet certain criteria and be found worthy of landmark status designation. There are no landmark trees along the Proposed Project corridor.[32] A significant tree (e.g., the palm trees along the Embarcadero) is on privately owned land within 10 feet of the public right-of-way and satisfies certain size requirements.[33] There are no significant trees along the Project corridor. Street trees are trees within the public right-of-way.[34]

As discussed under *Impact BI-1*, each alternative would involve the removal of trees based on the health of the trees and conflicts with the Proposed Project design. Overall, there would be fewer trees due to implementation of the Proposed Project. In the event that street tree removal is necessary, the Proposed Project would comply with the requirements of the Urban Forestry Ordinance and Article 16 of the Public Works Code, and, thus, would not conflict with the City's adopted plans concerning the preservation of trees. The Public Works Bureau of Urban Forestry must issue a permit before any trees with protected status under the Urban Forestry Ordinance

[32] San Francisco Public Works. n.d. "Services A-Z, Trees, Significant and Landmark Trees." Available at: http://www.sfdpw.org/index.aspx?page=663. Accessed on March 24, 2015.

[33] San Francisco Public Works. n.d. "Services A-Z, Trees, Significant and Landmark Trees." Available at: http://www.sfdpw.org/index.aspx?page=663. Accessed on February 26, 2015.

[34] San Francisco Public Works. n.d. "Services A-Z, Trees, Street Tree Removal Permitting Process." Available at: http://www.sfdpw.org/index.aspx?page=656. Accessed on February 26, 2015.

can be removed. Under this ordinance, an International Society of Arboriculture-certified arborist must prepare a tree protection plan prior to construction activities within the dripline of a protected tree. The plan must be submitted to the Public Works for review and approval before a permit is issued.

Because the Proposed Project would be required to comply with City tree protection policies, the Proposed Project would have a less-than-significant impact related to conflicts with a tree preservation ordinance.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-BI-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to biological resources. (Less than Significant)

The geographic context for cumulative biological resource impacts is any proposed development that is within and adjacent to the Project corridor. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. The biological resources setting along the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in biological resource impacts typically relate to the removal of trees; modification or interference with existing habitats, sensitive natural areas, riparian habitats or federally protected wetlands, migratory wildlife corridors; and conflicts with adopted regulations, plans or policies intended to protect and preserve rare or endangered species and their habitats. However, as discussed above the Project corridor is characterized as heavily urbanized with minimal landscaping located at existing buildings, sidewalk planter boxes, and roadway median strips as well as non-native tree species that do not support or provide habitat for rare or endangered species. Therefore, such changes resulting from cumulative projects would be expected to have minimal changes to the biological resources setting in the Project corridor.

Similarly, implementation of the Proposed Project would not have a significant adverse impact related to biological resources. All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which does not support or provide habitat for rare or endangered species. All of the proposed additions to the Project corridor consist of features, such as traffic signals, that already exist in the landscape; no portion of the project would result in taller structures or other features than those which already exist in the Project corridor. As discussed under *Impact BI-4*, the Proposed Project would comply with the requirements of the Urban Forestry Ordinance and the Planning Code, and, thus, would not conflict with the City's adopted plans concerning the preservation of trees. The Proposed Project's potential impacts on nesting migratory birds would be reduced through compliance with the MBTA. Therefore, the Proposed Project, in combination with other past, present, and

reasonably foreseeable projects in the vicinity of the Project corridor would not result in a cumulatively considerable biological resources impact.

This topic will not be analyzed further in the EIR.

E.14. Geology and Soils

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
14. GEOLOGY AND SOILS— Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☒	☐	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐	☐
iv) Landslides?	☐	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐	☐
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☐	☒
f) Change substantially the topography or any unique geologic or physical features of the site?	☐	☐	☐	☒	☐
g) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐	☐

The Proposed Project would not include any septic tanks or alternative wastewater disposal systems. In addition, the City has a combined sewer system and does not rely on the use of septic tanks or alternative wastewater disposal systems. Therefore, Topic 14e is not applicable to the Proposed Project and this topic will not be analyzed in the EIR.

Impact GE-1: The Proposed Project would not result in exposure of people and structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, seismic ground-shaking, lateral spreading, or landslides. (Less than Significant)

Surface Rupture and Ground Shaking

San Francisco is located in a seismically active region near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast.

The fault nearest the Project corridor is the northern segment of the San Andreas fault, located approximately 7 miles to the west of the Project corridor.[35] Maps included in the *General Plan*, Community Safety Element (October 2012) show areas of the City subject to seismic geologic hazards. As shown on those maps, although the closest fault to the Project corridor is the active San Andreas fault, there are no known active fault zones or designated Alquist-Priolo Earthquake Fault Zones mapped as crossing or within the City or Project corridor.[36]

Given the Proposed Project's proximity to the northern segment of the San Andreas fault, there is potential for strong seismic ground shaking in the Project corridor during an earthquake event.[37] The Community Safety Element of the *General Plan* also projects very strong seismic ground shaking in the Project corridor from an earthquake on the Hayward fault, located approximately 9.5 miles northeast of the Project corridor. Strong ground shaking along the Project corridor could result from an earthquake on any one of the numerous active regional faults in the Project Project's vicinity. The United States Geological Survey (USGS) Working Group on California Earthquake Probabilities concluded that there is a 62 percent probability of a strong earthquake (Magnitude M ≥ 6.7) occurring in the San Francisco Bay Region in a 30-year period from 2003 to 2032.[38,39]

The intensity of the seismic shaking during an earthquake depends on the distance between a site and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying the site. Earthquakes on faults closest to the Project corridor would most likely generate the largest ground motion in the Project corridor. The estimated peak ground

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35 United States Geological Survey and California Geological Survey, 2010. GIS data for the Quaternary fault and fold database for the United States. Available online: http://earthquake.usgs.gov/hazards/qfaults/. Accessed January 2015.

36 California Geological Survey, 2015. Regulatory Maps website. Available at: http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm. Accessed January 23, 2015.

37 United States Geological Survey and California Geological Survey, 2010. GIS data for the Quaternary fault and fold database for the United States.

38 Working Group on California Earthquake Probabilities, 2003. *Earthquake Probabilities in the San Francisco Bay Region: 2002 to 2031*. U.S. Geological Survey Open File Report 03-214.

39 Magnitude is a number that characterizes the relative size of an earthquake and is based on measurement of the maximum motion recorded by a seismograph.

acceleration from large earthquakes for the Project vicinity is approximately 0.70 to 0.75g, which corresponds to strong to very ground shaking.[40]

The Project corridor would be subject to potential impacts from ground shaking and seismically induced ground failure during construction and operation of the Proposed Project. While the potential for seismic ground shaking and ground failure within San Francisco is unavoidable, improvements to and redesign of existing transportation, streetscape, and utility infrastructure would not generally create new seismic hazards to people or structures. Redesign and rebuilding of Hallidie Plaza would include the addition of a new street-level deck over the existing plaza; the construction of this facility would be required to meet stringent construction codes to protect against failure during seismic events. Potential damage to surface improvements and underground utilities from seismic events would not create a significant impact on life and health, but seismic-related damage to other above-ground improvements, such as an overhead wiring pole, has the potential to affect nearby residents and property. The SFMTA Transit Division is responsible, through the Overhead Lines Department, for maintaining overhead lines and poles, and for responding to and addressing incidents of downed overhead wires as safely as possible. All three alternatives for the Proposed Project would be required to comply with engineering seismic design standards as part of the Public Works permitting process and engineering design specifications followed by SFMTA. Therefore, for each alternative, the Proposed Project would have a less-than-significant impact related to the exposure of people and structures to rupture of a known earthquake fault or strong seismic ground shaking. Public Works would coordinate the design of the Proposed Project with BART and SFMTA to ensure the structural integrity of their facilities is maintained and would not be impacted by the Proposed Project.

This topic will not be analyzed further in the EIR.

Seismic-Related Ground Failure

Liquefaction is the phenomenon in which saturated soil temporarily loses its shear strength during periods of earthquake-induced strong ground shaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the soil and the magnitude and frequency of earthquakes in the surrounding region. Saturated, unconsolidated silts, sands, and silty sands within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects.[41] In addition, densification of the soil resulting in vertical settlement of the ground can also occur. To determine liquefaction susceptibility of a region, three major factors must be analyzed: (a) the density and textural characteristics of the alluvial sediments; (b) the intensity and duration of ground shaking; and (c) the depth to groundwater.

[40] The intensity of earthquake-induced ground motions can be described using peak site accelerations, represented as a fraction of the acceleration of gravity (g).

[41] Youd, T.L. and D.M. Perkins, 1978. Mapping Liquefaction Induced Ground Failure Potential, in the *Proceedings of the American Society of Civil Engineers, Journal of the Geotechnical Engineering Division*.

According to the California Geological Survey (CGS) Seismic Hazard Zones Map for San Francisco, which illustrates the areas subject to liquefaction, a large portion of the Project corridor is located within an area mapped as a liquefaction hazard zone.[42] In addition, USGS has identified the Project corridor as having liquefaction susceptibility of moderate to very high.[43] The Project corridor is primarily underlain by unconsolidated artificial fill and dune sand with historic high groundwater levels ranging from 10 to 30 feet below ground surface.[44] The liquefaction hazard in this area is the result of the presence of this shallow groundwater and generally loose to medium dense granular soils (artificial fill and dune sands) within 50 feet of the ground surface. Liquefaction of the artificial fill and dune sands at shallow depths adjacent to and beneath the Project corridor could cause settlement in sidewalks, roadways, and utilities. Historically, liquefaction has occurred in the Project vicinity near The Embarcadero and the east end of Market Street. Activities with the greatest potential for excavation include relocation of the Path of Gold Light Standards, which have foundations approximately 12 feet deep, as well as foundation work at UN and Hallidie plazas. Foundations for the construction of structures at UN Plaza would require excavation to a depth of up to 80 feet below street level at UN Plaza and 110 feet below street level at Hallidie Plaza. However, development requiring excavation within the operational Public Works right-of-way is subject to Public Works permitting requirements, including applicable health and safety requirements of Public Works Code Article 2.4, Excavation in the Public Right-of-Way. Excavation for the plaza foundations is subject to the Building Code Chapter 33 (Excavation and Grading).

In addition to these requirements and given conditions within San Francisco, the SFMTA engineers take into account geologic and seismic hazards when designing projects that require any type of foundation such as overhead wiring poles or variable message sign poles. SFMTA generally uses traffic signal poles/mast arms designed by the California Department of Transportation. However, if customized poles are used, SFMTA and Public Works would be responsible for ensuring their engineering specifications and safe installation. These types of features are conservatively designed and constructed in accordance with applicable foundation standards taking into account such geotechnical parameters as soil type, height, and grade.[45] Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact with respect to seismic-related ground failure, including liquefaction.

This topic will not be analyzed further in the EIR.

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42 California Geological Survey. Seismic Hazards Zones Map, City and County of San Francisco, Official Map, November 17, 2000. Available at: http://gmw.consrv.ca.gov/shmp/download/pdf/ozn_sf.pdf. Accessed on February 12, 2015.

43 United States Geological Survey, 2000. Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California: A Digital Database. U.S. Geological Survey Open-File Report 00-444, Sheet 2 of 2. Available at: http://pubs.usgs.gov/of/2000/of00-444/. Accessed January 2015.

44 California Geological Survey, 2000. Seismic Hazard Zone Report for City and County of San Francisco, California, CGS Open File Report 2000-009 (SHZR 043), available online at**:** http://gmw.consrv.ca.gov/shmp/download/evalrpt/sf_eval.pdf. Accessed January 2015.

45 Email communication with Cheryl Liu, PE, Division of Sustainable Streets, San Francisco Municipal Transportation Agency, February 20, 2015.

Landslide

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is composed of flat to gently sloping topography, and would not affect any potentially unstable slopes susceptible to landslides. Further, the Project corridor is not located within an area mapped as an earthquake-induced landslide hazard zone.[46] Therefore, for each alternative, the Proposed Project would have no impact with respect to landslides.

Based on the above analysis, the Proposed Project would result in less-than-significant impacts related to exposure of people or structures to rupture of a known earthquake fault, strong seismic ground shaking, liquefaction, or landslides.

This topic will not be analyzed further in the EIR.

Impact GE-2: The Proposed Project would not result in substantial erosion or loss of topsoil. (Less than Significant)

The Project corridor is primarily underlain by unconsolidated artificial fill and dune sand in a highly developed urban area. All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is predominately covered by impervious surfaces with the exception of minor landscaped areas, such as tree wells, which are typically located in the sidewalk.

Grading and excavation during Proposed Project construction would expose soils to wind and water erosion. Activities with the greatest potential for excavation include relocation of the Path of Gold Light Standards, which have foundations approximately 12 feet deep, as well as foundation work at UN and Hallidie plazas. Foundations for the construction of structures at UN Plaza would require excavation to a depth of up to 80 feet below street level at UN Plaza and 110 feet below street level at Hallidie Plaza. If proper construction management and soil erosion control measures are not implemented during construction, erosion of the disturbed soils could result. Construction projects greater than 5,000 square feet must have a Stormwater Control Plan in accordance with Article 4, Section 2.147 of the Public Works Code. Additionally, all excavation in the operational public right-of-way, regardless of size, must incorporate several measures to prevent erosion, including requirements for covering excavation sites, removal of excavated material at the end of each work day, and requirements that any fill material, sand, aggregate, or asphalt may be stored at the site only in covered, locked containers (Public Works Code Article 2, Section 4.53). With respect to excavation in the plazas, the Project would implement construction BMPs to prevent erosion and the discharge of sediment into construction site stormwater runoff, as described in *Impact HY-1*. Compliance with these codes and requirements would minimize the potential for soil erosion during construction. Following construction, with the exception of soils surrounding trees, surface soils would no longer be exposed and no potential for erosion would

[46] California Geological Survey. Seismic Hazards Zones Map, City and County of San Francisco, Official Map, November 17, 2000. San Francisco Community Safety Element. Available at: http://www.sf-planning.org/ftp/general_plan/community_safety_element_2012.pdf. Accessed on September 9, 2015.

be present. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact on erosion and the loss of topsoil.

This topic will not be analyzed further in the EIR.

Impact GE-3: The Proposed Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Proposed Project, and would not potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. (Less than Significant)

As described under *Impact GE-1*, a large portion of the Project corridor is located within an area mapped as a liquefaction hazard zone. All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which has flat to gently sloping topography. However, construction and operation of the Proposed Project would not change or increase the potential for liquefaction in the event of an earthquake. In addition, the Proposed Project would be required to comply with engineering seismic design standards of Public Works and SFMTA. The Project corridor is not located within an area mapped as an earthquake-induced landslide hazard zone.[47] Thus, the Proposed Project would have no impact on a geologic unit or soil that is unstable and would not potentially result in a landslide. Therefore, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact on a geologic unit or soil that is unstable and would not potentially result in lateral spreading, subsidence, liquefaction, or collapse.

This topic will not be analyzed further in the EIR.

Impact GE-4: The Proposed Project would not be located on expansive soil which could create substantial risks to life or property. (Less than Significant)

Expansive soils are characterized by their ability to undergo significant volume change (shrink and swell) because of variations in soil moisture content. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and perched groundwater. Expansive soils are typically very fine grained with a high to very high percentage of clay. Expansive soils may cause differential and cyclical movements of foundations and other buried structures that can cause damage or distress to structures and equipment.

Soil materials underlying the Project corridor consist primarily of artificial fill of varying composition and dune sand. The dune sand is primarily fine grained sand, which is not expansive. Because much of the fill in the Project area was derived from the dune deposits that were leveled to facilitate development in the area during the mid to late 1800s, artificial fill in the vicinity of the Project corridor is expected to contain significant amounts of dune sand. However, because of the variable nature of the artificial fill materials, localized areas of expansive soil may

[47] California Geological Survey. Seismic Hazards Zones Map, City and County of San Francisco, Official Map, November 17, 2000. San Francisco Community Safety Element. Available at: http://www.sf-planning.org/ftp/general_plan/community_safety_element_2012.pdf. Accessed September 9, 2015.

be present. The Proposed Project would include new construction, although much of it would involve surface improvements. Modifications to Hallidie Plaza would include the addition of a new street-level deck over the existing plaza, which is located on City-owned land. As such, construction of this facility would be required to meet the requirements in the San Francisco Building Code (Building Code) and the California Building Code. Expansive soils would not present a significant safety risk as a result of structure collapse. Improvements such as utility overhead wiring poles and underground utility vaults and pipelines would be subject to Public Works specifications, City permitting requirements, and the Public Works application of engineering design standards, as described under *Impact GE-1*. These requirements include additional measures subject to engineering controls and safety requirements in areas where geologic hazards such as unstable soils may be present. Therefore, for each alternative, the Proposed Project would have a less-than-significant impact related to expansive soil.

This topic will not be analyzed further in the EIR.

Impact GE-5: The Proposed Project would not result in adverse impacts on topographical or unique geologic features. (No Impact)

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which has flat to gently sloping topography. There are no unique geologic features in the Project corridor. The entire Project corridor is currently developed and no building footprint would be expanded. In addition, significant re-grading of the Project corridor would not be necessary. Therefore, the Proposed Project would have no impact on unique geologic or physical features.

Impact GE-6: The proposed project would not result in damage to, or destruction of, an as-yet unknown unique paleontological resource or site or unique geologic feature. (Less than Significant)

Paleontological resources, or fossils, are the remains, imprints, or traces of animals, plants, and invertebrates, including their imprints, from a previous geological period. Collecting localities and the geologic formations containing those localities are also considered paleontological resources. They represent a limited, nonrenewable resource, and once destroyed they cannot be replaced.

The deposition and preservation of paleontological resources are related to the lithologic (rock) unit in which they occur. If a rock type was created in a deposition environment that was not conducive to the deposition and preservation of fossils, fossils will not be present. Lithologic units that may be fossiliferous include sedimentary and volcanic formations. Pleistocene sediments in the San Francisco Bay are known to yield vertebrate fossils.[48]

The ASA concluded that there is a low to moderate sensitivity for encountering archaeological deposits. A review of the local landscape history and geoarchaeological studies reveals that the

[48] UC Museum of Paleontology Specimens. 2015. UC Museum of Paleontology Specimens. Available: http://ucmpdb.berkeley.edu/cgi/ucmp_query2. Accessed: October 8, 2015.

study area contains fill at the ground surface, underlain by dunes and tidal flats. Based on the analytical framework presented in the ASA, it is anticipated that the fill and tidal flats have limited sensitivity for buried resources, while the dunes have higher sensitivity for buried resources. However, as described under Impact GE-2 in Topic 14, *Geology and Soils,* the Project corridor is in a highly developed urban area. Consequently, there is limited potential for unique paleontological resources, sites, or geologic features within the APE.

Given that the shallow depth of excavation necessary to implement the proposed project would not encounter a deposition environment conducive to the deposition and preservation of fossils and given the previous level of sub-surface disturbance in the project area, the potential for encountering unique paleontological resources is very low and no mitigation measures are needed as there would be a less-than-significant impact to such resources.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-GE-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would result in less-than-significant cumulative impacts on geology and soils. (Less than Significant)

The geographic context for cumulative geology and soils impacts are typically site-specific. The impacts of each reasonably foreseeable project would be specific to the respective site and its users and would not be common or contribute to (or shared with, in an additive sense) the impacts on other sites. In addition, development of each alternative would be subject to site development and construction standards (local, state, and federal) that are designed to protect public safety. For example, development of the reasonably foreseeable projects would be subject to Department of Building Inspection design review and safety measures. These measures would reduce the geologic effects of reasonably foreseeable projects to less-than-significant levels. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable geology and soils impact.

This topic will not be analyzed further in the EIR.

E.15. Hydrology and Water Quality

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
15. HYDROLOGY AND WATER QUALITY—Would the project:					
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion of siltation on- or off-site?	☐	☐	☒	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☒	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map?	☐	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒	☐
j) Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐	☐

As described in Topic 1, *Land Use and Land Use Planning*, and Topic 3, *Population and Housing*, the Proposed Project would not result in the development of residential uses. Therefore, Topic 15g is not applicable to the Proposed Project and this topic will not be analyzed in the EIR.

Impact HY-1: The Proposed Project would not violate water quality or waste discharge standards, exceed the capacity of existing drainage systems, provide additional sources of polluted runoff, or otherwise substantially degrade water quality. (Less than Significant)

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way. A majority of the modifications to the UN and Hallidie plazas would occur on City-owned land. The right-of-way and the plazas are predominately covered by impervious surfaces with the exception of minor landscaped areas, such as tree wells, which are typically located in the sidewalk. The primary water quality concern associated with Proposed Project implementation is the potential degradation of stormwater runoff flowing into the City's combined sanitary sewer and stormwater system (combined sewer system), which collects, transports, and treats sanitary sewage and stormwater runoff in the same facilities. Although implementation of the Proposed Project would not result in a significant change to the amount or locations of impervious surfaces in the City or the volume of stormwater entering existing drainage systems, Proposed Project elements could affect localized stormwater quality and drainage patterns.

As an urbanized area, the Project area has an abundance of impervious surfaces, such as buildings, streets, parking lots, and other paved surfaces, which prevent the absorption of rainfall. Urban stormwater runoff can be polluted with urban-type pollutants generated by leaks of fuel or lubricants from vehicles, tire wear, brake dust, and fallout from vehicle exhaust. These sources contribute petroleum hydrocarbons, heavy metals, and sediment to runoff, and those pollutants flow into the City's combined sewer system, which contributes to pollutants being discharged at sewer system overflow locations. As described under *Impact UT-1* in Topic 11, *Utilities and Service Systems*, the Project corridor is located within the Bayside drainage area. All wastewater and stormwater flows that emanate from the Bayside drainage area are subject to the 2008 Bayside Permit. The Bayside Permit prohibits overflows from the combined sewer overflow structures during dry weather, and requires wet-weather overflows to comply with the nine minimum controls specified in the federal Combined Sewer Overflow Control Policy. In addition, the Bayside Permits requires a Long-Term Control Plan to manage stormwater flows and minimize the effects of stormwater-related wastewater discharges.

Regulations that would reduce potential impacts from pollutant-laden runoff include compliance with National Pollutant Discharge Elimination System (NPDES) permits related to construction activities as administered by the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) and Article 4 of the Porter-Cologne Water Quality Act, compliance with the Combined Sewer Overflow Control Policy, and Total Maximum Daily Load standards as set forth by the Regional Water Board Basin Plan.[49]

[49] San Francisco Bay Regional Water Quality Control Board. 2010. *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan), incorporating all amendments approved by the Office of

Regulations incorporated into the City's Stormwater Management Ordinance (Ordinance No. 83-10) would require the Proposed Project to maintain, reduce, or eliminate the existing volume and rate of stormwater runoff discharged from the Project corridor.

With compliance with existing regulations regarding stormwater BMPs and Public Works standards, for each alternative, the Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact related to the violation of water quality or waste discharge standards during construction and operation.

The Project corridor is primarily underlain by unconsolidated artificial fill and dune sand with historic high groundwater levels ranging from 10 to 30 feet below ground surface.[50] In addition, groundwater could be encountered during excavation, notably during the abandonment and/or relocation of sewer sections and other underground utilities along Market Street under each alternative. Any groundwater or wastewater encountered during construction would be subject to treatment requirements of the City's Industrial Waste Ordinance (Ordinance Number 199-77). Discharges to the combined sewer system would be subject to water quality requirements of the City's Sewer Use Ordinance (Ordinance Number 19-92, amended 116-97), as supplemented by Public Works Order No. 158170, requiring a permit from SFPUC's Wastewater Enterprise Collection System Division. A permit may be issued only if an effective pretreatment system is maintained and operated to ensure the combined sewer system is not adversely degraded. The discharge from the Project corridor would mix with sewage in the City's combined sewer system and be treated at the Southeast Water Pollution Control Plant before discharge to the Bay, pursuant to the effluent discharge standards contained in the City's NPDES permit, as described under *Impact UT-1* in Topic 11, *Utilities and Service Systems*. Therefore, excavation dewatering activities during project construction would not substantially affect surface or groundwater quality, and this would be a less-than-significant impact.

The use of hazardous materials during construction, which would include fuels, oils, thermoplastic traffic striping material, and other chemicals, could result in accidental releases or spills, potentially affecting stormwater quality, as described in Topic 16, *Hazards and Hazardous Materials*. Public Works may also add conditions to permits in order to protect public health, safety, and welfare (Public Works Code Article 2, Section 4.20). All excavation in the public right-of-way must comply with requirements for covering excavation sites, hazardous material handling, removal of excavated material at the end of each work day, and requirements that any fill material, sand, aggregate, or asphalt may only be stored at the site in covered, locked containers (Article 2, Section 4.50 et seq.). The Proposed Project would comply with requirements for stormwater control, including compliance with the City's Stormwater Management Ordinance, which requires the preparation of a Stormwater Control Plan.

Administrative Law as of December 31, 2011 (hereinafter "Regional Water Board 2010"). Available at: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/basinplan/web/docs/bp_ch1withcover.pdf. Accessed on February 20, 2015.

50 California Geological Survey, 2000. Seismic Hazard Zone Report for City and County of San Francisco, California. CGS Open File Report 2000-009 (SHZR 043). Available at: http://gmw.consrv.ca.gov/shmp/download/evalrpt/sf_eval.pdf. Accessed January 2015.

The primary water quality concern during operation of the Proposed Project would be the potential degradation of stormwater runoff flowing into the City's combined sewer system from the Project corridor. Given the urbanized setting of the Project corridor, stormwater runoff is potentially polluted with urban-type pollutants generated by leaks of fuel or lubricants from vehicles, tire wear, brake dust, and fallout from vehicle exhaust. These sources contribute petroleum hydrocarbons, heavy metals and sediment to runoff, and those pollutants flow into the City's combined sewer system, potentially contributing to pollutants being discharged at sewer system overflow locations. Discharges to the Bay are in conformance with requirements of the Clean Water Act, Combined Sewer Overflow Control Policy, and the associated state requirements in the Water Quality and Control Plan for the San Francisco Bay Basin. In addition, the Proposed Project would be implemented in a largely pervious area. Consequently, the improvements would not increase the amount of impervious surfaces and the Proposed Project would not substantially increase the amount of stormwater runoff.

With compliance with existing regulations regarding stormwater BMPs and Public Works permit requirements, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact related to the existing drainage system capacity and polluted runoff during construction and operation.

This topic will not be analyzed further in the EIR.

Impact HY-2: The Proposed Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. (Less than Significant)

The Project corridor is located in the Downtown Groundwater Basin, which encompasses 12 square miles in downtown San Francisco.[51] The Downtown Groundwater Basin is not used as a source of water supply, and is considered to be inadequate to supply a significant amount of groundwater for municipal supply due to low yield and water quality impairment.[52] Groundwater would not be extracted for municipal supply during construction or operation of the Proposed Project.

The Project corridor is primarily underlain by unconsolidated artificial fill and dune sand with historic high groundwater levels ranging from 10 to 30 feet below ground surface.[53] The Proposed Project would include new construction, although much of it would involve surface improvements. Activities with the greatest potential for excavation include relocation of the Path of Gold Light Standards, which have foundations approximately 12 feet deep, as well as

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51 California Department of Water Resources. "San Francisco Bay Hydrologic Region Map." 2013. Available at: http://www.water.ca.gov/groundwater/bulletin118/maps/SF.pdf. Accessed on February 19, 2015.

52 Phillips, S. P., S. N. Hamlin, and E. B. Yates. *Geohydrology, Water Quality, and Estimation of Ground-Water Recharge in San Francisco, California, 1987-92*. United States Geological Survey Water Resources Investigations Report 93-4019. Prepared in cooperation with the City and County of San Francisco Water Department.

53 California Geological Survey, 2000. *Seismic Hazard Zone Report for City and County of San Francisco, California.* CGS Open File Report 2000-009 (SHZR 043). Available at: http://gmw.consrv.ca.gov/shmp/download/evalrpt/sf_eval.pdf. Accessed January 2015.

foundation work at UN and Hallidie plazas. Foundations for the construction of structures at UN Plaza would require excavation to a depth of up to 80 feet below street level at UN Plaza and 110 feet below street level at Hallidie Plaza. Based on the anticipated depth to groundwater within the Project corridor, which is 10 to 30 feet below ground surface, groundwater could be encountered during construction of the Proposed Project. If groundwater is encountered during excavation, the effects of lowering the water table would be localized, temporary, and minimal, as only a small fraction of the total Basin area would be affected. As such, the Proposed Project would not be anticipated to substantially deplete groundwater resources. Based on the above analysis, the Proposed Project would have a less-than-significant impact on the depletion of groundwater supplies.

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way as well as UN and Hallidie plazas, which are predominately covered by impervious surfaces. As such, no change in recharge to the groundwater would occur during the operational phase of the Proposed Project. In addition, groundwater would not be used during the Project's operational phase. Therefore, impacts to groundwater supplies and recharge during operation of the Proposed Project would be less than significant.

This topic will not be analyzed further in the EIR.

Impact HY-3: The Proposed Project would not substantially alter existing drainage patterns, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation. (Less than Significant)

The Project corridor is located within the Mission Creek Watershed, which is also considered a "Sewershed" inasmuch as the original creeks in the watershed have all been filled or otherwise engineered to run underground in culverts and sewer pipelines and are not free-flowing on the surface. There are no existing rivers in the City. Therefore, the Proposed Project would not alter the course of a stream or river.

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way as well as UN and Hallidie plazas, which are predominately covered by impervious surfaces. Implementation of the Proposed Project would not result in a marked change to runoff and drainage. Therefore, the Proposed Project would not substantially alter the existing drainage pattern nor substantially increase the rate or amount of surface runoff in a manner that would result in flooding or in substantial erosion or siltation.

As described under *Impact HY-1* and under Impact GE-2 in Topic 14, *Geology and Soils*, the Proposed Project would comply with requirements for stormwater control, including compliance with the City's Stormwater Management Ordinance, which requires the implementation of BMPs for erosion control during construction, and preparation of a Stormwater Control Plan. Furthermore, erosion control measures during construction of the Proposed Project would be implemented pursuant to Building Code Chapter 33 (Excavation and Grading) and the City's NPDES permit to ensure the Proposed Project does not result in siltation of the City's combined sewer system.

Thus, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would result in a less-than-significant impact on the alteration of drainage patterns.

This topic will not be analyzed further in the EIR.

Impact HY-4: The Proposed Project would not expose people or structures to substantial risk of loss due to flooding. (Less than Significant)

Flood risk assessment and some flood protection projects are conducted by federal agencies including the Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers. The flood management agencies and cities implement the National Flood Insurance Program (NFIP) under the jurisdiction of FEMA and its Flood Insurance Administration. The NFIP, which designates flood-prone areas, mapped communities along the San Francisco Bay, including San Francisco. Areas currently designated as prone to surface flooding in San Francisco on the new floodplain maps are in portions of Mission Bay, Treasure Island, Hunters Point Shipyard and Candlestick Point, as well as significant portions of the Port.

In 2008, the Board of Supervisors adopted the Floodplain Management Ordinance as part of the City's effort to join the NFIP. FEMA has prepared draft Flood Insurance Rate Maps (FIRMs) for the City and County of San Francisco. FIRMs identify areas that are subject to inundation during a flood having a one percent chance of occurrence in a given year (also known as a "base flood" or "100-year flood"). FEMA refers to the floodplain that is at risk from a flood of this magnitude as a special flood hazard area (SFHA). The Project corridor is not located within a SFHA.[54] Therefore, the Proposed Project would have no impact with respect to exposing people or structures to substantial risk of loss due to flooding related to a SFHA.

Nonetheless, development in San Francisco must account for flooding potential. Areas underlain by fill or Bay mud are susceptible to subsidence and this can result in sewers that do not drain freely during a storm, leading to backups or flooding of streets and sewers. The Project corridor is primarily underlain by unconsolidated artificial fill and dune sand, which is potentially at risk for backup-induced inundation during storms due to low surface elevation and land subsidence over time by compaction from buildings and soil drying. The potential risk of inundation or flooding of the portions of the Project corridor near San Francisco Bay is further increased by projections of future sea level rise made by the Bay Conservation and Development Commission and other agencies that study the relationship between global warming, carbon emission trends, and sea level rise.[55,56] The City is implementing a long-term program to upgrade the combined sewer system to handle stormwater runoff projections and implement flood control measures City-wide. Within the Project area, a 50-centimeter sea level rise would result in sea level reaching the level of Market Street between Spear and Main streets and the intersection of

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54 City and County of San Francisco. San Francisco Interim Floodplain Map, Northeast Sector, Final Draft. July 2008. Available at: http://sfgsa.org/Modules/ShowDocument.aspx?documentid=1785. Accessed on November 19, 2015.

55 Bay Conservation and Development Commission. *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline*. October 6, 2011.

56 ibid.

Mission and Steuart streets.[57] A 100-centimeter sea level rise would result in the sea level reaching the level of Beale Street along both Market and Mission streets. A 150 centimeter sea level rise would result in the sea level reaching a level above Fremont Street on Market Street and up to Fremont Street on Mission Street. This level of sea level rise would occur within the Project area with or without implementation of the Proposed Project, and the Proposed Project would not alter the elevation of the transportation system or streetscape within the area subject to a 150 centimeter sea level rise.

During the review of the permit to excavate for the Proposed Project, Public Works and/or SFPUC would consider the potential for flooding issues that may occur during and after construction of the Proposed Project.

Based on the above analysis, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact on flooding related to sea level rise.

This topic will not be analyzed further in the EIR.

Impact HY-5: The Proposed Project would not expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow, or as a result of the failure of a reservoir. (Less than Significant)

Tsunamis (seismic sea waves) are large, long-period waves that are typically generated by underwater seismic disturbances, volcanic eruptions, or submarine landslides. Damaging tsunamis are not common on the California coast. Most California tsunamis are associated with distant earthquakes rather than local earthquakes.

Devastating tsunamis have not occurred in historic times in the Bay Area. Because of the lack of reliable information about the kind of tsunami run-ups that have occurred in the prehistoric past, there is considerable uncertainty over the extent of tsunami run-up that could occur. There is ongoing research into the potential tsunami run-up in California. The San Francisco General Plan, Community Safety Element (October 2012) includes Map 5 (Tsunami Hazard Zones), which shows areas where tsunamis are thought to be possible. The Project corridor is located outside of the tsunami-induced inundation hazard zones identified in Map 5 of the Community Safety Element, with the exception of the northeast end of Mission Street between The Embarcadero and Steuart Street in Alternative 3.[58]

A seiche is an oscillation of a water body, such as a bay, which may cause local flooding. A seiche could occur in the San Francisco Bay due to seismic or atmospheric activity. Seiches can result in long-period waves that cause run-up or overtopping of adjacent landmasses, similar to tsunami run-up. According to the historical record, seiches are rare. Map 5 of the Community Safety

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57 Knowles, Noah. 2010. Potential Inundation Due to Rising Sea Levels in the San Francisco Bay Region. San Francisco Estuary and Watershed Science, 8:1. Available at http://escholarship.org/uc/search?entity=jmie_sfews;volume=8;issue=1. Accessed on November 19, 2015.

58 City and County of San Francisco Planning Department. Draft Community Safety Element of the *General Plan*, Map 05 – Tsunami Hazard Zones, October 2012.

Element also applies to seiches inasmuch as seiches represent water waves that cause run-up or overtopping of adjacent landmasses, similar to a tsunami run-up. In the event of an earthquake capable of producing a tsunami or seiche, the National Warning System and the City's outdoor warning system would provide warning. The advance warning system would allow for evacuation of people prior to a tsunami or seiche, and would provide a high level of protection to public safety. In addition, the Proposed Project would not create habitable structures that would expose people to tsunamis and seiches.

The potential impacts of mudflows, which are a type of landslide, are described under *Impact GE-1* in Topic 14, *Geology and Soils*. It was concluded that impacts related to landslides would be less than significant. Therefore, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact with respect to the exposure of people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow, or as a result of the failure of a reservoir.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-HY-1: The Proposed Project, in combination with other past, present, or reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute cumulative impacts related to water quality and hydrology. (Less than Significant)

The geographic context for cumulative hydrology and water quality impacts is any proposed development that is within the City. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which would replace existing structures with new residential, commercial, retail, and hotel uses. The hydrology and water quality setting along the Project corridor will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in hydrology and water quality impacts typically relate to the proposed land uses and the proposed change in impervious surfaces. There are development projects proposed throughout the City, each of which would contribute to changes to the hydrology and water quality within the City and would in some cases violate water quality standards, substantially deplete groundwater supplies, substantially alter existing drainage patterns, contribute runoff water, degrade water quality, and result in exposure to seiche, tsunami, or mudflow.

As described in the discussion for *Impact HY-1* through *Impact HY-5*, implementation of the Proposed Project would not have a significant adverse impact related to hydrology and water quality. Furthermore, the Proposed Project would not result in an increase in impervious surfaces over that which exists at present and an increase in stormwater runoff is not expected. The Proposed Project would be implemented in a largely impervious area, and would comply with existing regulations regarding stormwater BMPs and Public Works standards. Consequently, the improvements would not increase the amount of impervious surfaces and the Proposed Project would not substantially increase the amount of stormwater runoff. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable hydrology and water quality impact.

This topic will not be analyzed further in the EIR.

E.16. Hazards and Hazardous Materials

Topics:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
16.	**HAZARDS AND HAZARDOUS MATERIALS— Would the project:**					
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐	☐
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐	☐
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐	☐
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐	☒
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐	☒
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐	☐
h)	Expose people or structures to a significant risk of loss, injury or death involving fires?	☐	☐	☒	☐	☐

Hazards and hazardous materials impacts may occur when a project directly or indirectly results in hazardous materials exposures affecting people or the environment, subjects people or structures to wildfire hazards, or interferes with emergency response or evacuation plans. Whether this type of impact occurs is typically determined by assessing the potential for hazardous materials exposure, and wildfire hazards, and the potential for emergency response

restrictions in the project vicinity and then evaluating whether the proposed project would directly or indirectly result in a significant change in these conditions which could pose a threat to public health and safety.[59]

San Francisco International Airport is located approximately 11 miles south of the Proposed Project corridor, and the Project corridor is not located in the vicinity of a private airstrip. The Proposed Project would not expose people residing or working in the area to hazards from a public airport, public use airport, or private airstrip. Thus, Topics 16e and 16f are not applicable to the Proposed Project and these topics will not be analyzed in the EIR.

Impact HZ-1: The Proposed Project would not create a significant hazard through routine transport, use, disposal, handling, or emission of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Less than Significant)

Hazardous Materials Use during Construction and Operation

The use, storage, and disposal of hazardous materials is regulated by several federal, state, and local agency laws and regulations. The U.S. Environmental Protection Agency is the federal agency that administers hazardous materials and hazardous waste regulations. The Resource Conservation and Recovery Act of 1976 (RCRA), is the primary law that governs the disposal of solid and hazardous waste, and provides for a "cradle to grave" approach to hazardous waste management. RCRA focuses only on active and future facilities and does not address abandoned or historical sites that are managed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised.

At the state level, the Department of Toxic Substances Control (DTSC) administers laws and regulations related to hazardous waste and hazardous substances pursuant to Division 20, Chapters 6.5 and 6.8 of the California Health and Safety Code and Title 22 of the CCR, which are the state equivalents of RCRA and CERCLA, respectively. The State Water Resources Control Board (SWRCB) enforces laws and regulations governing releases of hazardous substances and petroleum pursuant to pursuant to Division 20, Chapters 6.7, 6.75, and 6.8 of the California Health and Safety Code (Sections 25100, 25200 and 25300 et seq.), and the Porter Cologne Water Quality Control Act (Division 7, Section 13100 et seq. of the California Water Code) and CCR Title 23. ARB promotes and protects public health, welfare, and ecological resources through the reduction of air pollutants pursuant to Division 3 of CCR Title 17.

[59] The California Health and Safety Code Section 25501 defines a hazardous material as, "…any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, radioactive materials, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment."

The Regional Water Control Board, BAAQMD, and the San Francisco Department of Public Health (SFDPH) have jurisdiction on a regional and local level. Most routine hazardous materials management programs in the City are administered by SFDPH. Hazards and hazardous waste is regulated through one or more programs within SFDPH, including the Hazardous Materials and Waste Program, which regulates sites that store or use hazardous materials or wastes, and operates Underground Storage Tanks (USTs); the Local Oversight Program, which oversees cleanup of properties with leaking USTs; and the Site Assessment and Mitigation Program, which oversees the Maher Program (described below) and the Voluntary Remedial Action Program.

Additional City programs have been enacted to address the potential to encounter hazardous materials in the soil at development sites and the safe handling of hazardous materials. They are contained in the San Francisco Health Code in Article 22A (Analyzing the Soil for Hazardous Waste, also known as the Maher Ordinance, formerly Article 20 of the Public Works Code), Article 21 (Hazardous Materials), Article 21A (Risk Management Program), and Article 22 (Hazardous Waste Management).

Potential Contamination in the Project Corridor

Because of the long history of heavy vehicular activity in the Project area, the soil in the medians and planter and tree boxes alongside Market and Mission streets may be contaminated with aerially deposited lead (ADL) from the exhaust of cars burning leaded gasoline. Elevated levels of ADL would be considered a potential health risk. In addition, paints containing lead may have been used on streetscape features within the operational public right-of-way, including Overhead Contact System support poles, streetlights, traffic signal poles, traffic lane striping, and other pavement markings. Debris from removal of these structures or soil excavated within the Project corridor may contain elevated concentrations of total or soluble lead that exceed limits established under Title 22 of the CCR, and require disposal in a Class I disposal site.

In addition to the potential presence of ADL, petroleum hydrocarbons, solvents, lubricants, and serpentine rock (which may contain naturally occurring asbestos) may also be present in soil in the Project area. Further, concrete, asphalt, and underlying baserock present along the Project corridor may contain asbestos. In addition, asbestos-containing materials may be present in building components of structures, such as UN and Hallidie plazas, along the Project corridor. The presence of ADL, lead paints, and asbestos in structures and streetscape features to be demolished, removed, or otherwise disturbed by the Proposed Project would be a potential health risk.

In addition, railroad ties and ballasts would be encountered during construction of some of the Proposed Project elements, including full replacement of existing Muni streetcar rail tracks to maintain state of good repair as well as minor adjustment to location of existing streetcar rail tracks at limited locations under Alternatives 1 and 2. It is anticipated that all ties encountered during construction are treated with creosote, which is used as a fungicide, insecticide, miticide, and sporicide to protect wood and is applied by pressure methods to wood products, primarily

utility poles and railroad ties. Wood treated with creosote would require disposal at a Class I disposal facility (on a landfill-by-landfill basis) or, more typically, a Class II disposal facility.[60]

Disposal of traffic striping material and asphalt coatings for removal or addition of striping within the operational public right-of-way (e.g., to color transit-only lanes, protected cycle track) could also result in impacts related to hazardous materials. Thermoplastic traffic striping material currently used by SFMTA is a solid powder which liquefies when heated during application and quickly solidifies again as it cools. Material Safety Data Sheets for the material indicate that it is lead-free and has no chronic health effects related to exposure, though it may cause skin, eye, and respiratory irritation, and may cause burns in its liquid form due to the heat used during application.[61] SFMTA also uses a non-toxic, water-based red asphalt[62] coating to demarcate transit-only lanes, and limited quantities of more traditional traffic paints for small areas such as curbs. Used in accordance with material specifications, the traffic striping material, asphalt coating, and paints would not be expected to pose a health risk to workers, the nearby public, or the environment.

Under the Proposed Project, the improper management of these hazardous materials would have the potential to result in releases of hazardous materials with potential impacts on human health and the environment.

Development requiring excavation within the operational public right-of-way is subject to Public Works permitting requirements, including applicable health and safety requirements of Public Works Code Article 2.4, Excavation in the Public Right-of-Way. Specifically, Section 2.4.53(d) of Public Works Code Article 2.4 states that excavation contractors are subject to all applicable hazardous material guidelines for disposal, handling, release, and treatment of hazardous material; site remediation; and worker safety and training.

San Francisco Health Code Article 22A requires an investigation of the potential presence of hazardous wastes that may be present in soil within historic fill areas at construction sites as a prerequisite for certain excavation and construction activities. Article 22A requires preparation of a site history report and a site assessment, as well as mitigation of any risks identified as a condition of approval for project construction. Approved amendments to Article 22A, which became effective on August 16, 2013, resulted in changes to requirements for projects that involve the disturbance of at least 50 cubic yards of soil within the designated areas defined by Article 22A. The amended Maher Ordinance expands the areas that will require SFDPH review to include properties/sites at which SFDPH determines that hazardous materials may be encountered during redevelopment/construction activities. The expanded criteria for inclusion pursuant to the Maher Ordinance include areas (1) zoned or used for industrial occupancy,

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60 A Class II disposal facility is a landfill that is not authorized to accept hazardous waste.

61 Ennis Paint Company, 2008 and 2007, MSDS for Coatings, Resins and Related Materials, White Thermoplastic Roadmarking Compound (revised March 14, 2008) and Lead Free Yellow Thermoplastic Roadmarking Compound (revised January 15, 2007). This document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, as part of Case File 2011.0558E.

62 Streetbond Corporation, MSDS for StreetbondCL Part A and Streetbond150 Part B, revised April 2014. Available at: http://www.streetbond.com/?q=content/sb-150-tech-data#MSDS, and http://www.streetbond.com/?q=content/sb-cl-tech-data#MSDS. Accessed January 15, 2015.

currently or historically as defined by Article 22A, (2) with current or former presence of hazardous substances or USTs, (3) located within 100 feet of USTs, and (4) located within 150 feet of elevated freeways. According to the September 2014 Expanded Maher Area map, portions of the Project corridor are located within the Maher Area and are subject to the Article 22A requirements.[63]

Construction projects, particularly excavation, grading, and demolition activities, generate particles that can remain airborne, affect respiratory function, and contribute to symptoms from respiratory diseases such as asthma. Children, the elderly, and people with preexisting respiratory symptoms are most susceptible to health effects from airborne particles. Adopted in 2008, San Francisco Health Code Article 22B, Construction Dust Requirements, is intended to protect the public from exposure to construction dust by requiring Dust Control Plans with enhanced monitoring and control measures for large construction projects in San Francisco. Article 22B applies to all construction projects more than 0.5 acre in size that are within 1,000 feet of a sensitive receptor (e.g., a residence, school, childcare center, hospital or other healthcare facility, or group living quarters).

Because the Proposed Project would affect more than 1 acre and excavated areas and materials would be exposed for a temporary period, compliance with NPDES permits related to construction activities as administered by the Regional Water Board would further reduce impacts from hazardous materials used during construction. Under these regulations, the Project Sponsor must obtain a general permit through the NPDES Stormwater Program. The general permit requires the implementation of BMPs for hazardous material storage and soil stockpiles, inspections, maintenance, training of employees, and containment of releases to prevent runoff of hazardous materials into existing stormwater collection systems or waterways.

In addition, all excavation in the operational public right-of-way, regardless of amount, must comply with permit requirements for covering excavation sites, hazardous material handling, removal of excavated material at the end of each work day, and requirements that any fill material, sand, aggregate, or asphalt be stored at the site in covered, locked containers (Public Works Code Article 2, Section 2.4.53(c) et seq.). Although designed for stormwater protection, these permit requirements would also reduce potential impacts related to accidental releases of hazardous materials during construction.

Based on the analysis above, the construction and operation of the Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would not result in significant hazardous materials emissions or the handling of hazardous materials during the construction or operational phases, with compliance with the Maher Ordinance.

This topic will not be analyzed further in the EIR.

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[63] San Francisco Planning Department. "Expanded Maher Area." September 2014. Available at: http://www.sf-planning.org/ftp/files/publications_reports/library_of_cartography/Maher%20Map.pdf. Accessed on March 3, 2015.

Impact HZ-2: The Proposed Project would not substantially emit hazardous emissions or acutely hazardous materials near schools. (Less than Significant)

Hazardous materials emissions near schools are a particular concern because children, due to their size and stage of development, are more susceptible to many potential health risks from hazardous materials. There are a number of schools within the vicinity of the Project corridor. However, as described in *Impact HZ-1*, the construction and operation of the Proposed Project, including the redesign and rebuilding of UN and Hallidie plazas, would not result in significant hazardous materials emissions or the handling of hazardous materials during the construction or operational phases, with compliance with the Maher Ordinance. Therefore, for each alternative, including the redesign and rebuilding of UN and Hallidie plazas, the Proposed Project would have a less-than-significant impact related to hazardous emissions or acutely hazardous materials near schools with compliance with the Maher Ordinance.

This topic will not be analyzed further in the EIR.

Impact HZ-3: The Proposed Project would not create a significant hazard to the public or the environment by the location on a hazardous materials site. (Less than Significant)

The Hazardous Waste and Substances Sites (Cortese) list, compiled pursuant to Government Code Section 65962.5, contains names and addresses of sites that have been identified as being contaminated from the release of hazardous materials, including industrial sites, waste disposal facilities, and sites containing leaking USTs.

The Cortese list of sites within the City includes a large number of sites, but the vast majority no longer pose a potential risk to human health and the environment. For example, there are 2,267 leaking UST (LUST) sites in San Francisco that are identified on the SWRCB's Geotracker database. Of the 2,267 LUST sites, 2,179 cases have been closed, indicating that investigation and remediation of the sites has been completed.[64] Of the 10 Cortese list sites overseen by DTSC, seven remain open/active investigation sites.[65]

Without remediation, contamination at a Cortese list site may have the potential to migrate via groundwater to nearby properties. Contamination that migrates in this manner generally affects soils and groundwater at the depth of groundwater. If construction workers were to excavate to the depth of groundwater during construction of the Proposed Project and soils and groundwater were impacted from reported hazardous material sites, the contaminated soil and groundwater could pose a risk to human health and the environment.

All of the various Proposed Project elements would be implemented on public land and a majority of the various Proposed Project elements would be implemented within the operational public right-of-way, which is largely under the jurisdiction of Public Works and SFMTA. Consequently, the Proposed Project would not be located on or directly affect industrial parcels

[64] State Water Resources Control Board, Geotracker Database. San Francisco Sites. Available at: www.geotracker.waterboards.ca.gov. Accessed January 15, 2015.

[65] Department of Toxic Substances Control, Envirostor Database., San Francisco Sites. Available at: http://www.envirostor.dtsc.ca.gov/public. Accessed on January 16, 2015.

or other reported hazardous materials sites. The Proposed Project would include new construction, although much of it would involve surface improvements. Activities with the greatest potential for excavation include relocation of the Path of Gold Light Standards, which have foundations approximately 12 feet deep, as well as foundation work at UN and Hallidie plazas. Foundations for the construction of structures at UN Plaza could include foundation work that would require excavation for foundations to a depth of up to 80 feet below street level at UN Plaza and 110 feet below street level at Hallidie Plaza. Based on the anticipated depth to groundwater within the Project corridor, which is 10 to 30 feet below ground surface, groundwater could be encountered during construction of the Proposed Project. Small seepage may occur but dewatering for groundwater removal alone is not anticipated (however, dewatering still would be needed to remove rainfall that collected in any excavation pit). Any groundwater encountered during construction is subject to the requirements of the City's Industrial Waste Ordinance (Ordinance Number 199-77), requiring that groundwater meet specified water quality standards before it may be discharged into the sewer system. Because groundwater is not anticipated to be encountered during construction, contamination that could migrate from a nearby site would not affect excavation activities during construction of the Proposed Project.

Other existing laws, regulations, and ordinances would protect construction workers and the general public in the event that hazardous materials from nearby hazardous material sites are encountered during construction of the Proposed Project. As described in *Impact HZ-1*, above, Article 22A of the San Francisco Health Code requires a hazardous materials investigation in areas where significant excavation in potentially contaminated fill materials is proposed. Permit provisions in Article 2, Section 4 of the Public Works Code regarding excavation in public rights-of-way requires compliance with all existing hazardous materials guidelines for disposal, handling, release, and treatment of hazardous material; site remediation; and worker safety and training. Public Works is authorized to require emergency remediation if hazardous materials are encountered at an excavation site within a public right-of-way (Public Works Code Article 2.4 Section 2.4.73). In addition, if contaminated soils are encountered during construction of the Proposed Project, compliance with the Maher Ordinance would ensure that contractor(s) would follow protocols deemed appropriate by SFDPH to avoid or minimize potential exposure.

Based on the analysis above, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant construction-related impact with respect to contact with contaminated soils from hazardous material sites with compliance with the Maher Ordinance and compliance with Public Works permit requirements for excavation within the right-of-way.

During operation of the Proposed Project, no potential exposure to contaminated soils from hazardous material sites would be anticipated. Therefore, for each alternative, the Proposed Project would have a less-than-significant operational impact with respect to contact with contaminated soils from hazardous material sites.

This topic will not be analyzed further in the EIR.

Impact HZ-4: The Proposed Project would not expose people or structures to a significant risk of loss, injury, or death involving fires, and would not interfere with the implementation of an emergency response plan. (Less than Significant)

Implementation of the existing hazardous material requirements described in *Impact HZ-1* would require the safe use, storage, and disposal of flammable materials during construction of the Proposed Project, which would minimize potential fire risks. In addition, development requiring excavation within the operational public right-of-way is subject to Public Works permitting requirements. Provisions in the Public Works Code regarding excavation (Article 2.4, Section 2.4.52) prohibit excavations greater than 1,200 feet in length without prior written approval of the Director of Public Works, in part to ensure that construction projects do not create significant barriers to emergency response. Public Works may also add conditions to excavation permits in order to protect public health and safety (Article 2.4, Section 2.4.20). As part of right-of-way permit review, Public Works provides notice to other City agencies, such as SFFD. The San Francisco Building and Fire Codes ensure fire safety in San Francisco. In addition, the San Francisco Fire Department (as well as San Francisco Department of Building Inspection) reviews final building plans to ensure conformance with these codes. As applicable, the construction of a new pavilion at UN and/or Hallidie plazas or a visitor center at Hallidie Plaza would conform to these fire safety standards. Furthermore, construction of the Proposed Project would be phased so that each geographic phase would consist of multiple blocks along the length of the Project corridor. Specifically, under Alternatives 1 and 2, construction along Market Street is anticipated to occur in four or five geographic phases over a 3- to 5-year period. Under Alternative 3, construction along Mission Street is anticipated to occur over a shorter period (1 to 2 years) than on Market Street because of fewer construction activities. Mission Street construction would occur after construction along Market Street is completed. During each sub-phase of construction, at least one lane would remain open at all times.

During operation of the Proposed Project, adherence to the Public Works Code and Public Works permit and coordination requirements would ensure that the Proposed Project would not expose persons or structures to significant impacts from increased fire risks or interfere with emergency response. The routine use of flammable materials or potential interference with emergency response is not anticipated during operation of the Proposed Project. In addition, the Proposed Project would not interfere with implementation of an emergency response plan.

Based on the above analysis, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact regarding the exposure of people or structures to a significant risk of loss, injury, or death involving fires, and the interference with the implementation of an emergency response plan.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-HZ-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute cumulative impacts related to hazards and hazardous materials. (Less than Significant)

The geographic context for cumulative hazards and hazardous materials impacts are typically site-specific. The impacts of each reasonably foreseeable project would be specific to the respective site and its users and would not be common or contribute to (or shared with, in an additive sense) the impacts on other sites. As described in the discussion for *Impact HZ-1* through *Impact HZ-4*, with compliance with the Maher Ordinance, which requires contractor(s) to test hazardous soils, construction of the Proposed Project would have a less-than-significant impact related to a reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. In addition, with compliance with the Maher Ordinance, the Proposed Project would have a less-than-significant impact related to hazardous emissions or acutely hazardous materials near schools and contact with contaminated soils from hazardous material sites. Implementation of the existing hazardous material requirements would require the safe use, storage, and disposal of flammable materials during construction of the Proposed Project, which would minimize potential fire risks. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable hazards and hazardous materials impact.

This topic will not be analyzed further in the EIR.

E.17. Mineral and Energy Resources

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
17. MINERAL AND ENERGY RESOURCES— Would the project:					
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☐	☒
c) Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	☐	☐	☐	☒	☐

All land in San Francisco, including the Project corridor, is an urbanized area and is designated as Mineral Resource Zone 4 (MRZ-4) by the California Division of Mines and Geology under the Surface Mining and Reclamation Act of 1975.[66] This designation means that land in San Francisco is not located within a designated area of significant mineral deposits. Further, there are no designated mineral resource recovery sites within San Francisco. Therefore, Topics 17a and 17b are not applicable to the Proposed Project and these topics will not be analyzed in the EIR.

Impact ME-1: The Proposed Project would not encourage activities that result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner. (Less than Significant)

Construction of any alternative would require increased fuel, water, and energy use for the construction vehicles and equipment, and water for construction site activities, such as dust control and equipment wash downs. Specifically, electricity would be used to operate construction equipment such as hand tools and lighting. Construction vehicles and equipment would primarily use diesel fuel, and construction workers would use gasoline, diesel, and electricity to travel to and from the Project corridor. However, the amounts of fuel and energy used during construction would be typical of public works projects and would not be expected to be used in a wasteful manner. As described under *Impact UT-3* in Topic 11, *Utilities and Service Systems*, non-potable water is required to be used for construction dust control pursuant to Article 21 of the Public Works Code. The Proposed Project also would be required to comply with the Resource Efficiency and Green Building Ordinance and Construction Recycled Content Ordinance, which indirectly reduces energy use by reducing the need to extract, transport, and manufacture new construction materials.

In addition, during operation of the Proposed Project, energy and fuel would be used more efficiently than under existing conditions because the Proposed Project would enhance transit capacity and carry more passengers more efficiently within the Project corridor. The Proposed Project would not generate new vehicle trips. The Proposed Project objectives include improving pedestrian safety, comfort, and mobility along and across Market Street from Octavia Street to The Embarcadero, as well as improving safety, comfort, and mobility of bicyclists along the length of the Project corridor. In addition, the Proposed Project was planned with the goal of reducing surface public transit travel time to complete service routes by minimizing idle time caused by congestion and intersection wait times, which increase energy and fuel use. Furthermore, by providing transit-only lanes under all three alternatives for the Proposed Project and raised and/or protected cycle tracks under Design Option B and Alternative 3, the Proposed Project would separate transit and bicycles from automobile traffic, thereby improving surface transit speed and reliability. Although the number of transit vehicles and the transit routes would remain the same under the Proposed Project, the improved transit performance (e.g., improved speed and reliability) and experience provided by the Proposed Project is anticipated to attract new riders to public transit along the Project corridor. Additionally, the Proposed Project would include improvements in bicycle safety, bicycle traffic capacity, bicycle comfort and mobility

[66] California Division of Mines and Geology. Open File Report 96 03 and Special Report 146, Parts I and II, 1986. Available at: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/OFR_96-03/OFR_96-03_Text.pdf. Accessed on June 4, 2015.

along the length of the Project corridor. In addition, the rebuilding and redesign of UN and Hallidie plazas would not result in the use of large amounts of fuel or energy. Consequently, the Proposed Project, including redesign and rebuilding of UN and Hallidie plazas, would have a less-than-significant impact on regional energy consumption.

This topic will not be analyzed further in the EIR.

Cumulative Impacts

Impact C-ME-1: The Proposed Project, in combination with other past, present, and reasonably foreseeable projects in the vicinity of the Project corridor, would not considerably contribute to cumulative impacts related to energy resources. (Less than Significant)

The geographic context for cumulative energy resources impacts is typically the service area of the energy providers. The Proposed Project would occur in this larger context that includes other projects and the construction of new buildings throughout much of the Project corridor, some of which will replace existing structures with new residential, commercial, retail, and hotel uses. The demand for energy within the service area of the energy providers will change in the future as development occurs in accordance with the General Plan and under the other projects listed in Section A.1 above.

Developments that may result in energy impacts typically use energy resources during construction or operation in a wasteful manner. There are development projects proposed throughout the service area of the energy providers, each of which would contribute to changes to the demand for energy and would in some instances result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner.

As described in *Impact ME-1*, energy resources used during construction of the Proposed Project would not be used in a wasteful manner. During operation of the Proposed Project, energy and fuel would be used more efficiently than under existing conditions because the Proposed Project would enhance transit capacity and carry more passengers more efficiently within the Project corridor. In addition, the Proposed Project was planned with the goal of reducing surface public transit travel time to complete service routes by minimizing idle time caused by congestion and intersection wait times, which increase energy and fuel use. Therefore, the Proposed Project, in combination with other past, present, and reasonably foreseeable projects, would not result in a cumulatively considerable energy impact.

This topic will not be analyzed further in the EIR.

E.18. Agricultural Resources

Topics:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Not Applicable
18. AGRICULTURE AND FOREST RESOURCES: —Would the project					
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined by Public Resources Code Section 4526)?	☐	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or forest land to non-forest use?	☐	☐	☐	☐	☒

A majority of the various Proposed Project elements would be implemented within the operational public right-of-way in San Francisco, an urban area. According to the California Department of Conservation's Farmland Mapping and Monitoring Program, land within the City and County of San Francisco is categorized as "Urban and Built-up Land," which is defined as "… land [that] is used for residential, industrial, commercial, institutional, public administrative purposes, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes."[67] Additionally, no land within the City is zoned for agricultural or forest uses.[68] Because the operational public right-of-way does not contain agricultural or forest uses and no proposed locations are zoned for such uses, under each alternative, the Proposed Project would not convert any land designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use, conflict with any existing agricultural zoning or a Williamson Act

[67] California Department of Conservation, Farmland Mapping and Monitoring Program. Bay Area Region Important Farmland 2004 and Urbanization 1984 – 2004. Available at: ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/statewide/2002/fmmp2002_11_17.pdf. Accessed on February 8, 2014.

[68] City and County of San Francisco. San Francisco Planning Code, as amended, Section 201, Classes of Use Districts.

contract, or involve any changes to the environment that could result in the conversion of farmland to a non-agricultural use. The Proposed Project also would not be located within any known forest land or timberland areas (as defined by Public Resources Code Sections 12220(g) and 4526, respectively). Thus, under each alternative, the Proposed Project would not result in the loss of forest land or timberland or in the conversion of forest land to non-forest use. Therefore, Topics 18a through 18e are not applicable to the Proposed Project and these topics will not be analyzed in the EIR.

E.19. Mandatory Findings of Significance

Topics:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*	*Not Applicable*
19. MANDATORY FINDINGS OF SIGNIFICANCE—Would the project:					
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐	☐
b) Have impacts that would be individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐	☐
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐	☐

The following topics have been fully analyzed in this Initial Study. The Proposed Project has been determined to have less-than-significant impacts or no impacts regarding these topics and would not have a considerable contribution to significant cumulative impacts: land use and land use planning, aesthetics, population and housing, greenhouse gas emissions, shadow, recreation, utilities and service systems, public services (including police protection, fire protection, schools, parks, and other services), geology and soils, hydrology and water quality, hazards and hazardous materials, mineral and energy resources, and agricultural and forest resources. The construction and operation of the Proposed Project would not cause degradation in the quality of the environment in the aforementioned topic areas.

As described in Topic 13, *Biological Resources*, the Proposed Project would not substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal. As described in Topic 4, *Cultural Resources*, the Proposed Project could result in a substantial adverse change in the significance of contributors to a historic district. Based on the analysis in this Initial Study, the Proposed Project could result in significant impacts related to the following topics: cultural resources, transportation and circulation, noise, air quality, and wind. The information in the technical reports prepared for each topic, if applicable, will be summarized in the EIR, and the potential direct and indirect impacts will be analyzed in the EIR. The EIR also will address the cumulative impacts related to cultural resources, transportation and circulation, noise, air quality, and wind, and evaluate the Proposed Project's contribution to potentially significant cumulative impacts.

As described in Topic 8, *Greenhouse Gas Emissions*, the Proposed Project's GHG emissions would not conflict with state, regional, and local GHG reduction plans and regulations, and the Proposed Project's contribution to GHG emissions would not be cumulatively considerable. Thus, the Proposed Project would not result in GHG emissions that would cause substantial adverse effects on human beings. As described in Topic 12, *Public Services*, improvements to and redesign of existing transportation, streetscape, and utility infrastructure would not generally result in substantial adverse physical impacts associated with new or physically altered governmental facilities. As such, the Proposed Project's impacts related to public services would not cause substantial adverse effects on human beings. As described in Topic 16, *Hazards and Hazardous Materials*, implementation of the existing hazardous material requirements described in *Impact HZ-1* would require the safe use, storage, and disposal of flammable materials during construction of the Proposed Project, which would minimize potential fire risks. During operation of the Proposed Project, adherence to the Public Works Code and Public Works permit and coordination requirements would ensure that the Proposed Project would not expose persons or structures to significant impacts from increased fire risks or interfere with emergency response. Thus, the Proposed Project would not result in hazards or hazardous materials that would cause substantial adverse effects on human beings. The Proposed Project could result in substantial adverse effects on human beings related to the following topics: transportation and circulation, noise, air quality, and wind based on the analysis in this Initial Study. The potential direct and indirect impacts on human beings related to these topics will be analyzed in the EIR.

F. MITIGATION MEASURES AND IMPROVEMENT MEASURES

For most topics analyzed in this Initial Study, the Proposed Project would have either no impact or less-than-significant impacts without mitigation. The following mitigation measure has been identified to address a potentially significant impact on archaeological resources resulting from

construction of the Proposed Project. Implementation of this mitigation measure would reduce potential impacts to archaeological resources to a less-than-significant level.

Mitigation Measure M-CP-1: Archeological Resources

The Project Sponsor shall distribute the Planning Department archeological resource "ALERT sheet" to the Project prime contractor; to any Project subcontractor (including demolition, excavation, grading, foundation, pile driving contractors); and utilities involved in soils disturbing activities within the Project site. Prior to any soils disturbing activities being undertaken, each contractor shall be responsible for ensuring that the ALERT sheet is circulated to all field personnel, including machine operators, field crew, pile drivers, and supervisory personnel. The Project Sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor(s), and utilities firm) to the ERO confirming that all field personnel have received copies of the ALERT Sheet.

Should any indication of an archeological resource be encountered during any soils disturbing activity, the Project Head Foreman and/or Project Sponsor shall immediately notify the ERO and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO has determined what additional measures should be undertaken.

If the ERO determines that an archeological resource may be present within the Project site, the Project Sponsor shall retain the services of an archaeological consultant from the pool of qualified archaeological consultants maintained by the Planning Department archaeologist. The archeological consultant shall advise the ERO as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require specific additional measures to be implemented by the Project Sponsor.

Measures might further include: preservation in situ of the archeological resource; an archaeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Environmental Planning Division guidelines for such programs. The ERO may also require that the Project Sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions.

The project archeological consultant shall submit to the ERO a Final Archeological Resources Report (FARR) that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to the ERO for review and approval. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall

receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning Division of the Planning Department shall receive one bound copy, one unbound copy, and three CDs containing an unlocked, searchable PDF of the FARR, along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.

G. PUBLIC NOTICE AND COMMENT

The Planning Department prepared a Notice of Preparation of an Environmental Impact Report and Notice of Public Scoping (NOP) for the Proposed Project in January 2015. Notice of Availability (NOA) of the NOP was published in a newspaper of general circulation on January 14, 2015. A NOA was mailed to a mailing list of approximately 6,500 addresses, including other public agencies and interested parties on January 13, 2015. Copies of the full NOP were mailed to public agencies and interested parties on January 13, 2015. Copies of the full NOP were placed in the Main Library in the San Francisco Public Library system on January 14, 2015. One public scoping meeting was held on February 4, 2015, beginning at 6:00 p.m., at which oral comments from the public were received and transcribed. Written comments regarding the scope of the environmental review for the Proposed Project were accepted until 5:00 p.m. on February 13, 2015.

At the public scoping meeting, no persons offered oral comments. Eight written comment letters were provided identifying a number of concerns presented by the current three alternatives for the Proposed Project. The issue with the most comments focused on vehicular access; specifically, entering and exiting private driveways and pedestrian drop-offs/loading and unloading at business entrances. This is followed by concerns over traffic congestion at the intersections with Market Street. There is concern over bicycle interaction and safety in conjunction with vehicles, transit and pedestrians. Several comments expressed concerns regarding access to Bay Area Rapid Transit (BART) entrances. There were no comments on the proposed plans for vehicle parking or plazas.

The environmental issues presented during the public scoping period have been taken into account during analyses prepared for this Initial Study, and will be considered in the analyses prepared for the EIR.

H. DETERMINATION

On the basis of this Initial Study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

DATE March 30, 2016

Sarah B. Jones
Environmental Review Officer
for
John Rahaim
Director of Planning

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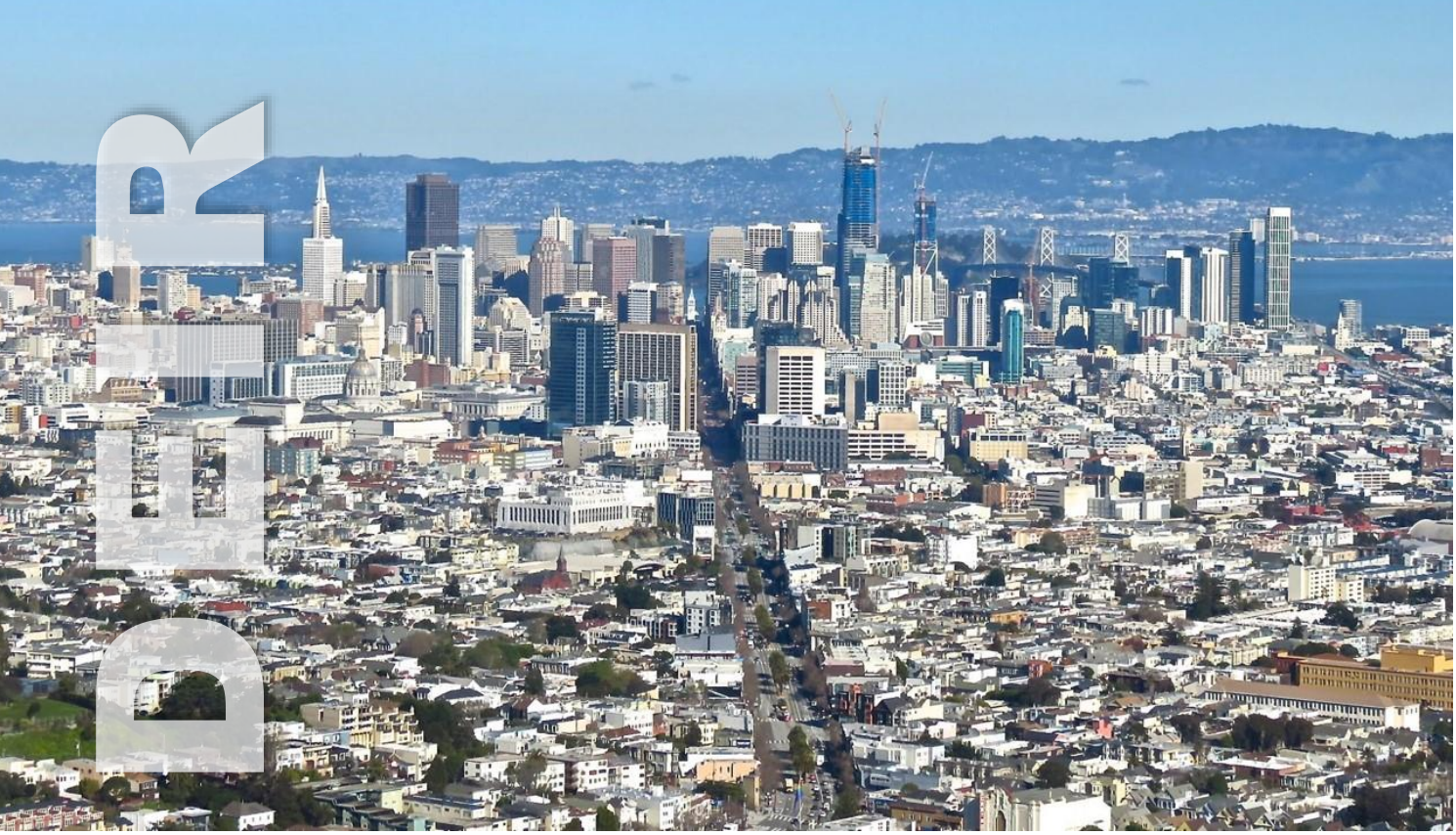
Glossary

BETTER MARKET STREET PROJECT
INITIAL STUDY

GLOSSARY

Complete Street	Complete streets are streets planned, designed, operated and maintained to support the mobility of individuals of all abilities and ages and to provide safe and efficient access for all users regardless of the form of transportation, including walking, bicycling, riding transit, and operating automobile for commercial or private purposes.
Contra-flow Bicycle Lane	Contra-flow bicycle lanes are bicycle lanes designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way traffic street into a two-way street: one direction for motor vehicles and bikes, and the other for bikes only.
Cycle track	Per the National Association of City Transportation Officials (NACTO), a cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used for bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. Cycle tracks may be one-way or two-way, and may be at street level, at sidewalk level, or at an intermediate level. The cycle track definitions are provided below. *Protected Buffered Cycle Track:* Protected cycle tracks are bikeways that are at street level and use a variety of methods for physical protection from passing traffic. A protected cycle track may be combined with a parking lane or other barrier between the cycle track and the motor vehicle travel lane. A protected cycle track can be one-way or two-way. One-way cycle tracks allow bicycle movement in one direction on one side of the road. Two-way cycle tracks allow bicycle movement in both directions on one side of the road. *Raised Cycle Track:* Raised cycle tracks are bicycle facilities that are vertically separated from motor vehicle traffic. Many are paired with a furnishing zone between the cycle track and motor vehicle travel lane and/or pedestrian area. A raised cycle track may allow for one-way or two-way travel by bicyclists.

Floating parking lane	A single parking lane placed in the buffer between a curbside cycle track and the vehicular travel lane. Alternative 3 would place a floating parking lane on one side of the street per block, with the parking lane alternating between the north and south sides of Mission Street.
Inbound	Transit traveling in the eastbound direction within the proposed Project corridor.
Outbound	Transit traveling in the westbound direction within the proposed Project corridor.
Overhead Contact System	Part of Muni's trolley bus overhead electric wire system for powering buses, in combination with the traction power (also see Traction Power below). Consists of copper-alloy wires along the transit route that provides power to the trolleybuses or streetcars, guy wires stabilizing the copper-alloy wires, and poles that hold up the guy wires.
Path of Gold Light Standards	Light poles with a three-part top, each containing a light globe. The Path of Gold Light Standards is a designated historic landmark identified under Article 10 of the Planning Code (Landmark No. 200) and is located between 1 Market Street and 2490 Market Street.
Safe hit posts	Physical barriers that defer vehicles from infringing upon painted safety zones and bicycle lanes (e.g., plastic traffic posts).
Sharrows	A sharrow is a pavement marking in a travel lane to indicate that the lane is shared with bicyclists.
Streetlife Zones	Streetlife Zones would be located along the entire length of Market Street adjacent to the sidewalk through-zone and the curb. Streetlife Zones would concentrate the objects currently located on, or proposed for, the sidewalk, including benches, trees, bicycle racks, and lighting.
Streetlife Hubs	Streetlife Hubs would be located in areas where the sidewalk is wider and near existing active uses, such as retail shops, in which more prominent streetscape elements could be featured, including kiosks, cafés, public art, or interactive installations.
Traction Power	Part of Muni's trolley bus overhead electric wire system for powering buses, in combination with the Overhead Contact System (see Overhead Contact System above).



DRAFT ENVIRONMENTAL IMPACT REPORT

Better Market Street Project EIR
APPENDIX 3: STANDARD PAVING MATERIALS IN SAN FRANCISCO'S PUBLIC RIGHTS-OF-WAY

PLANNING DEPARTMENT
CASE NO. 2014.0012E

STATE CLEARINGHOUSE NO. 2015012027

	Draft EIR Publication Date:	**February 27, 2019**
	Draft EIR Public Hearing Date:	**April 4, 2019**
	Draft EIR Public Comment Period:	**February 28, 2019 – April 15, 2019**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:
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APPENDIX 3: STANDARD PAVING MATERIALS IN SAN FRANCISCO'S PUBLIC RIGHTS-OF-WAY (PUBLIC WORKS ORDER 200369)

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City and County of San Francisco

San Francisco Public Works

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London N. Breed, Mayor
Mohammed Nuru, Director

Public Works Order No: 200369

STANDARD PAVING MATERIALS IN SAN FRANCISCO'S PUBLIC RIGHT OF WAYS

This Standard Paving Materials Public Works Director's Order shall serve as the City and County of San Francisco (CCSF) requirements on an expanded list of City standard paving materials, what they are, where permittees can install them in the public right of way and all installation requirements necessary to satisfy the Public Works approval process.

I. *Introduction*

This order expands the list of City standard paving materials. In addition to the current City standard concrete and asphalt paving, the standard paving materials addressed in this order will allow for the installation of a defined list of materials of different shapes, patterns and colors. These additional standard paving materials will allow for better maintenance of a broader variety of paving materials in our neighborhoods, on the streets and sidewalks throughout the City.

All paving materials not included in the Public Works standard paving palette must be permitted through Public Works Bureau of Street Use and Mapping. Permit types for non-standard paving materials can be found here: http://www.sfbetterstreets.org/learn-the-process/permit-process/#permitProcessByProjectType (also listed in section II number 4 Reference Documents below).

The additional standard paving materials and design criteria authorized by this order also ensures that, consistent with accessibility laws, pedestrians will continue to have a continuous and safe path of travel through the City's streets and sidewalks.

This order does not change property owners' and third parties' existing responsibilities to properly install, maintain, repair or replace paving materials. Under City law (Public Works Code Section 706), property owners are primarily responsible for maintaining the condition of sidewalks and the public right of way in front of their properties. Third parties who may disturb sidewalks and the public right of way - contractors working on behalf of the adjacent property owners, utility companies, and City agencies - are responsible for replacing any paving materials in kind (i.e., replacing any pre-existing paving materials with new paving materials of the same quality, shape, and design).

This order also does not change property owners' and third parties' existing responsibilities to obtain any necessary permits (e.g., construction, encroachment, etc.) from Public Works to install or repair paving materials. Public agencies, including City departments, are not subject to these permitting requirements; however, they are subject to the standards and information set forth in this order. Any property owner or private party that seeks to install, repair, or replace

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sidewalks in public rights of way using non-City standard paving materials must receive necessary permits from Public Works, Bureau of Street Use and Mapping.

II. *Reference Documents*

To learn more about San Francisco street types, character, and use of these materials, please see the following reference documents:

1. SF Better Streets Plan: http://www.sf-planning.org/ftp/BetterStreets/index.htm
2. SF Better Streets Plan Special Paving Guidelines: http://www.sf-planning.org/ftp/BetterStreets/docs/FINAL_6_Streetscape_Elements.pdf
3. SF Better Streets Plan Special Sidewalk Paving section: http://www.sfbetterstreets.org/find-project-types/streetscape-elements/sidewalk_paving/
4. SF Better Streets permit for non-standard paving in the right of way: http://www.sfbetterstreets.org/learn-the-process/permit-process/#permitProcessByProjectType
5. SF Public Works Sidewalk Landscaping Guidelines, Reference Drawings and Specifications, Paving Plans and Materials: https://www.sfpublicworks.org/sites/default/files/905-L-3.0_Paving%20Plan%20and%20Details%2011x17.pdf
6. SFMTA May 29, 2014 SFMTA Crosswalk Guidelines Memorandum: http://www.sfbetterstreets.org/wp-content/uploads/2016/01/SFMTA-CrosswalkGuidelines-5-29-14.pdf
7. Standard Paving Details Streets and Highways: http://www.sfpublicworks.org/services/standards-specifications-and-plans
8. Public Works Accessible Street Crossing Standard: http://sfpublicworks.org/sites/default/files/K2%20DPW%20Order%28185854%29.pdf

III. *Attachments*

The following documents are attached to this Director's Order to supplement the contents of the Order:

1. Attachment A: Definitions
2. Attachment B: Engineering Specifications
3. Table 1: City of San Francisco Standard Paving Palette
4. Table 2: Standard Paving Acceptable Locations Concrete and Unit Pavers
5. Table 3: Expanded Standard Paving Acceptable Locations Decorative Asphalt
6. Figure 1: Standard Paving Palette Acceptable Locations: Concrete Unit Pavers
7. Figure 2: Standard Paving Palette Acceptable Locations: Decorative Asphalt
8. Figure 3: Decorative Asphalt Patterns and Colors

IV. *Areas of Use*

The use and installation of the expanded standard paving systems shall comply with the following requirements and criteria shown in the attachments, tables, and figures listed above. All installations shall comply with Attachment B Engineering Specifications. The latest versions of standard paving specifications are available online at http://sfpublicworks.org/services/standards-specifications-and-plans and at the SF Public Works Street Use and Mapping Permit Counter.

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Accessibility Performance goal**:** Under the Americans with Disabilities Act, maintaining a continuous Pedestrian Access Route (PAR) in the public right of way is a goal (Refer to Attachment A Definitions for distinctions between Major PAR and Minor PAR). It is important to provide adequately designed and installed paving to minimize horizontal and vertical discontinuities. Concrete unit pavers should have durable structural edges with gaps in paver joints not more than 3/8"(9.52mm).

The attachments in this order are the authoritative reference for permissible use of the expanded list of City standard paving materials. But in general:

- Colored poured-in-place concrete paving materials as shown in Table 1: City of San Francisco Standard Paving Palette may be used for all sidewalks and public right of way.
- Large scale pavers (6" x 36", 12"x18", 12"x36") must be used for the sidewalk pedestrian throughway (major pedestrian access route (PAR)). Other sizes of pavers may be used in other sidewalk areas (known as the minor PAR) as specified in the attachments.
- Stamped and painted or stamped and thermoplastic inlay asphalt may be used in crosswalks as specified in the attachments.
- Stamped and painted asphalt may be used in alleys as specified in the attachments.

A. Areas Where Integrally Colored Concrete Is Acceptable

Colored poured-in-place concrete paving material is acceptable within the right of way, including Major, Minor and non- PAR areas as defined by this Order, and as shown in Table 2: Standard Paving Acceptable Locations Concrete and Unit Pavers.

B. Areas Where Concrete Unit Paving Systems Are Acceptable

The standard unit pavers in three sizes are acceptable within the Major, Minor and non-PAR areas as defined by this Order, and as shown in Table 2: Standard Paving Acceptable Locations Concrete and Unit Pavers and Figure 1: Standard Paving Palette Acceptable Locations: Concrete Unit Pavers. Public Works determines that 6”X36”, 12”X18”, and 12”X36” pavers are acceptable in the Major PAR only when the permittee installs them lengthwise (parallel) in the direction of path of travel.

C. Areas Where Concrete Unit Paving Systems Are Not Acceptable

Public Works shall not accept standard unit pavers in sizes smaller than 12”X18”, 6”X36” and 12”X36” within the Major PAR areas as defined by this Order, and as shown in Table 2: Standard Paving Acceptable Locations Concrete and Unit Pavers and Figure 1: Standard Paving Palette

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Acceptable Locations: Concrete Unit Pavers. Public Works shall accept standard pavers in all other sizes in Minor and non-PAR areas.

D. Areas Where Concrete Unit Paving Systems May Be Acceptable If They Conform to City standards

Public Works determines that the paving palette is acceptable within the Minor PAR or other non-PAR areas as defined by this Order, and as shown in Table 2: Standard Paving Acceptable Locations Concrete and Unit Pavers and Figure 1: Standard Paving Palette Acceptable Locations: Concrete Unit Pavers. Concrete unit paving shall comply with Attachment B Engineering Specifications. Specifically:

1. Pedestrian pass-through in the Furnishing Zone (e.g. Minor PAR areas next to a parking space on the sidewalk, or edge zone/courtesy strip) in order to provide a firm, stable surface, for passengers getting out of and into parked cars.
2. Alleys. In alleys or spaces without a legislated public sidewalk that may have slow-moving vehicles and pedestrians, permittees shall design the entire width of the public right of way to support the anticipated vehicle loading to a level acceptable to Public Works. Prior Public Works approval shall include not only the paver area, but also the PAR.
3. Plazas, Courtyards, Squares, Patios, Terraces, etc. in non-PAR plaza areas. Public Works may allow all standard paving materials in these areas as long as all accessible elements provided on the site are connected by a PAR. PARs should connect to at least one installation of each accessible element. (This includes such major features as the entrance to a building off of the plaza or minor features such as a drinking fountain.)
4. Paths and areas within parks, plazas, and courtyards with vehicular loads. The permittee shall design the sub-base for concrete unit paving systems to support passenger vehicles, trucks, and buses in such a way that the sub-base shall not degrade during the life of the paving system necessary to maintain accessible features. Therefore, if any portions of the plaza, courtyard, or square routinely have vehicles, the permittee shall engineer that portion of the site to accommodate that load.

V. *Maintenance Requirements*

1. Colored poured-in-place concrete, concrete unit paving and decorative asphalt shall be able to be maintained via City standard mechanical sweeping equipment. Repairs shall be made with the same paving system materials, to the same tolerances and quality standards.

WHEREAS, Public Works determined that the use of the attached standard paving materials is beneficial to the City and County of San Francisco, the Director of Public Works approves its use as described above for future roadway, streetscape, and building projects.

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APPROVED:

Mohammed Nuru

Director of Public Works

RECOMMENDED:

John F. Thomas

City Engineer and

Deputy Director for Infrastructure

RECOMMENDED:

Patrick Rivera

Bureau Manager, Engineering

REVIEWED BY:

Deputy Director, Operations

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Bureau Manager, Street Use and Mapping

Deputy Division Manager, Streets and Structures

Deputy Division Manager, Industrial Systems and Buildings

Bureau Manager, Landscape Architecture

Acting Bureau Manager, Project Management and Construction

Disability Access Coordinator

X

Rivera, Patrick
Bureau Manager, Engineering

X

Thomas, John
City Engineer and Deputy Director

X

Nuru, Mohammed
Director

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San Francisco Public Works Standard Paving Director's Order

Attachment A

Definitions

1. **Concrete unit pavers** – a paving system of solid interlocking concrete pavers of specific sizes as called out in Table 1, Standard Paving Palette

2. **Colored poured-in-place concrete** – Color pigments added to standard concrete mixes to match the colors on the City of San Francisco Standard Paving Palette. Colors may match the palette or be an approved equal. Table 1, Standard Paving Palette

3. **Pedestrian Accessible Route (PAR, see 2010 ADA) -** The pedestrian accessible route (PAR) is a continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path. A pathway with continuous connection of not less than 48 inches wide from the pedestrian zone of the sidewalk (Throughway Zone – see below) to primary property entry points, parking areas, public transportation, crosswalks, curb ramps, accessible parking zones, passenger loading zones, pedestrian refuge islands, and/or other destinations.

   The PAR shall be a continuous firm, stable, slip-resistant and smooth* surface. The cross-slope of a PAR when constructed, and in use, shall not exceed 2.0%. In the sidewalk pedestrian Throughway Zone (as defined in the Better Streets Plan), the accessible route includes the width of the pedestrian throughway, typically not less than 72 inches in clear width. The PAR may pass through other sidewalk zones as defined in the Better Streets Plan, including the Frontage, Furnishings, Curb, and Shy zones. In other sites and facilities, the accessible route is that which connects all elements and program areas that are required to be accessible. At least one area of each type of distinct program or use shall be served by the PAR.

   NOTE: Concrete unit pavers, when not properly designed and installed, can present challenges for people with disabilities, especially wheelchair users. Frequent joints and pavers with deep bevels may create vibration for users of wheelchairs and other mobility assistive devices.

   *Smooth: an even and regular surface free from perceptible projections, lumps, or indentations.

4.A. **Major PAR** – Pedestrian access routes traversing public right of way sidewalks, curb ramps, crosswalks and other components of the public rights-of-way which are essential elements that define an accessible pedestrian infrastructure and the accessible environment. Major PAR includes but is not limited to: those shown on "Table 1: Standard Paving Palette, latest edition and Figure 1: Standard Paving Palette Acceptable Locations Concrete Unit Pavers

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4.B. Minor PAR - Pedestrian circulation paths and areas that are supplemental to Major PAR, and which provide access to other elements and areas that may not be specifically required to be made accessible, but which may be accessed by or used by individuals with disabilities. Minor PAR include but are not limited to: those shown on "Table 1: Standard Paving Palette ", latest edition and Figure 1: Standard Paving Palette Acceptable Locations Concrete Unit Pavers

5. **Types of roadways** (FHWA Functional Classification System):

a. Sidewalks, Paths, Walks, etc.: Light duty - golf carts, wheelchairs, etc.

b. Alleys: Public Right of Way that has a maximum paved width of 25 feet and a minimum sidewalk width of 4 feet on each side. An alley with a sidewalk on only one side may be allowed only by variance to the SF DPW Subdivision Regulations.

d. Local or Collector Streets: Medium duty - passenger vehicles predominate, occasional garbage, delivery and utility trucks.

e. Collector or Arterial Streets: Heavy duty - trucks, vans, etc. High traffic volume.

f. Arterial Streets and Truck Routes: Extreme heavy duty - fire trucks, utility vehicles, buses. Very high traffic volume.

The Better Streets Plan also has defined Standard Street Types (Chapter 4.0, pages 55 and 56. The SFDPW Subdivision Regulations 2015 also contains definitions of Street Types on Pages 51-53 http://sfpublicworks.org/sites/default/files/4740-2015%20Subdivision%20Regulations_final.pdf

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San Francisco Public Works Standard Paving Director's Order

Attachment B

Engineering Specifications -
In order for Public Works to approve the use of concrete unit pavers in the right of way in allowable areas discussed in Section IV (A through D), the project needs to provide, at a minimum, the following information:

1. Geotechnical Testing & Report - Applicants shall submit test results from a soil boring log to characterize the soil and groundwater profile. R-values and Traffic Index shall be provided to determine the depth and compaction of subbase

2. Drawings & Specifications & Design Criteria - Applicants must submit an engineering scale design plan for any areas that will have to sustain a vehicle load with specifications for:

    a. Depth of the paver sub-base: These should be supported by engineering calculations and/or geotechnical report.

    b. Sub-base and materials (aggregate) specifications (specifying depth and type of rock base, where applicable). Products and materials to be reviewed and approved by Public Works before use.

    c. Compaction. Test results and reports to be reviewed and approved by Public Works. Proper strength to withstand H-20 vehicular loads when used in driveways, shared streets/spaces, parking lots, parking strips, and alleyways.

    d. Products must have proper strength to withstand pedestrian loads when used in sidewalks, park lands, pedestrian/bike paths, and plazas.

    e. Concrete Unit Paver Criteria: Solid Concrete Pavers shall meet ASTM C 936-16: Standard Specification for Solid Concrete Interlocking Paving Units, and shall have a minimum thickness of the pavers for PICP subject to vehicular traffic is 3 1/8 inches. 2 3/8" thick pavers may be used in pedestrian areas. All pavers shall be manufactured to above criteria for size, manufacturing variation, compressive strength, and tolerances per industry standards (e.g.: *Interlocking Concrete Pavement Institute*, www.icpi.org)

        - Aspect Ratio (length divided by thickness): Concrete Unit Pavers for pedestrian applications shall have maximum aspect ratio of 5:1. Pavers for vehicular applications shall have a maximum aspect ratio of 3:1.

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- Gap Sizes: Concrete Unit Pavers shall have gaps not less than 1/4" (6.35mm), and not more than 3/8"(9.52mm).
    - Concrete Unit Paver systems with gaps of 1/4" shall be installed only with plastic spacers, or using pavers with integral precast interlocking spacers.

    - Concrete Unit Paver systems with gaps of 3/8" shall only be installed using pavers with integral precast interlocking spacers.

- Tolerances: Construction tolerances (1/16”) for installed paver gaps under this *Order* shall allow up to 5/16" gaps for paver systems designed with 1/4" spacers.
  For paver systems designed with 3/8” joints paver gaps, when installed, shall not exceed 7/16" (11.11mm) or the installation will be subject to rejection and reconstruction. Any gaps in a paver installation that accept a 1/2" sphere, shall be rejected and must be reconstructed.
- Warpage, Lippage and Roughness: Warpage is the variation in the planarity of the walking surface of an individual paver. Lippage is the variation in the height of the walking surface of adjacent installed pavers and adjoining materials, defined in ANSI (American National Standards Institute) Standards A108/A118/A136. Roughness, in the context of accessibility for persons with disabilities, is a measurement of whole-body vibrations caused by traveling over a surface in a wheelchair. The warpage, lippage and roughness of paver units and paver installations shall be in accordance with the following:
    - Warpage- The warpage limits in ANSI A137.1:2017 is derived from ASTM International C485-16 – Standard Test Method for Measuring Warpage of Ceramic Tile. Paver warpage shall comply with ANSI A137.1:2017, as referenced to floor tile meeting the dimensional requirements for rectified tile. For example; edge warpage shall be within the following range: at minimum the lesser of -0.75% of edge length or -0.08 inch (-2.0 mm), and at maximum the lesser of 0.75% of edge length or 0.08 inch (2.0 mm). In order to avoid excessive concentration of paver warpage, one tenth of the length of the measured span of the paver shall not represent more than 25% of the total allowable warpage. The edges of other walking surfaces adjoining pavers must also comply with this standard in order to control lippage.
        - Lippage: No greater than 5/64 (0.08) inch (2.0 mm) difference in height between adjacent pavers, and between pavers and adjacent surfaces. Pavers installed in a staggered pattern (such as running bond) must be offset no more than 1/3 of the paver

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edge dimension if any edge of the paver is greater than 18 inches.

- Roughness: ASTM E3028-16e1 Standard Practice for Computing Wheelchair Pathway Roughness Index as Related to Comfort, Passability, and Whole Body Vibrations from Longitudinal Profile Measurements. The roughness index shall not exceed 0.60 in/ft.
- See also the United States Access Board's completed research: https://www.access-board.gov/research/completed-research
  - Dimensional Tolerances in Construction and for Surface Accessibility
  - Development of Surface Roughness Standards for Pathways Used by Wheelchair Users: Final Report

f. Unit Paver Edge Containment: Unit paver installations must be contained by a rigid header curb edge, or other rigid interface such as a wall. Wood containment edging is not acceptable.

- Concrete header curbs shall be minimum 4" wide x the full depth of the stone base course(s), for applications with only pedestrian loading requirements. For applications with vehicular loading requirements, the concrete header curb shall be minimum 6" wide x full depth of the stone base course(s) – curb reinforcement to be determined per project requirements.

- Upper edges of adjacent headers, curb and other materials: Bevels at upper edges must not exceed 1/8 inch, eased or tooled upper edges must not exceed 1/8 inch radius. 90 degree square upper edges may be acceptable if appropriate to the material.

- Metal headers must be traffic rated.

g. Design of the accessible route: Pedestrian access route (PAR) shall be constructed to have a running slope as closely matched as feasible to the running slope of the adjoining roadway. Acceptable design cross slope range is 1% minimum to 1.67% maximum and acceptable constructed cross slope range is 0.5% minimum to 2% maximum. A level concrete landing shall be installed at accessible entrances and exits at facilities within the PAR.

h. Unit Pavers within the PAR shall be installed with 90 degree square edges, or with top edges beveled 1/8 inch (3mm) or less.

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i. Slip Resistance: Pavers shall meet criteria set forth in the DPW Director's Order for Slip Resistance.

4. Quality control and supervision of the project – Applicant must submit a plan for Quality Control and supervision of the project, including excavation, compaction, and installation of the finished concrete unit paver pavement.

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TABLE 1: STANDARD PAVING PALETTE

	POURED-IN-PLACE CONCRETE	
	Colors	***Manufacturers***
1	Dark Grey: 860 "Jet Black" 7.5lbs per 94lb sack	Davis Colors; or equal
	C-34 "Dark Grey"	Scofield; or equal
2	Medium Grey: 860 "Grey Stone" 1.5lb per 94lb sack	Davis Colors; or equal
	1266 "Cool Grey"	Scofield; or equal
3	Dark Tan: 677 "Mesquite" 1.5lb per 94lb sack	Davis Colors; or equal
	SG-677 "Soft Chestnut"	Scofield; or equal
4	Medium Tan: 5237 "Sandstone" 1.5lb per 94lb sack	Davis Colors; or equal
	5237 "San Diego Buff"	Scofield; or equal
	Finishes ****	
1	Medium Broom	
2	Water Jet, or Acid Wash or similar finish	
3	Sparkle	
	UNIT PAVERS	
	Dimensions	***Manufacturers***
1	Square: 12" x 12"	Hanover*, Pacific Interlocking Paving (PIP)*, Basalite; or equal
2	Rectangular: 4" x 8"	Acker-stone, Hanover*, Basalite; or equal
3	Linear: 3" x 18", 12"x18"	Stepstone, Hanover*, Basalite; or equal
4	Large**: 6" x 36", 12"x18", 12"x36"	Hanover, Stepstone; or equal
	Colors/ Finishes	***Manufacturers***
1	Dark Grey: "Charcoal" / "Shot Blast"	Acker-stone; or equal
	"Charcoal" / "Tudor"	Hanover; or equal
	"French Grey" / "Light Sandblast"	Stepstone; or equal
	"Charcoal" / "Estate"	PIP; or equal
	"Truckee" / "Ground Face"	Basalite; or equal
2	Medium Grey: "Agave" / "Shot Blast"	Acker-stone; or equal
	"Limestone Grey" / "Tudor"	Hanover; or equal
	"Porcelain" / "Light Sandblast"	Stepstone; or equal
	"Grey" / "Estate"	PIP; or equal
	"Ukiah" / "Ground Face"	Basalite; or equal
3	Dark Tan: "Tan" / "Shot Blast"	Acker-stone; or equal
	"Chocolate" / "Tudor"	Hanover; or equal
	"Espresso Brown" / "Light Sandblast"	Stepstone; or equal
	"Brown" / "Estate"	PIP; or equal
	"Healdsburg" / "Ground Face"	Basalite; or equal
4	Medium Tan: "Carmel" / "Shot Blast"	Acker-stone; or equal
	"Cream" / "Tudor"	Hanover; or equal
	"Almond" / "Light Sandblast"	Stepstone; or equal
	"Tan" / "Estate"	PIP; or equal
	"Indio" / "Ground Face"	Basalite; or equal
	DECORATIVE ASPHALT***	
1	**Stamped Asphalt with Surface Color**	
	Colors/Patterns	***Product and Manufacturers***
	Grey, Light Grey, Sand, Tan, Santa Fe Clay, Brick Red; See Figure 3 for standard patterns	StreetPrint by Integrated Paving Concepts, Inc.; StreetBond by Ennis-Flint; or equal
2	**Thermoplastic Inlay**	
	Colors/Patterns	***Product and Manufacturers***
	Custom colors and patterns per SFMTA Crosswalk Guidelines.	Duratherm by Ennis-Flint; or equal
3	**Thermoplastic Overlay**	
	Colors/Patterns	***Product and Manufacturers***
	Colors and patterns reviewed and approved on a per project basis	TrafficPatternsXD by Ennis-Flint; or equal

See Attachment B - Specifications for detailed requirements.

***Hanover (12"x12," "4x8," 3"x18," 6"x36") and Pacific Interlocking Paving (all sizes) pavers have integrated spacers, and for the purposes of installation details shall be referred to as "interlocking." All other pavers by Hanover, Acker-stone, Basalite, and Stepstone lack integrated spacers and shall be referred to as "non-interlocking."**

****The large size paver is the only size allowable in the major PAR; it must be placed with the longest dimension parallel with the direction of travel.**

*****Refer to SFMTA Crosswalk Guidelines for decorative asphalt crosswalk requirements: http://www.sfbetterstreets.org/wp-content/uploads/2016/01/SFMTA-CrosswalkGui**

******Poured in place paving finishes must result in a slip-resistant finish that does not expose rounded aggregate that may not be slip-resistant and too rough for pedestrians. The concrete mix design for such finishes must use an angular or crushed exposed aggregate and all such exposed aggregate shall pass through a 1/4" sieve.**

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TABLE 2: STANDARD PAVING ACCEPTABLE LOCATIONS CONCRETE AND UNIT PAVERS

			FIGURE 1		FIGURE 1 (Note 3)
Figure Keynote #	**PAR Level**	**LOCATION [1]**	**All Paver Sizes**	**Large Scale Pavers Only (See table 1 for sizes)**	**Colored Poured in Place Concrete**
Sidewalks					
1	minor	**Building Frontage Zone**	Acceptable	Acceptable	Acceptable
2	major	**Pedestrian Throughway Zone**	Not Acceptable	Acceptable	Acceptable
3	major	**Building Access / Maneuvering Area**	Not Acceptable	Not Acceptable	Acceptable
4	minor	**Furnishing Zone**	Acceptable	Acceptable	Acceptable
5	minor	**Furnishing Zone: 4-ft Pedestrian Pass-Through** (for street parking)	Acceptable	Acceptable	Acceptable
6	minor	**Edge Zone** (aka. Curb Zone, or Courtesy Strip at street parking)	Acceptable	Acceptable	Acceptable
7	major	**Corner Zone**	Not Acceptable	Not Acceptable	Acceptable
8	major	**Transit Boarding Zone** (on sidewalk & in raised islands)	Not Acceptable	Acceptable	Acceptable
9	minor	**Driveway Zone** (except Driveway Curb Cut)	Acceptable	Acceptable	Acceptable
10	minor	**Corner Bulb Out / Extension Zone**	Acceptable	Acceptable	Acceptable
11	minor	**Mid- Block Bulb Out** (Not Shown in Figures 1-2)	Acceptable	Acceptable	Acceptable
Streets					
12	minor	**Non-Accessible Parking Lane** (with or without Combined Curb Gutter)	Acceptable	Acceptable	Acceptable
13	major	**Accessible Parking Lane (Blue Curb) / Loading Zone (White Curb)**	Not Acceptable	Not Acceptable	Acceptable
14	none	**Bus Pad** (heavy loading zone)	Not Acceptable	Not Acceptable	Acceptable
15	none	**Traffic Lane & Bike Lane (Non-Separated):** Arterials, Collectors, Peak Hour Lanes, Transit or Truck routes, etc.	Not Acceptable	Not Acceptable	Acceptable
16	minor	**Traffic Lane & Bike Lane (Non-Separated):** Neighborhood Residential, Frontage Roads, Lanes, etc.	Not Acceptable	Not Acceptable	Acceptable
17	minor	**Alleys** (pavers require approval by Public Works Director)	Not Acceptable	Not Acceptable	Acceptable
18	major	**Crosswalk**	Not Acceptable	Not Acceptable	Acceptable
19	minor	**Median:** Non-PAR Area	Acceptable	Acceptable	Acceptable
20	major	**Median, Pedestrian Refuge / Pass-Through**	Not Acceptable	Not Acceptable	Acceptable
Other Public Spaces (Not shown on Figures 1-2)					
21	major	**Bikeway and Pedway, Shared:** PAR Area	Not Acceptable	Not Acceptable	Acceptable
22	minor	**Bikeway, Separate:** Non-PAR Area	Acceptable	Acceptable	Acceptable
23	major	**Plaza, Courtyard, Square, Patio, and Terrace:** PAR Area	Not Acceptable	Not Acceptable	Acceptable
24	minor	**Plaza, Courtyard, Square, Patio, and Terrace:** Non-PAR Area	Acceptable	Acceptable	Acceptable
25	minor	**Parking Lot:** Non-PAR Area	Acceptable	Acceptable	Acceptable
26	major	**Accessible Parking Spaces and PAR within Parking Lots:** PAR Areas	Not Acceptable	Not Acceptable	Acceptable
27	minor	**Paths with Vehicular Loads:** Non-PAR Area	Acceptable	Acceptable	Acceptable
28	minor	**Driveways:** Non-PAR Area	Acceptable	Acceptable	Acceptable

1. When two ROW zones intersect, areas of higher PAR classification will take precedent.

2 Gap sizes: Concrete Unit Pavers shall have gaps not less than 1/4" (6.35mm), and not more than 3/8"(9.52mm). Unit Pavers within the PAR should be installed with top edges beveled 1/8 inch or less.

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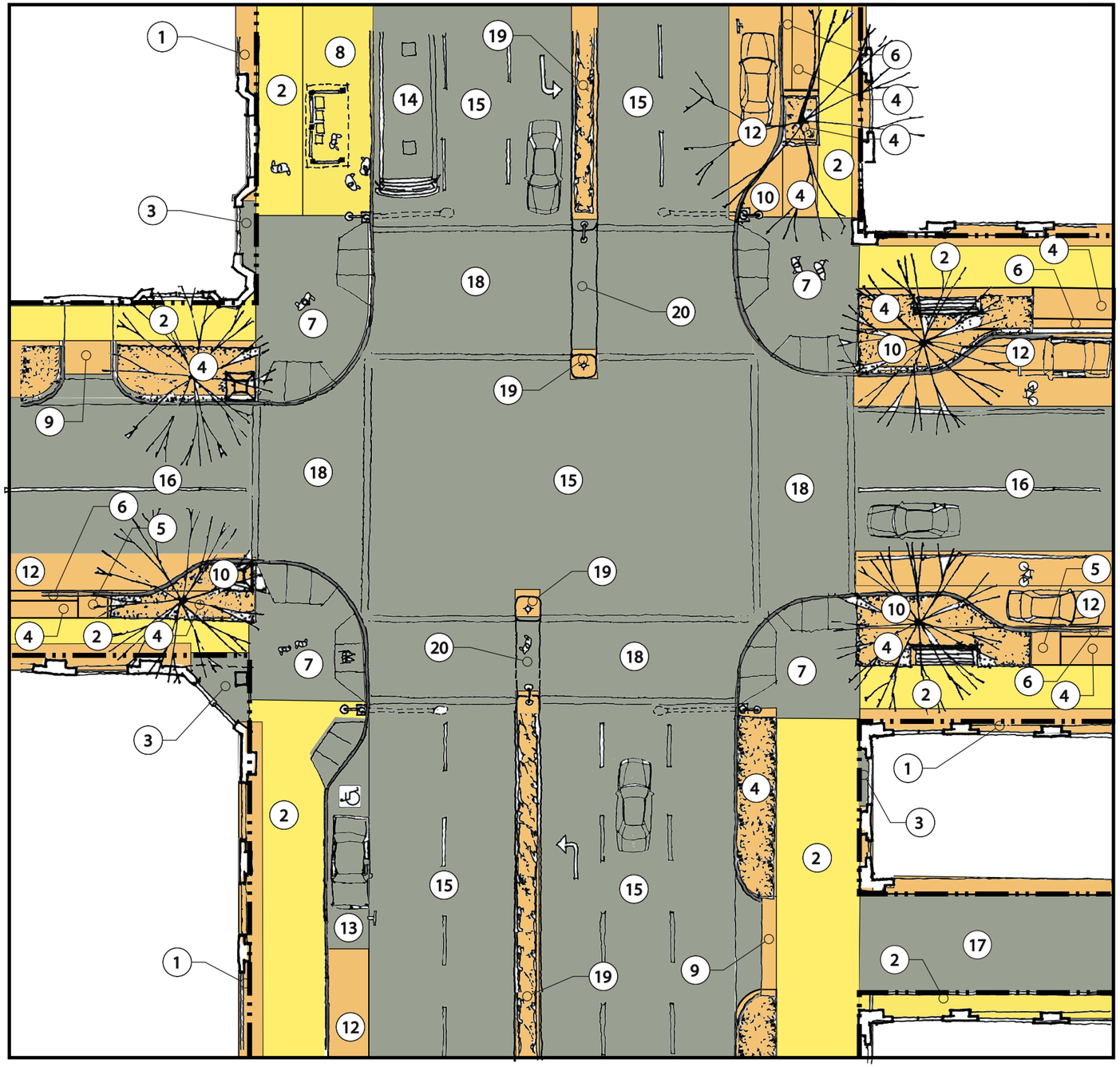
FIGURE 1
STANDARD PAVING PALETTE ACCEPTABLE LOCATIONS: **CONCRETE UNIT PAVERS**



SIDEWALKS AND STREETS

1. BUILDING FRONTAGE ZONE
2. PEDESTRIAN THROUGHWAY ZONE
3. BUILDING ACCESS / MANEUVERING AREA
4. FURNISHING ZONE
5. FURNISHING ZONE - 4-FT PEDESTRIAN PASS-THROUGH (AT STREET PARKING)
6. EDGE ZONE - (AKA, CURB ZONE, OR COURTESY STRIP AT STREET PARKING)
7. CORNER ZONE
8. TRANSIT BOARDING ZONE (ON SIDEWALK AND IN RAISED ISLANDS)
9. DRIVEWAY ZONE (EXCEPT DRIVEWAY CURB CUT)
10. CORNER BULB OUT / EXTENSION ZONE
11. MID-BLOCK BULB OUT (NOT SHOWN IN THIS FIGURE)
12. NON ACCESSIBLE PARKING LANE (W OR W/OUT COMBINED CURB GUTTER)
13. ACCESSIBLE PARKING LANE (BLUE CURB) / LOADING ZONE (WHITE CURB)
14. BUS PAD (HEAVY LOADING)
15. TRAFFIC LANES AND BIKE LANES ON ARTERIALS, COLLECTORS, PEAK HOUR LANES, TRANSIT OR TRUCK ROUTES, ETC.
16. TRAFFIC LANES AND BIKE LANES ON NEIGHBORHOOD RESIDENTIAL, FRONTAGE ROADS,LANES, ETC.
17. ALLEY (REQUIRES APPROVAL BY PUBLIC WORKS DIRECTOR)
18. CROSS WALKS
19. MEDIANS
20. MEDIANS: PEDESTRIAN REFUGE / PASS THROUGH

LEGEND

- ACCEPTABLE: ALL PAVER SIZES
- ACCEPTABLE: LARGE SCALE PAVERS ONLY
- NOT ACCEPTABLE
- BUILDING
- MAJOR PAR (PEDESTRIAN ACCESS ROUTE)
- PROPERTY LINE

NOTES

1. FIGURE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY. ALL TREES, PROPERTY LINES, VEGETATION, STREET FURNISHINGS, AND CROSSWALKS ARE APPROXIMATE AND BASED ON BETTER STREET PLAN RENDERINGS.
2. PAVEMENT DESIGN MUST MEET ALL APPLICABLE CITY CODES AND STANDARDS.
3. POURED-IN-PLACE CONCRETE IS ACCEPTABLE IN LOCATIONS 1-28 (SEE TABLE 2 FOR LOCATIONS NOT SHOWN ON THIS PLAN)

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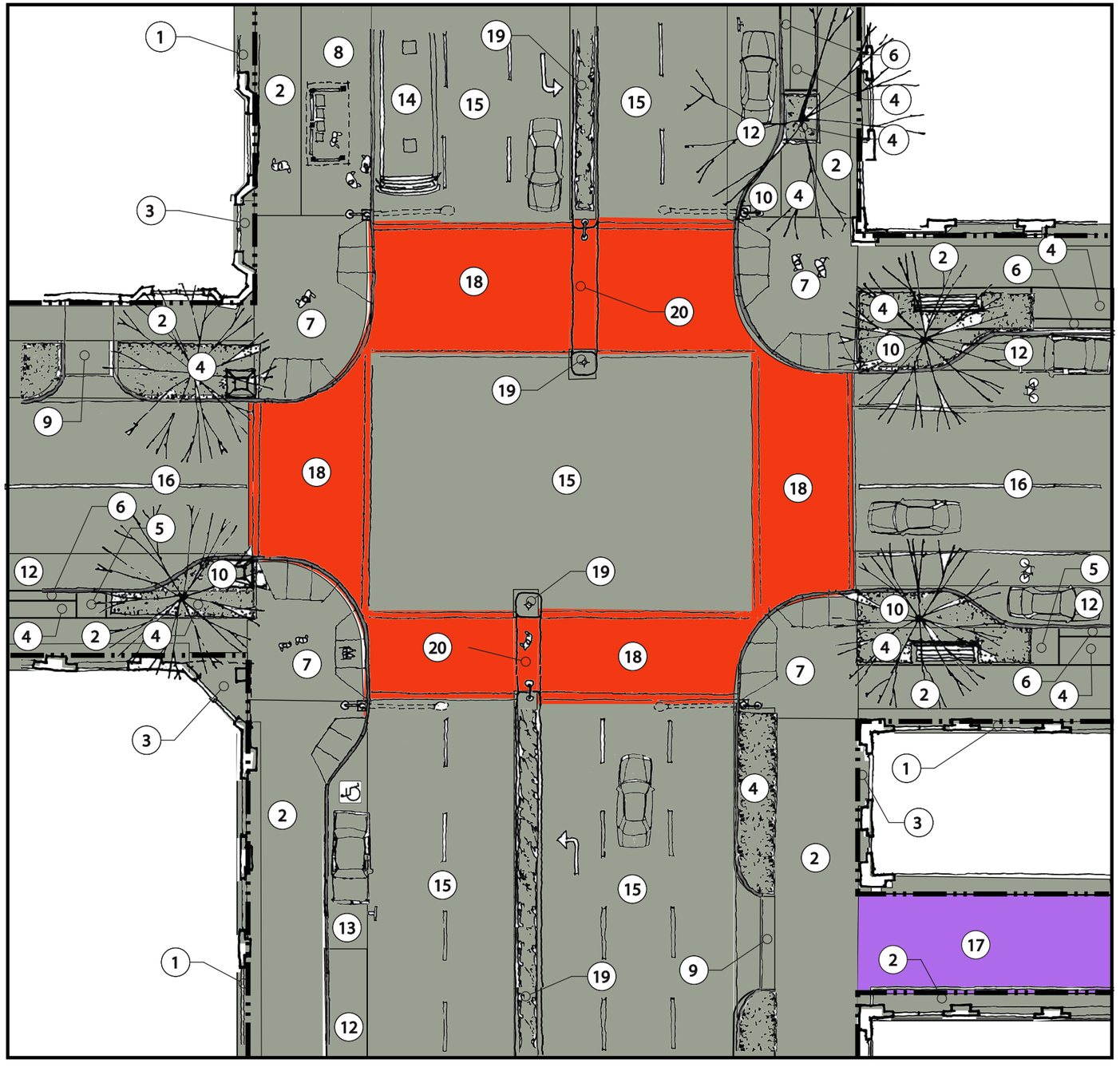
FIGURE 2
STANDARD PAVING PALETTE ACCEPTABLE LOCATIONS: **DECORATIVE ASPHALT**



SIDEWALKS AND STREETS

1. BUILDING FRONTAGE ZONE
2. PEDESTRIAN THROUGHWAY ZONE
3. BUILDING ACCESS / MANEUVERING AREA
4. FURNISHING ZONE
5. FURNISHING ZONE - 4-FT PEDESTRIAN PASS-THROUGH (AT STREET PARKING)
6. EDGE ZONE - (AKA, CURB ZONE, OR COURTESY STRIP AT STREET PARKING)
7. CORNER ZONE
8. TRANSIT BOARDING ZONE (ON SIDEWALK AND IN RAISED ISLANDS)
9. DRIVEWAY ZONE (EXCEPT DRIVEWAY CURB CUT)
10. CORNER BULB OUT / EXTENSION ZONE
11. MID-BLOCK BULB OUT (NOT SHOWN IN THIS FIGURE)
12. NON ACCESSIBLE PARKING LANE (W OR W/OUT COMBINED CURB GUTTER)
13. ACCESSIBLE PARKING LANE (BLUE CURB) / LOADING ZONE (WHITE CURB)
14. BUS PAD (HEAVY LOADING)
15. TRAFFIC LANES AND BIKE LANES ON ARTERIALS, COLLECTORS, PEAK HOUR LANES, TRANSIT OR TRUCK ROUTES, ETC.
16. TRAFFIC LANES AND BIKE LANES ON NEIGHBORHOOD RESIDENTIAL, FRONTAGE ROADS,LANES, ETC.
17. ALLEYS (REQUIRES APPROVAL BY PUBLIC WORKS DIRECTOR)
18. CROSS WALKS
19. MEDIANS
20. MEDIANS: PEDESTRIAN REFUGE / PASS THROUGH

LEGEND

- ACCEPTABLE: STAMPED/PAINTED & THERMOPLASTIC INLAY ASPHALT
- ACCEPTABLE: STAMPED/PAINTED ASPHALT
- NOT ACCEPTABLE
- BUILDING
- MAJOR PAR (PEDESTRIAN ACCESS ROUTE)
- PROPERTY LINE

NOTES

1. FIGURE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY. ALL TREES, PROPERTY LINES, VEGETATION, STREET FURNISHINGS, AND CROSSWALKS ARE APPROXIMATE AND BASED ON BETTER STREET PLAN RENDERINGS.
2. PAVEMENT DESIGN MUST MEET ALL APPLICABLE CITY CODES AND STANDARDS.
3. SEE TABLE 1 FOR LOCATIONS NOT SHOWN ON THIS PLAN.
4. SEE TABLE 3 FOR DECORATIVE ASPHALT PATTERNS AND COLORS.

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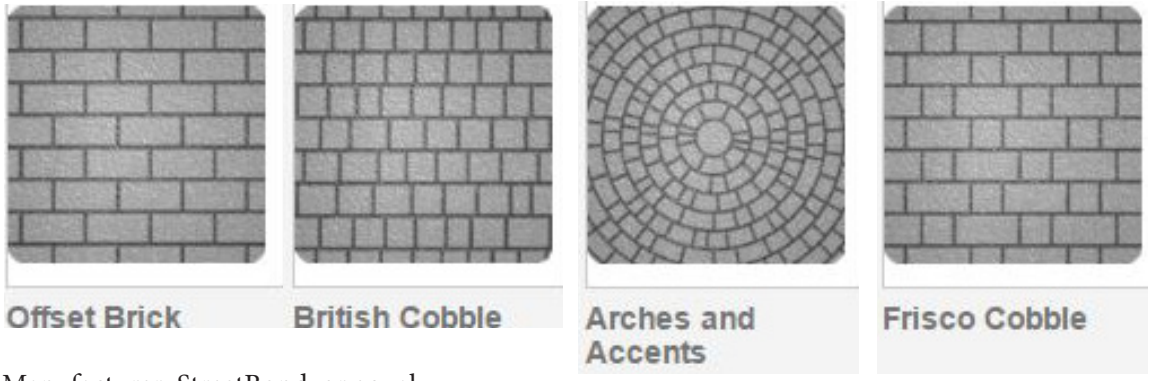
FIGURE 3
DECORATIVE ASPHALT PATTERNS AND COLORS

STAMPED ASPHALT WITH SURFACE COLOR

Standard Stamp Patterns:

Product: StreetPrint, by Integrated Paving Concepts, Inc., or equal.



Manufacturer: StreetBond, or equal.

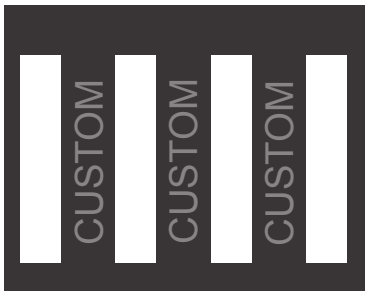
Grey, Light Grey, Sand, Tan, Santa Fe Clay, Brick Red

THERMOPLASTIC INLAY

Product: Duratherm, by Integrated Paving Concepts, Inc. or equal.

Custom Patterns:

Decorative asphalt can be installed in between SFMTA standard continental striping (see right). Decorative asphalt crosswalks require SFMTA approval



THERMOPLASTIC OVERLAY

Product: TrafficPatternsXD by Ennis-Flint, or equal.

Custom Patterns:

Colors and patterns reviewed and approved on a per project basis.

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Browsers (for SENDERS):	Internet Explorer 6.0? or above
Browsers (for SIGNERS):	Internet Explorer 6.0?, Mozilla FireFox 1.0, NetScape 7.2 (or above)
Email:	Access to a valid email account
Screen Resolution:	800 x 600 minimum
Enabled Security Settings:	•Allow per session cookies •Users accessing the internet behind a Proxy Server must enable HTTP 1.1 settings via proxy connection

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San Francisco Public Works Standard Paving Director's Order

Attachment A

Definitions

1. **Concrete unit pavers** – a paving system of solid interlocking concrete pavers of specific sizes as called out in Table 1, Standard Paving Palette

2. **Colored poured-in-place concrete** – Color pigments added to standard concrete mixes to match the colors on the City of San Francisco Standard Paving Palette. Colors may match the palette or be an approved equal. Table 1, Standard Paving Palette

3. **Pedestrian Accessible Route (PAR, see 2010 ADA) -** The pedestrian accessible route (PAR) is a continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path. A pathway with continuous connection of not less than 48 inches wide from the pedestrian zone of the sidewalk (Throughway Zone – see below) to primary property entry points, parking areas, public transportation, crosswalks, curb ramps, accessible parking zones, passenger loading zones, pedestrian refuge islands, and/or other destinations.

   The PAR shall be a continuous firm, stable, slip-resistant and smooth* surface. The cross-slope of a PAR when constructed, and in use, shall not exceed 2.0%. In the sidewalk pedestrian Throughway Zone (as defined in the Better Streets Plan), the accessible route includes the width of the pedestrian throughway, typically not less than 72 inches in clear width. The PAR may pass through other sidewalk zones as defined in the Better Streets Plan, including the Frontage, Furnishings, Curb, and Shy zones. In other sites and facilities, the accessible route is that which connects all elements and program areas that are required to be accessible. At least one area of each type of distinct program or use shall be served by the PAR.

   NOTE: Concrete unit pavers, when not properly designed and installed, can present challenges for people with disabilities, especially wheelchair users. Frequent joints and pavers with deep bevels may create vibration for users of wheelchairs and other mobility assistive devices.

   *Smooth: an even and regular surface free from perceptible projections, lumps, or indentations.

4.A. **Major PAR** – Pedestrian access routes traversing public right of way sidewalks, curb ramps, crosswalks and other components of the public rights-of-way which are essential elements that define an accessible pedestrian infrastructure and the accessible environment. Major PAR includes but is not limited to: those shown on "Table 1: Standard Paving Palette, latest edition and Figure 1: Standard Paving Palette Acceptable Locations Concrete Unit Pavers

4.B. Minor PAR - Pedestrian circulation paths and areas that are supplemental to Major PAR, and which provide access to other elements and areas that may not be specifically required to be made accessible, but which may be accessed by or used by individuals with disabilities. Minor PAR include but are not limited to: those shown on "Table 1: Standard Paving Palette ", latest edition and Figure 1: Standard Paving Palette Acceptable Locations Concrete Unit Pavers

5. **Types of roadways** (FHWA Functional Classification System):

a. Sidewalks, Paths, Walks, etc.: Light duty - golf carts, wheelchairs, etc.

b. Alleys: Public Right of Way that has a maximum paved width of 25 feet and a minimum sidewalk width of 4 feet on each side. An alley with a sidewalk on only one side may be allowed only by variance to the SF DPW Subdivision Regulations.

d. Local or Collector Streets: Medium duty - passenger vehicles predominate, occasional garbage, delivery and utility trucks.

e. Collector or Arterial Streets: Heavy duty - trucks, vans, etc. High traffic volume.

f. Arterial Streets and Truck Routes: Extreme heavy duty - fire trucks, utility vehicles, buses. Very high traffic volume.

The Better Streets Plan also has defined Standard Street Types (Chapter 4.0, pages 55 and 56. The SFDPW Subdivision Regulations 2015 also contains definitions of Street Types on Pages 51-53 http://sfpublicworks.org/sites/default/files/4740-2015%20Subdivision%20Regulations_final.pdf

San Francisco Public Works Standard Paving Director's Order

Attachment B

Engineering Specifications -
In order for Public Works to approve the use of concrete unit pavers in the right of way in allowable areas discussed in Section IV (A through D), the project needs to provide, at a minimum, the following information:

1. Geotechnical Testing & Report - Applicants shall submit test results from a soil boring log to characterize the soil and groundwater profile. R-values and Traffic Index shall be provided to determine the depth and compaction of subbase

2. Drawings & Specifications & Design Criteria - Applicants must submit an engineering scale design plan for any areas that will have to sustain a vehicle load with specifications for:

    a. Depth of the paver sub-base: These should be supported by engineering calculations and/or geotechnical report.

    b. Sub-base and materials (aggregate) specifications (specifying depth and type of rock base, where applicable). Products and materials to be reviewed and approved by Public Works before use.

    c. Compaction. Test results and reports to be reviewed and approved by Public Works. Proper strength to withstand H-20 vehicular loads when used in driveways, shared streets/spaces, parking lots, parking strips, and alleyways.

    d. Products must have proper strength to withstand pedestrian loads when used in sidewalks, park lands, pedestrian/bike paths, and plazas.

    e. Concrete Unit Paver Criteria: Solid Concrete Pavers shall meet ASTM C 936-16: Standard Specification for Solid Concrete Interlocking Paving Units, and shall have a minimum thickness of the pavers for PICP subject to vehicular traffic is 3 1/8 inches. 2 3/8" thick pavers may be used in pedestrian areas. All pavers shall be manufactured to above criteria for size, manufacturing variation, compressive strength, and tolerances per industry standards (e.g.: *Interlocking Concrete Pavement Institute*, www.icpi.org)

        - Aspect Ratio (length divided by thickness): Concrete Unit Pavers for pedestrian applications shall have maximum aspect ratio of 5:1. Pavers for vehicular applications shall have a maximum aspect ratio of 3:1.

- Gap Sizes: Concrete Unit Pavers shall have gaps not less than 1/4" (6.35mm), and not more than 3/8"(9.52mm).
    - Concrete Unit Paver systems with gaps of 1/4" shall be installed only with plastic spacers, or using pavers with integral precast interlocking spacers.

    - Concrete Unit Paver systems with gaps of 3/8" shall only be installed using pavers with integral precast interlocking spacers.

- Tolerances: Construction tolerances (1/16”) for installed paver gaps under this *Order* shall allow up to 5/16" gaps for paver systems designed with 1/4" spacers.
  For paver systems designed with 3/8” joints paver gaps, when installed, shall not exceed 7/16" (11.11mm) or the installation will be subject to rejection and reconstruction. Any gaps in a paver installation that accept a 1/2" sphere, shall be rejected and must be reconstructed.
- Warpage, Lippage and Roughness: Warpage is the variation in the planarity of the walking surface of an individual paver. Lippage is the variation in the height of the walking surface of adjacent installed pavers and adjoining materials, defined in ANSI (American National Standards Institute) Standards A108/A118/A136. Roughness, in the context of accessibility for persons with disabilities, is a measurement of whole-body vibrations caused by traveling over a surface in a wheelchair. The warpage, lippage and roughness of paver units and paver installations shall be in accordance with the following:
    - Warpage- The warpage limits in ANSI A137.1:2017 is derived from ASTM International C485-16 – Standard Test Method for Measuring Warpage of Ceramic Tile. Paver warpage shall comply with ANSI A137.1:2017, as referenced to floor tile meeting the dimensional requirements for rectified tile. For example; edge warpage shall be within the following range: at minimum the lesser of -0.75% of edge length or -0.08 inch (-2.0 mm), and at maximum the lesser of 0.75% of edge length or 0.08 inch (2.0 mm). In order to avoid excessive concentration of paver warpage, one tenth of the length of the measured span of the paver shall not represent more than 25% of the total allowable warpage. The edges of other walking surfaces adjoining pavers must also comply with this standard in order to control lippage.
        - Lippage: No greater than 5/64 (0.08) inch (2.0 mm) difference in height between adjacent pavers, and between pavers and adjacent surfaces. Pavers installed in a staggered pattern (such as running bond) must be offset no more than 1/3 of the paver

edge dimension if any edge of the paver is greater than 18 inches.

- Roughness: ASTM E3028-16e1 Standard Practice for Computing Wheelchair Pathway Roughness Index as Related to Comfort, Passability, and Whole Body Vibrations from Longitudinal Profile Measurements. The roughness index shall not exceed 0.60 in/ft.
- See also the United States Access Board's completed research: https://www.access-board.gov/research/completed-research
  - Dimensional Tolerances in Construction and for Surface Accessibility
  - Development of Surface Roughness Standards for Pathways Used by Wheelchair Users: Final Report

f. Unit Paver Edge Containment: Unit paver installations must be contained by a rigid header curb edge, or other rigid interface such as a wall. Wood containment edging is not acceptable.

- Concrete header curbs shall be minimum 4" wide x the full depth of the stone base course(s), for applications with only pedestrian loading requirements. For applications with vehicular loading requirements, the concrete header curb shall be minimum 6" wide x full depth of the stone base course(s) – curb reinforcement to be determined per project requirements.

- Upper edges of adjacent headers, curb and other materials: Bevels at upper edges must not exceed 1/8 inch, eased or tooled upper edges must not exceed 1/8 inch radius. 90 degree square upper edges may be acceptable if appropriate to the material.

- Metal headers must be traffic rated.

g. Design of the accessible route: Pedestrian access route (PAR) shall be constructed to have a running slope as closely matched as feasible to the running slope of the adjoining roadway. Acceptable design cross slope range is 1% minimum to 1.67% maximum and acceptable constructed cross slope range is 0.5% minimum to 2% maximum. A level concrete landing shall be installed at accessible entrances and exits at facilities within the PAR.

h. Unit Pavers within the PAR shall be installed with 90 degree square edges, or with top edges beveled 1/8 inch (3mm) or less.

i. Slip Resistance: Pavers shall meet criteria set forth in the DPW Director's Order for Slip Resistance.

4. Quality control and supervision of the project – Applicant must submit a plan for Quality Control and supervision of the project, including excavation, compaction, and installation of the finished concrete unit paver pavement.

TABLE 1: STANDARD PAVING PALETTE

	POURED-IN-PLACE CONCRETE	
	Colors	***Manufacturers***
1	Dark Grey: 860 "Jet Black" 7.5lbs per 94lb sack	Davis Colors; or equal
	C-34 "Dark Grey"	Scofield; or equal
2	Medium Grey: 860 "Grey Stone" 1.5lb per 94lb sack	Davis Colors; or equal
	1266 "Cool Grey"	Scofield; or equal
3	Dark Tan: 677 "Mesquite" 1.5lb per 94lb sack	Davis Colors; or equal
	SG-677 "Soft Chestnut"	Scofield; or equal
4	Medium Tan: 5237 "Sandstone" 1.5lb per 94lb sack	Davis Colors; or equal
	5237 "San Diego Buff"	Scofield; or equal
	Finishes ****	
1	Medium Broom	
2	Water Jet, or Acid Wash or similar finish	
3	Sparkle	
	UNIT PAVERS	
	Dimensions	***Manufacturers***
1	Square: 12" x 12"	Hanover*, Pacific Interlocking Paving (PIP)*, Basalite; or equal
2	Rectangular: 4" x 8"	Acker-stone, Hanover*, Basalite; or equal
3	Linear: 3" x 18", 12"x18"	Stepstone, Hanover*, Basalite; or equal
4	Large**: 6" x 36", 12"x18", 12"x36"	Hanover, Stepstone; or equal
	Colors/ Finishes	***Manufacturers***
1	Dark Grey: "Charcoal" / "Shot Blast"	Acker-stone; or equal
	"Charcoal" / "Tudor"	Hanover; or equal
	"French Grey" / "Light Sandblast"	Stepstone; or equal
	"Charcoal" / "Estate"	PIP; or equal
	"Truckee" / "Ground Face"	Basalite; or equal
2	Medium Grey: "Agave" / "Shot Blast"	Acker-stone; or equal
	"Limestone Grey" / "Tudor"	Hanover; or equal
	"Porcelain" / "Light Sandblast"	Stepstone; or equal
	"Grey" / "Estate"	PIP; or equal
	"Ukiah" / "Ground Face"	Basalite; or equal
3	Dark Tan: "Tan" / "Shot Blast"	Acker-stone; or equal
	"Chocolate" / "Tudor"	Hanover; or equal
	"Espresso Brown" / "Light Sandblast"	Stepstone; or equal
	"Brown" / "Estate"	PIP; or equal
	"Healdsburg" / "Ground Face"	Basalite; or equal
4	Medium Tan: "Carmel" / "Shot Blast"	Acker-stone; or equal
	"Cream" / "Tudor"	Hanover; or equal
	"Almond" / "Light Sandblast"	Stepstone; or equal
	"Tan" / "Estate"	PIP; or equal
	"Indio" / "Ground Face"	Basalite; or equal
	DECORATIVE ASPHALT***	
1	**Stamped Asphalt with Surface Color**	
	Colors/Patterns	***Product and Manufacturers***
	Grey, Light Grey, Sand, Tan, Santa Fe Clay, Brick Red; See Figure 3 for standard patterns	StreetPrint by Integrated Paving Concepts, Inc.; StreetBond by Ennis-Flint; or equal
2	**Thermoplastic Inlay**	
	Colors/Patterns	***Product and Manufacturers***
	Custom colors and patterns per SFMTA Crosswalk Guidelines.	Duratherm by Ennis-Flint; or equal
3	**Thermoplastic Overlay**	
	Colors/Patterns	***Product and Manufacturers***
	Colors and patterns reviewed and approved on a per project basis	TrafficPatternsXD by Ennis-Flint; or equal

See Attachment B - Specifications for detailed requirements.

***Hanover (12"x12," "4x8," 3"x18," 6"x36") and Pacific Interlocking Paving (all sizes) pavers have integrated spacers, and for the purposes of installation details shall be referred to as "interlocking." All other pavers by Hanover, Acker-stone, Basalite, and Stepstone lack integrated spacers and shall be referred to as "non-interlocking."**

****The large size paver is the only size allowable in the major PAR; it must be placed with the longest dimension parallel with the direction of travel.**

*****Refer to SFMTA Crosswalk Guidelines for decorative asphalt crosswalk requirements: http://www.sfbetterstreets.org/wp-content/uploads/2016/01/SFMTA-CrosswalkGui**

******Poured in place paving finishes must result in a slip-resistant finish that does not expose rounded aggregate that may not be slip-resistant and too rough for pedestrians. The concrete mix design for such finishes must use an angular or crushed exposed aggregate and all such exposed aggregate shall pass through a 1/4" sieve.**

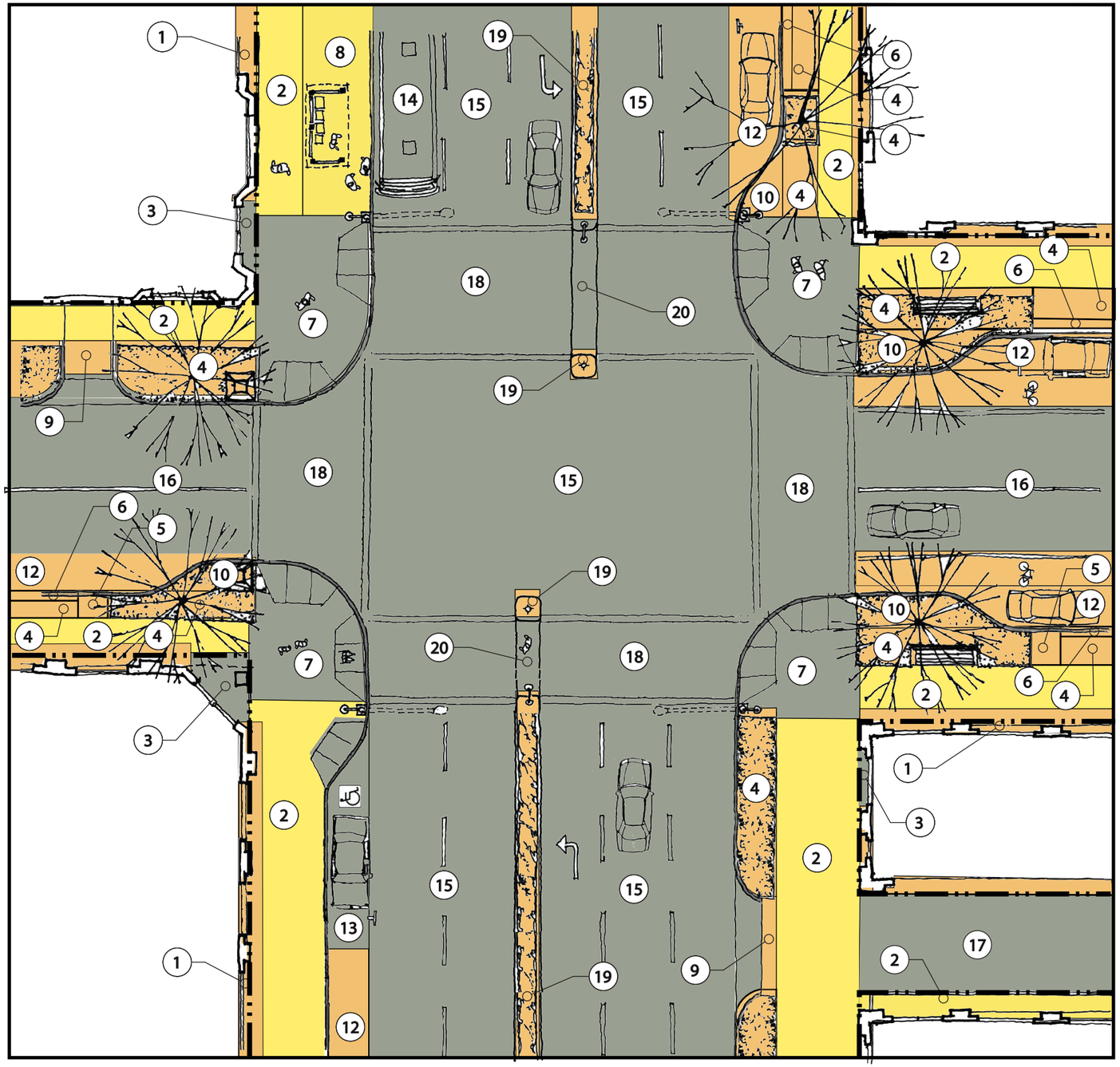
TABLE 2: STANDARD PAVING ACCEPTABLE LOCATIONS CONCRETE AND UNIT PAVERS

			FIGURE 1		FIGURE 1 (Note 3)
Figure Keynote #	**PAR Level**	**LOCATION** [1]	**All Paver Sizes**	**Large Scale Pavers Only (See table 1 for sizes)**	**Colored Poured in Place Concrete**
Sidewalks					
1	minor	**Building Frontage Zone**	Acceptable	Acceptable	Acceptable
2	major	**Pedestrian Throughway Zone**	Not Acceptable	Acceptable	Acceptable
3	major	**Building Access / Maneuvering Area**	Not Acceptable	Not Acceptable	Acceptable
4	minor	**Furnishing Zone**	Acceptable	Acceptable	Acceptable
5	minor	**Furnishing Zone: 4-ft Pedestrian Pass-Through** (for street parking)	Acceptable	Acceptable	Acceptable
6	minor	**Edge Zone** (aka. Curb Zone, or Courtesy Strip at street parking)	Acceptable	Acceptable	Acceptable
7	major	**Corner Zone**	Not Acceptable	Not Acceptable	Acceptable
8	major	**Transit Boarding Zone** (on sidewalk & in raised islands)	Not Acceptable	Acceptable	Acceptable
9	minor	**Driveway Zone** (except Driveway Curb Cut)	Acceptable	Acceptable	Acceptable
10	minor	**Corner Bulb Out / Extension Zone**	Acceptable	Acceptable	Acceptable
11	minor	**Mid- Block Bulb Out** (Not Shown in Figures 1-2)	Acceptable	Acceptable	Acceptable
Streets					
12	minor	**Non-Accessible Parking Lane** (with or without Combined Curb Gutter)	Acceptable	Acceptable	Acceptable
13	major	**Accessible Parking Lane (Blue Curb) / Loading Zone (White Curb)**	Not Acceptable	Not Acceptable	Acceptable
14	none	**Bus Pad** (heavy loading zone)	Not Acceptable	Not Acceptable	Acceptable
15	none	**Traffic Lane & Bike Lane (Non-Separated):** Arterials, Collectors, Peak Hour Lanes, Transit or Truck routes, etc.	Not Acceptable	Not Acceptable	Acceptable
16	minor	**Traffic Lane & Bike Lane (Non-Separated):** Neighborhood Residential, Frontage Roads, Lanes, etc.	Not Acceptable	Not Acceptable	Acceptable
17	minor	**Alleys** (pavers require approval by Public Works Director)	Not Acceptable	Not Acceptable	Acceptable
18	major	**Crosswalk**	Not Acceptable	Not Acceptable	Acceptable
19	minor	**Median:** Non-PAR Area	Acceptable	Acceptable	Acceptable
20	major	**Median, Pedestrian Refuge / Pass-Through**	Not Acceptable	Not Acceptable	Acceptable
Other Public Spaces (Not shown on Figures 1-2)					
21	major	**Bikeway and Pedway, Shared:** PAR Area	Not Acceptable	Not Acceptable	Acceptable
22	minor	**Bikeway, Separate:** Non-PAR Area	Acceptable	Acceptable	Acceptable
23	major	**Plaza, Courtyard, Square, Patio, and Terrace:** PAR Area	Not Acceptable	Not Acceptable	Acceptable
24	minor	**Plaza, Courtyard, Square, Patio, and Terrace:** Non-PAR Area	Acceptable	Acceptable	Acceptable
25	minor	**Parking Lot:** Non-PAR Area	Acceptable	Acceptable	Acceptable
26	major	**Accessible Parking Spaces and PAR within Parking Lots:** PAR Areas	Not Acceptable	Not Acceptable	Acceptable
27	minor	**Paths with Vehicular Loads:** Non-PAR Area	Acceptable	Acceptable	Acceptable
28	minor	**Driveways:** Non-PAR Area	Acceptable	Acceptable	Acceptable

1. When two ROW zones intersect, areas of higher PAR classification will take precedent.

2 Gap sizes: Concrete Unit Pavers shall have gaps not less than 1/4" (6.35mm), and not more than 3/8"(9.52mm). Unit Pavers within the PAR should be installed with top edges beveled 1/8 inch or less.

FIGURE 1
STANDARD PAVING PALETTE ACCEPTABLE LOCATIONS: **CONCRETE UNIT PAVERS**



SIDEWALKS AND STREETS

1. BUILDING FRONTAGE ZONE
2. PEDESTRIAN THROUGHWAY ZONE
3. BUILDING ACCESS / MANEUVERING AREA
4. FURNISHING ZONE
5. FURNISHING ZONE - 4-FT PEDESTRIAN PASS-THROUGH (AT STREET PARKING)
6. EDGE ZONE - (AKA, CURB ZONE, OR COURTESY STRIP AT STREET PARKING)
7. CORNER ZONE
8. TRANSIT BOARDING ZONE (ON SIDEWALK AND IN RAISED ISLANDS)
9. DRIVEWAY ZONE (EXCEPT DRIVEWAY CURB CUT)
10. CORNER BULB OUT / EXTENSION ZONE
11. MID-BLOCK BULB OUT (NOT SHOWN IN THIS FIGURE)
12. NON ACCESSIBLE PARKING LANE (W OR W/OUT COMBINED CURB GUTTER)
13. ACCESSIBLE PARKING LANE (BLUE CURB) / LOADING ZONE (WHITE CURB)
14. BUS PAD (HEAVY LOADING)
15. TRAFFIC LANES AND BIKE LANES ON ARTERIALS, COLLECTORS, PEAK HOUR LANES, TRANSIT OR TRUCK ROUTES, ETC.
16. TRAFFIC LANES AND BIKE LANES ON NEIGHBORHOOD RESIDENTIAL, FRONTAGE ROADS,LANES, ETC.
17. ALLEY (REQUIRES APPROVAL BY PUBLIC WORKS DIRECTOR)
18. CROSS WALKS
19. MEDIANS
20. MEDIANS: PEDESTRIAN REFUGE / PASS THROUGH

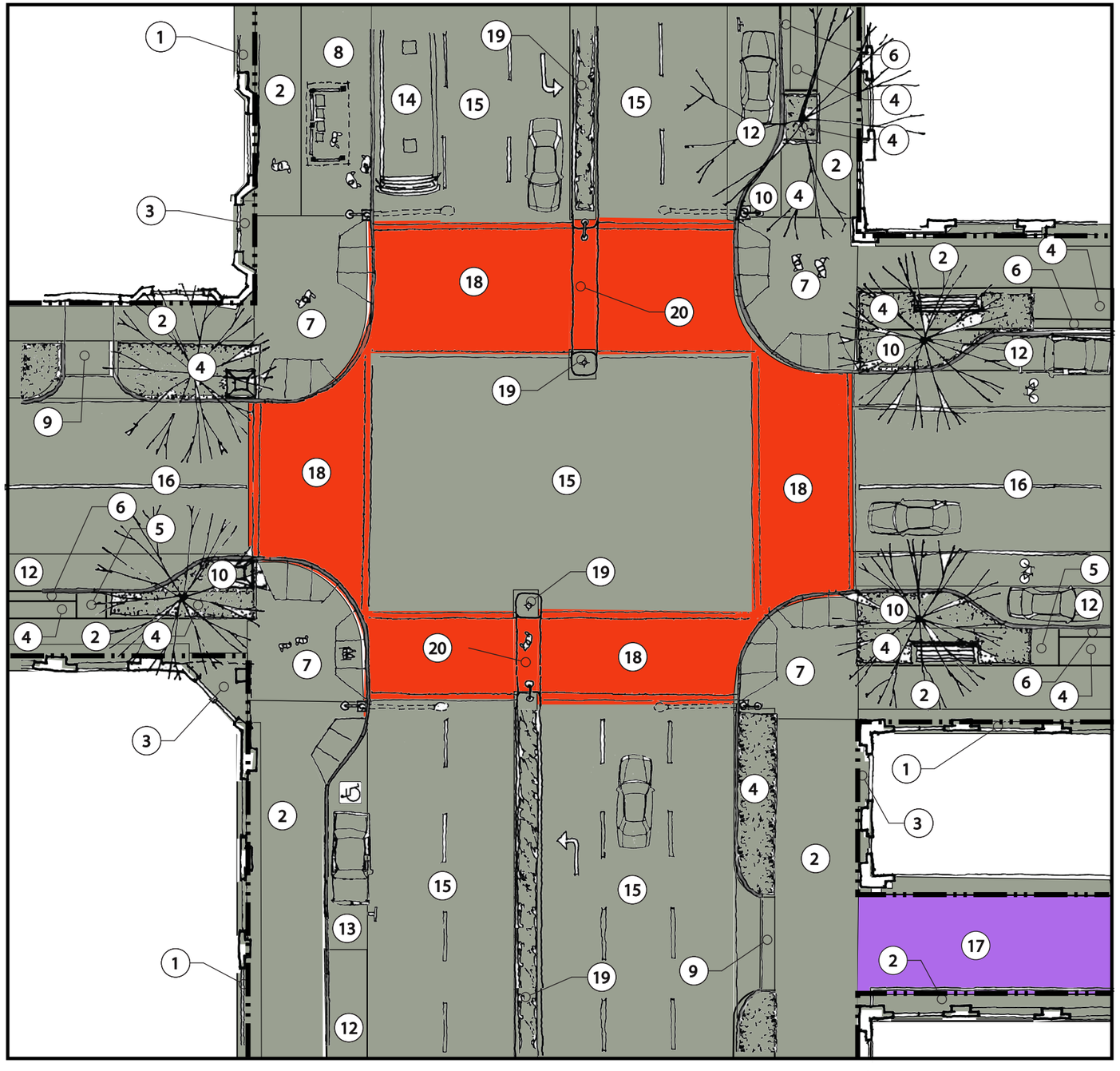
LEGEND

- ACCEPTABLE: ALL PAVER SIZES
- ACCEPTABLE: LARGE SCALE PAVERS ONLY
- NOT ACCEPTABLE
- BUILDING
- MAJOR PAR (PEDESTRIAN ACCESS ROUTE)
- PROPERTY LINE

NOTES

1. FIGURE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY. ALL TREES, PROPERTY LINES, VEGETATION, STREET FURNISHINGS, AND CROSSWALKS ARE APPROXIMATE AND BASED ON BETTER STREET PLAN RENDERINGS.
2. PAVEMENT DESIGN MUST MEET ALL APPLICABLE CITY CODES AND STANDARDS.
3. POURED-IN-PLACE CONCRETE IS ACCEPTABLE IN LOCATIONS 1-28 (SEE TABLE 2 FOR LOCATIONS NOT SHOWN ON THIS PLAN)

FIGURE 2
STANDARD PAVING PALETTE ACCEPTABLE LOCATIONS: **DECORATIVE ASPHALT**



SIDEWALKS AND STREETS

1. BUILDING FRONTAGE ZONE
2. PEDESTRIAN THROUGHWAY ZONE
3. BUILDING ACCESS / MANEUVERING AREA
4. FURNISHING ZONE
5. FURNISHING ZONE - 4-FT PEDESTRIAN PASS-THROUGH (AT STREET PARKING)
6. EDGE ZONE - (AKA, CURB ZONE, OR COURTESY STRIP AT STREET PARKING)
7. CORNER ZONE
8. TRANSIT BOARDING ZONE (ON SIDEWALK AND IN RAISED ISLANDS)
9. DRIVEWAY ZONE (EXCEPT DRIVEWAY CURB CUT)
10. CORNER BULB OUT / EXTENSION ZONE
11. MID-BLOCK BULB OUT (NOT SHOWN IN THIS FIGURE)
12. NON ACCESSIBLE PARKING LANE (W OR W/OUT COMBINED CURB GUTTER)
13. ACCESSIBLE PARKING LANE (BLUE CURB) / LOADING ZONE (WHITE CURB)
14. BUS PAD (HEAVY LOADING)
15. TRAFFIC LANES AND BIKE LANES ON ARTERIALS, COLLECTORS, PEAK HOUR LANES, TRANSIT OR TRUCK ROUTES, ETC.
16. TRAFFIC LANES AND BIKE LANES ON NEIGHBORHOOD RESIDENTIAL, FRONTAGE ROADS,LANES, ETC.
17. ALLEYS (REQUIRES APPROVAL BY PUBLIC WORKS DIRECTOR)
18. CROSS WALKS
19. MEDIANS
20. MEDIANS: PEDESTRIAN REFUGE / PASS THROUGH

LEGEND

- ACCEPTABLE: STAMPED/PAINTED & THERMOPLASTIC INLAY ASPHALT
- ACCEPTABLE: STAMPED/PAINTED ASPHALT
- NOT ACCEPTABLE
- BUILDING
- MAJOR PAR (PEDESTRIAN ACCESS ROUTE)
- PROPERTY LINE

NOTES

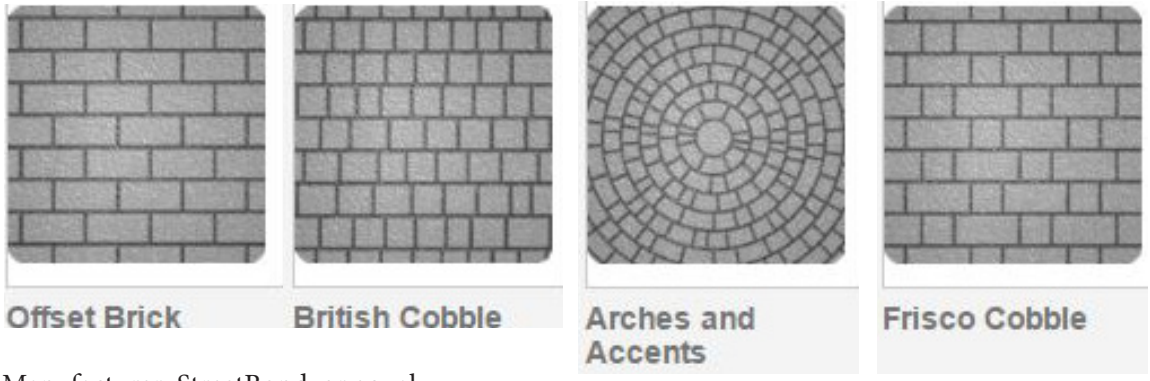
1. FIGURE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY. ALL TREES, PROPERTY LINES, VEGETATION, STREET FURNISHINGS, AND CROSSWALKS ARE APPROXIMATE AND BASED ON BETTER STREET PLAN RENDERINGS.
2. PAVEMENT DESIGN MUST MEET ALL APPLICABLE CITY CODES AND STANDARDS.
3. SEE TABLE 1 FOR LOCATIONS NOT SHOWN ON THIS PLAN.
4. SEE TABLE 3 FOR DECORATIVE ASPHALT PATTERNS AND COLORS.

FIGURE 3
DECORATIVE ASPHALT PATTERNS AND COLORS

STAMPED ASPHALT WITH SURFACE COLOR

Standard Stamp Patterns:

Product: StreetPrint, by Integrated Paving Concepts, Inc., or equal.



Manufacturer: StreetBond, or equal.

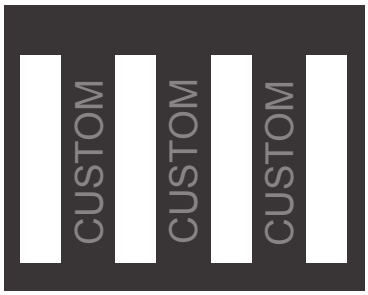
Grey, Light Grey, Sand, Tan, Santa Fe Clay, Brick Red

THERMOPLASTIC INLAY

Product: Duratherm, by Integrated Paving Concepts, Inc. or equal.

Custom Patterns:

Decorative asphalt can be installed in between SFMTA standard continental striping (see right). Decorative asphalt crosswalks require SFMTA approval



THERMOPLASTIC OVERLAY

Product: TrafficPatternsXD by Ennis-Flint, or equal.

Custom Patterns:

Colors and patterns reviewed and approved on a per project basis.

APPENDIX 4: STANDARD CONSTRUCTION MEASURES FOR PUBLIC WORKS PROJECTS AND DRAFT CONSTRUCTION CONTRACT PROCEDURES

SAN FRANCISCO PUBLIC WORKS

Edwin M. Lee
Mayor

Mohammed Nuru
Director

San Francisco Public Works
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twitter.com/mrcleansf

June 26, 2017

TO: Public Works Staff

FROM: Mohammed Nuru, Director

SUBJECT: Standard Construction Measures for Public Works Projects

With the issuance of these Standard Construction Measures ("Measures"), I direct Public Works staff to incorporate these Measures into Public Works projects. The purpose of these measures is for Public Works to adopt environmentally responsible practices to apply to Public Works projects.

In addition to complying with applicable local, State, and federal laws and regulations, these Measures are to be followed as a standard practice in the execution of every Public Works project. While some of the Measures may not apply to a project, it is important to address each of the Measures either by implementing the Measure as described, or by documenting in a note to file why it is not applicable to the particular project. Some of the Measures are very broad and will be tailored to suit each project site and surrounding circumstances, which may involve undertaking further investigation and developing a more detailed work plan to address the resource or impact addressed by a specific measure.

For projects that undergo full CEQA review (Mitigated Negative Declarations or Environmental Impact Reports), are assigned environmental commitments as part of the NEPA process, and/or receive resource agency permits (e.g., US Army Corps of Engineers, California Department of Fish and Wildlife, etc.), these Measures may be superseded and/or amplified with more detailed, project-specific mitigation measures or conditions stipulated in the project CEQA document and/or permits.

The responsibility for implementation of the Standard Construction Measures rests with each Public Works Project Manager. If you have any questions please contact Boris Deunert, Manager, Regulatory Affairs Section, at 415-558-4011.

Please begin implementing these Measures immediately. Thank you for your cooperation.

Public Works Standard Construction Measures

1. SEISMIC AND GEOTECHNICAL STUDIES: The project manager shall ensure that projects that may potentially be affected by existing soil, slope and/or geologic conditions at the project site will be screened for liquefaction, subsidence, landslide, fault displacement, and other geological hazards at the project site, and will be engineered and designed as necessary to minimize risks to safety and reliability due to such hazards. As necessary, geotechnical investigations will be performed.

2. AIR QUALITY: All projects will comply with the Construction Dust Control Ordinance (see Attachment A). Major construction projects that are estimated to require 20 or more days of cumulative days of work within the Air Pollutant Exposure Zone must comply with the additional clean construction requirements of the Clean Construction Ordinance (see Attachment B).

3. WATER QUALITY: All projects will implement erosion and sedimentation controls to be tailored to the project site, such as fiber rolls and/or gravel bags around stormdrain inlets, installation of silt fences, and other such measures sufficient to prevent discharges of sediment and other pollutants to storm drains and all surface waterways, such as San Francisco Bay, the Pacific Ocean, water supply reservoirs, wetlands, swales, and streams. As required based on project location and size, a Stormwater Control Plan (in most areas of San Francisco) or a Stormwater Pollution Prevention Plan (SWPPP) (in certain areas of San Francisco) will be prepared. If uncontaminated groundwater is encountered during excavation activities, it will be discharged in compliance with applicable water quality standards and discharge permit requirements. Groundwater contamination is addressed in item 6 below.

4. TRAFFIC: All projects will implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction of the project. The measures will also, at a minimum, be consistent with the requirements of San Francisco Municipal Transportation Agency (SFMTA)'s Blue Book. Traffic control measures may include, but not be limited to, flaggers and/or construction warning signage of work ahead; scheduling truck trips during non-peak hours to the extent feasible; maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method; and coordination with local emergency responders to maintain emergency access. Any temporary rerouting of transit vehicles or relocation of transit facilities would be coordinated with SFMTA Muni Operations.

5. NOISE: All projects will comply with local noise ordinances regulating construction noise. Public Works shall undertake measures to minimize noise disruption to nearby neighbors and sensitive receptors during construction. These efforts could include using best

available noise control technologies on equipment (i.e., mufflers, ducts, and acoustically attenuating shields), locating stationary noise sources (i.e., pumps and generators) away from sensitive receptors, erecting temporary noise barriers, and other such measures.

During nighttime construction activities, the following shall apply: impact tools and vibratory pile drivers shall have intake exhaust mufflers and/or acoustically attenuating shields or shrouds recommended by the manufacturers and approved by the Director of Public Works; the construction contractor shall avoid using water blasters; and the use of vehicles that are legally required to be equipped with backing warning alarms will be reduced to the extent feasible; and administrative controls as defined in the California Code of Regulations, Title 8 Sec. 1592 will be used for worker protection for backing movements by other vehicles. Hours of vibration-intensive activities, such as vibratory pile driving, shall be restricted to between 7:00 a.m. and 8:00 p.m.

6. HAZARDOUS MATERIALS: Projects that involve excavation of 50 cubic yards of soil in the Maher Z will comply with the Maher Ordinance (see Attachment C). Projects on sites that are not currently located in the Maher Zone but have the potential to contain hazardous materials in soil and/or groundwater will be referred to the Department of Public Health as newly identified Maher sites.

7. BIOLOGICAL RESOURCES: Public Works will comply with all local, State, and federal requirements for surveys, analysis, and protection of biological resources (e.g., Migratory Bird Treaty Act, Federal and State Endangered Species Acts, etc.). All project sites and the immediately surrounding area will be screened to determine whether biological resources may be affected by construction. If biological resources are present, a qualified biologist will carry out a survey of the project site to note the presence of general biological resources and to identify whether habitat for special-status species and/or migratory birds is present. If necessary, measures will be implemented to protect biological resources, such as installing wildlife exclusion fencing, establishing work buffer zones, installing bird deterrents, monitoring by a qualified biologist and other such measures. If tree removal is required, Public Works will comply with any applicable tree protection ordinance.

8. VISUAL AND AESTHETIC CONSIDERATIONS, PROJECT SITE: All project sites will be maintained in a clean and orderly state. Construction staging areas will be sited away from public view, and on currently paved or previously disturbed areas, where possible. Nighttime lighting will be directed away from residential areas and have shields to prevent light spillover effects. Upon project completion, project sites on City-owned lands will be returned to their general pre-project condition, including re-grading of the site and re-vegetation or re-paving of disturbed areas to the extent this is consistent with Public Works Bureau of Urban Forestry policy and San Francisco Code. Project sites on non-City land will be restored to their general

pre-project condition so that the owner may return them to their prior use, unless otherwise arranged with the property owner.

9. CULTURAL RESOURCES: All projects that will alter a building or structure, produce vibrations, or include soil disturbance[1] will be screened to assess whether cultural resources are or may be present and could be affected, as detailed below.

Archeological Resources. No archeological review is required for a project that will not entail soil disturbance. Projects involving soil disturbance will initially be screened by Public Works Regulatory Affairs staff to identify whether there is demonstrable evidence of prior soil disturbance at the project site to the maximum vertical and horizontal extent of the current project's planned disturbance. Public Works will complete the Public Works Preliminary Archeological Checklist (PAC), Part I only (see Attachment D). For projects where prior complete soil disturbance has occurred throughout areas of planned work, Public Works will provide evidence of the previous disturbance in the environmental application to be reviewed by EP Archeological staff.

1) For projects that are on previously undisturbed sites or where the depth/extent of prior soil disturbance cannot be documented, or where the planned project-related soil disturbance will extend beyond the depth/extent of prior soil disturbance, additional screening will be carried out as detailed below and shown on the flow chart titled "Public Works Standard Construction Measure #9 Archeological Assessment Process" (see Attachment E). The EP Archeologist will complete the Preliminary Archeological Checklist, Part II (PAC) for the project, which will include recommendations for one of three Standard Archeological Measures (I - Discovery, II – Monitoring, or III – Testing/Data Recovery) to be implemented by Public Works to protect and/or treat significant archeological resources identified as being present within the site and potentially affected by the project (see Attachments F, G, and H). Additional research and documentation, such an Archeological Research Design and Treatment Plan (ARDTP), Archeological Sensitivity Study (ASA), or an archeological field survey, may also be requested by the EP Archeologist. These documents should be completed by a qualified consultant from the EP Archeological Resources Consultant Pool and should by scoped, reviewed, and approved by the EP Archeologist.

2) Public Works shall implement the PAC recommendations prior to and/or during project construction consistent with Standard Archeological Measures I, II, and III, and shall consult with the EP Archeologist in selecting a qualified archeological consultant from

[1] **Soil is defined as native earthen deposits or introduced earthen fill. Soil does not include materials that were previously introduced as part of the roadway pavement section including asphalt concrete wearing surface, roadway base, and subbase.**

the EP Archeological Resources Consultant Pool, as needed, to implement these measures.

3) Soil-disturbing activities in archeologically sensitive areas, as identified through the above screening, will not begin until required preconstruction archeological measures of the PAC (e.g., preparation of an Archeological Monitoring Plan, Archeological Treatment Plan, and/or an Archeological Research Design and Data Recovery Plan) have been implemented.

Public Works, the EP Archeologist and the ERO will revisit the PAC process outlined above one year after these measures are finalized.

Historic (Built Environment) Resources. Public Works will consult with CCSF Planning Department Preservation staff to determine if projects that would modify an existing building, structure, or landscape feature require preservation review and if a Historic Resource Evaluation (HRE) will be required. The HRE will be prepared by a qualified architectural historian and will be scoped with CCSF Planning Department Preservation staff. Where the potential for the project to have adverse effects on an historical resource is identified by CCSF Planning Department Preservation staff, the CCSF Planning Department Preservation Planner will consult with Public Works to determine if the project can be conducted as planned or if the project design can be revised to avoid the significant impact. If these options are not feasible, the project will need to undergo further environmental review with the CCSF Planning Department and mitigation may be required. If so, the project would not qualify for a Categorical Exemption from CEQA review.

Within historic districts established by ordinance, and/or mapped by the San Francisco Planning Department as eligible for or on the California Register of Historic Resources and/or the National Register of Historic Places, all distinctive sidewalk elements such as brick surfacing, brick gutters, granite curbs, cobblestones and non-standard sidewalk scoring, and streetscape elements that may include, but are not limited to, streetlights, sidewalk lights, sidewalk elevators and chutes, benches, and utility plates, that appear to be 45 years or older will be treated as potentially character-defining features of their respective historic districts. For those locations, historic materials will be protected in place (preferred method), salvaged and re-installed, or replaced in-kind to match the existing color, texture, material, and character of the existing condition.

Where construction will take place in proximity to a building or structure identified as a significant historical resource but would not otherwise directly affect it, Public Works will implement protective measures, such as but not limited to, the erection of temporary construction barriers to ensure that inadvertent impacts to such buildings or structures are avoided. These measures shall require the development of a Construction Best Practices for

Historical Resources Plan and a plan outlining the Construction Monitoring for Historical Resources Program to be reviewed and approved by CCSF Planning Department Preservation staff.

If a project includes or is directly adjacent to historic buildings or structures susceptible to vibration (such as but not limited to unreinforced masonry, earthen construction, lathe and plaster, or fragile architectural ornamentation) as determined in consultation with CCSF Planning Department Preservation staff, Public Works will determine if vibrations associated with proposed construction activities has the potential to cause damage to such buildings or structures. Generally, vibration below 0.12 inches per second peak particle velocity does not have the potential to damage sensitive buildings or structures. A vibration study may be necessary to determine if such vibration levels will occur. If Public Works determines in consultation with CCSF Planning Department Preservation staff that vibration damage may occur, Public Works will engage a qualified historic architect or historic preservation professional to document and photograph the pre-construction condition of the building and prepare a plan for monitoring the building during construction. The monitoring plan will be submitted to and approved by CCSF Planning Department Preservation Planner prior to the beginning of construction and will be implemented during construction. The monitoring plan will identify how often monitoring will occur, who will undertake the monitoring, reporting requirements on vibration levels, reporting requirements on damage to adjacent historical resources during construction, reporting procedures to follow if such damage occurs, and the scope of the preconstruction survey and post-construction conditions assessment.

If any damage to a historic building or structure occurs, Public Works will modify activities to minimize further vibration. If any damage occurs, the building will be repaired following the Secretary of the Interior's Standards for the Treatment of Historic Properties under the guidance of a qualified historic architect or historic preservation professional in consultation with CCSF Department Preservation Planner.

cc: Lisa Gibson, Environmental Review Officer, San Francisco Planning Department

ATTACHMENTS

A. Construction Dust Measures
B. Clean Construction Measures
C. Maher Compliance
D. Public Works Preliminary Archeological Checklist (PAC)

E. Flow Chart: Public Works Standard Construction Measure #9 Archeological Assessment Process
F. Public Works Archeological Measure I (Archeological Discovery)
G. Public Works Archeological Measure II (Archeological Monitoring)
H. Public Works Archeological Measure III (Archeological Testing/Data Recovery)

Attachment A: Public Works Dust-Control Measures

For the purposes of this document, "sensitive receptor" means residence, school, childcare center, hospital or other health-care facility or group living quarters, and "visible dust" means dust comprising visible emissions as defined in Bay Area Air Quality Management Board Regulation 6 – Particulate Matter.

For all projects, Public Works will institute though its construction specifications the following dust-control measures to achieve a goal of no visible dust emissions:

- Clean up spillage on City streets, whether directly or indirectly caused by construction operations.
- Remove demolition debris from the Site no later than the end of each workday. Any hazardous materials and/or suspected hazardous materials stored on site shall be stored in accordance with all applicable Cal EPA regulations, including being stored in proper containers and being protected from exposure from the elements. Any such materials shall be removed from the site as soon as possible for disposal/recycling in accordance with all applicable statutes and regulations.
- Keep the Site and adjacent areas clean and perform wet sweeping at the end of each shift.
- Perform continuous water spraying during dust generating activities. Mist or spraying shall be conducted in such a way as to prevent puddling or generation of runoff. Mist any immediate area of demolition with a water spray to prevent airborne dust particles.
- Wet all exposed soil surfaces at least three times daily during dry weather or more frequently if dust is blowing or if required by the City. Any serpentine residuals on the street shall be wet swept immediately.
- Use dust enclosures, curtains, and dust collectors as necessary to control dust.
- Load haul trucks, hauling debris, soils, sand or other such materials so that the material does not extend above the walls or back of the truck bed. Wet before covering and tightly cover the surface of each load before the haul truck leaves the loading area.
- Limit vehicle speed limit on unpaved roads to 15 miles per hour (mph).
- Cover any inactive (no disturbance for more than seven days) stockpiles greater than ten cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil with a 10 mil (0.01 inch) polyethylene plastic or equivalent tarp and brace it down or use other equivalent soil stabilization techniques.
- Reclaimed water will be used for all dust-control operations to the extent feasible (without resorting to extraordinary means and measures) and allowed by law.

If the project grades or excavates more than one half acre surface area at any given time, and the project is within 1,000 feet of a sensitive receptor as defined above, Public Works or its contractor shall prepare a Site-Specific Dust Control Plan for the review and approval of the Department of Public Health. The site-specific dust control plan shall contain mapping identifying locations of sensitive receptors and contain additional site-specific dust monitoring and control measures that will apply to the project. These site-specific measures may include the following or equivalent measures, which accomplish the goal of minimizing visible dust:

- Wetting down areas around soil improvement operations, visibly dry disturbed soil surface areas, and visibly dry disturbed unpaved driveways at least three times per shift per day.
- Analysis of the wind direction.
- Placement of upwind and downwind particulate dust monitors.
- Recordkeeping for particulate monitoring results.
- Hiring of an independent third party to conduct inspections for visible dust and keeping records of those inspections.
- Requirements for when dust generating operations have to be shut down due to dust crossing the property boundary or if dust is contained within the property boundary but not controlled after a specified number of minutes.
- Establishing a hotline for surrounding community members to call and report visible dust problems so that Public Works or its contractor can promptly fix those problems; posting signs around the site with the hotline number and making sure that the number is given to adjacent residents, schools and businesses.
- Limiting the area subject to excavation, grading, and other demolition or construction activities at any one time.
- Minimizing the amount of excavated material or waste materials stored at the site.
- Installing dust curtains, plastic tarps or windbreaks, or planting tree windbreaks on the property line on windward and down windward sides of construction areas, as necessary.
- Paving, applying water three times daily, or applying non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at the construction site. Reclaimed water must be used if required by Article 21, Section 1100 et seq. of the San Francisco Public Works Code, Article 22. If not required, reclaimed water should be used whenever possible.
- Establishing speed limits so that vehicles entering or exiting construction areas shall travel at a speed that minimizes dust emissions. This speed shall be no more than 15 mph.
- Installing wheel washers to clean all trucks and equipment leaving the construction site. If wheel washers cannot be installed, tires or tracks and spoil trucks shall be brushed off before they re-enter City streets to minimize deposition of dust-causing materials.
- Terminating excavation, grading, and other construction activities when winds speeds exceed 25 mph.
- Hydroseeding inactive construction areas, including previously graded areas inactive for at least 10 calendar days, or applying non-toxic soil stabilizers.
- Sweeping of surrounding streets during demolition, excavation and construction at least once per day to reduce particulate emissions.

SECTION 01 35 48

ADDITIONAL CLEAN CONSTRUCTION REQUIREMENTS ON MAJOR CONSTRUCTION PROJECTS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section 01 35 48 incorporates additional requirements of the San Francisco Clean Construction Ordinance ("Ordinance") for projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone and which are within 1,000 feet of a Sensitive Use, as set forth in Chapter 25 of the Environment Code and Section 6.25 of the Administrative Code.

B. For projects that meet Environment Code Section 2504(b), which are located outside the Air Pollutant Exposure Zone, or which are in the Air Pollutant Exposure Zone but are not within 1,000 feet of a Sensitive Use, refer to Section 00 73 73, Article "CLEAN CONSTRUCTION REQUIREMENTS ON MAJOR CONSTRUCTION PROJECTS."

C. The Department of the Environment is responsible for administering the Ordinance. For more information about the Ordinance and its implementation, please visit the Department of Public Health website at: https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp and https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf.

1.02 DEFINITIONS

A. "Air Pollutant Exposure Zone" means a zone having a substantially greater than average concentration of air pollutants as defined in Health Code Section 3804.

B. "Alternative Fuels" means any transportation fuel that is less polluting than gasoline or petroleum diesel fuel, as determined by the California Air Resource Board and that is shown to have lower lifecycle carbon emissions than gasoline or petroleum diesel. Alternative Fuels may include, but are not limited to: natural gas; propane; biofuels from low carbon, sustainable and preferably local sources; hydrogen produced from low carbon and/or renewable sources; and electricity.

C. "Alternative Sources of Power" means utility-based electric power or other power sources other than diesel engines.

D. "ARB" means the California Air Resources Board.

E. "Clean Construction" means the performance of all work required to be performed under a Public Works contract meeting the requirements in Sections 2504, 2505 and 2506 of the Environment Code, as applicable.

F. "Construction" means building, demolition, excavation, grading or foundation work, whether or not the work requires a City permit.

G. "Construction Activities" means the performance of all work involved in or required for Construction, except for the issuance or obtaining of a site permit for a project.

H. "Construction Phase" means a particular construction activity over a certain period of time. Construction phases may include, but are not limited to, demolition, site preparation, grading, building construction, architectural coatings, and paving. Multiple Construction Phases of a single project may take place at the same time.

I. "Equipment" means off-road and on-road equipment.

J. "Equipment Type" means a category of off-road equipment. Types of off-road equipment include bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.

K. "Major Construction Project" means a public work to be performed within the geographic limits of the City that uses off-road equipment and that is estimated to require 20 or more cumulative days of work, including non-consecutive days, to complete.

L. "Most Effective Verified Diesel Emission Control Strategy" means a device, system or strategy that is verified, pursuant to Division 3, Chapter 14, of Title 13 of the California Code of Regulations, to achieve the highest level of pollution control tram an off-road vehicle.

M. "Off-Road Engine" means a non-road engine as defined in Title 40 of the Code of Federal Regulations, Section 89.2.

N. "Off-Road Equipment" means equipment with an off-road engine having greater than 25 horsepower and operating for more than 20 total hours over the entire duration of Construction Activities.

O. "On-Road Equipment" means a heavy-duty vehicle as defined in Title 40 of the Code of Federal Regulations, Section 86.1803-01.

P. "Portable Diesel Engine" means a diesel engine that is portable as defined in 71 California Code of Regulations, Section 93116.2(bb).

Q. "Sensitive Use" means a category of building use identified as a "Sensitive Use" in Health Code Section 3804.

R. "Tier 2 Off-Road Emission Standards" means the Tier 2 new engine emission standards in Title 13, California Code of Regulations, Section 2423(b)(1)(A) and/or Title 40, Code of Federal Regulations, Part 89.112(a).

S. "VDECS" means a verified diesel emission control strategy, designed primarily for the reduction of diesel particulate matter emissions, which has been verified by ARB pursuant to "Verification Procedures, Warranty and In-Use Strategies to Control Emissions from Diesel Engines," Title 13, California Code of Regulations, Sections 2700-2710. VDECS can be verified to achieve Level 1 diesel particulate matter reductions (at least 25 percent), Level 2 diesel particulate matter reductions (at least 50 percent), or Level 3 diesel particulate matter reductions (at least 85 percent).

1.03 SUBMITTALS

A. Construction Emissions Minimization Plan:

1. Contractor shall submit its initial Construction Emissions Minimization Plan no less than 28 days prior to mobilization. (See Subsection 1.04B.)

2. Contractor shall submit an updated Construction Emissions Plan on a quarterly basis in compliance with Subsection 1.04B.5.a, and submit each quarterly report within seven business days of the end of each quarter.

3. Contractor shall submit a final Construction Emissions Minimization Plan report summarizing construction activities within two weeks of achieving Substantial Completion in compliance with Subsection 1.04B.5.b.

B. Clean Construction Emissions Plan Certification Statement: Contractor shall submit this statement with its Construction Emissions Minimization Plan. (See Subsection 1.04B.3.)

C. Waiver Request: Contractor shall submit a waiver request to the Department Head no less than two weeks prior to the planned use of a specific piece of off-road equipment. (See Subsection 1.05A.)

1.04 REQUIREMENTS FOR MAJOR CONSTRUCTION PROJECTS WITHIN THE AIR POLLUTANT EXPOSURE ZONE

A. For all Major Construction Projects that meet the requirements of Environment Code Section 2504(a) and which are located in the Air Pollutant Exposure Zone and within 1,000 feet of a Sensitive Use, the following requirements apply:

1. All off-road equipment shall have engines that (a) meet or exceed either United States Environmental Protection Agency or ARB Tier 2 off-road

emission standards, and (b) have been retrofitted with an ARB Level 3 VDECS. Equipment with engines meeting Tier 4 Interim or Tier 4 Final off- road emission standards automatically meet this requirement. See Section 1.05A regarding the procedure for requesting a waiver to this requirement.

2. Where access to alternative sources of power is available, use of portable diesel engines to perform work on the project shall be prohibited. See Section 1.05B regarding the waiver procedure for this requirement.

3. Diesel engines, whether for off-road or on-road equipment, shall not be left idling for more than two minutes at any location, except as allowed for in applicable state regulations regarding idling for off-road and on-road equipment (e.g., traffic conditions, safe operating conditions). The Contractor shall post legible and visible signs, in English, Spanish, and Chinese, in designated queuing areas and at the construction site to remind operators of the idling limit. Refer to the following link for the Clean Construction Sign Template: https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp.

4. The Contractor shall instruct construction workers and equipment operators on the maintenance and tuning of construction equipment, and require that such workers and operators properly maintain and tune equipment in accordance with manufacturer specifications.

B. Construction Emissions Minimization Plan: All Major Construction Projects that meet the requirements of Environment Code Section 2504(a), which are located in the Air Pollutant Exposure Zone and are within 1,000 feet of a Sensitive Use, also must comply with the following requirements:

1. Before starting on-site Construction Activities, the Contractor shall submit a Construction Emissions Minimization Plan ("Emissions Plan") to the City Representative for review and approval. The Emissions Plan shall state, in reasonable detail, how the Contractor will meet the requirements of Section 2505 of the Environment Code.

2. The Emissions Plan shall include estimates of the construction timeline by phase, with a description of each piece of off-road equipment required for each Construction Phase.

   a. The description may include, but is not limited to: equipment type, equipment manufacturer, equipment identification number, engine model year, engine certification (Tier rating), horsepower, engine serial number, and expected fuel usage and hours of operation.

   b. For the VDECS installed, the description may include, but is not limited to: technology type, serial number, make, model,

manufacturer, ARB verification number level, and installation date and hour meter reading on installation date.

c. For off-road equipment using alternative fuels, the description shall also specify the type of alternative fuel.

d. Contractor may use the Clean Construction Equipment Inventory Template to satisfy the Emissions Plan requirements. Refer to the following link for that template: https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp.

3. The Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of the Agreement. Contractor must submit a signed Clean Construction Emissions Plan Certification Statement to the City Representative. Refer to the following link for the Emissions Plan Certification Statement Template: https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp.

4. After City review and approval, the Contractor shall make the Emissions Plan available to the public for review onsite during working hours.

a. The Contractor shall post at the construction site a legible and visible sign summarizing the Emissions Plan. Refer to the following link for the Clean Construction Sign Template: https://www.sfdph.org/dph/EH/Air/CleanConstruction.asp.

b. The sign shall also state that the public may ask to inspect the Emissions Plan for the project at any time during working hours, and shall explain how to request to inspect the Emissions Plan.

c. The Contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.

5. Reporting:

a. After Construction Activities begin, the Contractor shall update the Emissions Plan on a quarterly basis documenting changes from the original plan and demonstrating compliance with the Emissions Plan. The report shall be submitted to the City Representative quarterly and a copy shall also be maintained at the construction site.

b. Prior to receiving a Notice of Final Completion, or within six months of completion of Construction Activities if a final certificate of acceptance is not required, the Contractor shall submit to the City Representative a final report summarizing Construction Activities, including the start and end dates and duration of each Construction Phase, and the specific information required in the Emissions Plan.

1.05 WAIVERS

A. Waivers Under Subsection 1.04A.

1. The Contractor may request to waive the equipment requirements of Paragraph 1.04A.1 if: (a) a particular piece of off-road equipment with an ARB Level 3 VDECS is technically not feasible; (b) the equipment would not produce desired emissions reduction due to expected operating modes; (c) installation of the equipment would create a safety hazard or impaired visibility for the operator; or, (d) there is a compelling emergency need to use off-road equipment that is not retrofitted with an ARB Level 3 VDECS.

2. Contractor shall submit a waiver request to the Department Head, or designee, no less than two weeks prior to the planned use of a specific piece of off-road equipment.

3. If the Department Head, or designee, grants the waiver specified in Section 1.05A.1, the Contractor must use the next cleanest piece of off-road equipment, according to Table 1, below.

Table 1
Off-Road Equipment Compliance Step Down Schedule*

Compliance Alternative	Engine Emission Standard	Emissions Control
1	Tier 2	ARB Level 2 VDECS
2	Tier 2	ARB Level 1 VDECS
3	Tier 2	Alternative Fuel**

* If the City determines that the equipment requirements cannot be met, the Contractor must meet Compliance Alternative 1. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 1, then the Contractor must meet Compliance Alternative 2. If the City determines that the Contractor cannot supply off-road equipment meeting Compliance Alternative 2, then the Contractor must meet Compliance Alternative 3.

** Alternative fuels are not a VDECS

B. Waivers Under Subsection 1.04A.2.

1. The Department Head, or designee, may waive the alternative source of power requirement set forth in Subsection 1.04A.2 if an alternative source of power is limited or infeasible at the project site. If the City grants the waiver, the Contractor must submit documentation that the equipment used for onsite power generation meets the requirements of Subsection 1.04A.1, above.

C. All Other Waivers: The Department Head or designee also may waive the requirements of the Ordinance on the grounds set forth in Section 2507 of the Environment Code.

D. For any waiver granted in this Subsection 1.05, the City Representative will within two business days prepare a written notice of the waiver and a written memorandum explaining the basis for the waiver and the steps that will be taken to safeguard public and City employee health during the noncomplying work. The memorandum will also state the steps that the City and the Contractor will take to minimize the use of noncomplying equipment or engines during the noncomplying work.

1.06 NONCOMPLIANCE AND PENALTIES

A. Liquidated Damages: By entering into the Agreement, Contractor and City agree that if Contractor uses off-road equipment and/or off-road engines in violation of the Clean Construction requirements set forth in Administrative Code Section 6.25 and Chapter 25 of the Environment Code, the City will suffer actual damages that will be impractical or extremely difficult to determine. Accordingly, Contractor and the City agree that Contractor shall pay the City the amount of $100 per day per each piece of off-road equipment and each off-road engine used to complete Work on the Project in violation of the Ordinance. Such amount shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply with the Clean Construction requirements.

B. False Representations: False representations by the Contractor, in connection with the bidding, execution or performance of any City contract, regarding the nature or character of the off-road equipment and/or off-road engines to be utilized, on the contract, or to the City about the nature or character of the off-road equipment and/or off-road engines actually used may subject the Contractor to the consequences of noncompliance specified in Section 2510 of the Environment Code, including but not limited to the penalties prescribed therein. The assessment of penalties for noncompliance shall not preclude the City from exercising any other rights or remedies to which it is entitled.

END OF SECTION

ATTACHMENT C:

Maher Ordinance Screening Request

For a project to which you have been assigned as a Public Works project manager, complete the top of this form and submit to SAR, with plan showing the limits of excavation and of known Maher locations in the work area.

Project Name: _____ JO#_____ Date submitted:_____

Submitted by: _____ Date requested by (minimum of 20 working days): _____

Describe the general project scope, and give details of ground-disturbing activities:
Describe the project location(s). For work in parcels, provide street addresses. For work in the public right-of-way, provide street addresses for the beginning and ends of each street segment in which work will be done:
Estimated volume of excavated native material or earthen fill that the project will generate: _____ yd^3 — Does the project require a building or grading permit from DBI? Yes ☐ No ☐

FOR SITE ASSESSMENT & REMEDIATION USE

SA&R: Complete this section, initial, and forward to Project Manager and Regulatory Affairs Manager:

Date returned to PM:_____ Initial:_____ Date forwarded to RA:_____ Initial:_____

☐ Project does not meet excavation-volume threshold and/or intersect with a known Maher site. Maher does not apply.

☐ Project does not require a building or grading permit from the Department of Building Inspection. This includes all projects for the repair and replacement ("R&R") of existing structures in the public right-of-way for end-of-life replacement and/or to address structural inadequacies found during regular inspection. Per Health Code §22A.3 and Building Code §106A.2.4, the Maher Ordinance does not apply.

☐ Project does not require a building or grading permit and Maher does not apply, but the project will require construction specifications for protection for workers and the public, and for hazardous-materials handling and disposal to meet state and federal regulatory requirements. Please budget an estimated $_____ for specification development.

☐ Project requires a building permit and/or grading permit and will bring to the surface 50 or more cubic yards of native material or earthen fill. A Maher application is required. Please budget an initial $_____ in SFPH fees. We anticipate that the following will also be required:

- ☐ Site history (Phase I ESA).
- ☐ Phase II / Phase II workplan.
  - ☐ With site mitigation plan.
  - ☐ With site mitigation report/ Environmental inspection.

Recommended by:

_____

Signature Print Name Date

To complete this form, you will need the following information:

You will need to know that approximate total amount of excavated earth and earthen fill your project will bring to the surface, both permanent excavation and excavation that later will be backfilled. The key to whether or not activities add to your Maher total is whether or not the material brought up is earth or earthen fill -- roadway base, for example, does not count -- and whether or not it is brought to the surface -- pile driving does not count, but the spoils of holes drilled for piles will.

The easiest way to arrive at an approximate total is to classify excavations by type. For example, your project may have 12 pole footings, and two linear trenches. Each footing requires excavation of an area approximately 5' x 5' to a depth of 5'. There are 12 of these, so 5' x 5' x 5' x 12 = 1,500 ft^3. For the trenches, one is 10' deep, 5' wide, and 40' long, and the other is 8' deep, 5' wide, and 20' long. This would be (10' x 5' x 40') + (8' x 5' x 20') = 2,800 ft^3. Together, the total excavation for Maher is about 150 yd3, which would go over the 50 yd^3 limit that triggers Maher screening.

You'll need to provide a brief description of your project. Provide a general scope of your project (whether it is a streetscape project, a building-rehabilitation project, etc.) and provide details on the construction activities that will disturb the soil. For example, discuss the pole footings and the excavation that will accompany their construction. Provide identifiable project location(s). If your project is on a parcel, give the project address. If the project is in the public right-of-way, give, at a minimum, the street addresses at the beginning and end of each street segment. If the project is on a large public parcel (such as a park/open space), give enough information so that the location can clearly be identified.

You will need to provide mapping of your excavations with the Maher mapping overlain in order to facilitate SAR's presentation of your project information to San Francisco Public Health (SFPH), who oversee Maher compliance. Present the layers of your plans that contain the bulk of your excavation activities, and overlay the Maher Map. Maher mapping in GIS and DWG form can be found on the Public Works GIS server at \\dpwhyd1\boe5m\sfGeology\MaherSitesAndBlocks. (You may have \\dpwhyd1\boe5m mapped as the K: drive.)

Email this mapping along with the filled-out (top section only) digital version of the PDF form to the Site Assessment and Remediation (SAR) section. SAR will respond (after a minimum of 20 working days) with an assessment of whether or not your project requires further action, and what this action will be.

SAR: Stanley DeSouza <stanley.desouza@sfdpw.org>
Regulatory Affairs: Boris Deunert <boris.deunert@sfdpw.org>

Attachment D - PAC

SAN FRANCISCO
PLANNING DEPARTMENT

San Francisco Public Works
Preliminary Archeological Checklist (PAC)

1650 Mission St.
Suite 400
San Francisco,
CA 94103-2479

Reception:
415.558.6378

Fax:
415.558.6409

Planning
Information:
415.558.6377

PART I - PROJECT INFORMATION:

Date:_____ **Public Works RA Staff:** _____

Project name: _____ **Case No:** _____

Application type: EE CatEx

Project address: _____

APN/Cross streets: _____

EP Planner:_____**EP Archeologist:** _____

Consultant Archeologist name/firm (if applicable):_____

1. PROJECT DESCRIPTION: (include description of construction methods, all potentially ground-disturbing activities including parking, staging, equipment and spoils storage, temporary and permanent work areas, utility lines)

2. POTENTIAL GROUND DISTURBANCE

Yes	No	Project Component
☐	☐	Excavation (basement, elevator, utilities, seismic retrofit, remediation, underground vaults, septic tank system, culverts, etc.) Maximum depth:

2. POTENTIAL GROUND DISTURBANCE (cont.)

☐	☐	Pipeline replacement or installation (specify cut and cover, directional drilling, pipe bursting, etc):
☐	☐	Tunnels, transport storage boxes
☐	☐	Bore pits, test pits
☐	☐	Shallow Building Foundation (Mat, Spread Footings, etc.) Depth:
☐	☐	Piles, piers, micropiles, pilings, piling replacement
☐	☐	Grading, scraping
☐	☐	Demolition
☐	☐	Construction staging, spoils on unpaved area, fill
☐	☐	Road construction
☐	☐	Geotechnical trenching (dimensions)_____
☐	☐	New rip rap
☐	☐	Wharf or seawall modification
☐	☐	Other (specify):

Anticipated maximum extent of project ground disturbance:
Vertical_____Horizontal_____
APE Map Attached Y N

3. PREVIOUS SOILS DISTURBANCE AT PROJECT SITE:
Has the project site been previously disturbed by any of the following?

Yes	No	**Component of disturbance**
☐	☐	Existing Basement Depth:_____ Area:_____
☐	☐	Existing Foundation (footings, perimeter, piles, micropiles, etc.) Depth:
☐	☐	Site remediation/UST installation or removal, other excavation. Depth:
☐	☐	Site Grading
☐	☐	Demolition
☐	☐	Dredging
☐	☐	Piling installation (width and depth of trench):_____
☐	☐	Riprap
☐	☐	Seawall construction
☐	☐	Other (specify):

4. Has the entire project area previously been disturbed to the maximum depth and extent of proposed project disturbance? Y N
(Attach documentary evidence such as plans and profiles of prior trenching, utility street occupancy, historic photos, specifications from prior projects, etc.)
List attachments provided:_____
_____

☐ **Complete prior disturbance adequately documented. No further archeological assessment is required. EP Archeologist Concurs:** _____

☐ **Prior ground disturbance is unknown or cannot be adequately documented; Part II Required.**

PART II - ARCHEOLOGICAL DATA ASSESSMENT

1. ARCHIVAL AND DATA REVIEW

Dates of review:_____

Resources reviewed:

- ☐ Maher zone maps. Dates/ origin/ depth of fill if known_____
- ☐ Geotechnical data for project site and vicinity. Report_____
- ☐ EP Archeological GIS maps (all layers or specify applicable layers)_____

_____

- ☐ Sanborn Insurance maps (1887-93, 1899-1900)
- ☐ U.S. Coast Survey maps (1853, 1857, 1869)
- ☐ Information Center archeological records search (attach request and response)
- ☐ NAHC Sacred Lands File
- ☐ Native American/ Ethnic group consultation
- ☐ Other:_____
- ☐ Historical Maps or other information provided by Public Works

2. ARCHEOLOGICAL FIELD INVENTORY

- ☐ Not warranted; no exposed ground surface in project area
- ☐ Results negative
- ☐ Results positive
- ☐ Survey results inconclusive

Archeologist/ Firm_____ Date of Survey_____

Attach Archeological Survey Report/Memo; may combine with results of archival review.

3. SUMMARY OF RESULTS OF PROJECT ASSESSMENT

Site History/Formation:

Recorded/documented archeological sites/ investigations on/in the vicinity of the project site:

4. CONCLUSIONS AND RECOMMENDATIONS

a) NO EFFECTS TO ARCHEOLOGICAL RESOURCES EXPECTED:

☐ Project effects limited to previously-disturbed soils Project effects limited
☐ to culturally sterile soils
☐ Based on assessment above, no potentially CEQA-significant archeological resources are expected within project area affected soils.

b) AVOIDANCE AND TREATMENT MEASURES NECESSARY TO AVOID AN ADVERSE EFFECT TO SIGNIFICANT ARCHEOLOGICAL RESOURCES:

☐ Discovery: potential to adversely affect archeological resources; may be avoided by implementation of **Public Works Standard Archeological Measure I** (Discovery during Construction), with implementation of Standard Archeological Measures II (Monitoring) and/or III (Testing/ Data Recovery) in the event of a discovery during construction.

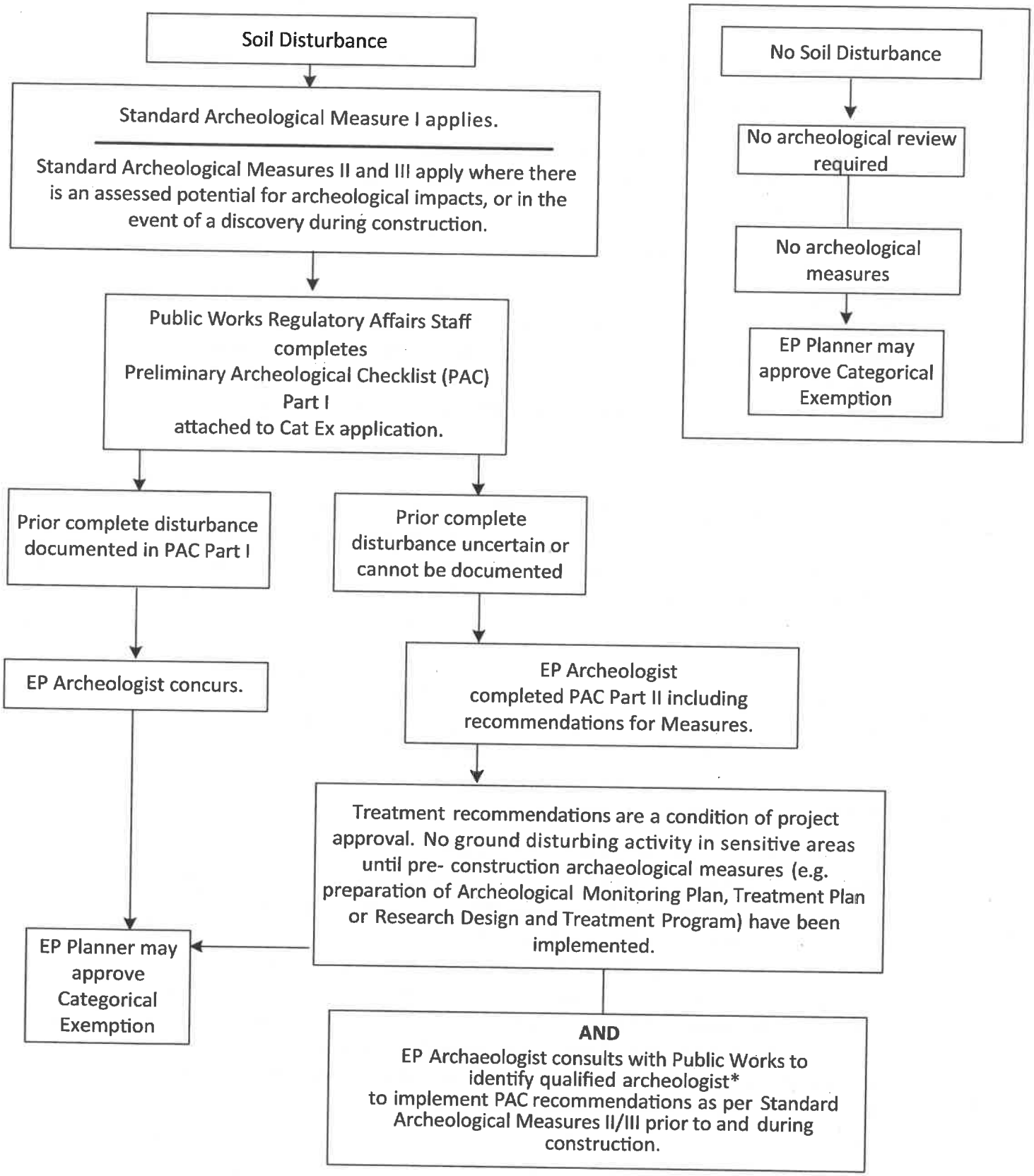
☐ Monitoring: some potential for the project to adversely affect archeological resources; may be avoided by implementation of **Public Works Standard Archeological Measure II** (Archeological Monitoring) during construction.

☐ Testing/Data Recovery: potential of the project to adversely affect archeological resources; may be avoided by implementation of **Public Works Standard Archeological Measure III** (Archeological Testing/Data Recovery)

Implementation Require:
prior to or during construction.

☐ CEQA evaluation of the project requires preparation and implementation of an archeological research design and treatment plan (ARDTP) by a qualified archeological consultant. See attached scope of work for the ARDTP

Attachment E:
Public Works Standard Construction Measure #9 Archeological Assessment Process



* Archeologist or archeological consultant who meets the Secretary of the Interior's Professional Qualifications Standards (36 CFR 61) as defined in Standard Archeological Measure I.

Attachment F: Public Works Archeological Measure I (Archeological Discovery)

The following requirements are applicable to:

- All projects that will include soil disturbance,
- Any discovery of a potential historical resource or of human remains, with or without an archeological monitor present.

Prior to ground disturbing activities:

A. Alert Sheet. Public Works shall, prior to any soils disturbing activities, distribute the Planning Department archeological resource "ALERT" sheet to each project contractor or vendor involved in project-related soils disturbing activities; ensure that each contractor circulates it to all field personnel; and provide the Environmental Review Officer (ERO) with a signed affidavit from each contractor confirming distribution to all field personnel.

Upon making a discovery:

B. Work Suspension. Should a potential archeological resource be encountered during project soils disturbing activity, with or without an archeological monitor present, the project Head Foreman shall immediately suspend soils-disturbing activities within 50 feet (15 meters) of the discovery in order to protect the find from further disturbance, and notify the Public Works Project Manager (PM) and/or environmental planning staff, who shall immediately notify the ERO for further consultation.

C. Qualified Archeologist. All archeological work conducted under this measure shall be performed by an archeologist who meets the Secretary of the Interior's Professional Qualifications Standards (36-CFR 61); consultants will be selected in consultation with the ERO and meeting the criteria or specialization required for the resource type as identified by the ERO in a manner consistent with Public Works's on-call contracting requirements.

D. Assessment and Additional Measures. If the ERO determines that the discovery is a potential archeological/historical resource, the archeologist, in consultation with the ERO, shall document the find, evaluate based on available information whether it qualifies as a significant historical resource under the CEQA criteria, and provide recommendations for additional treatment as warranted. The ERO will consult with Public Works and the qualified archeologist on these recommendations and may require implementation of additional measures as set forth below in Archeological Measures II and III, such as preparation and implementation of an Archeological Monitoring Plan, an Archeological Testing Plan, and/or an Archeological Data Recovery Plan, and including associated research designs, descendant group consultation, other reporting, curation, and public interpretation of results.

E. Report Reviews. All plans and reports prepared by an archeological consultant, as specified herein, shall be submitted first and directly to the ERO for review and comment with a copy to the Public Works and shall be considered draft reports subject to revision until final approval by the ERO.

F. Draft and Final Archeological Resources Reports. For projects in which a significant archeological resource is encountered and treated during project implementation (see Archeological Measures II and III), the archeological consultant shall submit a draft Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological testing/monitoring/data recovery program(s) undertaken, research questions addressed, and research results. Information that may put at risk any archeological resource shall be provided in a separate, removable insert within the draft final report.

Once approved by the ERO, copies of the FARR shall be distributed as follows: two copies to the applicable California Historic Information System Information Center (CHRIS), one copy to each descendant group involved in the project, and documentation to the San Francisco Planning Department of transmittal of the above copies. In addition, the Planning Department shall be provided one bound, one unbound and one unlocked, searchable PDF copy on CD of the FARR, which shall include copies of any formal site recordation forms (CA DPR 523 series) and/or National Register of Historic Places/California Register of Historical Resources nominations.

G. Other Reports. In instances of high public interest or interpretive value, the ERO may require different or additional final report content, format, and distribution than that presented above.

H. Human Remains, Associated or Unassociated Funerary Objects. Public Works shall ensure that human remains and associated or unassociated funerary objects discovered during any soils disturbing activity are treated in compliance with applicable State and federal laws. In the event of the discovery of potential human remains, the construction contractor shall ensure that construction activity within 50 feet of the find is halted and the Public Works PM, ERO, and the County Coroner are notified immediately. If the Coroner determines that the remains are of Native American origin, he/she will notify the California State Native American Heritage Commission. Subsequent consultation on and treatment of the remains shall be conducted consistent with Public Resources Code Section 5097.98 and CEQA Guidelines Section 15064.5(d), in consultation with the ERO.

I. Consultation with Descendant Communities. Consistent with AB 52 requirements, if requested, Public Works shall provide opportunities for Native American descendant groups to provide input during project planning for projects that may affect potential Tribal Cultural Resources. In addition, on discovery during construction of an archeological site associated with descendant Native Americans, the Overseas Chinese, or other descendant group, an appropriate representative of the descendant group shall be contacted by Public Works at the direction of the ERO. Public Works will offer this representative the opportunity to monitor archeological field investigations of the site and to consult with the ERO regarding the appropriate treatment and, if applicable, interpretation of the site and the recovered materials.

J. Construction Delays. Archeological monitoring and/or data recovery programs required by this measure may suspend construction of the project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if this is the only feasible means to reduce potential effects on a significant archeological find to a less-than-significant level.

Attachment G. Public Works Archeological Measure II (Archeological Monitoring)

A. Archeological Monitoring Plan (AMP). Where an archeological field investigation to identify expected buried or submerged resources cannot reasonably be carried out during project planning/ environmental review (for example, where definitive determination would require extensive street opening prior to construction), prior to any project-related soils-disturbing activities the qualified archeologist identified under Archeological Measure I.C. shall consult with Public Works and the ERO to develop an Archeological Monitoring Plan (AMP). The AMP which will be implemented in conjunction with soil-disturbing activities during construction. Preparation and implementation of an AMP also may be required based on the results of pre-construction archeological testing or upon a discovery during construction.

The AMP shall include the following elements, at minimum:

- Historical context and research design for assessment of resource types likely to be encountered;
- Project activities to be archeologically monitored and intensity of monitoring of each type and location of project construction activity; and
- Procedures for the documentation, significance and integrity assessment, treatment, interpretation and reporting of the types of resources likely to be encountered.

B. Reporting. Whether or not significant archeological resources are encountered, the archeological consultant shall submit a written report of the findings of the monitoring program to the ERO at the end of construction (See Archeological Measure I.E [Report Reviews] and I.F. [Draft and Final Archeological Research Report]).

C. Monitoring Authorities

- The archeological monitor will have the authority to halt construction activity at the location of a suspected resource for inspection, documentation, and assessment of the need for further measures as set forth in Archeological Measure III.
- The Archeological Monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis.
- The Archeological Monitor(s) shall be present on the project site according to a schedule identified in the AMP, subject to modification upon ERO concurrence, based on findings.

D. Testing/Data Recovery. In the event of a discovery during construction, if the ERO and archeological consultant determine that the discovery is a significant resource (that is, a

resource that meets the eligibility criteria of the California Register of Historic Resources or qualifies as a unique archeological resource) that will be adversely affected (that is, where the project would result in loss of data potential) or that additional investigation is required to make this determination, all applicable elements of Archeological Measure III (Archeological Testing/Data Recovery) also shall be implemented.

Attachment H. Public Works Archeological Measure III (Testing / Data Recovery)

The following provisions apply prior to or during construction when a significant archeological resource (as defined in Measure II.D) or an archeological resource of undetermined significance is expected to be present in the work area and the ERO, in consultation with the qualified archeologist, determines that an archeological field investigation is needed to determine: a) the presence of an archeological resource, b) whether it retains depositional integrity, and c) whether it qualifies as a legally significant resource under CEQA criteria. All archeological work under this Measure will be carried out by a qualified archeologist as identified in Archeological Measure I.C. Per Archeological Measure I.J, implementation of this measure shall not exceed four weeks except at the direction of the ERO and only if this is the only feasible means to reduce potential effects on a significant archeological find to a less-than-significant level.

A. Archeological Testing Program. If an archeological investigation is required in order to verify resource location and/ or assess the significance of the resource, the archeological consultant shall consult with the ERO to prepare and implement an Archeological Testing Plan (ATP) that identifies:

- Key research questions and associated data needs,
- Testing/ sampling methods, and
- Testing locations.

Results of testing shall be presented to ERO in a written report following Measure I.E. If, based on the archeological testing program, the archeological consultant finds and the ERO concurs that significant archeological resources may be present, Measures III.B and/or III.C below will be implemented.

B. Treatment. If the project could adversely affect a significant (CRHR-eligible) archeological resource, preservation in place is the preferred manner of mitigating impacts, as detailed in CEQA Guidelines 15126.6(b) (3)(a) and (b).

If preservation in place is determined to be infeasible, the Public Works at its discretion shall either:

- Re-design the proposed project so as to reduce the adverse effect to a less-than-significant level through preservation in place or other feasible measures; and/or
- For a resource important for its association with an important event or person, or which is of demonstrable public interest for both its scientific and historical values (e.g., a submerged ship), and where feasible, preserve the resource in

place with appropriate documentation; or, if not feasible to preserve in place, systematically document and/or recover for interpretive use, at the discretion of the ERO, and/or;

- For an archeological resource significant primarily for its data potential, design and implement an archeological data recovery program, as detailed under Measure III.D, below.

C. Archeological Data Recovery Plan (ADRP). For resources for which the elected treatment is archeological data recovery, the archeological consultant, in consultation with the ERO, shall prepare and implement an ADRP. It will identify how the significant information the archeological resource is expected to contain will be recovered and preserved. Data recovery results will be reported in the FARR, as detailed in Measure I.F. The ADRP shall include the following elements:

- Historic context and research design
- Field methods and procedures, including sampling strategy
- Archeological monitoring recommendations for ongoing construction
- Cataloguing and laboratory analysis
- Discard, deaccession, and curation policy
- Interpretive program
- Security measures

VIBRATION CONTROL PROCEDURES FOR INCLUSION IN CONSTRUCTION CONTRACTS

SECTION 01 35 51

VIBRATION CONTROL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes minimum provisions for compliance with City, state, and federal laws and regulations for vibration control, and notes to which Standard Construction Measure (SCM) the section refers.

1. Vibration Control (SCM-5).

B. Related Sections:

1. Section 00 41 00 Bid Form
2. Section 01 35 49 Minimum Environmental Procedures
3. Section 01 31 19 Project Meetings

1.2 REFERENCES

A. Refer to the following references:

1. Andrews, Jim, et al. Transportation and Construction Vibration Guidance Manual. California Department of Transportation Report No. CT-HWANP-RT-13-069.25.3, September 2013.

1.3 DEFINITIONS

A. For the purposes of this Section, the following definitions apply:

1. Historic buildings or historic structures: Buildings or structures labeled as historic structures on project plans.

1.4 SUBMITTALS

A. Contractor shall submit the following prior to the start of construction and prior to performing any vibration monitoring:

1. A record of laboratory calibration shall be provided for all vibration-monitoring instruments to be used on site. Certification shall be provided to indicate that the instruments are calibrated and maintained in accordance with the equipment manufacturer's calibration requirements and that calibrations are traceable to the U. S. National Institute of Standards and Technology (NIST). The record shall certify that all seismographs shall have been calibrated by the manufacturer or certified calibration laboratory within one year of their use on site.
2. Manufacturer's product data for all vibration-monitoring instruments to be used on site describing all specified vibration-monitoring instruments, together with product data and instruction manuals.
3. Documentation and photography of the properties that are the subject of the Vibration Monitoring Plan, as specified below in 3.4.G.

4. A written Vibration Monitoring Plan detailing the procedures for vibration monitoring. Such plan shall include:

   (a) The name of the Firm providing the vibration monitoring services.

   (b) Description of the instrumentation and equipment to be used.

   (c) Measurement locations and methods for mounting the vibration sensors.

   (d) Procedures for data collection and analysis.

   (e) A limiting value as applied in 3.4, below.

   (f) Means and methods of providing warning when a limiting value is reached.

   (g) Generalized plans of action to be implemented in the event the limiting values is reached. The generalized plans of action shall be positive measures by the Contractor to control vibrations (e.g. using alternative construction methods).

   (h) Procedures for post-construction assessment of any damage due to vibration during construction to historic buildings or structures susceptible to vibration in or adjacent to the project, and reporting requirements and procedures if such damage occurs.

5. Within 10 working days after the completion of the background vibration monitoring as described in 3.4.G, Contractor shall submit a hard copy report documenting the results of background vibration monitoring at each monitoring location.

B. Qualification Data: For firms and persons specified in subsection 1.5 "Quality Assurance" of this Section to demonstrate their capabilities and experience.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Qualified Vibration Instrumentation Engineer: a registered Professional Engineer in the State of California, who has a minimum of a Bachelor of Science degree in civil engineering, and who has at least 4 years of experience in the installation and use of vibration-monitoring instrumentation and in interpreting instrumentation data.

B. Regulatory Requirements

1. All work shall comply with the following:
   (a) San Francisco Police Code, Article 29, Ordinance #274-72 ("Noise Ordinance")
   (b) San Francisco Public Works Code, Article 2.4 (“Excavation in the Public Right-of-Way”)
   (c) San Francisco Public Works Code Ordinance #175-91,Sections 1100-1107

C. The City will inspect and monitor Contractor's adherence to the requirements specified herein and will report on Contractor's compliance.

1. Said inspection, monitoring, and reporting activities may include, but are not limited to, qualitative, quantitative and photographic observations and data collection on the impacts of vibration.

2. Contractor shall cooperate with such inspection and monitoring activities, provide access to the Work site to establish and secure monitoring stations, and make its facilities and records available to the City for performing such monitoring.

3. The City will issue a Non-Compliance Notice to Contractor for any detected non-compliance with the provisions herein or of any environmentally objectionable acts and the corrective action to be taken.

1.6 SEQUENCING

A. Contractor shall submit a Vibration Control Plan to the City for review and approval at least 30 days prior to commencing construction.

B. Contractor shall notify the City Representative at least 24 hours prior to starting a new construction task potentially capable of exceeding the project's vibration Threshold Value.

1.8 DAMAGES FOR FAILURE TO MEET ENVIRONMENTAL REQUIREMENTS

A. The Contractor shall be liable for all fines, penalties, liquidated damages and costs arising from any failure to implement mitigation measures to control vibration impacts that are subject to Federal, State, and local regulatory fines.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials necessary for compliance with the Vibration Monitoring Program:

1. The seismograph(s) used as part of the program shall have the following minimum features:

(a) Seismic range: 0.01 to 4 inches per second with an accuracy of +5 percent of the measured peak particle velocity or better at frequencies between 10 Hertz and 100 Hertz, and with a resolution of 0.01 inches per second or less.

(b) Frequency response (+3 dB points): 2 to 200 Hertz.

(c) Three channels for simultaneous time-domain monitoring of vibration velocities in digital format on three perpendicular axes.

(d) Two power sources: internal rechargeable battery and charger and 115 volts AC. Battery must be capable of supplying power to monitor vibrations continuously for up to 24 hours.

(e) Capable of internal, dynamic calibration.

(f) Direct writing to printer and capability to transfer data from memory to a secure digital memory card and/or USB mass storage device. Instruments must be capable of producing strip chart recordings of readings on site within one hour of obtaining the readings. Provide computer software to perform analysis and produce reports of continuous monitoring.

(g) Continuous monitoring mode must be capable of recording single-component peak particle velocities, and frequency of peaks with an interval of one minute or less.

PART 3 - EXECUTION

3.1 VIBRATION CONTROL

A. This subsection applies when trees, rock outcroppings, historic buildings, historic structures, or other resources or landscape features are shown on the project plans and are labeled as requiring a vibration-monitoring program.

B. Where the project includes or is directly adjacent to a resource susceptible to vibration, as shown on project plans, the Contractor shall institute a vibration-monitoring program to protect such properties from excess vibration during demolition and construction activities associated with the project.

C. The Contractor shall submit a Vibration Control Plan to the City for review and approval, to be fully implemented upon approval.

1. For purposes of this subsection, “limiting value” shall be:

   (a) For Vibration Control Plans for historic buildings or historic structures, 0.12 inches per second peak particle velocity (in/sec PPV) for sustained vibration (e.g. impact pile drivers, vibratory equipment) in any direction, unless a greater value is approved in writing by the City Representative.

   (b) For Vibration Control Plans for all other resources, 0.2 inches per second peak particle velocity (in/sec PPV) for sustained vibration (e.g. impact pile drivers, vibratory equipment) in any direction, unless a greater value is approved in writing by the City Representative.

2. The Contractor’s vibration-monitoring personnel shall include a Qualified Vibration Instrumentation Engineer approved by the City’s Representative. The Qualified Vibration Instrumentation Engineer shall:

   (a) Be on site and supervise the initial installation of each vibration-monitoring instrument.

   (b) Supervise interpretations of vibration-monitoring data.

3. Contractor shall collect seismograph data prior to any vibration-producing demolition or construction activities to document background vibrations at each monitoring location. The background monitoring shall be performed for a minimum of two non-consecutive workdays, spanning the hours during which demolition and construction activities will take place. Monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart.

4. Contractor shall have seismographs in place and functioning at least 24 hours prior to any such activity within 200 feet of the monitoring locations. No significant vibration-producing activity shall occur within this zone unless the monitoring equipment is functioning properly, as determined by the City Representative.

5. Contractor shall monitor vibration during demolition and other significant vibration-producing construction activities as determined by the City Representative. This monitoring shall consist of a continuous recording of the maximum single-component peak particle velocities for one-minute intervals, which shall be printed on a strip chart. During the monitoring, Contractor shall document all events that are responsible for the measured vibration levels, and submit the documentation to the City Representative with the data.

6. All vibration monitoring data shall be recorded contemporaneously and plotted continuously on a graph by the data acquisition equipment. Each graph shall show time-domain wave traces (particle velocity versus time) for each transducer with the same vertical and horizontal axes scale

7. The Contractor shall interpret the data collected, including making correlations between seismograph data and specific construction activities. The data shall be

evaluated to determine whether the measured vibrations can be reasonably attributed to construction activities

8. The equipment shall be set up in a manner such that an immediate warning is given when the peak particle velocity in any direction exceeds the Threshold Value in the previously submitted Vibration Monitoring Plan. The warning emitted by the vibration-monitoring equipment shall be instantaneously transmitted to the responsible person designated by Contractor by means of warning lights, audible sounds or electronic transmission.

9. If a Limiting Value is reached, the Contractor shall:

   (a) Immediately notify the City Representative and suspend activities in the affected area, with the exception of those actions necessary to avoid exceeding the Limiting Value.

   (b) Meet with the City Representative to discuss the need for response action(s).

   (c) If directed by the City Representative during the above meeting that a response action is needed, submit within 24 hours a detailed specific plan of action based as appropriate on the generalized plan of action submitted previously as part of the vibration-monitoring plan.

   (d) If directed by the City Representative, implement response action(s) within 24 hours of submitting a detailed specific plan of action, so that the Limiting Value is not exceeded.

10. Where the subject of the Vibration Monitoring Plan is a historic building or structure, Contractor shall engage a Qualified Historic Architect or Historic Preservation Professional to document and photograph the properties that are the subject of the Vibration Monitoring Plan to ensure structural damage does not result from construction activities that could cause ground vibration.

    (a) The post-construction survey and monitoring results will be evaluated to determine whether the new structural and/or architectural damage was caused by vibration due to Contractor’s performance of this Work.

    (b) If, following completion of construction, changes in the architectural or structural conditions the properties that are the subject of the Vibration Monitoring Plan have occurred, Contractor shall restore the buildings to pre-construction conditions, and to the satisfaction of the City Representative.

END OF SECTION

DRAFT WATER AND AWSS PROTECTION PROCEDURES FOR INCLUSION IN CONSTRUCTION CONTRACTS

SECTION 01 41 28

PROTECTION OF EXISTING WATER AND AWSS FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION

A. Design and install temporary supports to work around the San Francisco Public Utilities Commission's (SFPUC) Potable Water (PW), Recycled Water (RW), and Auxiliary Water Supply System (AWSS) facilities to protect and provide uninterrupted service to these facilities. Contractor will be held responsible for any damage related to or caused by failure to exercise due care. Repair of existing utilities and improvements damaged during construction shall be at the Contractor's expense.

B. The Contractor shall furnish, install and remove upon completion of the work, Settlement Reference Points (SRP) and Settlement Monitoring Points (SMP) for the San Francisco Public Utilities Commission's (SFPUC) Auxiliary Water Supply System (AWSS) piping as shown on drawings and conduct the survey of SRPs and SMPs as specified hereinafter.

C. The Contractor shall perform all required work as stated in this specification section and as shown on the Drawing(s) and furnish all materials, other than those specified to be furnished by the City, which are necessary or required to complete the work.

1.02 RELATED SECTIONS

Not Used

1.03 RECORD DRAWINGS AND STANDARDS

Records of the existing PW, RW, and AWSS facilities and Standard requirements are available for examination by bidders/awarded Contractor at the SFPUC's City Distribution Division (CDD), Engineering Section, 1990 Newcomb Ave, San Francisco, CA 94124. Telephone number 415-550-4994.

Contractors are warned that changes which do not appear in the records for existing CDD facilities may have been made. The City makes no representation as to the completeness or accuracy of said records and assumes no responsibility thereto.

1.04 DEFINITIONS

A. Maximum Allowable Settlement: Level at which no further movement will be acceptable and if reached requires work to be halted until submittal and acceptance of a written plan detailing corrective actions and restorative measures.

B. Response Values: Predetermined values within the instrument range indicating different levels of response as specified herein.

C. Settlement Monitoring Point: A system of points along the alignment of the AWSS for monitoring vertical deformation (settlement or heave) at or near the ground surface using optical survey techniques.

E. Settlement Reference Point: A stable, fixed control point established at a surface structure above ground that is referenced during settlement monitoring point measurements to permit calculation of vertical movements.

1.05 REFERENCES

A. AWSS Standard Plans

Drawing No.	Title
HPL-5993 Ch. 3	AWSS Standard Details AWSS Settlement Point; 07/09/84
HPL-5993.1 Ch. 1	AWSS Settlement Point for Double Spigot; 05/16/83

B. AWSS Settlement Monitoring Drawings in the Contract showing approximate locations of settlement monitoring and reference points.

C. State of California Labor Code, Section 6705 and 6707.

D. State of California Construction Safety Orders, Article 6 - Excavation.

1.06 SUBMITTALS

Submit the following to City Representative for review:

A. Work plan, support details, and calculations.

1. Work Plan for working around existing PW, RW, and AWSS facilities. The plan shall show the locations of proposed facilities, existing utilities and pipelines, proposed pipe supports for SFPUC CDD facilities, pipe storage, spoil bank, excavation and pipe laying equipment, shoring system, and a description of how the work will proceed around the

existing SFPUC CDD facilities. Provide drawings that include dimensions to allow determining the distances of objects relative to the SFPUC CDD facilities. Sizes of existing and proposed facilities, width and depth of proposed trench, and any other pertinent information must be shown in the drawings. For proposed structural facilities, such as retaining walls, potentially impacting CDD facilities, submit elevation and or section views showing horizontal and vertical locations of CDD facilities relative to the proposed structure.

2. Where supports are required, submit support details and calculations, signed and stamped by a California licensed Civil or Structural Engineer, for structural support for the protection of all exposed and/or undermined sections of SFPUC CDD pipe or facilities. At the discretion of SFPUC CDD Engineering, revised support details and calculations may be required to be submitted if conditions vary significantly following excavation.

3. Submit minimum (7) days before planned excavation.

B. Control Density Fill (CDF) mix design where CDF is required per this Specification. Submit certified laboratory test results within the past 1-year that the mix proportions and materials comply with these Specifications.

C. Survey of Settlement Reference and Monitoring Points data: The Contractor shall submit elevations of all SMPs and SRPs (to be provided in “feet”) by a State of California licensed Land Surveyor in addition to deflection calculations for each pipe joint.

Data and calculations shall be submitted once prior to the start of construction, once a week during construction, once at the end of construction and final survey is completed, and when threshold values are exceeded as specified below. Pipe deflection angles and elevation readings calculated from SMPs and SRPs are to be tabulated in chronological order with all previous results for review and approval within 24 hours of the survey being performed.

PART 2 PRODUCTS

2.01 CONTROLLED DENSITY FILL

A. Materials shall conform to the following:

1. Cement: ASTM C150, Type II or V.

2. Aggregate: ASTM C33. Aggregate shall consist of fine aggregate with a maximum size of 1/4", free of clay, organics, and other deleterious

materials. Less than 10 percent by weight shall pass the No. 200 sieve, and material passing the No. 40 sieve shall be nonplastic as determined in accordance with ASTM D4318.

3. Water: Potable.

4. Pozzolans: ASTM C618, Class C fly ash. Class F fly ash and slag is not permitted.

5. Air entraining: ASTM C260. Air content shall not exceed 25 percent.

6. Admixtures: Shall not contain chloride ions and shall not cause delayed strength gain.

B. Mixes:

1. Performance requirement: proportioned to be free-flowing, self-consolidating, hand tool excavatable, low-shrink slurry.

2. Mix design requirement: The Contractor and its supplier shall determine the materials and proportions used to meet the requirements of the Specifications.

3. Strength: Unconfined compressive strength at 28 days shall be between 50 to 125 psi tested per ASTM D 4832.

4. Flowability: 6 to 9 inches when tested per ASTM C-143 or ASTM D 6103.

5. Cementitious Material: Portland Cement. Where pozzolans are used, pozzolans shall be limited to maximum 60% of the weight of cement.

2.02 AWSS SETTLEMENT REFERENCE AND MONITORING POINTS

A. AWSS Settlement Reference and Monitoring Well Covers

6-inch valve cover, H-20 load rated, cover similar to the San Francisco Water Department's 6-inch gate valve cover.

B. Required survey monitoring of AWSS facilities outside of trenches and/or excavations:

1. Refer to the AWSS Settlement Monitoring Drawing(s) for the minimum number of SMPs to be installed as part of the contract work; and

2. For trench/excavation crossing AWSS, the SMPs shall be located starting on the closest pipe bell near the edge of the trench and/or excavation and installed outward away from the trench and/or excavation; and

3. Rod, guide pipe, and monitoring well shall be per Drawings "HPL-5993" and/or "HPL-5993.1", which are attached to this specification section and shall be at the approximate locations as shown on the AWSS work contract drawing(s), which are included in the contract documents. The exact SRP and SMP locations shall be determined in the field and approved by the SFPUC CDD Representative.

C. Required monitoring of AWSS facilities inside of trenches and/or excavations:

1. Exposed AWSS pipe joints in trenches and/or excavations shall be identified as a SMP regardless of whether the joint is called out on the AWSS Settlement Monitoring Drawing(s) to be surveyed and monitored. Price for additional survey locations when required by the specifications and/or by the SFPUC CDD Representative shall be based on the Contractor's total bid price for SMPs divided by the quantity of SMPs as shown on the AWSS work drawing(s) to be installed, surveyed and removed. Field verification of the exact location shall be required and approved by SFPUC CDD Engineering.

2. Additional SMPs within trenches and/or excavations may be necessary on either or both sides of the AWSS joint to distinguish the difference between vertical displacement and joint deflection.

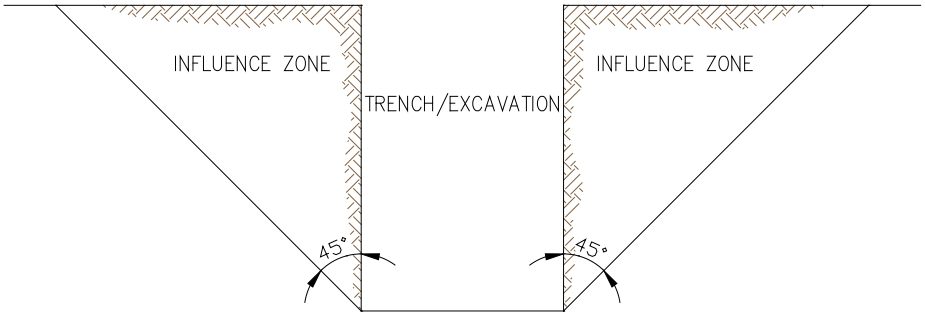
D. Placement of SRP(s) for survey monitoring of SMPs:

1. A settlement reference point shall be designated by a marking on a hydrant or other stable, permanent fixture located within the public right-of-way. The same location shall be surveyed for reference over the course of the project. Refer to the AWSS Settlement Monitoring Drawing(s) for the minimum number of SRP(s) to be installed as part of the survey monitoring work.

PART 3 EXECUTION

3.01 SUPPORT OF EXISTING PW, RW, AND AWSS FACILITIES

A. Inspection, Review and Approval of Methods



1. If existing SFPUC CDD facility, not shown on the drawing or is shown on the drawing outside of the influence zone, is found to be within the influence zone of the proposed trench/excavation as shown in the figure above, the Contractor is required to contact CDD Engineering and request an inspection to review and approve the field methods being used and/or proposed for the protection of CDD facility. CDD Engineering reserves the right to require the Contractor to implement protection methods, such as placement of steel plates over AWSS or water facilities, additional shoring and pipe supports, use of hand-digging, change shoring system around impacted CDD facilities, or other protective methods, as appropriate for full protection of the CDD facilities.

2. If two or more consecutive SFPUC CDD lead filled, cast-iron pipe joints are located within the trench/excavation, CDD requires replacement of the existing pipe with new ductile iron pipe with elastomeric EPDM joint gaskets within the influence zone prior to excavating below the pipe.

3. Existing valves exposed in trench/excavation:

    a. If existing valve with lead filled joints will be exposed within the trench/excavation, CDD requires replacement of the existing valve and cast-iron pipe with new ductile iron pipe with elastomeric EPDM joint gaskets within the influence zone prior to excavating below the pipe as shown in the drawings.

    b. If existing valve with restrained elastomeric gasketed joints connecting to ductile-iron pipe will be exposed within trench/excavation, pipe support requirement shall be the same as that for ductile-iron pipe as specified in the following requirement. If valve is not restrained, restraints shall be added by CDD prior to excavating below the valve.

4. Pipe supports are required where CDD pipe is exposed more than:

    a. 6 ft. for cast-iron pipe with no exposed joint.

b. 3.5 ft. for cast-iron pipe with exposed joint.

c. 10 ft. for ductile-iron pipe with no exposed joint.

d. 6 ft. for ductile iron pipe with exposed joint(s).

5. Sheet pile driving adjacent to existing CDD pipe shall maintain a minimum clear spacing between back of sheet pile and edge of pipe of:

a. 1.5 ft. for ductile iron pipes.

b. 4 ft. for cast-iron pipes. If within 4 ft., settlement monitoring is required for both LPW and AWSS lines. Settlement monitoring of LPW lines shall be the same as for AWSS lines unless approved otherwise by CDD Engineering.

6. Main disconnection/reconnection, and valve replacement work for PW and RW shall be performed by SFPUC CDD. Excavation, backfilling, pipe laying, paving, traffic control, permitting, and any other support work necessary for the PW and RW replacement work shall be the Contractor's responsibility. All AWSS replacement work shall be performed by Contractor or subcontractor qualified by CDD to perform AWSS main installation. All replacement valves and piping for CDD replacement is supplied by CDD.

7. Provide details and calculations for structural support for the protection of exposed and/or undermined sections of SFPUC CDD facilities. Details and calculations shall be signed and stamped by a California licensed Civil or Structural Engineer. Structural supports shall be designed to protect (1) AWSS pipes constructed with Class H cast iron lead jointed pipe operating at 350 psi static pressure, (2) AWSS pipes constructed with Class 56 ductile iron pipe, (3) PW pipes constructed with Class B cast iron lead jointed pipe operating at 150 psi static pressure, and (4) PW or RW pipes constructed with Class 53 ductile iron pipe operating at 150 psi static pressure. Maximum deflection in pipe support members shall not exceed L/500, where L is the unsupported length of the member.

B. Restoration of Facilities

If project work exposes CDD facilities, the Contractor is required to

1. backfill and compact in compliance with San Francisco Department of Public Works (SFDPW) Street Excavation Code or as required by SFPUC CDD; and

2. perform soil compaction testing for backfill material placed within three (3) feet, horizontally or vertically, from the outside edge of a water facility, with all test results furnished to CDD Engineering.

For excavations that expose more than four (4) feet of CDD facilities or pipe joint (4-inch and smaller pipes are excluded), backfill is required to be constructed with control density fill (CDF) material. CDF material shall be free of organic materials and other deleterious substances. The CDF material shall have produced 28 days unconfined compressive strength from 50 pounds per square inch (psi) to a maximum of 100 psi and shall contain aggregate no larger than 3/8" top size with the 3/8" aggregate comprise less than 30% of the total aggregate content.

CDF material shall begin at one (1) foot above the top of any utility crossing under a CDD facility and continue up to the bottom of the CDD facility. CDF material shall not extend beyond the spring-line of any CDD facility. Width of CDF backfill shall be OD of CDD pipe + 1ft on each side.

3.02 INSTALLATION OF AWSS SETTLEMENT REFERENCE AND MONITORING POINTS AND SUPPORT OF PIPE

A. Installation

The SRPs and SMPs shall be installed prior to the start of construction work requiring excavation around AWSS pipe.

For SRPs at fire hydrants, the contractor shall select the top center of fire hydrant. The contractor must ensure that the exact same point is used to establish survey control prior to monitoring of SMPs and additional SRPs.

For installation of SMPs outside of trench/excavations, the Contractor shall expose the bell of the pipe so that the position of the guide pipe on the bell can be visually verified before backfilling. The installation method used shall not cause the guide pipe to move from its intended position.

For installation of SMPs inside of trench/excavations, the Contractor shall verify the leveling rod is positioned on top of the pipe by verifying the pipe crown with a level vial and marking the exact location on the pipe to ensure consistent monitoring of the same point.

The correct positioning of each SRP and SMP on the top of the pipe bell shall be verified and approved by a CDD Representative by visual inspection. To request an inspection by a CDD Representative, please contact CDD Engineering a minimum of five (5) business days in advance to schedule the inspection.

It is the responsibility of the Contractor to maintain all SRP and SMP installations in working order at all times.

The Contractor shall contact CDD Engineering to perform a "drop test" before installation of SMPs or SRPs to determine the ability of the pipe to maintain pressure. The CDD Representative will isolate the AWSS line during the installation of SMPs and SRPs and reactivate the line after the construction of the SMPs and SRPs is completed by the Contractor. To request a drop test by a CDD Representative, please contact CDD Engineering a minimum of five (5) business days in advance to schedule the test.

B. Removal

The SMPs and SRPs shall be removed by the Contractor, including pipe guides, monitoring well frames and covers and the roadway restored to its original condition(s).

C. Survey of Settlement Reference and Monitoring Points

1. The Contractor shall obtain elevations of all SMPs and SRPs, by a State of California licensed Land Surveyor.

2. Initial Survey: Record the elevations within an accuracy of 0.005 feet (1/16-inch) for each settlement monitoring point on all surveys. After completion of each instrument installation, take 3 sets of verification data readings for each instrument to demonstrate the adequacy of the installation, to demonstrate the proper operation and precision of the instrument, and to establish an initial value. Differential Leveling and Total station accuracy shall comply with the accuracy standard specified in Caltrans Second Order Differential Leveling Specifications and Second Order (Vertical) TSSS Survey Specifications respectively. If differential leveling survey method is used, a collimation (Two-Peg) test shall be performed to ensure accuracy within 0.003 feet prior to each survey run. Submit the initial readings to the City Representative.

3. Monitoring Schedule: Take readings of all SMPs and SRPs prior to the start of construction, once after the construction work is completed, and a final time a week after all construction work is completed. Intermediate monitoring frequency during construction shall as a minimum comply with the following:

Monitoring Frequency During Sheet Pile Driving	Monitoring Frequency During Excavation or Backfill	Monitoring Frequency in or Around Open Trench	Monitoring Frequency Away from Open Trench
Daily[1]	Daily[2]	3 Days[3]	Once[4]

Notes:

1 For SMP's within 25 ft. of pile driving, monitor daily if pile installation using vibratory hammer and every four hours if pile installation using impact hammer.

2 Daily for SMPs within 25 ft. of a trench section being actively excavated or backfilled.

3 Once every three days for SMPs within 25 ft. of an open trench after excavation is completed and utilities are being installed.

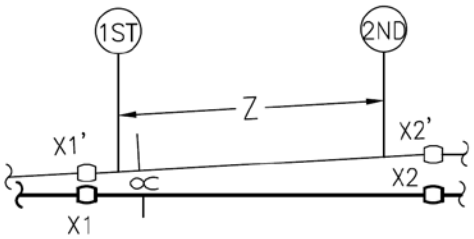
4 Once after trench within 25 ft of SMP is completely backfilled unless directed otherwise by the City Representative.

4. Elevation readings from SMPs and SRPs are to be tabulated in chronological order with all previous results and sent to CDD Engineering for review and approval within 24 hours of the survey being performed. Measurements shall be provided in "feet". Provide a plot of measured values versus time, including a time history of construction activity likely to influence such readings.

D. Response Values and Required Actions

1. The Maximum Allowable Settlement shall not result in any joint deflecting more than 1/4 degrees, where the deflection angle is calculated using this equation:

$$\propto \text{Tan}^{-1} \frac{(X1 - X1') - (X2 - X2')}{Z}$$



$\propto$ = DEFLECTION ANGLE IN DEGREES
$x1$ = INITIAL READING OF 1ST SMP
$x1'$ = CURRENT READING OF 1ST SMP
$x2$ = INITIAL READING OF 2ND SMP
$x2'$ = CURRENT READING OF 2ND SMP
z = DISTANCE BETWEEN SMPs

2. The response values are measured as a percentage of the Maximum Allowable Settlement. The Contractor shall abide by the following Response Values.

Threshold Value	Contractor Response Value	Shutdown Value
50%	80%	100%

3. When a given response value is reached, the Contractor shall provide written notice within the specified time and respond in accordance with the following:

   a. Threshold Value: The Contractor shall provide written notice within 24 hours of occurrence and meet with the City Representative within 24 hours of providing notice to discuss his means and method to determine what changes, if any, shall be made to better control ground movement. Instrument readings shall be required on a daily basis, unless instructed otherwise, until five consecutive working days of readings do not worsen the settlement by more than 5% of the Maximum Allowable.

   b. Contractor Response Value: The Contractor shall provide written notice and meet with the City Representative within 24 hours to discuss his means and method to determine what changes shall be made to better control ground movement. The Contractor shall actively control ground movement in accordance with the approved plan to prevent reaching the Shutdown Value:

   c. Shutdown Value: Contractor shall stop all work immediately and provide written notice within one hour upon occurrence. The Contractor shall meet with the City Representative to develop a plan of action before the work can be resumed. A drop-test will be performed by CDD prior to continuation of work.

E. Arrangement with Utility Companies

The Contractor shall make all necessary arrangements with the public service utility companies and obtain all necessary permits for any work or alteration of facilities as may be required due to the above described work.

E. Street and Sidewalk Restoration

Sidewalk and pavement restoration shall include the replacement of traffic lane(s) and crosswalk stripes, parking stall markings, and curb painting that might be obliterated during the installation/removal of the SRPs and SMPs construction.

F. Expose, Test, Realign, and Repair of AWSS Facilities

1. Requirement of Repair Work

Should readings from any two sets of surveys indicate a change in deflection at or exceeding the Shut Down Value, the Contractor shall stop all construction work in the vicinity of the AWSS facilities until the AWSS facilities have been inspected, repaired, if necessary, and the CDD Representative authorizes the Contractor to resume construction work.

If the CDD Representative determines that repairs are required, the Contractor will be responsible for preparing and restoring the site(s) for repairing the damaged joint(s). Repair of damaged joint(s) shall be done by CDD at Contractor's expense.

Site preparation and restoration will include

a. Contractor shall submit for review and approval by CDD Engineering, structural plans and details for the support and protection of AWSS facilities in the vicinity during repair of the damaged joint;

b. Contractor shall support and protect AWSS facilities per approved submittal(s);

c. Contractor shall excavate a trench as required by CDD Engineering to expose the damaged AWSS pipe joint for repair purposes;

d. Upon direction and approval from a CDD Representative, Contractor shall remove support and protection devices, and restore facilities as described in this Section; and

e. CDD Representative shall inspect and approve all site preparation and restoration for AWSS joint repair work.

2. Contractor Responsible for all Costs

Exposure and restoration, testing, realignment, replacement, and repair of existing AWSS facilities as described in this Section including furnishing of materials, labor, equipment including pump and tools necessary, or required, to do such work shall be at the expense of the Contractor.

The Contractor shall be responsible for all CDD labor and material costs associated with repairing the damaged AWSS facilities.

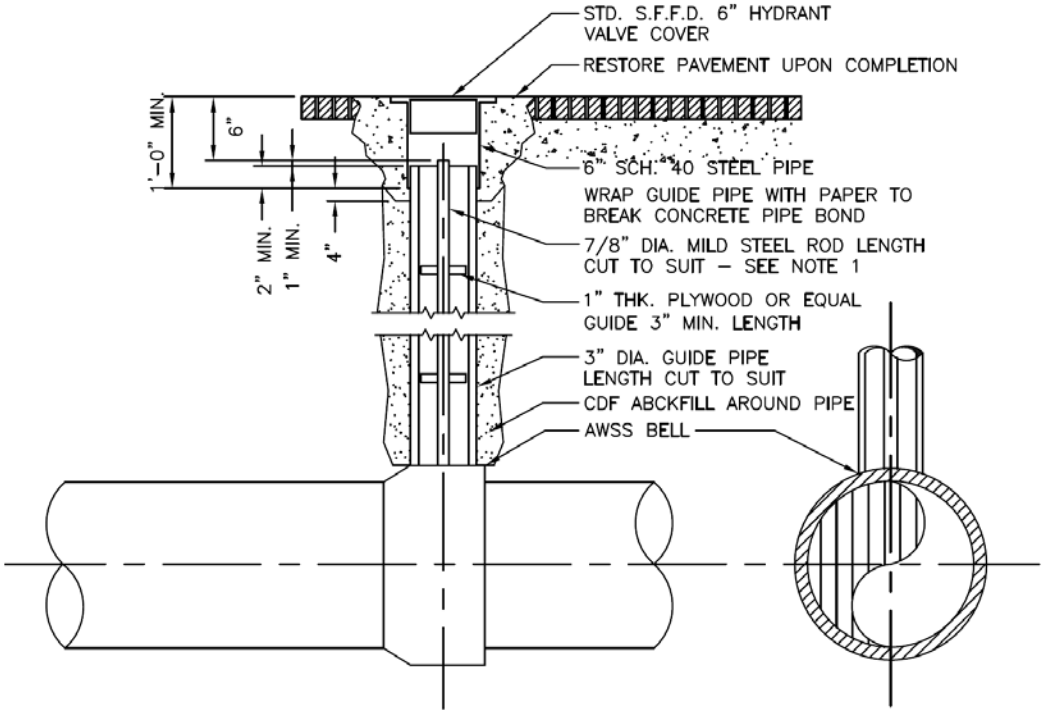
3. Testing

The Contractor is hereby notified that change in deflection of an AWSS pipe joint will require all the joints between two adjacent SRPs (on each side of the surveyed joint) to be exposed and realigned to the original alignment. The realignment of the pipe shall require CDD to isolate the pipe by closing gate valve(s), testing the aligned pipe at a pressure of 350 psi (or other pressure designed by the CDD Engineer), repair any joints showing leakage or lead extrusions, and reactivating the pipe.

A CDD Representative will witness all pressure tests when performed by the Contractor where alignment of the pipe is not required. The Contractor shall inform CDD Engineering a minimum of five (5) business days before all tests.

NOTES:

1. THE CONTRACTOR SHALL REPORT THE LENGTH OF THE ROD TO THE NEAREST HUNDREDTH OF A FOOT TO THE CITY.
2. PLYWOOD SHALL BE PRESS FIT TO THE 7/8"ø STEEL ROD AND SHALL FLOAT IN THE GUIDE PIPE.
3. MONITORING HOLE COVER AND FRAME ASSEMBLIES SHALL BE RATED FOR H-20 LOADING.
4. CONTRACTOR SHALL RESTORE ROADWAY TO (E) CONDITIONS UPON COMPLETION OF SURVEY WORK.



CITY AND COUNTY OF SAN FRANCISCO
PUBLIC UTILITIES COMMISSION
SAN FRANCISCO WATER DEPARTMENT

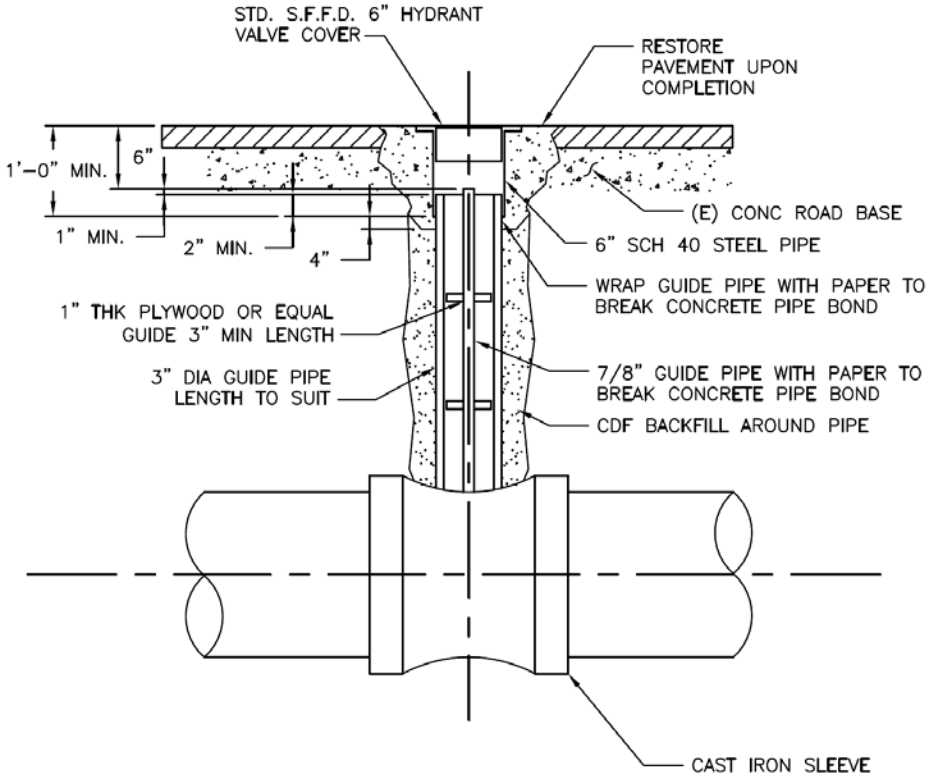
AUXILIARY WATER SUPPLY SYSTEM - STANDARD DETAILS

AWSS SETTLEMENT MONITORING POINT FOR BELL AND SPIGOT PIPE

	BY: DOUG LEE	DR: GLORIA CHU	DRAWING NO.
APPROVED: SAM YOUNG	CH: THANH NGUYEN	SCALE: NONE	HPL-5993
CDD MANAGER: KATIE MILLER	DATE: 01/2015	VERSION:	

NOTES:

1. THE CONTRACTOR SHALL REPORT THE LENGTH OF THE ROD TO THE NEAREST HUNDREDTH OF A FOOT TO THE CITY.
2. PLYWOOD SHALL BE A PRESS FIT TO THE 7/8"ø STEEL ROD AND SHALL FLOAT IN THE GUIDE PIPE.
3. MONITORING HOLE COVER AND FRAME ASSEMBLIES SHALL BE RATED FOR H-20 LOADING.
4. CONTRACTOR SHALL RESTORE ROADWAY TO (E) CONDITIONS UPON COMPLETION OF SURVEY WORK.



CITY AND COUNTY OF SAN FRANCISCO
PUBLIC UTILITIES COMMISSION
SAN FRANCISCO WATER DEPARTMENT

AUXILIARY WATER SUPPLY SYSTEM -- STANDARD DETAILS

AWSS SETTLEMENT MONITORING POINT FOR DOUBLE SPIGOT PIPE

	BY: DOUG LEE	DR: GLORIA CHU	DRAWING NO.
APPROVED: SAM YOUNG	CH: THANH NGUYEN	SCALE: NONE	HPL-5993.1
CDD MANAGER KATIE MILLER	DATE: 01/2015		

END OF SECTION

APPENDIX 5: LIST OF PAST, PRESENT, AND REASONABLY FORESEEABLE PROJECTS IN THE VICINITY OF THE PROJECT CORRIDOR

TABLE A. PAST, PRESENT, AND REASONABLY FORESEEABLE LAND USE PROJECTS, PLANS, AND TRANSPORTATION PROJECTS IN THE VICINITY OF THE PROJECT CORRIDOR

Case Number	Address/Project Name	Project Summary[a]
Land Use Projects		
2008.1084E	706 Mission Street	The project would renovate the existing Aronson Building and construct a new 47-story, 550-foot-tall tower, including a mix of residential, museum, restaurant/retail, and possibly office uses. The project is currently under construction.
2007.1464PRJ	1040/1036 Mission	The project would create a 100 percent affordable residential mid-rise building, consisting of 106 dwelling units with ground-floor retail. Construction of the project is complete.
2005.1018E	570 Jessie Street	Demolish existing 15,000 square feet of office/printing shop and construct 47 dwelling units and 24 parking spaces. Construction of the project is complete.
2005.1101E_3	2 New Montgomery Street	The project would convert 25 hotel rooms to residential use and construct a new 17-story addition (680 feet tall with 125 dwelling units). Project is on hold as of October 2014.
2005.0979E	1390 Market Street (Assessor's Block 0813/006)	The project would demolish an existing two-story retail and office building and construct a new 120-foot-tall, 11-story building with up to 250 dwelling units and approximately 20,000 gross square feet of ground-floor retail use. There would be no change to the existing Fox Plaza mixed-use tower. The project received CEQA clearance in 2009.
2005.0540C/ 2013.1051C	1401–1415 Mission Street	The project would allow construction of a 15-story, 150-foot-tall mixed-use development, including 190 units, 4,400 gross square feet of commercial/retail space, and approximately 38,000 gross square feet of mechanical/storage/circulation/service areas. The project received CEQA clearance in 2015. Construction of the project is complete.

Case Number	Address/Project Name	Project Summary[a]
2006.1523E_5	50 First Street	The project would include a new 61-story, 850-foot-tall building with 34 stories of office and a potential 5-story street-level urban room or atrium below 22 stories containing 124 dwelling units. The project received CEQA clearance in 2016. The project is currently under construction.
2007.0604E	1145 Mission Street	The project would include a new 6-story building with 25 dwelling units and ground-floor retail. The project received CEQA clearance in 2017.
2009.0159E	One Oak Street (formerly 1500–1540 Market Street) (Assessor's Block 0836/002)	The project would demolish two buildings and construct a 40-story mixed-use residential building. The project would include 310 residential units with ground-floor commercial space, one off-street loading space, and a subsurface parking garage for residents. The project received CEQA clearance in 2017.
2011.0409E	925 Mission Street (5M)	The project would include substantial development of office, retail, residential, cultural, educational, and open space uses in the southwest quadrant of Fifth and Mission streets, including buildings of up to 470 feet in height. The project received CEQA clearance in 2017.
2011.1043E	1400 Mission Street (Assessor's Block 3507/042)	The project would include an approximately 150-foot-tall, 10- to 15-story mixed-use building on an approximately 25,000-square-foot lot. It would provide approximately 242,000 gross square feet of space for approximately 190 affordable housing units over approximately 4,400 gross square feet of ground-floor retail space, with 42 off-street parking spaces. The project received CEQA clearance in 2013. Construction of the project is complete.
2011.0702E	101 Polk Street (Assessor's Block 0811/002 and 003)	The project would construct a 13-story, 162-dwelling unit residential building with 51 subgrade parking spaces on a site that currently contains a surface parking lot. The project received CEQA clearance in 2013. Construction of the project is complete.
2012.0678E	19–25 Mason Street and 2–16 Turk Street	The project would include replacement of a parking lot with a 12-story, 120-foot-tall building with 155 dwelling units, ground-floor retail, and 68 off-street parking spaces. The project received CEQA clearance in 2015.
2012.1531E	351V Turk Street and 145 Leavenworth Street	The project would include the construction of two 8-story, 80-foot-tall, group housing buildings with 238 group housing rooms. The project received CEQA clearance in 2014.

Case Number	Address/Project Name	Project Summary[a]
2012.1123E_3	1100 Market Street (Assessor's Block 0351/001)	The project would include exterior improvements to the existing building. This project received CEQA clearance in 2012. Construction of the project is complete.
2012.0877E	1546–1564 Market Street (Assessor's Block 0836/007)	The project would construct 110 dwelling units. The project is currently under construction.
2013.0154E	Moscone Center Expansion	This project would include an increase in the size of Moscone Center from about 945,200 gross square feet to 1,156,300 gross square feet. . Construction of the project is complete.
2013.0276E_3	350 Mission Street	The project would include a six-story addition to a 24-story, 375-foot-tall building, resulting in 420,000 square feet of office space plus retail and parking. Construction of the project is complete.
2013.1179E	1700 Market Street (Assessor's Block 0855/016)	The project would demolish an existing two-story building and construct an eight-story mixed-use residential building (up to 48 dwelling units) with approximately 1,500 gross square feet of ground-floor retail. The project received CEQA clearance in 2014. The project is currently under construction.
2013.1753E	1066 Market Street (Assessor's Block 0350/003)	The project would construct up to 330 dwelling units. The project received CEQA clearance in 2017. The project is currently under construction.
2013.1690E	1075 Market Street (Assessor's Block 3703/062)	The project would construct 90 dwelling units. The project received CEQA clearance in 2016. . Construction of the project is complete.
2013.1049E	950–974 Market Street (Assessor's Block 0342/001)	The project would demolish the buildings and parking lot/structure and construct a 12-story mixed-use building with 242 dwelling units, a 232-room hotel, and approximately 16,600 gross square feet of commercial retail space. The project received CEQA clearance in 2016. The project is currently under construction.
2017-003134CUA	72 Ellis Street (Assessor's Block 0327/011)	The project would demolish a surface parking lot and construct an 11-story, 125-foot-tall hotel, consisting of approximately 192 rooms, a lobby, accessory meeting rooms, and retail. The project originally received CEQA clearance in 2001; a 2-year extension of the performance period was granted in January 2018.

Case Number	Address/Project Name	Project Summary[a]
2013.1005E	22–24 Franklin Street (Assessor's Block 0836/011-012)	The project would demolish the existing commercial building and construct an eight-story, 85-foot tall mixed-use building. The building would include 35 dwelling units and 2,100 gross square feet of retail space. The project received CEQA clearance in 2016. The project is currently under construction and nearing completion.
2013.1458E	198 Valencia Street	This project would demolish existing one-story, 1,900 square foot oil change facility and a surface parking lot with seven off-street parking spaces and construct a five-story, 55 foot-tall, 33,795 gross square foot mixed-use building (6,269 gross square feet of ground-floor commercial space and a subterranean garage to accommodate 19 off-street parking spaces on, with 28 residential units (16 one-bedroom units and 12 two-bedroom units) on the first through fourth-floor levels. The project received CEQA clearance in 2016.
2013.0511E	1125 Market Street (Assessor's Block 3702/047)	The project would construct a 160-room mixed-use hotel. The project is currently under environmental review.
2013.0973E	150 Van Ness Avenue	The project would construct a 13-story over-basement-level mixed-use residential building. Construction of the project is complete.
2013.1305E	1532 Howard Street	The project would construct a six-story single-room-occupancy building. Construction of the project is nearing completion.
2014.1060ENV	1870 Market Street	The project would demolish a vacant single-story, 600-gross-square-foot commercial building and a four-vehicle surface parking lot and construct an approximately eight-story, 85-foot-tall (with an additional 16 feet for the mechanical and staircase penthouses) mixed-use development. The approximately 16,300-gross-square-foot building would be comprised of approximately 12,900 gross square feet of residential space and 400 gross square feet of ground-floor commercial space. The proposed project would provide approximately 10 dwelling units. No off-street parking is proposed. The project received CEQA clearance in 2017. Construction of the project is complete.

Case Number	Address/Project Name	Project Summary[a]
2014.0964ENV	1228 Folsom Street	The project would merge three lots into one lot, demolish a 16,450-square-foot building, and construct a new 41,440-square-foot mixed-use building with 24 residential units and 1,110 square feet of ground floor commercial use. The building would be 65 feet tall (79 feet tall with elevator penthouse) and six stories on its Folsom Street frontage and 45 feet tall and four stories on its Clementina Street frontage. The project received CEQA clearance in 2016.
2014.0484E	1699 Market Street (Assessor's Block 3504/030)	The project would construct 160 dwelling units. The project received CEQA clearance in 2016. The project is currently under construction.
2014.0409E	1740 Market Street (Assessor's Block 0855/010)	The project would demolish an existing 25,000-gross-square-foot commercial building and construct a nine-story, 85-foot-tall mixed-use building with 110 group housing units and approximately 7,600 gross square feet of ground-floor retail space. The project received CEQA clearance in 2016.
2014.0241E	1028 Market Street (Assessor's Block 0350/002)	The project would construct 186 dwelling units. The project received CEQA clearance in 2017.
2014.0408E	1053 Market Street (Assessor's Block 3703/066)	The project would construct a 155-room tourist hotel. A planning application was filed for the project in 2014. The project received CEQA clearance in 2017.
2014-000803PRJ	1095 Market Street (Assessor's Block 3703/059)	The project would construct a 202-room tourist hotel/motel with 3,992 gross square feet of retail space. The project is currently under environmental review. Construction of the project is nearing completion.
2014.0926ENV	1270 Mission Street	The project would replace a single-story commercial building and surface parking lot with 13-story, 120-foot-tall mixed-use building with 199 dwelling units. The project received CEQA clearance in 2016.
2014-000362	1500 Mission Street (Assessor's Block 3506/006, 3506/007, 3506/008-011 [4 lots]))	The project would construct 767,200 gross square feet of residential uses (including 560 dwelling units) and 567,300 gross square feet of City office uses. The project received CEQA clearance in 2017. The project is currently under construction.

Case Number	Address/Project Name	Project Summary[a]
2014.1121ENV	1601 Mission Street (Assessor's Block 3514/043)	The project would demolish gas station facilities and construct a 120-foot-tall, 12-story mixed-use building with up to 220 dwelling units, 6,756 gross square feet of retail space, 145 bicycle parking space, and 102 below-grade vehicle parking spaces that would be accessed from South Van Ness Avenue. The building would include a publicly accessible mid-block alley and public realm improvements. The project received CEQA clearance in 2016.
2014.1423V	1 Franklin Street (Assessor's Block 0837/003)	The project would replace a 32-space surface parking lot with a mixed-use building, consisting of residential, retail, and parking spaces. The project did not require environmental review. Construction of the project is complete.
2014-002330ENV	Parcel M (300 Octavia Street) (Assessor's Block 0832/025) and Parcel N (350 Octavia Street) (Assessor's Block 0832/025)	The project site consists of two discontinuous vacant lots along the east side of Octavia Street, between Fell and Oak streets. Parcel M is an approximately 2,200-square-foot lot with frontages on Fell, Octavia, and Hickory streets; Parcel N is an approximately 2,300-square-foot lot with frontages on Oak, Octavia, and Hickory streets. The project includes construction of two 55-foot-tall (70 feet with elevator penthouse), five-story mixed-use buildings. No off-street parking is proposed. In total, the project would involve construction of 32 residential units, approximately 1,400 gross square feet of commercial uses, and 32 bicycle parking spaces. The project received CEQA clearance in January 2016.
2014.1322ENV	Parcel R and Parcel S (Assessor's Block 0838/034, 035, 093-096)	The project would develop a vacant lot by constructing an approximately 34,504-gross-square-foot mixed-use development, consisting of two dwellings with approximately 19,492 gross square feet of affordable housing and approximately 4,925 gross square feet of neighborhood-serving retail. This project was on hold as of December 2016.
2014.1509DRP	Parcel T/188 Octavia (Assessor's Block 0853/033, 034, and 022)	The project would construct a five-story, 55-foot-tall (71 feet with elevator penthouse) mixed-use building with up to 27 dwelling units above ground-floor commercial space. No off-street parking is proposed. The project received CEQA clearance in March 2017 and is currently under construction.

Case Number	Address/Project Name	Project Summary[a]
2015-004568PRJ	10 South Van Ness Avenue (Assessor's Block 3506/004)	The project would demolish an existing two-story building and construct a mixed-use residential building with up to 984 residential units, retail space on the ground floor, and two below-grade levels for parking and loading activities (up to 518 vehicle parking spaces and seven freight loading spaces), which would be accessed from a single curb cut and driveway on 12th Street. Two project design options are being considered: the "project," a two-tower design with two separate 41-story, 400-foot-tall towers (420 feet to the top of the elevator penthouses) on top of podiums, and the "single tower project variant," a single 55-story, 590-foot-tall tower (610 feet to the top of the elevator penthouses) on top of a podium. The project would include approximately 48,000 gross square feet of usable open space, including an approximately 3,000-square-foot mid-block alley that would provide a pedestrian connection between South Van Ness Avenue and 12th Street; the single tower project variant would include approximately 47,000 square feet of open space and the mid-block pedestrian alley. The project is currently under environmental review.
2015-010013ENV	30 Otis Street (Assessor's Block 3505/016)	The project would demolish buildings and construct an approximately 27-story, 250-foot-tall mixed-use building. It would include up to 423 dwelling units and approximately 5,600 gross square feet of retail space. In addition, 17,000 gross square feet of arts activity space would be used by the City Ballet School, which currently operates onsite. The project received CEQA clearance in November 2018. The project is under construction.

Case Number	Address/Project Name	Project Summary[a]
2015-005848ENV	1629 Market Street (1601–1637 Market Street, 1125 Stevenson Street, 53 Colton Street [Plumbers Union site]) (Assessor's Block 3505/001, 007, 008, 027, 028, 029, 031, 031A, 032, 032A, 033, 033A, 035), 1601–1937 Market Street/53 Colton Street (Assessor's Block 3505/001)	The project would demolish the existing UA Local 38 building (1621 Market Street), demolish the majority of the Lesser Brothers Building (1629–1645 Market Street), rehabilitate the Civic Center Hotel (1601 Market Street), and demolish the 242-space surface parking lots. In total, the project would construct five new buildings (ranging from four to 10 stories, 58 to 85 feet tall). The project would include 477 market-rate residential units and 107 affordable supportive housing units. The project would also include construction of the 18,300-square-foot Brady Open Space at the northeast corner of Brady and Colton streets. Within the new buildings, there would be approximately 13,000 gross square feet of ground-floor retail/restaurant space. The project would construct 584 dwelling units; a planning application was filed for the project in 2015. The project received CEQA clearance in October 2017.
2015-007525ENV	111 Turk Street (57 Taylor Street) (Assessor's Block 0343/001)	The project would demolish a portion of the existing structure (vacant retail space) and construct of a 12-story over-basement mixed-use residential group housing and retail building with 190 dwelling units. The project is currently under environmental review.
2015-015253ENV	996 Mission Street (Assessor's Block 3704/025)	The project would demolish a two-story residential hotel building and construct of an eight-story hotel (two floors for residential hotel units and five floors for a tourist hotel) with ground-floor retail. The project is currently on hold.
2015.012994ENV	200-214 Van Ness Avenue	The project would demolish two buildings, a three-story building with 27 dwelling units (200 Van Ness Avenue) and a two-story building, approximately 12,000 gross square feet. The project would merge the two parcels and construct a 12-story mixed-use building to provide housing and other facilities for the San Francisco Conservatory of Music. The proposed building would have approximately 113 units (420 beds), three faculty housing units, 27 housing units to replace the 27 existing units at 200 Van Ness Avenue, approximately 50,000 gross square feet of institutional uses, approximately 4,300 gross square feet of broadcast studio space, and 2,600 gross square feet of restaurant space. The project received approval in April 2018. The project is currently under construction.

Case Number	Address/Project Name	Project Summary[a]
2015-000940ENV	30 Van Ness Avenue (Assessor's Block 0835/004)	The project's approximately 790,000 gross square feet would include 21,000 gross square feet for retail, 350,000 gross square feet for general office, and 520,000 gross square feet for residential uses (including 610 residential units). The project is being analyzed as part of the Hub Plan environmental review process (discussed below).
2015-000940ENV	33 Gough Street Project (Assessor's Block 3504/029)	The project's approximately 420,000 gross square feet would include a mix of approximately 304,000 gross square feet for market-rate and affordable residential uses (518 residential units), approximately 5,600 gross square feet for commercial uses (retail), and 8,400 gross square feet for common indoor spaces. The project is currently under environmental review.
2015-000940ENV	98 Franklin Street (Assessor's Block 0836/008, 009, and 013)	The project's approximately 469,100 gross square feet would include a mix of approximately 349,200 gross square feet of market-rate and affordable residential uses (354 total apartment units), approximately 3,100 gross square feet of commercial uses (retail), and approximately 75,000 gross square feet of school uses. The project is being analyzed as part of the Hub Plan environmental review process (discussed below).
2015-014148ENV	1245 Folsom Street (3756/041)	The project would demolish existing one story of Alt School and construct a seven-story at Folsom street and five-story at Ringold Street mixed-use building. The building would include 37 residential units above a two-story commercial space at the ground floor, with parking space at basement level. The project received CEQA clearance in September 2018.
2015-012878ENV	1695 Folsom Street	The project would construct a building that includes five stories, one basement, and four dwelling units. The project is currently under environmental review.
2016-005406ENV	42 Otis Street (Assessor's Block3505/020)	The project would replace the existing building with a 15,805-gross-square-foot, five-story, 55-foot-tall mixed-used building. The proposed building would include 24 single-occupancy residential units on the upper floors and 1,900 gross square feet of ground-floor commercial space fronting Otis Street. No off-street parking would be provided. The project is currently under environmental review.

Case Number	Address/Project Name	Project Summary[a]
2016-013184ENV	973 Mission Street (Assessor's Block 3725/078)	The project would build out a currently open (warm shell) space of approximately 16,000 gross square feet to configure it for use by Proof School. The project is currently under environmental review.
2016-007303ENV	5 Third Street (Hearst Building) (Assessor's Block 3707/057)	The project would include a change of use for the existing Hearst Building to include hotel, roof deck, office, and retail space. The project is currently under environmental review.
2016-011827ENV	1500-1528 15th Street	The project would demolish existing automotive sales office and smog check facility and parking area to construct an eight story, 62,100-gross-square-foot building with approximately 1,300 square feet of ground floor retail and 184 group housing units. No off-street parking is proposed. The project is under environmental review as of 2017.
Plans		
2004.0160E	Eastern Neighborhoods Rezoning and Area Plans	The Eastern Neighborhoods Rezoning and Area Plans would involve the introduction of new use (zoning) districts, including districts that would permit at least some PDR uses in combination with commercial uses, districts mixing residential and commercial uses, residential and PDR uses, and new residential-only districts. The new districts would generally replace existing industrial, commercial, and residential single-use districts. In addition to zoning changes, the project would include revisions to the existing Central Waterfront and South of Market Area Plans within the San Francisco General Plan and the preparation and adoption of new area plans for East SoMa, the Mission, Showplace Square/Potrero Hill and the Central Waterfront. The project received CEQA clearance in 2008.
2003.0347E	Market and Octavia Area Plan	The Market and Octavia Area Plan proposes new and amended zoning and height and bulk districts throughout the area as well as transit preferential, bicycle and pedestrian-oriented street and public space improvements. The project received CEQA clearance in 2007.

Case Number	Address/Project Name	Project Summary[a]
2008.0877E	Western SoMa Community Plan	The Western SoMa Community Plan consists of three separate components: (1) adoption of the Western SoMa Community Plan; (2) the rezoning of 46 parcels, comprising 35 lots, two proximate to the draft plan boundary, to reconcile their use districts with those of the neighboring properties; and (3) a mixed-use project at 350 Eighth Street, within the Western SoMa Community Plan Area, consisting of approximately 444 dwelling units, approximately 34,000 gross square feet of commercial space, approximately 8,150 gross square feet of light industrial/artist space, and approximately 1,400 gross square feet of community space. The project received CEQA clearance in 2012.
2011.1356E	Central SoMa Plan	The Central SoMa Plan (formerly, Central Corridor Plan) is a comprehensive plan for the area surrounding much of the southern portion of the Central Subway transit route, a 1.7-mile extension of the Third Street light-rail line, which will link the Caltrain depot at Fourth and King streets to Chinatown and provide service within the SoMa area. The Central SoMa Plan area includes roughly 230 acres, comprising 17 city blocks, as well as the streets and thoroughfares that connect SoMa to its adjacent neighborhoods: Downtown, Mission Bay, Rincon Hill, and the Mission District. The Central SoMa Plan would rezone the area for a variety of land uses, including residential and retail, and increase height limits in some areas. The Central SoMa Plan would also propose improvements for streets and open spaces in the area. The project received CEQA clearance in 2018.
N/A	Civic Center Public Realm Plan	The Civic Center Public Realm Plan will create a unified vision for medium- and long-term improvements to Civic Center's plazas, streets, and other public spaces. The plan is an interagency effort managed by the planning department and part of the City's larger Civic Center initiative to improve the area by creating both a neighborhood gathering space and a public commons for all San Franciscans. The project is in its design phase. Environmental review is anticipated to begin in 2019, with plan adoption in late 2020.

Case Number	Address/Project Name	Project Summary[a]
2015-000940ENV	The Hub Plan, 30 Van Ness Avenue Project, 98 Franklin Street Project, and Hub Housing Sustainability District (HSD)	The Hub Plan, which is an amendment to the 2008 Market and Octavia Area Plan, is a comprehensive plan for the easternmost portions of the Market and Octavia Area Plan as well as two individual development projects within the Hub Plan area at 30 Van Ness Avenue and 98 Franklin Street. The Hub HSD would be designated within all or portions of the Hub Plan area. The Hub Plan seeks to encourage housing, especially affordable housing; create safer and more walkable streets as well as welcoming and active public spaces; increase transit capacity and make transit services more reliable; and create a complete neighborhood with adequate services and amenities. The Hub Plan would pursue this vision through changes to current zoning controls in the area to meet plan objectives. This would include changes to building heights for select parcels to allow more housing, including more affordable housing. Modifications to zoning controls would also allow more flexibility for development of nonresidential uses, specifically, institutional uses, art uses, and public uses. The plan also calls for public realm improvements to streets and alleys within and adjacent to the Hub Plan area. Requirements for micro retail would ensure a mix of retail sizes and uses. Parking requirements would be lowered to decrease the number of vehicles parked within the Hub Plan area, a transit-rich location. The project is currently under environmental review.

Case Number	Address/Project Name	Project Summary[a]
Transportation Projects		
2011.0558E	Muni Forward	Muni Forward (previously referred to as the Transit Effectiveness Project [TEP]) presents a thorough review of San Francisco's public transit system, initiated by SFMTA in collaboration with the City Controller's Office. Muni Forward is aimed at improving reliability, reducing travel times, providing more frequent service, and updating Muni bus routes and rail lines to match current travel patterns. Implementation of Muni Forward was initiated in 2015. Muni Forward recommendations include new routes and route realignments, increased service frequency and speed on busy routes, and elimination or consolidation of certain routes or route segments with low ridership. In addition, the TEP identified the need for "rapid," or "travel time reduction," networks, which are currently being planned or incorporated as a part of Muni Forward. For example, the 14 Mission Rapid Project (between the Daly City Bay Area Rapid Transit [BART] station and The Embarcadero) has been approved and implemented between 13th and Randall streets. It has reduced Muni collisions by 85 percent, improved reliability, and reduced travel time for 67,000 daily Muni riders. The Muni Forward project received CEQA clearance in 2014.
N/A	Polk Street Streetscape Project	The SFMTA, Public Works, and San Francisco Public Utilities Commission are implementing streetscape and utility improvements on Polk Street between Beach and McAllister streets. The aim of the project is to create a thriving and active corridor, enhance the pedestrian experience, complement bicycle and transit mobility, and support commercial activities. Interim safety improvements, part of overall streetscape improvements, have been implemented and include leading pedestrian intervals, daylighting at signalized and stop-controlled intersections, loading zone improvements, new accessible parking spaces, new shared lane markings (sharrows), and a new right turn on northbound Polk Street at Broadway. Environmental clearance was completed in 2015. Construction of the project is complete.

Case Number	Address/Project Name	Project Summary[a]
N/A	Van Ness BRT Project/Van Ness Improvement Project	The Van Ness BRT Project is a program to improve Muni bus service (i.e., the 90 San Bruno Owl, 47 Van Ness, and 49 Van Ness/Mission bus routes, including the planned 49R Van Ness-Mission Rapid route) along Van Ness Avenue between Mission and North Point streets through the implementation of operational improvements and physical improvements. The project will construct transit-only lanes in each direction of Van Ness Avenue within a median right-of-way. Other physical improvements will include high-quality and well-lit bus stations to improve passenger safety and comfort and streetscape improvements and amenities to make the street safer and more comfortable for pedestrians and bicyclists who access the transit stations. Operational improvements will include adjusting traffic signals to give buses more green-light time at intersections and providing real-time bus arrival and departure information to passengers to allow them to manage their time more efficiently. Construction of the project within the Van Ness Avenue right-of-way is currently underway; the current travel lane configuration during construction (i.e., two mixed-flow travel lanes in each direction, reduced from three mixed-flow travel lanes in each direction pre-construction) is consistent with the final number of mixed-flow travel lanes. The project also includes eliminating all left turns on Van Ness Avenue, except for the northbound left turn at Lombard Street and the southbound left turn at Broadway. To date, all planned left-turn restrictions have been implemented. Following completion of construction in 2019, bus service will be relocated to the median transit-only lanes, and the existing curbside bus stops on Van Ness Avenue at Market Street will be discontinued. New BRT stations in the southbound and northbound directions of Van Ness Avenue will be located at Market Street. The project received CEQA clearance in 2013 and began construction in 2017. Construction of the project is estimated to be complete in 2021.

Case Number	Address/Project Name	Project Summary[a]
N/A	Geary Rapid Project/Geary Boulevard Improvement Project	The Geary Rapid Project will provide transit and pedestrian infrastructure improvements along the corridor from Market Street to 34th Avenue, including improvements similar to those proposed under the Van Ness BRT Project. Phase 1 of Geary Rapid construction began in summer 2018, which will extend transit and pedestrian improvements from Market Street west to Stanyan Street, including enhanced bus stops, side-running bus-only lanes, and related streetscape improvements. Construction of Phase 1 improvements is expected to be complete by 2021.
N/A	Vision Zero	The City adopted Vision Zero in 2014. Vision Zero is a road safety policy that focuses on eliminating traffic deaths in San Francisco by 2024. To commence, SFMTA, in collaboration with other City agencies, prioritized more than 24 street engineering projects, which are to be completed within the first two years of adopting the policy; pedestrian improvements at more than 170 locations (identified through the WalkFirst pedestrian safety planning process) along high-injury corridors; and bicycle-related safety improvement projects. The key Vision Zero projects applicable to the proposed project include signals at the following alleyway locations: Mission and Ecker streets, Mission and Mint streets, Sixth and Stevenson streets, and Sixth and Jessie streets.

Case Number	Address/Project Name	Project Summary[a]
N/A	Central Subway Project	The Central Subway Project is the second phase of the Third Street light rail line (i.e., T Third), which opened in 2007. Construction is currently under way. The Central Subway will extend the T Third line northward from its current terminus at Fourth and King streets to a surface station south of Bryant Street, then go underground through a portal at I-80. From there, it will continue north to stations at Moscone Center (i.e., on the west side of Fourth Street between Folsom and Clementina streets); Union Square, providing passenger connections to Powell Street Station and BART; and Chinatown, with the line terminating at Stockton and Clay streets. Construction associated with utility relocation and tunneling has been completed. Work is under way to outfit the alignment with an overhead contact system, rails, telecommunications, signaling, and stations. Construction of the Central Subway is scheduled to be complete in 2019; revenue service is scheduled for 2019.
N/A	San Francisco Bicycle Plan	The San Francisco Bicycle Plan includes planned short-term improvements to Fifth Street, including class II bicycle lanes and class III bicycle routes in both directions between Market and Townsend streets. San Francisco Bicycle Plan improvements on Fifth Street would reduce the number of travel lanes and prohibit northbound and southbound left turns; other minor changes to lane geometry and on-street parking would be implemented. The project received CEQA clearance in 2009 and is currently being implemented.
N/A	San Francisco Bicycle Strategy	The SFMTA 2013–2018 Bicycle Strategy sets new directions and policy targets to make bicycling a part of everyday life in San Francisco. The key actions are designed to meet the SFMTA 2013–2018 Strategic Plan's mode share goal (i.e., 50 percent of all trips made using sustainable modes [walking, bicycle, public transit, vehicle sharing]).
N/A	Ford GoBike	In May 2015, Ford GoBike announced an expansion of the existing pilot system in San Francisco. New bike share stations were rolled out in phases through 2017, throughout SoMa and north of Market Street. Further expansion is planned in several locations, including Upper and Lower Haight, Japantown, North Beach, Westwood Highlands, the Marina District, Excelsior and Outer Mission, and farther west.

Case Number	Address/Project Name	Project Summary[a]
N/A	Upper Market Street Safety Project	The Upper Market Street Safety Project is a substantial, multi-phased effort to improve the safety and comfort of Market Street between Octavia Boulevard and Castro Street for all roadway users. The project is based on a data-driven approach to identifying collision hot spots and factors, and includes engineering recommendations for the corridor's complex 6-legged intersections, dedicated bike lane upgrades, and public realm improvements to enhance safety and comfort for people walking, driving, and bicycling. Project goals are to improve safety and comfort for all users by reducing the potential for conflict and by making travel along the corridor more predictable and intuitive. Implementation of near-term improvements was initiated in 2015 and is anticipated to be complete by 2020.
N/A	SFMTA Mission Street/South Van Ness Avenue/Otis Street Intersection Improvements	SFMTA Mission Street/South Van Ness Avenue/Otis Street Intersection Improvements[b] – The SFMTA is planning implementation of various improvements at the intersection of Mission/South Van Ness/Otis as well as along Otis and Mission Street in the vicinity of this intersection. This would be constructed by the Van Ness BRT Project. Key improvements would include: • Extending and/or creating a bulb out at the northeast corner of the intersection by up to 25 feet into the roadway to shorten the northern crosswalk, and potentially include landscaping/sidewalk furniture and bicycle racks and benches; • Conversion of the existing class III route (sharrows) along westbound (outbound) Mission Street to a class II bicycle route located adjacent to the planned right-turn only lane; • Redesign of the existing median on the east edge of the intersection of South Van Ness Avenue and Mission Street and relocate the median to the south to accommodate the westbound (outbound) right-turn only lane, the planned westbound (outbound) class II bicycle lane and allow for two-stage pedestrian crossing along the east crosswalk with a new pedestrian refuge island;

Case Number	Address/Project Name	Project Summary[a]
		• Extending the sidewalk (or bulb out) on the west side of the intersection between westbound (outbound) Otis Street and eastbound (inbound) Mission Street north into the roadway up to 12 feet to shorten the crossing distance between this sidewalk and the northwest corner of the intersection; • Widen the north sidewalk along westbound (outbound) Otis Street by five feet, from 10 feet to 15 feet wide. The sidewalk widening would extend from South Van Ness Avenue to Brady Street; • Installation of an eight-foot-wide transit island that would be five to six feet from the widened sidewalk on the north side of Otis Street and the transit island would be approximately 120 feet long; and • Relocating the existing parking on the north side of Otis Street from approximately 200 feet east of Brady Street to Gough Street from the curb to 9 to 12 feet south of the curb to allow for a parking-separated bikeway.
2007.0558E; 2008.0789E	Transbay Terminal and Transit Center District Plan	The project would include road diets, transit facilities, and bike facilities consistent with the Transit Center District Plan. The project received CEQA clearance in 2012. The SF Transit Center was completed in 2018. At time of publication of this EIR, Transbay bus routes are being routed to the Temporary Transbay Terminal rather than the SF Transit Center.
N/A	Second Street Improvement Project	Second Street Improvement Project includes a road diet from two to one through lane with right-turn pockets in each direction, cycle tracks in each direction, and new protected right-turn phases on Second Street. Construction is expected to be completed in 2019.
N/A	Sixth Street Road Diet Project	The Sixth Street Road Diet Project would reduce the number of vehicle lanes in each direction from two to one; it would also provide wider sidewalks, corner bulb-outs, new traffic signals, and new crosswalks at targeted intersections. Construction is anticipated to begin in winter 2019.

Case Number	Address/Project Name	Project Summary[a]
N/A	BART Market Street Canopies and Escalators Modernization Project	The project would include the installation of canopy covers over 22 of the Downtown San Francisco BART/Muni station entrances/exits along Market Street leading to the underground Embarcadero, Montgomery Street, Powell Street, and Civic Center/UN Plaza station concourses, as well as replacement and refurbishment of existing street-level escalators. The project is currently under detailed design review, with construction expected to commence in 2019 and be completed in 2025.
NA	Safer Taylor Street	The project would identify streetscape improvements on the section of Taylor Street between Market and Sutter streets to improve transportation safety and livability for all users of this corridor. Preliminary design options have been developed for Taylor Street, which include sidewalk widening, travel lane reductions, traffic signal modifications, and improved loading zones. The project is in the engineering and design phase.
NA	Turk Street Safety Project	The project identified transportation network improvements on the section of Turk Street between Market and Gough streets to provide a safer and more comfortable walking and bicycling environment as well as a more predictable and safer driving environment. As part of the project, the bicycle lane network on Turk Street was completed. The project has been implemented between Taylor and Polk streets and is coordinating with local City and development projects for other blocks.
NA	Powell Streetscape Project	The project would design and construct a new permanent streetscape layout for Powell Street between Geary and Ellis streets to enhance the quality and use of the public realm, improve safety for all street users, improve cable car safety and performance, and renew transportation infrastructure. Changes could include wider sidewalks, restrictions to vehicle access, and improved loading for businesses and hotels. The project is currently in the engineering and design phase.

Case Number	Address/Project Name	Project Summary[a]
NA	The Embarcadero Enhancement Project	The project would develop and implement improvements along The Embarcadero between Townsend and North Point streets. The project would focus on providing a physically protected two-way waterside bikeway to reduce conflicts with other modes, including shorter, more accessible pedestrian crossings; more efficient traffic signals and intersections; improved loading zones; and enhancements to streetcar operations. The project is completing the planning and conceptual design phase, which will be followed by environmental review and preliminary engineering. Improvements that could be implemented in the near term (e.g., removal of peak-period tow-away restrictions, implementation of a full-time green bike lane, crosswalk upgrades) were implemented in December 2018.
NA	27 Bryant Transit Reliability Project	The project would identify improvements to enhance the reliability of the 27 Bryant bus route, particularly north of Market Street, as well as improvements to the transportation network for people walking and bicycling. The project was recently initiated and is currently in the planning phase.
2018-014251ENV	Bike Lane Pilot on Valencia Street from Market Street to 15th Street	The project would include changes in parking and loading as well as other pedestrian safety improvements. The purpose of the project is to improve safety for cyclists and pedestrians. The project is a pilot program in that data would be collected as part of a study leading to the development of a long-term streetscape project along the corridor. Extensive evaluation of the pilot would help inform long-term streetscape changes. The project would include a parking-protected bike lane on Valencia from Market to 15th streets. Left turns off Valencia Street to Duboce Avenue would be restricted to accommodate separated signal phasing for right turns and through bicycles; eastbound left turns off Clinton Park would be restricted during school hours. Concrete parking buffers/accessible paths for portions of the corridor with school loading would be included. The project is currently in the construction phase.

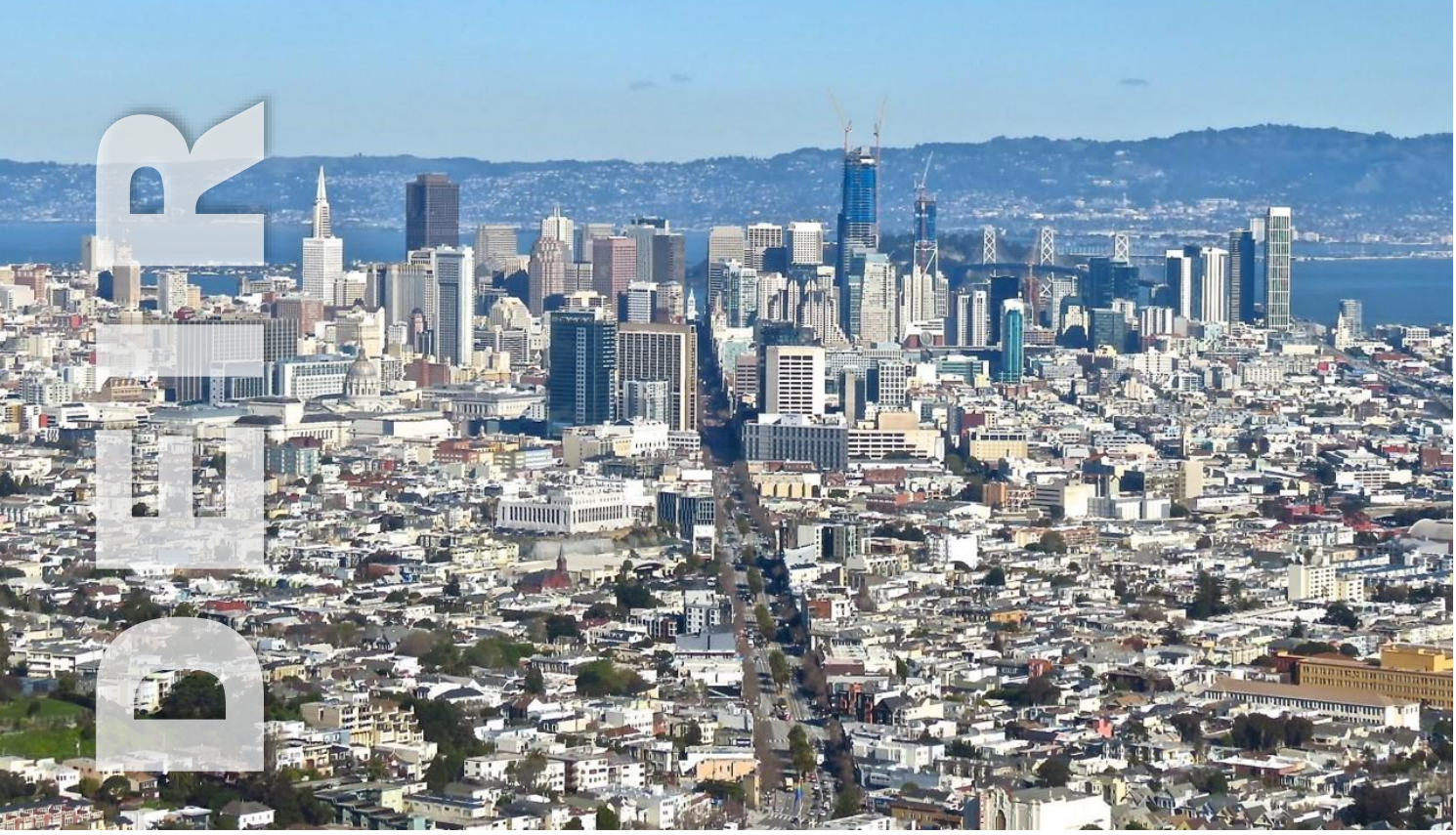
Case Number	Address/Project Name	Project Summary[a]

Notes:

a. Project summaries are based on the best available information as of January 2019.

b. SFMTA – Mission Street/South Van Ness Avenue/Otis Street Certificate of Determination Exemption from Environmental Review. A copy of this report is available for review at the San Francisco Planning Department, 1650 Mission Street Suite 400, San Francisco as part of Case File No. 2014.002258ENV.

Source: San Francisco Planning Department 2019.



DRAFT ENVIRONMENTAL IMPACT REPORT

Better Market Street Project EIR
APPENDIX 6: CULTURAL RESOURCES SUPPORTING INFORMATION

PLANNING DEPARTMENT
CASE NO. 2014.0012E

STATE CLEARINGHOUSE NO. 2015012027

	Draft EIR Publication Date:	**February 27, 2019**
	Draft EIR Public Hearing Date:	**April 4, 2019**
	Draft EIR Public Comment Period:	**February 28, 2019 – April 15, 2019**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:
Chris Thomas, AICP | 1650 Mission Street, Suite 400 | San Francisco, CA 94103 or
christopher.thomas@sfgov.org

APPENDIX 6: CULTURAL RESOURCES SUPPORTING INFORMATION

APPENDICES

Appendix 6-1A: Historic Architectural Resources Locations Table

Appendix 6-1B: Historic Architectural Resources Map

Appendix 6-2: CEQA Historical Resources Summary Tables

Appendix 6-3: Cultural Landscape Evaluation

Appendix 6-4: Public Works Standard Archaeological Measures I-III

Appendix 6-1A: Historic Architectural Resources Locations Table

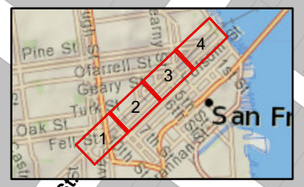
TABLE A-1. INDIVIDUAL CEQA HISTORIC ARCHITECTURAL RESOURCES WITHIN THE HISTORIC RESOURCES CEQA STUDY AREA

Map Number (each property is mapped in Figure A in this appendix)	Property Name	Location
1	Hyatt Regency	22 Drumm Street
2	Matson Building	215 Market Street
3	Pacific Gas and Electric Company General Office Building and Annex	245 Market Street
4	1 California Street	1 California Street
5	Mechanics Monument	Southwest side of the Mechanics Monument Plaza, located between Bush, Battery, and Market streets
6	Site of Invention of the Three-Reel Bell Slot Machine	Immediately northeast adjacent to the median on the north side of Market Street at the intersection of Battery, Bush, and Market streets
7	Standard Oil Building/Chevron Towers	555 Market Street
8	Crown-Zellerbach Building	1 Bush Street
9	The Flatiron Building	540-548 Market Street
10	Market Street Railway Substation (referenced in the project description as Downtown Traction Power Substation)	
11	550 Market Street	550 Market Street
12	554 Market Street	554 Market Street
13	560 Market Street	560 Market Street
14	The Chancery Building	562-566 Market Street
15	The Finance Building	576-580 Market Street
16	California Statehood Monument	Intersection of Market, Montgomery, and Post streets
17	The Palace Hotel	2 New Montgomery (633 Market Street)
18	660 Market Street	660 Market Street
19	The Old Chronicle Building	690 Market Street
20	Lotta's Fountain	Median on the north side of the intersection of Market, Geary, and Kearny streets
21	Humbolt Savings Bank Building	783-785 Market Street
22	James Bong Building	833 Market Street
23	Samuel's Clock	Sidewalk area in front of 856 Market Street
24	The Flood Building	870 Market Street
25	The Emporium	835 Market Street
26	Bank of Italy/ Bank of America	1 Powell Street

27	Wilson Building	973-977 Market Street
28	979-989 Market Street	979-989 Market Street
29	Hibernia Bank	1 Jones Street
30	Hotel Shaw	1100-1112 Market Street
31	Francesca Theater	1127 Market Street
32	Federal Building, 50 United Nations Plaza	50 United Nations Plaza
33	United Nations Plaza	2.6 acre public open space located between Market Street (to the south), Fulton Street (to the north), Charles J. Brenham Place (to the east), and Hyde Street (to the west); see sketch map in DPR for boundary
34	Orpheum Theater	1182 Market Street (2 Hyde Street)
35	Tourist Hotel	1666-1668 Market Street
36	Gaffney Building	1670-1680 Market Street
37	Edward McRoskey Mattress Factory	1687 Market Street
38	Hotel Fallon	1693-1695 Market Street
Marked with symbol	Path of Gold Light Standards	Discontiguous along Market Street
Marked with symbol	Path of Gold Associated Historic Utility Boxes	Discontiguous along Market Street
Marked with symbol	Shoreline Markers	Discontiguous along Market Street
Marked with symbol	Golden Triangle Light Standards	Discontiguous along Market Street

Source: ICF and San Francisco Planning Department, 2018-2019.

Appendix 6-1B: Historic Architectural Resources Map



Laguna St.
Waller St.
Octavia Blvd.
Haight St.
Gough St.
Rose St.
Lily St.
Page St.
Franklin St.
Oak St.
Van Ness Ave.
Fell St.
Hickory St.
Dr Tom Waddell Pl.
Hayes St.
Polk St.
Market St.
36
35
37
38
Valencia St.
Elgin Park.
McCoppin St.
Hwy 101
Stevenson St.
Jessie St.
Gough St.
Brady St.
Colton St.
12th St.
South Van Ness Ave.
11th St.
10th St.
Jessie St.
Otis St.
Mission St.
Mission St.

Path: \\PDCCITRDSGIS1\Projects_1\CCSF\00056_14_BetterMarketStreets\dataworking\31_ArchitecturalResourceMapping_20180524\mxd\Fig_XX_Appendix_Mapbook_ArchiteturalResources_20181214.mxd; User: 50660; Date: 2/20/2019

Note: Some of the historic and conservation districts extend outside the boundary of the map. In addition, portions of the Path of Gold, Path of Gold Associated Historic Utility Boxes, Golden Triangle Light Standards, San Francisco Auxiliary Water Supply System, and San Francisco Cable Cars National Historic Landmark that are located outside of the Historic Resources CEQA Study Area are not identified in this map to maintain the map's clarity. The historic districts shown in this figure were determined eligible for listing in local, state, or national inventories. Refer to Section 4.A, Cultural Resources, for more information on each district's eligibility.

Better Market Street Project
Case No. 2014.0012E

Source: Parcels, City and County of San Francisco 2014;
Streets, City and County of San Francisco 2014;
Building Footprints, City and County of San Francisco 2011;
Historic Resources CEQA Study Area, ICF and San Francisco
Public Works 2018; Historic Districts, San Francisco Planning Department 2018;
Path of Gold and Auxiliary Water Supply System, City and County of San Francisco 2018;
Golden Triangle and POG Associated Utility Boxes, ICF 2019.

0 100 200
Feet

- Historic Resources CEQA Study Area
- Market Street Cultural Landscape District
- LGBTQ Tenderloin Historic District
- Market Street Masonry Landmark District
- New Montgomery-Mission-2nd Street Conservation District
- Kearny-Market-Mason-Sutter Conservation District
- Uptown Tenderloin National Register Historic District
- Market Street Theatre and Loft National Register Historic District
- Civic Center Landmark District
- CEQA Historic Architectural Resource (see Table A.0 in this Appendix)
- San Francisco Cable Cars National Historic Landmark
- Path of Gold Light Standard
- Path of Gold Associated Historic Utility Box
- Golden Triangle Light Standard
- Shoreline Marker
- Auxiliary Water Supply System Cistern
- Auxiliary Water Supply System Hydrant

Figure A
Historic Districts, Conservation Districts, and Historic Architectural Resources within the Historic Resources CEQA Study Area (Sheet 1 of 4)

Path: \\PDCCITRDSGIS1\Projects_1\CCSF\00056_14_BetterMarketStreets\data\working\31_ArchitecturalResourceMapping_20180524\mxd\Fig_XX_Appendix_Mapbook_ArchiteturalResources_20181214.mxd; User: 50660; Date: 2/20/2019

Fulton St.
Grove St.
Larkin St.
Hyde St.
Leavenworth St.
Dale Pl.
Jones St.
Golden Gate Ave.
Taylor St.
Eddy St.
Turk St.
Mason St.
McAllister St.
Market St.
United Nations Plaza
32
33
34
29
30
31
28
27
Stevenson St.
9th St.
8th St.
7th St.
6th St.
Laskie St.
Jessie St.
Mint St.
Mission St.
Minna St.
hburn St.

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0 100 200
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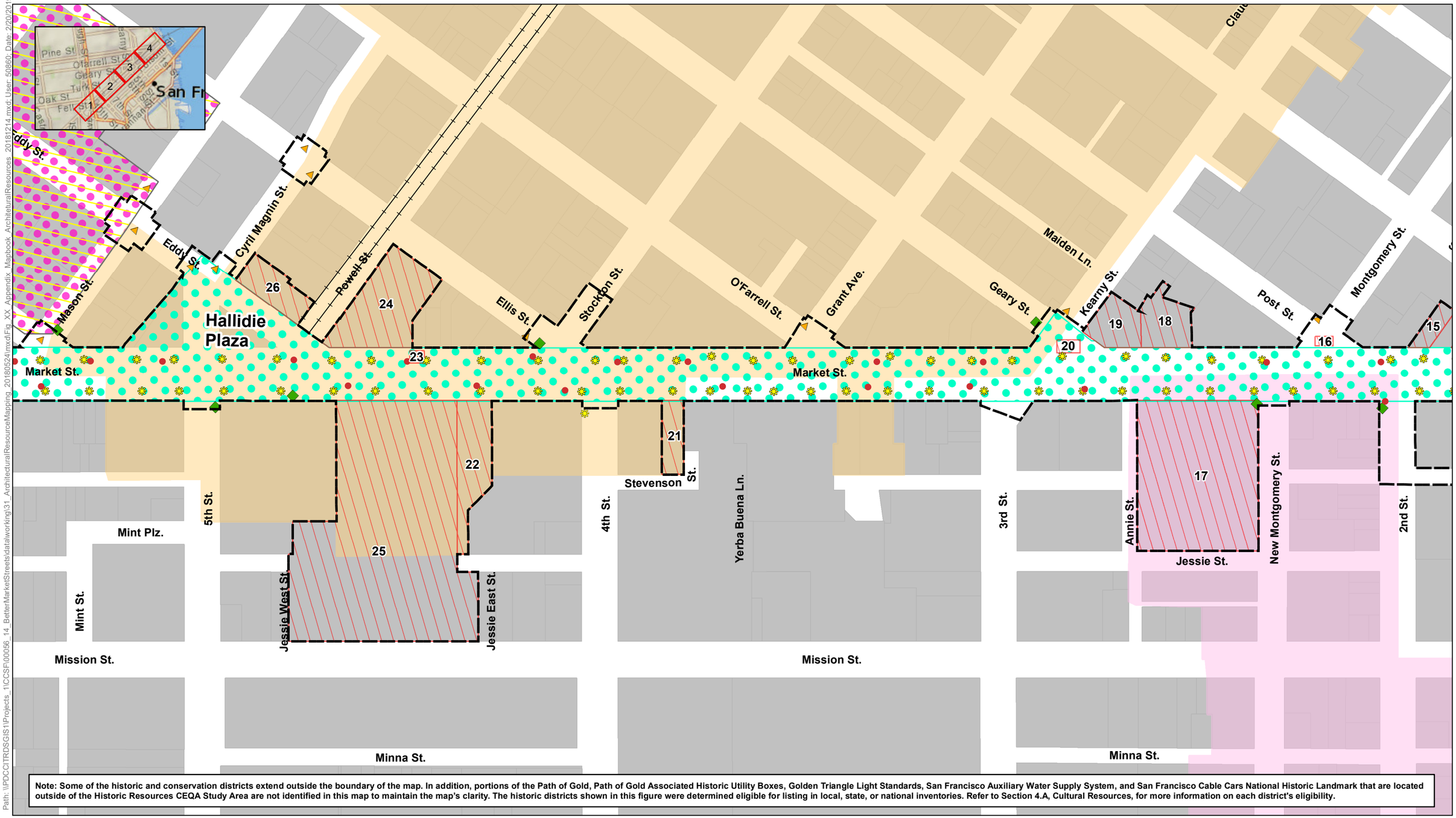
- Golden Triangle Light Standard
- Shoreline Marker
- Auxiliary Water Supply System Cistern
- Auxiliary Water Supply System Hydrant

Figure A
Historic Districts, Conservation Districts, and Historic Architectural Resources within the Historic Resources CEQA Study Area (Sheet 2 of 4)



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Better Market Street Project
Case No. 2014.0012E

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Golden Triangle and POG Associated Utility Boxes, ICF 2019.

0 100 200
Feet

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- Path of Gold Light Standard
- Path of Gold Associated Historic Utility Box
- Golden Triangle Light Standard
- Shoreline Marker
- Auxiliary Water Supply System Cistern
- Auxiliary Water Supply System Hydrant

Figure A
Historic Districts, Conservation Districts, and Historic Architectural Resources within the Historic Resources CEQA Study Area (Sheet 3 of 4)

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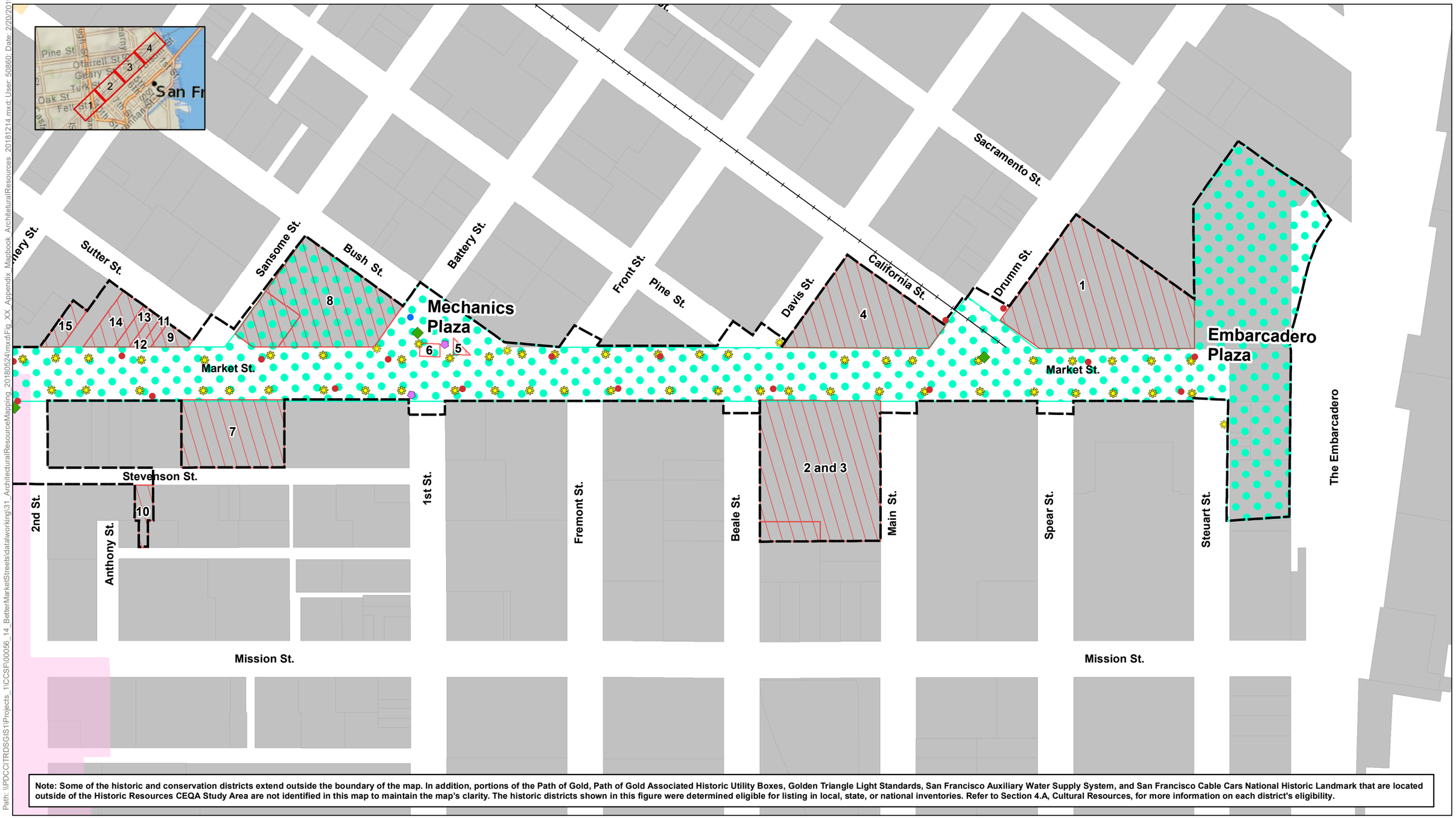
\ArchitecturalResourcesMapping_20180524\mxd\Fig_XX_Appendix_Mapbook_ArchiteturalResources



Note: Some of the historic and conservation districts extend outside the boundary of the map. In addition, portions of the Path of Gold, Path of Gold Associated Historic Utility Boxes, Golden Triangle Light Standards, San Francisco Auxiliary Water Supply System, and San Francisco Cable Cars National Historic Landmark that are located outside of the Historic Resources CEQA Study Area are not identified in this map to maintain the map's clarity. The historic districts shown in this figure were determined eligible for listing in local, state, or national inventories. Refer to Section 4.A, Cultural Resources, for more information on each district's eligibility.

Better Market Street Project
Case No. 2014.0012E

Source: Parcels, City and County of San Francisco 2014;
Streets, City and County of San Francisco 2014;
Building Footprints, City and County of San Francisco 2011;
Historic Resources CEQA Study Area, ICF and San Francisco
Public Works 2018; Historic Districts, San Francisco Planning Department 2018;
Path of Gold and Auxiliary Water Supply System, City and County of San Francisco 2018;
Golden Triangle and POG Associated Utility Boxes, ICF 2019.

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Feet

- Historic Resources CEQA Study Area
- Market Street Cultural Landscape District
- LGBTQ Tenderloin Historic District
- Market Street Masonry Landmark District
- New Montgomery-Mission-2nd Street Conservation District
- Kearny-Market-Mason-Sutter Conservation District
- Uptown Tenderloin National Register Historic District
- Market Street Theatre and Loft National Register Historic District
- Civic Center Landmark District
- CEQA Historic Architectural Resource (see Table A.0 in this Appendix)
- San Francisco Cable Cars National Historic Landmark
- Path of Gold Light Standard
- Path of Gold Associated Historic Utility Box
- Golden Triangle Light Standard
- Shoreline Marker
- Auxiliary Water Supply System Cistern
- Auxiliary Water Supply System Hydrant

Figure A
Historic Districts, Conservation Districts, and Historic Architectural Resources within the Historic Resources CEQA Study Area (Sheet 4 of 4)

Path: \\PDCCITRDSGIS1\Projects_1\CCSF00056_14_BetterMarketStreets\data\working\31_ArchitecturalResourceMapping_20180524\mxd\Fig_XX_Appendix_Mapbook_ArchitecturalResources_20181214.mxd; User: 50660; Date: 2/20/2019

Appendix 6-2: CEQA Historical Resources Summary Tables

MARKET STREET CULTURAL LANDSCAPE DISTRICT SUMMARY TABLES

The Market Street Cultural Landscape District is the only historic architectural resource analyzed in this document that includes identification of character-defining feature priority levels. Given the complex nature of the Market Street streetscape, the Cultural Landscape Evaluation (CLE)[1] assigned priority levels to help "evaluate the relative importance of landscape features as indicators of significance for Market Street." The presence of some landscape characteristics and character-defining features are more critical to integrity than others. As such, the priority level hierarchy establishes: **Priority 1** – Character-defining features are those features most critical to expressing association with a given area of significance and, subsequently, most essential to establishing integrity. For a landscape to be found to retain integrity, a majority of Priority 1 features must be retained. **Priority 2** – Character-defining features are those features that contribute meaningfully to expressing association with a given significance where aggregate loss of these features can greatly diminish the ability to read Market Street's associations with history. **Priority 3** – Character-defining features are those features least essential to the expression of Market Street's associations with history and where loss will diminish Market Street's integrity but not to the extent of making the landscape unreadable as a historic resource.

Table A-1, Table A-2, and Table A-3 identify priority levels for each of the character-defining features associated with Market Street's three significances.

- Table A-1 summarizes Market Street in terms of its significance as San Francisco's Main Circulation Artery and Facilitator of Urban Development.
- Table A-2 summarizes Market Street in terms of its significance as Market Street as Venue for Civic Engagement in San Francisco.
- Table A-3 summarizes Market Street in terms of its significance as the Market Street Redevelopment Plan Designed Landscape.

[1] ICF. 2016. *Cultural Landscape Evaluation, Better Market Street Project, Market Street, San Francisco, CA. Final. November. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA.*

TABLE A-1. MARKET STREET CULTURAL LANDSCAPE DISTRICT SUMMARY TABLE: MARKET STREET AS SAN FRANCISCO'S MAIN CIRCULATION ARTERY AND FACILITATOR OF URBAN DEVELOPMENT

Property Name	Address	Designations	NRHP/ CRHR Eligibility Criteria	Character-Defining Features	Character Defining Feature Priority Levels	Period of Significance	Historic Property Boundary Description
Market Street under Significance statement 1: Market Street as San Francisco's Main Circulation Artery and Facilitator of Urban Development	Market Street	None	A/1 (eligible)	alignment as axis	1	1847–1929, from the street's creation by the O'Farrell survey in 1847 through the 1920s economic boom, ending in 1929 with the U.S. Stock Market Crash that led to the Great Depression and a national economic recession up until World War II. This duration saw significant expansion of multi-modal transportation, urban infrastructure, and investment in public and private built environment development in San Francisco prior to the Depression. This period defines the span of time in which Market Street, as a circulation artery, has the greatest impact facilitating urban development in San Francisco.	Boundaries of the CLE reside within the Better Market Street historic resources CEQA study area, which includes a 2.2-mile section of Market Street, from Steuart Street to Octavia Boulevard. Within such boundaries, the following resources were evaluated as part of the cultural landscape assessment under the CLE's significance statement 1: Market Street as San Francisco's Main Circulation Artery and Facilitator of Urban Development: the entire area of Market Street, from building façade to building facade, including sidewalks, vegetation, and anything within Market Street's right of way. Under
				linear plan	1		
				presence of multi-modal transportation systems	1		
				landmark buildings	1		
				line of sight from west to east	1		
				Path of Gold Light Standards and Utility Boxes	1		
				grid alignment	2		
				sidewalks	2		
				roadway	2		
				rails	2		
				electric catenary wire system	2		
				cable car turnarounds	2		
				line of sight from	2		

Property Name	Address	Designations	NRHP/ CRHR Eligibility Criteria	Character-Defining Features	Character Defining Feature Priority Levels	Period of Significance	Historic Property Boundary Description
				east to west			significance statement 1, no plazas were included in the historic resource boundary.
				grade	3		
				view of Market Street from Twin Peaks	3		
				Lotta's Fountain	3		
				AWSS fire hydrants	3		
				Samuel's Clock	3		
				Mechanics Monument	3		
				California Statehood Monument	3		
				Emergency Call boxes	3		

Source: *ICF. 2016. Cultural Landscape Evaluation, Better Market Street Project, Market Street, San Francisco, CA. Final. November. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA.*

TABLE A-2. MARKET STREET CULTURAL LANDSCAPE DISTRICT SUMMARY TABLE: MARKET STREET AS A VENUE FOR CIVIC ENGAGEMENT IN SAN FRANCISCO

Property Name	Address	Designations	NRHP/CRHR Eligibility Criteria	Character-Defining Features	Character Defining Feature Priority Levels	Period of Significance	Historic Property Boundary Description
Market Street under Significance statement 2: Market Street as Venue for Civic Engagement in San Francisco	Market Street	None	A/1 (eligible); Criteria Consideration G	verticality of streetscape	1	1870s–1979. This period begins with labor rights protests in the 1870s and extends through the 1979 White Night Riot. The duration includes local protests associated with national movements, including women's suffrage (1840–1920), the modern civil rights movement (1954–1964), war protests and peace celebrations associated with World War I (1914–1918), World War II (1930–1945), the Cold War and Vietnam (1954–1975), and the LGBTQ rights movement beginning in 1960. This period defines the span of time in which Market Street, as a venue for civic engagement, had the greatest impact facilitating the action of protest and	The boundaries of the CLE reside within the Better Market Street historic resources CEQA study area, which includes a 2.2-mile section of Market Street, from Steuart Street to Octavia Boulevard. Within such boundaries, the following resources were evaluated as part of the cultural landscape assessment under the CLE's significance statement 2: Market Street as Venue for Civic Engagement in San Francisco: the entire area of Market Street, from building façade to building facade, including sidewalks, vegetation, and anything within Market Street's the right of way. Under significance statement 2, plazas were also included in
				alignment of axis	1		
				grid alignment	1		
				plaza arrangement along Market Street	1		
				north-south intersections	1		
				sidewalks	1		
				roadway	1		
				grade	1		
				vista of City Hall from United Nations Plaza	1		
				linear plan	2		
				broad view of streetscape	2		
				Embarcadero Plaza open space	3		
				Lotta's Fountain	3		
				Path of Gold Light	3		

Property Name	Address	Designations	NRHP/CRHR Eligibility Criteria	Character-Defining Features	Character Defining Feature Priority Levels	Period of Significance	Historic Property Boundary Description
				Standards		celebration by participants, as well as the observation of these activities by audiences. Development in San Francisco.	the historic resource boundary. These include: Large Plazas (Embarcadero Plaza; Hallidie Plaza; United Nations Plaza) and Small Plazas (Robert Frost Plaza; Mechanics Monument Plaza; Crocker Plaza; Mark Twain Plaza)
				AWSS fire hydrants	3		
				Samuel's Clock	3		
				Mechanics Monument	3		
				California Statehood Monument	3		

Source: *ICF. 2016. Cultural Landscape Evaluation, Better Market Street Project, Market Street, San Francisco, CA. Final. November. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA.*

TABLE A-3. MARKET STREET CULTURAL LANDSCAPE DISTRICT SUMMARY TABLE: MARKET STREET REDEVELOPMENT PLAN DESIGNED LANDSCAPE

Property Name	Address	Designations	NRHP/CRHR Eligibility Criteria	Character-Defining Features	Character-Defining Feature Priority Level	Period of Significance	Historic Property Boundary Description
Market Street under Significance statement 3: Market Street Redevelopment Plan Designed Landscape	Market Street	None	C/3 (eligible); Criterion Consideration G	alignment of 120-foot-wide street diagonally from east to west	1	1979. This date corresponds with substantial completion of the Market Street Redevelopment Plan design as reflected by the commission of as-built photography from photographer Joshua Friewald by Lawrence Halprin & Associates. While components of the Market Street Redevelopment Plan project such as the large plazas (Embarcadero Plaza, Hallidie Plaza, and United Nations Plaza), small plazas (Robert Frost Plaza, Mechanics Plaza, Crocker Plaza, Mark Twain Plaza, and Market Street Plaza), and elements of the	The boundaries of the CLE reside within the Better Market Street historic resources CEQA study area, which includes a 2.2-mile section of Market Street, from Steuart Street to Octavia Boulevard. Within such boundaries, the following resources were evaluated as part of the cultural landscape assessment under the CLE's significance statement 3: Market Street Redevelopment Plan Designed Landscape: the entire area of Market Street, from building façade to building facade, including sidewalks,
				pedestrian-oriented separation of foot, vehicle, and rail traffic	1		
				large plazas (Embarcadero Plaza, Hallidie Plaza, and United Nations Plaza)	1		
				small plazas (Robert Frost Plaza, Mechanics Monument Plaza, Crocker Plaza, Mark Twain Plaza)	1		
				plazas placement along length of Market Street	1		
				red brick paving in herringbone pattern that distinguishes pedestrian from vehicular space	1		
				street trees (species and vegetation)	1		
				retained view of City	1		

Property Name	Address	Designations	NRHP/CRHR Eligibility Criteria	Character-Defining Features	Character-Defining Feature Priority Level	Period of Significance	Historic Property Boundary Description
				Hall from Market Street		streetscape were completed throughout the 1970s, 1979 is the date when a critical volume of completed Market Street Redevelopment Plan components were present to physically express the design intent of the Market Street Joint Venture Architects for this project.	vegetation, and anything within Market Street's the right of way. Under significance statement 3, plazas were also included in the historic resource boundary. These include Large Plazas (Embarcadero Plaza; Hallidie Plaza; United Nations Plaza) and Small Plazas (Robert Frost Plaza; Mechanics Monument Plaza; Crocker Plaza; Mark Twain Plaza)
				Path of Gold Light Standards and Utility Boxes (small-scale feature retained from earlier period)	1		
				AWSS fire hydrants (small-scale feature retained from earlier period)	1		
				Samuel's Clock (small-scale feature retained from earlier period)	1		
				California Statehood Monument (small-scale feature retained from earlier period)	1		
				Emergency Call Boxes (small-scale feature retained from earlier period)	1		
				repeating pattern of BART/Muni subway entrances along length of Market Street	2		
				repeating pattern of street signage (square	2		

Property Name	Address	Designations	NRHP/CRHR Eligibility Criteria	Character-Defining Features	Character-Defining Feature Priority Level	Period of Significance	Historic Property Boundary Description
				and circular)			
				repeating pattern of traffic lights and traffic signage	2		
				arrangement of street trees in double and single rows down sidewalks	2		
				tree allées (circulation feature)	2		
				vertical circulation features (elevator, escalator, and stairs) of BART/Muni stations (Civic Center, Embarcadero, Montgomery, and Powell) and Muni-only station (Van Ness)	2		
				BART/Muni station street entrances (Embarcadero Station, Montgomery Station, Powell Station, and Civic Center Station)	2		
				Van Ness Muni station street entrances	2		

Property Name	Address	Designations	NRHP/CRHR Eligibility Criteria	Character-Defining Features	Character-Defining Feature Priority Level	Period of Significance	Historic Property Boundary Description
				granite bollards with chain links	2		
				bronze BART/Muni street level elevators	2		
				bronze four-sided street clocks	2		
				square and circular pole-mounted street signs	2		
				semaphore-style traffic signage and traffic signal lights	2		
				bronze tree grates	3		
				retained broad view of Market Street width	3		
				Lotta's Fountain (water feature)	3		
				Sunlight channeled through northern diagonal street grid into triangular plazas	3		

OTHER HISTORIC DISTRICTS

Table A-4 summarizes the name, address, local/state/national designations, NRHP/CRHR Eligibility Criteria, contributing buildings and character defining features, period of significance, and historic property boundary for the nine historic districts with boundaries that intersect with the Better Market Street historic resources CEQA study area, including: Civic Center Landmark District (which includes Civic Center National Historic Landmark, Civic Center National Register, and Civic Center Article 10 Landmark District); Market Street Theatre and Loft National Register Historic District; Uptown Tenderloin National Register Historic District; Market Street Masonry Landmark District; New Montgomery-Mission-2nd Street Conservation District; Kearny-Market-Mason-Sutter Conservation District; LGBTQ Tenderloin Historic District; San Francisco Auxiliary Water Supply System Historic District; and the San Francisco Cable Cars National Historic Landmark.

TABLE A-4. HISTORIC ARCHITECTURAL RESOURCES SUMMARY TABLE: OTHER HISTORIC DISTRICTS

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
Civic Center Landmark District	Various, San Francisco	1994 Article 10 Landmark District; 1987 National Historic Landmark District; 1978 National Register of Historic Places District	A/1 and C/3	Contributing buildings and character-defining features of the district include: **Block 0355-**Contributing buildings: 1200 Market, 1212 Market, 1230/1236/1244 Market, 1240-1242 Market, 1256-1264 Market, 1272-1276 Market, 1278-1298 Market. Character-defining features: granite curbs on Larkin, Market, Grove and Hayes; ca. 1899 fire/police box on Larkin; AWSS hydrants on Market; pre-1945 and pre-1928 street lights on Market, Grove and Larkin; and pre-1945 street signal on Grove. **Block 0351 (United Nations Plaza)-**Contributing buildings: 1 United Nations Plaza, 83 McAllister Street, 50 United Nations Plaza, 1182 Market Street. Character-defining features: 1915 granite curbs on	The period of significance established in the Civic Center CLI is 1896-1951, beginning with the earliest known feature- the Pioneer Monument, and ending in 1951 just prior to the Douglas Baylis plan for Civic Center Plaza.	The district boundary coincides with the Article 10 Landmark District boundary established in 1994. The district is bounded on the north by Golden Gate Avenue, Redwood Street, and McAllister Street; Charles J. Brenham Place to the east; Market Street, Hayes Street and Fell Street to the south; and Franklin Street to the west.

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				Charles J. Brenham Place, Hyde, Market and Leavenworth streets; AWSS hydrant at Hyde and Market streets; pre-1928 street light on Market Street; the Fulton Street Mall, 1936 planting area and tree allee at United Nations Plaza, 1936 London Plane trees at United Nations Plaza.		
Market Street Theatre and Loft National Register Historic District	Historic district including buildings located at 982-1112 Market Street (northwest side), 973-1105 Market Street (southeast side), One Jones Street and 1-35 Taylor Street.	1985 National Register of Historic Places District	A/1 and C/3	The district is comprised of 20 contributing buildings. Character-defining features of the district include steel-frame and/or reinforced concrete flat roof structures clad in terra cotta, brick, galvanized iron or stucco. Contributing structures have fenestration that is either double-hung, Chicago windows, or a combination of both, with some arcading at top floors; often commercial at the ground-floor. No streetscape features are identified as character-defining.	1899-1930, reflecting the date of the design for the district's oldest building, the Hibernia Bank, through the year movie production and distribution was consolidated into eight major studios.	The district boundary includes the following buildings: 982-1112 Market Street (northwest side), 973-1105 Market Street (southeast side), One Jones Street and 1-35 Taylor Street.

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
Uptown Tenderloin National Register Historic District	Historic district located in a 16-block area with boundaries between Taylor, Turk, Larkin and Geary streets	2008 National Register of Historic Places District	A/1 and C/3	The district is made up of 409 contributing buildings, 1 contributing site, 43 noncontributing buildings and 24 noncontributing sites. Character-defining features include Tudor Revival, Late Gothic Revival, Spanish Colonial Revival, Italian and French Renaissance style buildings; the predominant building type found in the district, which is a multi-unit, 3-to-7 story apartment, hotel, or apartment hotel building constructed of reinforced concrete; and contributing features such as granite curbs, the Auxiliary Water Supply System, sidewalk vault lights, sidewalk lights, elevators, chutes, metal utility plates (manhole and handhole covers), sidewalk stamps, and streetlights.	1906-1931, which corresponds to the period of construction, from the post-1906 earthquake to the Depression era.	The district is bounded at the east by Taylor, Ellis and Mason streets; on the south by Market Street, McAllister Street, and Golden Gate Avenue; on the west by Larkin Street and on the north by Geary Street.
Market Street Masonry	Discontiguous historic	Article 10 Landmark	1 and 3	The district consists of eight	1911-1925, the period in which the buildings were	The discontiguous boundary of the historic resource is

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
Landmark District	district of 8 buildings located between Van Ness Avenue to the east, Fell Street to the north, Valencia Street to the west, and Stevenson Street to the South.	District		buildings. Character-defining features include elaborate metal cornices, pattern brickwork, historic storefronts with glass transom lights, bronze plate glass window frames and decorative bases. Public landscape elements, including streets and sidewalks, are not considered character-defining features.	constructed.	associated with the district's eight building footprints. These buildings are: 150 Franklin Street (APN 0834/012), 1580-1598 Market Street (APN 0836/010), 1666-1668 Market Street (APN 0854/004), 1670-1680 Market Street (APN 0854/005), 1649 Market Street (APN 3504/001), 1657 Market Street (APN 3504/046), 1687 Market Street (APN 3504/040), and 1693-1695 Market Street (APN 3504/038).
New Montgomery-Mission-2nd Street Conservation District	Eastern part of the South of Market Area in downtown San Francisco	Article 11 Conservation District	3	The district is adjacent to the south side of Market Street between 2nd Street and Annie Street, and extends south of Market to Mission Street. This district is primarily characterized by large masonry commercial loft and light industrial buildings.	1906-1933, the period in which the core of the district's buildings were constructed as part of the reconstruction of downtown San Francisco following the 1906 earthquake and fire	Boundary of the historic resource is Market Street to the north, Third Street to the west, Howard Street to the south, and Second Street to the east, with contributing resources found on Mission, Natoma, Jessie, Minna, New Montgomery, and Howard streets.
Kearny-Market-	Historic district	Article 11 Conservation	1 and 3	The district is notable as one of the few homogenous	ca. 1906-1930	Boundary of the historic resource is roughly bound by

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
Mason-Sutter Conservation District	roughly bound by Pine and Bush streets to the north, Kearny Street to the east, Market, Jessie and Stevenson streets to the south, and Taylor Street to the west.	District		collections of early 20th century commercial architecture of its type in the United States. Character-defining features include: buildings found in the district are small to medium scale, light to medium colored structures ranging from four to eight stories in height. Nearly all structures are built to their front property lines and fill the entirety of their lots. Ornament is Classical, Renaissance, Gothic, Romanesque, and in limited numbers, Spanish Colonial in style and frequently consists of arches, columns, pilasters, projecting bracketed cornices, multiple belt-courses, lintels, pediments, and decorated spandrels. Buildings are commonly steel and reinforced concrete construction clad in terra cotta, brick, stone and		Pine and Bush streets to the north, Kearny Street to the east, Market, Jessie and Stevenson streets to the south, and Taylor Street to the west.

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				stucco. Facades are primarily two or three-part vertical compositions consisting of a base and shaft or base, shaft and capital.		
LGBTQ Tenderloin Historic District	Market Street and portions of the Uptown Tenderloin National Register Historic District.	None	A/1 (eligible)	Individual contributing buildings and sites have not yet been identified. District character-defining features have not yet been identified. However, the buildings associated with this district are generally those of the Market Street Theater and Loft Historic District and Uptown Tenderloin National Register Historic District, above.	1933-1990, the period in which the following significance themes took place: Early Development of LGBTQ Communities in San Francisco (Early 20th Century to 1960s), Policing and Harassment of LGBTQ Communities (1933-1960s), Evolution of LGBTQ Enclaves and Development of New Neighborhoods (1960s to 1980s), Homophile Movements (1950 to 1960s), and Gay Liberation, Pride, and Politics (1960s to 1990s).	Boundary of the historic resource is not clearly defined. According to the HRER for 1028 Market Street (2014.0241E) the district would roughly fall within the boundary of the properties along Market Street within the Market Street Theatre and Loft National Register Historic District (roughly boundary – Market Street bounded by Sixth, Seventh, McAllister, and Jones streets) and within the boundaries of the Uptown Tenderloin National Register Historic District.
San Francisco Auxiliary Water Supply System (AWSS)	City of San Francisco	None	A/1 and C/3 (eligible)	A gravity-fed fire suppression water supply system comprised of numerous buildings, structures, and infrastructural features	1908-1913, beginning when the city engineers drafted a preliminary plan for the AWSS and city voters overwhelmingly supported a bond measure	Boundary associated with AWSS is limited to the footprints of all contributing elements that comprise the original extent of the system. These include the parcels or

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				located throughout San Francisco. The contributing elements of the AWSS discontiguous historic district are its water storage structures (Twin Peaks Reservoir and Ashbury Street and Jones Street tanks), Pump Stations 1 and 2, approximately 135 miles of underground iron distribution pipes with associated 3,828 gate valves, 135 circular cisterns; approximately 1,600 high-pressure water hydrants, 52 waterfront suction connections, and five manifolds that are distributed throughout the city (although concentrated in its northeastern quadrant). The character-defining features of the discontiguous AWSS district are the following: 1) Overall design and engineering of the	finding its construction, and ends when the Board of Public Works and the Board of Fire Underwriters certified that construction of the system was complete.	sites containing unique AWSS feature types (reservoir, pumping stations, and water storage tanks), as well as contributing ubiquitous features (hydrants, cisterns, manifolds) and pipes and valves that date to the resource's period of significance, 1908–1913. These features are generally contained within an area bounded by the San Francisco waterfront to the north and east, 20th Street and the Twin Peaks Reservoir to the south, and Clayton Street to the west. As the AWSS is a discontiguous historic district, however, areas lying between the footprints of contributing features are not included in the NRHP/CRHR–eligible resource. Furthermore, the district boundary extends below grade to capture contributing pipes, valves, and cisterns. The district boundary encompasses the locations of these contributing features at

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				AWSS: Operation and physical separation independent of domestic water supply; Configuration of three separate pressure zones, based on elevation, capable of being combined into a single pressure zone; Multiple redundancies expressed through the paired reservoir bays, pumping stations, and water tanks, as well as a complex gridiron of pipes and means of receiving water from independent sources (cisterns, San Francisco Bay); 2) Twin Peaks Reservoir: Elevated location in open site above the rest of the AWSS; Oval shape, reinforced concrete construction, and sloped walls leading towards center; Two-bay design to create redundancies, divided by a buttressed central wall; Forebays at north edge leading to gate chambers and the AWSS		street level only when a surface expression of the feature is present, such as perimeter brick pavers or a cast iron utility cover.

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				pipe network; Reinforced concrete fence surrounding the reservoir structure with iron railing; Presence of perimeter walkway; Continued function providing gravity pressure to feed the distribution pipes and two storage tanks; 3) Pumping Stations No. 1 and No. 2: Locations near San Francisco Bay in the South of Market District and at the foot of Van Ness Avenue at Fort Mason; Original façade designs, architectural styles, and ornamentation; Interior equipment spaces containing extant AWSS pumping equipment and pipes original to the system (either retrofitted for current use or abandoned in place); Intake tunnels capable of bringing water from San Francisco Bay; Continued function and ability to pump salt water from the Bay into the AWSS distribution pipes; Site features original		

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				to Pumping Station No. 2: landscaped lawn and elevated water tanks with associated piping south of the primary building; 4) Ashbury Tank and Jones Street Tank: Lot configuration of round tank structures with conical roofs located to the rear of street-facing gate houses; Original façade designs, architectural styles, and ornamentation of gate houses and Jones Street Tank structure; General massing and features of the replaced Ashbury Tank structure; Open, primary interior space in each gate house containing original pipes, valves, gauges, and other equipment; Bypass valves that can be opened at the water tanks to combine different AWSS pressure zones; Continued function supplying water to the Upper Zone and Lower Zone of the pipe network; 5) High Pressure Hydrants:		

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				Cast iron construction and original design of wide barrel and bonnet; Hydrants manufactured in 1909 and placed within the original extent of the AWSS; Painted bonnet signifying source of water: Twin Peaks Reservoir (black); Ashbury Tank (red); Jones Street Tank (blue); Sub-surface hydrant branch valve, expressed through covers embedded in the street surface and signified through the stamp on the hydrant's operating valve; Interior valves engineering design capable of withstanding high-pressure water flow; Configuration in discernible corridors adjacent to city streets, with hydrants generally located at or near corners or mid-block and spaced relatively regularly; Consistent placement of hydrants near the curb (generally between 18 and 24 inches); Continued function of the hydrants as		

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				outlets of high-pressure water used only for fire suppression; 6) Pipes and Valves: Gridiron configuration of distribution pipeline delivering water from reservoir and water tanks to hydrant locations within the original AWSS extent, allowing multiple routes to any one hydrant; Presence of valves at the ends of blocks that can isolate a given block if the pipeline ruptures; Design and construction of cast iron pipes and isolation gate valves located in the original extent of the AWSS; Presence of cast iron utility covers signifying the location of gate valve chambers, bearing the letters "HPFS" (high-pressure fire system; Connections to fireboat manifolds and two salt water pumping stations; Continued function delivering water to the AWSS and ability to		

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				withstand pressurized water; 7) Cisterns: Round or ellipse shaped configurations of cisterns constructed before 1913, generally located at street intersections; Reinforced concrete construction; Separation from the AWSS pipelines; Below ground position, expressed at the street surface by circular configurations of brick pavers; Presence of cast iron utility covers (generally once at center and one at edge) with letters reading "SFFD CISTERN;" Continued function storing water for firefighting use; 8) Manifolds: Original design of symmetrical, cast iron assembly of two tapered arms; Ten plugged 3-inch inlets; Location alongside the San Francisco Bay waterfront (although specific locations of these features do not date to the period of significance);		

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				Connection to the AWSS pipelines; Continued function allowing SFFD fireboats to connect directly and pump salt water into the AWSS; 9) Fireboats: Contributing role of fireboats in the AWSS, containing pumping equipment that can connect hoses to fireboat manifolds to pressurize the AWSS pipes; current fireboats do not date to period of significance and themselves are not character-defining		
San Francisco Cable Cars National Historic Landmark	City of San Francisco	1978 National Register of Historic Places District and National Historic Landmark	A/1 and C/3	The district includes components of the continually operating San Francisco Cable Car System. Character-Defining Features of the entire system include: the rails on which the cars run (approximately 10 miles on 8 different streets which include: 1) Hyde Street, between Beach and Washington streets, 2) Washington Street, between	1873-1899, beginning when the first underground cable car track was installed from Kearny Street, over Nob Hill to Leavenworth, and ending when electric street cars began to replace cable cars nearly everywhere, except on steep grades including those in San Francisco.	The San Francisco Cable Cars National Historic Landmark is limited to the footprint of the Power House and the Car-Barn building at Washington and Mason streets; approximately ten miles of streets that includes all active cable car tracks on the following streets: 1) Hyde Street, between Beach and Washington streets, 2) Washington Street, between Hyde and Powell streets, 3)

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				Hyde and Powell streets, 3) Powell Street, between Market and Jackson streets, 4) Jackson Streets, between Hyde and Powell streets, 5) California Street, between Van Ness Avenue and Market Street, 6) Mason Street, between Washington Street and Columbus Avenue, 7) Columbus Avenue, between Mason and Taylor streets, and 8) Taylor Street, between Bay and Chestnut streets); cars which run on the rails (there are 39 cars in the fleet); roundtable turnarounds at the end of the lines; a moving cable between the tracks and below ground, covered over at ground level, with a narrow slot left so that the clutch mechanism from the car can reach through and grasp the moving cable; a car-barn and repair shop at the corner of Washington and Mason streets, which also		Powell Street, between Market and Jackson streets, 4) Jackson Street, between Hyde and Powell streets, 5) California Street, between Van Ness Avenue and Market Street, 6) Mason Street, between Washington Street and Columbus Avenue, 7) Columbus Avenue, between Mason and Taylor streets, and 8) Taylor Street, between Bay and Chestnut streets; and the footprints of the turning mechanisms which are located at the end of various lines of track.

Property Name	Address; City	Designations	NRHP/CRHR Eligibility Criteria	Historic District Contributing Properties and Character-Defining Features	Period of Significance	Historic Property Boundary Description
				contains the huge winding mechanism to keep the cables continuously moving throughout the city of San Francisco.		

Source: The Civic Center Cultural Landscape Inventory (CLI) was adopted by the San Francisco Historic Preservation Commission on September 16, 2015. The inventory provided new information about the landscape features and open spaces within the district, as well as clarified the findings of three prior designations: the 1978 National Register of Historic Places District designation, the 1987 National Historic Landmark District designation, and the 1994 San Francisco Article 10 designation. For the purposes of this project, the more comprehensive CLI information is summarized in the table above; *MIG. 2015. San Francisco Civic Center Historic District Cultural Landscape Inventory. June. Portland, OR. Prepared for San Francisco Planning Department, San Francisco, CA., accessed: http://www.sf-planning.org/ftp/files/Preservation/cultural_landscape/CivicCenterCLI_FinalReport.pdf; United States Department of the Interior. 1986. Market Street Theatre and Loft District National Register of Historic Places Inventory—Nomination Form. March. Washington D.C.; United States Department of the Interior. 2008. Uptown Tenderloin Historic District National Register of Historic Places Registration Form and Continuation Sheet (NPS Form 10-900 and 10-900-a). May. Washington D.C.; San Francisco Landmarks Preservation Advisory Board. 2013. Market Street Masonry Historic District, Ordinance No. 64-13. September. San Francisco, CA.; San Francisco Planning Code. 2018. Appendix F to Article 11, New Montgomery-Mission-Second Street Conservation District. May. San Francisco, CA.; San Francisco Planning Code. 2018. Appendix E to Article 11, Kearny-Market-Mason-Sutter Conservation District. May. San Francisco, CA.; San Francisco Planning Department. 2016; 950-974 Market Street Historic Resource Evaluation Response. June. San Francisco, CA; San Francisco Planning Department. 2016;1028-1056 Market Street, Historic Resource Evaluation Response. August. San Francisco, CA (LGBTQ Tenderloin Historic District reference); AWSS High-Pressure Hydrants, Department of Parks and Recreation Form 523A, B, K, and L. April. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; Tetra Tech, Inc., "Draft Historical Resources Evaluation Report for the Auxiliary Water Supply System," July 2009; United States Department of the Interior. 1978. San Francisco Cable Cars National Register of Historic Places Inventory—Nomination Form. April. Washington D.C.*

BUILDINGS, STRUCTURES, AND OBJECTS SUMMARY TABLE

Table A-5 summarizes the name, address, local/state/national designations, NRHP/CRHR Eligibility Criteria, historic property character defining features, period of significance, and historic property boundary, and presence/absence of sub-sidewalk basements for the 41 resources in the Better Market Street historic resources CEQA study area, including 32 buildings immediately adjacent to Market Street and nine structures or objects within the Market Street streetscape.

TABLE A-5. HISTORIC ARCHITECTURAL RESOURCES SUMMARY TABLE: BUILDINGS, STRUCTURES, AND OBJECTS

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
Hyatt Regency	22 Drumm Street; San Francisco	None	A/1 and C/3 (eligible)	An 18-story building with a 17-story interior atrium and is part of the Embarcadero Center redevelopment project. Character-defining features include wedge-shaped plan and stepped massing that incorporates two slab volumes along Drumm and Market streets; cascading angled balconies that face Embarcadero Plaza and the Embarcadero Center; three-story base; precast concrete façade; evenly spaced groupings of tinted, metal-framed windows divided by fins and fluted piers; metal and concrete balcony railings; 17-story atrium; geometric forms; and a circular restaurant volume enclosed by two concrete, cantilevered square frames.	1967-1972, starting when construction started in 1967 and ending when the building was completed in 1972.	Boundary of the historic resource is aligned with the trapezoidal legal parcel containing the building at 22 Drumm Street, APN 0234/017.	Undetermined
Matson Building	215 Market Street; San	Article 11 (Category I)	A/1 and C/3	15-story Renaissance Revival-style office building.	Under Criterion A/1 the Period of significance is	Boundary of the historic resource is the footprint	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
and Annex	Francisco	Significant		Character-defining features include highly ornate polychrome glazed terra cotta cladding on the original 15-story building and seven-story annex; tripartite building composition at the Market Street and Main Street façades; arched entryway at the center of the Market Street façade; Ionic columns across the ground floor exterior and upper window assembly; regularly spaced bays containing window pairings; "Matson Building" inscription, cartouche, and shields; polychrome frieze between the shaft and capital; projecting cornice, tower, and cupola; straight barrel Mission tile cladding with aquamarine-color glazed finish on the tower and fifteenth floor parapet wall.	1922-1947, which encompassing the period during which the building housed the headquarters of the Matson Navigation Company; Under Criterion C/3, there are two periods of significance: 1922-1924 and 1945-1947. These correspond with the construction dates of the original building and the annex.	of the Matson Building and Annex, APNs 3711/014A, 3711/018, and 3711/019. The building shares its parcel with the adjacent Pacific Gas & Electric (PG&E) building at 245 Market Street, and the two buildings are joined internally.	
Pacific Gas and Electric Company	245 Market Street; San Francisco	Article 11 (Category I) Significant	A/1 and C/3	17-story Beaux Arts-style office building. Character-defining features	1923-1947, beginning with its year of construction and extending to encompass its continued use as the PG&E	Boundary of the historic resource is the footprint of the Pacific Gas and Electric Company	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
General Office Building and Annex				include rusticated Granitex terra cotta cladding at the original building volume and annex; tripartite building composition; arched windows that rise to the height of the lowermost two stories; evenly spaced bays containing paired windows throughout the building shaft; Doric columns separating windows near the roofline on the Market Street and Beale Street façades; full entablature surmounted by freestanding urns; original steel windows; and setback penthouse volume with tiled, hipped roof.	headquarters	General Office Building and Annex, APNs 3711/014A, 3711/018, and 3711/019. The building shares its parcel with the adjacent Matson building at 215 Market Street, and the two buildings are joined internally.	
N/A	1 California Street; San Francisco	None	A/1 and C/3	Corporate Modern-style, 32-story office tower and 2-story-plus-mezzanine branch bank building/pavilion surrounded by street-level pedestrian plaza within a triangular-shaped parcel. Character-defining features include grouping of a high-rise office tower and adjacent, lower pavilion placed within	1967-1969, corresponding to the years the two buildings within the parcel were under construction.	Boundary of the historic resource is aligned with the legal parcel containing the buildings and pedestrian plaza at APN 0264/004.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				a street-level pedestrian plaza (although the features of the plaza themselves are not character-defining); orientation of the buildings parallel to the California Street axis, with chamfered corners that relate to the Market Street alignment; Corporate Modern architectural style on both buildings, characterized by lack of applied ornament or Classically derived façade composition; rhythm of cast concrete piers with chamfered corners that separate vertical bands of tinted glass windows and spandrel panels; colonnade at the ground floor of the tower surrounding a recessed, fully glazed lobby; and articulation of the roofline by horizontal concrete panels.			
Standard Oil Building/Chevron Towers	555 Market Street; San Francisco	None	A/1 and C/3	Corporate Modern high-rise office building. Character-defining features include vertical boxed massing; illusion of ground	1964, the year it was constructed, and 1975, the year the building's garden plaza and entry were redesigned to integrate it with the neighboring building at 575 Market	Boundary of the historic resource is aligned with the legal parcel containing the building and pedestrian plaza at 555 Market Street, APN	No

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				floor pilotis or stilts that make the building appear to be floating; repeating fenestration pattern; tinted glass; absence of exterior ornament; and landscaped entryway and garden, including its stonework and stepped water features.	Street.	3708/174.	
Crown-Zellerbach Building	1 Bush Street; San Francisco	Article 10	A/1, B/2 and C/3	Character-defining features include the 20-story high-rise office tower, a one-story circular banking pavilion, landscaped plaza and pedestrian median. Character-defining features include composition of two buildings and pedestrian plaza filling one city block, contrasting to traditional lot-line development; the steel-frame, glass-curtain-wall, flat-roofed office tower; green-tinted, aluminum-framed glass windows and dark green spandrel glass, which form the glass curtain wall; volume facing Market Street clad in brown glass mosaic tiles; entrance facing	1959, the date the complex was originally completed.	Boundary of the historic resource encompasses the two buildings and plaza located within the area bound by Bush Street to the north, Sansome Street to the west, Sutter Street to the south, Market Street to the south and southeast, and Battery Street to the east. The historic property boundary excludes the brick paving along Market Street, which is south of the subject buildings, and includes the driveway located parallel to Battery Street. The historic property boundary of 1 Bush Street also includes part of the northern part	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				Bush Street and rear facing Market Street with a recessed, glass-enclosed lobby and platform; green granite pilotis, which give the Crown-Zellerbach Building its floating appearance; ancillary glass-clad, one-story circular pavilion with chevron roof; Japanese-influenced sunken plaza design in a triangular-shaped lot, which includes landscaping such as olive and mayten trees, and curved paving composed of river rock and slate panels, evergreen groundcover atop the circular pavilion's podium and found throughout the plaza in the form of sloping and curved beds; slightly curved and raised wall along the public sidewalk at Market and Battery streets; the curved and raised angular-cut granite walls at Market and Sutter streets and along Sansome Street which surround the site and provide privacy to the plaza twelve		of the pedestrian median located east of the two buildings between Battery Street to the west, Market Street to the south, and Bush Street to the east. The historic property boundary of the pedestrian median for 1 Bush Street excludes the brick paving to the south, but includes the descending driveway, a raised walkway, some trees, and the plaque for the Site of Invention of the Three-Reel Bell Slot Machine.	

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				feet below; the slightly curved or arcing limestone steps to Market Street; the concrete bridge connecting Bush Street with the building's travertine deck and lobby; handcrafted sculptural features such as David Tolerton's sculptural fountain; descending driveway; and the triangular-shaped, landscaped pedestrian median located at the intersection of Battery Street (excluding the brick paving to the south, but including the raised walkway, trees, and the plaque for the Site of Invention of the Three-Reel Bell Slot Machine).			
Flatiron Building	540-548 Market Street; San Francisco	Article 10 and Article 11 (Category I) Significant	A/1 and C/3	10-story building located on a triangular-shaped. Character-defining features include triangular-shaped plan and massing with flat roof; three street-facing façades mostly clad in concrete and stucco, with its	1913-1929, representing the year the building was built through the end of the period of post-earthquake reconstruction.	The boundary of the historic resource is aligned with the legal parcel containing the Flatiron Building, on APN 0291/001.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				bay windows constructed of galvanized iron; steel-frame construction with reinforced concrete walls and floors; two-part building composition; regularly spaced bays containing window groupings and spandrel panels; window hierarchy terminating in groupings of arched windows at the uppermost floor; projecting cornice with Gothic pendants.			
Market Street Railway Substation/ Downtown Traction Power Substation	San Francisco	Article 11 (Category III)	3	2-story, reinforced-concrete municipal/ industrial building designed in the American Commercial style. Character-defining features include the building footprint, gable roof, materials, and steel fenestration.	1920, the year the building was constructed.	The boundary of the historic resource is aligned with the legal parcel.	unknown
N/A	550 Market Street; San Francisco	None	C/3	3-story, Renaissance Revival-style commercial building. Character-defining features include flat roof; terra cotta entablature with cornice,	1908-1929, starting with the year the building was constructed through the period of post-earthquake reconstruction.	The boundary of the historic resource is aligned with the legal parcel containing the building at 550 Market Street, on APN 0291/002.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				dentils and corner brackets; terra cotta bands dividing the top two stories; and groupings of three-over-three double-hung wood-sash windows, slightly recessed, at the second and third floors.			
N/A	554 Market Street; San Francisco	None	3	2-story, Classical Revival-style commercial building. Character-defining features include off-center entrances at Sutter Street with bracketed hood; large second-story windows with bracketed sills and mullions, in a segmental arched opening facing Market Street and in a rectangular opening facing Sutter Street; decorative crest and low-relief panels above the second-story window at Market Street; and cornice and dentils supporting roof slopes.	1907-1929, starting with the year the building was constructed through the period of post-earthquake reconstruction.	The boundary of the historic resource is aligned with the legal parcel containing the building at 554 Market Street, on APN 0291/003.	Yes
N/A	560 Market Street; San Francisco	None	A/1, B/2, and C/3	3-story, Neoclassical (at Sutter Street)/Mid-Century Modern (at Market Street) commercial building.	1907-1960, the period beginning with its initial construction following the San Francisco Earthquake and Fire of 1906, and	Boundary of the historic resource is aligned with the legal parcel containing the building at 560 Market Street, APN	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				On the Market Street façade, the building's character defining features include the 1960s Mid-Century Modern-style gold-colored grill. On the Sutter Street façade, the character-defining features include two distinct building sections that differentiate the building's two significant time periods: the 1960s renovated storefront and signage at the lower half of the façade, and the original Neoclassical design above it featuring Ionic columns, three recessed window bays, and entablature with ornate frieze.	ending when part of the building was remodeled in the Mid-Century Modern style.	0291/004.	
The Chancery Building	562-566 Market Street; San Francisco	Article 11 (Category I) Significant	C/3	7-story commercial building. Character-defining features include trapezoidal massing; reinforced concrete structure; rusticated terra cotta cladding at the Market Street and Sutter Street façades; tripartite façade composition; regularly spaced bays containing three-part window assemblies;	1923-1929, starting with the year the building was built through the period of post-earthquake reconstruction.	Boundary of the historic resource is aligned with the legal parcel containing the Chancery Building, APN 0291/005.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				continuous glazing at the second story; presence of entrances fronting both Market and Sutter streets; recessed windows at the upper floors; and flat roof with overhanging cornice.			
The Finance Building	576-580 Market Street; San Francisco	Article 11 (Category I) Significant	C/3	6-story, trapezoidal commercial building. Character-defining features include its trapezoidal massing; tripartite building plan; terra cotta cladding; tri-sash wood windows at the second floor; wood one-over-one double-hung windows; flat roof and simple cornice; and three decorative friezes dividing the building's tripartite composition, including a band of frets and dentils.	1923-1929, starting with the year the building was constructed through the period of post-earthquake reconstruction.	Boundary of the historic resource is aligned with the legal parcel containing the Finance Building, on APN 0291/005B.	No
Palace Hotel	2 New Montgomery Street; San Francisco	Article 10, Article 11 (Category II) Significant, and Article 11 New Montgomery-Mission-2nd	A/1 and C/3	Renaissance Revival-style hotel. Character-defining features include imposing massing that fills half a city block; two street-facing façades mostly clad in brick, at New	1909-1933, starting with the year the building was constructed through the period of post-earthquake reconstruction	Boundary of the historic resource is aligned with the legal parcel containing the Palace Hotel at 2 New Montgomery Street, APN 3707/052.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
		Street Conservation District contributor		Montgomery and Market streets; facades clad mostly in brick at Jessie and Annie streets—specifically the southeast corner and lower portion of Jessie Street and the northern part of Annie Street which excludes the 1938 addition; tripartite vertical façade composition with distinctive end bays; regularly spaced bays containing recessed one-over-one windows; double-height window and door arrangements at the building's base; the hotel's primary entrance oriented at New Montgomery with an open loggia composed of three arched bays; Renaissance Revival ornamentation, including belt courses, brackets, and ornate cornice; rounded arch windows at the uppermost floor; 4-story interior garden court with 8,000 square foot stained glass ceiling dome and marble flooring; Pied Piper Bar with interior "Pied Piper" mural; and two			

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				interior murals by San Franciscan artist Antonio Sotomayer; and the Men's Grill (Ralston Room), Banquet Room (Gold Room), and the Parlour and Gallery (French Parlours), which have all been restored to their original states.			
NA	660 Market Street; San Francisco	Article 11 (Category I) Significant	C/3	5-story, Gothic Revival-style commercial building. Character-defining features include light-colored terra cotta cladding; Tudor-arched openings at the ground floor; recessed entrance with large divided-lite transom; low-relief ornamentation consisting of repeating geometric and Gothic-arched motifs; pairings of casement and fixed Gothic arched windows; textured, blue-green terra cotta tiles; and parapet consisting of terra cotta latticework alternating between solid walls.	1924-1929, starting with the year the building was constructed through the period of post-earthquake reconstruction.	Boundary of the historic resource is aligned with the legal parcel containing the building at 660 Market Street, on APN 0311/005.	Yes
The Old Chronicle Building	690 Market Street; San Francisco	Article 10 and Article 11 (Category I)	A/1, B/2 and C/3	A large, twenty-four story hotel and apartment building.	1890-1929, beginning with the year of the building's construction and	Boundary of the historic resource is aligned with the legal parcel	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
		Significant		Character-defining features include asymmetrical plan; historic building volumes, comprising the 11-floor original volume facing Market Street the 16-floor volume at Kearny Street; the ground floor's sandstone cladding and carved archway on Market Street; pressed red brick and terra cotta cladding; "DeYoung Building" signage above ground-floor archway; angled front façade divided into three sections; regular arrangement of window bays, including arched openings at the 8th floor of the original building volume; and projecting canted bay at the center section of the front façade facing the intersection of Market and Geary streets, with pilasters and entablatures.	continuing through the period of post-earthquake reconstruction.	containing the Old Chronicle Building, on APNs 0311/016 through 0311/119.	
Humboldt Savings Bank Building	785 Market Street; San Francisco	Article 11 (Category I) Significant and an Article	A/1 and C/3	17-story Renaissance Revival style building. Character-defining features	1907-1930, starting with the year the building was constructed through the end of the period of post-	Boundary of the historic resource is aligned with the legal parcel containing the	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
		11 Kearny-Market-Mason-Sutter Conservation District contributor		include 17-floor height; narrow and vertical massing; three-part vertical composition with a base, rusticated shaft, capped with an ornamental dome; Renaissance and Baroque ornamentation; use of brick, stone, terra cotta and copper materials throughout exterior; ornamented entrance surrounds, divided by Ionic engaged columns at the base; "Humboldt Savings Bank" inscription above entrance; ground-floor storefronts; rusticated piers at the shaft of the tower dividing three bays, which contain wood-frame, double-hung, tripartite windows; recessed main entrance; moldings and lion head motifs; and decorative stepped upper-story floors; minimal to no ornamentation on the remaining facades and rear volume.	1906 earthquake reconstruction.	Humboldt Savings Bank Building, APN 3706/048	
James Bong Building	833 Market Street; San Francisco	Article 11 (Category II) Significant and an Article	A/1 and C/3	9-story Renaissance/Baroque style commercial building.	1906-1929, beginning with the year the property was constructed through the end of the period of post-	Boundary of the historic resource is aligned with the legal parcel containing the James	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
		11 Kearny-Market-Mason-Sutter Conservation District contributor		Character-defining features include 9-story building height; three-part vertical composition, with a base, rusticated shaft, and capital capped by an ornamental cornice; exterior ornamentation including terra cotta eagles, garlands, swags, and emblems; glass blocks above the primary entrance to the south and two bands of glass blocks above the ground floor storefront and second story; band of fixed windows above the ground floor; recessed primary entrance containing highly ornamented arched doorway; recessed bays with tripartite wood-frame, double-hung windows; decorative balconettes at the base of the top story; and decorative cornice entablature and a flat roof.	1906 earthquake reconstruction.	Bong Building, APN 3705/037.	
Flood Building	870 Market Street; San Francisco	Article 10, Article 11 (Category I) Significant, and Article 11, Kearny-	A/1 and C/3	12-story classical revival building. Character-defining features include twelve-story height;	1904-1929. Begins with its initial construction and ends at the close of the post-earthquake reconstruction period.	Boundary of the historic resource is aligned with the legal parcel containing the Flood Building, APN 0329/005.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
		Market-Mason-Sutter Conservation District contributor		irregular plan encompassing a central light well; sandstone cladding; five-part façade composition featuring distinct window types and patterns; and ornate Classical Revival style expressed through decorative elements such as horizontal banding, belt courses, dentil courses, brackets, rounded arches, Corinthian order columns, wreaths, and elaborate cornice at the roofline.			
The Emporium	835 Market Street; San Francisco	Article 11 (Category I) Significant, and Article 11 Kearny-Market-Mason-Sutter Conservation District contributor	A/1 and C/3	7-story Classical-Revival style commercial building. Although redevelopment during the mid-2000s removed much of the interior structure, character-defining features include: even massing, filling the parcel that fronts both Market and Mission streets; six-story height with flat roof; symmetrical, three-part façade composition at Market Street divided by belt courses and terminating in a prominent cornice with	1896 and 1906-1929, corresponding to the building's initial construction, and its association with the reconstruction during San Francisco's post-earthquake recovery period.	Boundary of the historic resource is aligned with the legal parcel containing the Emporium, APN 3705/042.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				balustrade; stucco as the predominant cladding material; cast iron and wood-frame display windows at the base of the façade; massive central arched entrance sheltering an elaborately decorated vestibule; secondary arched entrances at the outer ends of the Market Street façade; bronze doors; discernible window hierarchy arranged according to regularly spaced bays separated by a series of engaged columns; profuse Classically derived ornamentation at the upper floors, and the glass and steel dome located at the center of the building.			
Bank of Italy/Bank of America	1 Powell Street; San Francisco	Article 11 (Category 1) Significant and in the Kearny-Market-Mason-Sutter Conservation District	A and C	Eight story, steel frame building. Character-defining features include its 8-story height; terra cotta cladding with a rusticated granite base; round-headed windows and rounded corners; a base with large pilasters; balcony that	1920-1940, which includes the building's date of construction through the years it served as the bank's head office.	Boundary of the historic resource is aligned with the legal parcel containing the Bank of Italy/Bank of America 1 Powell Street, APNs 0330/027-072.	Undetermined

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				acts as a cornice between the first and second floors; cornice at the top of the eighth floor; and a frieze with foliated detailing.			
Wilson Building	973-977 Market Street; San Francisco	Article 11 (Category II) Significant, and NRHP- and CRHR-listed Market Street Theatre and Loft National Register Historic District contributor	C/3	Highly ornate, seven-story commercial loft building. Character-defining features include its 7-story height; tripartite façade composition containing three bays; columns flanking the primary Market Street entrance; highly ornate and polychromatic terra cotta at the primary façade; groupings of wood-frame windows with ornate spandrel panels; and additional decorative elements such as lion's-head brackets, belt courses, columns within the recessed window openings at the uppermost floor, and projecting cornice.	1908-1930, representing the year the building was constructed through the end of the Market Street Theatre and Loft National Register Historic District's period of significance	Boundary of the historic resource is aligned with the legal parcel containing the Wilson Building, APN 3704/069.	Yes
NA	979-989 Market Street; San Francisco	Article 11 (Category II) Significant, and NRHP-	B/2 and C/3	6-story commercial loft building. Character-defining features	1907-1930, which begins with the existing building's construction through the end of the	Boundary of the historic resource is aligned with the legal parcel containing the building at	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
		and CRHR-listed Market Street Theatre and Loft National Register Historic District contributor		include its six-floor height, three-part façade composition, regularly spaced bays containing distinctive window configurations (fixed windows flanked by operable sashes and surmounted by transoms, some containing prismatic glass); and series of engaged Corinthian-order columns carrying molded belt courses.	Market Street Theatre and Loft National Register Historic District's period of significance	979-989 Market Street, APN 3704/068.	
Hibernia Bank	1 Jones Street; San Francisco	Article 10 and Article 11 (Category I) Significant, and Market Street Theatre and Loft National Register Historic District contributor	A/1 and C/3,	Beaux-Arts style building. Character-defining features include the building's massing, scale, footprint, and masonry construction; materials, design, and fenestration on all facades, which includes: domed corner entrance and entrance stairway with colonnaded rotunda, marble floor, coffered ornamented panel ceiling, monumental and pronounced corner entrance with semi-circular white granite steps, bronze doors, pedimented granite, and	1892-1930, representing the year the building was construction through the end of the Market Street corridor's significance as a commercial theater district adjacent to downtown San Francisco.	Boundary of the historic resource is aligned with the legal parcel containing the Hibernia Bank, APN 0349/003.	No

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				marble door surround; white granite exterior walls, rusticated water table, neo-classical features throughout the façade, such as the two-story Corinthian colonnade, pediment, balustrade, dentils, entablature, aedicules, and arched windows; double-heighted pilasters, pediments and brackets on window hoods, monumental cornice with balustrade, spandrels (at McAllister Street), two-story arched openings (Jones Street), metal frame windows, primary facades with bronze-clad entrance doors; copper dome; carved granite cladding; "Hibernia Bank" sign at the dome's base above the entrance; interior space formerly used as a banking hall, with a waiting area, and first and second floors as offices, multiple vaults, and a safe deposit room; interior design and materials such as marble floors and wainscoting, ornamental cast plaster, stair railings and decorative interior painting;			

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				Bank Teller Counter; art glass skylights; and historic lighting fixtures (which was added between 1934-1957).			
Hotel Shaw	1100-1112 Market Street; San Francisco	Article 11 (Category I) Significant, and NRHP- and CRHR-listed Market Street Theatre and Loft National Register Historic District contributor	A/1 and C/3	7-story hotel building. Character-defining features include flatiron plan; base with display windows surmounted by transoms; stepped back building shaft; brick cladding at the upper stories; terra cotta belt courses, spandrel panels, and cartouches; regularly spaced bays containing individual and paired wood-sash windows; arched window openings at the uppermost floor, and prominent copper cornice.	1926 -1930, which begins with the building's construction through the end of the Market Street corridor's significance as a commercial theater district adjacent to downtown San Francisco.	Boundary of the historic resource is aligned with the legal parcel containing the Hotel Shaw, APN 0351/001.	Yes
Francesca Theater/ Strand Theater	1127 Market Street; San Francisco	None	A/1 and 3/C	4-story, Edwardian-style theater building. Character-defining features include the two-part composition of its front façade, divided by a modillioned belt course; four distinct window bands; the third floor's window bands	1917-1921, for its initial construction through the last year it operated as a combination theater	Boundary of the historic resource is aligned with the legal parcel containing the Francesca/Strand Theater, APN 3702/046.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				consist of three banks, each with four six-lite wood-sash double-casement windows; the fourth (top) floor's windows share the same composition as the third floor's, although shorter; flat roof; frieze underneath projecting cornice; and projecting cornice with long modillions.			
Federal Building	50 United Nations Plaza; San Francisco	Civic Center Article 10 Landmark District contributor, San Francisco Civic Center National Historic Landmark District contributor	A/1 and C/3	Beaux Arts Federal Building. Character-defining features include mostly rectangular plan with angled corners at the façades facing United Nations Plaza and Hyde Street; central courtyard; exterior facades composed of brick infill with granite facing (except for the façade along McAllister Street, which has terra cotta facing above the third floor); three-part façade composition; bands of window across each façade, organized according to regularly spaced bays; stone balustrades at the ground floor, center, and upper	Under Criterion A/1 the period of significance of the district is 1985-1995, which corresponds with the duration of the AIDS/ARC vigil. Under Criterion C/3, the period of significance is 1936, the year of the property's construction.	Boundary of the historic resource is aligned with the legal parcel containing the Federal Building, APN 0351/035.	No

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				building portions; cornice that demarcates the roofline; hipped metal roof; Doric columns and pilasters; projecting head-shaped keystones; and arched entrances surmounted by crests and flanked by ornate glass lanterns.			
Orpheum Theater	1182 Market Street; San Francisco	Article 10 and Article 11 (Category I) Significant, Civic Center Article 10 Landmark District contributor, Civic Center National Historic Landmark District contributor	C/3	A large, four-story theater building with upper-story office space. Character-defining features include asymmetrical plan; flat roof with a tile-covered pent roof along the facades facing Market and Hyde streets; heavy Spanish Colonial Revival ornamentation designed after the Cathedral of Leon along with a highly ornamented parapet facing Market Street; fenestration pattern consisting of arched window and door openings at the first and second stories, with groupings of rectangular windows separated by wood mullions at the third and	1926, the year of its construction.	Boundary of the historic resource is aligned with the legal parcel containing the Orpheum Theater, APN 0351/022.	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				fourth stories; numerous external doorways; "Orpheum" blade sign above primary entrance with "Orpheum Theater" above marquee; recessed primary entrance.			
Tourist Hotel	1666-1668 Market Street; San Francisco	Market Street Masonry Article 10 Landmark District contributor	1 and 3	A 5-story Colonial Revival-style hotel building. Character-defining features include height and massing; brick cladding; fenestration pattern with six-over-six light, wood, double-hung sash; Colonial Revival decorative features including arched, recessed entrance in the left bay with Doric columns in antis and divided sidelights and a fanlight transom; upper stories with arched window openings on the second story with infilled, paneled arches; third story with flat lintels and sills; fourth-story with segmental arch lintels and keystones; belt course that separates the fifth story; entablature with triglyphs and medallions on	1913-1929, representing the year the building was constructed through the period of post-earthquake residential redevelopment in Hayes Valley.	Boundary of the historic resource is aligned with the legal parcel containing the Tourist Hotel, APN 0854/004.	Undetermined

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				the frieze and a modillion cornice; parapet topped with a balustrade.			
Gaffney Building	1670-1680 Market Street; San Francisco	Market Street Masonry Article 10 Landmark District contributor	3	A 6-story steel-frame residential-over-commercial building. Character-defining features include stucco cladding; storefronts with tiled bulkheads and window enframements, original wood frame storefront windows, and high, divided, straight, transom windows with arched openings and turned spindle muntin runs; entry with shouldered arched opening and a door hood on brackets with a shouldered pediment; upper stories with bay windows in the second, fourth, and sixth bays with paneled spandrels; colonettes with spiral fluting and molded friezes; and entablature with molded medallion frieze and modillion cornice.	1911-1925 (district), 1926 (constructed date of subject building)	Boundary of the historic resource is aligned with the legal parcel containing the Gaffney Building, APN 0854/005.	Yes
Edward McRoskey	1687 Market Street; San	Market Street Masonry	1 and 3	A 2-story with mezzanine, Classical Revival-style,	1911-1925 (district), 1925 (constructed date of	Boundary of the historic resource is aligned with	Yes

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
Mattress Factory	Francisco	Article 10 Landmark District contributor		concrete-frame commercial building. Character-defining features include 2-story height with mezzanine; enframed window at primary façade, which is three bays wide and divided by pilasters; centered and recessed entryway; frieze with garland ornamentation; Union Jack window muntin configuration on upper stories; gilded frieze that reads "Edward McRoskey Matress Co;" clay tiled cornice; and shaped parapet that caps the primary facade.	subject building)	the legal parcel containing the Edward McRoskey Mattress Factory, APN 3504/040.	
Hotel Fallon	1693-1695 Market Street; San Francisco	Market Street Masonry Article 10 Landmark District contributor	1 and 3	5-story, Renaissance Revival-style commercial-over-residential building. Character-defining features include five-story height and rectangular massing; combination brick and stucco cladding; recessed residential entry at the left bay; four-story continuous canted bays with wood sash awning windows; spandrel panels	1911-1925 (district), 1914 (constructed date of subject building)	Boundary of the historic resource is aligned with the legal parcel containing the Hotel Fallon building, APN 3504/038.	No

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				and fixed, recessed, half-round or square transoms; fire escape at the central bays on the second through fifth floors; and entablature and double, arched parapet with decorative keystones above the first and fourth bays and a flagpole in the center.			
Path of Gold Light Standards and Associated Historic Utility Boxes	Market Street, from The Embarcadero at Steuart Street extending to 2490 Market Street in the Castro District	Article 10	C/3	The Path of Gold Light Standards consists of 327 Classical Revival-style cast iron and glass light standards. These lamps are located in the pedestrian sidewalk area on both the north and south sides of Market Street from The Embarcadero to Castro Street. 236 of the standards are located within the project corridor and are located between Steuart Street and Octavia Boulevard. Spacing among the lamps in their east-west configuration is relatively consistent; lamps on the north side of Market Street are positioned roughly parallel with lamps on the south side. The original Path of Gold Light Standards were	1908-1916, and 1976. The period of significance begins with the year when the bases were first placed along Market Street and concludes with the year when the tops were added to the original lamps, from the start of Market Street to Valencia Street; and 1976, the year the standards were reinstalled between The Embarcadero and Octavia Boulevard as part of the Market Street Redevelopment Plan.	The boundary of the linear resource includes the overall location and alignment of the standards along Market Street between The Embarcadero and Castro Street.	N/A

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				replaced from The Embarcadero to Octavia Boulevard with replicas made from the original casts during the Market Street Redevelopment Plan project construction process in the 1970s. Later, some of the original standards were installed in new locations along Market Street from Octavia Boulevard to Castro Street. The Article 10 landmark includes all standards from The Embarcadero to Castro Street. Although the replicas within the project corridor are placed in an alignment that evokes the "path of gold" effect for which the original light standards were named and they do retain their general relationship with Market Street, some of the lamps have been removed or moved from their original locations. Character defining features include:			

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				all material elements of the base, shaft and three-light tops of the standards; general aspects of the location of the light standards when re-installed in 1976 including their linear arrangement on Market Street; their proximity to the curb rather than facades of buildings along Market Street, creating a "pedestrian zone" on the sidewalk; their general spacing of around 100 feet between each standard; and their general arrangement in pairs on the north and south side of Market Street. Some individual standards been moved from their original location and therefore their precise location is not considered a character-defining feature, light source within the glass globes of the light standards have been updated routinely and are not character-defining features, and the light standards have been painted routinely and the paint color is not a character-defining			

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				feature. The associated historic utility boxes (labeled Eagle Signal Company and located at street intersections in close proximity to individual Path of Gold light standards) are also character-defining features of the Path of Gold.			
Mechanics Monument	Located at the intersection of Market, Bush, and Battery streets	None	3	Dedicated in 1901, Mechanics Monument was designed by sculptor Douglas Tilden at a cost of $25,000. The Mechanics Monument consists of a bronze statue and foundation. The monument was dedicated to Peter Donahue, an Irish mechanic who founded San Francisco's first iron foundry, gas company, and street railway. The statue received a dedication ceremony in May of 1901 which featured San Francisco Mayor James Phelan and Union Iron Works president Irving M. Scott. Despite the widespread destruction caused by the 1906 earthquake, the	1901, the date the monument was dedicated.	The boundary of the monument is limited to the footprint of the granite base and bronze statue. Note: The surrounding plaza post-dates the placement of the monument and is not considered a character-defining feature of the resource.	N/A

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				monument survived the 1906 earthquake relatively unharmed. Character defining features of the monument include a foundation with five muscular figures in loin clothes punching holes into the steel plate of a ship.			
Shoreline Markers	Two plaques sit within the sidewalk on Market Street; one marker is located at the northeast corner of Bush and Market streets adjacent to the base of the Donahue/Mechanics Monument, and one marker is located at the	California Historical Landmark No. 83; status code 7L	1	Bronze plaques indicating the original shoreline at the time gold was discovered in Coloma by James W. Marshall in January 24, 1848. According to *Splendid Survivors*, there are three markers, however based on historic research and field survey, ICF confirms that only two are extant. Character-defining features of the markets include their bronze material, rectangular shape, and location on the sidewalk. Additional character-defining features of the marker located at the northeast corner of Bush and Market streets include:	1921, the year the markers were installed on Market Street.	Boundaries associated with (2) Shoreline Markers are limited to the footprints of the markers.	N/A

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	southwest corner of First and Market streets.			William M. Eddy's 1851 raised map of the original water shoreline that extended from Mission to Water streets; and the inscription. Additional character-defining features of the marker located at the southwest corner of First and Market streets include the inscription.			
Site of Invention of the Three-Reel Liberty Bell Slot Machine	Traffic island on north side of Market Street between Bush and Battery streets, San Francisco	Listed California Historical Landmark No. 937 (1/15/1981 registration date; plaque placed on October 21, 1984)	1 and 2	A California Historical Landmark plaque commemorates the site of gaming inventor Charles August Fey's workshop at 406 Market Street. Fey invented the Three-Reel Bell Slot Machine and manufactured the popular "Liberty Bell" gaming devices at the site. Fey's Three-Reel Bell Slot Machine was the first coin-operated, three-reel slot machine when it was created in 1895. Fey manufactured the popular 'Liberty Bell' gaming devices until the 1906 earthquake and subsequent fires which destroyed his workshop. Using Fey's basic design, the slot machines became	1895-1906, beginning with Fey's invention of the coin-operated, three-reel slot machine at the site and ending when production of the original slot machines ceased after the earthquake destroyed the building.	The resource's boundary is limited to the historic footprint of Fey's workshop, originally at 406 Market Street, as identified in the 1900 Sanborn map. A plaque is sited within the traffic island situated on -the north side of Market Street between Battery and Bush streets, which represents the historic site that has since been demolished.	N/A

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				popular gambling devices and demonstrated Fey's ingenuity as an inventor. Because the workshop was destroyed in 1906, none of the historic site's character-defining features are extant. The resource consists of the location of the site (based on the footprint of the workshop identified in the 1900 Sanborn). Character defining features include the commemorative plaque marking this location, which states, "LIBERTY BELL SLOT MACHINE". California registered historical landmark No. 937. Plaque placed by the state department of parks and recreation in cooperation with E Clampus Vitus. October 21, 1984"			
California Statehood Monument	Intersection of Market, Montgomery, and Post streets		(assumed eligible)	The California Statehoood Monument (also known as the Admission Monument and the Native Sons Monument) was sculpted by Douglas Tilden and unveiled	1897, the date the monument was installed	The boundary of the resources is limited to the monument's footprint.	N/A

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				in 1897 to commemorate California's admission into the Union. The monument's character-defining features consists of a granite base supporting a bronze sculpture of an angel holding an open book inscribed with the date California was granted statehood, September 9, 1850.			
Lotta's Fountain	At the intersection of Market, Geary, and Kearny streets; San Francisco	Article 10	A/1, B/2, C/3	Cast-iron fountain with sculptures imbedded. Character-defining features include its location at the intersection of Market, Geary, and Kearny streets; cast-iron material; lion or griffin's head sculptures at each basin, with water that can flow from the mouth; the original sections castings, which were made in Philadelphia and shipped to San Francisco; brass medallions depicting California scenes; lamp that caps the fountain; and the base composed of granite that is 8-foot-square and 2-foot-	1875-1915, corresponding with the year Lotta Crabtree presented the fountain to the City of San Francisco through the year when Lotta visited the fountain for her 68th birthday.	The boundary of the resources is limited to the fountain's footprint.	N/A

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				thick.			
Golden Triangle Light Standards	The area bounded by Market, Mason and Sutter streets, in downtown San Francisco	Article 10 Landmark	1, 2, 3	The Golden Triangle Light Standards are a collection of 189 decorative lighting fixtures lining both sides of the streets bounded by Market, Mason and Sutter streets. They consist of metal bases and, originally, of San Francisco Carrarra-Style glass globes. The first 139 Golden Triangle light standards were installed in 1918 along the streets (excluding alleys) within the area bounded by Market, Powell, Sutter, and Kearny streets. A short while later, approximately 50 additional standards were added to Mason Street between Market and Sutter streets, Sutter Street between Kearny and Sansome streets, and Post Street between Kearny and Montgomery streets. A few standards along Mason Street have plates at their bases that read, "Property of PG&E, Erected	1915-1918; this period spans the years the Golden Triangle Light Standard installation was completed.	Limited to the footprints of the existing 189 Golden Triangle Light Standards that line the streets in the area bounded by Market, Mason, and Sutter streets.	N/A

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				under the auspices of the Downtown Associates," and "Joshua Handy Ironworks, San Francisco, 1917." With the exception of three standards manufactured in 1991 for installation in front of the Hilton Hotel at 333 O'Farrell Street, all of the standards date to the early 20th century. It appears that all of the original globes have been replaced over time. The non-original globes appear to replicate the shape of the original but are made from a different material. Character defining features of the resource include: the early 1900s design, which is composed of a high base and intricate capital that resembles the Corinthian order; stylized acanthus leaves located at the fluted shaft with scrolled modillions; a pair of fluted			

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				torchiere capped at top with a finial; acorn-shaped metal decorative design at the base of the two torchieres; the shape of the globes, the metal construction; and the 22-foot height of the standards.			
Samuel's Clock	On the sidewalk area in front of 856 Market Street near Powell Street; San Francisco	Landmark 77, Article 10, Article 11 Kearny-Market-Mason-Sutter Conservation District contributor	2, 3	18-foot clock commissioned by Albert S. Samuels. Character-defining features include location in front of 856 Market Street; 18-feet height; a base with four small clock faces, column shaft, and is capped by the main spherical clock structure composed of four major clocks on all four facades; gold-toned sphere which houses the large clock faces at the top of the structure; Corinthian capital that holds the major sphere; fluted column; six-foot high, square and blue pedestal that supports the column, with glass panels on each of the column's facades showing the clock's internal	1915, which corresponds with the year the clock was mounted at its original location in front of 895 Market Street, and 1943, which corresponds with the date the clock was placed in its current location in sidewalk area in front of 856 Market Street.	Boundary of the object limited to the footprint of Samuel's Clock.	NA

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				mechanical workings; plaques below the smaller clocks, located on the blue pedestal, which state the clock is dedicated to the public of San Francisco.			
United Nations Plaza	Assessor's Blocks 0351 and 0355; San Francisco	Civic Center Article 10 Landmark District non-contributor	A/1 and C/3	2.6-acre triangular public plaza. Character-defining features include: location along Market Street between 7th and 8th Streets; asymmetrical design; irregular-shaped plan with two linear promenades projecting north and west; primary axis that projects west to Fulton Street and a secondary axis that projects north to Leavenworth Street; view corridors from Market Street to the City Hall dome; the portion of Fulton Street that is closed to vehicular traffic, which creates a wide pedestrian promenade or allee; red brick paving in herringbone pattern and concrete-strip paving throughout the plaza; at the plaza's west end—two large,	1976-1985, starting with the year it was dedicated and ending when United Nations Plaza served as the location for the first civil disobedience protest against the AIDS epidemic anywhere in the world.	Boundary for United Nations Plaza includes the public open space located between Market Street (to the south), McAllister Street (to the north), Charles J. Brenham Place (to the east), and Hyde Street (to the west).	N/A

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				rectangular planting beds with London Plane trees planted inside and around them, and Simon Bolivar equestrian statue; below-grade fountain at the plaza's east end with angled and tiered granite blocks and arched water spigots; Ocean pools" and "Earth Tides" water cycle of UN Plaza Fountain; shallow steps surrounding half of the fountain, forming a semi-octagon shape, which is located adjacent to Market Street; vertical circulation for Civic Center BART/Muni station including elevator, stair, and escalator; granite light standards in Fulton promenade (the light standards themselves have been modified and therefore the materials of the globes are not character-defining features); light poles at fountain; flag poles with radial base design; granite paving with brass inlay; the stone monument next to the fountain; bollards adjacent to			

Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
				BART/Muni entrance.			

Source: *ICF International and Garavaglia Architecture. 2016. 870 Market Street, Department of Parks and Recreation Form 523A, B, and L. April. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International and Garavaglia Architecture. 2016. 835 Market Street, Department of Parks and Recreation Form 523A, B, and L. April. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International and Garavaglia Architecture. 2016. 1100-1112 Market Street, Department of Parks and Recreation Form 523B and L. July. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International and Garavaglia Architecture. 2016. 973-977 Market Street, Department of Parks and Recreation Form 523B and L. July. San Francisco, CA. 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Property Name	Address; City	Designations	NRHP/ CRHR Eligibility Criteria	Historic Property and Character-Defining Features	Period of Significance	Historic Property Boundary Description	Sub-sidewalk basement
523A, B, L. July. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International and Garavaglia Architecture. 2016. 22 Drumm Street, Department of Parks and Recreation Form 523A, B, L. April. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International and Garavaglia Architecture. 2016. 1 Jones Street, Department of Parks and Recreation Form 523B and L. May. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; San Francisco Planning Department. 2012. Historic Resource Evaluation Response 1 Jones Street (Hibernia Bank). November. San Francisco, CA; ICF International. 2016. 1666-1668 Market Street, Department of Parks and Recreation Form 523 L. May. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International. 2016. 1670-1680 Market Street, Department of Parks and Recreation Form 523 L. May. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International. 2016. 1687 Market Street, Department of Parks and Recreation Form 523 L. May. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; ICF International. 2016. 1693-1695 Market Street, Department of Parks and Recreation Form 523 L. May. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; San Francisco Landmarks Preservation Advisory Board. 1975. Samuel's Clock, Ordinance No. 461-75. September. San Francisco, CA; United States Department of the Interior. 1975. Lotta's Fountain National Register of Historic Places Inventory—Nomination Form. June. Washington D.C.; ICF. 2016. Cultural Landscape Evaluation, Better Market Street Project, Market Street, San Francisco, CA. Final. November. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA;; ICF. 2016. Path of Gold Light Standards, Department of Parks and Recreation Form 523 L and K. April. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA; Anne Bloomfield. 1997. Path of Gold Light Standards, Department of Parks and Recreation Form 523A, B, and L. July. San Francisco, CA; San Francisco Landmarks Preservation Advisory Board. 1991. Path of Gold Light Standards, Ordinance No. 266-91. June. San Francisco, CA; San Francisco Landmarks Preservation Advisory Board. 2002. Golden Triangle Light Standards, Ordinance No. 92-03. September. San Francisco, CA; The San Francisco Call. 1901. "Phelan, For the City, Accepts Statuesque Donahue Foundation" May 16, 1901; San Francisco Chronicle. 1901. "As Mechanics See Donahue Fountain." April 1, 1901; The San Francisco Examiner. 1986. "The Mechanics Monument." April 13, 1986; The San Francisco Examiner-Sun. 1993. "A Guide to Labor's Landmarks in San Francisco" April 13, 1986; State of California Office of Historic Preservation. 2018. Shoreline Markers. Available: http://ohp.parks.ca.gov/ListedResources/Detail/83. Accessed October 9, 2018; The Foundation for San Francisco's Architectural Heritage. 1979. Splendid Survivors: San Francisco's Downtown Architectural Heritage. California Living Books: San Francisco, CA: 246; San Francisco Chronicle. 1921. "Bronze Tablets For 2 Landmarks of Early Gold Days" April 1, 1921; State of California Office of Historic Preservation. 2018. Site of Invention of the Three-Reel Bell Slot Machine. Available: http://ohp.parks.ca.gov/ListedResources/Detail/937. Accessed: October 10, 2018;; Native Sons Monument. Available: https://www.argcs.com/portfolio-item/native-sons-monument/; ICF International. 2016. United Nations Plaza, Department of Parks and Recreation Form 523A, B, and L. March. San Francisco, CA. Prepared for the San Francisco Department of Public Works, San Francisco, CA. Location and map information sourced from: 2018 Google Earth Pro, Version 7.3.1.4507. Mountain View, CA. Accessed: April 26, 2018 2001-2018. ProQuest, LLC. Digital Sanborn Maps of San Francisco, CA: 1900							

Appendix 6-3: Cultural Landscape Evaluation

CULTURAL LANDSCAPE EVALUATION

Better Market Street Project, Market Street, San Francisco, CA

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ICF. 2016. Cultural Landscape Evaluation. Better Market Street Project, Market Street, San Francisco, CA. November. (ICF 00056.14 005.01) San Francisco, CA. Prepared for San Francisco Public Works, San Francisco, California.

Executive Summary

This Cultural Landscape Evaluation report (CLE) was prepared by ICF on behalf of San Francisco Public Works to assess Market Street as a cultural landscape. This assessment was performed as part of the Better Market Street Project (proposed project) for the purpose of determining whether Market Street qualifies as an historical resource under the California Environmental Quality Act (CEQA) or as an historic property under the National Historic Preservation Act (NHPA). For the purposes of this study, the CLE study area includes only the 2.2 miles of Market Street in San Francisco from the Embarcadero to Octavia Boulevard. The San Francisco Planning Department (SF Planning) will refer to this CLE along with other historic resources studies being conducted for the Civic Center, among others, to prepare the City of San Francisco's (the City's) official determination of whether CEQA historical resources are present in the proposed project area. This determination will be presented in SF Planning's Historic Resource Evaluation Response. This CLE also supports future efforts to assess impacts of the proposed project under CEQA and the NHPA, Section 106.

Market Street was evaluated against California Register of Historical Resources (CRHR) criteria for purposes of CEQA. For efficiency, the properties also were evaluated for eligibility for listing in the National Register of Historic Places (NRHP) in preparation for the Section 106 compliance anticipated after completion of the CEQA process. California Department of Parks and Recreation (DPR) 523 A and B forms are included as Appendix A to this CLE for Justin Herman Plaza, Hallidie Plaza, and United Nations Plaza. California Department of Parks and Recreation (DPR) 523 forms for the Auxiliary Water Supply System, the Path of Gold, and 38 individual buildings and sites in the CEQA study area also will be compiled and provided to SF Planning under separate cover.

Market Street has significance under NRHP/CRHR A/1 for its role as San Francisco's Main Circulation Artery and Facilitator of Urban Development (significance area 1) and for its role as a Venue for Civic Engagement in San Francisco (significance area 2). In addition, Market Street also has significance under NRHP/CRHR C/3 for its association with the work of master architects Mario J. Ciampi and John Carl Warnecke and master landscape architect Lawrence Halprin (significance area 3). Market Street retains sufficient historical integrity to convey these three areas of significance and, in the case of significances 2 and 3 (which have periods of significance that include end dates of less than 50 years), meet the NRHP Criteria Consideration G threshold. Thus, Market Street meets the criteria for listing in both the NRHP and CRHR for all three of its areas of significance.

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Appendix A DPR 523 Forms
Appendix B Market Street Transportation Development Timeline of Key Events

Acronyms and Abbreviations

AWSS	Auxiliary Water Supply System
BART	Bay Area Rapid Transit
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
City	City of San Francisco
CLE	Cultural Landscape Evaluation
CRHR	California Register of Historical Resources
DPR	California Department of Parks and Recreation
JRP	JRP Historical Consulting
LGBTQ	lesbian, gay, bisexual, transgender, and queer
Muni	San Francisco Municipal Railway
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
PPIE	Panama Pacific International Exposition
proposed project	Better Market Street Project
SF Planning	San Francisco Planning Department
SF Public Works	San Francisco Public Works
SFMTA	San Francisco Municipal Transportation Agency
SFRA	San Francisco Redevelopment Agency
UCSF	University of California, San Francisco
UN Plaza	United Nations Plaza

Chapter 1
Introduction

This Cultural Landscape Evaluation report (CLE) was prepared by ICF on behalf of San Francisco Public Works (SF Public Works) of the City and County of San Francisco to assess a portion of Market Street as a cultural landscape. This assessment was performed as part of the Better Market Street Project (proposed project) for the purpose of determining whether the 2.2 miles of Market Street proposed for redevelopment under the proposed project qualifies as an historical resource under the California Environmental Quality Act (CEQA) or as an historic property under the National Historic Preservation Act (NHPA).

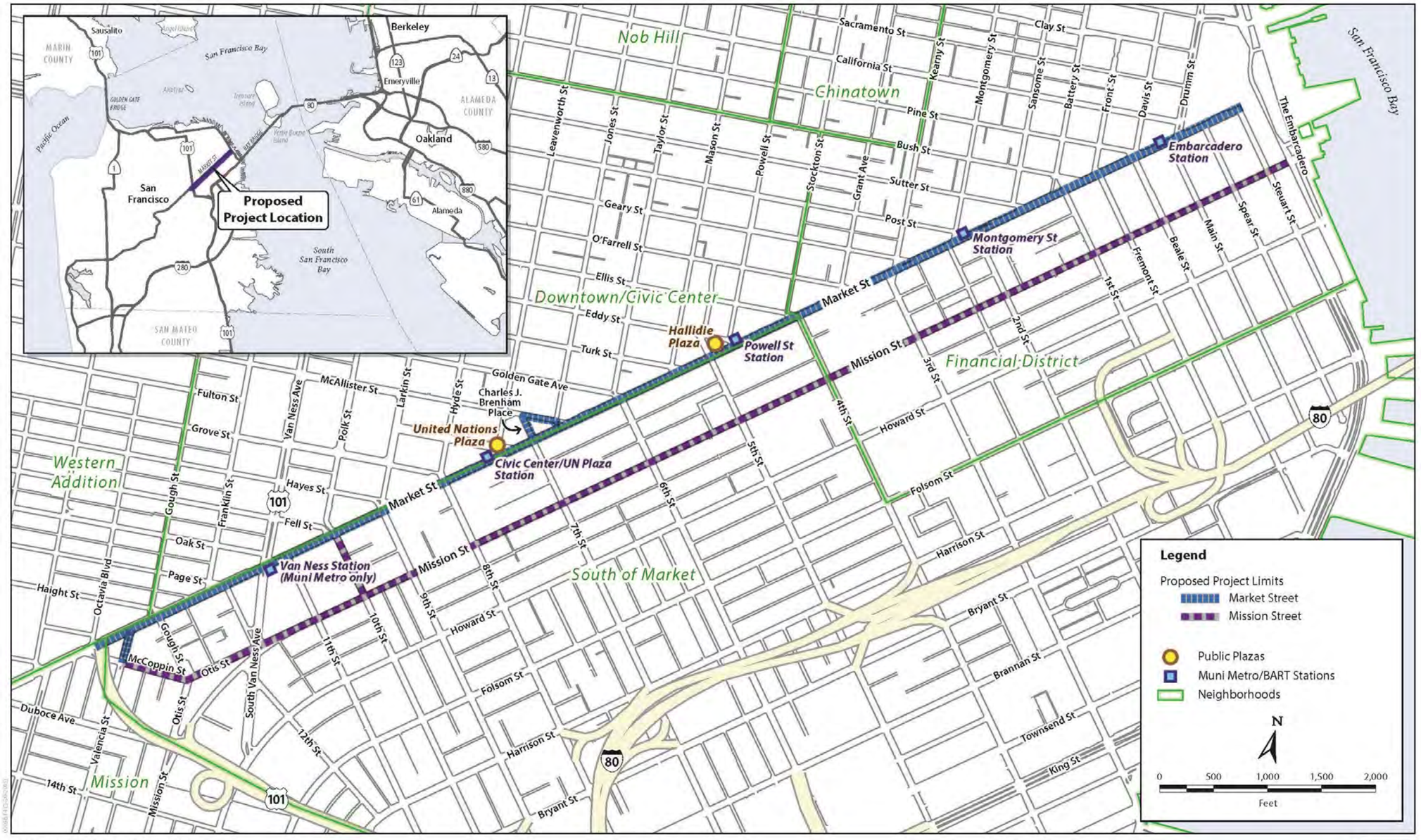
1.1 Better Market Street Project Overview

The project sponsor, SF Public Works, in coordination with the Citywide Planning Division of the San Francisco Planning Department (SF Planning) and the San Francisco Municipal Transportation Agency (SFMTA), proposes to redesign and provide various transportation and streetscape improvements along 2.2 miles of Market Street in San Francisco from the Embarcadero to Octavia Boulevard, and potentially to Mission Street (**Figure 1**). All proposed changes would be implemented on public land and the majority of the various proposed project elements would occur within the operational right-of-way and existing transportation corridor. The Project has three alternatives and two design options.

- ***Alternative 1:*** Market Street (Complete Street and Transit Priority Improvements)
- ***Alternative 2:*** Market Street – Moderate Alternative (Complete Street and Moderate Transit Priority Improvements)
- ***Alternative 3:*** Market Street and Mission Street (Complete Street and Transit Priority Improvements on Market, plus Bicycle Facility Improvements on Mission)

The proposed project would include the option to reconstruct United Nations Plaza (UN Plaza) and Hallidie Plaza. The conceptual plans for UN Plaza envision filling in the existing fountain and creating a new outdoor pavilion with seating, a new stage, and new trees and other streetscape elements. The conceptual plans for Hallidie Plaza envision reconstructing the entire area by decking over the sunken portion to create a street-level plaza, repaving the entire plaza and adding a new outdoor pavilion, tourist information center, outdoor seating, and other streetscape elements. The area beneath the decked Hallidie Plaza would continue to provide access to the Powell Street Station for the underground Muni and Bay Area Rapid Transit (BART) transit services.

No changes to plazas adjacent to Mission Street are proposed as part of this project. The proposed project would include extensive construction within the public right-of-way to accommodate the various transportation, streetscape, plaza, and utility improvements.



Better Market Street Project
Case No. 2014.0012E

Figure 1
Proposed Project Location

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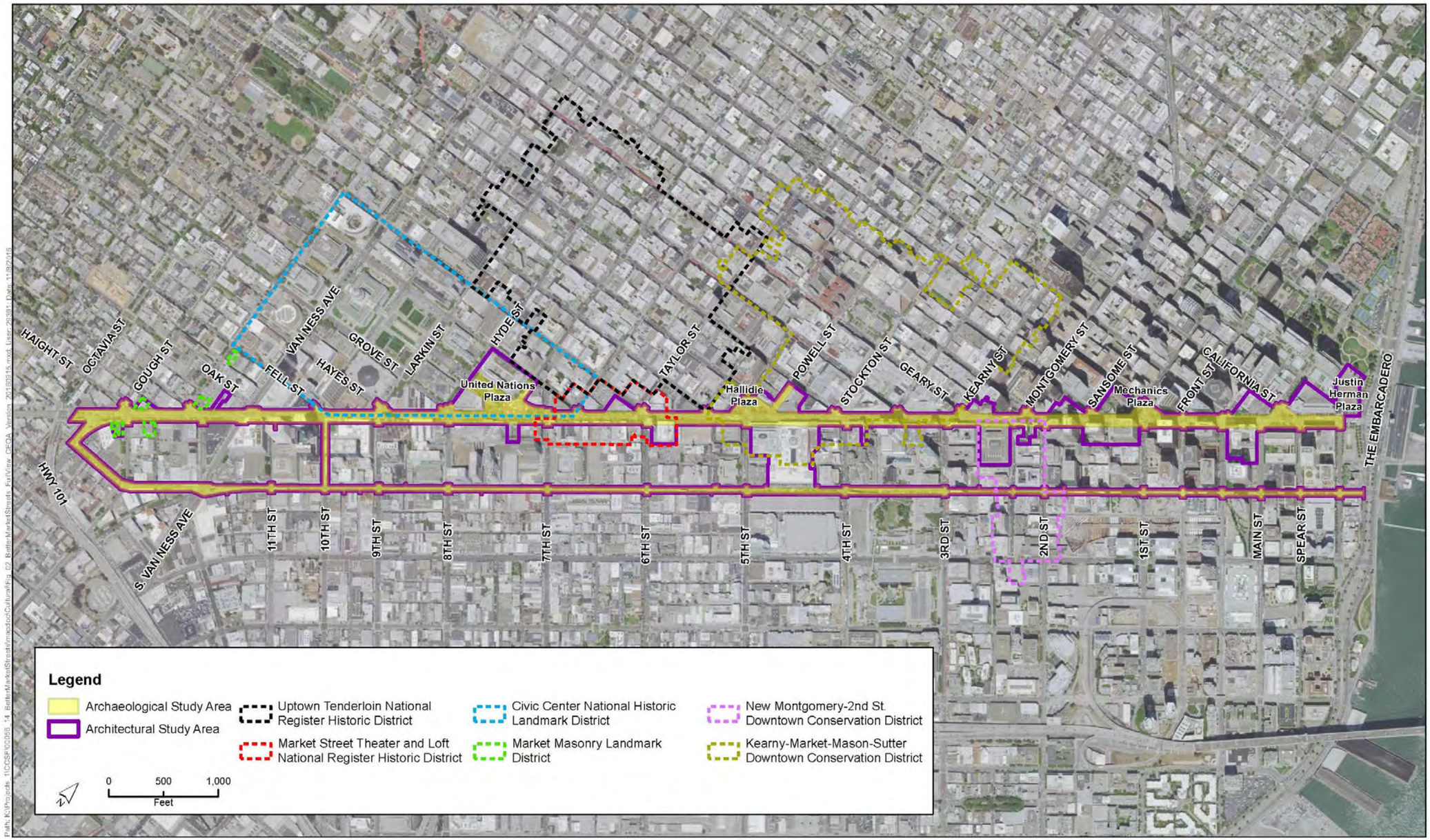
1.1.1 CEQA Study Area Description

The project corridor is along the boundary of, or within, several northeast and southeast neighborhoods of the City of San Francisco (City) and County of San Francisco, specifically, the Western Addition, Mission, Downtown/Civic Center, South of Market, and Financial District neighborhoods. **Figure 2** illustrates the CEQA Study Area for archaeological and historic architectural resources, along with historic, conservation, and landmark district boundaries. The CEQA Study Area consists of two segments.

- ***Market Street:*** The 2.2 miles of Market Street between Octavia Boulevard and The Embarcadero, as well as Valencia Street between Market and McCoppin Streets and other adjacent streets both north and south of Market Street.
- ***Mission Street:*** The 2.3 miles of McCoppin, Otis, and Mission Streets between Valencia Street and The Embarcadero, as well as some adjacent streets both north and south of Mission Street.

All of the various proposed project elements would be implemented on public land and a majority of the various proposed project elements within the public operational right-of-way throughout the project corridor, which are largely under the jurisdiction of SF Public Works and SFMTA. SF Public Works maintains authority over excavation in the right-of-way, street design, and the official grade of streets within San Francisco. Section 8A.102 of the San Francisco Charter grants SFMTA the exclusive authority to adopt regulations that control the flow and direction of motor vehicle, bicycle, and pedestrian traffic and to design, select, locate, install, operate, maintain, and remove all official traffic control devices, signs, roadway features and pavement markings that control the flow of traffic on streets and highways within City jurisdiction. Other proposed project elements would be implemented on public land under the jurisdiction of other public agencies (e.g., City and County of San Francisco Department of Real Estate – Hallidie Plaza; California Department of Transportation – Van Ness Avenue).



Better Market Street Project
Case No. 2014.0012E

Source: Imagery, ESRI 2014; Archaeological APE, Parisi Transportation Consulting and San Francisco Department of Public Works 2014; Architectural APE, Parisi Transportation Consulting and San Francisco Department of Public Works 2014; Civic Center Landmark District, San Francisco Planning Department.

Figure 2
Cultural Resources
CEQA Study Area

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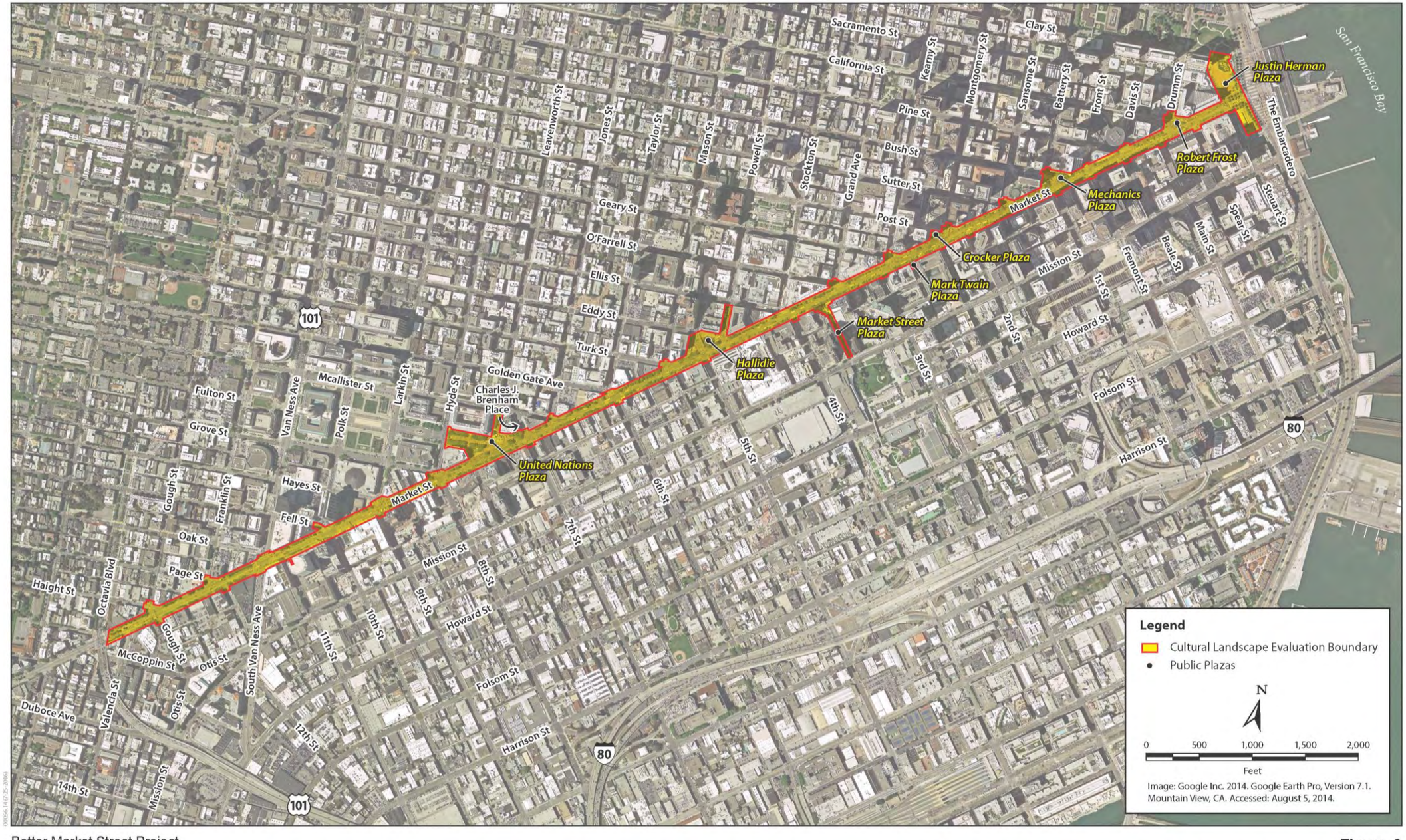
1.2 Purpose of the Cultural Landscape Evaluation

The purpose of this CLE for Market Street is to document whether Market Street qualifies as an historical resource under CEQA or as an historic property under NHPA. The Cultural Landscape Evaluation boundary includes most of the area within the architectural CEQA study area along Market Street between the Embarcadero and Octavia Street, but differs in two significant ways. While the Architectural Study Area boundary component of the CEQA study area (**Figure 2**) includes buildings in various locations along Market Street, the CLE boundary includes only the sidewalks and roadway between the facades of the buildings that line Market Street. The CLE boundary also includes the plazas designed as part of the Market Street Redevelopment Plan that began in 1968 and ended in 1979. The CLE includes an evaluation of historic resources along Market Street that are within the public right-of-way (sidewalks on both sides of Market Street, the street itself and vertical space above) and within large (Justin Herman Plaza, Hallidie Plaza, and UN Plaza) and small plazas (Robert Frost Plaza, Mechanics Plaza, Mark Twain Plaza, Crocker Plaza, Market Street Plaza) (**Figure 3**). California Department of Parks and Recreation (DPR) 523 forms are included as Appendix A to this CLE for Justin Herman Plaza, Hallidie Plaza, and United Nations Plaza. California Department of Parks and Recreation (DPR) 523 forms for the Auxiliary Water Supply System (AWSS), Path of Gold, and 38 individual buildings and sites in the CEQA study area will also be compiled and provided to SF Planning under separate cover. SF Planning will refer to the CLE in preparing the City's official determination of whether CEQA historical resources are present in the proposed project area.



Better Market Street Project
Case No. 2014.0012E

Figure 3
Cultural Landscape Evaluation

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1.3 Applying a Cultural Landscape Approach

The cultural landscape approach forms a foundation for analyzing the significance and integrity of Market Street against the criteria of the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP) because it recognizes the complexity and interconnectedness of the street, sidewalks, plazas, public art, plantings, buildings, and uses of a dynamic urban landscape. Cultural landscape methods of analysis elicit a record of associations with community events and individuals, a more nuanced understanding of the designers' intentions for a public landscape, and a recognition of the dynamic process of change that is inherent in landscapes.

The ICF team's preparation of this CLE report included five basic steps, listed below. Each step was performed in close collaboration with SF Planning.

1. Create a customized overview of the criteria and approach for evaluating cultural landscapes. This effort included conducting an overview of previous studies of Market Street, as well as studies of similar landscapes in the United States. A discussion of the evaluation criteria and methods is included in Section 2.1, *Evaluation Criteria and Methods*, and a summary of the evaluation approach is provided in Section 2.2, *Cultural Landscape Evaluation Approach for Market Street*.
2. Address research questions and information gaps. The ICF team addressed outstanding research questions and information gaps through archival research as well as review of other studies being conducted in the vicinity of the proposed project. A summary of research methods is available in Section 2.3, *Research Methods*.
3. Evaluate historical significance and character-defining features. The ICF team assessed the historical significance of Market Street according to NRHP and CRHR significance criteria and identified the character-defining features that represent areas of historical significance. Field surveys were conducted to inventory the extant character-defining features and identify intrusions that detract from the significant character of the landscape. Summaries of Market Street's Character-Defining Features are available in Section 6.1, *NRHP/CRHR Criterion A/1: Market Street as San Francisco's Main Circulation Artery and Facilitator of Urban Development*; Section 6.2, *NRHP/CRHR Criterion A/1: Market Street as Venue for Civic Engagement in San Francisco*; and Section 6.4, *NRHP/CRHR Criterion C/3: Market Street Redevelopment Plan Designed Landscape*.
4. Assess Integrity. The ICF team conducted integrity evaluation according to the seven aspects of historic integrity defined by the National Park Service (NPS), focusing on those aspects most associated with significance (Page, Gilbert and Dolan 1998:72). Discussions of relevant aspects as they apply to Market Street are included in Section 6.1, *NRHP/CRHR Criterion A/1: Market Street as San Francisco's Main Circulation Artery and Facilitator of Urban Development*; Section 6.2, *NRHP/CRHR Criterion A/1: Market Street as Venue for Civic Engagement in San Francisco*; and Section 6.4, *NRHP/CRHR Criterion C/3: Market Street Redevelopment Plan Designed Landscape*.
5. Apply NRHP Criterion Consideration G. For resources that meet the significance and integrity criteria as part of Steps 3 and 4, and are less than 50 years old (such as the Modernist design elements of Market Street), the ICF team determined whether the resources satisfy NRHP

Criteria Consideration G, which must be met for resources less than 50 years old in order to qualify for listing in the NRHP (Sherfy and Luce 1998:9). Discussions of this criterion as it applies to Market Street are included in Section 6.1, *NRHP/CRHR Criterion A/1: Market Street as San Francisco's Main Circulation Artery and Facilitator of Urban Development*; Section 6.2, *NRHP/CRHR Criterion A/1: Market Street as Venue for Civic Engagement in San Francisco*; and Section 6.4, *NRHP/CRHR Criterion C/3: Market Street Redevelopment Plan Designed Landscape*.

Chapter 2
Criteria and Methods

Cultural landscape analysis remains a nascent area of study in the historic preservation industry. Among cultural landscape studies, determining the significance of Modernist landscape designs has few exemplary precedents. Thus, the ICF team has derived a CLE approach from the standard NPS criteria and methods for evaluating historic properties, NPS guidance for documenting and evaluating cultural and designed landscapes, and a review of previous landscape evaluations of comparable landscape resources. Section 2.1, *Evaluation Criteria and Methods*, describes each of these sources of evaluation criteria and methods. Section 2.2, *Cultural Landscape Evaluation Approach for Market Street*, describes how these criteria and methods have been customized for use in evaluating Market Street. Section 2.3, *Research Methods*, and Section 2.4, *Field Methods*, provide an overview of the research and fieldwork methods, respectively.

2.1 Evaluation Criteria and Methods

2.1.1 General Evaluation Criteria and Methods

This CLE provides an evaluation of the historic significance of Market Street based on NRHP and CRHR Criteria A/1, B/2, and C/3, which are defined in Chapter 3, *Regulatory Context*. Application of this criteria is guided by *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluations* (Andrus and Shrimpton 1995) and guidelines for historic landscape evaluations. The ICF team has prepared a separate integrity evaluation for each significance statement identified during the analysis of NRHP and CRHR Criteria A/1, B/2, and C/3. The method of analysis used in this CLE includes:

- Evaluating the chronological history of Market Street against comparative contexts that relate to important trends or events in San Francisco, California, or U.S. history to determine whether Market Street has significance under **NRHP/CRHR Criterion A/1**. This CLE assesses Market Street's significance in historical events or trends by determining how the street's history is associated with the themes of labor history; the modern civil rights movement; women's suffrage; public response to war and peace; the gay, lesbian, bisexual, transgender, and queer (LGBTQ) rights movement; and post-World War II urban renewal and redevelopment.
- Evaluating the significance of historical figures associated with Market Street's cultural landscape to determine whether Market Street has significance under **NRHP/CRHR Criterion B/2**.
- Evaluating whether Market Street has significance under **NRHP/CRHR Criterion C/3** as a work that represents an important stage in the evolution of a master designer's canon of work, or whether Market Street is a significant example of a period, type, style, or method of construction. This CLE assesses Market Street as a joint venture design of master landscape architect Lawrence Halprin and master architects Mario Ciampi and John Carl Warnecke.
- Because the Market Street Redevelopment Plan components of Market Street are less than 50 years old, this CLE evaluates significance, integrity, and considerations as guided by NRHP **Criterion Consideration G** (Andrus and Shrimpton 1995:25).

After significance is established, a crucial step in the process of evaluating the integrity of a property is identifying the period of significance for that property. *National Register Bulletin 16A: How to Complete the National Register Registration Form* provides guidance. The period of significance is "the length of time when a property was associated with important events, activities, or persons, or attained the characteristics which qualify it for National Register listing" (McClelland 1991:42). For properties found to have significance under Criterion A, the period of significance is the span of time when the event occurred or when the property actively contributed to the historic trend. For properties found to have significance under Criterion B, the period of significance is the length of time the property was associated with the important person. For Criterion C, the period of significance is the date of construction or the dates of any significant alterations or additions. For archaeological sites found to be significant under Criterion D, period of significance is the estimated time when it was occupied or used for reasons related to its importance. A property's period of significance can be a single year, or may span many years (McClelland 1991:42).

The integrity evaluation portion of the CLE looks at NPS's seven aspects of integrity—location, design, materials, workmanship, setting, feeling, and association—and the degree to which landscape characteristics that define the property's historical significance are still present and able to convey significance. SF Planning directed the ICF team to review the preliminary assessment of significance and the methodology for identifying a hierarchy of character-defining features for each of the areas of significance.

Based on SF Planning input, a character-defining feature priority methodology (described in the introduction to Chapter 6, *Evaluation*) was refined and used as a basis for conducting a pedestrian survey of the study area (described in more detail in Section 2.3, *Field Methods*).

Historic and contemporary landscape base maps have been reproduced in this CLE to identify and support the evaluation of the integrity of Market Street's landscape characteristics and features. The CLE's analysis and evaluation of Market Street, in the context of the landscape as a whole, compares findings from site history and existing conditions in order to identify the significance of landscape features and associated features.

Market Street is evaluated within this CLE as a landscape/site property type rather than as a series of individual buildings, a district of buildings, or as an individual linear structure. This approach has been selected based on the nature of Market Street as a composite of physical and experiential qualities. As such, in addition to these general evaluation criteria and methods, the ICF team has referenced and applied cultural landscape evaluation guidelines in the development of the CLE (see Section 2.1.2 below).

2.1.2 Cultural Landscape Evaluation Resources and Guidelines

NPS publications provide a framework for the evaluation of historical significance and a nuanced approach to historic integrity of cultural landscapes. NPS guidance and standards for the survey and evaluation methodology of cultural landscapes have been referenced from the following publications.

- *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluations.* Provides general guidance on the how to apply the National Register of Historic Places Criteria, how to define categories of historic properties, how to evaluate a property within its historic

context, how to identify a property's significance type, how to apply criteria considerations, and how to evaluate the integrity of a property (Andrus and Shrimpton 1995).

- *National Register Bulletin 16a: How to Complete the National Register Registration Form.* Provides general guidance on how to submit a property for listing in the National Register of Historic Places, with general instruction for completing each of the major sections of the National Register Registration Form and specific guidance for developing nuanced elements such as property description, statement of significance, and period of significance, among others (McClelland 1991).
- *National Register Bulletin 22: Guidelines for Evaluating and Nominating Properties that Have Achieved Significance within the Past Fifty Years*. Provides general guidance on evaluating properties that are less than 50 years old, with discussions regarding historic context, scholarly evaluations, fragile or short-lived resources, time, comparative evaluation, association with living persons, properties in historic districts, justifying the importance of properties that have achieved significance in the past 50 years, and examples that meet Criteria Consideration G (Sherfy and Luce 1998).
- *National Register Bulletin 18: How to Evaluate and Nominate Designed Historic Landscapes*. Provides technical guidance on comprehensive planning, survey of cultural resources, and registration in the National Register of Historic Places as applicable to designed historic landscapes, including components specifically relevant to Market Street such as plaza/square/green/mall or other public spaces, city planning or civic design, and bodies of water and fountains (Keller, Keller, and Land and Community Associates, Charlottesville, Virginia 1987).
- *The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Illustrates how treatment options described in the Secretary of the Interior's Standards for the Treatment of Historic Properties—preservation, rehabilitation, restoration, and reconstruction—can be applied to the unique qualities of cultural landscapes. In addition to providing guidance regarding treatment options, this CLE provides commentary about the nuances of evaluating cultural landscapes in terms of change and continuity, relative significance in history, integrity and existing physical condition, geographical context, use, archaeological resources, natural systems, management and maintenance, interpretation, accessibility considerations, health and safety considerations, environmental protection requirements, and energy efficiency (Birbaum n.d.)
- *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*. Establishes the model for Cultural Landscape Report development, which includes site history, existing conditions, analysis, evaluation, treatment, and record of treatment. This resource offers particularly relevant guidance on crafting methodology, identifying landscape characteristics, documenting existing conditions, establishing a statement of significance, and assessing historic integrity (Page, Robert R., Gilbert, Cathy A., Dolan, Susan A. 1998).
- *National Park Service Cultural Landscapes Inventory Professional Procedures Guide*. Offers instruction crafted for comprehensive inventory of cultural landscapes within the National Park Service system. Robust guidance on organization of survey data, writing statements of significance, evaluating integrity, and defining landscape characteristics. The information in this resource is transferable to cultural landscapes beyond NPS boundaries and applicable to Market Street (Page, Killion, and Hilyard 2009).

2.1.3 Review of Previous Investigations

Previous investigations have been reviewed for potential to be used as comparative properties, sources for Market Street-specific architectural and landscape design information, and guidance on thresholds established by the City on similar past studies. This review resulted in refinement of the CLE outline and cultural landscape approach developed with input and approval by SF Planning. Previous investigations referenced include the following.

- The *Civic Center Cultural Landscape Inventory* addresses a large civic space that is similar in use to the plazas along Market Street, though it dates to an earlier period of San Francisco history. The *Civic Center Cultural Landscape Inventory* also connects to this CLE through UN Plaza, which was discussed in the *Civic Center Cultural Landscape Inventory* but not fully evaluated (MIG 2015).
- The Administrative Draft Civic Center Historic District Modern Era Cultural Heritage Theme Survey Phase 1 Research Summery Report, November 20, 2015 is the first draft report in a two-phase study to identify and evaluate important events and people related to the Civic Center Historic District public gathering spaces in the post-World War II era (Architectural Resources Group 2015). A Phase 2 summary report has not yet been submitted to the City.
- Existing studies by one or more of the Market Street designers or studies of similar resources (Nicolet Boulevard in Minneapolis, Minnesota; Lovejoy Plaza in Portland, Oregon; and Heritage Park Plaza in Fort Worth, Texas) helps establish thresholds for historical significance, comparative context statements, and inventory and documentation techniques.
- Though the *Draft Historic Context Statement, Mid-Market Historical Survey, June 30, 2011*, (prepared for the San Francisco Redevelopment Agency by Tim Kelley Consulting, LLC) was not completed or adopted, it provides useful information on early 20th century commercial and labor contexts pertinent to Market Street.

2.2 Research Methods

The ICF team prepared this CLE following an outline developed collaboratively with SF Planning, crafted specifically to apply cultural landscape inventory methods and evaluation criteria to assess the full history of Market Street. As described below, the ICF team conducted various levels of research to establish a general historic context and to better understand the history of Market Street. Research efforts included: (1) background research of previously recorded resources and completed reports within and adjacent to the CLE study area at the Northwestern Information Center and at various City and County of San Francisco repositories, (2) outreach to organizations that might have relevant information, and (3) in-depth property-specific research at local repositories, at the Lawrence Halprin Collection at the Architectural Archives, University of Pennsylvania, and of available materials online.

2.2.1 Records Search and Background Research

To establish a chronological history, historic contexts, and significance for Market Street, the ICF team conducted background research at the following repositories.

Northwest Information Center: Bibliographic references, previous survey reports, historic maps, and archaeological site records pertinent to the study area were compiled through a records search of the California Historical Resources Information System to identify prior studies and known cultural resources within 1/8 mile of the CEQA study area.

This records search (File No.14-0541) was conducted at the Northwest Information Center, Sonoma State University, Rohnert Park, on October 24, 2014. The area of potential effects and an area within 1/8 mile of the area of potential effects composed the records search study area. The search involved a review of the following information.

- Site records for previously recorded sites
- All previous studies conducted within the study area
- The NRHP
- The California Register of Historic Resources
- The Office of Historic Preservation Historic Properties Directory

San Francisco Planning Department: SF Planning provided materials for the proposed project area to the ICF team on August 25, 2014. This information included materials pertaining to the Civic Center National Historic Landmark District, historic Market Street images, historic maps, and original plans and drawings for the Civic Center and UN Plaza. The ICF team made an additional request and received materials pertaining to the Mid-Market Survey, Market Street Masonry Landmark District and associated DPR 523 forms, and the Muni-Metro Study in September 2014. During August and September 2014 and March and April 2015, the ICF team collected available surveys and historic contexts for the study area including current and completed surveys, NRHP and CRHR historic district context statements, landmark designations, and DPR 523 forms for previously recorded or evaluated properties in the study area through the SF Planning website and through the San Francisco Property Information Map. SF Planning staff provided copies of the *Draft Civic Center Historic District Modern Era Cultural Heritage Theme Survey Phase 1 Research Summary Report* (*November 20, 2015*) and *Citywide Historic Context Statement for LGBTQ History in San Francisco* to the ICF team in February 2016. ICF also received the final adopted *Citywide Historic Context Statement for LGBTQ History in San Francisco* from the City in March 2016.

San Francisco Public Works: The ICF team submitted a records search request to the SF Public Works on October 14, 2014, requesting available as-built plans, and subsequent drawings pertaining to the Market Street Reconstruction Project of 1967–1982. The ICF team received materials from the SF Public Works on November 10, 2014, which included plans and drawings pertaining to the Market Street Reconstruction Project. Many of these drawings were duplications of poor quality and were unreadable, including those sheets representing as-built drawings depicting small-scale features and planting plans.

San Francisco Public Library: The ICF team collected relevant materials from the San Francisco Library online database in April 2015, including Special Collections, Newspaper Collection, Sanborn Fire Insurance Maps, the Historical Photograph Collection, and San Francisco Chronicle (1865–1922).

City and County of San Francisco Department of Building Inspections: Research by the ICF team included search of available permits filed for properties in the study area in April 2015.

Market Street Railway: The ICF team gathered Market Street transportation history research through questionnaire and follow-up interview with Market Street Railway President and CEO Rick Laubscher on July 11, 2016.

Additional resources consulted online:

- San Francisco City Directories
- Social Security Death Index
- Federal Census records through Ancestry.com
- Library of Congress Historic American Newspaper collection
- Online Archives of California
- Historic aerial photographs (historicaerials.com)
- Pacific Coast Architecture Database provided by the University of Washington
- California Historic Resource Inventory
- The Historic American Engineering Record through the Library of Congress
- NRHP websites were consulted to obtain the previous records for the NRHP-listed properties in the study area.

2.2.2 Consulting Parties

On April 23, 2015, the ICF team sent letters requesting information on potential cultural and built resources in the CEQA study area to the following parties: California Historical Society; California Preservation Foundation; California Heritage Council; Docomomo Noca; GLBT Historical Society; Northern California Chapter of the Historic American Landscape Survey; San Francisco Architectural Heritage; San Francisco History Association; San Francisco Museum and Historical Society; and the Victorian Alliance of San Francisco. To date, the ICF team has not received materials from any of these associations.

2.2.3 Property-Specific Research

Warnecke Family Archives, Healdsburg, California: In April 2015, the ICF team gathered materials related to John Carl Warnecke's involvement in the Market Street Redevelopment Plan.

University of California Berkeley College of Environmental Design Archives: In February 2016, the ICF team conducted research in the Ciampi Collection. Market Street Redevelopment Plan-related materials were limited, but included technical reports from Market Street Redevelopment Plan.

University of California Berkeley Bancroft Library: March 2016 research by the ICF team included review of Market Street-related images in the Fang Family San Francisco Examiner Photography Archive, negative files, circa 1930–2000.

Oakland Museum of California: March 2016 research by the ICF team included review of Dorothea Lange Photography Collection, including images of the Market Street streetscape.

University of Pennsylvania Architectural Archives, Lawrence Halprin Collection: In February 2016, the ICF team conducted research related to the Market Street Redevelopment Plan design at the University of Pennsylvania Architectural Archives, Halprin Collection. Materials included professional correspondence, financial records, design notebooks, newspaper and magazine clippings, and as-built photography (prints, contact sheets, and slides).

2.3 Field Methods

The purpose of the ICF team's field survey was to capture an inventory of the character-defining features of Market Street that are present, and by omission, those that have been lost to changes in the urban landscape over time. The inventory also included recordation of streetscape features that have been added to the landscape since the periods of significance. Prior to engaging in the field survey, the ICF team met with SF Planning to review a preliminary list of character-defining features.

Based on SF Planning input, the list of character-defining features was refined, and used as a basis for conducting a pedestrian survey of Market Street from Justin Herman Plaza to Octavia Boulevard. Two architectural historians from the ICF team conducted the pedestrian survey from March 25 to 30, 2016, using maps created for the project in 2015 as the base for recording locational data and notes. SF Public Works LIDAR scans of Market Street were not completed before CLE field survey work. Field conditions were recorded with digital photograph images and handwritten notes on the base maps.

Chapter 3
Regulatory Context

Chapter 3 outlines the federal, state, and local regulatory contexts applicable to the evaluation of Market Street, including: summary of National Register of Historic Places Criteria with discussion of National Park Service guidance related to landscape characteristics, integrity, and Criterion Consideration G; summary of California Register of Historic Places; summary of City and County of San Francisco Preservation Bulletin No. 16; and guidance for Evaluating Significance within Historical Context. SF Planning is the lead agency under CEQA, but the proposed project may later involve funding from the Federal Transit Administration and also require compliance with federal regulations, specifically Section 106 of the NHPA. Consequently, resources were evaluated using both the CRHR and the NRHP criteria.

3.1 National Register of Historic Places Criteria

The criteria for evaluating the eligibility of a historic property for listing in the NRHP are defined in Code of Federal Regulations, Title 36, Section 60.4. To be listed in the NRHP, a property should generally be at least 50 years old (or be of exceptional historic significance if less than 50 years old) and meet one or more NRHP criteria. To qualify for listing, a historic property must represent a significant theme or pattern in history, architecture, archaeology, engineering, or culture at the local, state, or national level. It must meet one or more of the four significance criteria listed below and have sufficient integrity to convey its historic significance.

- **Criterion A:** Association with events that have made a significant contribution to the broad patterns of our history.
- **Criterion B**: Association with the lives of persons significant to our past.
- **Criterion C**: Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D**: Resources that have yielded, or may be likely to yield, information important to history or prehistory.

In addition to meeting the significance criteria, a significant historic property must possess sufficient historic integrity to convey the identified significance to be considered eligible for listing in the NRHP. Integrity is a quality that applies to historical resources in seven specific ways: location, design, setting, materials, workmanship, feeling, and association. To be considered a significant historic property, a resource must possess several, and usually retains most, of these aspects of integrity, depending on the context and the reasons the property is significant (Andrus and Shrimpton 1995: 44). The National Park Service's *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* (Andrus and Shrimpton 1995: 44-45), discusses the aspects of integrity as follows.

- **Location**: The place where the historic property was constructed or the place where the historic event took place.

- **Design**: The combination of elements that create the form, plan, space, structure, and style of a property.
- **Setting**: The physical environment of a historic property.
- **Materials**: The physical environments where combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- **Workmanship**: The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- **Feeling**: A property's expression of the aesthetic or historic sense of a particular period of time.
- **Association**: The direct link between an important historic event or person and a historic property.

3.1.1 Landscape Characteristics

The fundamental approach for evaluating cultural landscapes is to address key landscape characteristics and features. NPS guidance for evaluating the NRHP eligibility of cultural landscapes discusses this approach in terms of distinct tangible and intangible characteristics. The 9 landscape characteristics discussed below are selected from 13 landscape characteristics found in NPS guidance as the most applicable to the evaluation of Market Street as a cultural landscape; these characteristics are explored further in the CLE as they relate to the areas of significance that resulted from the evaluation of historical significance (Page, Killion, and Hilyard 2009). Select landscape characteristics, as appropriate for a given resource or landscape area, have been applied to organize and frame analyses of resources and landscape areas within the urban cultural landscape. The description of Market Street as a cultural landscape is organized under the following nine landscape characteristics (Page, Gilbert, and Dolman 1998).

- **Natural Systems and Features**. Natural aspects that often influence the development and resultant form of a landscape.
- **Spatial Organization**. Arrangement of elements creating the ground, vertical, and overhead planes that define and create spaces.
- **Cluster Arrangements**. Locations of buildings and structures in the landscape.
- **Circulation**. Spaces, features, and materials that constitute systems of movement.
- **Topography**. Three-dimensional configuration of the landscape surface characterized by features and orientation.
- **Vegetation**. Indigenous or introduced trees, shrubs, vines, ground covers, and herbaceous materials.
- **Buildings and Structures**. Three-dimensional constructs such as houses, barns, garages, stables, bridges, and memorials.
- **Views and Vistas**. Features that create or allow a range of vision, which can be natural or designed and controlled.
- **Constructed Water Features**. Built features and elements that utilize water for aesthetic or utilitarian functions.

- **Small-Scale Features**. Elements that provide detail and diversity combined with function and aesthetics.

3.1.2 Criteria Consideration G

Significant properties that retain integrity but are less than 50 years old, must also be evaluated against National Register of Historic Places Criteria Consideration G. When first establishing a national register of historic places in the 1960s, NPS recognized that certain property types—birthplaces, religious properties, reconstructed properties, moved properties, and properties built within the past 50 years—would not usually be considered for listing in this register. NPS recognizes that it is often difficult to have clear, historical perspective on properties built within the past 50 years, and established Criteria Consideration G to "guard against the listing of properties of passing contemporary interest" (Andrus and Shrimpton 1995:41). To ensure that such properties are deserving of recognition, NPS requires additional consideration of their relative importance within history. According to the Criterion Consideration G, properties that have achieved significance within the last 50 years may be eligible for listing if they are of "exceptional" importance (Sherfy and Luce 1998:25).

3.2 California Register of Historical Resources Criteria

The criteria used for determining CRHR eligibility are closely based on those developed by the National Park Services for the NRHP. To be eligible for listing in the CRHR, a property must demonstrate significance under one or more of the following criteria.

- **Criterion 1 (Events):** Resources that are associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.
- **Criterion 2 (Persons):** Resources that are associated with the lives of persons important to local, California, or national history.
- **Criterion 3 (Design/Construction):** Resources that embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of a master, or possess high artistic values.
- **Criterion 4 (Archaeological/Source of New Information):** Resources or sites that have yielded or have the potential to yield information important to the prehistory or history of the local area, California, or the nation.

In addition to meeting the significance criteria, a significant historic resource must possess integrity to be considered eligible for listing in the CRHR. Consideration of integrity for evaluation of CRHR eligibility follows the same definitions and criteria from the National Park Service's *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* (Andrus and Shrimpton 1995) presented in Section 3.1, *National Register of Historic Places Criteria*.

3.3 City and County of San Francisco Preservation Bulletin No. 16

San Francisco Preservation Bulletin No. 16 provides procedures for addressing historic resources in the City and County of San Francisco. The bulletin states:

> The California Environmental Quality Act [Public Resources Code Sections 21000-21178] and the Guidelines for Implementing CEQA (State CEQA Guidelines, Section 15064.5) give direction and guidance for evaluation of properties for purposes of CEQA as well as the preparation of Categorical Exemptions, Negative Declarations and Environmental Impact Reports. This section defines in general terms what types of property would be considered an "historical resource"; such a resource may include historic buildings, structures, districts, objects or sites. Continuing consultation by staff with the Planning Department's Preservation Coordinator and the Neighborhood Planning Team's Preservation Technical Specialists during the entire planning and environmental review process is vital (City and County of San Francisco 2008:1).

Chapter 4
Historic Chronology and Comparative Contexts

When evaluating the significance of a cultural landscape, a relevant chronological history of the resource is developed in order to identify the property's period of significance. The period of significance is the temporal point of reference from which a property's significant features are evaluated. This is the duration of time when the property was associated with important events, activities, and persons, or is the construction completion date.

The evaluation of significance also includes identification of historic contexts—organizing structures for interpreting history that group historic properties sharing a common theme, geographic location, and time period. Historic contexts allow for comparative analysis that evaluates the significance of one property relative to another within the same context (Page, Killion and Hilyard 2009:5-12).

In addition, the historical themes—trends or patterns in history or prehistory relating to a particular aspect of cultural development—are identified to compare against the property's chronological history (Page, Killion, and Hilyard 2009:1-2). When a resource has demonstrable association with significant themes, it is historically significant.

To evaluate the significance of Market Street and develop relevant statements of significance, the ICF team asked questions such as the following (Page, Killion, and Hilyard 2009:5-9).

- In what ways do events that occurred on Market Street reflect the broad patterns of American history and why are they significant?
- How do the functions and processes of Market Street relate to the broader development of the city, state, or nation? How do the remaining landscape characteristics, processes, and physical forms of Market Street reflect these functions and processes?
- How have significant individuals or events contributed to the development of the Market Street?
- Are any landscape architects, designers, builders, or planners important to the property's development?
- What are the physical features and characteristics that distinguish Market Street, including, topography, land use, spatial organization, circulation patterns, structures, and materials?
- Does Market Street convey a sense of cohesiveness through design, setting, materials, workmanship, feeling, and association?

The chronological history, comparative contexts, and historical themes relevant to Market Street presented in this chapter address these questions. The following historic chronology focuses on the development of Market Street, including the associated buildings, structures, objects and natural features that compose the cultural landscape. This chapter discusses the earliest development under the Mexican government, the urban development in the area after the discovery of gold in the Sierra Nevada, and the intensive urban development in the nineteenth century. The discussion of these periods is abbreviated since the physical character and role of Market Street is less complex during its early history. Market Street's current fabric represents a blend from development activities after

the great earthquake and fire of 1906, the City Beautiful Movement, and post-World War II decline and redevelopment of the area, and therefore more information is provided for these periods.

The comparative contexts included in this chapter explore social movements (labor rights, women's suffrage, civil rights, war protest and peace celebration), urban renewal trends, and the collaboration between the modern design masters that created the Market Street Redevelopment Plan. These contexts offer the perspective required to place the history of Market Street within broader patterns of local, state, and national history.

4.1 Chronological Historical Narrative

4.1.1 Spanish and Mexican Periods

In 1769, an expedition led by Spanish soldier Gaspar de Portolá, founder and first Governor of Alta California, traveled north from San Diego in an attempt to locate Monterey Bay, but arrived instead at Sweeny Ridge in today's San Mateo County, where members of the party became the first Europeans to observe the San Francisco Bay. In 1776, Juan de Bautista de Anza led a party that traveled from Monterey into what is now San Francisco to explore settlement locations. Anza chose the site of today's Fort Point for a new Spanish garrison, or presidio, and chose a creek location approximately 3 miles to the southeast, which he named Arroyo de los Delores, for a new mission. On June 29, Fray Francisco Palou held the first Mass at the site where the mission would be developed, a half-mile southwest of the proposed project area. The Presidio of San Francisco was dedicated in September, and Mission San Francisco de Asís (which would become known as Mission Delores) was dedicated in October (Kyle 2002:350-52; Woodbridge 2006:18-21).

The Spanish period ended in 1822, as the new government of Mexico seized control of California, and the pueblo of Yerba Buena was formally created in 1835. Fueled by anti-clerical sentiment, during the 1830s the Mexican government began secularizing the California missions. Throughout the Spanish era and much of the Mexican era, areas between Mission Delores and Mission Bay to the east, and Rincon Point and Yerba Buena Cove to the northeast, remained undeveloped. However, Spanish and Mexican residents were familiar with and made transient use of these undeveloped landscapes. By the mid-1820s, trails ran along the contours of Yerba Buena Cove, and a horse path approximating today's Mission Street extended from the cove southwest to the mission and pueblo (Bean and Rawls 2002:56, 58-70, 72; Sandos 2004:11-12, 108-09; JRP Historical Consulting [JRP] 2010:33-35; Tim Kelley Consulting 2011:5).

Increased maritime activity at Yerba Buena Cove, which was not San Francisco's official anchorage, eventually increased land use in the vicinity of the cove. In 1822, Captain William A. Richardson arrived in San Francisco as the last Spanish Governor, and made Yerba Buena Cove San Francisco's principal anchorage, managing shipments between San Francisco and the Embarcadero at Mission San José to the south (Kyle 2002:354; Lotchin 1974:7; JRP 2010:34-35). The village of Yerba Buena began to take shape in the latter 1830s as Richardson and his family, Jacob Leese, and other early residents constructed buildings west of the cove. In 1839, the local alcalde (mayor) hired Swiss immigrant Jean-Jacques Vioget to prepare a survey of Yerba Buena incorporating previous grants. Situated north of the proposed project area, Vioget's 12-block grid was bounded on the south by California Street (JRP 2010:35-36).

4.1.2 The Gold Rush and Early Urban Development, 1847–1860

Prior to Captain John B. Montgomery's arrival in 1846, Alcalde (mayor) Washington Allon Bartlett had commissioned Jasper O'Farrell, Surveyor General of Alta California, to conduct a new survey of San Francisco and modify Vioget's earlier plat. In 1847, O'Farrell planned Market Street as San Francisco's main artery, paralleling the old route between Mission Delores and Yerba Buena Cove, which became Mission Street (**Image 1**). North of Market Street, O'Farrell expanded Vioget's original 12-block, 50-vara grid to the south and west, with streets running in cardinal directions. South of Market Street, O'Farrell created a grid of larger 100-vara blocks with streets aligned northeast, northwest, southeast, and southwest rather than cardinally. O'Farrell then shifted the line of the streets parallel to the waterfront by 2.5 degrees in a northwest and southeast direction. This shift was called the O'Farrell swing because it shifted the line of the streets from a pivot at the corner of present-day Washington and Kearny Streets and altered the lot lines in the previous surveyed section. O'Farrell's plat also included 444 small beach and water lots in and along the cove. The new lots sold well. Nearly half were purchased during the summer of 1847. The remainder sold during the Gold Rush, and in 1849 William Eddy was hired to expand O'Farrell's 1847 survey (JRP 2010:36; Lotchin 1974:7164-65; Woodbridge 2006:33).

Many San Franciscans were unhappy with O'Farrell's plat. Real estate speculators complained that the 120-foot width of the Market Street thoroughfare wasted potentially valuable land. Historian Rand Richards alleges that after publication of the first map of O'Farrell's survey, a mob demanded that he be hanged, which prompted the surveyor to flee to Sausalito for a time. San Franciscans also complained that, save Market Street, O' Farrell's platted streets north of Market Street were too narrow, and that the grid was generally unsuited to the hilly topography. With respect to Vioget's cardinally oriented original grid, the diagonal alignment of Market Street created numerous triangular shaped blocks on the north side of the street, where half of the intersecting north-south aligned streets terminated due to the larger sizes of blocks south of Market Street. The result was numerous "T" intersections, which, as historian Roger Lotchin wrote in the 1970s, would eventually create "the traffic nightmare of contemporary Market Street" (Lotchin 1974:165; JRP 2010:36; Richards 1999:201; Soulé 1855:489-90).

San Francisco became a frontier boomtown during the Gold Rush. Although many lots south of Market Street sold in 1847, until the Gold Rush, development was restricted to the commercial district north of Market Street. With the onset of the Gold Rush in 1848, newcomers created tent cities near the cove south of Market Street at "Happy Valley" and "Pleasant Valley," situated north and south of Mission Street respectively. South of Market Street, dwellings with solid envelopes were limited to hastily built shanties. As late as summer 1849, no wharfs extended beyond the shallows to the cove's deeper waters, while mud covered the cove shorefront from Clark's Point south to Pine Street, and sand dominated the shoreline farther south (JRP 2010:38-39; Lotchin 1974; Soulé 1855:215-16). In 1849, San Francisco experienced a particularly wet winter, and terrible street conditions throughout the city included locations where mud was knee- and waist-deep. Brush and limbs from trees were cut down and thrown into the streets to mitigate conditions (Olmsted 1991:4). In response, in 1850, the City contracted the Mission Delores Plank Road Company to construct a wood "highway" from the commercial district to Mission Delores, and to maintain the road through toll charges on horse teams and carts. Planks were made from Oregon fir (Douglas fir), 3 to 4 inches thick. Plank roads were constructed on streets other than Market Street

during subsequent years because an 80-foot-high sand dune made Market Street impassable between 2nd and 3rd Streets (JRP 2010:39; Hittell 1878:152; Olmsted 1991:4, 6; Lotchin 1974:166).

Lower Market Street and the eastern waterfront as a whole gradually extended into Yerba Cove with the construction of wharfs and piling-supported piers, and with incorporation of wood ships into the fabric of the waterfront built environment as stationary instead of mobile structures. By the end of 1850, nine wharves reached eastward into the cove. The southernmost of these was the Market Street Wharf, which extended 600 feet from the shore by October 1850 (JRP 2010:42; Hittell 1878:464-65; Lotchin 1974:172-73; Soulé 1855:489-90).

San Francisco's wood buildings, plank streets, and wharves comprised abundant fuel for fires that proved increasingly destructive during the Gold Rush years and into the early 1850s. In 1851, after repeated fire devastation, San Franciscans mobilized to fill portions of the wharf zone. Entrepreneurs developed the "steam paddy," a steam-powered shovel named for its ability to replace shoveling Irish laborers, which "cut into the sand hills that lined the waterfront" and "from it, hopper cars running along temporary rail lines carried the sand to the water, where it was dumped." Approximately 22 million cubic yards of fill would eventually eliminate the original crescent-shaped contour of Yerba Buena Cove and extend urbanizing San Francisco to the east (Delgado 2009:79 quoted, 80-85; Lotchin 1974:174-76).

Ongoing fill activities dovetailed with grading efforts. To improve drainage, in 1853 the City of San Francisco adopted a new grading system in response to the filling of the cove, which had extended the shoreline nearly 1,000 feet to the east. Westerly streets had to be raised or lowered to provide for effective drainage flows toward the cove to the east. Named for the City Engineer who conducted the new grading survey, the Hoadley Grade set a baseline elevation of 6.7 feet above the high water mark at a wood piling located at Pacific and Davis Streets—a baseline elevation that the City continues to use today. Individual lots and buildings had to be modified in response to the new street grades. Some buildings, including brick masonry buildings, were raised through the construction of new basements. The Hoadley Grade exacted what was later characterized as an especially "heavy expense upon those who had already built of brick." A machine based on the principle of the hydraulic press was invented and used for raising about 900 brick houses in San Francisco, one of them covering an area of approximately 137 square feet (Hittell 1878:436, 438; JRP 2010:43).

Image 1. Jasper O'Farrell's 1847 plan, illustrating Market Street's diagonal alignment joining San Francisco's northern and southern grids. (San Francisco History Center, San Francisco Public Library)

4.1.3 Intensive Nineteenth-Century Urbanization, 1860–1906

From the year 1860, when the first railroad began service on Market Street, to the calamitous earthquake and fire of 1906, development transformed San Francisco from a frontier port city to a truly modern Victorian city. Private wealth invested in industry, commerce, and improved transportation helped fuel this growth. While few became truly wealthy from the gold rush, those who made fortunes after 1860 from railroad development, real estate, banking, and the Comstock Lode increasingly made San Francisco their homes, including William C. Ralston and Darius O. Mills of the Bank of California, and Leland Stanford, member of the "Big Four," who organized the Central Pacific Railroad (later the Southern Pacific Railroad) and completed the first transcontinental railroad in 1869. In an era when the influence of private interests dwarfed the influence of government, growing wealth and private enterprise fueled the expansion and development of San Francisco. The city's population stood at 56,835 in 1860. A decade later San Francisco had nearly 150,000 residents (Hittell 1878:366, 429; Scott 1985:50-51).

At the same time that San Francisco spread to the west and south, increasingly high density in its older districts made the city California's most heavily urbanized built environment (**Image 2**). Market Street became the grand avenue that O'Farrell had envisioned prior to the Gold Rush. While the financial district remained concentrated north of Market Street, by the last decades of the nineteenth century, Market Street had come to function as the main circulation artery for both the city's transit system and its commercial culture. San Francisco's streets were first paved with cobblestone (rounded river rocks) interspersed with rubble and flagstone walkways at intersections to delineate crosswalks in the 1850s (Olmsted 1991:6). By the 1870s, asphalt was used extensively for sidewalks, though the material was not considered heavy and strong enough for street paving (Olmsted 1991:10, 12). In 1873, Municipal Order #1127 adopted cobblestones and stone blocks for construction of the pavement for streets in San Francisco, but did not specify stone type (Olmsted 1991:14). By 1875, San Francisco began using basalt stone blocks for street paving (Olmsted 1991:12), and Municipal Order #2121 in 1889 required San Francisco's streets to be repaved with basalt block. (Olmsted 1991:14).

Material changes improved conditions along the roadway, but were not the most innovative alterations to Market Street during this period. In 1857, Colonel Thomas Hayes received approval from the State Legislature to build a steam railroad along Market Street west to a tract he hoped to subdivide, which would become Hayes Valley. The character of Market Street changed dramatically in 1860 when Hayes's Market Street Railroad Company completed construction of a steam-powered railway west of Montgomery Street (**Image 3**). The system consisted of paired tracks running down the center of Market Street (the route of today's Muni 21-Hayes line) (Vielbaum, Hoffman, Ute, Townley 2004:7; Laubscher 2016).

By 1863, horse-drawn streetcars supplanted the steam engine. Within several years, new lines developed by both the Market Street Railroad and other private companies crossed Mission Street at several locations. North of Market Street, Andrew Smith Hallidie and the Clay Street Hill Railroad Company put the first of San Francisco's famed cable cars into service in 1873. In 1882, the Central Pacific Railroad, owned by Leland Stanford, acquired the Market Street Railroad Company. In 1883, the existing system was converted from streetcars to a cable car system and renamed Market Street Cable Railway. The upgrade included construction of a main powerhouse complex on the south side of Market Street at the intersection with Valencia Street. Stanford's $1,750,000 investment in upgrading the system would pay handsomely and give Central Pacific interests near-monopoly

control of San Francisco's transit system. Improved travel on the main Market Street line, which extended from the Ferry Terminal on the bay southwest to 28th and Valencia Streets, would boost development in the outer Mission District, while westward branch lines would spur development to Van Ness Avenue and beyond, eventually reaching out around Golden Gate Park. Other lines soon operated south of Market Street, on Mission and Howard streets and several of the numbered streets (McGloin 1978:121-125; Page & Turnbull 2009a:37-38; Scott 1985:76; Laubscher 2016; Woodbridge 2006:74-75;).

Between 1883 and 1889, five cable lines were introduced on Market Street running west from the Ferry Terminal and branching out to McAllister, Hayes, Haight, Valencia and Castro Streets. 1892 saw the introduction of electric streetcars in San Francisco, though none were routed on Market Street at that time. In 1893, with the death of Leland Stanford, Market Street Cable Railway Company was renamed to Market Street Railway Company and San Francisco's major transit lines (formerly operated by multiple private companies) were consolidated into ownership by the Market Street Railway Company, making it an even more attractive investment (Laubscher 2016).

In 1902, Market Street Railway Company was acquired by the Baltimore Syndicate, which merged them with the Sutter Street Railway and the San Francisco & San Mateo Electric Railway. The consolidated company became known as United Railroads of San Francisco (Vielbaum, Hoffman, Ute, Townley 2004:7). By 1906, Market Street had two sets of cable car tracks running the length of the street from the Ferry Building (completed in 1903 at the terminus of Market Street at the San Francisco Bay) to Sutter Street (**Image 4**). These two cable car tracks in the center of the roadway were flanked by two horse-drawn streetcar tracks (Laubscher 2016).

Municipal development and management of public infrastructure and services was largely a product of Progressive Era reform, which did not gain real political traction and gradually transform San Francisco City government until after the turn of the century. During the nineteenth century, most of San Francisco's infrastructure and services were privately developed under City charters, franchises, and other limited forms of municipal oversight, including "night removal" services that emptied privy vaults and private companies that constructed sewer connections to buildings. Overtime, the City increased its oversight of vault cleaners and began to replace both redwood and brick sewer conduits with concrete or iron-stone sewer pipes (JRP 2010:61-64).

As with sewer construction, street improvements were often undertaken haphazardly during much of the nineteenth century. Looking back on those decades from the historical vantage point of 1884, San Francisco's superintendent of public streets, T. J. Lowney, explained that the absence of "statuary law authorizing municipal governments to order street work done and specify the manner in which it should be done, led to a loose and irregular mode of improvement. Paving, sewering, planking, and macadamizing was done in whatever manner the contractors and the property owners could agree on, with no regard being paid to permanency or future utility" (City and County of San Francisco 1883-84:108).

Over time, the City increased its oversight over street improvements, which were undertaken as property owners submitted petitions for paving and sidewalk construction work financed through assessments to their property. As directed by the superintendent of public streets, the City then adopted adequately improved streets and assumed responsibility for their maintenance. Early cobble, stow (wood block) and Nicolson (also wood block) pavement began to be replaced with stone block pavement, including basalt pavement, brick, and with butimen or bituminous rock

(asphalt) pavement toward the end of the century (City and County of San Francisco 1870-71 to 1898-99).

The Spring Valley Water Company, which secured monopoly control of the city's water supply service, did not begin to extend water lines to much of the South of Market Area until the 1860s. Water use in San Francisco increased dramatically with population growth during this period. In 1865, San Francisco's 110,000 residents used approximately 2.4 million gallons of water daily. In 1880, a population of 233,000 San Franciscans used approximately 17 million gallons daily. Streets superintendent S. H. Kent complained in 1875 that, as a consequence of the city's "rapid growth," gas and water companies "are constantly replacing their mains and pipes with larger ones, to do which it is often necessary to tear up paved streets." Sanborn Fire Insurance maps dating to the late 1880s show that by that time, the Spring Valley Water Company had created an extensive network of water lines comprised of pipelines varying widely in size, with numerous lines running underneath Market and Mission streets (City and County of San Francisco 1874-75:134 quoted; Page & Turnbull 2009a:29; Sanborn Fire Insurance Maps [Sanborn Map] 1886, 1887, 1889; Young 1912:584-86).

During the latter decades of the nineteenth century, the project to construct a new City Hall at the site of Yerba Buena Cemetery became a long saga that symbolized both a commitment to private development, and a municipal government that a growing number of San Franciscans considered inept, corrupt, and inefficient—sentiments that would give rise to Progressivist municipal reform after the turn of the century. Given that a majority of San Franciscans were opposed to the prospect of bond indebtedness for public acquisition of the Spring Valley Water Company monopoly, it is not surprising that little political will existed to fund construction of a new City Hall through bonded indebtedness. Instead, the City Hall facility would be developed in a slow, piecemeal fashion. The City awarded the first contracts for initial construction of the City Hall building in 1871. By the early 1890s, the building had yet to be completed, and citizens began referring to it with disgust as "the new City Hall ruin" (Issel and Cherny 1986:133; Young 1912:516-517).

Private investment, with limited municipal oversight, had nonetheless transformed Market Street into a densely developed thoroughfare by the late 1880s and the 1890s. Although older wood-frame buildings stood along the thoroughfare when the 1906 earthquake and fire devastated the city, over the course of the late nineteenth century, masonry construction had increasingly become the norm for larger or better-funded building construction along Market Street (Page & Turnbull 2009a:46). Still, few buildings would survive the disaster of 1906.

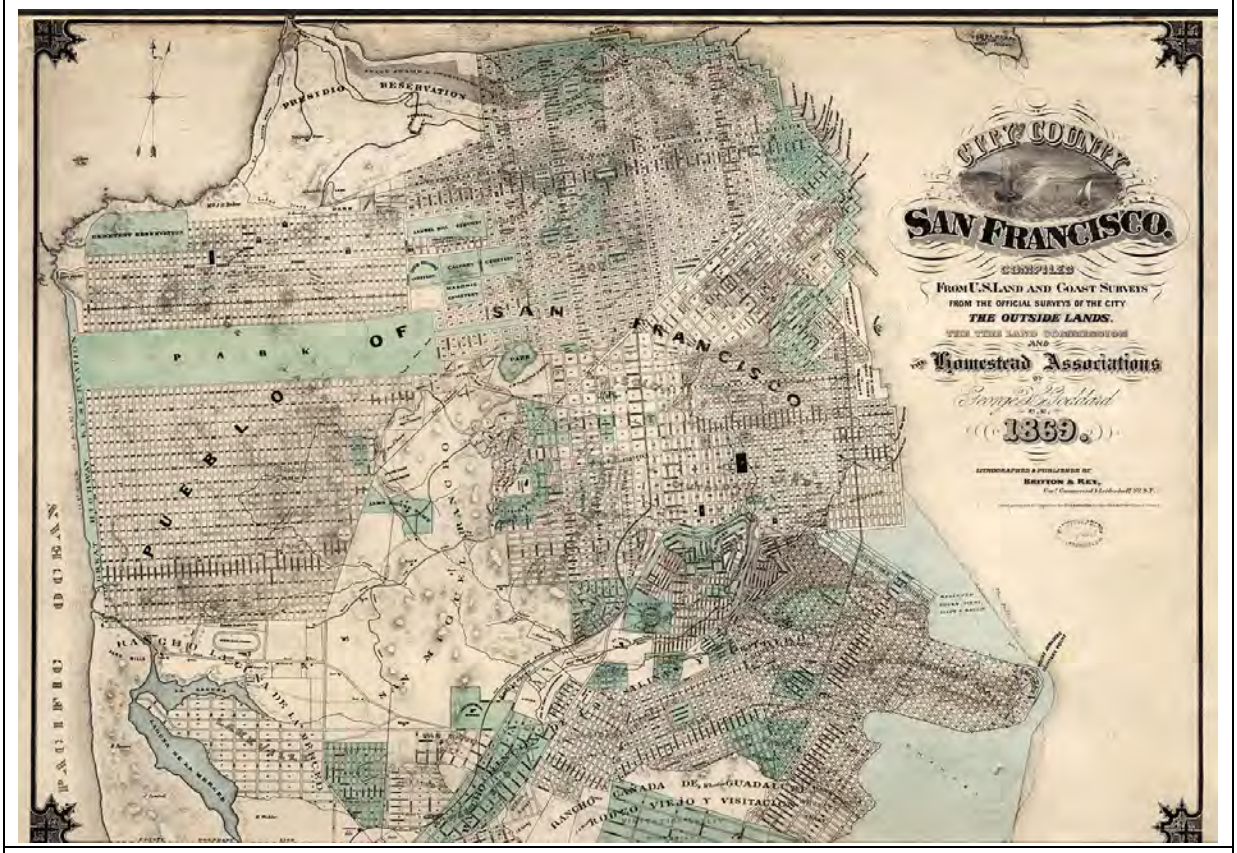

Image 2. U.S. Land and Coast Survey – City of San Francisco and Its Vicinity, Cost Survey Office, 1869, illustrating expansion of San Francisco with consistent Market Street alignment. (David Rumsey Map Collection)

Image 3. The character of Market Street changed dramatically in 1860 when Hayes's Market Street Railroad Company completed construction of a steam-powered railway west of Montgomery Street. This image shows Market Street, 1865, east view towards San Francisco Bay showing roadway before introduction of railway transit east of Montgomery Street. (San Francisco History Center, San Francisco Public Library)

Image 4. Market Street, 1905, west view from the Ferry showing cable car routes down Market Street. (San Francisco History Center, San Francisco Public Library)

4.1.4 Market Street at the Turn of the Twentieth Century

By the turn of the twentieth century, Market Street was well established as San Francisco's main circulation artery (**Image 5**). The thoroughfare linked the city's eastern waterfront and financial district—the latter of which was located on the north side of lower (northeast) Market—to the Mid-Market theater and hotel district, the Civic Center, and the predominantly residential districts west, north, and south of the proposed project area that had taken shape toward the end of the nineteenth century. These districts included the Lower Haight, Hayes Valley, Duboce Triangle, and the Mission District. In addition to serving as the city's main circulation artery, Market Street had become one of the city's principle spaces for public gatherings, processions, and parades by the turn of the century (Tim Kelley Consulting 2011:66-67).

Constructed between 1894 and 1903, and originally known as the Union Depot and Ferry House, the Ferry Building marked Market Street's northeastern terminus at the bay. Designed by architects A. C. Schweinfurth and A. Page Brown, the neo-classical Ferry Building's central block was modelled on Charles Atwood's Columbia Exposition railroad station in Chicago. The Ferry Building also featured a tower inspired by Classical Spanish and Italian Renaissance towers. The building functioned as one of the city's main gateways. Disembarking ferry passengers had ready access to

streetcars that switched direction at the loop in front of the Ferry Building and traveled both directions along Market Street rail lines to the southwest (**Image 6**) (Sanborn Maps 1887, Vol. 1; Woodbridge 1988:75).

Lower Market Street included a mix of commercial-, industrial-, and shipping-oriented uses that reflected its proximity to the waterfront. These included shipping agent offices, ship's chandlers, working-class lodging houses, and suppliers of coal, lumber, and other construction materials, as well as grocers, liquor stores, and light manufacturing operations (Sanborn Maps 1887, Vol. 1; Woodbridge 1988:75). Southwest of Market Street's intersections with Montgomery and 2nd Streets was the vital theater and hotel district that had taken shape in the 1880s, which was interspersed with offices and retail businesses. The Theater District would move southwest between 5th and 9th Streets following the 1906 earthquake and fire. This area of Market Street also included a number of large dry goods stores, including the Weinstock Lubin Company at Taylor Street, and the J. J. O'Brien Company at the corner of Jones Street. The Hale Brothers department store stood on the south side of Market Street between 5th and 6th Streets. Large furniture stores such as Chas. Plum and Company, Fincke & Schindler's, and Bare Brothers were developed in the vicinity of 9th Street. Other smaller furniture stores and second-hand stores, including Salvation Army outlets, also did business along Market Street. Constructed in 1892 at the intersection of Market, Jones, and McAlister Streets, the Hibernia Bank represented San Francisco's first example of the Beaux Arts-style architecture. Fraternal orders such as the Knights of Pythias and the Independent Order of Odd Fellows also had large masonry buildings in this area of Market Street and to the southwest (Corbett 1979:73, 90; Issel and Cherny 1986:26-27; Page & Turnbull 2009a:37-38; Sanborn Maps 1887, Vol. 1; Tim Kelley Consulting 2011:11-12; Woodbridge 1988:57).

In contrast to the higher-end hospitality businesses concentrated northeast of Jones and 7th Streets, turn-of-the-century Market Street to the southwest in the vicinity of the Civic Center, featured businesses that were geared to the daily needs of working- and middle-class residents of the South of Market Area. This portion of Market Street included the Central Park baseball grounds on the south side of the thoroughfare at 8th Street, which contained bleacher seating for crowds of up to 15,000, and two Panorama buildings that, by the turn of the century, had been converted to a boxing arena and a bicycle velodrome. Situated at the far northern end of the proposed project area, where Market Street intersected with Valencia, Gough, and Haight Streets, was "the Hub." The name derived from its location as the nexus of San Francisco's Market Street Cable Railway. In 1883, that company developed its main powerhouse complex on the south side of Market Street at its intersection with Valencia Street. Like so many masonry structures in the city, the complex's chimney, an area landmark, would collapse during the 1906 earthquake (The Green Arcade n.d.:2-3; Page & Turnbull 2007:51; Sanborn Maps 1887, Vol. 1; 1886, Vol. 2; 1889, Vol. 3; Tim Kelley Consulting 2011:43-44).

As San Francisco's main circulation artery, Market Street had also evolved into one of the city's most important public spaces by the turn of the century. During much of the nineteenth century, public processions had centered on the social space of Portsmouth Plaza north of Market street, and had crossed or made limited use of Market on route to or from the plaza. During the 1870s, working-class and largely Irish participants in the Workingmen's Party and the anti-Chinese movement often paraded down Market Street from the sandlots around city hall, where crowds gathered to hear speeches by movement leaders such as Dennis Kearny. By the turn of the century, Market Street had become the principle site of most public processions and parades. Labor Day parades typically traveled up Market Street to the Mechanics' Pavilion at 10th Street, but often

slowed around the Chronicle Building to protest against the staunchly anti-union *San Francisco Chronicle* and its publisher, M. H. De Young (Issel and Cherny 1986:125-128; Tim Kelly Consulting 2011:66-67).

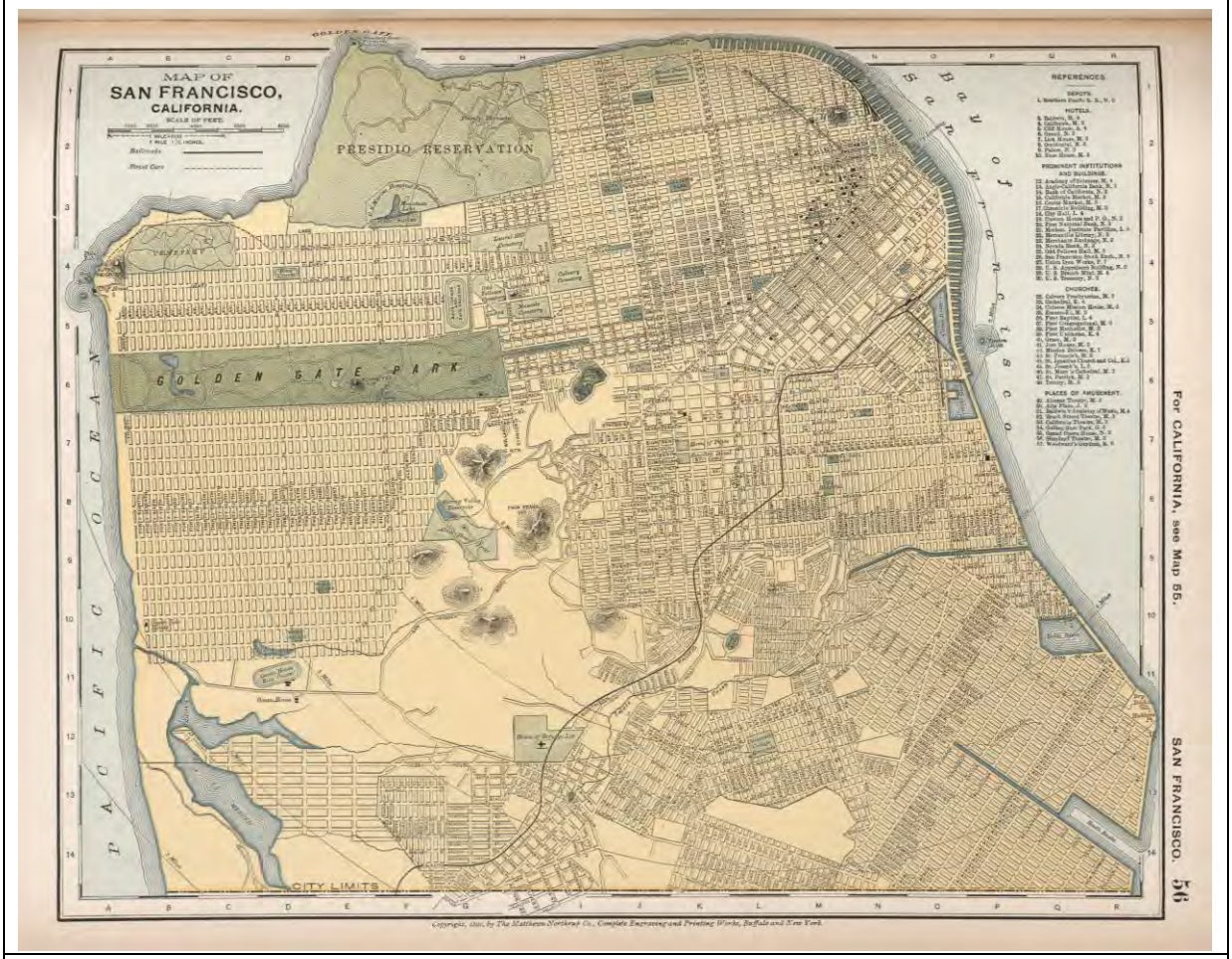

Image 5. Map of San Francisco, California, Matthews-Northrup Co., 1891, illustrating the city's expansion just before the turn of the century, as well as the consistent location and alignment of Market Street. (David Rumsey Map Collection)

Image 6. Market Street, with view of the Ferry Building in 1906, showing the condition of the streetscape prior to the earthquake. (San Francisco History Center, San Francisco Public Library)

4.1.5 The 1906 Disaster and Aftermath

On April 18, 1906, a major earthquake struck San Francisco and the Bay Area. The quake's impact was worsened by liquefaction in areas such as lower Market, where dense development had occurred on land created by extensive filling of bay tidelands. Many of Market Street's numerous masonry buildings were destroyed or damaged, along with older, generally smaller frame buildings. With water mains broken across the city, unseasonably warm weather and east winds fed fires and eventually firestorms for three days following the quake. The fires destroyed an estimated 28,000 buildings and devastated the city. Many buildings that might have survived the quake alone were destroyed by fires or so severely damaged them that they had to be demolished (**Image 7**) (JRP 2010:56; Page & Turnbull 2009a:46; Tim Kelley Consulting 2011:14).

Although a portion of the proposed project area in the Mid-Market area had been included in a fire district requiring fire-resistant exteriors, the 1883 law that created the district left existing frame buildings in place within the district. These and numerous frame buildings south of Market Street provided abundant fuel for the fires. Moreover, no building was actually fireproof. As historian

Philip L. Fradkin explained, "all materials failed," and "fire slithered like a snake through small openings, devoured vulnerable interiors, and left modern steel and brick buildings blackened shells." Market Street's few surviving buildings included the Hibernia Bank, the Chronicle Building, and the Grant Building. The facades of the Hale Brothers department store, the Emporium, and the Wilson Building also remained, and would subsequently be incorporated into new buildings. Although the Palace Hotel could have been salvaged, owners opted to construct a more modern steel-framed concrete and brick building. The disaster produced an enormous amount of debris. Workers laid railroad lines down Market and other streets to facilitate rubble removal, which took many months (Fradkin 2005:240; Page & Turnbull 2009a:47, 54; Tim Kelley Consulting 2011:14).

The 1906 earthquake and fire destroyed the cable car system along Market Street, including the main powerhouse and cable-winding machinery at Valencia and Market Streets. While the disaster did not result in alteration to the existing street alignment or width, it did result in other significant changes to the streetscape (Laubscher 2016). The earthquake damaged the city's basalt-paved streets, throwing the blocks out of alignment and requiring reconstruction (Olmsted 1991:15). Re-establishment of the public transit system was deemed an essential priority for recovery and, within 10 days of the fire being extinguished, electric wires were strung to allow replacement of cable service on Market Street with electric trolley to facilitate reconstruction efforts (Ute, Hoffman, Beach, Townley, Vielbaum 2011:11-12). The electric streetcars were originally routed over the cable car tracks, but reconstruction of the tracks soon followed to replace the cable car infrastructure with tracks engineered to handle heavier street cars (Laubscher 2016).

The South of Market Area would be rebuilt slower than Market Street and other parts of the city. Only the wholesale district around 2nd, New Montgomery, 3rd, 4th, and 5th Streets south to Howard Street had been included in the pre-1906 fire district. After the disaster, some industrialists and business owners wanted to extend the fire district to include the South of Market Area in order to prohibit the kinds of densely packed frame residences that had fed the fires. Some industries and businesses simply relocated to other areas of the city. At the same time, the prospect of rebuilding in masonry would prove too expensive for many longtime residents and some business owners. The Board of Supervisors eventually decided not to extend the fire district and instituted a policy of prohibiting flammable roofing materials. Amid the uncertainty, many owners of smaller lots opted to sell their property to businessmen who intended to develop industrial facilities (Page & Turnbull 2009a:48-50).

The South of Market Area changed substantially as it recovered from the earthquake and fires. Many longstanding industries were re-established, and community institutions such as churches were rebuilt or constructed anew at different locations. However, whereas 62,000 people resided south of Market Street in 1900, only 24,500 lived there in 1910. The trend away from residential use and toward greater industrial and commercial use in the district would continue for decades. Additionally, fewer families resided there after the disaster, and unmarried male workers came to dominate the district's population. Indeed, reconstruction efforts dramatically increased the number of construction workers in San Francisco, and World War I production brought another wave of industrial workers to San Francisco and the South of Market Area. Numerous residential hotels and apartment buildings were developed in the South of Market district to house unmarried working-class men (Averbach 1973:203- 206; Page & Turnbull 2009a:51-53).

Image 7. Market Street, 1906, showing post-earthquake view of ruined buildings and extensive devastation. (San Francisco History Center, San Francisco Public Library)

4.1.6 Market Street Reconstruction, 1906–1920

Once debris had been removed in the immediate aftermath of the disaster, a wide array of infrastructure—utilities, transportation, and buildings—had to be reconstructed across Market Street and the wider city. The 1906 earthquake reconstruction effort coincided with the height of the City Beautiful Movement, an approach to urban planning that emphasized the value of highly structured, formal, historicist aesthetics for their own sake, but more importantly saw this type of urban beauty as a way to morally uplift society. The movement had four components—Civic Art, Civic Design, Civic Reform, and Civic Improvement. Each of these 4 components responded to the 10 objectives of City Beautiful Planning: centralize services and related uses in such a way that a hierarchical land use structure was achieved; establish convenient and efficient commercial and civic center districts; establish hygienic urban conditions, especially for residential areas; express the individuality of towns through exploitation of scenic features; treat composition of building groups as a more important functional and aesthetic concern than architectural design; create focal points in the streetscape to visually unify the city; integrate regional circulation systems into a clear hierarchy; treat open spaces as critical urban needs, but emphasize active rather than passive

recreation; preserve some historic urban elements; and provide a unified system for incorporation of modern urban features such as industrial facilities and skyscrapers into existing cities (Pregill, Volkman 1998:584-585).

Utilities

While the City Beautiful Movement did not strictly dictate the post-disaster recovery effort in San Francisco, evidence of its influence abounds, particularly in terms of ideals around public infrastructure. Streets, sidewalks, and sewers had to be replaced or repaired. The City's Bureau of Streets reported, for example, that by 1908 it had repaired 3,287 sewers, cleaned 66 blocks of sewers, and emptied 1,000 cesspools. By 1908, utility providers had also dug nearly 16,000 "openings" in city streets to install new water, gas, and electricity lines. Circular cisterns were installed under intersections throughout the city to provide water supply in the event of water pipe failure in future seismic events (JRP 2010:64, 66).

1909 saw the launch of construction on the AWSS of the San Francisco Fire Department. Proposed but not implemented prior to the 1906 earthquake and fire, the system included nearly 1,600 high-pressure fire hydrants. The hydrants were dry-barrel, cast-iron assemblies, and were larger than their low-pressure counterparts. Because these hydrants were designed to be used with saltwater from San Francisco Bay, the valves were bronze to minimize damaging corrosion. Each AWSS hydrant was capable of pumping water at 300 pounds per square inch. Each hydrant had a painted cap that indicated the reservoir source; the hydrants on Market Street had blue caps, which indicated that the Jones Street water tank on Nob Hill provided the water supply. The hydrants were made at the Olympic Foundry in Seattle, Washington. In 1912, the AWSS was completed and featured more than 60 hydrants located along Market Street between the Embarcadero and Octavia Boulevard (No Author 1922).

Erected from 1906 to 1916 and located in an alignment along Market Street from the Ferry Building to Valencia Street, a new system of streetlights inspired by City Beautiful Movement and the Beaux Arts aesthetic was introduced. The new cast iron light standards consisted of a long pole and sculptural base became known as the "Path of Gold" in recognition of its gold glass light globes. The base was designed by sculptor Arthur Putnam and depicted the "winning of the West" with images of Native Americans, miners, pumas, bears, and a covered wagon train. Using Putnam's base design, Willis Polk designed the base-and-pole ensemble, which was originally colored green with gold accents. The poles supported four parallel overhead streetcar power wires and switching wires for United Railroads' new electrified trolley system. The heads and arms supporting the lights were designed by sculptor Leo Lentelli and engineer Walter D'Arcy Ryan to be mounted on the railway poles (Corbett 1979:241; Issel and Cherny 1986; 172-73; Laubscher 2016; San Francisco Planning Department 2010:2-3).

Transportation

While Market Street's alignment did not alter after the 1906 earthquake (**Image 8**), extensive replacement of cable car infrastructure by streetcar tracks from 1906 through 1912 resulted in changes to the Market Street streetscape**.** This effort included repaving (Laubscher 2016). "It became common practice to asphalt both sides of a street for automobile use while keeping the center paving blocks exposed to protect the tracks and simplify repairs" (Olmsted 1991:16).

This period of infrastructure investment included bonds approved in 1909 to construct a Municipal Railway (Muni), the first municipally owned streetcar line in the nation (Ute, Hoffman, Beach,

Townley, Vielbaum 2011:7). Spurred by a graft prosecution scandal that ensnared several United Railroads officials and corrupt San Francisco Mayor Abe Ruef, implementation of the Muni system initially included City acquisition of a private cable car line running from Market Street to the Richmond District via Geary Street. This line did not originally extend east to the Ferry Terminal via Market Street because of franchise rights held by United Railroad on Market Street, but Muni would soon begin constructing its own infrastructure (**Image 9**) (Laubscher 2016).

In 1913, Muni extended Geary Street service to the Ferry Terminal by taking over the rights to horsecar tracks that flanked the United Railroads streetcar tracks east of Sutter Street (Ute, Hoffman, Beach, Townley, Vielbaum 2011:24). In addition, horse car service on Market Street ended (Laubscher 2016). The first "traffic indicator," a precursor to traffic signals that was controlled manually by a traffic officer, was installed in 1915 at the city's busiest intersection, Kearny and Market Streets (Ute, Hoffman, Beach, Townley, Vielbaum 2011:52).

In 1918, Muni opened what was the world's largest streetcar tunnel under Twin Peaks to facilitate commuter transit from western developed areas (now known as Sunset and Parkside Districts) to downtown (Laubscher 2016). Expansion soon included construction of new Muni tracks beside United Railroad tracks along the entire length of Market Street to connect the J-Church streetcar tracks and the Twin Peaks tunnel portal at Castro Street to existing Muni tracks at Geary and Market Streets (Market Street Railway Museum 2016).

Buildings

Large buildings that survived the 1906 earthquake and fires provided models of the kinds of structures that would be most resilient for the new downtown San Francisco. One earthquake survivor built in 1889 at Market and Kearny Streets, the Chronicle Building, represented San Francisco's first Chicago-style skyscraper. The building was designed by Daniel Burnham and John Root, who subsequently led the design of Chicago's 1893 Columbia Exposition, which gave birth to the City Beautiful Movement that helped popularize Beaux Arts and other Classical Revival, as well as Romanesque, architectural styles around the turn of the century. The iron- and steel-frame construction supporting the Chronicle Building's exterior brick Romanesque Revival ornamentation helped it withstand the quake. The steel-frame Ferry Building also survived, though its tower incurred major damage. After 1906, larger steel-frame buildings with fireproof concrete or masonry skins multiplied dramatically along Market Street and across San Francisco. By 1909, San Francisco had 20,500 new buildings, a large number of which accounted for approximately half of the steel-frame and concrete buildings constructed within the United States by that year (Corbett 1979:27-28, 32, 34; Woodbridge 1988:75-77).

In addition to the Chronicle and Ferry Buildings, a number of other notable Market Street buildings survived the earthquake and fires. These buildings included the Beaux Arts Hibernia Bank (1892) at Jones street (restored after the disaster), the Call/Spreckels Building (1898) at 3rd Street (remodeled in the Moderne style in 1938), and Renaissance-Baroque examples such as the Grant Building (1905) at 7th Street, the Mutual Savings Bank Building (1902) at 3rd Street (restored), and the triangular Flood Building (1904) at Powell Street (repaired). The facades of other important pre-earthquake buildings also survived. Located on the south side of Market Street opposite the Flood Building to the north, the façade of the Emporium Building (1896) remained intact after the earthquake and fires; both buildings were designed by Albert Pissis. Neo-classical in arrangement, with Renaissance-Baroque ornamental detail, the sandstone Emporium façade was incorporated into a new steel-frame building with a large distinctive interior dome in 1908. Designed by the Reid

Brothers, the Italian Renaissance façade of the Hale Brothers department store (1902) was incorporated into a newly constructed building completed in 1907. In other cases, Market Street landmarks would be constructed anew. Although the Sharon Estate could have restored the heavily damaged Palace Hotel at New Montgomery, it opted to hire the firm of Trowbridge & Livingston to design a new building. The firm sent George Kelham to San Francisco to supervise the project, and the new Renaissance Revival-style Palace Hotel was completed in 1909 (Corbett 1979:77, 83, 85, 90-91, 98; Page & Turnbull 2009a:54; Tim Kelley Consulting 2011:14, 21, 24).

The architecture of new buildings constructed on the cleared lots of earthquake and fire-ravaged Market Street properties incorporated Neo-Classical and Renaissance Revival or Baroque influences for the most part, and, to a lesser extent, Gothic and other influences. Renaissance Revival examples included the Humboldt Bank Building (1906) at 4th Street, the Metropolis Trust and Savings Bank (1907) at New Montgomery Street, the Hearst Building (1909) at 3rd Street, the flatiron San Christina Building at Golden Gate Avenue and Taylor Street, and the Southern Pacific Building (1916) at the foot of Market Street near the Ferry Building. Departing from the Renaissance Revival style were the Santa Fe Building (1917), which featured English Adams/Georgian ornamentation, and the Flatiron Building at Sutter and Sansome Streets, which, apart from its cornice, featured restrained Gothic ornamental detail (Corbett 1979:77, 79, 82-83, 85, 88, 95).

Although slowed temporarily by World War I, the overall 1906 to 1920 reconstruction effort altered the cityscape in ways other than the architectural style of new buildings. New steel-framed buildings were generally constructed to greater heights than the average pre-1906 buildings. Most of the central business district north of Market Street had been reconstructed by 1910, and it expanded both vertically and horizontally. Amid the devastation of 1906, financial interests and better-funded surviving businesses were able to acquire new property from less fortunate owners. As the financial district expanded, it pushed the Embarcadero waterfront's warehouse district south of Market Street. The retail district around Grant Avenue shifted to the westward to the Union Square area, and to the area of Powell and Market Streets in the vicinity of the Emporium. Hotels were pushed out of the financial district, and theaters multiplied along Market Street southwest of 5th Street (Corbett 1979:35; Kelley and VerPlanck 2008:43).

Plans to improve San Francisco's Civic Center area predated the 1906 disaster. In 1899, with the encouragement of Mayor James Phelan, architect Bernard. J. S. Cahill developed a plan for the area that proposed to bifurcate Market Street to create a middle island on which a hotel would be built as well as the construction of a new U.S. Court House and Post Office in close proximity to Old City Hall (constructed 1872-1897 on the site of the present-day San Francisco Public Library). For unknown reasons, this plan was never carried out (MIG 2015: 10-12). In 1904, the Association for the Improvement and Adornment of San Francisco was established and named Phelan as its president. The Association brought in Burnham to create a City Beautiful plan for San Francisco. Burnham's 1905 plan would have created a series of monumental civic buildings organized around a radial street grid similar to Paris and proposed moving the Civic Center to Market Street and Van Ness Avenue. Cahill developed his own plan in response, which involved the creation of a collection of buildings around a public open space. Neither the Burnham or Cahill plans were executed before the 1906 disaster, which destroyed much of the City and left Old City Hall in ruins. (MIG 2015: 13). After the disaster, civic leaders asked Burnham to revise his plan along with his San Francisco colleague Willis Polk in 1909. Cahill continued to fight the Burnham plan, calling it too costly, and promoted his own plan again in response. Disagreements over the two plans, including controversy over where to locate City Hall, stalled adoption of the Burnham plan and official rebuilding efforts.

Meanwhile, private property owners began to reconstruction buildings along the pre-existing grid. (MIG 2015: 130).

In 1911, reformist Mayor James "Sunny Jim" Rolph revived plans for a new Civic Center to be developed in conjunction with the Panama Pacific International Exposition (PPIE) to celebrate San Francisco's recovery and the opening of the Panama Canal. Rolph created a design competition for a new City Hall and Exposition (Civic) Auditorium and appointed a Board of Consulting Architects in 1912 to plan the new civic center. The Board was led by John Galen Howard and included Frederick W. Meyer and John Reid, Jr. (MIG 2015: 14). The debate over the site of the proposed City Hall was resolved by the Consulting Architects in 1912 and Van Ness Avenue between Grove and McAllister Streets was selected. This decision was pivotal in the evolving role of Market Street in the context of the Civic Center, as it moved the center of focus for public buildings away from Market Street (the original location of Old City Hall) to Van Ness Avenue. It was not until the creation of United Nations Plaza in the 1970s that Market Street was once again physically and monumentally reconnected to Civic Center and City Hall.

The adopted master plan for the new Civic Center provided for creation of a central plaza bounded by McAllister, Larkin, Grove, and Polk Streets, a new City Hall at the plaza's west side, a new State Office Building and Courthouse on the north side of the plaza, a new public library at the east side, and a Civic Auditorium at the south side backing up to Market Street, now known as the Bill Graham Civic Auditorium. The architecture of the buildings would be unified by Beaux Arts design. After a design competition that attracted 73 entries, Arthur Brown, Jr. and John Bakewell, Jr. won the commission for the new Civic Center. As an element the overall plan to be used during the PPIE, the Civic Auditorium, designed by Architectural Advisory Committee members Galen, Meyer, and Howard, was completed first. The new City Hall was completed a month after the PPIE closed, at a price of $3.4 million. Work finished on the Public Library in 1917. The Civic Center's War Memorial Complex and State Building (renamed the Earl Warren Building in 1998 and home to Supreme Court of California) would be completed during the 1920s (MIG 2015:12-17; Page & Turnbull 2007:65-66; Scott 1985:154-57).

During this 1906 to 1920 period, Market Street continued to serve as one of the city's primary venues for public engagement. Events included the Preparedness Day Bombing, which took place on July 22, 1916, during a parade held in anticipation of the United States imminent entry into World War I; the first Armistice Day Parade on November 11, 1918, to celebrate the end of World War I; and suffrage activists participating in Labor Day parades to promote their cause.

Image 8. Map of San Francisco, California, 1915, showing consistent location and alignment of Market Street. While Market Street's alignment did not alter after the 1906 earthquake, extensive replacement of cable car infrastructure by streetcar tracks from 1906 through 1912 resulted in changes to the Market Street streetscape (U.S. Geological Survey Topographic Archive)

Image 9. Market Street, 1911, showing how multi-modal transportation in the form of electrified streetcars and automobiles integrates with pedestrian traffic. This image also shows Lotta's Fountain at the corner of Market Street (foreground) and Kearny Streets (background). (San Francisco History Center, San Francisco Public Library)

4.1.7 Market Street from Boom, to Bust, to World War II, 1920–1945

During the economic boom years of the 1920s, nationwide economic growth and business prosperity, along with rising middle-class standards of living, would reinforce changes in the character of Market Street that had begun to take shape during the earlier reconstruction period. Large portions of Market Street evolved into public spaces shaped primarily by consumer-oriented mass culture, which simultaneously reflected and influenced consumer desire and spending among both the increasingly prosperous middle class, and aspirants among the working classes seeking upward mobility. Although national economic growth stalled during the Great Depression of the 1930s, consumer culture endured across Market Street's built environment. Market Street continued to function as one of San Francisco's most important public spaces through World War II.

While much of the interwar-era construction along the lower and eastern Mid-Market areas consisted of office buildings developed as part of the expansion of the financial and business district, the booming consumer culture of the 1920s had a stronger influence on the character of other parts of Market Street. Increasing numbers of white-collar corporate workers occupied the newer and larger office buildings, some of them upwardly mobile members of the working-class population that resided in the South of Market Area. The growth of large retailers such as the Hale Brothers department store, which was taken over by JC Penny in the 1940s, created new white-collar jobs. (Faragher et al. 2001:427-35; Tim Kelley Consulting 2011:19, 27-31, 35). The number and size of theaters increased along Market Street, particularly in the Mid-Market area. Earlier, modest-sized venues originally built for vaudeville performances such as the American Theater (1907) located opposite UN Plaza on the south side of Market—which subsequently did business as the Rialto, the Rivoli, the Embassy, and the Strand—would survive beyond the rise of full-length "talky" motion pictures, but newer, larger movie palaces eliminated the older market for short-film working-class nickelodeon venues. Designed by B. Marcus Priteca, Market Street's Orpheum Theater (originally the Pantages, built in 1926) at Grove and Hyde Streets exemplified the new theaters of the 1920s in its size, its upper floor offices fronting the thoroughfare, and its elaborate Spanish Baroque exterior ornament. Other major 1920s theaters along Market Street included the Granada (1921), the Golden Gate (1922), the Warfield (1922), and the Fox (1929). Although the number of theaters operating on Market Street decreased during the economically lean years of the Great Depression, like other elements of mass consumer-oriented culture that came of age during the 1920s, including radio and modern department stores, the movie palace would survive beyond the 1930s (Corbett 1979:99; Faragher et al. 2001:430-431, 429-30, 456; Tim Kelley Consulting 2011:55, 58-60).

The 1930s and early 1940s are remembered as a period of extensive federally funded public works projects associated with President Franklin Delano Roosevelt, the Brain Trust, the New Deal, and World War II mobilization. However, the built environment of Market Street was not dramatically altered by public works projects during this period. The most important public work implemented along Market Street during the 1930s was the Federal Building at Fulton and Leavenworth Streets. Funded by allocations in the pre-Depression year of 1927, and designed by architect Arthur Brown, Jr., the Federal Building embodied the Beaux Arts classicism and City Beautiful aesthetic of the earlier constructed Civic Center elements around it. Several important public works beyond Market Street would have important long-term influences on the character of the thoroughfare. Two of the most important New Deal-funded projects of the 1930s in this regard, the construction of the San Francisco–Oakland Bay Bridge (1936) and Golden Gate Bridge (1937), dramatically increase automobile traffic in the city (**Image 10**), including traffic along Market Street, and provide the impetus for construction of downtown parking structures above and below street level (Faragher et al. 2001:448-54; MIG 2015:20; Scott 1985:234-29, 238; No Author 1978:8-24).

With 24 transit lines operating along Market Street, transit infrastructure remained relatively unchanged from 1920 through 1947 (**Images 12-14**). However, heavily in debt and plagued by corruption, United Railroads went bankrupt in 1921 and Market Street Railway re-emerged as the railway operator (Vielbaum, Hoffman, Ute, Townley 2004:7). In 1925, Standard Gas & Power Company acquired Market Street Railway and hired the Byllesby Corporation to operate and modernize the railway with Samuel Kahn as executive vice president (Vielbaum, Hoffman, Ute, Townley 2004:7). In that same year, a bond issue to reduce streetcar traffic on Market Street by developing an underground subway was defeated. Automobile traffic on Market Street increased as personal vehicle ownership expanded (Laubscher 2016).

In 1930, an initiative was passed to give Market Street Railway a 25-year operating permit extension (Ute, Hoffman, Beach, Townley, Vielbaum 2011:61), but, in 1944, Muni purchased its private competitor, Market Street Railway Company for $7.2 million (Vielbaum, Hoffman, Ute, Townley 2004:7).

Market Street continued to function as one of San Francisco's most important spaces for collective public expression during the interwar period and World War II. When the International Longshoremen's Association strike at San Francisco's Embarcadero turned violent on July 5, 1934, memorial services for men killed included a funeral procession down Market Street (**Image 11**). In response to the "Bloody Thursday" tragedy, the San Francisco General Strike from July 16–19, 1934, included marches on Market Street. With passage of the Wagner Act in 1935, Roosevelt's New Deal legitimized the notion that organized labor had a right to bargain collectively. As a result, retail workers on strike in 1937 and 1938 picketed across Market Street, demanding improved working conditions, benefits, union recognition, preferential hiring, seniority arrangements, and shorter work weeks, continuing a tradition of public labor protest along the thoroughfare that began in the 1870s. A darker instance of collective public expression occurred during the ostensibly joyous celebration and Victory Parade after Japan surrendered to the United States in 1945. The celebration degenerated into rioting concentrated in the Mid-Market area, which resulted in the deaths of 12 people and injuries to hundreds (Tim Kelley Consulting 2011:39-40, 67-69; Faragher et al. 2001:452).

Image 10. Market Street, 1928, showing electric streetcar tracks flanked by asphalt-paved automobile lanes and pedestrian sidewalks. (San Francisco History Center, San Francisco Public Library)

Image 11. Market Street, 1934, showing the funeral procession for the men slain during the violent Longshoremen's Association strike on July 5, 1934. (1934 International Longshoremen's Association and General Strike Collection, UC Berkeley, Bancroft Library via Calisphere, July 27, 2016)

Image 12. Market Street, 1934, showing J Line with catenary lines—overhead system of wires used to supply electric power to streetcar—and boarding island. (San Francisco History Center, San Francisco Public Library)

Image 13. Market Street at Battery Street, 1934, showing four lines of electrified streetcars in the roadway. (San Francisco History Center, San Francisco Public Library)

Image 14. Market Street, 1945, showing construction crews laying new track. (San Francisco History Center, San Francisco Public Library)

Image 15. Valencia Street at Market Street, 1945, showing where elevation of Market Street begins to increase as it heads west toward Twin Peaks. (San Francisco History Center, San Francisco Public Library)

4.1.8 Decline and Redevelopment, 1945–1985

4.1.8.1 Post-WWII Decline of San Francisco

At the end of World War II, Market Street and much of downtown strongly resembled the built environment that existed along and around the major thoroughfare at the end of the 1920s boom decade (**Image 16**). Although some newer, larger Moderne buildings had heightened the skyline, the streetscape along Market Street had not been dramatically altered over the course of the 1930s and early 1940s. The large towers constructed during the second half of the 1920s fit harmoniously into existing spatial organization at the street level, and into the overall architectural character of the city (Godfrey 1997:316). However, by the end of the World War II, major economic and social changes had begun to alter the character of Market Street in some areas, and would lead to major changes to the built environment in areas of Market Street and across downtown San Francisco over the next several decades.

As with other urban centers in the post-war years, downtown San Francisco and Market Street commerce went into decline as increasing numbers of middle-class residents relocated from the city to new suburban housing developments. A great number of people began to experience the city on a daily basis as commuters rather than as residents. Independent Market Street department stores such as Weinstein's were permanently closed in the 1960s. With the rise of television, movie attendance began to decline across the nation. At the same time, moviegoers were increasingly apt to attend theaters near their residences. Although the Golden Gate, Orpheum, and Warfield theaters

would survive and be converted to live entertainment, the Fox Theater was demolished in 1963. Numerous smaller theaters along Market Street began to be converted to adult theaters. The Mid-Market theater district declined further with the construction of BART in the 1970s, and the advent of home video in the 1980s (Tim Kelley Consulting 2015:61-63; 69-70; Scott 1985:273, 280, 283-84).

Image 16. Map of San Francisco, California, 1947 (cropped), showing Market Street's 20th century alignment consistent with prior decades. (U.S. Geological Survey Topographic Archive)

4.1.8.2 Modern and Postmodern Redevelopment

Early Transportation Redevelopment

Transportation development also altered Market Street and downtown San Francisco. Population growth during World War II had put new stress on the city's Market Street Railway and Muni (**Image 17**). Following Muni's purchase of Market Street Railway (1944), a bond issue in 1947 replaced two dozen streetcar lines with modern electric trolley buses. Electric was selected instead of diesel for superior performance traversing hill elevations. The new trolley buses did not require tracks, but did continue to use an overhead power supply system and a second wire was added to

serve as ground. With the 1947 transition, the outer pair of tracks on Market Street unused by the electric trolley buses were removed (Laubscher 2016).

Increasing automobile traffic also put new pressure on the existing transportation system. By 1949, Market Street was a six-lane thoroughfare, with three lanes in each direction, consisting of streetcars in the center, electric trolley and motor coaches (buses) in the curb lane, and automobile traffic in between the center lane and the curb lane (**Images 17, 18**) (Ute, Hoffman, Beach, Townley, Vielbaum 2011:94). A 1948 San Francisco Planning Department Comprehensive Trafficways Plan for a system of San Francisco freeways was partially implemented. The James Lick Freeway, which carried Bay Bridge traffic into downtown and south to the Bayshore Highway, was completed in 1950. Soon after, construction began on the Embarcadero Freeway, which, as originally planned, would have connected to the Golden Gate Bridge. Growing anti-freeway sentiment in the city eventually undermined plans to extend the Embarcadero Freeway, construct a Panhandle Freeway through Golden Gate Park, and extend the partially completed Central Freeway north to Lombard Street along an alignment roughly parallel to Van Ness Avenue. However, by 1959, the elevated Embarcadero Freeway crossed Market Street, thereby disrupting views of the waterfront and the iconic Ferry Building from the thoroughfare (**Images 19, 21**) (Godfrey 1997:315; Page & Turnbull 2007:80-81; Woodbridge 1990:119-122).

Downtown Office and Residential Redevelopment

Also altering the downtown built environment was the advent of the information economy and deindustrialization, which led to the development of new office buildings and complexes. Beginning in the 1960s, blue-collar jobs in San Francisco's manufacturing and wholesale trade sectors began to decrease. At the same time, white-collar jobs in the finance, real estate, insurance, and office sectors increased. Not until the 1950s did occupancy rates for office space in existing buildings begin to create a market for new downtown office building construction. During the period between 1966 and 1982, downtown San Francisco office space more than doubled to 60.9 million square feet as a result of new construction. Meanwhile, downtown retail, hotel, cultural, industrial, parking, and residential space increased by 30 million square feet during this period (Godfrey 1997:317-318; Kelley & VerPlanck 2008:44-45).

New office buildings were initially designed in the style that came to be known as Corporate Modernism. The style evolved from the International Style, which emerged in Europe during the first part of the twentieth century. Practitioners of the style rejected historicism and traditional ornament in favor of buildings with clean horizontal lines and cubic forms that expressed their structure and function through use of materials such as concrete, steel frames, stucco, ribbon windows, and pilotis (cylindrical pillars) that supported structures off the ground. Corporate Modernism came to be associated with Mies van der Rohe's sleek glass curtain-wall skyscrapers. The earliest major International Style/Corporate Modernist office complex in San Francisco was constructed 1959 on Market Street at Bush Street. Designed by Edward Bassett, the main office building of the Crown-Zellerbach complex rose to a height of 20 stories and was clad in aluminum-framed tinted-glass curtain walls, a south-facing service block tower sheathed in glass mosaic tile, and squared pilotis. The complex marked a departure from existing downtown spatial organization in that it included both a secondary building—a circular one-story pavilion—and a Japanese-influenced landscaped plaza that continued underneath the piloti-raised main office tower. The landscape features a fountain sculpture by Japanese-American artist Ruth Asawa. In addition to the property's architecture, its Modernist organization of space and plaza design would strongly

influence office complex design over the next several decades (Brown 2010b:167, 135; Kelley and Verplanck:45).

The Crown-Zellerbach complex's Modernism became the preferred mode of design associated with major San Francisco redevelopment projects pursued on behalf of urban renewal during the 1960s and 1970s, which often proved as controversial, just as the freeway development plan had been. With establishment of the San Francisco Redevelopment Agency (SFRA) in 1948, San Francisco became one of the first American cities to plan for major redevelopment, and to make use of federal funding to clear areas and neighborhoods classified as slums for redevelopment, often redevelopment shaped by Modernist design ideals. Controversy erupted in 1953 when the SFRA announced plans to condemn 12 blocks south of Market Street for convention center, stadium, and corporate office development, a plan perceived by its opponents as an attempt to expand the central financial and business district further south. Although stalled and marred by controversy for decades, this redevelopment plan would lead to construction of the Yerba Buena Center and the Moscone Convention Center in the 1980s. Negative reaction to redevelopment gave birth to organized opposition, and the Tenant and Owners Opposition to Redevelopment was created in 1969 in response to South of Market redevelopment plans. Opposition to redevelopment, along with corporate high-rise development, was also expressed in the emerging historic preservation movement. Still, between 1948 and 1970, the SFRA completed eight major redevelopment projects. In addition to the Yerba Buena Center and Moscone Center, these redevelopment projects included Western Addition A-1 and A-2, Diamond Heights, and Golden Gateway (Brown 2010b:41; Kelley & VerPlanck 2008:46-47, 49-51; Page & Turnbull 2009a:67-70).

The Golden Gateway redevelopment project would transform the north side of lower Market Street near the Ferry Building and the Embarcadero Freeway, and create 2.8 million square feet of new office space downtown. The project required elimination of a wholesale produce market dating to the nineteenth century. The winning design team of Wurster, Bernardi, and Emmons, and Demars and Reay, created a plan that situated office towers and high-rise apartments with lower parking and commercial spaces amid parks and plazas that separated traffic from pedestrian circulation through elevated plazas and footbridges. The first phases of the project were constructed between 1962 and 1967, and the plan included the Corporate Modernist Alcoa Building designed by Skidmore, Owings & Merrill, featuring an external structural skeleton (Brown 2010b:46-47).

The Embarcadero Center formed the southern portion of the Golden Gateway project (**Image 22**). The five-block commercial project would be the largest office development in San Francisco. Built in stages from 1971-1973, the project would create four office towers of up 45 stories in height, a shopping mall, and connecting footbridges. The complex was designed by John C. Portman, Jr., of John Portman and Associates, who also designed the adjacent Hyatt Hotel Building (built in 1973) at 5 Embarcadero/22 Drumm Street. These Modernist buildings departed from the International Style and Corporate Modernism and represented downtown San Francisco's premier example of Brutalism, a style that evolved from Le Corbusier's mid-century experiments with rough concrete and named for the French phrase "beton brut," or "raw concrete," by English architects Alison and Peter Smithson in 1953. The Embarcadero Towers and the Hyatt Building exemplified Brutalism in their repetitive geometry, their open expression of structural reinforced-concrete with raw board-form exterior surfaces, and their Modernist rejection of historical ornamental references (Brown 2010b:47, 190, 245; Kelley and VerPlanck 2008:45-46).

Market Street Redevelopment

Approval of the 1962 San Francisco Bay Area Rapid Transit District spurred inspiration for the redevelopment of Market Street in conjunction with construction of the BART subway system (San Francisco Public Library 1967:3). On June 6, 1962, a meeting of Market Street businessmen, property owners, and officers of San Francisco Planning and Urban Renewal Association, resulted in agreement on three objectives, "to transform Market Street into one of the world's most attractive boulevards; to rid Market Street of its shabby atmosphere; and to put new life into Market Street as a center of Bay Area business, shopping, and entertainment" (San Francisco Public Library 1962:5).

Recognizing the complexity of the problems of Market Street, the committee retained a team of consultants—urban planners, designers and real estate experts—to tackle the challenge of surveying and analyzing Market Street in the interest of defining its problems and suggesting an approach to revitalization. In December 1962, *What To Do About Market Street* was published by Livingston and Blayney, City and Regional Planners, in association with Lawrence Halprin and Associates, Landscape Architects, Rockrise and Waston, Architects, and Larry Smith and Co., Real Estate Consultants. The document proposed a program of redevelopment that featuring improvements to the environment including "better designed, more effective signs, both public and private," "more attractively designed street furniture, such as benches, newsstands, and litter cans," "beautiful landscaping, tree planting, fountains, and sculpture," and "squares, plazas, and arcades where people can gather and enjoy themselves" (San Francisco Public Library 1962:7).

What To Do About Market Street formally articulates Lawrence Halprin's first thoughts on the physical environment of Market Street, which he recorded in his "Monday meander on Market Street" notes from July 3, 1962 (Lawrence Halprin Collection, The Architectural Archives, University of *Pennsylvania* 1962). In his notes, Halprin comments on the need for a fountain adjacent to the Ferry building such that "the objectionable qualities of the Embarcadero Freeway would be minimized" and remarks to "look into the question of depressing a plaza." He expresses a desire for heavy tree planting throughout the streetscape and believes "sign design and control would be important." Halprin also notes when existing features might be retained, stating, "street lights should be kept, refurbished and painted bright colors…gold, etc., and any other lights that are used should be small, pinpoint lights at special places," and the "Clock outside Samuel's nice." Halprin's commentary also includes a sensitivity for viewsheds. He notes, "there is an elegant view of the Civic Center" (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1962).

The Market Street Joint Venture Architects—Mario J. Ciampi with Mario J. Ciampi & Associates, John Carl Warnecke with John Carl Warnecke & Associates, and Lawrence Halprin with Lawrence Halprin & Associates—were hired to collaborate on development on the Market Street Redevelopment Plan (1968-1979). The Market Street Redevelopment Plan refers to the designed landscape that the Market Street Joint Venture Architects created for the section of Market Street between the Embarcadero and Octavia Boulevard. The Market Street Redevelopment Plan included design of the streetscape, design of two large plazas (UN Plaza and Hallidie Plaza), and design of four small plazas (Robert Frost Plaza, Mechanics Plaza, Mark Twain Plaza, and Market Street Plaza). The Market Street Redevelopment Plan incorporated Embarcadero Plaza/Justin Herman Plaza (which was funded as part of the Embarcadero Center through a separate redevelopment project, the Golden Gateway Redevelopment Project (Brown 2010b:148, 150, 153), into its design concept footprint as an anchoring element of the Market Street corridor. The Market Street Redevelopment Plan also incorporated Crocker Plaza, funded through a private project, into its design concept. The Market Street Redevelopment Plan differs from the Market Street Reconstruction Project, which refers more

specifically to the San Francisco Redevelopment Agency's 1967–1982 project associated with construction of BART and subsurface Muni light rail subway systems. The Market Street Reconstruction Project did not include Embarcadero/Justin Herman Plaza.

As the 1967 Market Street Design Plan Summary Report produced by the City and County of San Francisco in consultation with the Market Street Joint Venture Architects explained:

> Market Street has the potentiality of dynamic economic growth and, importantly, the possibilities of self-renewal. However, the construction of the new subways and new buildings will not in themselves produce a greater Street than there has been in the past. These natural assets can only be developed to their future civic possibilities through the reconstruction of the Street in the manner of a great thoroughfare. Attractive landscaping, paving, street furniture, and inviting public open spaces must be provided (San Francisco Public Library 1967:3).

Construction on the Market Street BART and Muni subway along Market Street began in July 1967 (Bay Area Rapid Transit 2015). In 1968, a $24.5 million general obligation bond issue was approved to fund the Market Street Beautification project. The project proposed replacement of streetcars with Muni's new subsurface light rail subway vehicles and removal of streetcar and electric trolley buses (including catenary wires—the system of overhead lines that supply power to the vehicles) on Market Street (originally advocated in the *What To Do About Market Street* publication) (San Francisco Public Library 1976a:247).

Also in 1968, the Schematic Street Design Plan developed by the Market Street Joint Venture Architects was adopted by the San Francisco Board of Supervisors (Res. 116-68) (Knight 1985:2). The Market Street Redevelopment Plan design sought to reconcile Market Street's economic importance as San Francisco's main circulation spine with its symbolic, social, commercial, and civic importance. The Market Street Redevelopment Plan design sought to reconcile Market Street's economic importance as San Francisco's main circulation spine with its symbolic, social, commercial, and civic importance. While the 1968 Schematic Street Design Plan (illustrated in **Images 23-26)** initially envisioned a more expansive version of this concept with a network of pedestrian routes and public spaces extending to the north, above Market Street, and to the south, below Market Street, this version of the design was not fully realized. However, the version of the Market Street Redevelopment Plan design concept that was built retained the fundamental objective to prioritize the pedestrian experience through plaza development, including efforts to "unify the north and south sides of the street into one overall pedestrian network—a great linear plaza" (San Francisco Public Library 1967:8). The plan also sought to enhance the pedestrian experience through introduction of coordinated street furnishing amenities, removal of the street-level Muni transit vehicles (i.e., streetcars and trolley buses, not motor coaches) that relied on overhead catenary wires for electrification, and blending of new street-level BART facilities into the overall streetscape.

Image 17. Market Street, 1952, showing interim parking in the middle of the street and on Muni boarding islands as a result of additional traffic created by the temporary loss of public transit during the Muni Railway strike. (San Francisco History Center, San Francisco Public Library)

Image 18. Multi-modal traffic jam, 1952, involving electric trolley buses, motor coach buses, and automobiles. Image also illustrates pedestrian traffic on sidewalk (left) and boarding island (right). (San Francisco History Center, San Francisco Public Library)

Image 19. Market Street, 1955, west view across the Embarcadero from the Ferry Building showing the area that became Justin Herman plaza, before the plaza's construction and before construction of the Embarcadero Freeway. (San Francisco History Center, San Francisco Public Library)

Image 20. Market Street, 1956, showing busy thoroughfare, including active sidewalks lined with Path of Gold Light Standards. (San Francisco History Center, San Francisco Public Library)

Image 21. Market Street, 1958, east view toward the Ferry Building showing placement of Embarcadero Freeway. (San Francisco History Center, San Francisco Public Library)

Image 22. Market Street, 1964, west view as observed from the Ferry Building showing Twin Peaks in the distance. This image also shows buildings in the area in the foreground that were later demolished for development of Embarcadero Center (Golden Gateway project) and Justin Herman Plaza. (San Francisco History Center, San Francisco Public Library)

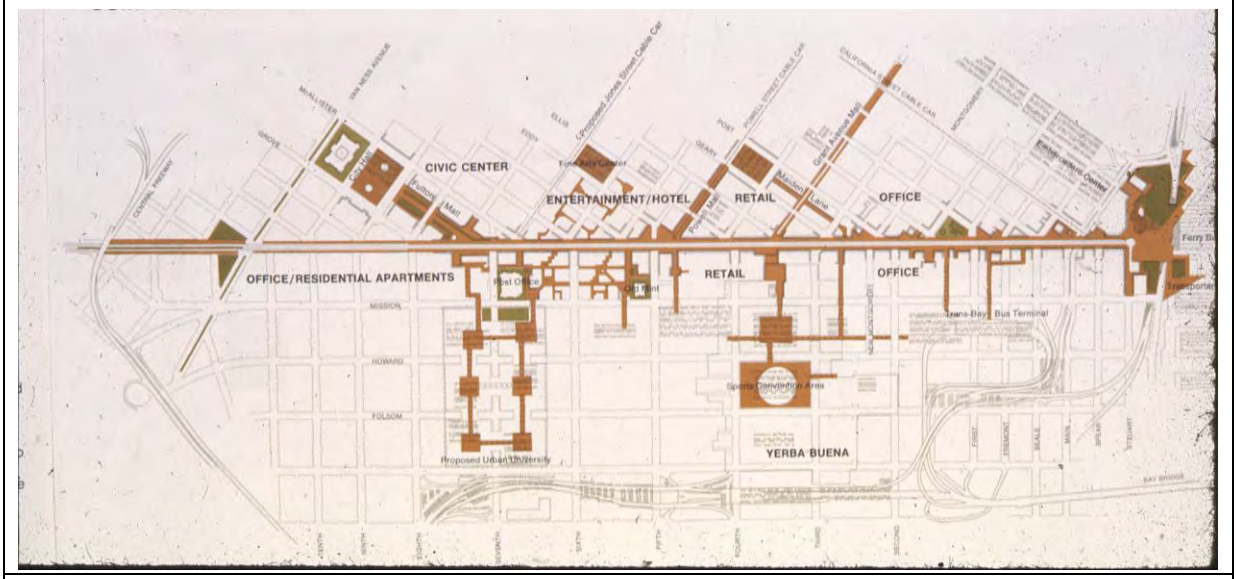

Image 23. While the full extent of the pedestrian network envisioned in the Comprehensive Sketch Plan diagram (above) was not realized, as presented in the 1967 Market Street Design Plan, many of the plazas immediately adjacent to Market Street were retained as part of the implemented design. (Reproduced, copyright *Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

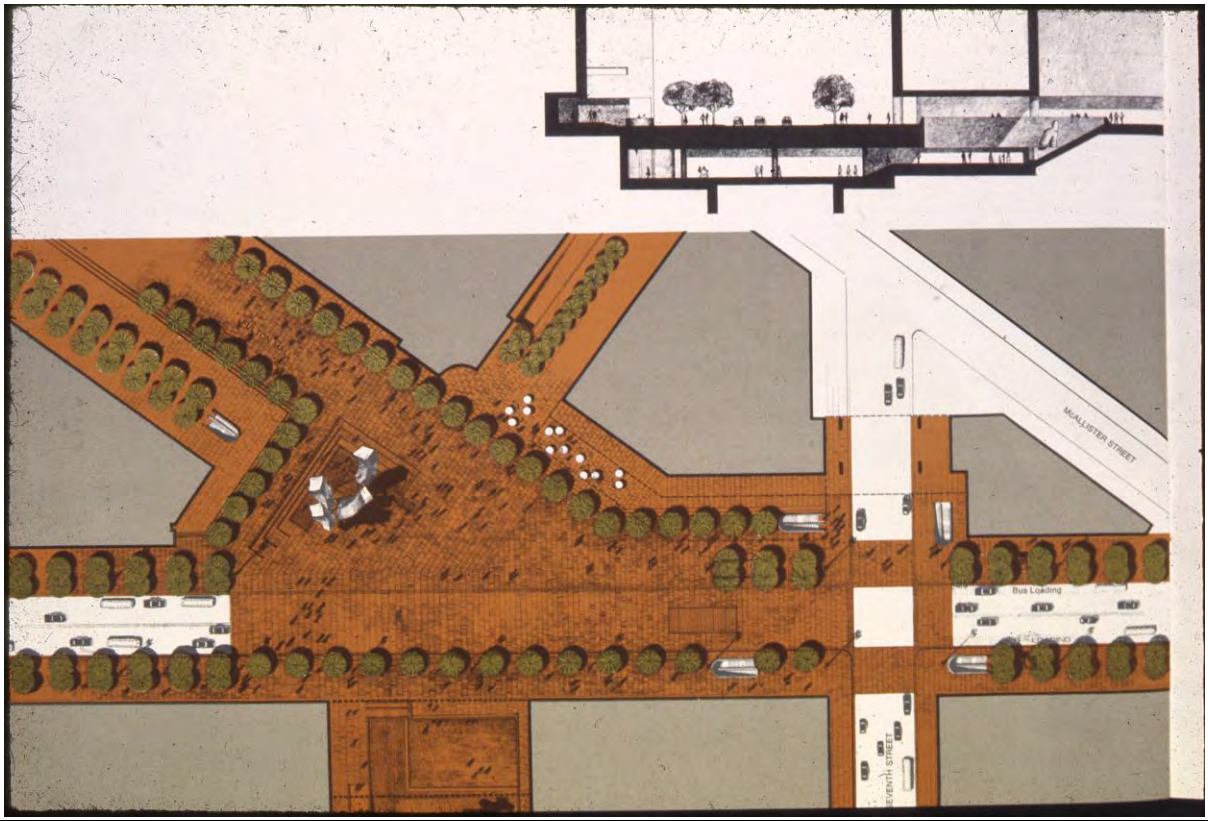

Image 24. UN Plaza, as it was originally conceived, differs significantly from the executed design, but renderings presented in the 1967 Market Street Design Plan show brick paving as the early

materials of choice for unifying the streetscape's sidewalks, crosswalks, and plaza pedestrian areas. (Reproduced, copyright *Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

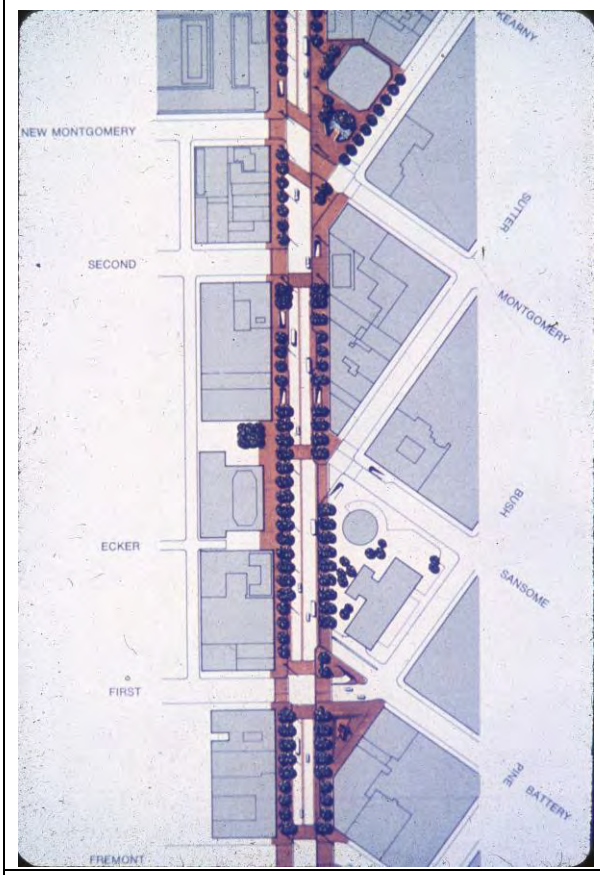

Image 25. Concept for double and single tree rows lining Market Street is presented in the 1967 Market Street Design Plan renderings and implemented in final construction. (Reproduced, copyright *Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

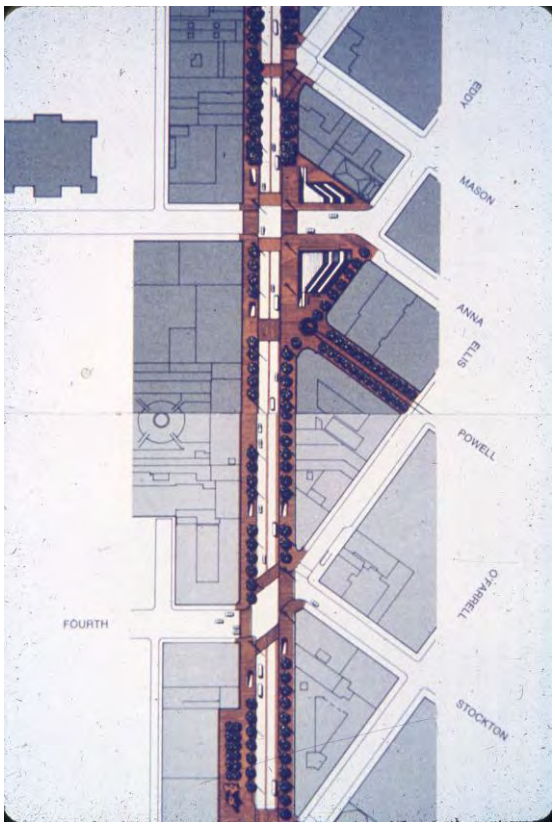

Image 26. Basic configuration of Hallidie Plaza and the Powell Street cable car turnaround is one element presented in the 1967 Market Street Design Plan that was retained through design development and construction phases. (Reproduced, copyright *Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Market Street Streetscape

The Market Street Redevelopment Plan design reflects the varying circulation roles of the street by including expanded 35-foot-wide sidewalks (reducing street width by approximately one lane overall) to prioritize pedestrian space, with restriction to sidewalk width of 26 feet in some locations to allow greater street width that accommodates right-turn lanes or services bays (San Francisco Public Library 1967:8). While the plan did not alter the alignment of Market Street, it envisioned Market Street as a long linear promenade or grand boulevard that integrated malls and plazas as part of a comprehensive design interconnected by the hierarchically dominant spine (**Image 27**). "Thus, areas for movement (the malls and the widened sidewalks) and for pause (the plazas) were carefully choreographed in a rhythmic sequence along the length of the street" (Hirsch

2014:79). Rather than enhance the street's variety, the Market Street Redevelopment Plan design created uniformity intended to "knit together all the various uses" of the diverse street. (Hirsch 2014:79). Halprin's landscape architecture approach informed expansion of the sidewalk width and development of plazas as open spaces for pedestrian movement and gathering, along with the placement of the street furniture, plazas, underground transit entrances, fountains, and trees along Market Street to vary the tempo and experience of pedestrian movement on the route. As a design principle, rhythm refers to the tempo that is created by the repetition or alteration of features or clusters of features that offer opportunity for pause, such as gathering spaces to mingle, fountains to observe, or benches to sit, in contrast to spaces that facilitate faster movement, such as sidewalks with no street furnishings.

The 1968 Schematic Street Design Plan emphasized, the Market Street pedestrian environment would be "defined by a rich pattern of warmly colored unit paving blocks, such as brick" (San Francisco Public Library 1967:18). Halprin looked at the Market Street corridor from the perspective of a pedestrian or pedestrians in movement, and this method informed key components of the plan, such as selection of brick paving to differentiate pedestrian surfaces. Warnecke also believed the red brick paving used on all of the sidewalk areas and for crosswalks was important. Warnecke believed it would create a strong sense that the street was organized around a pedestrian's priorities (Goldberger 1979: C15). Like Warnecke and Halprin, Ciampi also saw pedestrian movement as a key factor in the development of the plan. He noted sidewalks would have to be widened to at least 35 feet to meet increased pedestrian traffic demands expected to arise from introduction of the BART transit system in downtown San Francisco (San Francisco Chronicle 1965:2).

The Market Street Redevelopment Plan design included introduction of red brick paving laid in a herringbone pattern for pedestrian areas including sidewalks and some crosswalks. While research did not conclusively determine why some portions of the brick paving were constructed as designed in the 1967 Market Street Design Plan and others were not, the following information provides some insight into the concerns expressed regarding the selection of brick paving for sidewalks and some crosswalks. Correspondence exchanged between the Market Street Joint Venture Architects' project manager, William R. Hull, AIA; the joint venture's attorneys, Crimmins, Kent, Bradley & Burns; City of San Francisco Transit Task Force Project, Manager Jack Barron; and Ciampi, Warnecke and Halprin, chronicles a disagreement over the Market Street Reconstruction Brick Specifications. In a letter dated July 24, 1969, Hull responded to what can be inferred is Barron's concern about the risk of pedestrians slipping on brick paving:

> There are presently neither acceptable test nor standard appropriate to the specification of allowable 'slipperiness' for brick paving. It is further understood that similar test and standard also do not exist for concrete or asphalt… If the City wishes to undertake such a research and testing program with the intent of establishing acceptable standards, the Joint Venture would be willing to cooperate, but such a program is not within the scope of work of our present agreement… The Joint Venture is obligated to recommend to the City such materials and methods that in its judgement and in the accepted standards of the industry are satisfactory for use in the subject project. In the absence of any recommendations involving new or exotic materials it would not be appropriate to expect the Joint Venture to undertake either the work or the responsibility of establishing new industry standards… Brick masonry used as a paving materials is neither new nor exotic, having been used in this capacity for in excess of three thousand years… There are no paving materials that can be guaranteed to be slip-proof under all conditions and combinations of weather, maintenance, sanitation, age, shoe, or tire materials, etc. Materials must be selected and value judgements made, based on performance and/or past usage. As stated above, we are recommending a common paving material which has been

> previously approved as to general type and which we would expect the City to continue to accept based on present construction industry standards for specification and use." (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1969a)

This letter was followed by a memo from Hull to the Market Street Joint Venture Architects principals—Ciampi, Warnecke, and Halprin—among others on December 23, 1969, that forwards a letter from the joint venture's lawyers. The attorneys advised the Market Street Joint Venture Architects not to comply with the City's request for a letter indicating that brick is specified predicated on the fact that it is "non-skid" *(*Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1969b). However, the joint venture responded with a letter signed by Ciampi, Warnecke and Halprin (dated January 6, 1970) to the City that stated:

> In response to your verbal request at our meeting on December 9, 1969, this will serve to put in writing our understanding relative to the "non-skid" characteristics of the brick sidewalk paving proposed for Market Street. A "brick-like" material was approved by the Board of Supervisors when it approved the Schematic Design Phase of the Market Street Reconstruction project. During the Design Development Phase, or Section I of our present agreement, extensive presentations relative to brick paving were made to the City including a thorough report and representative examples of the proposed material… In evaluating and making recommendations pertaining to architectural materials consideration can be given to reusability, availability, blendability with adjacent areas when repaired, "non-skid" properties, etc. But no material can satisfy any one or any combination of these criteria 100%... The criteria listed were considered in our selection and recommendation of the sidewalk paving material… With specific reference to the term "non-skid"; as noted above this is a subjective term… There are no paving materials that can be guaranteed to be slip-proof… In closing we note that brick paving is not new to San Francisco and is used extensively throughout the United States, as well as elsewhere, for city sidewalks, plazas, college campuses, etc. We would anticipate, therefore, that it could serve at least as well on Market Street and perhaps considerably better than in areas of the country where ice and snow occur" (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1970a).

It is unclear exactly why the Market Street Joint Venture Architects selected brick as the "warmly colored unit paving" material of choice for construction. The fact that they defended the retention of brick as the paving surface for portions of Market Street would seem to indicate the material choice was meaningful. However, based on the 1968 Schematic Street Design Plan's emphasis on the need for a unit paving material to define the pedestrian environment, it seems establishing pedestrian circulation space through selection of a material of contrasting color, pattern, and texture was the underlying priority of the paving selection.

In addition to the brick sidewalks and crosswalks, paving features included granite curbs, square granite gutter paving, granite edging for brick crosswalks, a granite centerline for the eastern portion of Market Street, and a circular decorative paving feature where Market and Steuart Streets meet in front of the Justin Herman Plaza promenade (**Images 28-33**).

Image 27. Market Street, 1979, showing that the street's alignment remained unchanged from that of previous decades. The verticality of buildings along the streets alignment continued to form the space. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R16-6*, by Joshua Friedwald, dated 1979 [*014.VI.5I.702-720*], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 28. Market Street, 1979, showing brick crosswalk with granite edging and granite centerline. *(Photograph of Contact Sheet*

Image 29. Brick sidewalk in herringbone pattern with brick edging, granite curb, and gutters of square granite pavers. *(Photograph of*

[cropped] taken by author. Sheet 1479R60-3*, by Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	*Contact Sheet [cropped] taken by author. Sheet* 1479R49-4*, by Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*
Image 30. Market Street, 1979, showing curb cutout in granite, blending with granite curbs, gutters and granite edging of brick sidewalks. *(Photograph of Slide Sheet [cropped] taken by author.* Slide E322 by *Joshua Friedwald, dated 1979 [014.IV.A.9]), Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	**Image 31.** Market Street at Steuart Street, 1979, showing decorative paving at in foreground, with Justin Herman Plaza promenade in middle-ground and Embarcadero Freeway and Ferry Building in background. Promenade features square bollards and square light poles. *(Photograph of Contact Sheet [cropped] taken by author. Sheet* 1479R23-8*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

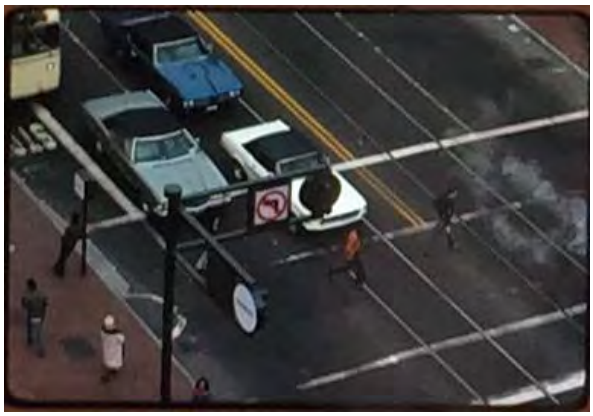

Image 32. Market Street, 1979, showing traffic lights and signage featured a style reminiscent of railway semaphores. This image also shows that some Market Street crosswalks were not brick-paved. *(Photograph of Slide Sheet [cropped] taken by author.* Slide E319*, by Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 33. Sidewalk and pedestrian crossing, 1979, showing broad brick-paved crosswalks that prioritize pedestrian traffic. *(Photograph of Contact Sheet [cropped] taken by author.* Slide E320, by *Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

The Market Street Redevelopment Plan also included new coordinated street furnishing designs to reduce clutter and unify the streetscape. New street furnishings included: Benches with backs featuring bronze-clad supports for 10-foot-long wood slats; square stone benches without backs; 12-foot-high bronze "umbrella" shelters; telephone booths with bronze-cladded paired booths with glass dome roofs; granite bollards joined by bronze chain links; bronze cylindrical trash receptacles; bronze radial tree grates; traffic signs and lights designed in a style reminiscent of railroad semaphores; street signs featuring poles topped with square and white street name graphics and circular white directional graphics; street clocks featuring bronze spheres with four-sided clocks; light standards featuring 10-foot-high poles and caps of solid bronze with translucent glass; drinking fountains featuring bronze hemispheres on square granite bases with bronze fixtures; 12-foot-high cylindrical advertising kiosks with bronze roofs; and elevators featuring 6-foot-square cabs with bronze-clad doors, sides, and fascia to convey passengers from street level to underground transit (**Images 34-46** show examples of these features. While the majority of these images are dated 1979 and are derived from as-built photography commissioned by Lawrence Halprin & Associates, Inc., **Image 45** and **Image 46** are dated 2008 and 2009, respectively. Because no images in the 1979 set showed examples of the drinking fountains or elevators, later images of those features have been included) (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania n.d). Bronze was chosen as the chief material for the new street furniture along with glass and granite because bronze not only is an "elegant, traditional, and natural material, but also because it 'heals itself'—scratches, scuffs, and scars become obscured through bronze's natural patina'" (San Francisco Public Library 1976b:67).

Image 34. Pedestrian area, 1979, showing cylindrical bronze kiosk in the foreground and bronze phone booth and bus shelter in the background. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R55-4*, by Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 35. Market Street, 1979, showing bronze bus shelter. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R14-12*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 36. Market Street, 1979, showing that bollards, positioned to prevent vehicle incursion onto sidewalks and guide pedestrians to crosswalks, were located on some Market Street

Image 37. Pedestrian area, 1979, showing street furnishing clusters that include square backless granite benches adjacent to phone booths. *(Photograph of Contact Sheet [cropped] by*

corners and were joined by chain links. *(Photograph of Contact Sheet [cropped] by author. Sheet Sheet* 1479R14-4*, Joshua Friedwald, dated 1979, [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	*author. Sheet* 1479R1-11*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*
Image 38. Market Street, 1979, showing wood-slat benches and street lights with square translucent glass that were included in the some Market Street plazas. This image also shows the northeast corner of Robert Frost Plaza looking east towards the Ferry Building. (*Photograph of Contact Sheet [cropped] by author. Sheet* 1479R48-2*, by Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	

Image 39. Market Street streetscape, 1979, showing bronze tree grates with decorative radial design. *(Photograph Contact Sheet* 1497R49-8*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 40. Market Street, 1979, showing traffic light and signage in semaphore style and square street signage joined with retained Path of Gold Light Standards. *(Photograph Contact Sheet* 1479R46-10*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 41. Pedestrian area, 1979, showing bronze street furnishings that include circular trash receptacles. *(Photograph of Slide Sheet [cropped] by author. Slide* Slide E230*, by Joshua Friedwald, dated 1979 [*014.VI.5I.702-720*], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

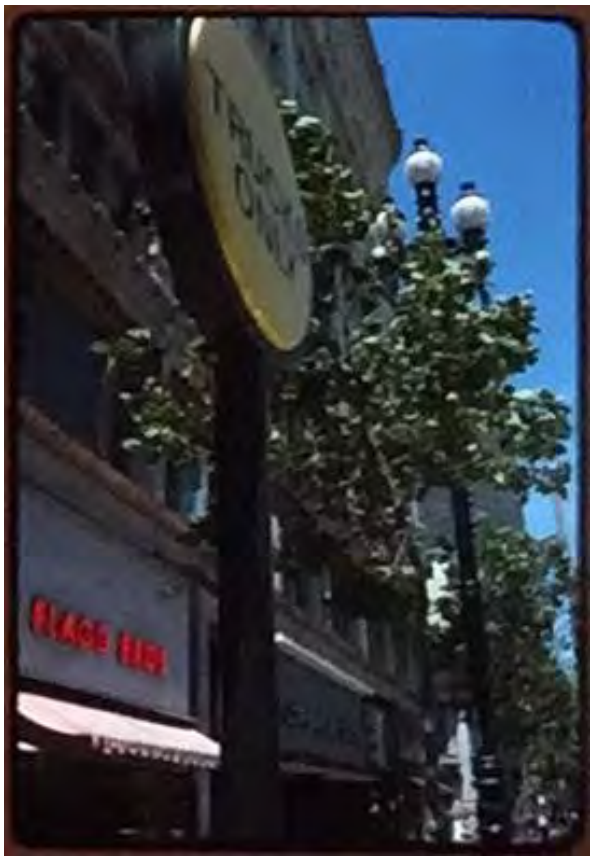

Image 42. Market Street streetscape, 1979, showing that in addition to square street signs, circular signage was also added to the Market Street streetscape by the Market Street Redevelopment Plan project. *(Photograph of Slide Sheet [cropped] by author.* Slide E423*, by Joshua Friedwald, dated 1979 [*014.VI.5I.702-720*], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 43. Market Street corridor, 1979, showing street furnishings clustered in the corridor, placed in the sidewalk space between the roadway and buildings. Furnishings included items such as phone booths (foreground) with trash receptacles and bus shelters (background). *(Photograph of Slide Sheet [cropped] by author. Sheet* Slide E223*, by Joshua Friedwald, dated 1979 [*014.VI.5I.702-720*], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 44. Pedestrian area, 1979, showing Market Street Redevelopment Plan-era street clocks that feature granite pillars topped with four-sided bronze clock faces. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R34-2*, by Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 45. Public transit entrance, 2008, showing street-level BART elevator structures designed to match style and material of other Market Street Redevelopment Plan street furnishings, featuring bronze minimalism. (San

Image 46. Pedestrian area, adjacent to Mechanics Monument Plaza, 2009, showing Market Street Redevelopment Plan-era drinking fountains that feature granite bases. (San Francisco Chronicle, May 10, 2009.

Francisco Chronicle, December 1, 2008. http://www.sfgate.com/bayarea/article/S-F-BART-to-upgrade-Market-St-elevators-3182638.php)	http://www.sfgate.com/bayarea/article/S-F-fountain-is-a-mess-3162012.php)

While additional street furnishings, such as 12-foot-diameter bronze-clad flower stands, 9-foot-high and 14-inch-wide bronze modular magazine and newsstands, small modular bronze news kiosk units, 6-foot-high bronze newspaper vending machines on bronze-clad columns, 4-foot by 8-inch bronze sidewalk retailer display cases, 8-foot-high bronze-clad sidewalk theater cases for marquee and ads, and bronze transit map cases were modeled as part of the original Market Street Redevelopment Plan design, these do not appear in as-built photography and appear to have not been be executed.

While the Market Street Redevelopment Plan emphasized the role of new street furnishings as unifying elements on the streetscape, some historic streetscape elements that pre-dated the redevelopment were incorporated into the new design. According to the 1967 Market Street Design Plan:

> *The environmental focus of each Street section is found in the plaza areas wherein the old and the new combine to give Market Street its unique appearance. Here Lotta's Fountain, the Mechanics' Monument, the Pioneers Memorial and the Path of Gold lamp standards provide the historical tie to the Street's robust past (*San Francisco Public Library 1967:14).

Although the Path of Gold lights and poles along Market Street were replaced with replicas during the 1970s as part of Market Street Redevelopment Plan construction process (Corbett 1979:241; Issel and Cherny 1986:172-73), the replicas retained the original design and locations on the streetscape. Lotta's Fountain and Mechanics' Monument both were moved short distances from their original locations as part of the Market Street Redevelopment Plan (San Francisco Public Library 1976d:684). In addition to Lotta's Fountain, the Mechanics' Monument, and Pioneers Memorial, the AWSS fire hydrants, California Statehood Monument, and Samuel's Clock were also retained as part of the Market Street Redevelopment Plan as historic features that "created the stage and props intended to support everyday rituals and stimulate public interaction" (**Images 47-48**) (Hirsch 2014:83). This approach was consistent with the 1967 Market Street Design Plan Summary Report's proposed sensitivity to retention of historic resources. The document highlighted, "Upon approval of the Schematic Design Plan, further studies should be initiated leading to public actions in the following areas . . . 3. Historic Buildings: Preservation of buildings of historic or architectural merit; the recently adopted Historic Preservation Ordinance offers a valuable tool to implement this goal" (San Francisco Public Library 1967:24).

Image 47. The California Statehood Monument was retained as part of the Market Street Redevelopment Plan design. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R14-11*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 48. Lotta's Fountain at Kearny and Market was moved a short distance to accommodate Market Street Redevelopment Plan design. *(Photograph of Contact Sheet [cropped)] by author. Sheet* 1479R32-3*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

The Market Street Redevelopment Plan streetscape design was also characterized by approximately 600 London planetrees (*Plantanus acerifolia*, a variety of Sycamore), arranged in double and single rows within the sidewalk space between the street and building facades (**Images 49-51**). These trees were selected for scale and canopy size (40 feet tall with a spread of 30 feet) relative to the planned sidewalk width and Path of Gold Light Standard heights and quick rate of growth to maturity. The deciduous species was perceived as preferable because the canopy would shade pedestrians from the sun in summer and allow sunlight through the bare branches when the tree would be leafless in the winter. In addition, the lowest tree branches grow about 12 feet from the base of the trunk and would not obscure view of storefronts from the street. Despite these merits, there was public controversy over the species selection. Critics expressed concerned about the tree's tendency to drop large leaves from August through January (which would result in costly maintenance) and suffer from susceptibility to blight (Canter n.d.).

Image 49. The Market Street Redevelopment Plan design featured double-tree allées in some areas of the streetscape*. (Photograph of Contact Sheet [cropped] by author. Slide E238, by Joshua Friedwald, dated 1979 [014.VI.5I.702-720], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 50. Some segments of the Market Street alignment included single-row tree placement. *(Photograph of Contact Sheet [cropped] by author. Slide E232, by Joshua Friedwald, dated 1979 [014.VI.5I.702-720], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 51. London planetrees were selected amid controversy as street trees for the Market Street Redevelopment Plan design. *(Photograph of Slide Sheet [cropped] by author. Slide E418, by Joshua Friedwald, dated 1979 [014.VI.5I.702-720], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

The Market Street Redevelopment Plan also included design for street-level entrances for combined BART and Muni stations at mid-block between 1st and 2nd Streets (one entrance to Montgomery Station), Embarcadero, Montgomery, Powell, and Civic Center, as well as an entrance for the Muni-only Van Ness Station. These entrances were located within the sidewalk width on both the north and south sides of Market Street. South side entrance locations (from east to west) are positioned at Spear Street (one entrance to Embarcadero Station, west corner), Main Street (one entrance to Embarcadero Station, west corner), mid-block between Beale and Fremont Streets (one entrance to Embarcadero Station), 2nd Street (one entrance to Montgomery Station, east corner), New Montgomery Street (one entrance to Montgomery Station, west corner), 4th Street (one entrance to Powell Station, east corner), mid-block between 4th and 5th Streets (two entrances to Powell Station), 5th Street (one entrance to Powell Station, west corner), 7th Street (one entrance to Civic Center Station, west corner), mid-block between 7th and 8th Streets (one entrance to Civic Center Station), 8th Street (one entrance to Civic Center Station, east and west corner), Van Ness Avenue (two entrances to Van Ness Muni Station, east and west corners). Entrance locations (from east to west) on the north side of Market Street are positioned at Drumm Street (one entrance to Embarcadero Station, east corner), Davis Street (one entrance to Embarcadero Station, east corner), Front Street (one entrance to Embarcadero Station, east corner), Sutter Street (one entrance to Montgomery Station, west corner), corner of Sutter and Sansome Streets (one entrance to Montgomery Station), Montgomery Street (one entrance to Montgomery Station, east corners), Crocker Plaza at One Post Street (one entrance to Montgomery Station, west corner), mid-block between Grant and Stockton Streets (one entrance to Powell Station), corner of Stockton and Ellis Street (one entrance to Powell Station), Ellis Street (one entrances to Powell Station, west corner), Hallidie Plaza (one entrance to Powell Station), Leavenworth Street (one entrance to Civic Center Station, west corner), UN Plaza (one entrance to Civic Center Station), Hyde Street (one entrance to Civic Center Station, east and west corner), and Van Ness Avenue (two entrances to Van Ness Muni Station, east and west corners).

While design details vary slightly among the station entrances, most are low profile, U-shaped portals of minimalist design, which reduce the visual impact of transit presence on the street-level pedestrian experience. The Market Street streetscape featured two major parapet exterior styles—bronze railing and stone—with two material styles for the interior walls of the stone parapets—white octagonal tile and brown rectangular glazed brick (**Images 52-54**). The exceptions to these generalities are the station entrances in Hallidie Plaza and UN Plaza, which are more elaborate (see plaza descriptions below). Even in the plaza examples, the station entrances are designed to make transit secondary to the plaza's role as pedestrian open space.

Image 52. Street-level BART entrances featured minimalist design, but varied in terms of detail. This image shows an example of the bronze railing design. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R22-9, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 53. BART entrances on Market Street featured some examples with brick interior finish. *(Photograph Contact Sheet [cropped] by author. Sheet 1479R5-10, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 54. White tile was featured as one of the two interior wall finishes for BART stone parapet entrances. *(Photograph of Slide Sheet [cropped] by author. Slide E316, by Joshua Friedwald, dated 1979 [014.VI.5I.702-720], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Embarcadero Plaza/Justin Herman Plaza (1972)

One of the most prominent elements of this redevelopment initiative was the creation of Embarcadero Plaza (also referred to as Ferry Building Park), which was completed in 1972 and renamed Justin Herman Plaza in 1974 to honor director of the SFRA (San Francisco Chronicle 1974:4). Designed by Lawrence Halprin, the Plaza was bounded in the east by the Embarcadero and the elevated Embarcadero Freeway, in the south by Don Chee Way, and in the north by the Embarcadero Freeway off-ramps to Clay and Washington Streets. The plaza's western boundary included the Embarcadero Center and Hyatt Regency buildings, as well as the eastern end of Market Street.

Prior to the construction of the Golden Gateway project, the site of Justin Herman Plaza was densely built with low-scale commercial and industrial buildings ranging from one to four stories in height. Buildings facing the Embarcadero on the block between Sacramento and Commercial Streets featured a series of small storefronts and restaurants, whereas buildings further west along Sacramento and Commercial included more industrial uses, including a ship storage and service yard, several single-story stores, storage structures, and a hotel. The block between Commercial Street and Clay Street included a one-story gas station at the corner of this block along the Embarcadero, and restaurants, stores, and residential hotels further to the west. All of the properties on the site prior to construction of the plaza appear to have supported the workers and shipping/trade uses along the Embarcadero (**Images 55-58**) (1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheets 11 and 12).

While the Embarcadero Plaza was not part of the Market Street Reconstruction Project, it served as the anchor to the Market Street Redevelopment Plan sequence, connecting the street to the Ferry Building and the waterfront despite the freeway obstruction (Hirsch 2014:17). The four-acre plaza was characterized by an irregular pentagon-shaped plan reminiscent of an Italian piazza. The primary plaza paving material is brick laid in herringbone pattern to compliment the streetscape paving along the Market Street corridor (**Images 59, 60**). The plaza design included terracing, with the upper terrace of concrete on the western boundary descending to the lower plaza via three concrete steps (**Image 65**). Halprin conceived of the plaza as an environment for public participation and hired Canadian-Québécois artist Armand Vaillancourt to design a Modernist fountain for the lower terrace. The plaza and its focal point, the fountain, were both deliberately situated off-axis to avoid the Renaissance quality of objects in visually static relationships (Hirsch 2014:79-80). Halprin situated the sculpture in the bend of the freeway ramp, so the ramp and fountain would create a sense of enclose for the rest of the plaza, a large open space.

Dedicated in 1971, the fountain was designed to be approximately 40 feet high and constructed of precast concrete square tubes arranged in irregular angles. The concrete finish was highly textured. The fountain was designed to pump one million gallons of water an hour through the tubes, which spill into a pool below. There were two walkways with stairs that allow the public to stand between the tubes and offer views overlooking the plaza. The fountain featured concrete square platforms within the pool, which allowed the public to venture between the fountain's back wall and tube projections. Although the plaza did not incorporate the canals and lagoons envisioned in earlier plans, the sculptural fountain provided for visitors interaction with water, which was a common characteristic of Halprin's work and, in this case, helped re-establish the site's historic relationship to the Ferry Building and the waterfront across the Embarcadero Freeway. The sound of water falling with volume and from height created sound intended to help overcome the noise from the double-deck freeway behind it (Cultural Landscape Foundation 2015; Woodbridge 1990:121-24).

The plaza's fountain caused much lively public and media debate regarding its visual appeal and artistic merit upon its completion (Hirsch 2014:79-80).

Pedestrian circulation through the plaza was structured along two axes—a primary axis along the pedestrian promenade connecting Market Street with the Ferry Building, and the north-south axis through the Plaza. The sunken plaza consisted primarily of red brick laid in a running bond pattern, broken by double red brick courses radiating in a sunburst pattern from the fountain. The lower plaza was edged in concrete and stairs from the upper plaza on the western boundary that descended down to the lower plaza were also concrete (**Image 65**). Paving of the upper terrace on the western boundary was granite. The southeastern boundary of the main plaza included a terraced concrete platform. The main plaza also featured a circular terraced concrete platform near its southern boundary (**Image 59)**. Justin Herman Plaza featured modern light standards with semi-translucent square luminaires mounted on square, light-colored granite columns (**Images 63-64**). The pedestrian promenade that connected Market Street with the Ferry Building featured light standards symmetrically arranged along the allée. Original concrete bollards were square granite reflecting the style of the original light standards spanning the width of the pedestrian promenade that connects Market Street with the Ferry Building at both the east and west ends (**Image 62**). Vegetation within the plaza also included circular, 5-foot-diameter stone flower tubs (**Images 64, 65**). A purchase list from The Marina Florist, dated May 29, 1970, records a variety of plants tagged for purchase for the Embarcadero Plaza: Lombardy Poplar (*Populus Nigra Italica)* – four 30" boxes and ten 24" boxes, twenty-seven 15 gallon buckets; Japanese black pine (*Pinus Thunbergii*) – one 24" box, one 15 gallon bucket; Austrian Pine (*Pinus Nigra)* – three 24" boxes; Scots pine (*Pinus Sylvestris)* – three 24" box; Monterey Pine (*Pinus Radiata*) – ten 24" boxes, thirty 15 gallon buckets; London planetree (*Platanus Acerifolia*) – fourty-one 15 gallon buckets, eighteen 20" boxes; and 42,000 square feet of sod (50% Windsor and 50% Newport) (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1970b). While additional research would be required to discover the plazas specific planting plan, in general, pines and poplars were planted along the property's eastern boundary (along the Embarcadero) and sycamores (London planetrees) were planted along the western boundary of the plaza and along Steuart Street (**Image 62**). A cluster of sycamores was also placed on either side of the pedestrian promenade's western entrance. In addition, the western boundary of Justin Herman Plaza's upper terrace, adjacent to the Embarcadero Center development, features wood benches (**Image 66**). Statues of Bautista de Anza and Carlos III of Spain were also present in Justin Herman Plaza (**Image 67**). Correspondence between Lawrence Halprin and Justin Herman discussed the location of Juan Bautista de Anza statue at the southern end of the plaza adjacent to the lawn, but did not explicitly discuss where the Carlos III of Spain statue was placed (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1968). Both statues were relocated from Justin Herman Plaza to Lake Merced in 2004 (San Francisco Visual Arts Committee 2004).

Appendix A includes DPR 523 Form for Justin Herman Plaza, which provides individual eligibility analysis.

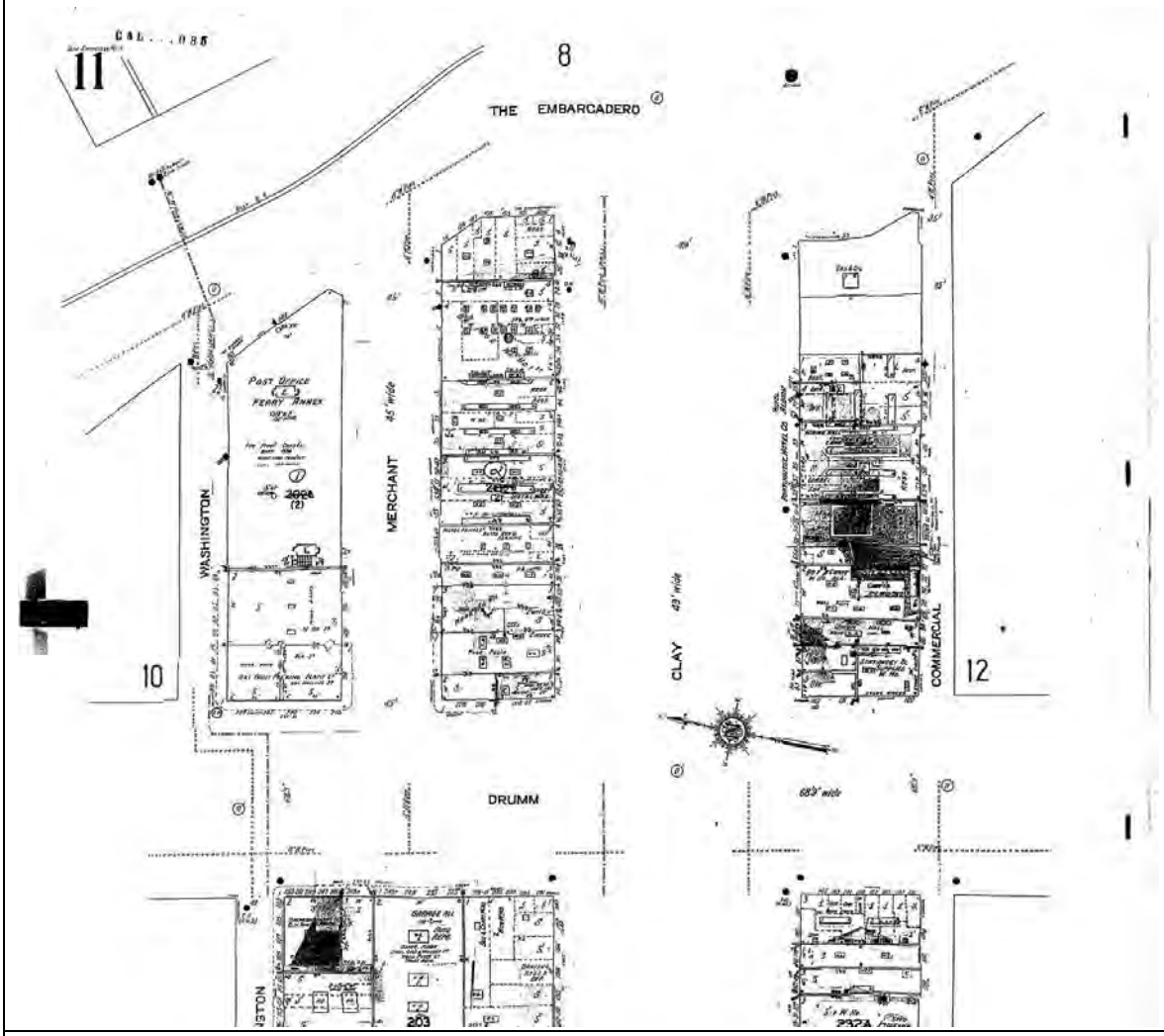

Image 55. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheets 11 shows area where Washington, Merchant, Clay, and Commercial Streets meet the Embarcadero (top left), illustrating existing properties demolished as part of the Embarcadero Center Redevelopment and construction of Embarcadero Plaza. (*San Francisco History Center, San Francisco Public Library*)

Image 56. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheets 12 shows area where Market, Sacramento, and Commercial Streets meet the Embarcadero (top left), illustrating existing properties demolished as part of the Embarcadero Center Redevelopment and construction of Embarcadero Plaza. (*San Francisco History Center, San Francisco Public Library*)

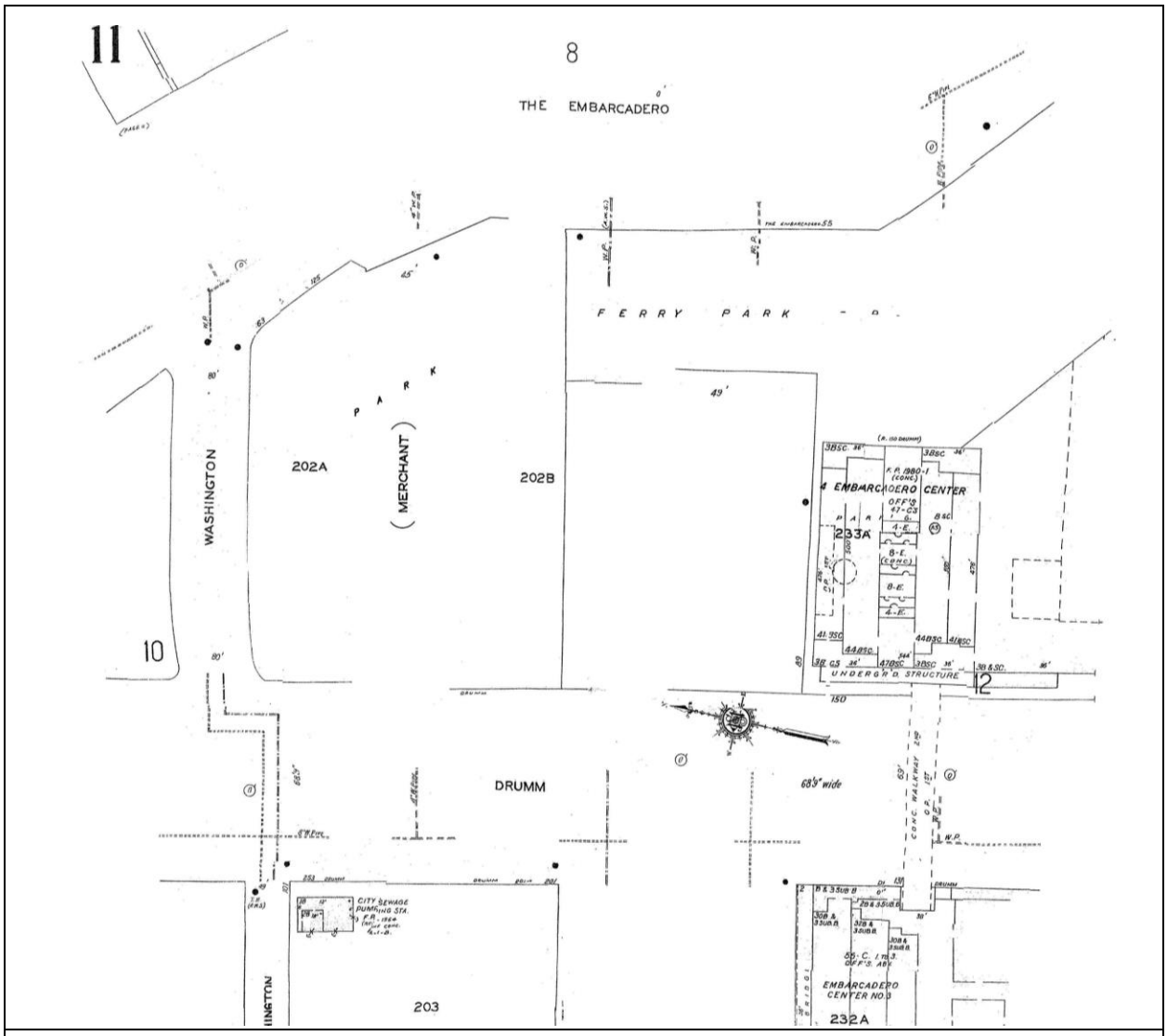

Image 57. 1960-1991 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheet 11 shows the northern section of Justin Herman Plaza (indicated as Ferry Park), flanked on its western boundary by Embarcadero Center redevelopment and on its east by The Embarcadero. (*San Francisco History Center, San Francisco Public Library*)

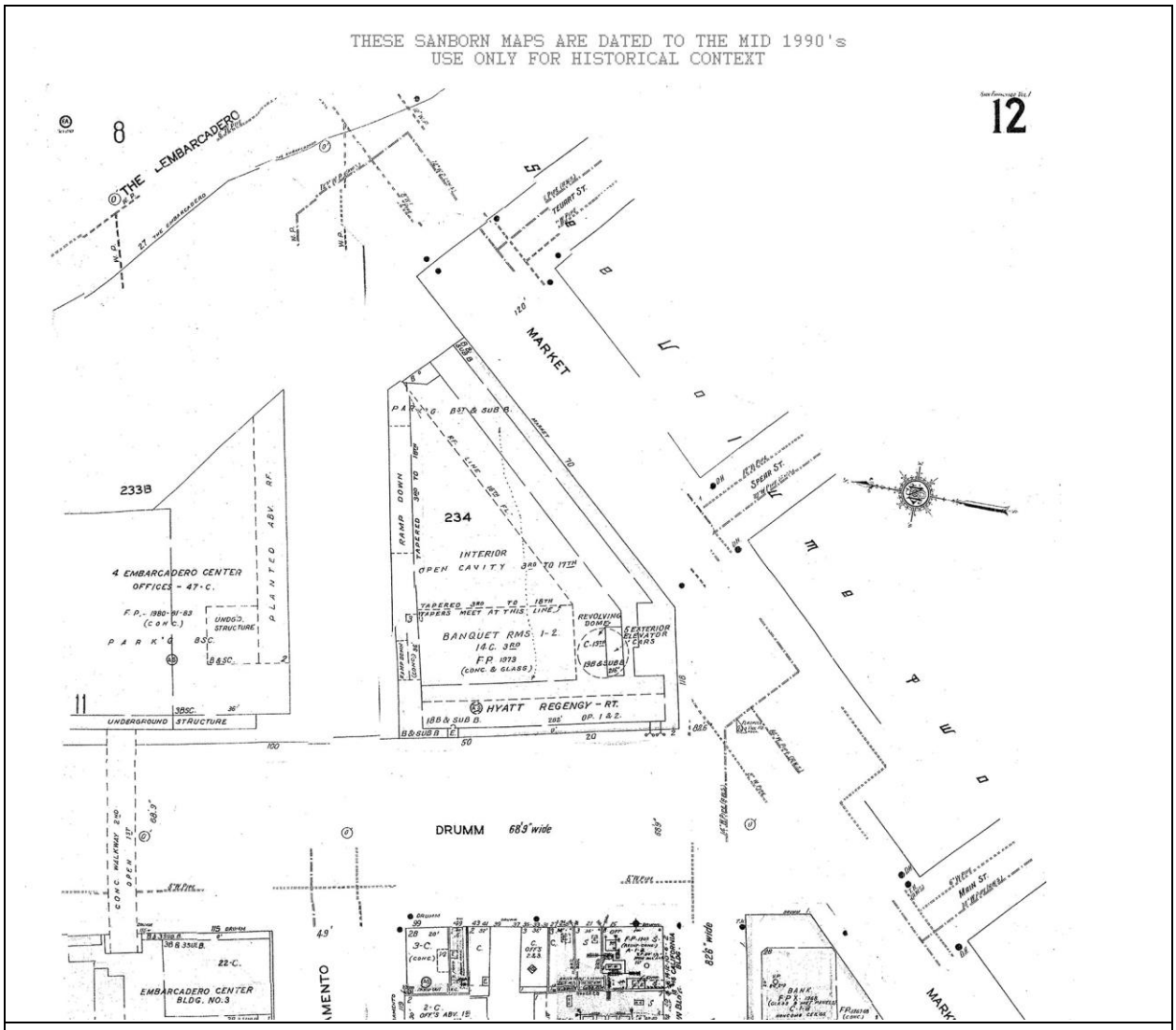

Image 58. 1960-1991 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheet 12 shows the center section of Justin Herman Plaza (unlabeled) where its western boundary is flanked by the Embarcadero Center redevelopment, Hyatt Regency, and eastern terminus of Market Street. (*San Francisco History Center, San Francisco Public Library*)

Image 59. Justin Herman Plaza, 1979, showing south end of the lower terrace, east of the eastern terminus of Market Street. Lower terrace was paved in brick and featured a concrete platform along its southeastern boundary and a concrete island in the center of its southern section (right). Upper terrace and pedestrian promenade was paved with granite (left). *(Photograph of Contact Sheet [cropped] by author. Slide 22E105, by Joshua Friedwald, dated 1979 [014.VI.22E.101-127], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 60. Justin Herman Plaza, 1979, showing north end of the lower terrace paved with brick, featuring Vaillancourt fountain position in the northeast corner with the Embarcadero Freeway ramp wrapping around the plaza's northern boundary. *(Photograph of Slide Sheet [cropped] by author. Slide 22E104, by Joshua Friedwald, dated 1979 [014.VI.22E.101-127], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 61. The promenade of Justin Herman Plaza connected the eastern terminus of Market Street to the Embarcadero as a pedestrian space with the main terraced plaza to the north (left) and lawn in the south (right). *(Photograph of*

Image 62. The southern section of the plaza featured a lawn open space backed by poplar trees on the eastern boundary and London planetrees on the western boundary. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R16-9, Joshua*

Contact Sheet [cropped] by author. Sheet 1479R16-5, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)	*Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*
Image 63. Justin Herman Plaza's upper terrace and promenade originally featured granite paving and square light poles with translucent glass. In addition, the Embarcadero Freeway off-ramps to Clay and Washington Street wrapped around the plaza's northern boundary, and pine and poplar trees lined the eastern boundary adjacent to the freeway. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R47, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	**Image 64.** Small-scale features in Justin Herman plaza included stone planting tubs and square light poles with square translucent glass. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R22-3, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 65. Justin Herman Plaza, 1979, western boundary adjacent to Embarcadero Center development with concrete steps joining upper and lower terraces, featuring circular planters. *Photograph of Slide Sheet [cropped] by author. Slide 2C725, by Joshua Friedwald, dated 1979 [014.VI.2C.101-740], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.*

Image 66. The western boundary of Justin Herman Plaza's upper terrace, adjacent to the Embarcadero Center development, featured granite paving and included wood benches. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R29-7, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania).*

Image 67. The statue of Juan Bautista de Anza was placed at the southern end of Justin Herman Plaza, adjacent to the lawn. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R6-10, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania).*

Hallidie Plaza (1973)

Hallidie Plaza, a three-level terraced plaza was designed as part of the Market Street Redevelopment Plan at the intersection of Market and 5th Streets, adjacent to the Powell Street cable-car turnaround.

Prior to the construction of Hallidie Plaza, the triangular-shaped block bounded by Market, Mason, Eddy, and Powell Streets was densely built out with commercial buildings that varied in height from three stories at the corner of Market and Powell Streets to eight stories along Mason Street. Buildings that were demolished to create Hallidie Plaza included large-footprint commercial buildings featuring several stores and restaurants at the ground floor, as well as a few two-story commercial buildings including stores, restaurants, and a billiard hall/movie theater. All of the buildings on the west side of the block along Mason Street were retained and are present today. These buildings, from the corner of Mason and Market Streets north along Mason Street to Eddy Street, include: the eight-story Graystone building; the seven-story Garfield Building, which wraps around the back of the Graystone Building and includes a façade along Market Street that was heavily modified in 2007); and two four-story mixed use commercial/hotel buildings. These buildings all date to 1907 and 1908 and featured various commercial uses including restaurants, stores, offices, and a movie theater (**Images 68-69**) (1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63; and 1960-1991 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63).

Constructed in 1973, this plaza intended to serve as a major multi-modal transportation hub, providing pedestrian access to the underground Muni and BART Powell Station (**Image 70**), as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, busses, and the end of the Powell Street cable car line. The plaza also was designed to act as the gateway to the retail section of Market Street. The design featured an entrance to the BART station from a sizeable underground concourse that opens into the plaza, which is sunken below street level and accessible from the street by stairs and escalators. The 1967 Market Street Design Plan Summary Report called for the sunken plaza with "amphitheater-style steps" to serve as a venue that could accommodate seasonal events such as fashion shows, concerts, and fundraising affairs (San Francisco Public Library 1967:18). In addition, the vertical movement via stairs and escalators from street level to Hallidie Plaza's terrace levels was desirable to Halprin as a means of varying the potential monotony of walking along the flat ground-lane of Market Street (Hirsch 2014:81).

The Market Street Redevelopment Plan called for careful attention to the pedestrian connections and "leftover" triangular spaces where the diagonal Market Street intersected with streets of the northern grid. To rationalize traffic flow, the plan called for the closure of some of these streets. These closures resulted in the Powell Street mall, which forms Hallidie Plaza and comprises the block of Powell Street between Ellis and Market Street (Hirsch 2014:78).

The plaza is divided at street-level by Cyril Magnin Street (**Image 71**). Below this overpass is a passage way that joins the east and west sides of the plaza's lowest level and includes space for a visitor center. Escalators are parallel to Market Street on both the eastern and western sides of the plaza (**Image 72**). In addition to the stairs adjacent to the escalators, the plaza also features stairways independent of escalators, which parallel Cyril Magnin Street on both sides. The design also includes: stepped concrete-walled terraces serving as areas for landscaped vegetation; red brick paving laid in a herringbone pattern (which unified the plaza with the Market Street Redevelopment Plan design as a whole); mezzanines on both sides of the plaza, which creates space for pedestrian traffic to circulate between stairs and offers vantage to view the plaza floor below; the below-street level passage that joins the east and west sides of the plaza and includes space for the visitors center; circular flower tubs like those also found in Justin Herman Plaza; tree plantings along the plaza's northeastern boundary and in the sunken plaza with circular metal grates similar to those found throughout the Market Street Redevelopment Plan; and custom-designed wood-slat benches overlooking and within the plaza (**Images 73-77**). Research did not reveal a Market Street Redevelopment Plan planting plan that identified precise locations of circular flower tubs and tree plantings, but, according to an edition of the Market Street Development Project newsletter, 18 additional trees were added to upgrade the image of Hallidie Plaza sometime between its dedication in 1973 and 1976 (San Francisco Public Library 19776e:241). Further research is required to determine if these trees correspond directly with the trees placed at the northern boundary.

Appendix A includes DPR 523 Form for Hallidie Plaza, which provides individual eligibility analysis.

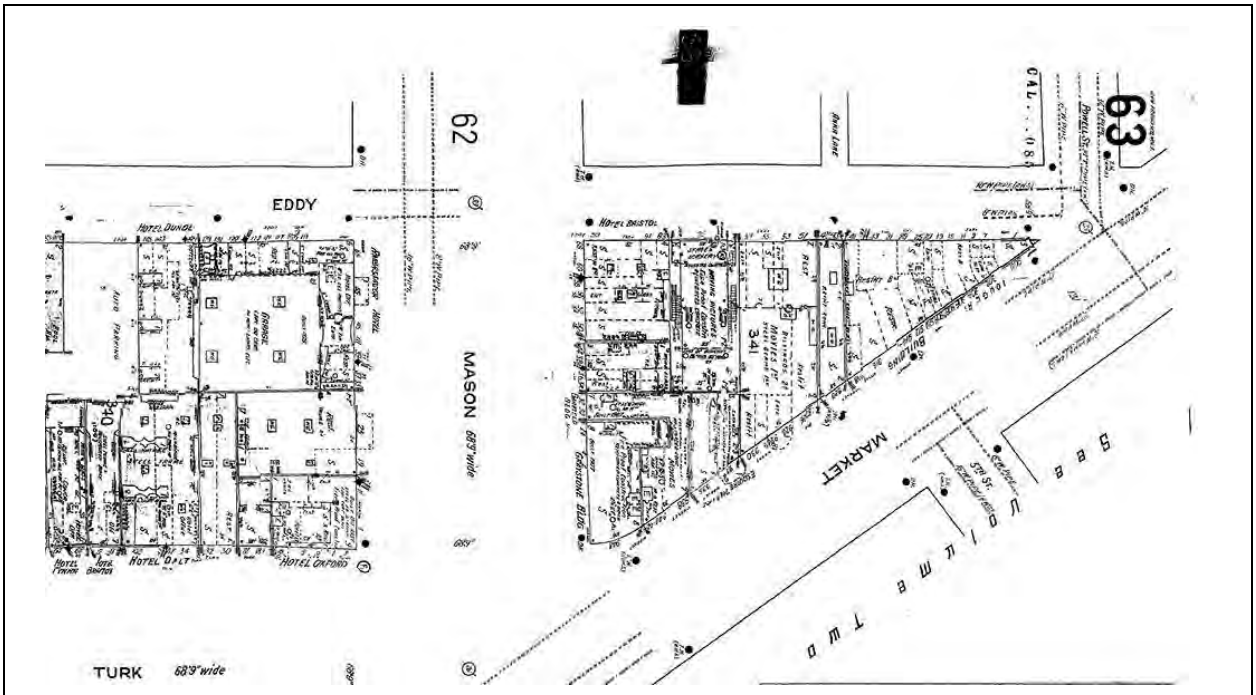

Image 68. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63 shows block on the north side of Market Street between Powell Street and Mason Street, illustrating existing properties demolished as part of the Hallidie Plaza construction. (*San Francisco History Center, San Francisco Public Library*)

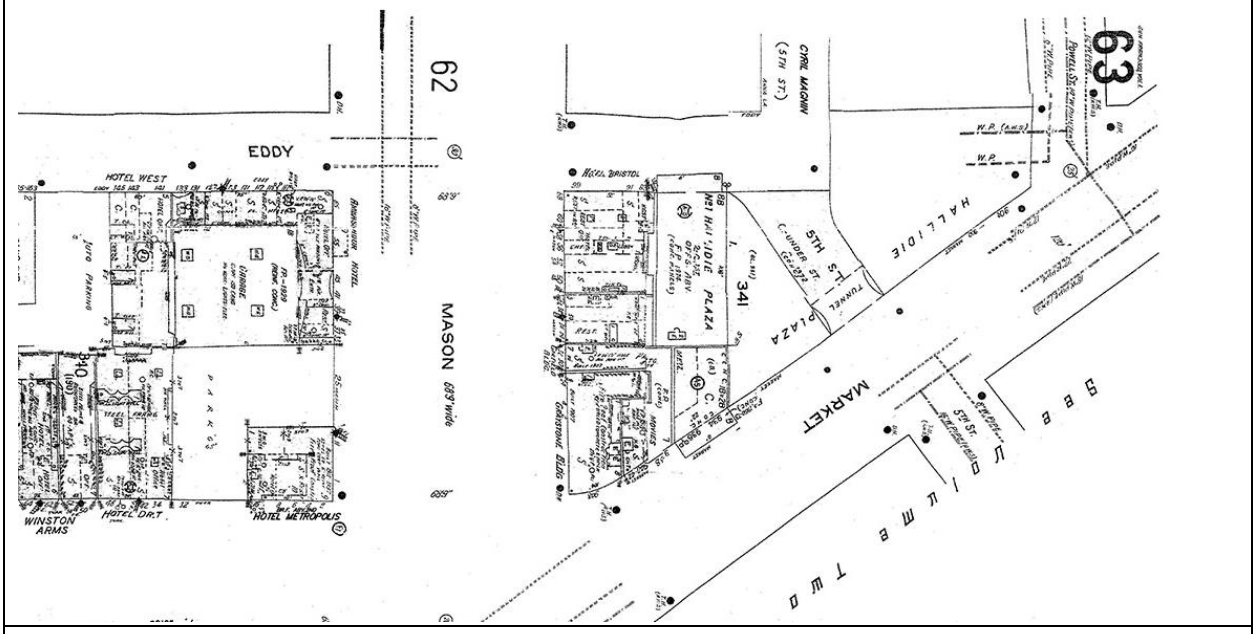

Image 69. 1960-1991 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63 shows location of Hallidie Plaza, bisected by Cyril Magnin Street and adjacent to Powell Street cable car turnaround. (*San Francisco History Center, San Francisco Public Library*)

Image 70. Hallidie Plaza, 1979, view from within the BART station looking up to the northeastern corner of the plaza (toward the Powell Street cable car turnaround) showing broad width of BART entrance stairway. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R3-9, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 71. Hallidie Plaza, 1979, showing east side of the plaza with lower terrace entrance to BART Station (left) and Cyril Magin overpass forming space for Visitor Center below (center). *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R2-5, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 72. West side of Hallidie Plaza, 1979, showing landscaped terraces and stairs joining lower level of the plaza with middle and street level. This image also shows alignment of trees on northern street-level boundary of the plaza. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R2-2, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, Architectural Archives, University of Pennsylvania)*	**Image 73**. Hallidie Plaza, 1979, southwest view showing tree placement and planting tub arrangement, along with vertical features—escalator and stairs. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R1-1, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*
Image 74. Hallidie Plaza, 1979, east side of plaza showing wood-slat benches lining the wall on the lowest level and trees clustered with planting tubs at the foot of the eastern stairs. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R38-8, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	**Image 75**. Hallidie Plaza, 1979, showing west side stair access to upper terrace levels on the northern boundary. This image also shows distinctive light poles with square shaped lamps at street level and wood-slat benches in the lower level. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R38-9, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 76. Hallidie Plaza, 1979, view of mid-level terrace on east side showing wood-slat benches, terrace plantings, and plaza's granite walls. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R38-1, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 77. Hallidie Plaza, 1979, showing street-level northern boundary that includes an alignment of street trees, wood-slat benches, and brick paving in a herringbone pattern to match Market Street streetscape. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R11-5, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

United Nations Plaza (1976)

Dedicated in 1976, UN Plaza was established to commemorate the 1945 founding of the United Nations at the San Francisco Civic Center (San Francisco Public Library 1976c:441-440). The 2.6-acre plaza served as a tree-lined approach to the Civic Center, as well as an open space for the Mid-Market Street area. Located between 7th and 8th Streets, extending westward from Market Street to Hyde and Fulton Streets, UN Plaza was the pivot of the Market Street and offered a processional way where parades could march on the urban boulevard turning at UN Plaza to continue up the Mall to the Polk Street steps of City Hall, located adjacent to the Federal Building at 50 United National Plaza (Hirsch 2014:82-83).

United Nations Plaza was created on three existing city blocks and the site of the terminus of Fulton Street, which was abandoned at Hyde Street to create the plaza. Several historic buildings around the perimeter of the plaza site were retained and are still present today. These buildings are described in further detail below. The majority of the buildings on the existing triangular-shaped block bounded by Market, Hyde, Fulton and Leavenworth Streets were demolished to make way for UN Plaza. Demolished buildings included several commercial building varying in height from one to four stories. Examples of these buildings included a drugstore at the corner of Hyde and Market Streets, the Marshall Building featuring eight storefronts and a restaurant along Market Street, and several one-story stores decreasing in size moving towards the gore corner at Leavenworth and Market Streets. Buildings that were retained on this block were limited to the four-story Orpheum

Theater at 1182-1192 Market Street (1925), and the adjacent one-story Art Deco-style commercial building at 1 United National Plaza (1932) (MIG 2015: 27, 82-83). The Federal Building at 50 United Nations Plaza (1936) filled the entire block bounded Hyde, McAllister, Leavenworth, and Fulton Streets and was retained. This four-story, Beaux Arts-style civic building was constructed in 1936 by Arthur Brown, Jr. and established the northern edge of the plaza. The block formerly bounded by Leavenworth, McAllister, Jones and Market Streets was bisected at 7th Street to create Charles J. Brenham Place, which established the east edge of the plaza. The majority of the buildings to the west of Charles J. Brenham Place were demolished and included commercial buildings (stores and restaurants), offices and lodging houses ranging in height from one to five stories. The only building that was retained on this portion of the block was the five-story Methodist Book Concern building (a former printing/publishing house) at 83 McAllister Street (1907). The seven-story hotel at 1100-1112 Market Street takes up the remained of the triangular-shaped block to the east of Charles J. Brenham Place. This building, now known as the Renoir Hotel, was retained and was located outside of the boundaries of the plaza site (**Images 78-79**) (1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95; and 1960-1991 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95).

The Market Street Redevelopment Plan design for UN Plaza created a pedestrian approach from Market Street that offered a framed vista of the City Hall dome (**Image 80**), a viewshed that serves as an important element of UN Plaza. In addition to being the main gateway to the Civic Center, the plaza serves as major multi-modal transportation hub, providing vertical circulation via street access to the underground Muni and BART Civic Center Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, and busses.

As with creation of the Powell Street mall that forms Hallidie Plaza, the street closure establishes pedestrian connections and leverages "leftover" triangular spaces where Market Street meets the northern street grid, and establishes the Fulton-Leavenworth mall, which forms UN Plaza (**Image 81**) (Hirsch 2014:78).

The plaza paving consists primarily of red brick laid in a herringbone pattern similar to the material and design of the sidewalk paving along Market Street. Breaking the pattern at 40-foot intervals is a band of solid red brick courses on the Fulton Street central promenade. Additional granite paving with brass inlay was incorporated into the original design near the southwest end of the fountain to indicate the city's latitude and longitude (**Image 82**). The central promenade aligned with Fulton Street between Hyde Street and what was formerly Leavenworth Street was originally designed with 16 granite light standards symmetrically arranged with 8 fixtures per side placed at regular 40-foot intervals. The modernist light standards consisted of semi-translucent, hooded luminaires mounted on square, light-colored granite columns (**Image 83**). The 1973 plans indicate that there were 24 wooden-slat benches symmetrically placed along the central promenade with 12 benches per side arranged in a paired configuration. The custom-designed benches featured wooden slats and bronze-clad metal supports. Twenty-five concrete bollards linked with chain were placed along Hyde and McAllister Streets. Thirty-six decorative, circular-shaped bronze tree grates with a radial design were installed on Market Street as part of the larger Market Street Redevelopment Plan project. The grass-covered planting beds along the Fulton Street central promenade were established in 1936 and incorporated into the design of the plaza. The planting area near the BART entrance was competed in 1975. At least 36 London planetrees were planted in the plaza in 1975. London planetrees are a traditional choice for formally designed landscapes, and are a major feature of the public open spaces in the Civic Center district dating back to the Beaux Arts period. There is

evidence of London planetrees planted as street trees in the district by 1916 (and some examples from that period remain). London planetrees were included by Thomas Church in his design for the War Memorial Courtyard in 1936, and by Douglas Baylis for Civic Center Plaza in 1960. Halprin's use of London planetrees at UN Plaza is consistent with the historic plant palette in the area, marking his attention to the historic context of the site (MIG 2015:17, 29, 34, 45).

Lombardy poplar trees (*Populus nigra*) were also planted near Market Street. The stairwell and escalator to the BART subway station were built between 1973 and 1975. Two flagpoles with a radial pattern metal base and an advertisement kiosk were installed in 1975. Pedestrian circulation is structured along two axes—a primary axis along Fulton Street, which Halprin saw as a processional parade route and pivot from Market Street to City Hall, a secondary axis along Leavenworth Street. The UN Plaza Fountain, designed by Lawrence Halprin, was completed in 1975 (**Image 84**). The fountain features more than 100 blocks of granite clustered into five major masses that symbolize the major continents of the world, with the lower block in the center representing the mythical lost continent of Atlantis. The pools of water surrounding the granite masses signify the Earth's major oceans. The tidal movement of the Earth's oceans was originally represented by a surge of water into the fountain basin, followed by a short pause at flood stage, then a rapid draining period. The original design called for the tidal cycle to be completed every 2 minutes, with a jet of water shooting up into the air to alert people that the surge was about to begin. Jets of water arching into the air were included in the original design to make the fountain more visible from Market Street and the surrounding plaza. The fountain area also includes tall gold-colored spot lights. Pre-existing features within the street level of the UN Plaza that were left in place and incorporated into the overall plan for the plaza include: a red metal fire box dating to 1899 on Hyde Street; two fire hydrants on Hyde Street dating to 1909; sections of granite curbing on Market, Leavenworth, and Hyde Streets, dating to 1925; and 10 pre-1928 Path of Gold Light Standards on Market Street within the plaza boundaries (MIG 2015:82-84).

Appendix A includes DPR 523 Form for United Nations Plaza, which provides individual eligibility analysis.

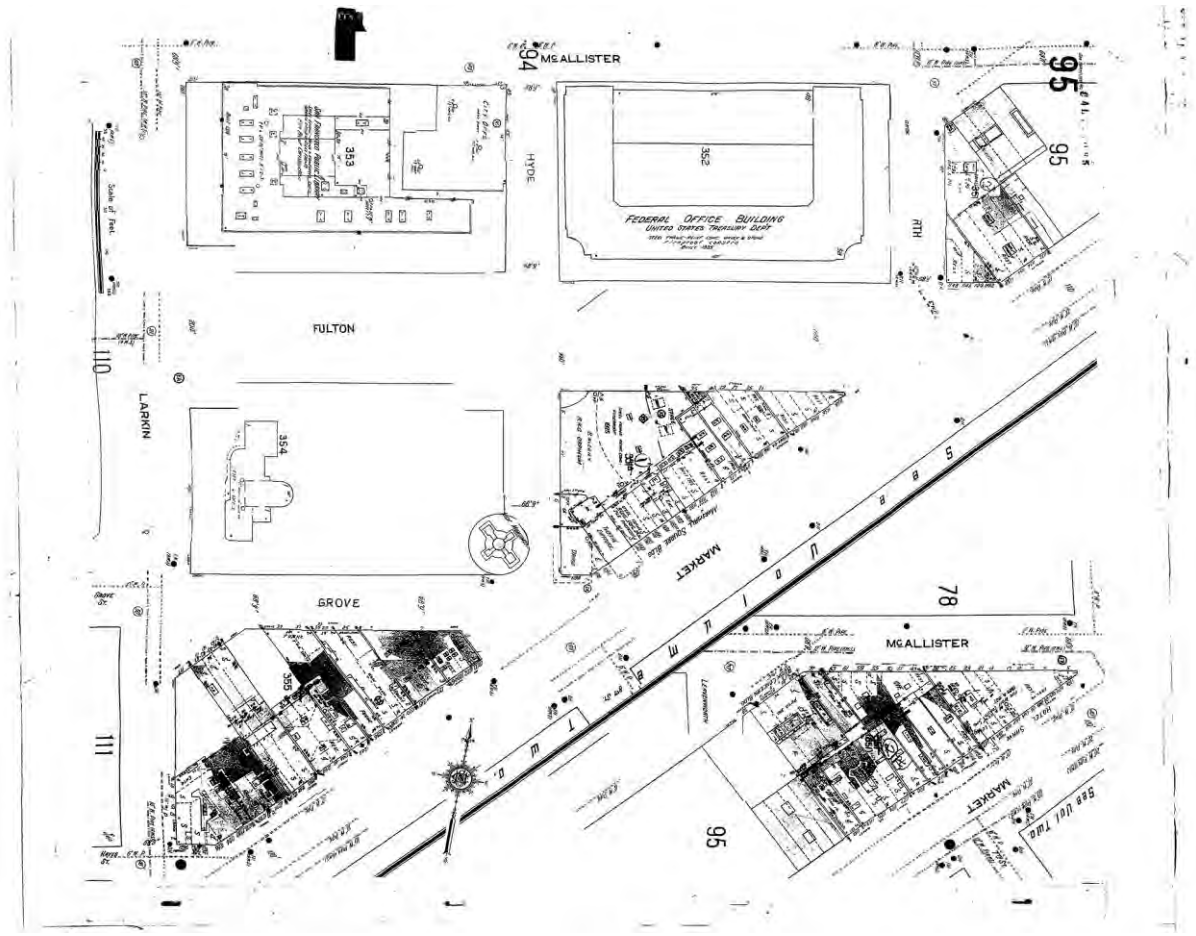

Image 78. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95 shows site conditions prior to construction of UN Plaza, including structures demolished as part of the Market Street Redevelopment Plan. (San Francisco History Center, San Francisco Public Library)

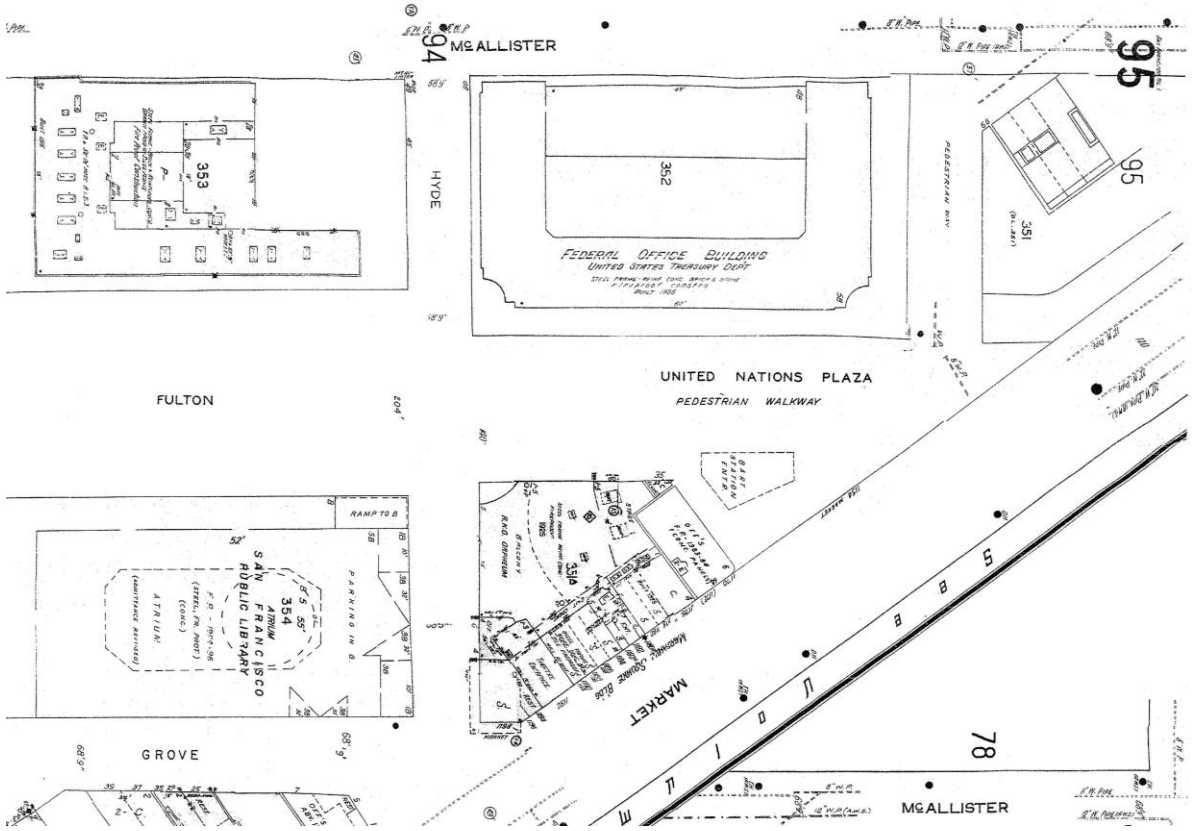

Image 79. 1960-1991 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95 shows site conditions after construction of United Nations Plaza, with Leavenworth and Fulton Streets repurposed as pedestrian malls. (San Francisco History Center, San Francisco Public Library)

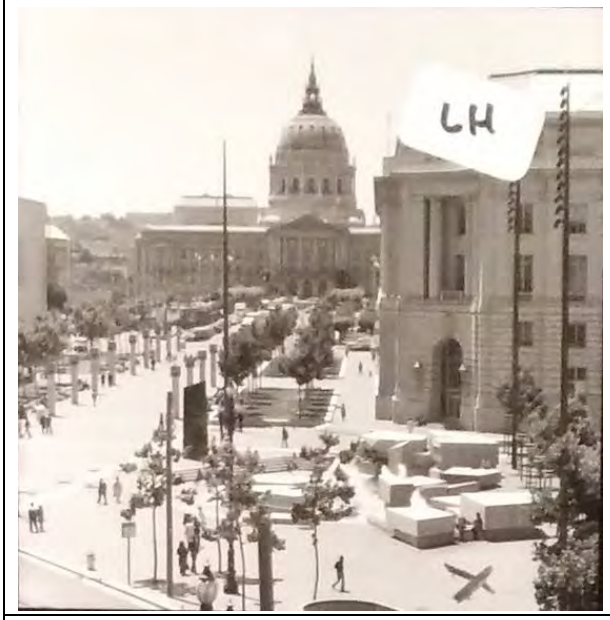

Image 80. UN Plaza, 1979, showing orientation of fountain, monument, and Fulton Promenade (with lighting and tree rows) in relation to the view of City Hall. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R40-2*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 81. Fulton Promenade, 1979, southeast view showing brick-paved areas for pedestrian traffic heading toward the fountain and BART station entrances, as well as trees aligned within grass-filled planting beds. *(Photograph of Contact Sheet [cropped] by author. Slide 56608, by Joshua Friedwald, dated 1979 [014.VI.5G.601-622], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 82. UN Plaza, 1979, showing herringbone brick pattern accompanied with granite and in-laid bronze. This image also

Image 83. Fulton Promenade, 1979, with lighting that features granite pillars with square, translucent glass lamps. *(Photograph of Contact*

shows a northeast view toward the plaza fountain, lighting, and monument. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R6-12, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	*Sheet [cropped] by author. Slide 56607, by Joshua Friedwald, dated 1979 [014.VI.5G.601-622], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*
Image 84. UN Plaza featured a Halprin-designed fountain, pictured here, with light poles featuring square translucent glass lamps lining its north side. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R7-11*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	

Small Plazas of Market Street

The following descriptions of Market Street's minor plazas—Robert Frost Plaza, Mechanics Monument Plaza, Crocker Plaza, Market Twain Plaza, and Market Street Plaza—are organized based on geographic positioning east to west along the street.

Robert Frost Plaza (1978)

Named in honor of the poet, Robert Frost Plaza was dedicated on March 23, 1978. The open space was on a triangular site just south of the Hyatt Hotel at the terminus of the California cable car line at the intersection of California, Drumm, and Market Streets on the north side of Market Street (**Image 85**). Designed by the Market Street Joint Venture Architects, Robert Frost Plaza features

include a plaque mounted on a stone pedestal honoring Frost, who was born a few doors away from the cable car turntable at Powell and Market Street, and a street clock characterized by a bronze sphere with four-sided clock face mounted atop a granite pillar on the eastern side adjacent to Drumm Street (**Image 86**). The plaza also featured a wood-slat bench and light pole with a square translucent glass light on the east side. The plaza paving is red brick laid in a herringbone pattern to blend with Market Street sidewalks (San Francisco Public Library 1976c:239).

Image 85. Robert Frost Plaza, 1979, view from east to west showing wood-slat bench and light pole with square translucent glass lamp in the lower right corner, California Street cable car track angled from middle right to lower center, U-shaped street-level entrance to BART subway in the center, and Robert Frost monument beside four-faced clock in the upper right. This image also shows an example of a loading bay on the south side of Market Street. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R16-3, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 86. Street-level view of four-faced clock (left) and Robert Frost Monument (center), 1979, as viewed looking northeast. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R15-6, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Mechanics Monument Plaza (1973)

Dedicated on June 12, 1973, Mechanics Monument Plaza, designed by the Market Street Joint Venture Architects, is at the corner of Market and Bush Streets on the north side of Market Street (San Francisco Public Library 1976d:665). The Mechanics Monument, originally unveiled in May 1901 in memory of iron works industrialist Peter Donahue, was located at this intersection prior to the Market Street Redevelopment Plan and was moved a short distance as part of the Market Street

Redevelopment Plan (San Francisco Public Library 1976d:683). Triangular in plan, Mechanics Plaza is bordered on all three sides by red brick laid in a herringbone pattern. The Mechanics Monument was placed in the southwest corner (**Image 87**). The plaza includes granite steps on the south and west sides that terrace to the granite paved plaza. The northeast side (longest side of the triangle) is lined by London planetrees similar to those present on the Market Street streetscape. The stepped south and west sides also feature large squared pyramid bollards. The plaza also featured wood slat benches in the granite-paved space (**Image 88**).

Image 87. Mechanics Monument Plaza, 1979, as viewed from northwest corner of the plaza. Features include squared pyramid bollard, wood-slat bench, statue, and view of granite steps into plaza. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R25-12, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

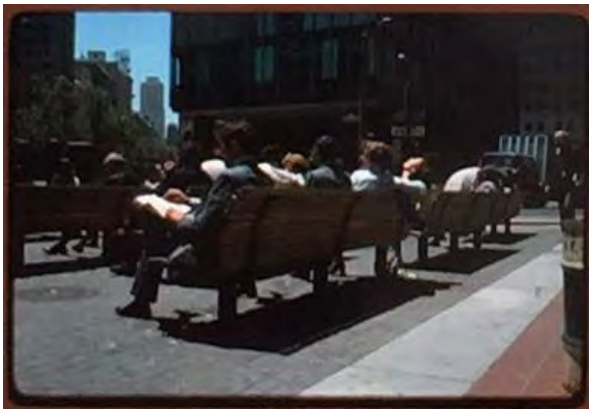

Image 88. Close-up view of Mechanics Monument Plaza, 1979, showing wood-slat benches and stone paving, with granite edging to adjacent brick sidewalk. *(Photograph of Contact Sheet [cropped] by author. Slide E303, by Joshua Friedwald, dated 1979 [014.VI.5I.702-720], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Crocker Plaza (1969)

Located on the north side of Market Street at One Post Street at the intersection of Post, Montgomery, and Market Streets, Crocker Plaza was named for its association with the railroad pioneer, Charles Crocker. The site was the first acquisition made by the Crocker estate and the location of the Crocker building, which was completed in 1892 and extant until demolished for construction of the Aetna Life & Casualty Building and Crocker Plaza in 1967 (San Francisco Public Library 1976d:257). Although the plaza was incorporated in the conceptual footprint of the Market Street Redevelopment Plan design, it was designed by Sasaki Walker Associates in association with the private development of the adjacent Aetna Life & Casualty building. Despite its separate development history, Crocker Plaza was designed to be compatible with the larger Market Street Redevelopment Plan streetscape redevelopment project. Completed in 1969, the multi-level design includes a primary plaza, a street-level, and a secondary sunken plaza (**Images 89-94**). The 8,000-square-foot sunken plaza features square brick paving, though its pattern does not reflect that of the

Market Street Redevelopment Plan herringbone design (San Francisco Public Library 1976e:647). The sunken plaza includes retail space and provides an entrance to the Montgomery Street BART/Muni station. While the site is roughly triangular, the upper plaza is composed of a two-tiered, octagon-shaped platform (**Image 92**). The granite steps, which create the platform, are used for seating and are backed by an iron fence (**Images 89-91**). Paving around the granite platform—brick laid in a herringbone pattern—was designed to blend with the adjacent Market Street Redevelopment Plan-designed sidewalks. An April 1970 *Market Street Development Project Newsletter* encouraged readers to visit Crocker Plaza: "You may be interested to see the type of brick work sidewalks there, because this is how the future Market Street sidewalks will be finished" (San Francisco Public Library 1976d:129). The Aetna Life & Casualty building was later occupied by the McKesson Corporation and Crocker Plaza was renamed McKesson Plaza.

Image 89. Crocker Plaza, 1979, as viewed from east looking west, featuring southern platform steps, iron bar fence, and square backless stone benches. *(Photograph Contact Sheet 1479R14-2, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 90. Crocker Plaza, 1979, as viewed looking southwest to Market Street showing the eastern platform steps. *(Photograph Contact Sheet* 1479R14-8*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 91. Crocker Plaza, view from the southeast showing planting tub, granite entrance to plaza's lower level, and signage. (Photograph by SWA via http://tclf.org/sites/default/files/styles/scale_600x600/public/thumbnails/image/4049535661_5477e7b37e_o.jpg?itok=v8hQUOF3)

Image 92. Crocker Plaza, view from above showing octagonal platform, tree placement in lower level of plaza, and orientation of lower plaza entrance. (Photograph by SWA via http://tclf.org/sites/default/files/styles/scale_600x600/public/thumbnails/image/4049535759_7e05b0f2aa_o.jpg?itok=n6IoDMap)

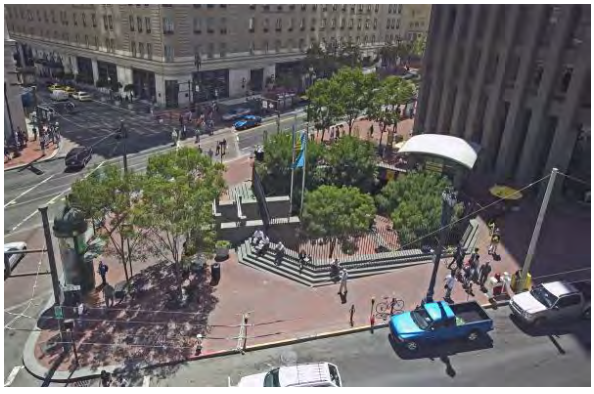

Image 93. Crocker Plaza, view from northeast toward southwest showing street-level structure

Image 94. Crocker Plaza, view of lower level showing center platform with planting tubs at

(right side of image) on opposite side of the plaza platform from entrance to plaza's lower level. (Photograph by SWA via http://tclf.org/sites/default/files/styles/scale_600x600/public/thumbnails/image/4049535841_a123675f01_o.jpg?itok=CNWNJoxb)	corners with additional planting tub and trash receptacle in foreground. (Photograph by SWA via http://tclf.org/sites/default/files/styles/scale_600x600/public/thumbnails/image/4050281336_cb6017b206_o.jpg?itok=Pka-PgjN)

Mark Twain Plaza (1978)

Dedicated on June 8, 1978, Mark Twain Plaza is located on the south side of Market Street between New Montgomery and 3rd Street on the former site of Annie Street (San Francisco Public Library 1976f:83, 113). The renaming honored Twain, who worked in the area of 3rd and Market Streets (formerly known as "Newspaper Row") in the 1860s and began his career as a writer and lecturer. The plaza was designed by the Market Street Joint Venture Architects to complement the Market Street Redevelopment Plan streetscape and includes typical red brick paving in a herringbone pattern, a bronze advertising kiosk, and light poles with translucent glass. The space also includes concrete benches (**Image 95**) (San Francisco Public Library 1976f:107).

Image 95. Mark Twain Plaza, 1979, view from sidewalk adjacent to Market Street, looking south, showing a bronze circular advertising kiosk, concrete planting bed, concrete bench, and light poles with square translucent glass lamps. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R32-8, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Market Street Plaza

Located on the south side of Market Street across from the intersection of Grant Avenue and Market, the Market Street Plaza was envisioned as space to connect Market Street with the planned Yerba Buena Center redevelopment. Development of the Market Street Plaza included demolition of Grant Market, but did not include destruction of the St. Patrick's Church (San Francisco Public Library 1976a:291). While demolition occurred during the Market Street Redevelopment Plan-era redevelopment, further research is required to determine if the plaza's completion was consistent with the 1967 Market Street Design Plan or if it is more appropriately associated with the Yerba Buena Center development project. Because the Joshua Friedwald images commissioned by Halprin do not show the as-built condition of Market Street Plaza in 1979, it appears to have not been completed as part of the Market Street Redevelopment Plan project.

Redevelopment of the Market Street "Transit Thoroughfare"

As early as 1975, the City began to reconsider the merit of removing historic streetcar and electric trolley car service from Market Street. Study of the effect of trolley car wire removal on service operating costs and capital expenditures determined retention of the surface trolley service with overhead catenary wires to be preferable to the wire removal strategy incorporated into the Market Street Redevelopment Plan (San Francisco Public Library 1976a:247).

By 1978, the San Francisco Board of Supervisions amended the 1968 Schematic Street Design Plan to require retention of electric trolley overhead catenary wires (Res. 213-78) and, in 1979, the Board of Supervisors empowered itself to control track and boarding island removals from the street (Res. 846-79). In 1981, the Board of Supervisors authorized a *Market Street Design Planning Study* (Res. 240-81) to review transit operations and street design, including retention of historic streetcars. The findings of that study spurred the Board of Supervisors to formally acknowledge the need to maintain and improve Muni transit operations on Market Street in 1983. They amended the 1968 plan and adopted a new concept, referred to as the "Transit Thoroughfare" (Knight 1985:1-2).

In June 1983, the first of five summer San Francisco Historic Trolley Festivals was held, operating historic streetcars from the Transbay Terminal at 1st and Mission Streets to Market Street, and up Market Street to Duboce Avenue. The following year, the Market Street Planning Project was created, administered by San Francisco Public Utility Commission Planning and Development (Knight 1985:1-2).

The *Market Street Planning Project Final Report*, published in 1985, formally called for a Transit Thoroughfare on Market Street. Recommendations included permanent reintroduction of historic streetcars, including upgrading streetcar tracks on Market Street East of Van Ness Avenue. In August of the same year, Muni and SF Public Works began a 9-month trial operation of four-lane service on Market Street between Financial District and Civic Center, including Muni electric trolley service and buses in two lanes traveling in both directions, along with streetcar service. The SF Public Works also relocated boarding islands and curb stops to serve the four lanes of Muni vehicles (Knight 1985:1).

4.1.8.3 Public Engagement on Market Street from Post-War to Postmodern

During this period of urban decline and redevelopment (1950–1985), Market Street remained a backdrop for public interaction, particularly in terms of protesting for peace and civil rights advocacy. While the majority of these events focused on the Civic Center area, marches associated with protest rallies at City Hall often included Market Street routes. Examples include: April 19, 1961, when Cuba Intervention Protests marched from Union Square to the Federal Building, crossing Market Street (Architectural Resources Group 2015:20-21); the July 12, 1964, Human Rights March along Market Street to City Hall (Architectural Resources Group 2015:8); the March 14, 1965, Torchlight Procession for Selma march along Market Street to Civic Center (San Francisco News-Call Bulletin 1965); August 6, 1968, when the Vietnam War Protest March traveled west along Market Street to Civic Center (Architectural Resources Group 2015:23); the October 12, 1968, GI Protest march against Vietnam with rally in Civic Center Plaza (Architectural Resources Group 2015:9); and the April 5, 1977, UN Plaza disability advocacy sit-in (504 Celebration & Commemoration Committee 1997).

Civic engagement on Market Street during this period also featured the launch of the San Francisco LGBTQ Pride Celebration and Parade. While the first gay rights parade took place in June 1970 on an alternative route—from Aquatic Park to City Hall via Polk Street—beginning in 1977, the Gay Freedom Day Parades traveled west across Market Street from downtown to City Hall. Inspired by antigay backlash, the parades of 1977 and 1978 drew record numbers—200,000 and 350,000 respectively—making it biggest annual parade in San Francisco. The 1978 parade has been called "the signal event of the gay emergence in San Francisco during the late 1970s" (Graves and Watson 2016:222). The San Francisco Chronicle reported that it "may have been the largest single political gathering in San Francisco, and possibly the country, in the 1970s" (Graves and Watson 2016:222). For that same parade, a group of artists created a rainbow flag based on a design by artist Gilbert Baker. In subsequent years, the rainbow flag gradually came to be recognized and used internationally as a symbol for LGBTQ pride (Graves and Watson 2016:222). Market Street also served as the venue for a series of tragic, but no less unifying, LGBTQ events. On November 27, 1978, Daniel James White assassinated San Francisco Mayor George Moscone and Supervisor Harvey Milk, a LGBTQ rights leader, at City Hall. On May 21, 1979, 6 months after the assassinations, White was convicted on two counts of manslaughter, rather than first-degree murder. That night, thousands of grief-stricken and violent protesters marched down Market Street from the Castro District to Civic Center, overwhelming the San Francisco Police, shattering windows at City Hall, and setting police cars on fire (Graves and Watson 2016:234). Several civilians and police officers were injured in the protest and this event became known as the White Night Riot. On October 27, 1985, the LGBTQ community chose the Federal Building adjacent to the Market Street Redevelopment Plan-designed UN Plaza as the site of a peaceful protest in response to the government's inaction associated with the AIDS epidemic. The AIDS/ARC Vigil lasted for 10 years and is among the longest running acts of civil disobedience in San Francisco.

4.1.9 Alterations to the Market Street Redevelopment Plan Landscape, 1986-Present

4.1.9.1 Market Street Streetscape

Alterations to the Market Street streetscape since the completion of the Market Street Redevelopment Plan have included both the removal of features as well as the addition of new features over time. Market Street Redevelopment Plan small-scale features removed from the streetscape include: benches with backs featuring bronze-clad supports for 10-foot-long wood slats; square stone benches without backs; 12-foot-high bronze "umbrella" shelters; telephone booths with bronze-cladded paired booths with glass dome roofs; bronze cylindrical trash receptacles; street signs featuring poles topped with square and white street name graphics and circular white directional graphics; light standards featuring 10-foot-high poles and caps of solid bronze with square translucent glass; drinking fountains featuring bronze hemispheres on square granite bases with bronze fixtures; 12-foot-high cylindrical advertising kiosks with bronze roofs; and elevators featuring 6-foot-square cabs with bronze-clad doors, sides, and fascia to convey passengers from street level to underground transit.

Features introduced after completion of the Market Street Redevelopment Plan included: Muni high-low loading platforms, SFMTA bus shelters installed in 2010 (Roth 2010); bike stands of a variety of styles; bike lanes in some portions of the roadway; bollards in a variety of styles; flower retail structures, newspaper and magazine vending machines; waste receptacles in a variety of

styles; stainless steel elevator enclosures with matching v-shaped advertising structures; Liberty Bell Slot Machine monument placed in 1984; and 17-foot-tall advertising kiosks installed in 1995 (King 2010). In addition, palm trees were planted in the median of Market Street west of Valencia Street in 1993 (Yee 2010).

4.1.9.2 Large Plazas

Embarcadero Plaza

In 1989, the Loma Prieta earthquake damaged and led to the 1991 demolition of the Embarcadero Freeway and off-ramps to Clay and Washington Streets. This redefined the Embarcadero Plaza's northern boundaries as the terminus of Clay Street and the 5.3-acre open space that would be renovated and named Sue Bierman Park in 2011 (San Francisco Parks and Recreation 2016).

Original pine and poplar trees along the property's eastern boundary (along the Embarcadero) were replaced with Canary Island date palms in 1992. While the species was changed, the linear arrangement of the post-Market Street Redevelopment Plan palms was similar to that of the original pines (Ho 2013). The eastern boundary of the plaza—the green space buffering the plaza from Embarcadero where the highway had been—was remodeled in 2003. This hardscaping replaced the concrete platform on the southeastern boundary of the plaza and the concrete island that was also in the southern section of the main plaza. The post-Market Street Redevelopment Plan hardscaping featured concrete stairs, ADA-accessibility ramps, and a much narrower grassy area. The two additional London planetrees located in the southeastern corner of the lower terrace of the main plaza may have been added during this renovation.

During this renovation, an allée of double palm tree rows (four trees in each row) were added on either side of the pedestrian promenade that joins the eastern terminus of Market Street to the Ferry buildings. Light fixtures were mounted to the tree trunks.

Additional alterations to the promenade included removal of the original lighting—modern standards with semi-translucent square luminaires mounted on square, light-colored granite pillars arranged along either side of the pedestrian promenade's east-west axis. Replica Path of Gold Light Standards were placed in the plaza's promenade. Original concrete bollards (square granite reflecting the style of the original light standards) spanning the north-south width of the pedestrian promenade at both the east and west ends were replaced with circular concrete bollards with similar alignment. In 1995, a green metal toilet was installed near the eastern end of the pedestrian promenade.

When the concrete island platform originally positioned in the southeast corner of the main plaza's lower terrace was removed, the location was paved with brick to match the rest of the lower plaza. Original granite paving of the upper terrace was replaced by concrete. Paving in the pedestrian promenade connecting Market Street with the Ferry Building was replaced by bands of light and dark grey granite flanked by brick laid in a herringbone pattern, which visually extend the Market Street sidewalks through the plaza.

The Juan Bautista de Anza and Carlos III of Spain statues were moved in 2003 to accommodate construction and permanently relocated from Justin Herman Plaza to Lake Merced in 2004 (San Francisco Visual Arts Committee 2004).

Public art pieces were added to Justin Herman Plaza after its completion, including large statues on the upper terrace adjacent to the Embarcadero Center development and the American Lincoln Brigade Memorial positioned on the east side of the plaza behind the fountain was dedicated in 2008. The southern lawn adjacent to Don Chee Way was remodeled as bocce courts in 2010.

Market Street Redevelopment Plan-era flower tubs were removed from the plaza. Potted palms clustered around the base of light poles on the upper terrace of the main plaza were added (current pots are not repurposed Market Street Redevelopment Plan-era flower tubs). Square trash receptacles with conical recycling tops, which are not original, were placed in the plaza. The date that these alterations were made is unknown.

Hallidie Plaza

In 1997, a large three-stop elevator was installed in the eastern side of Hallidie Plaza on its southern boundary to provide access to the subgrade plaza, the San Francisco Visitor Center, and the Powell Street BART/Muni stations. The Post-Modern-style elevator was designed by MWA Architects of Oakland and features a sculpted form sheathed with perforated stainless steel screen walls.

The custom-designed wood-slat benches originally included to overlook and provide seating in the plaza's lower terrace were removed in 1998. At the same time, trees were removed from the plaza's northeastern boundary and post-Market Street Redevelopment Plan lighting (gold poles and luminaries) were added to discourage illicit night-time activities in the area (King 2006).

UN Plaza

A bronze equestrian monument of Simon Bolivar was installed in 1984 at the west end of the plaza fronting Hyde Street. The statue was a gift from Venezuela to the City of San Francisco to commemorate the 200th anniversary of Bolivar's birth, but was not part of the original Market Street Redevelopment Plan design (MIG 2015:34).

UN Plaza was renovated in 1995 with input from Lawrence Halprin. The original semi-translucent, hooded luminaires mounted on square, light-colored granite columns were replaced with the frosted spherical globes. In addition to the original granite paving with brass inlay that indicated the city's latitude and longitude near the southwest end of the fountain, the plaza's paving was modified to include additional bands of granite and brass inlay quoting the Preamble to the United Nations charter placed in the Fulton Street promenade. A circular granite feature engraved with the United Nations symbol was placed into the paving at the intersection of the plaza's primary axis (Fulton Street promenade) and secondary axis (Leavenworth Street). A stone monument with the U.N. emblem and text was also installed in the plaza during the 1995 renovation to commemorate the 50th anniversary of the founding of the United Nations. This monument was erected in addition to the black monument pillar placed adjacent to the fountain as part of the original design (MIG 2015:82-84).

The planting beds along the Fulton Street central promenade were established in 1936 and incorporated into the Market Street Redevelopment-era design of the plaza. While they are extant, they have been altered to contain decomposed granite and grass. The advertising kiosk installed in 1975 with the UN Plaza flagpoles is no longer intact, though the exact date of removal is unknown.

The pumps and other associated mechanical equipment required to produce the tidal effect in the UN Plaza fountain have not been in operation since the early 1980s. The tidal movement of the

Earth's oceans was originally represented by a surge of water into the fountain basin, followed by a short pause at flood stage, then a rapid draining period. The original design called for the tidal cycle to be completed every 2 minutes, with a jet of water shooting up into the air to alert people that the surge was about to begin. Jets of water arching into the air remain present, but currently the tidal pool is not operational. In addition, gold-colored light poles were added on the north side of the Fulton promenade in 2005 (Fagan 2005).

4.1.9.3 Small Plazas

Robert Frost Plaza

The light pole with square translucent light and wood-slat bench adjacent to the Hyatt building were removed from Robert Frost Plaza. The precise date of removal is unknown.

Mechanics Monument Plaza

This plaza was redesigned in 2014. Alterations include removal of the original wood-slat benches, introduction of square tables and square granite stools, addition of mobile electronic device charging station, plaza paving in a checkerboard pattern, and alteration to plantings (San Francisco Public Works 2014).

Crocker Plaza

Alterations to Crocker Plaza include removal of the octagonal trash receptacles in sunken plaza and removal of the square backless granite benches on the south side where the plaza joins the Market Street Redevelopment Plan streetscape. Signage has been altered over the stairway at street level and for retail shops in the sunken plaza. The precise dates of these alterations are unknown.

Mark Twain Plaza

The advertising kiosk that was once present where the plaza joined the Market Street streetscape close to the west side of the plaza has been removed. The precise date of removal is unknown.

Market Street Plaza

While the character of the original Market Street Redevelopment Plan is unknown, research associated with the plaza's current condition indicates the space was redesigned in 2005 by landscape architect, Walter Hood. The post-Market Street Redevelopment Plan design includes a bosque an allée, benches, a ramp, stairs, a canopy, an oculus fountain, a kiosk, bamboo plantings, and metal screens (Walter J. Hood Design 2015).

4.2 Comparative Contexts

To determine the historical significance of Market Street, a clearer understanding of the themes that are important in local, state, and national history, and how Market Street may be associated with them, is required. Each of the following comparative context statements includes a definition of the geographic scale of the theme, range of years that define the context's period of significance, and a narrative description of the historical trend.

4.2.1 Labor Movement, 1865–1902

The rise of powerful railroads and other large industries during and after the American Civil War (1861–1865) signaled a loss of voice for workers. In the small, employer-owned businesses of earlier times, the worker and employer usually came to terms with each other as individuals, settling their differences and agreeing on wages, hours, and other issues through face-to-face discussions. This communication changed drastically in post-Civil War industry, when business owners hired professional managers to streamline their work. In the era of mass production, in which goods are produced on a large scale, getting the most work from laborers for the lowest possible wages was a matter of company policy (Benson, Stock, and Brennan 2006).

Large national labor unions arose to play an essential part in the fight for the rights of workers, particularly with respect to wages and working conditions. Unions were slow to grow in the United States in the late 1860s. Part of the problem was that millions of immigrants were arriving in the country willing to take jobs at very low wages. The diversity of the workforce, which resulted in different cultures and languages among the workers, made it difficult for workers to communicate and unite for common issues and goals. Additionally, industry owners were determined to keep their workforces from organizing and sometimes resorted to drastic means, including violence and intimidation. Most laws and law enforcers backed the employers (Benson, Stock, and Brennan 2006).

From the mid-nineteenth century to the early twentieth century, America's labor movement saw a series of clashes between workers and employers, growth in union organization, and increase in labor rights. These events included the formation of the National Labor Union in 1863; the Great Strikes of July 16, 1877, which started in Baltimore, Maryland, but later spread to other states, including California; the formation of the Knights of Labor in 1879; the Formation of the Federation of Organized Trades and Labor Unions in 1881; the first Labor Day celebration and parade in New York City on September 5, 1882; the Haymarket Riots on May 4, 1886, in Chicago, Illinois; the formation of the American Federation of Labor in 1886; the Pullman strike on May 11, 1894; the passage of the Labor Day bill to create the national holiday in 1894; and the Homestead strike in Pittsburgh, Pennsylvania, from July 1 to November 20, 1892 (Benson, Stock, and Brennan 2006).

Labor unions scored a major victory in 1902 when President Theodore Roosevelt intervened in the United Mine Workers strike. Federal troops were called in to support the workers rather than the employers for the first time in U.S. history. It was a sign of change in public opinion. Reforms in work hours and conditions, child labor, benefits, and workers' compensation gradually followed. After World War I, however, labor unions lost their force, and did not regain momentum until after 1941 (Benson, Stock, and Brennan 2006).

4.2.2 Women's Suffrage Movement, 1840–1920

In the second half of the nineteenth century, American women started pushing for social reforms, especially the right to vote, as part of a larger effort to improve the political, economic, and human rights of women throughout the United States. Arising from the same progressive sentiments that fueled nineteenth-century reform campaigns such as the abolitionist and temperance movements, the suffrage movement gained strength during the mid-nineteenth century as feminist women and their male supporters began to speak out in opposition to a legal system that defined women largely as the property of fathers and husbands. After the Civil War brought about the end of slavery, divisions arose within the movement between those who saw an opportunity to link the voting

rights of African American men with those of women and those who believed it was important to prioritize the rights of freed men or newly freed slaves. In 1840 U.S. abolitionists Lucretia Mott and Elizabeth Cady Stanton were refused seats at the all-male World Anti-Slavery Conference in London—a rebuff that inspired them join with other women in launching a women's rights movement in the United States. On July 19 and 20, 1848, Mott, Stanton, Mary Coffin Wright, Mary Ann McClintock, and Jane Hunt organized the first U.S. women's rights convention in Seneca Falls, New York. Following the Seneca Falls gathering, suffragists campaigned tirelessly for the vote while also promoting other issues of importance to women, including temperance and the abolition of slavery (Riggs 2015b). In 1869, Elizabeth Cady Stanton joined with Susan B. Anthony to form the National Woman Suffrage Association. That same year, another group of women founded the American Woman Suffrage Association. The two organizations joined in 1890 to form the National American Women Suffrage Association (Graves and Watson 2016:31-33).

Women in California were granted suffrage in 1911, thanks in no small part to leadership in San Francisco. "One of the first women in the American West to campaign for women's rights was Laura de Force Gordon, a trailblazing lawyer and newspaper editor whose speech in 1868 at Platt's Hall on the corner of Montgomery and Bush Streets was one of the first public statements in the west to address equal rights for women. In 1870, she helped found the California Women Suffrage Society, which met regularly in San Francisco (Graves and Watson 2016:33). In 1871, Susan B. Anthony and Elizabeth Cady Stanton made their first trip to San Francisco and were hosted by Governor Leland Stanford at the Grand Hotel on the corner of Market and New Montgomery Streets (Graves and Watson 2016:33).

The entry of the United States into World War I (1917–1918) interrupted the suffragists' efforts, but the increasingly visible role of women in the workforce during the war contributed to popular support for women's right to vote. By June 1919, both houses of Congress had passed the Nineteenth Amendment, granting women the vote, and on August 18, 1920, Tennessee became the 36th state to ratify it (Riggs 2015b).

4.2.3 Modern Civil Rights Movement, 1954–1964

The modern Civil Rights movement in the United States began with the 1954 *Brown v. Board of Education* decision, which overturned the "separate but equal" ruling passed in 1896 in *Plessy* v. *Ferguson*. The legal victory, achieved by the W.E.B. du Bois' National Association for the Advancement of Colored People Legal Defense and Educational Fund helped lay the groundwork for greater legal, political, social, economic, and educational equality. However, the decision only paved the way for *de jure*—but not necessarily *de facto*—desegregation. As such, African-Americans continued to face discrimination and racial violence throughout the country (Architectural Resources Group 2015:22).

Three years after the Supreme Court ruled school segregation unconstitutional in *Brown v. Board of Education* and 2 years after the Montgomery, Alabama, bus boycott, President Dwight D. Eisenhower signed the first civil rights bill since Reconstruction. The 1957 Civil Rights Act created the independent U.S. Commission on Civil Rights (National Park Service 2015).

The high point of the civil rights movement occurred on August 28, 1963, when 250,000 people participated in a March on Washington to urge the federal government to support desegregation and protect voting rights. Mass demonstrations like the march, as well as televised racial violence and the black passive resistance movement of the early 1960s led to adoption of the landmark Civil

Rights Act of 1964 (National Park Service 2015). Considered the most comprehensive civil rights legislation in U.S. history, the act granted the federal government strong enforcement powers in the area of civil rights. It prohibited tactics to limit voting; guaranteed racial and religious minorities equal access to public accommodations; outlawed job discrimination on the basis of race, color, religion, sex, or national origin; and continued the U.S. Commission on Civil Rights (National Park Service 2015). The sweeping legislation shattered the legal foundation of segregation by prohibiting discrimination in places of public accommodation and ensuring black consumer rights. The act also struck an economic blow by denying federal funding to programs with discrimination or segregation policies. The Civil Rights Act also established the Equal Employment Opportunity Commission and outlawed discrimination in private businesses with 25 or more employees, as well as in labor unions (Riggs 2015a).

Gains in civil rights varied for minorities during this era. Hispanics lost ground as they experienced mass deportations of legal and illegal immigrants in Operation Wetback, educational segregation in Southwest schools, and police brutality cases that rocked Los Angeles. In contrast, the re-emergence of a women's rights movement in the 1960s resulted in significant civil rights gains: adoption of the 1963 Equal Pay Act, the prohibition of inequality based on gender in the Civil Rights Act of 1964, and the breaching of barriers to employment for women. Asian Americans likewise experienced gains and losses in civil rights. The McCarran-Walter Act of 1952 permitted Japanese immigrants to become citizens but contained restrictive quotas based on race and country of origin. Chinese Americans, especially during the McCarthy era of the 1950s, found themselves targets of suspicion and possible deportation following the Communist takeover of China (National Park Service 2015).

4.2.4 Gay Liberation, Pride Celebration and LGBTQ Political Protest, 1960–1995

The advances of the black civil rights movement encouraged racial minorities, women, and LGBTQ people to create their own visible, powerful movements for equality. Conceptualizing gay rights, and organizing for them, evolved and became more complex from the 1960s through the 1980s. Earlier homophile activists had worked on the premise that rights would be gained by arguing that sexual behavior was a private matter and only one small part of their identity; in all other ways they were the same as straight people—and should therefore be equal to them. The Gay Liberationist Movement that arose in America during the 1960s believed incorporating homosexuality into public behavior and discussing identity was important and could transform society in coalition with other progressive movements. Both the gay liberation and the gay pride or gay identity movements assumed the central importance of coming out publicly as gay or lesbian (Graves and Watson 2016:180).

As the Gay Liberation Movement grew in the United States, the gay community in San Francisco provided leadership. In 1966, the Society for Individual Rights established what is commonly described as the first gay community center at 83 6th Street in San Francisco. By the late 1960s, the organization had 900 members, had created an educational program on sexually transmitted diseases. However, within a few years, the Society for Individual Rights' campaign to methodically win gay rights was overshadowed by more militant gay liberation groups, which drew tactics from the civil rights struggle, black militancy, labor organizing, and anti-war movements. They further parted from the assimilationist stance of earlier gay rights groups by publicly affirming, celebrating, and cultivating homosexual difference (Graves and Watson 2016:182).

Homophile organizers began to employ more assertive tactics in the 1960s that reflected those of other protest movements. San Francisco homophile groups organized one of their first public protests on Armed Forces Day in May 1966 at the plaza in front of the Federal Building (450 Golden Gate Avenue, extant) to protest the exclusion and dishonorable discharge of homosexuals from military service. The Mattachine Society, the Daughters of Bilitis, the Council on Religion and the Homosexual, and the Society for Individual Rights notified the San Francisco Police Department of their plans and distributed more than 20,000 leaflets to promote and explain the protest. The gathering drew more than 40 protestors and several hundred onlookers—the largest gay rights demonstration up to this point in San Francisco. The protest received extensive local print and television coverage, as well as articles in *The New York Times* and *Newsweek*. The crowd listened to speakers such as Glide Memorial Church's Rev. Cecil Williams, who announced, "There is a homosexual revolution here and across the land" (Graves and Watson 2016:181).

In 1970, San Francisco Bay Area activist Carl Wittman published *A Gay Manifesto*, an influential and widely distributed declaration of these views. Wittman calls San Francisco "a refugee camp for homosexuals," saying "we have fled here from every part of the nation, and like refugees elsewhere, we came not because it is so great here, but because it was so bad where they are" (Graves and Watson 2016:182).

On June 28, 1969, the Stonewall Inn, a gay bar in New York City, was raided by the police. Nearly 400 people joined a riot that lasted 45 minutes and resumed on succeeding nights. The event spurred annual commemoration in the form of Gay Pride celebration parades and rallies in U.S. cities, as well as other countries (Levy 2009).

By the mid-1970s, San Francisco had become, in comparison with the rest of the country, a liberated zone for lesbians and gay men, with the largest number and widest variety of organizations and institutions (Graves and Watson 2016:185). This growing community provided economic opportunity for owners of gay-oriented businesses, such as bathhouses, bars, media, and restaurants. During this period, the Gay Rights Movement and their allies campaigned to raise understanding of gay men and lesbians among medical doctors and mental health professionals. Challenges from homophile activists and their sympathizers led to the 1968 reclassification of homosexuality by the American Psychiatric Association to rank it with other "nonpsychotic mental disorders." That year, San Francisco hosted the annual meeting of the American Medical Association, which included a speech given by Charles Socarides, author of *The Overt Homosexual* (Graves and Watson 2016:187).

The AIDS epidemic is among the most significant events to shape the LGBTQ community. San Francisco, New York, and Los Angeles were the first American cities to face the AIDS crisis in 1981. A pathologist at the University of California, San Francisco (UCSF) identified the first diagnosis of Kaposi's Sarcoma in April 1981. Two months later the Center for Disease Control released a report on the disease. UCSF was also at the forefront of treating the disease, opening a specialty clinic in August 1981, which attracted patients from across Northern California. In 1982, the Kaposi's Sarcoma Research and Education Foundation (later renamed the San Francisco AIDS Foundation) formed to mobilize the gay community to address the threat and pressure the government for funding to support treatment and cure research. In 1984, the Center for Disease Control and Prevention reported that of nine cities surveyed, only San Francisco had the needed partnerships between community AIDS organizations and public health officials to develop effective prevention programs (Graves and Watson 2016:292-294).

In his book *Impure Science: AIDS, Activism and the Politics of Knowledge*, sociologist Stephen Epstein describes AIDS activism as "the first social movement in the United States to accomplish the large-scale conversion of disease victims into activist-experts" (Graves and Watson:301). In San Francisco, direct action protests and civil disobedience included an AIDS Candlelight March from the Castro District to San Francisco Civic Center on May 2, 1983, which was the first public demonstration organized by people with AIDS and became an annual, international vigil of protest and commemoration (Graves and Watson:301-302). Several protesters with ARC (AIDS Related Complex) and AIDS, in what has been described as the first use of civil disobedience against the AIDS epidemic anywhere in the world, chained themselves to the doors of the federal building housing the regional office of Health and Human Services at 50 UN Plaza on October 27, 1985. The protesters demanded national attention and funding from the U.S. government for research, care, and social services via a 10-year, 24-hour vigil. The vigil ended in 1995 when the encampment was damaged by a storm, just as effective antiretroviral treatments were becoming available (Graves and Watson 2016:303).

4.2.5 Protesting War and Celebrating Peace: World War I, World War II, Cold War, and Vietnam

World War I Protests and Celebrations, 1914–1918

The decades leading up to World War I had seen the emergence of the union movement. Organizations like the Socialist Party and the Industrial Workers of the World gained national prominence in America with their ideas of building a democratic worker-run society not tied to the interests of capital or business. Many movements for social change were framed in terms of labor, and agitation against Europe's Great War was no exception (Kindig 2008a).

World War I was a conflict between European powers over boundaries, borders, and spheres of influence in colonized continents. It emerged just as the United States entered a deep economic recession in 1914 and seemed to provide a way for American capital to solve the economic crisis by expanding into foreign markets and competing for its own sphere of political and economic influence. For some, the prospect of American entry into the conflict meant jobs in war industries like shipbuilding, lumber, and shipping. For others it meant conscription into a brutal overseas war and a curtailing of democratic freedoms at home, which led to public protest (Kindig 2008a).

Leading up to 1917 and the United States' declaration of war against Germany, the United States government sponsored massive propaganda campaigns—the best-known being the Creel Commission—to convince the public that war was both right and inevitable. The government also took steps to repress antiwar activity once war was declared in 1917 by passing the Espionage Act, which made any "disloyal" statements illegal. Thousands of anti-war activists were prosecuted on authority of this Act and the Sedition Act of 1918. The Espionage Act was used to round up not just antiwar speakers, but to control growing labor radicalism. Across the country, hundreds of Industrial Workers of the World members, socialists, and radicals were put on trial or imprisoned (Kindig 2008a). Conscientious objectors who refused to drill or carry out any noncombatant service were sentenced to prison at Alcatraz Island in San Francisco, or Fort Leavenworth U.S. Disciplinary Barracks in Kansas (Yoder n.d.).

Public celebrations associated with World War I include public gatherings held in major cities throughout the United States on Armistice Day, November 11, 1918.

World War II Protests and Celebrations, 1930–1945

While the World War II-era in America is most frequently remembered for mass participation of soldiers and public displays of support, this period was not without public displays of dissent. Opposition to World War II was most prevalent before the war started. During the 1930s, a nationwide student movement developed that, at its peak, involved hundreds of thousands of students. Participants identified with the American labor movement and its links to the radical organizations of the World War I decade. The movement attracted a coalition of liberals, pacifists, communists, and socialists—students who sought to identify with the mass labor struggles of the decade, oppose racial discrimination in the U.S. and fascism abroad, and advocate for domestic relief programs. The largest student demonstrations of the period were explicitly anti-war and anti-fascist, and aimed at avoiding another world war (Kindig 2008b).

After the United States declared war on Japan on December 8, 1941, and Germany on December 11, 1941, domestic sentiment was predominately positive, with industry throughout the country re-tooling to support the war effort. The San Francisco Bay Area's major contribution to victory during World War II was shipbuilding. Men and women working in Bay Area shipyards, such as Kaiser's Richmond Shipyard Number Three, built 1,400 vessels—a ship a day, on average. Mare Island Naval Shipyard provided well-established repair and shipbuilding facilities. The converted Richmond Ford Motor Company Assembly Plant prepared tanks for shipment overseas to the Pacific Theater, and the Benicia Arsenal manufactured munitions. In addition to industry, the Presidio of San Francisco hosted military personnel, and batteries along the San Francisco and Marin County coasts formed the Harbor Defenses of San Francisco (Martini 2004).

Three months after the attack on Pearl Harbor, President Franklin Roosevelt issued Executive Order 9066, ordering the relocation of Japanese Americans living in coastal areas, who were at the time considered a security risk. In San Francisco, Civilian Exclusion Order No. 20 required 660 people living in the area bounded by Sutter and California Streets and Presidio and Van Ness Avenues to report to the Japanese American Citizens League at 2031 Bush Street for registration, and then, on April 29, 1942, for removal to internment camps. Approximately 8,000 Japanese Americans were detained in converted horse stables and makeshift barracks between April and October 1942, then transported to permanent internment camps inland. In all, nearly 100,000 Californians of Japanese descent were removed from their homes and livelihoods for incarceration during the war until 1945. Dissent during this period included their protest (Martini 2004).

In 1944, drafting of interned Japanese American citizens for the war effort began by executive order of President Roosevelt. While many of the interned welcomed the opportunity as a way to prove their loyalty and patriotism, others did not. Japanese Americans protested both the order and their incarceration at the Heart Mountain camp in Wyoming. One out of every nine men drafted in the camp refused to report for induction (Kindig 2008b).

Victory in Europe Day, May 8, 1945, was the public holiday celebrated to mark the formal acceptance by the Allies of World War II of Nazi Germany’s unconditional surrender of its armed forces, ending World War II in Europe. Massive public celebrations took place in major cities throughout the country. Victory in Japan Day (also knowns as Victory in the Pacific Day), was announced on August 14, 1945, but officially commemorated on September 2, 1945, when the official surrender ceremony was performed in Tokyo Bay, Japan (Kamiya 2015).

Cold War and Vietnam War Protests, 1954–1975

By the end of World War II, the U.S. and the Soviet Union emerged as the two world superpowers, battling for military, political, and economic dominance. This Cold War instigated a massive nuclear arms race, espionage, proxy wars, and a huge propaganda campaign. Anti-Soviet hysteria in the U.S. led to the repression of the entire political left, as communists, pacifists, socialists, and liberals were all accused of harboring "anti-American" ideas (Kindig 2008c).

At the height of the Cold War, approximately 50,000 women brought together by Women Strike for Peace marched in 60 cities to demonstrate against nuclear weapons on November 1, 1961 (Jewish Women's Archive 1961). A year later, the most dangerous confrontation during this period—the Cuban Missile Crisis—occurred in October 1962. It is recognized as the incident when the United States and Soviet Union superpowers came closest to nuclear war (U.S. Department of State Office of the Historian 2013). That event spurred world-wide protest by Women Strike for Peace supporters; other organizations, such as the Campaign for Nuclear Disarmament, marched in protest as well (Taylor 2012).

Meanwhile, the Vietnam War (1954–1975) pitted the communist government of North Vietnam and its allies in South Vietnam (known as the Viet Cong) against the government of South Vietnam and the United States, its chief ally in the conflict (Spector 2016). The Vietnam War was the longest war in U.S. history and the most unpopular war of the twentieth century. It sparked a mass antiwar movement employing the civil disobedience tactics and grassroots mobilizations of the civil rights struggles. The early movement was also spurred by networks of student protest already formed during the Berkeley Free Speech Movement in 1964 and the founding of Students for a Democratic Society in 1960. Though sailors and soldiers following World War II had protested U.S. aid to the French colonization project in Vietnam, and liberal anti-nuclear groups had begun discussing the conflict in the early 1960s, it was not until President Johnson's switch in 1965 from a proxy war to a full-scale air and ground war that the large organized protest to the war emerged (Kindig 2008c).

The antiwar movement developed rapidly among student groups and by 1969, hundreds of thousands of people were demonstrating against the war. The following year, hundreds of campuses across the country went on strike in protest of Nixon's escalation of the war into Cambodia. Inside all branches of the military, soldiers began refusing orders, printing underground antiwar newspapers, and organizing small-scale mutinies, which crippled the military's ability to function (Kindig 2008c).

When then United States evacuated Saigon on April 29, 1975, and formally ended its participation in the Vietnam War on April 30, 1975, without victory, homecomings for soldiers returning to America did not include the kind of public celebrations that accompanied the conclusions of prior wars.

4.2.6 Urban Renewal and Revitalization through Landscape Design and Urban Planning in the United States and San Francisco, 1945–1980

Urban renewal and revitalization through landscape design and urban planning is a historical theme associated with American cities from 1945 through 1980. In *Landscapes in History*, written by scholars Philip Pregill (Associate Professor in the Department of Landscape Architecture, California State Polytechnic University in Pomona) and Nancy Volkman (Associate Professor of Landscape Architecture, Texas A&M University), the role of these disciplines as crucial influence on the urban

environment are explored. The beginning of the Depression in 1929 to the end of World War II in 1945 created a "significant break in the design continuum of the early twentieth century" (Pregill and Volkman 1999:702). In the United States, that break allowed a new generation of designers to experiment with responses to the social, economic, and environmental issues that resulted from the upheavals of the Depression and the war. In particular, there were four major differences that affected the natural and built environment at all scales during the post-war period: changes in the means of financing investment in development, increase in number and type of regulations affecting planning, changes in demographics and lifestyle, and the impact of modernism (Pregill and Volkman 1999:702).

Economic revival following World War II caused a rebirth of interest in improvement of cities by some after nearly two decades in which private buildings and public infrastructure had decayed due to lack of funding. Post-war planning addressed four major issues: so-called urban blight, accommodating the automobile in the city, flight to the suburbs, and integrating government-sponsored urban planning and social welfare programs into a private-enterprise-driven economy (Pregill and Volkman 1999:704).

The first significant post-war urban legislation was the Housing Act of 1949 and much of America's urban renewal and revitalization initiatives during this period focus on "slum removal" and affordable housing development. The Highway Act of 1956, which created the National System of Interstate and Defense Highways, also had a significant impact on America's post-war development. The interstate road system was designed to link major cities and most state capitals, reducing time over traditional long-distance routes and, in urban areas, carrying a higher volume of traffic during congested, peak commuting hours (Pregill and Volkman 1999:695). The urban revitalization trend in late-twentieth century American cities had a negative effect on older, poorer, minority-occupied areas for two reasons. First, many planners viewed highway development as a federally funded method to renew run-down areas under the guise of "progress." Thus, older neighborhoods were often the first targeted as highway right-of-way. Secondly, these roads were planned based on "objective" criteria of traffic capacity, cost, and scientific safety standards by federal and state level engineers. Plans did not account for local goals other than those associated with prime travel destinations, nor was there serious examination of the social consequences of right-of-way location or other unintended consequences such as safety, pollution, or public health. Lack of comprehensive planning resulted in destruction of urban neighborhoods and the historic fabric of small towns, occupation of waterfronts by highways, and unnatural segmentation of cities into zones unrelated to function (Pregill and Volkman 1999:696).

"Highway departments and engineers often did look to landscape architects for help with highways—to 'beautify' them after construction" (Pregill and Volkman 1999:697), and the Highway Beautification Act of 1965 provided guidelines for billboard construction and roadside planting. However, the landscape design community sought a broader role in transportation infrastructure planning. In 1964, *The View from the Road* proposed a more comprehensive approach to roadway design that invented a notation system to evaluate urban landscapes viewed at a high speed and suggested that landscapes have meaning that is communicated to the driver—and that these meanings influence both highway safety and sense of place (Pregill and Volkman 1999:699).

"The failure of government-sponsored urban planning, the insensitive severity of Modernist planning and architecture, pent-up demands for racial equity, and the maturing of liberal-minded baby boomers were all forces that led to greater social responsiveness in the design professions beginning in the 1960s" (Pregill and Volkman 1999:710). In 1966 the Demonstration Cities and

Metropolitan Development Act established the Model Cities Program, which mandated citizen input into planning decisions and required neighborhood preservation rather than demolition be part of urban improvement (Pregill and Volkman 1999:706). "Citizen Involvement in the planning and design process, although resisted by some designers, proved to be a boon to others who pursued it as a specialty" (Pregill and Volkman 1999:710-711).

City beautification through urban design in the last half of the twentieth century focused on development of specific sites or areas within the city. Four specific site types were especially important during this era: the mixed-use center, the downtown mall, the plaza, and the redeveloped waterfront (Pregill and Volkman 1999:721). Designers looked to the creation of these spaces as key devices for bolstering urban economic and social activity.

In most cities, the task of coordinating urban renewal fell to newly created local redevelopment agencies. In San Francisco, Justin Herman directed the San Francisco Redevelopment Agency during a particularly active period from 1959 until 1971. As with other city redevelopment agencies throughout the country, the SFRA leveraged federal funding and new powers to acquire land through eminent domain to facilitate redevelopment by razing large sections of San Francisco. At the time, this large-scale clearance was considered a necessary technique by some, which provided an environment for the redeveloped area that would prevent it from returning to its former blighted condition. However, this method displaced thousands of residents and businesses, proving especially disruptive to San Francisco's low-income, black, and Asian communities (Brown 2010b:41).

San Francisco's first master plan, completed in 1946, identified four areas of blight: Western Addition, South of Market, the Mission District, and Chinatown. In addition to several smaller efforts, the SFRA undertook five major projects from 1948 through 1970. These projects included Western Addition A-1, Diamond Heights, Golden Gateway, and Yerba Buena Center.

Western Addition A-1 focused on areas west of Civic Center and featured projects such as the Geary Avenue expressway, Japan Center, St. Mary's Cathedral, and at least eight multi-family residential complexes. The first residential complex, St. Francis Square, was completed in 1961 and included landscape design by Lawrence Halprin (Brown 2010b:42-43).

Diamond Heights was envisioned as a new residential subdivision featuring a variety of housing types (single- and multi-family houses, rental apartments, and condominiums), shopping center, churches, playgrounds, schools, and a firehouse. Located near Twin Peaks and Glen Canyon, at 325 acres, Diamond Heights was SFRA's largest project in terms of site size. The Diamond Heights project was unique for a redevelopment area during this period in that the land was largely vacant, but qualified for redevelopment funding because the area's streets and lots, as originally platted, could not accommodate greater density without alteration (Brown 2010b:44-45).

The Golden Gateway added approximately 2.8 million square feet of office space to downtown San Francisco alongside the financial district and the waterfront. An advisory council, including Mario Ciampi, judged the 1959 site design competition. The project, designed by Wurster, Bernardi and Emmons, and DeMars and Reay, placed residential and office towers among parks and plazas, separated pedestrian and vehicle traffic through elevated footbridges, and featured towers stacked atop two-story podiums composed of garage and commercial space. The southern-most portion of this project included Embarcadero Center, adjacent to the Embarcadero Freeway and Embarcadero Plaza (aka Justin Herman Plaza). This five-block commercial project was the largest office development in San Francisco history, featuring a shopping mall on the three lower levels and

placement of numerous public art pieces (Brown 2010b:46-47). The Embarcadero Center Master Plan, an 8.5-acre component of the 51-acre Golden Gateway redevelopment project, was designed by Lawrence Halprin and Associates (1969–1974). The plan featured common design elements of Modern redevelopment-era San Francisco commercial and corporate design landscapes, including lighting features, benches and seating areas, grassy areas, signage, tress, walkways, and pedestrian circulation, planters, fountains, and sculpture (Brown 2010b:148, 150, 153).

Yerba Buena Center redevelopment area included what is now the Moscone Center and surrounding areas south of Market Street. The first Yerba Buena Master Plan (1969) was developed by a team that included architects Kenzo Tange, John Savage Bolles and Gerald McCue, with landscape architect, Lawrence Halprin. Their concept proposed an exhibition hall, sports arena, hotel, theater, parking, airline terminal, landscaped plazas, and commercial space, but delays in implementation resulted in redesign with a second master plan in 1981 by Olympia and York (Shibley et al. 1999:4). The project, completed in 1989, eventually included several museums, arts and recreation facilities, a public plaza and low-income housing (Brown 2010b:48-49).

By the 1960s, local opposition to the devastation wrought by urban renewal to existing residents and historic fabric echoed nationwide. Through the 1970s, projects across the county and in San Francisco began shifting focus to reuse and rehabilitation rather than full-scale neighborhood clearance (Brown 2010b:41-42). Lawrence Halprin received national attention for master planning an early San Francisco example—Ghirardelli Square complex near Fisherman's wharf (1962–1965)—which successfully adapted an industrial complex for commercial use (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1975:7; Brown 2010b:1949). In addition to pioneering the adaptive reuse concept, the project also leveraged landscape design for urban revitalization through design of fountains, lighting, planting, and outdoor performance spaces (Brown 2010b:149).

4.2.7 Market Street Redevelopment Plan: A Collaboration of Modern Design Masters

The three designers associated with the Market Street Redevelopment Plan in San Francisco—architects Mario Ciampi and John Carl Warnecke, and landscape architect Lawrence Halprin—developed their expertise as master architects during the period of renewal and revitalization from 1945 through 1980 and within the context of increasing collaboration among design disciplines. They expressed their thought-leadership in the environmental design community by applying approaches to urban placemaking that modeled pedestrian-oriented design, harmonized Modern design within historic settings, developed public spaces for positive economic and social impact, and employed collaborative design processes.

While approaches employed to achieve these goals have since evolved, particularly in terms of pedestrian-oriented design and historic preservation best practices, during the period of urban renewal and revitalization when these designers collaborated as joint venture partners, their response to the design challenge of Market Street's redevelopment was innovative. Their approaches countered typical contemporary modernist practices, which prioritized the automobile and sacrificed large-scale historic settings for new development without leveraging public spaces as assets for economic and social impact. The joint venture collaboration of these masters was an innovation as an early application of an interdisciplinary approach to design, bringing together masters in architecture and landscape architecture. Their effort helped elevate the influence of

landscape architecture as a discipline that provides perspective on modern urban planning and illustrated the viability of prioritizing sensitivity to the human experience and the existing built environment, despite the demolition of some existing buildings, as part of the urban redevelopment process.

While each of the three designers may not be considered a master in all of the areas of thought leadership listed (pedestrian-oriented design, harmonization of Modern design within historic settings, development of public spaces for positive economic and social impact), engagement in the collaborative design process as joint venture partners provided an opportunity for each individual to leverage his strengths. The combined effect of the strengths and experiences of the three design masters contributed to the development of the Market Street Redevelopment Plan as a project that applied approaches to urban placemaking that modeled pedestrian-oriented design, harmonized Modern design within historic settings, developed public spaces for positive economic and social impact, and employed collaborative design processes.

John Carl Warnecke (1919–2010)

John Carl Warnecke was born and raised in Oakland, California. The son of a prominent San Francisco Architect, Carl I. Warnecke, he earned a bachelor's degree from Stanford University in 1941. While studying there, he met future U.S. President John F. Kennedy, and was a member of the 1940 Rose Bowl-winning Stanford Indians football team. During this time, he suffered an injury that would keep him from serving in World War II (Brown 2010b:251).

Warnecke was an early participant in the group, Telesis, which first formed in 1940 to foster collaboration among landscape architects, planners, and architects in the San Francisco Bay Area, and to stage an exhibition highlighting three main concepts that later guided local planning efforts: urban renewal in "slum" areas, preserving an urban greenbelt, and collaborative planning at the regional level. Telesis has been recognized by the American Planning Association as the first volunteer-based group to bring multiple fields together to work toward environmental development on a regional basis (Brown 2010b:142-143) and involvement with this group likely influenced Warnecke's approach to planning and interdisciplinary collaboration.

As a graduate student in the Master of Architecture program at Harvard University, Cambridge, Massachusetts, Warnecke studied with Walter Gropius, a German architect credited with founding the Bauhaus School and being among the pioneering masters of Modern architecture. Warnecke completed the 3-year program in 1 year, earning his degree in 1942 (Grimes 2010).

Upon completing graduate school, Warnecke worked as a building inspector in Richmond, California, and later worked as a draftsman in his father's firm. He was inspired by the progressive approaches of Second Bay Tradition architects such as William Wurster and Bernard Maybeck (Brown 2010b:251).

In 1950, Warnecke founded his own firm John Carl Warnecke and Associates in San Francisco. He built his practice as "an architect whose modernist approach was tempered by a sensitivity for history and the environment" (Brown 2010a). His firm grew to be one of the country's largest during the 1960s. In addition to his San Francisco location, the firm also had an office in New York City. The firm worked on projects throughout the country on a wide variety of project types—skyscrapers, airports, libraries, civic complexes, and shopping centers, among others. San Francisco projects include the Hilton Hotel Tower (1971) and the Federal Building at 450 Golden Gate Avenue (1959). Notable projects that touched on planning, landscape design, and contextualization

challenges included the United States Naval Academy master plan and several buildings in Annapolis, Maryland (1965); the John F. Kennedy Eternal Flame memorial gravesite at Arlington National Cemetery (1967); and the Hawaii State Capitol building in Honolulu, Hawaii (1969).

Warnecke's prominence as an early proponent of contextualizing designs to adapt to their surroundings was solidified by work on Lafayette Square in Washington, D.C. His role as designer of the project, which included integrating new designs for the Howard T. Markey National Courts Building (1967) and the New Executive Office Building (1969), arose through participation in the advocacy campaign, supported by First Lady Jaqueline Kennedy, that sought to prevent the U.S. General Services Administration from razing historic townhouses lining Lafayette Square to replace them with federal office buildings. Critics argued that the changes would destroy the character of the square. Warnecke's proposal included renovation of the rowhouses and construction of office buildings behind them. "The plan was ultimately hailed as an elegant solution to the problem of historic preservation in an age of rapid urban renewal" (Brown 2010a).

Mario Joseph Ciampi (1907–2006)

Mario Joseph Ciampi was born in San Francisco to Italian immigrants—his mother, a seamstress for Levi Strauss, and his father, in the business of architectural stone—and grew up living on Twin Peaks. During the 1920s, Ciampi began drafting as an apprentice for architect Alexander Cantin and attended classes at the San Francisco Architectural Club. He applied for a scholarship to attend Harvard and was admitted to the graduate program even though he had no college degree. In 1932, Ciampi graduated from Harvard University and then received a scholarship for additional study at the Ecole des Beaux-Arts, Paris (Weinstein 2005).

Ciampi worked for Dodge A. Reidy Architects before founding his own firm, Mario Ciampi and Associates, in 1945 (Brown 2010b:209; Weinstein 2005). Ciampi first gained professional prominence by designing schools, commercial buildings, and churches in San Francisco Bay Area. Projects in the city of San Francisco included Lawton Elementary School (1940), Storefront of 4463 Mission Street (1948), Crest Auto Parts at 5050 Mission Street (1948), Storefront at 4680-4690 Mission Street (1949), California Flower Market (1956), and the Corpus Christi Catholic Church (1953). Other local projects included a collaboration on the Westmoor High School (1956) in Daly City with Market Street Redevelopment Plan joint venture partner, Lawrence Halprin (Brown 2010b:209).

Ciampi's focus later shifted to urban planning. He was involved in a number of significant planning projects including a master plan for San Mateo County's Jefferson High School District, St. Mary's College in Moraga, and the University of Alaska in Fairbanks (Lowell 2011). In this role of urban planner, Ciampi left a significant imprint on the San Francisco Bay Area, leading projects that employed a focus on developing public spaces for positive economic and social impact. He served as the consultant in charge of the City's 1965 draft San Francisco Downtown Plan (Brown 2010b:209). He also consulted on projects including Golden Gateway Redevelopment Project (1969–1974), Embarcadero Plaza (later named Justin Herman Plaza) (1972), Fisherman's Wharf, and Yerba Buena Center (1969).

During the urban renewal and roadway expansion era, Ciampi conducted a freeway study for San Francisco with the California Department of Transportation. He also designed a series of overpasses and interchanges along Interstate 280 in California in 1965. "After public protest compelled state highway engineers to seek outside help for aesthetics, Ciampi's streamlined concrete structures…[and] transformed a crude preliminary scheme into one of the most gracious freeways

in the world" (Temko 1991). Ciampi's innovative approach to the design of road infrastructure appealed to the public and earned him the respect of his professional community. He was awarded an American Institute of Architects Honor Award for the Junipero Serra overpass for Highway 280 on the San Francisco Peninsula (Lowell 2011).

Lawrence Halprin (1916–2009)

Born in New York City, Lawrence Halprin earned a B.S. degree in Plant Sciences from Cornell University in 1939 and continued his studies at University of Wisconsin where he earned an M.S. degree in Horticulture. As a student, Halprin met his wife, Anna, whose work as an avant-garde dancer and choreographer would have inspirational influence on his design philosophies including focus on participatory environmental experience (Hirsch 2014:1-2). As a graduate student, Halprin visited Taliesin, the home of master architect, Frank Lloyd Wright. This experience inspired his interest in design and motivated his enrollment at Harvard University Graduate School of Design where he earned a Bachelor of Landscape Architecture degree in 1944 (Brown 2010b:270). Like Warnecke, Halprin studied under Walter Gropius at Harvard, as well as Marcel Breuer, who is also recognized as a master of Modernist architecture (Brown 2010b:760), During World War II, Halprin served in the U.S. Navy and was assigned to the USS Morris. When his ship was destroyed, Halprin was given leave in San Francisco, where he remained (Brown 2010b:270).

Halprin's design career in the San Francisco Bay Area began with a focus on residential garden design. From 1945 through 1949, Halprin worked with master landscape architect, Thomas Church (Brown 2010b:144-145). Collaboration included work on the Dewey Donnell Garden in Sonoma County (Brown 2010b:271), as well as Parkmerced (Brown 2010b:147-148).

In 1949, Halprin opened his own firm, Lawrence Halprin & Associates Landscape Architects. He escalated to designing large-scale planned residential complexes, such as the San Francisco project, St. Francis Square (1961) (Brown 2010b:147-148), but is best known for creating the master plan for Sea Ranch (1962–1967) near Gualala, California. The iconic complex of condominiums and single-family houses at Sea Ranch is sited in a bucolic coast area of Sonoma County and is considered a master work of the Third Bay Tradition design. For this project, Halprin collaborated with prominent architects of the period, including Joseph Esherick, William Turnbull, Jr., Charles Moore, Donlyn Lyndon, Richard Whitaker, as well as a large multi-disciplinary team including geologists, landscape architects, naturalists, native plant specialists and other disciplines. Lawrence Halprin created the landscape and development plan, which clustered buildings to optimize the opportunities and constraints of the rugged coastal context and provided large areas of community open space (Brown 2010b:133).

From the late 1930s into the 1950s, a growing collaboration between architects and landscape architects resulted in a new synthesis of buildings and landscapes (Brown 2010b:139-140). While residential landscape design formed the foundation of most landscape architects' practices before the 1940s, landscape architects in the post-World War II era increasingly expanded their practice to include master planning, campus planning, site planning, and regional planning (Brown 2010b:141). Through the work of his firm, Halprin reasserted the landscape architect's role as distinct from planners or architects in regenerating the American city by making vital social and pedestrian spaces out of formerly marginal sites such as historic industrial complexes or the spaces over or under freeways. "In doing so, they re-imagined a public realm for American cities that had been cleared by federal urban renewal programs and abandoned for new suburban developments" (Meyer 2008). Halprin's leadership included collaboration with Livingston and Blayney and George

Thomas Rockrise on the 1962 *What to do about Market Street* planning proposal (Brown 2010b:247) and subsequent collaboration with Mario J. Ciampi and John Carl Warneke on the Market Street Redevelopment Plan.

Landscape designers helped play an important role in shaping the form, spatial configuration, and uses of corporate plazas, landscapes, and public spaces during the Modern period. In addition to his work associated with Market Street and associated plazas, the evolution of Halprin's career included commercial and corporate designed landscapes like the rooftop garden at the Fairmont Hotel (1961), Bank of America plaza (1967), the Yerba Buena Gardens Master Plan (1969), and Embarcadero Center Master Plan (including plazas and shopping center courtyards)(1969–1974), and design of the plaza at One Embarcadero Center (1967) (Brown 2010b:135, 138, 148-150).

Halprin is also recognized a pioneer of adaptive reuse design for his work on master planning for the Ghirardelli Square project (1962–1965), which transformed an industrial complex into public plaza and shopping center in the San Francisco Fisherman's Wharf area (completed 1968, included on the National Register of Historic Places in 1982) (Brown 2010b:149). In his book, *Cities*, Halprin wrote:

> We need, in cities, buildings of different ages, reflecting the taste and culture of different periods, reminding us of our past as well as our future. Some buildings are beautiful or striking enough to have their useful periods artificially extended by preservation—almost like seed trees in a forest—so that succeeding generations can enjoy them, and through them maintain a sense of continuity with the past. Old buildings and old sections of cities establish a character, a flavor of their own, which often becomes the most interesting and provocative part of a city. Part of this is due to scale, since each age develops its own sense of scale and relationship of parts (Halprin 1963:216-217).

Halprin's work is marked by his attention to human scale, user experience, and social impact of his designs. He is credited for developing innovative design development processes such as "motation," and "RSVP Cycles." Motation offered an alternative to traditional devices for creating form such as plans and elevations. Motation used movement as a starting point to generate form (Hirsch 2014:11-13). Similarly, RSVP Cycles is a collaborative approach meant to guide the development of formal design and participatory process. It included the components of resources (pre-existing site conditions and the act of inventorying them), scores (temporal-situational guidelines that structure unfolding performance), valuaction (a term Halprin coined for the critical feedback process that leads to consistent revision of the scores), and performance (acting out of the scores) (Hirsch 2014:4-5).

As such, Halprin's projects are memorable for their striking forms and sequences that evoke multiple associations and recall varied references. The signature vocabulary that characterizes his work, particularly water features, includes a fractured urban ground terraced to choreograph the movement of bodies of water rendered in poured-in-place concrete that simultaneously evoke monumental geological forms and dynamic ecological processes (Meyer 2008). Many of his projects reflect these ideals, including those in and beyond the San Francisco Bay area.

Nicollet Mall (1962–1967), a 12-block pedestrian street and transit mall in the shopping and dining district of Minneapolis, was designed as the first transit mall in the U.S. and was created to help downtown retail compete with shopping in the suburbs. Like Market Street, Nicollet Avenue was historically Minneapolis's "parade street." For both of these projects, Halprin was given the chance to enhance the quality of civic rituals as collective participatory events (Hirsch 2014:84). Although it was redesigned in 1990, Nicollet Mall is recognized as being the inspiration for similar projects by Halprin in Portland, Oregon, and Denver, Colorado (Hirsch 2014:90, 98).

Four of Portland's public spaces were designed by Halprin: The National Register-listed Portland Open Space Sequence consisting of a multi-block sequence of public fountains and outdoor rooms, featuring the Ira Keller Fountain, Lovejoy Fountain, Pettigrove Park, Auditorium Forecourt, and associated features. Halprin also designed Portland's Transit Mall (1965–1978),a pair of one-way streets with exclusive bus lanes and widened landscaped sidewalks, which was redesigned in 2009 (Biggs n.d.). Skyline Park (1975), a 1-acre linear park and plaza in Denver, Colorado, was redesigned in 2003. Freeway Park in Seattle, Washington, is noted for its innovative approach to reclaiming an interstate right-of-way for park space (1976). The Downtown Mall in Charlottesville, Virginia, is a pedestrian-only zone contextualized along the city's historic Main Street (1976). His work also includes Heritage Park Plaza (1980) in Fort Worth, Texas, which is listed on the National Register of Historic Places, and the Franklin Delano Roosevelt Memorial in Washington, D.C. (1997), which contextualizes a modern design aesthetic within the Victorian Gothic Revival, and neo-Classical styles of surrounding monuments of the National Mall.

As a leader in his field, Halprin served on national commissions, including the White House Council on Natural Beauty and the Advisory Council on Historic Preservation (Meyer 2008). He also earned numerous awards and honors, such as the American Society of Landscape Architects (ASLA) Gold Medal (1978), the Thomas Jefferson Gold Medal in architecture (1979), and a Michelangelo Award (2005) (Brown 2010b:271).

Chapter 5
Description of Market Street Existing Conditions

Market Street is a cultural and designed landscape composed of physical characteristics that change over its length, but retain a common orientation to balancing pedestrian experience with transportation utility. The following description of the built environment is a reflection of former and current uses along the street's geography. This chapter describes existing conditions for the Market Street streetscape, Justin Herman (Embarcadero) Plaza, Hallidie Plaza, UN Plaza, and the small plazas of Market Street (Robert Frost Plaza, Mechanics Plaza, Crocker Plaza, Mark Twain Plaza, and Market Street Plaza). Evaluation of individual eligibility for the three large plazas within the Market Street Redevelopment Plan—Justin Herman Plaza, Hallidie Plaza, and UN Plaza—is provided in Appendix A, DPR 523 Forms. Additional DPR 523 Forms for the AWSS, Path of Gold, and 38 Buildings on Market Street have been prepared and submitted under separate cover.

5.1 Market Street Streetscape

The following summarizes existing conditions for Market Street streetscape in terms of Natural Systems and Features, Spatial Organization, Cluster Arrangement, Circulation, Vegetation, Buildings and Structures, Views and Vistas, Constructed Water Features, and Small-Scale Features.

5.1.1 Natural Systems and Features

Market Street is subject to northwestern prevailing winds, which are channeled by the diagonal street convergences. While the perpendicular alignment of the southern street grid with Market Street results in deep shadow along the south side of the street, the diagonally intersecting street grid north of Market Street offers openings for sunlight to shine more abundantly on the north side of the street (**Image 96**). The orientation of the street also focuses western views to the sunset and San Francisco's fog processes, which emanate from the Pacific Ocean on the city's western most boundary. The topography of dunes, recorded as being located at Mid-Market at a height of approximately 80 feet during the 1850s (JRP 2010:39; Hittell 1878:152; Lotchin 1974; 166), have been removed by leveling, paving, and parcel development.

5.1.2 Spatial Organization

Market Street is a 120-foot-wide boulevard aligned diagonally from east to west. From its eastern terminus at Justin Herman Plaza, Market Street aligns the Ferry Building and the San Francisco Bay with Twin Peaks in the west. The eastern 2 miles of Market Street, roughly from the Bay to the intersection with Valencia Street, have only minor undulations and are generally flat before the land rises to the west. The line of site looking west, however, rises steeply up Twin Peaks, an ascent that Market Street was eventually built to climb on the southeast flank of the hill (**Image 98**).

The street serves as the boundary that joins San Francisco's discordant northern and southern street grids. As the meeting point of San Francisco's offset street grids, Market Street is designed not only as a boulevard for east-west travel, but as the city's main circulation artery. This alignment creates a series of intersections that allow north-south navigation across discordant street grids (**Image 97**).

In addition to the ground plane, Market Street's vertical spatial organization is defined by the wall of buildings on either side of the street. Building and structure types, mostly constructed after the 1906 earthquake and fire, form the façade walls of the streetscape (**Image 99**).

5.1.3 Cluster Arrangement

Pedestrian plazas sited throughout the length of Market Street offer room-like open spaces that encourage pause for pedestrians and represent cluster arrangements along the corridor. These include three large plazas—Justin Herman Plaza at the eastern end of Market Street (1972), Hallidie Plaza between Cyril Magnin Street and the end of the Powell Street cable car line (1973), and UN Plaza between Charles J. Brenham Place and Hyde Street (1975)—as well as five small plazas—Robert Frost Plaza, at the intersections of California, Drumm and Market Streets; Mechanics Plaza, which fronts an office building at 22 Battery Street; Crocker Plaza at One Post Street; Mark Twin Plaza, located between New Montgomery Street and 3rd Street; and Market Street Plaza at Yerba Buena Lane. Detailed descriptions of the large and small plazas are provided below under Sections 5.2 through5.5, with details regarding each plaza's natural systems and features, spatial organization, cluster arrangement, circulation, buildings and structures, views and vistas, constructed water features, and small-scale features. Cluster arrangements also include repeating patterns of street furnishings and signage within the sidewalk space between building facades and the street; placement of street trees planted in single rows or in paired configurations in the sidewalk area (**Images 100, 111-112**); and the repeating pattern of BART/Muni entrance placement along Market Street.

5.1.4 Circulation

Multiple modes of transport are present at multiple levels of elevation—below ground and at grade—and are accessible by pedestrians through the joint BART and Muni entrance portals and bus stops along the street. Entrances to the below ground portals from east to west are: Embarcadero Station, Montgomery Station, Powell Station, Civic Center Station and Van Ness Station (Muni only). These station entrances, which were constructed in phases, were completed by 1982 and offer points of access between levels and include stairways, escalators, and elevators, and facilitate separation of pedestrian, vehicle, and rail traffic. BART and Muni entrance portals are of minimalist design, which reduces the impact of transit presence on the street-level pedestrian experience. In the cases of Hallidie Plaza and UN Plaza transit entrances are incorporated into plaza designs. In the cases of these access points, the entrances are secondary to the intended function of the plazas as a public open spaces.

BART subway trains, Muni underground and surface light rail train cars, Muni high-low platforms in the roadway, cable cars, a ferry at its eastern terminus, pedestrians, overhead electric catenary wires and conventional buses, bicycles, motorcycles, commercial, governmental, and private cars evidence Market Street's role as a transportation hub of San Francisco. The spaces, features, and material finishes of Market Street's landscape comprise varied systems of movement. The buildings lining Market Street orient their users' circulation patterns to sidewalks with a variety of entrances from simple to opulent, side entrances to side streets, and, for many properties on the south side of Market Street, to alley-fronting rear freight access doors. Beyond people and goods, stormwater systems, electrical, gas, and water conveyance infrastructure constitute circulatory systems rendering essential urban services. These services include the AWSS and the Path of Gold Light Standards.

The brick paving laid in a herringbone pattern found in the Market Street sidewalks is also a circulation feature as it functions to visually cue areas for pedestrian circulation. Arrangement of double and single tree allées along broad sidewalks flanking Market Street create pedestrian lanes that further guide pedestrian circulation (**Images 100-101**).

5.1.5 Vegetation

London planetrees (*Plantanus acerifolia*, a variety of Sycamore) dominate the vegetative character of the streetscape. Approximately 600 street trees are arranged in the sidewalk area between the street and building facades. Trees found in double allées or single rows where the sidewalk width narrows are placed in the Market Street Redevelopment Plan configuration. Canary Island Date Palm trees (*phoenix canariensis*), added in 1993, are planted in the median of Market Street west of Valencia Street (**Image 102-103**) (Yee 2010). Other species of street trees are present in private properties adjacent to the public sidewalks and plazas, and, in cases where these trees are potted, occasionally encroach on the Market Street Redevelopment Plan area of the streetscape. Small-scale flower and shrub plantings are rare along the street. Original Market Street Redevelopment Plan planters have been removed and planters that have been placed in the streetscape over time are not uniform in design, placement, or species selection. The majority of tree locations still feature placement of healthy London planetrees. However, the trees in some sections of Market Street are in poor condition. Trees are missing in a few of the designated tree locations (made evident on the streetscape by an empty circular bronze tree grate).

5.1.6 Buildings and Structures

Market Street is composed of a series of built environment districts from the eastern end of Market Street in the Financial District to a mixed commercial and residential district at the western end of the study area terminating at Octavia Boulevard. These districts traverse multiple neighborhoods yet meld into one another and share similar historical and current uses from offices to residences. Predominantly residential structures do not begin until west of Castro Street. As such, buildings heights decrease down the length of the street from the Embarcadero heading to Octavia Boulevard.

Structures within the Market Street Redevelopment Plan include street-level entrances for combined BART and Muni stations at Embarcadero, Montgomery, Powell, and Civic Center, as well as an entrance for the Muni-only Van Ness Station. These entrances were within the sidewalk width on both the north and south sides of Market Street.

Entrance locations (from east to west) on the south side of Market Street are positioned at:

- Spear Street (one entrance to Embarcadero Station, west corner)
- Main Street (one entrance to Embarcadero Station, west corner)
- Mid-block between Beale and Fremont Streets (one entrance to Embarcadero Station)
- Mid-block between 1st and 2nd Streets (one entrance to Montgomery Station)
- 2nd Street (one entrance to Montgomery Station, east corner)
- New Montgomery Street (one entrance to Montgomery Station, west corner)
- 4th Street (one entrance to Powell Station, east corner)
- Mid-block between 4th and 5th Streets (two entrances to Powell Station)

- 5th Street (one entrance to Powell Station, west corner)
- 7th Street (one entrance to Civic Center Station, west corner)
- Mid-block between 7th and 8th Streets (one entrance to Civic Center Station)
- 8th Street (one entrance to Civic Center Station, east and west corner)
- Van Ness Avenue (two entrances to Van Ness Muni Station, east and west corners)

Entrance locations (from east to west) on the north side of Market Street are positioned at:

- Drumm Street (one entrance to Embarcadero Station, east corner)
- Davis Street (one entrance to Embarcadero Station, east corner)
- Front Street (one entrance to Embarcadero Station, east corner)
- Sutter Street (one entrance to Montgomery Station, west corner)
- Corner of Sutter and Sansome Streets (one entrance to Montgomery Station)
- Montgomery Street (one entrance to Montgomery Station, east corners)
- Crocker Plaza at One Post Street (one entrance to Montgomery Station, west corner)
- Mid-block between Grant and Stockton Streets (one entrance to Powell Station)
- Corner of Stockton and Ellis Street (one entrance to Powell Station)
- Ellis Street (one entrances to Powell Station, west corner)
- Hallidie Plaza (one entrance to Powell Station)
- Leavenworth Street (one entrance to Civic Center Station, west corner)
- UN Plaza (one entrance to Civic Center Station)
- Hyde Street (one entrance to Civic Center Station, east and west corner)
- Van Ness Avenue (two entrances to Van Ness Muni Station, east and west corners)

While design details vary slightly among the station entrances, most are low profile, U-shaped portals of minimalist design, which reduced the visual impact of transit presence on the street-level pedestrian experience. The Market Street streetscape features two major styles: bronze railing and stone (**Images 104-106**). The exceptions to these generalities were the station entrances in Hallidie Plaza and UN Plaza, which are more elaborate (see plaza descriptions below).

5.1.7 Views and Vistas

Market Street's alignment with the northern and southern street grids creates diagonal views and triangular plaza spaces on the north side of the street. At UN Plaza, for example, the view northwest is of the formal, Beaux Arts style City Hall and its gilded dome (discussed and illustrated in more detail in the UN Plaza section below).

Meanwhile, the long, wide, straight, and mostly level boulevard permits long vistas to the east and west. Looking east on Market Street, rising building heights create a focal prospect of the Italian Renaissance-Revival style clock tower of the Ferry Building. Cross streets north of Market Street from Mid-Market to Van Ness Avenue frame sunset views and illuminate with sunshine the

otherwise shaded street canyon. The 120-foot width of Market Street, along with wide sidewalks, allows for a broader view of building façades. These pedestrian vantage points appear to have encouraged designers to invest in architectural ornament that continues even to upper stories, particularly those of many pre-World War II buildings.

An almost aerial view of the Market Street landscape, from its broad-swath roadbed, gently undulating allées, and, after dark, rows of illuminated Path of Gold Light Standards, is visible from the Twin Peaks Vista Point and other vantages along the ridge. The view displays Market Street as a focal feature of San Francisco's cityscape.

5.1.8 Constructed Water Features

Although water currently does not flow, Lotta's Fountain (1875), located in the triangle between Kearny and Geary Streets, is a constructed water feature present on Market Street. The 24-foot-tall cast iron fountain is ornately decorated, featuring four lion-head spouts and topped by a pillar with glass globe light fixture. Additional water features include fountains in Justin Herman (Embarcadero) Plaza and UN Plaza. These fountains are discussed in detail in the Justin Herman Plaza and UN Plaza sections that follow.

5.1.9 Small-Scale Features

Market Street's history has left a wide variety of small-scale features that reflect the functional needs and aesthetic concerns in the cultural landscape. These include features from the Market Street Redevelopment Plan design, features retained by the Market Street Redevelopment Plan from earlier periods, and features introduced since the completion of the Market Street Redevelopment Plan-era redevelopment of Market Street.

Market Street Redevelopment Plan-era small-scale features that remain on the landscape in some locations include: street clocks on granite pillars with bronze spheres featuring four-sided clocks (located on corners at the following intersections: Market and O'Farrell Streets; Market, Sutter and Sansome Streets; and Market, California, and Drumm Streets in Robert Frost Plaza); granite bollards joined by bronze chain links (**Image 118**); traffic signage and traffic lights resembling railroad semaphores; and bronze tree grates (**Image 113**).

The Market Street Redevelopment Plan small-scale features that have been removed from the streetscape include: benches with backs featuring bronze-clad supports for 10-foot-long wood slats; square stone benches without backs; 12-foot-high bronze "umbrella" shelters; telephone booths with bronze-cladded paired booths with glass dome roofs; bronze cylindrical trash receptacles; street signs featuring poles topped with square and white street name graphics and circular white directional graphics; light standards featuring 10-foot-high poles and caps of solid bronze with square translucent glass; drinking fountains featuring bronze hemispheres on square granite bases with bronze fixtures; 12-foot-high cylindrical advertising kiosks with bronze roofs; and elevators featuring 6-foot-square cabs with bronze-clad doors, sides, and fascia to convey passengers from street level to underground transit.

Small-scale features introduced after completion of the Market Street Redevelopment Plan include: Muni high-low loading platforms, SFMTA bus shelters installed in 2010 (Roth 2010); bike stands of a variety of styles; bollards in a variety of styles; bike lanes in some portions of the roadway; flower retail structures, newspaper and magazine vending machines; waste receptacles in a variety of

styles; new stainless steel elevator enclosures with matching v-shaped advertising structures; Liberty Bell Slot Machine monument placed in 1984; and 17-foot-tall advertising kiosks installed in 1995 (**Images 107-110, 114-116**) (King 2010).

Small-scale features that were retained by the Market Street Redevelopment Plan project and still remain on the streetscape include AWSS fire hydrants, replica Path of Gold Light Standards, the California Statehood Monument, Samuel's Clock, and Lotta's Fountain (**Images 119-121**).

Image 96. Example of diagonally intersecting street grid north of Market Street, featuring openings for sunlight to reach triangular intersections and plaza areas on the north side of Market Street. (Google Earth 2016)

Image 97. Market Street, 2016, aligned diagonally from east to west, joins San Francisco's discordant northern and southern street grids. (Google Earth 2016)

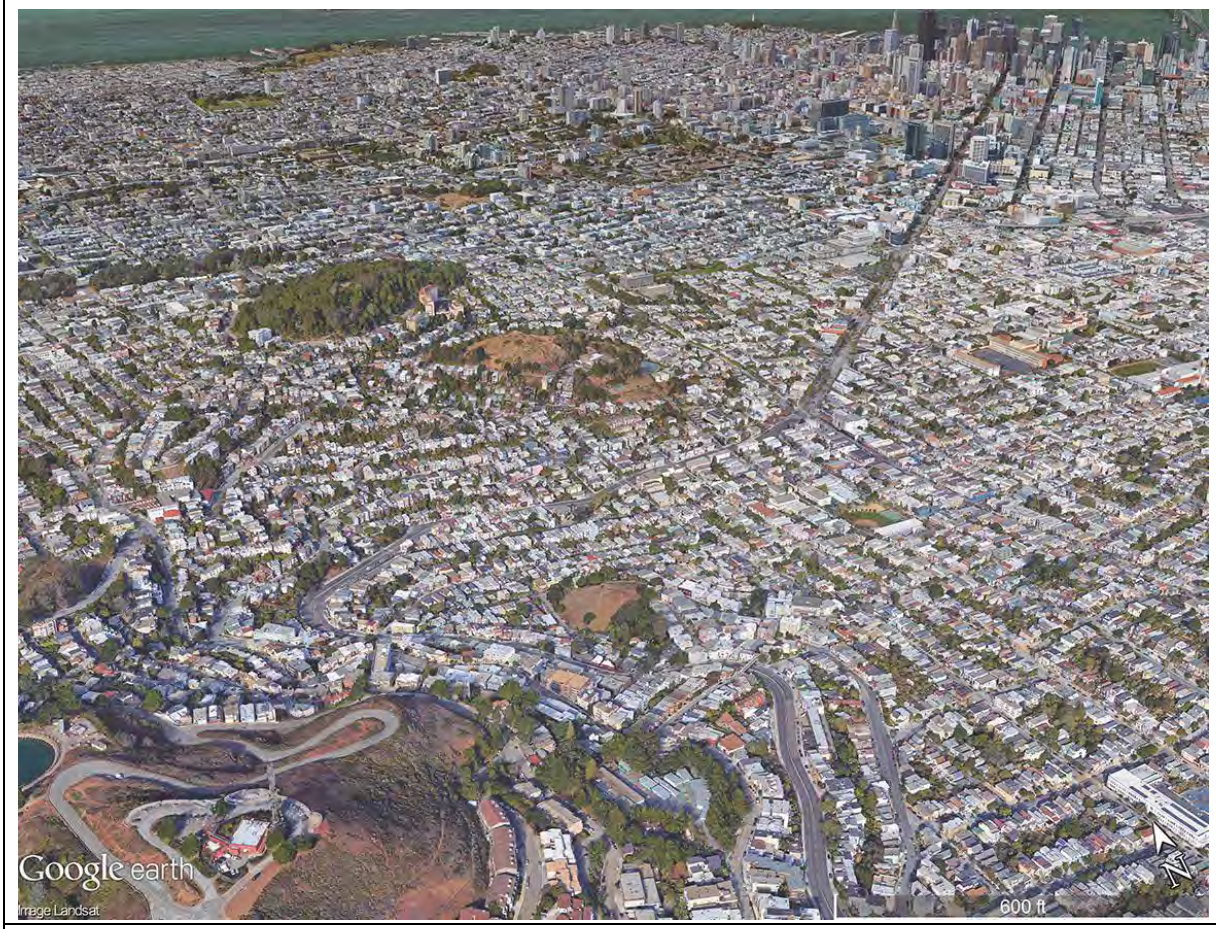

Image 98. Market Street, 2016, is aligned from eastern terminus at the San Francisco Bay (upper right corner) with a line of sight to Twin Peaks in the west (lower left corner). The topography is relatively flat along Market Street before rising steeply at Twin Peaks. (Google Earth 2016)

Image 99. Market Street, 2016, showing how the facades of buildings create a vertical spatial organization with height generally decreasing from east to west. (Google Earth 2016)

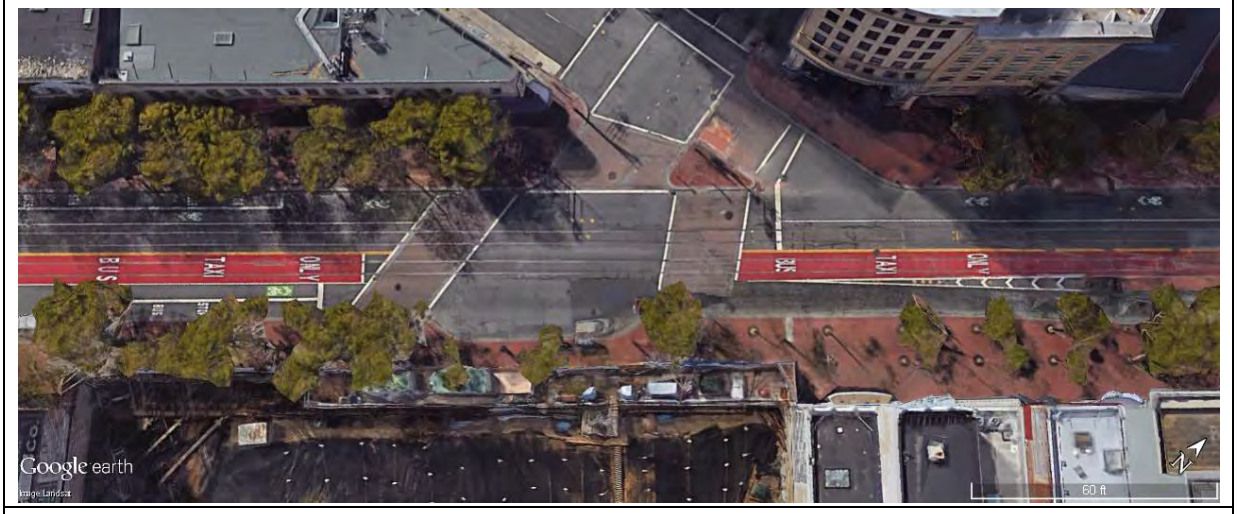

Image 100. Market Street, 2016, showing alignment of double tree rows line at the intersection of Mason and Turk Streets. This image also shows where tree trees are unhealthy (as indicated by lack of canopy) or missing. (Google Earth 2016)

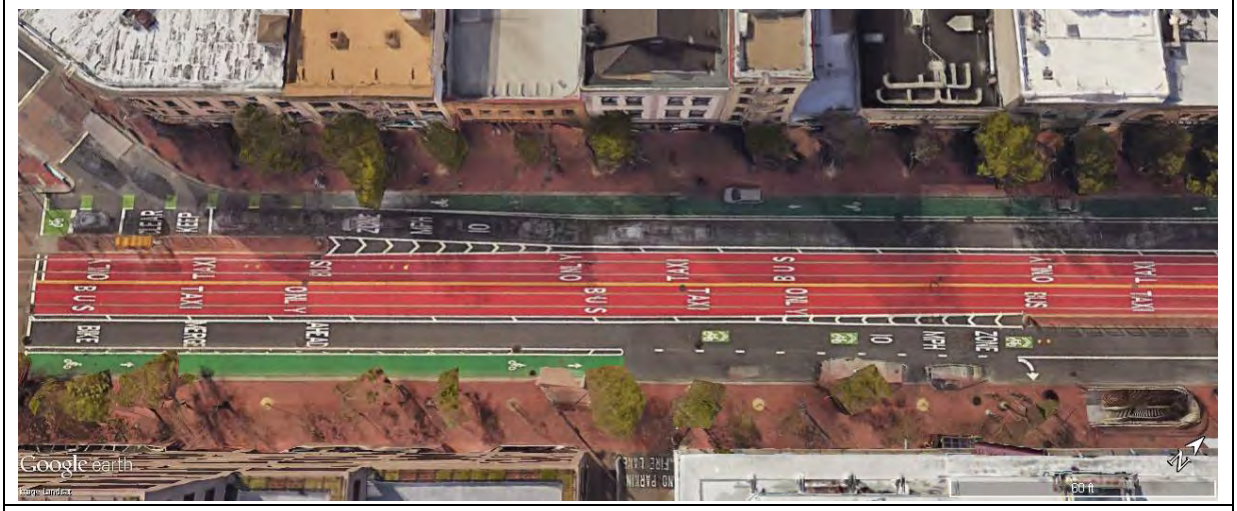

Image 101. Market Street, 2016, showing alignment of single tree rows line west of 8th Street. This image also shows locations where tree trees are unhealthy (as indicated by lack of canopy) or missing. (Google Earth 2016)

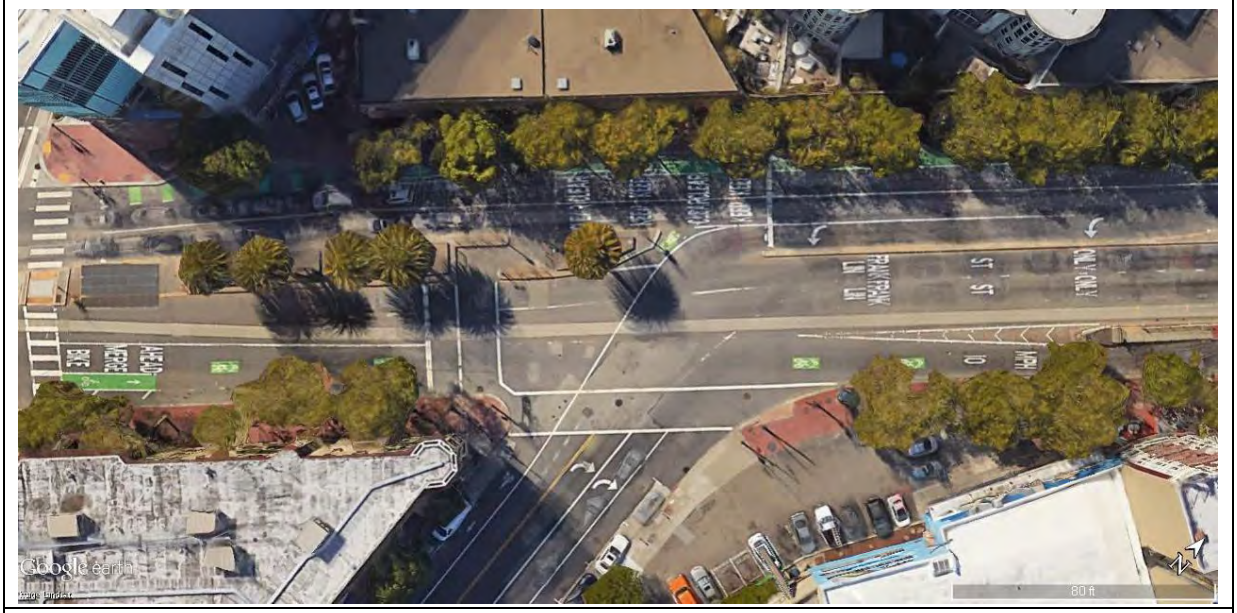

Image 102. Valencia Street, 2016, showing palm trees in the median that were not part of the Market Street Redevelopment Plan design. (Google Earth 2016)

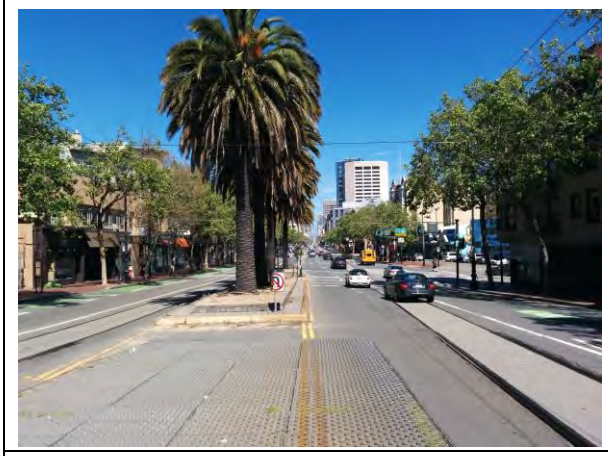

Image 103. Valencia Street, 2016, showing palm trees in the median that were placed in 1993. (Photograph by author, March 2016)

Image 104. Example of Market Street BART entrance portal with bronze railings. (Photograph by author, March 2016)

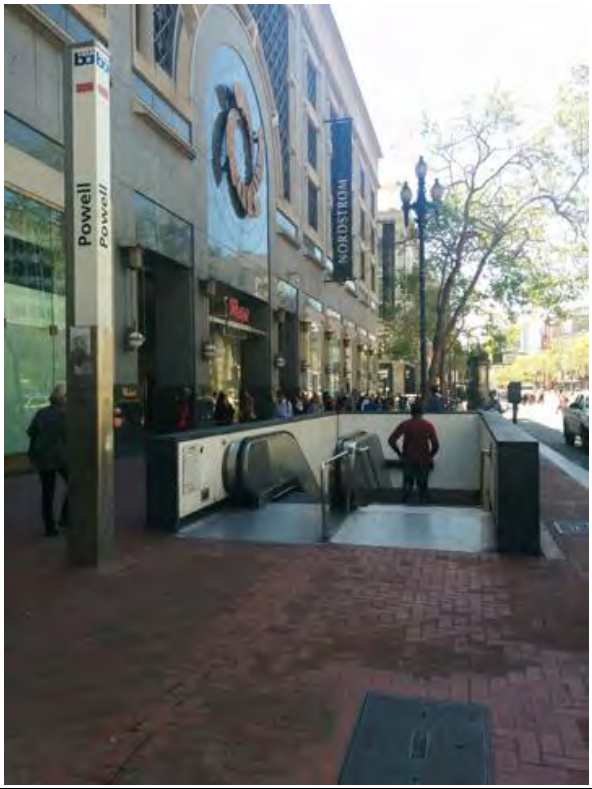

Image 105. Example of Market Street BART entrance portal with white tile interior finish to stone parapet. (Photograph by author, March 2016)

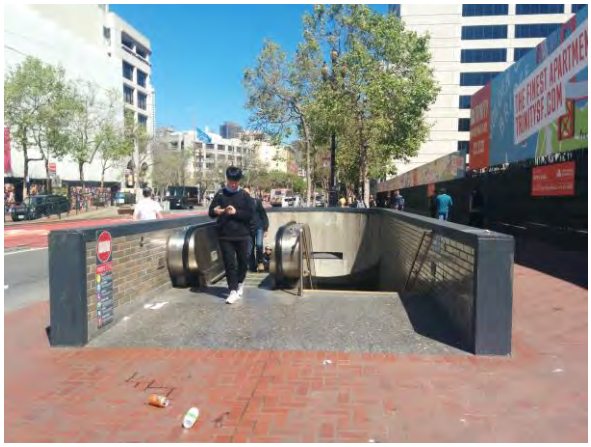

Image 106. Example of Market Street BART entrance portal with glazed brick finish to interior of stone parapet. (Photograph by author, March 2016)

Image 107. Market Street BART elevator enclosure. (Photograph by author, March 2016)

Image 108. Market Street advertising kiosk. (Photograph by author, March 2016)

Image 109. Muni high-low loading platform on Market Street with overhead electric trolley catenary wires, red transit-only lanes and bike shared lane markings. (Photograph by author, March 2016)

Image 110. Cluster arrangement of post-Market Street Redevelopment Plan Market Street street furnishings, including newspaper vending machines, mailboxes, and trash receptacle. (Photograph by author, March 2016)

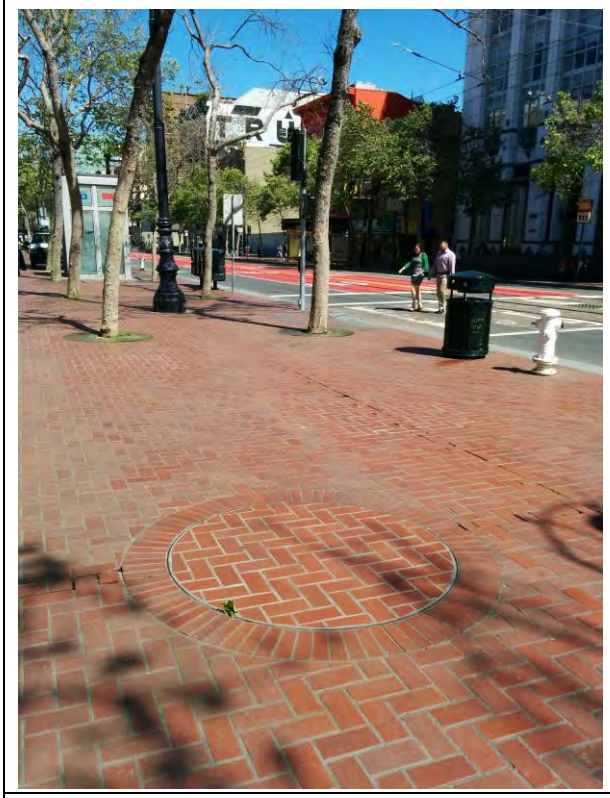

Image 111. Example of tree loss in Market Street's double tree allée, including paving of street tree planting location. (Photograph by author, March 2016)

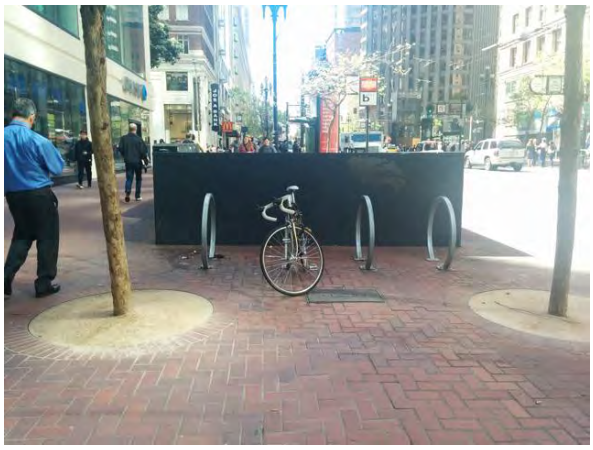

Image 112. Example of one type of the wide variety of bike racks added to Market Street landscape. Image also shows double tree allée with missing tree grates and BART entrance parapet wall. (Photograph by author, March 2016)

Image 113. Market Street, 2016, showing example of Market Street Redevelopment Plan-era semaphore-style traffic lights and signage structure that remain present on Market Street. (Photograph by author, March 2016)

Image 114. Advertising kiosk, introduced to Market Street after completion of the Market Street Redevelopment Plan, with retained Path of Gold light pole in background. (Photograph by author, March 2016)

Image 115. Market Street, 2016, showing a variety of flower stand styles that are along Market Street. (Photograph by author, March 2016)

Image 116. News and magazine kiosks, introduced to Market Street after completion of the Market Street Redevelopment Plan, match advertising kiosks. (Photograph by author, March 2016)

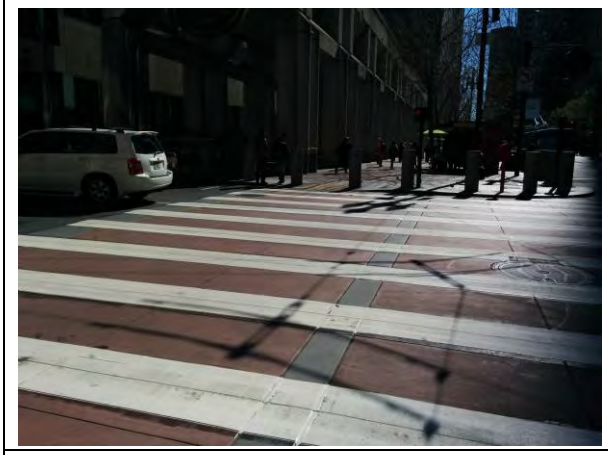

Image 117. Corner of Market Street and Spear Street, 2016, showing that brick-paved sidewalks are no longer present, but are mimicked by color paving in some locations. (Photograph by author, March 2016)

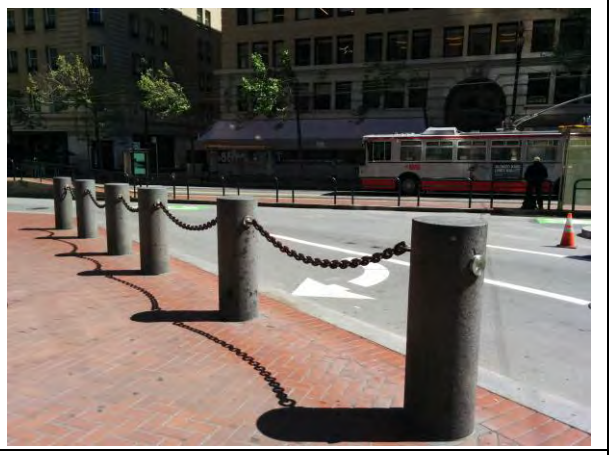

Image 118. Market Street, 2016, showing granite bollards joined by chain link; some locations are missing the chain-link element. (Photograph by author, March 2016)

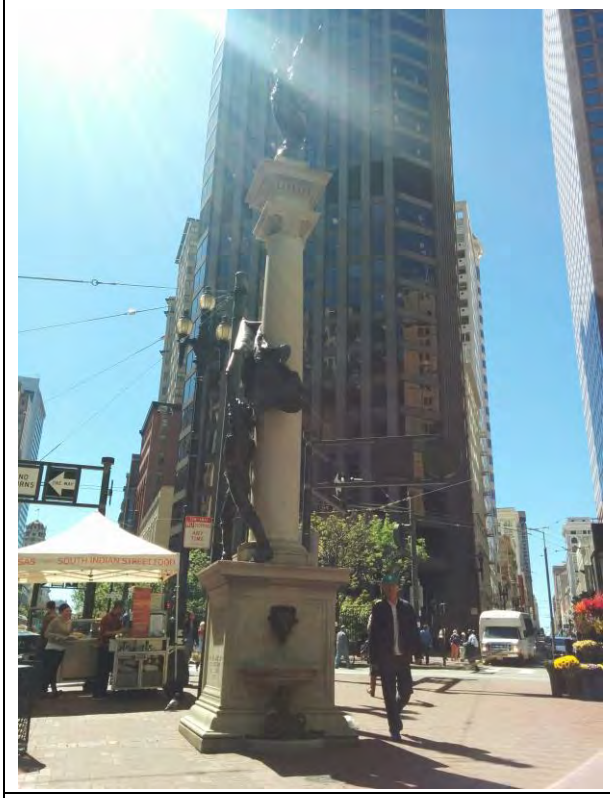

Image 119. Market Street at Montgomery Street, 2016, showing the California Statehood Monument, retained as part of the Market Street Redevelopment Plan design. (Photograph by author, March 2016)

Image 120. Market Street, between Powell and Stockton Streets, 2016, showing the century-old Samuel's Clock, commissioned in 1915 and moved from its original location at 895 Market Street to present location at 856 Market Street in 1943. (Photograph by author, March 2016)

Image 121. Market Street at Kearny Street, 2016, showing Lotta's Fountain, which, although moved slightly as part of the Market Street Redevelopment Plan project, remains placed at the intersection. (Photograph by author, March 2016)

5.2 Justin Herman (Embarcadero) Plaza

The following summarizes existing conditions for Justin Herman (Embarcadero) Plaza in terms of Spatial Organization, Circulation, Vegetation, Views and Vistas, Constructed Water Features, and Small-Scale Features.

5.2.1 Spatial Organization

Justin Herman Plaza is at the eastern terminus of Market Street adjacent to the Embarcadero. The plaza is bounded in the west by the Embarcadero Center and Hyatt Regency buildings and the eastern end of Market Street. The plaza is no longer bounded in the north by the Embarcadero Freeway Clay and Washington Streets off-ramps. Instead, the boundary is now marked by the terminus of Clay Street and Sue Bierman Park, a 5.3-acre open space that was designed following the 1989 Loma Prieta earthquake, which damaged and led to demolition of the freeway and off-ramps to Clay and Washington Streets in 1991 (**Image 122**). Sue Bierman Park was renovated and renamed in 2011 (San Francisco Parks and Recreation 2016). At the eastern boundary of the plaza, there is a

green space buffering the plaza from the Embarcadero where the highway had been. The area was remodeled in 2003 and includes hardscaping that replaced the concrete platform on the southeastern boundary of the plaza and the concrete island that was also in the southern section of the main plaza (**Image 129**). The post-Market Street Redevelopment Plan hardscaping features concrete stairs, ADA-accessibility ramps, and a much narrower grassy area (**Image 127**). Justin Herman Plaza's southern boundary is Don Chee Way.

The ground plane of the northern main plaza is characterized by an irregular, pentagon-shaped plan. A pedestrian promenade, which joins the eastern terminus of Market Street to the Embarcadero in front of the Ferry Building (**Image 123**), bisects the northern section of the plaza (main plaza with fountain) and the southern section of the plaza (former lawn area that was remodeled as bocce court in 2010) (**Image 124, 134**). The Valliancourt-designed fountain is located in the northeast corner of the main plaza's lower terrace.

5.2.2 Circulation

Pedestrian circulation is structured along two axes—a primary axis along the pedestrian promenade connecting Market Street with the Ferry Building (**Image 125**), and the north-south axis through the Plaza. The 4-acre brick plaza is terraced, with the upper terrace of concrete descending to the lower plaza via three concrete steps. The sunken lower plaza consists primarily of red brick laid in a running bond pattern. This pattern is broken by double red brick courses radiating in a sunburst pattern from the plaza's fountain (**Image 126**). The lower plaza is edged in concrete and stairs from the upper plaza down to the lower plaza are also concrete. The concrete island platforms originally positioned in the southeast corner of the lower terrace has been removed and the location has been paved with brick to match the rest of the lower plaza. Other patches to the brick are incompatible materials—those which do not match original historic materials in consistent color, size, and style of original—in a few locations. This patchwork includes scored and dyed concrete. Original paving of the upper terrace was granite, and since been replaced by concrete. Paving in the pedestrian promenade connecting Market Street with the Ferry Building has been replaced by bands of light and dark grey granite flanked by brick laid in a herringbone pattern, which visually extend the Market Street sidewalks through the plaza.

5.2.3 Vegetation

The eastern boundary of the plaza is lined with Canary Island date palms (*Phoenix canariensis*), which have replaced the pine and poplars that originally divided the plaza and the Embarcadero Freeway (**Image 129**) (Ho 2013). The post-Market Street Redevelopment Plan double allée of palms on either side of the pedestrian promenade are also Canary Island date palms (**Image 131**). Light fixtures are mounted on their trunks. Potted palms clustered around the base of light poles in the main plaza appear to be Queen Palms (*Syagrus romanzoffiana*) (**Image 130**). These pots are not repurposed Market Street Redevelopment Plan-era flower tubs. The trees in the lower plaza area, which are positioned within tree grates that are similar, but not identical to Market Street Redevelopment Plan-era tree grates, appear to be London planetrees (*Platanus acerifolia*). These trees appear to have been added after the lower plaza island was removed. The double row of trees planted along the plaza's western boundary adjacent to the Embarcadero Center development appear to be Ginkgo (*Ginkgo biloba*) (**Image 138**). Trees planted adjacent to the bocce court along Steuart Street are London planetree.

5.2.4 Buildings and Structures

In 1995, a green metal toilet was installed near the eastern end of the pedestrian promenade (**Image 137**). The structure is positioned south of the main plaza and styled consistent with advertising kiosks introduced along Market Street at the same time.

5.2.5 Views and Vistas

Market Street Redevelopment Plan-era views of the Embarcadero Freeway are no longer extant given its collapse and subsequent demolition after the 1989 earthquake. The obstructed Market Street Redevelopment Plan-era view of the Ferry Building and Bay Bridge from Justin Herman Plaza has been opened up with the removal of the freeway. The east-to-west view of the Market Street Alignment is visible from the Justin Herman Plaza promenade (**Image 132**). The view of Justin Herman Plaza fountain from the promenade is also intact.

5.2.6 Constructed Water Features

The Justin Herman Plaza fountain (also known as the Vallaincourt Fountain) is in the northeastern corner of Justin Herman Plaza (**Image 133**). The fountain measures approximately 40 feet high, 200 feet long, and 140 feet wide. It is composed of steel and precast concrete to form an interactive grotto that allows visitors to move under and through the structure. The precast concrete square tubes are arranged in irregular angles and feature a concrete finish that is highly textured. While the fountain was designed to pump 1 million gallons of water an hour through the tubes and spill it into the pool below, currently no water is flowing. Two walkways with stairs allow the public to stand between the tubes and offer views overlooking the plaza. The fountain also features concrete square platforms within the pool area, which allow the public to venture between the fountain's back wall and tube projections. Guard rails have been added to prevent falls, but do not block access to walking through the fountain or climbing the stairs. At the time the plaza was completed, the double-deck Embarcadero Freeway served as a massive backdrop for the fountain, dominating the skyline and cutting the plaza off from the waterfront. The fountain was positioned in the bend of the freeway ramp so that the ramp and the fountain enclosed the space that makes up the remainder of the plaza. The freeway and ramps are no longer extant, having been demolished following the 1989 Loma Prieta earthquake.

5.2.7 Small-Scale Features

None of the original lighting—modern standards with semi-translucent square luminaires mounted on square, light-colored granite square pillars arranged along the pedestrian promenade that connects Market Street with the Ferry Building—remains intact. Replica Path of Gold Light Standards are now placed in the plaza's promenade. Original concrete bollards (square granite reflecting the style of the original light standards) spanning the width of the pedestrian promenade that connects Market Street with the Ferry Building at both the east and west ends have been replaced with circular concrete bollards (**Image 135**). Circular-shaped bronze tree grates in the lower plaza appear to have been added after the lower plaza island was removed (**Image 128**). In a few cases, trees have been removed and their subsequent holes cemented. Square receptacles with conical recycling tops, which are not original, have been placed in the plaza (**Image 136**). The Juan Bautista de Anza and Carlos III of Spain statues are no longer present. They were relocated from Justin Herman Plaza to Lake Merced in 2004 (San Francisco Visual Arts Committee 2004). Public art

pieces that have been added to Justin Herman Plaza since its completion include large statues on the upper terrace adjacent to the Embarcadero Center development (**Image 139**) and the American Lincoln Brigade Memorial positioned on the east side of the plaza behind the fountain.

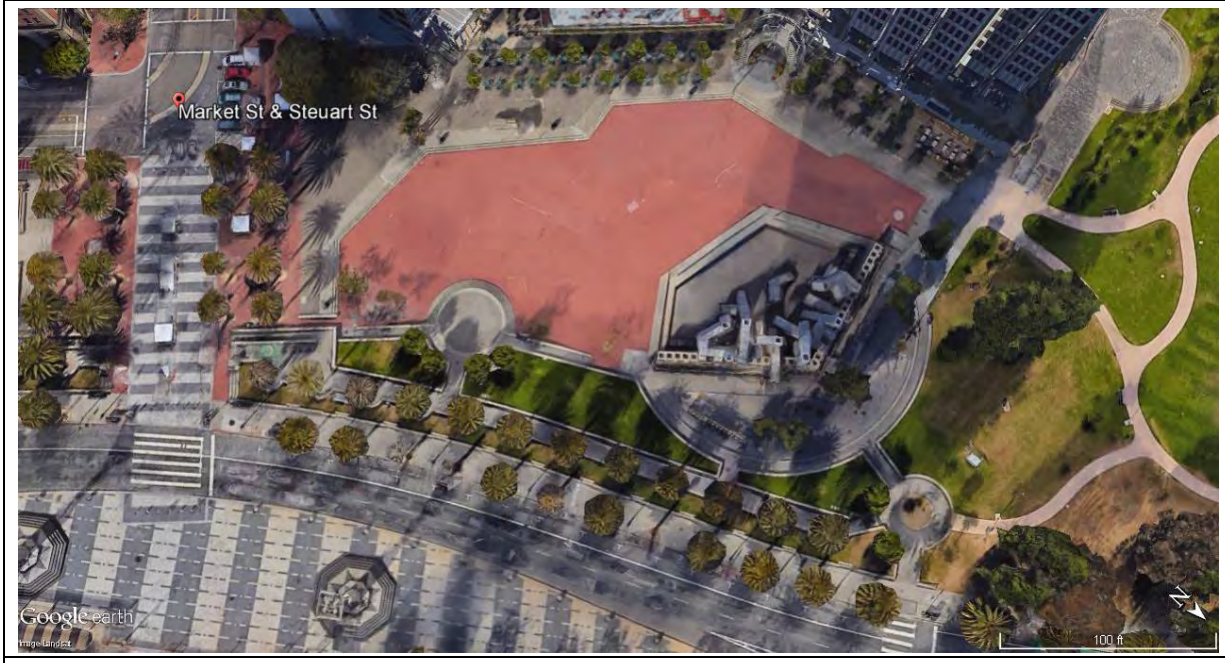

Image 122. Justin Herman Plaza, 2016, showing the northern section of the plaza that still features the main plaza with Valliancourt-designed fountain. However, the plaza has lost its center island and hardscaping along the eastern boundary also has been altered. The Embarcadero Freeway and off-ramps have been removed. (Google Earth 2016)

Image 123. Justin Herman Plaza, 2016, showing the center section (featuring the pedestrian promenade), which has been altered since the Market Street Redevelopment Plan era with removal of lighting, replacement of bollards and paving, and addition of palm trees. (Google Earth 2016)

Image 124. Justin Herman Plaza, 2016, showing the southern section of the plaza, which has been redeveloped with bocce courts (concrete hardscaping with decomposed granite and grass) and palm tree plantings. (Google Earth 2016)

Image 125. Justin Herman Plaza, 2016. Promenade pedestrian circulation space remains intact, but paving has been replaced, Market Street Redevelopment Plan-era lighting has been removed and paving has been altered. (Photograph by author, March 2016)

Image 126. Justin Herman Plaza, 2016, showing radiating pattern of brick in main plaza that has been retained, though original materials have been patched. (Photograph by author, March 2016)

Image 127. Justin Herman Plaza, 2016, showing the addition of stairs as part of the 2003 renovation. (Photograph by author, March 2016)

Image 128. Justin Herman Plaza, 2016, showing London planetrees in lower plaza. These trees may have been added when the lower plaza island was removed. (Photograph by author, March 2016)

Image 129. Justin Herman Plaza, 2016, showing palm trees along Embarcadero that have replaced poplars and pine trees. (Photographs by author joined into panorama with Photoshop image stitching, March 2016)

Image 130. Justin Herman Plaza, 2016, showing potted Queen palms clustered around light poles. (Photograph by author, March 2016)

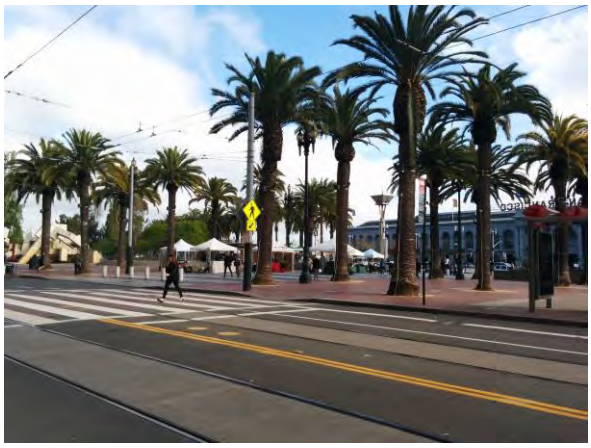

Image 131. Justin Herman Plaza, 2016, showing Canary Island date palms lining the promenade.(Photograph by author, March 2016)

Image 132. Justin Herman Plaza, 2016, showing view of plaza, ferry building and bay bridge, and Embarcadero Center development. (Photographs by author joined into panorama with Photoshop image stitching, March 2016)

Image 133. Justin Herman Plaza, 2016, showing plaza fountain. (Photograph by author, March 2016)

Image 134. Justin Herman Plaza, 2016, showing bocce courts in the plaza's southern-most section. (Photograph by author, March 2016)

Image 135. Justin Herman Plaza, 2016, showing bollards located at the Market Street entrance of the plaza's promenade. (Photograph by author, March 2016)

Image 136. Justin Herman Plaza, 2016, showing example of trash receptacle placed in plaza. (Photograph by author, March 2016)

Image 137. Justin Herman Plaza, 2016, showing public toilet structure placed in plaza between the main plaza and the pedestrian promenade. (Photograph by author, March 2016)

Image 138. Justin Herman Plaza, 2016, showing patio dining tables and Ginkgo trees along boundary with Embarcadero Center that have replaced Market Street Redevelopment Plan-era benches. (Photograph by author, March 2016)

Image 139. Justin Herman Plaza, 2016, showing public artwork introduced to the plaza since its completion. (Photograph by author, March 2016)

5.3 Hallidie Plaza

The following summarizes existing conditions for Hallidie Plaza in terms of Spatial Organization, Circulation, Vegetation, Buildings and Structures, Views and Vistas, Constructed Water Features, and Small-Scale Features.

5.3.1 Spatial Organization

Hallidie Plaza is a three-level terraced plaza at the intersection of Market and 5th Streets, adjacent to the Powell Street cable-car turnaround (**Image 140**). The ground plane of the main plaza is characterized by a triangular-shaped plan. The plaza is divided at street-level by Cyril Magnin Street. Below this overpass is a passage way that joins the east and west sides of the plaza's lowest level and includes space for a visitor center. Escalators are parallel to Market Street on both the eastern and western sides of the plaza. In addition to the stairs adjacent to the escalators, the plaza also features stairways independent of the escalators, which parallel Cyril Magnin Street on both sides. The design also includes stepped concrete-walled terraces serving as areas for landscaped

vegetation and mezzanines on both sides of the plaza, which creates space for pedestrian traffic to circulate between stairs.

5.3.2 Circulation

The plaza serves as a major multi-modal transportation hub, providing pedestrian access to the underground Muni and BART Powell Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, busses, and the end of the Powell Street cable car line. The BART station is entered from the sizeable underground concourse that opens into the plaza, which is sunken below street level and accessed from the street by stairs and escalators. The plaza is divided at street-level by Cyril Magnin Street. A passage way below the Cyril Magnin Street overpass joins the east and west sides of the plaza's lowest level and includes space for a visitor center. Escalators parallel Market Street on both the eastern and western sides of the plaza. In addition to the stairs adjacent to the escalators, the plaza also features stairways independent of escalators, which parallel Cyril Magnin Street on both sides. As with the Market Street streetscape, red brick laid in a herringbone pattern paves the pedestrian circulation area throughout. Mezzanines on both sides of the plaza form the mid-level terrace and create space for pedestrian traffic to circulate between stairs and offer vantage to view the plaza floor below. The below-street level passage that joins the east and west sides of the plaza includes space for the visitors center.

5.3.3 Vegetation

Stepped concrete-walled terraces include planting bed space for landscaped vegetation (shrubs on the western side of the plaza and ornamental grasses on the eastern side of the plaza) (**Image 144**). Lower plaza tree plantings are London planetrees (*Platanus acerifolia*) like those found in the adjacent Market Street streetscape. Research did not reveal a Market Street Redevelopment Plan planting plan; accordingly, specific species for tub plantings and terrace planting beds are unknown. Few of the Market Street Redevelopment Plan-era flower tubs remain placed within the plaza and those that remain intact appear to have been moved. Historic images indicate there may have been a greater number of Market Street Redevelopment Plan-era flower tubs in the plaza, which were originally clustered in different locations than where they are found in Hallidie Plaza today. The majority of the tubs are relocated within the fenced café area at the northern boundary of the lower plaza. While tree grates remain intact to indicate where missing trees were originally clustered, several of the below street-level tree plantings remain intact on both sides of the plaza. The row of trees along the plaza's northeastern boundary at street level were removed in 1998 (**Image 141**) (King 2006).

5.3.4 Buildings and Structures

The plaza includes a large three-stop elevator, installed in 1997, to provide access to the subgrade plaza, the San Francisco Visitor Center, and the Powell Street BART/Muni stations (**Image 143**). The Post-Modern-style elevator was designed by MWA Architects of Oakland and features a sculpted form sheathed with perforated stainless steel screen walls. The elevator and its screen walls nearly obliterate the view of the sunken transit station steps and deeply beveled post and lintel entrances for pedestrians approaching from the lower level of the plaza. Additional structural components of the plaza include the terrace walls with rusticated granite characterized by evenly spaced vertical grooves, the Cyril Magin overpass, and the Visitor Center structure below the overpass.

5.3.5 Small-Scale Features

Hallidie Plaza retains an example of the original Market Street Redevelopment Plan advertising kiosks (street level on the northern corner of its west side), though its original bronze has been painted blue and gold (**Image 142**). Café seating with fence enclosure is present in the east side of the plaza at the lowest terrace level in one of the areas where original wood-slat benches were removed. While the known date of wooden bench removal is 1998, the date for the addition of café tables is unknown (**Image 145**). When trees were removed from the plaza's northeastern boundary in 1998, post-Market Street Redevelopment Plan lighting (gold poles and luminaries) were added to discourage illicit night-time activities in the area (King 2006).

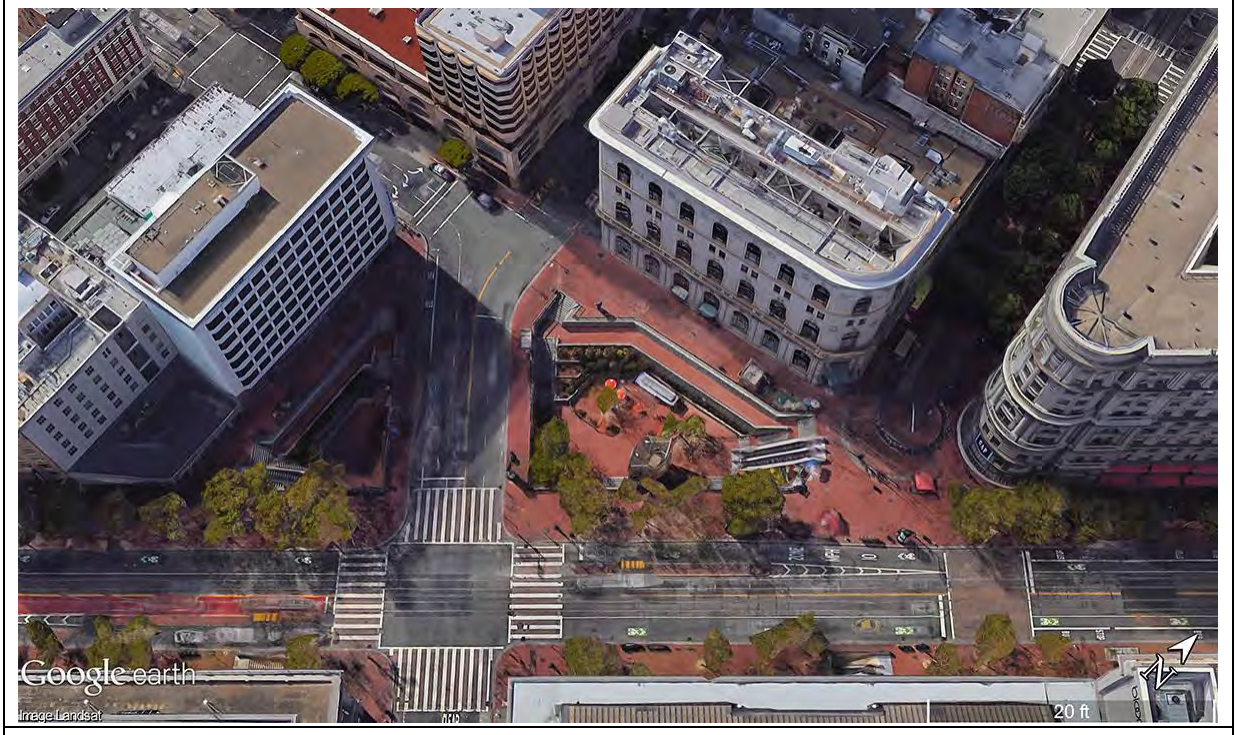

Image 140. Hallidie Plaza, 2016, retains it triangular plan, bisected by Cyril Magnin. Aerial view shows loss of tree row on northeastern boundary, as well as loss of original wood-slat benches. (Google Earth 2016)

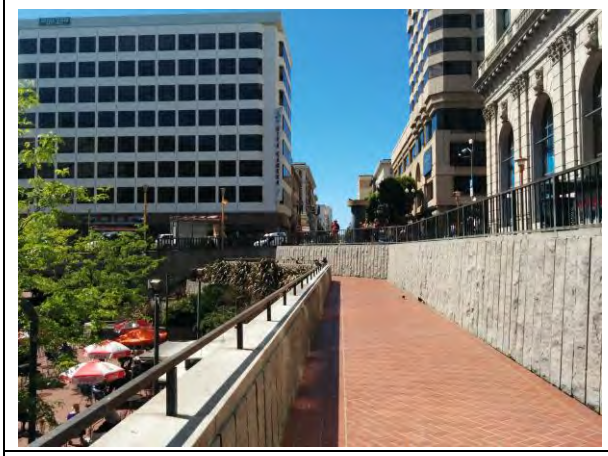	
Image 141. Hallidie Plaza, 2016, east side view showing absence of trees lining the northeast boundary at street level, and absence of ground-level plantings and wood-slat benches on terrace. (Photograph by author, March 2016)	**Image 142.** Hallidie Plaza, 2016. Although it appears to have been painted, Market Street Redevelopment Plan-era advertising kiosk has been retained at northern street-level stairway on eastern side of the plaza. Post-Market Street Redevelopment Plan wayfinding BART signage has also been added. (Photograph by author, March 2016)

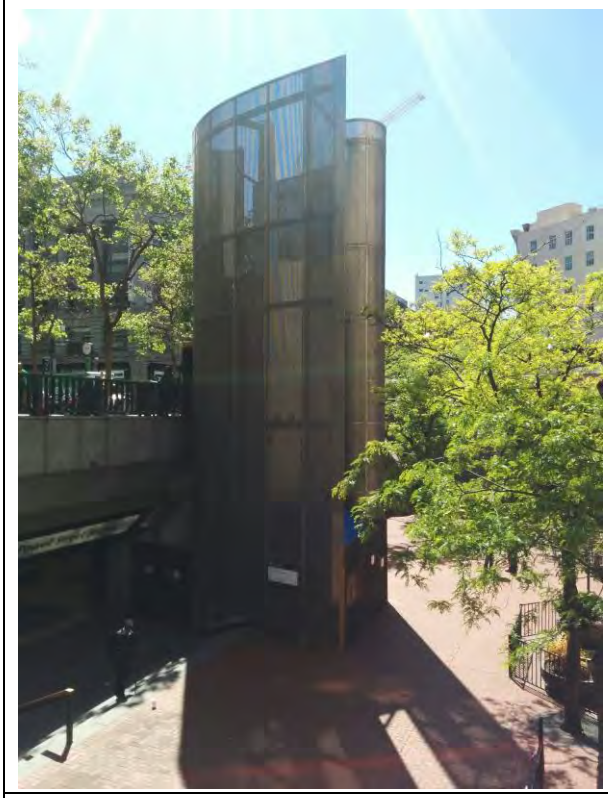

Image 143. Hallidie Plaza, 2016, showing multi-story elevator added to plaza in 1997 on the southern boundary that blocks a portion of the lower-level BART station entrance and alters the open character of the plaza. (Photograph by author, March 2016)

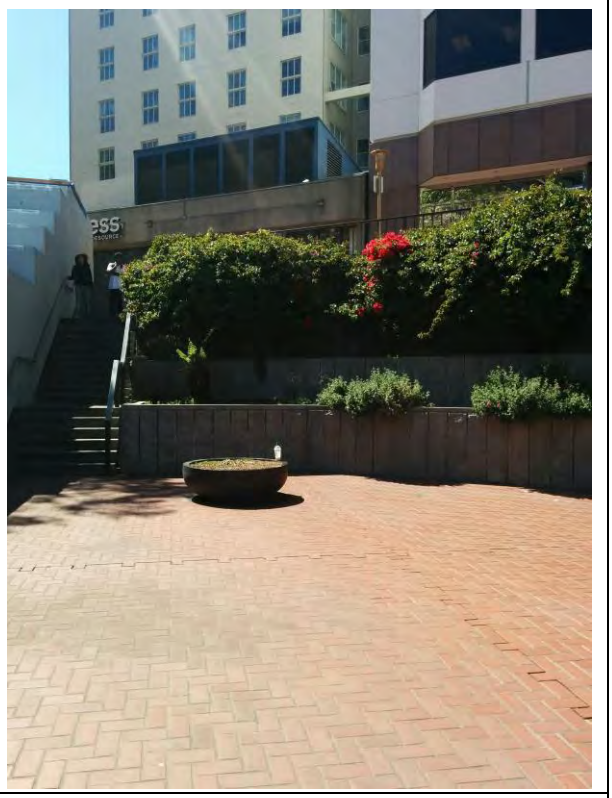

Image 144. Hallidie Plaza, 2016, showing eastern side of the plaza where wood-slat benches have been removed and cluster arrangement of planting tubs has been altered. Shrubby character of landscaped terrace beds is retained. (Photograph by author, March 2016)

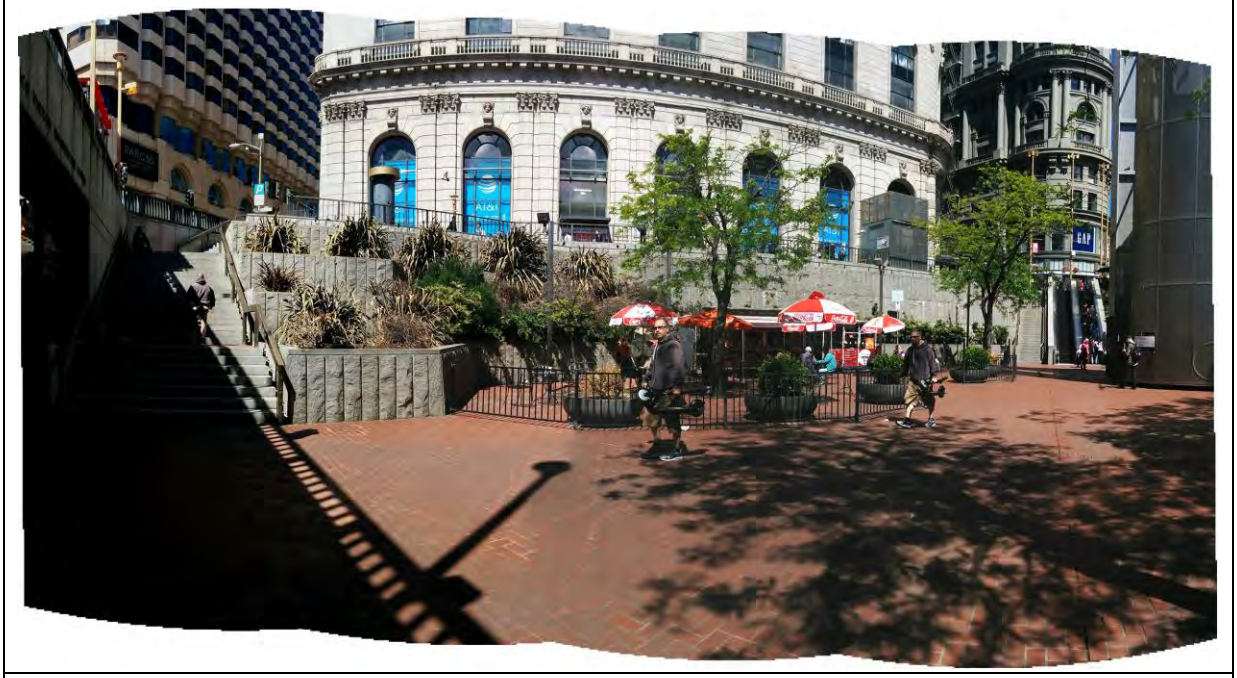

Image 145. Hallidie Plaza, 2016, showing eastern side of the plaza's lower level. With removal of wood-slat benches, café seating with fence enclosure has been added and planting tub arrangement has been altered. Terraced planting beds in eastern side of the plaza feature ornamental grasses. (Photograph by author, March 2016)

5.4 United Nations Plaza

The following summarizes existing conditions for UN Plaza in terms of Spatial Organization, Circulation, Vegetation, Buildings and Structures, Views and Vistas, Constructed Water Features, and Small-Scale Features.

5.4.1 Spatial Organization

The 2.6-acre UN Plaza spans the Market Street alignment between 7th and 8th Streets, extending westward from Market Street to Hyde and Fulton Streets. The ground plane of the main plaza is characterized by a triangular plan, but the site also includes two linear promenades projecting to the north and west. The main plaza includes a water feature—the UN Plaza Fountain—in its eastern section (**Image 146**).

5.4.2 Circulation

In addition to being the main pedestrian gateway from Market Street to the Civic Center, the plaza serves as major multi-modal transportation hub, providing street access to the underground Muni and BART Civic Center Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, and busses. Vertical circulation consists of the stairwell and escalator to the BART/Muni subway station. Pedestrian circulation through the plaza remains structured along two axis—a primary east-west axis along Fulton Street and a secondary north-south axis along

Leavenworth Street (**Image 148**). As with the Market Street streetscape, the paving in areas of pedestrian traffic consists primarily of red brick laid in a herringbone pattern. The granite paving with brass inlay indicating the city's latitude and longitude located near the southwest end of the fountain was included in the original design and remains intact (**Image 153**). The bands of granite and brass inlay quoting the Preamble to the United Nations charter that are placed in the Fulton Street promenade were added in 1995. The circular granite feature engraved with the United Nations symbol located at the intersection of the plaza's primary axis (Fulton Street promenade) and secondary axis (Leavenworth Street) was also placed into the paving during the 1995 renovation (**Image 160**) (MIG 2015:82-84).

5.4.3 Vegetation

The approach from United Nations Plaza to the Civic Center features original arrangement of trees organized in paired rows flanking single rows of lights aligned parallel within the pedestrian mall on the east-west Fulton Street axis. The secondary linear arrangement of trees along the west side of the Levenworth mall axis is also retained. The grass-covered planting beds along the Fulton Street central promenade that were established in 1936 and retained by the Market Street Redevelopment Plan design remain in the plaza, though northern beds contain decomposed granite and southern beds contain grass (**Image 149**). The planting area near the BART entrance is also filled with decomposed granite instead of plantings. At least 36 London planetrees (*Platanus acerifolia*) were planted in the plaza in 1975. The rows of London planetrees remain intact, although they show the effects of the westerly winds that pass through the plaza. Lombardy poplar trees (*Populus nigra*) were also planted near Market Street and remain intact.

5.4.4 Buildings and Structures

A metal public toilet, added in 1995, is located at the southeastern edge of the plaza, adjacent to the Market Street sidewalk streetscape.

5.4.5 Views and Vistas

The original view of City Hall from UN Plaza, designed to maintain visual connection between the pedestrians in the plaza and civic center (**Image 147**), is present when observed from Market Street, but is partially obscured by the bronze equestrian monument of Simon Bolivar when the observer is positioned near the statue (**Image 154**). The view from the west end of the Fulton promenade to UN Plaza fountain and Market Street beyond is open if the observer is not standing behind the Bolivar statue.

5.4.6 Constructed Water Features

UN Plaza Fountain remains intact and located at the eastern end of UN Plaza (**Image 151**). Arched jets of water shooting up from the center of the fountain remain intact, but mechanical equipment used to create the fountain's tidal effect, which was a component in producing the fountain's symbolism, is not currently functioning (MIG 2015:35).

5.4.7 Small-Scale Features

Small-scale features of UN Plaza include lighting, paving, seating, monuments, bollards, and signage:

Lighting: There are 16 granite light standards arranged symmetrically along the central promenade with eight fixtures per side placed at regular 40-foot intervals (**Image 152**). While the lamps originally consisted of semi-translucent, hooded luminaires mounted on the square, light-colored granite columns, when the plaza's lighting scheme was altered in 1995, the original square Modernist hoods capping the luminaries were replaced with the frosted spherical globes that are in place now. The square granite columns and the spatial arrangement of the light fixtures remain unchanged. Multi-story gold-colored light poles that feature multiple spotlight heads remain positioned around the fountain. In addition, the light poles were added on the north side of the Fulton promenade in 2005 (Fagan 2005) and remain in place (**Image 158**).

Monuments: The black monument pillar placed adjacent to the fountain is a feature of the original Market Street Redevelopment Plan design and remains intact (**Image 150, 159**). The plaza also features a stone monument with the U.N. emblem and text in the plaza (**Image 161**). This monument was installed in 1995 to commemorate the 50th anniversary of the founding of the United Nations. (MIG 2015:82-84). There is a bronze equestrian monument of Simon Bolivar installed in 1984 at the west end of the plaza where the Fulton Street promenade meets Hyde Street. The statue was a gift from Venezuela to the City of San Francisco to commemorate the 200th anniversary of Bolivar's birth and is not part of the original Market Street Redevelopment Plan design (MIG 2015:34).

Flagpoles: Two flagpoles with a radial pattern metal base next to the plaza's BART/Muni entrance were installed in 1975 as part of the Market Street Redevelopment Plan. The flagpoles and remain present today (**Image 156**) (MIG 2015:81).

Advertising kiosk: An advertisement kiosk was placed next to the plaza's BART/Muni entrance when the flagpoles were installed in 1975 as part of the Market Street Redevelopment Plan. While the flagpoles and remain present today the Market Street Redevelopment-era kiosk does not appear intact (**Image 156**) (MIG 2015:81).

Seating: The original wood-slat benches that were placed along the central promenade (12 benches per side arranged in a paired configuration) were removed from the central promenade sometime after 1999. No replacement seating has been added.

Bollards: Bollards with chain link adjacent to the BART/Muni entrance planting bed remain intact (**Image 155**).

Signage: Wayfinding signage with street map, points of interest and transit information has been added near the BART/Muni entrance (**Image 157**). Precise date of addition is unknown.

Pre-Market Street Redevelopment Plan features: A few of the features within the ground plane of the UN Plaza that pre-date construction were retained and remain intact. These features include: one red metal fire box dating to 1899 on Hyde Street; two fire hydrants dating to 1909 on Hyde Street; and sections of granite curbing dating to 1925 on Market, Leavenworth, and Hyde Streets.

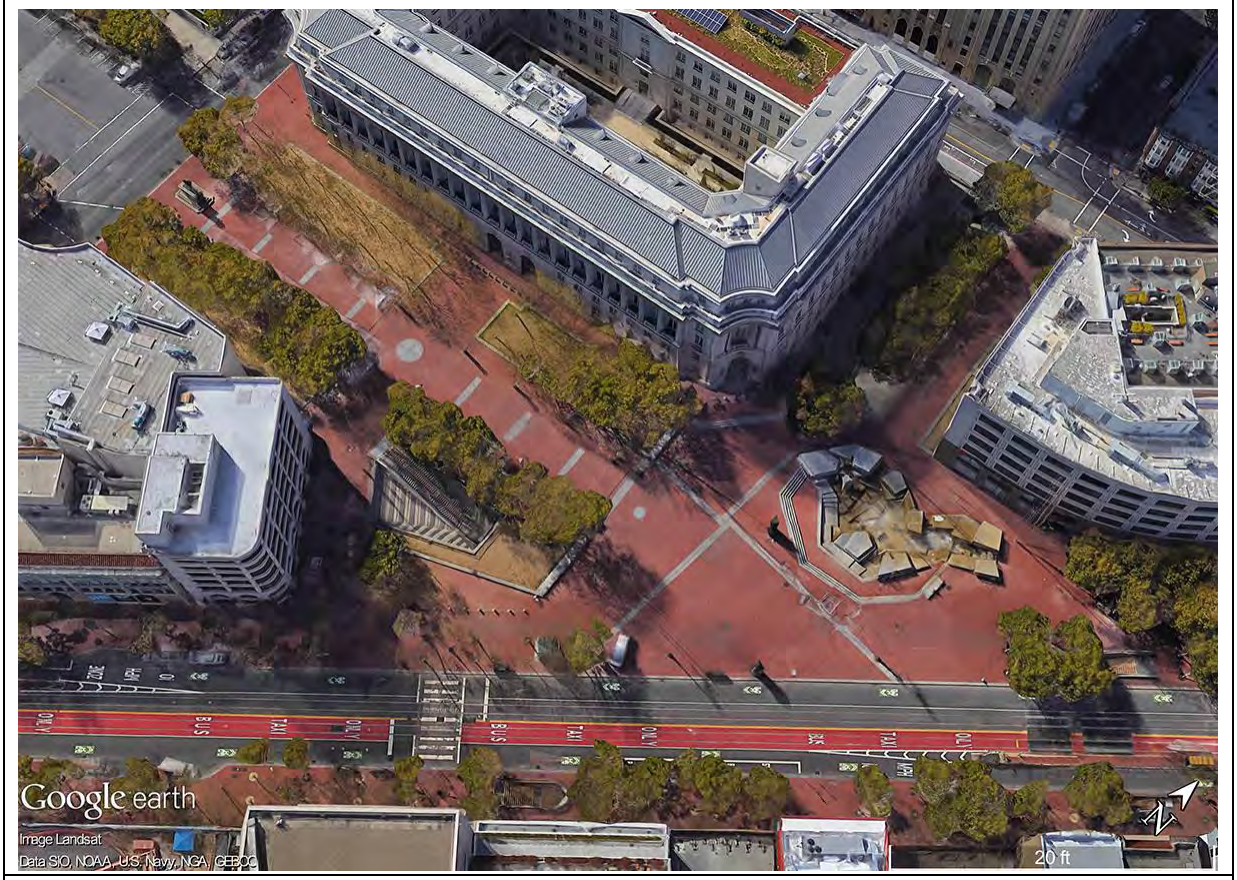

Image 146. UN Plaza, 2016, showing the presence of features including retained fountain and monument cluster, Fulton and Leavenworth Streets promenades with tree plantings, BART entrance with planting bed and bollard. Brick paving remains intact, blending pedestrian plaza space with Market Street streetscape area. This image also shows placement of Bolivar statue at the end of the Fulton promenade in the upper left corner, as well as granite paving features added between the promenade's tree allée in 1995. (Google Earth 2016)

Image 147. UN Plaza, 2016. View of City Hall from UN Plaza is retained, though diminished by Bolivar statue obstruction (center). This image also shows placement of flagpoles flanking Fulton promenade, as well as the altered lighting, with retained granite pillars and replaced circular glass lamps. (Photograph by author, March 2016)

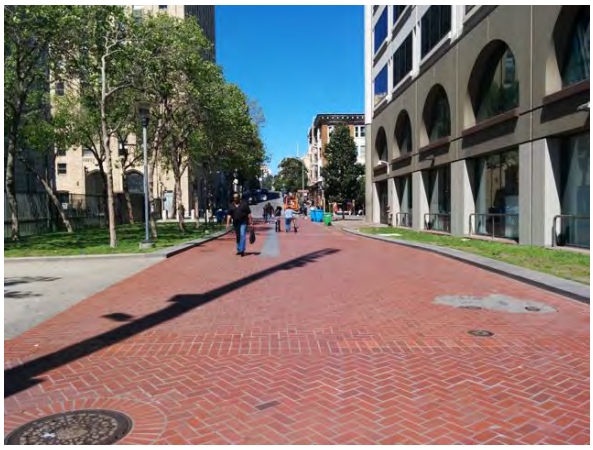

Image 148. UN Plaza, 2016, showing brick paving featured in the Leavenworth Promenade north of the UN Plaza fountain. (Photograph by author, March 2016)

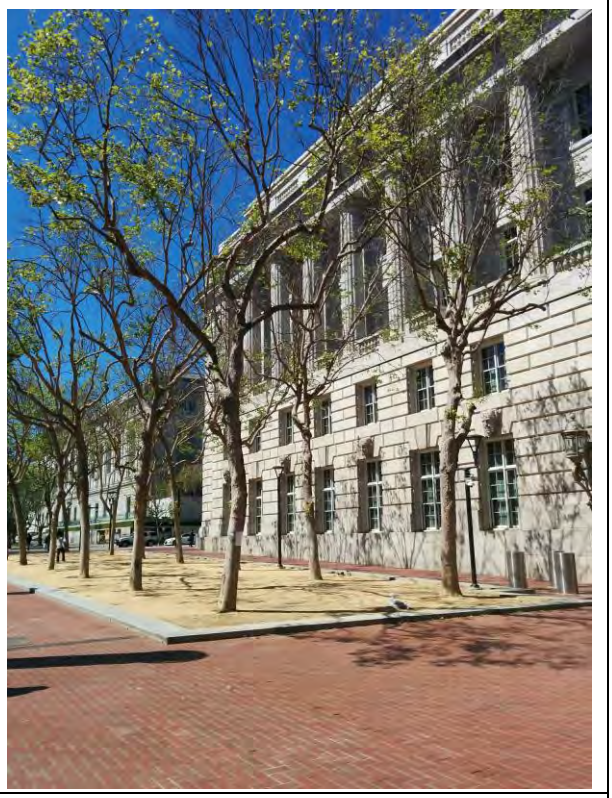

Image 149. UN Plaza, 2016, showing decomposed granite that has replaced grass in Fulton Promenade planting beds. (Photograph by author, March 2016)

Image 150. UN Plaza, 2016, retains cluster arrangement with granite monument on southwest side and multi-story lighting retained on northern side. (Photograph by author, March 2016)

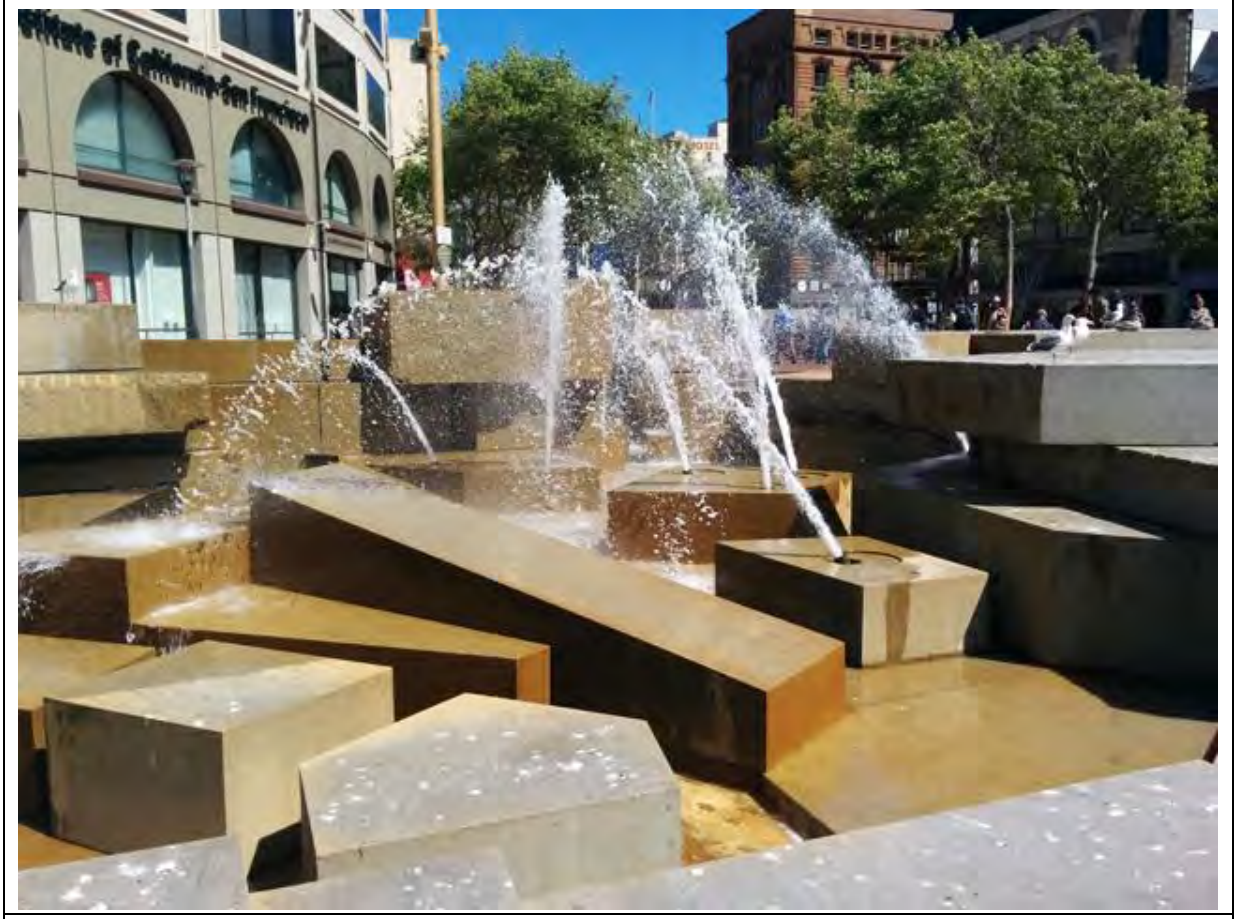

Image 151. UN Plaza, 2016, showing the design of UN Plaza fountain is intact. Although the "earth tides" water flow in the fountain's pool is not currently operational, jets of water actively spray. (Photograph by author, March 2016)

Image 152. UN Plaza, 2016, showing Fulton promenade light standard with original granite base and altered circular glass light fixture. (Photograph by author, March 2016)

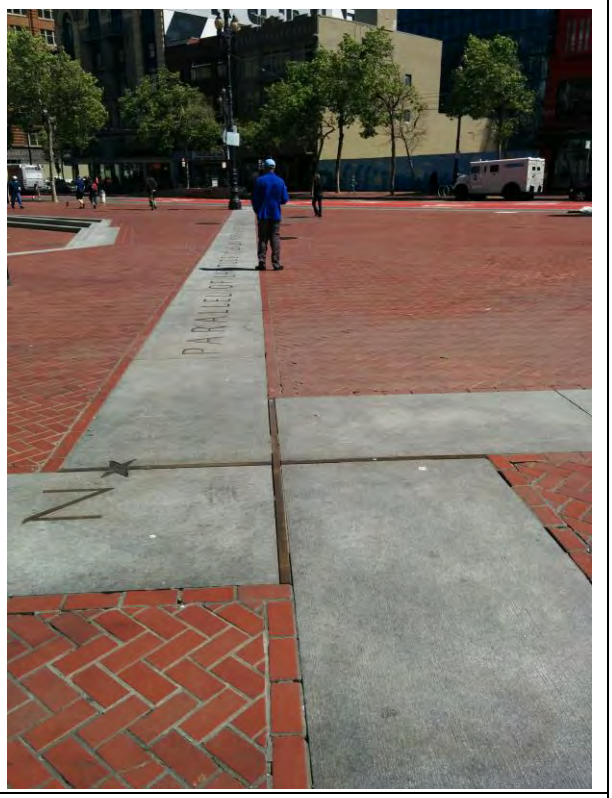

Image 153. UN Plaza, 2016. Although bands of granite with brass inlay in the Fulton promenade were added after the plaza was completed, the granite with brass latitude and longitude (pictured) are part of the original design. (Photograph by author, March 2016)

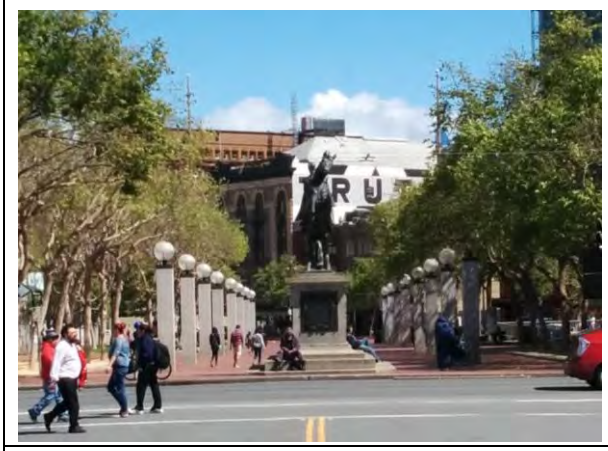

Image 154. UN Plaza, 2016, showing that the addition of Simon Bolivar statue obscures view from Civic Center through plaza to Market Street. (Photograph by author, March 2016)

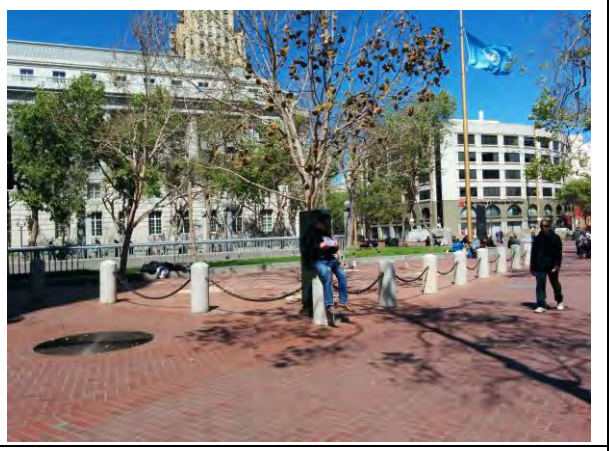

Image 155. UN Plaza, 2016, showing that concrete bollards with chain links adjacent to BART entrance planting bed remain intact. (Photograph by author, March 2016)

Image 156. UN Plaza, 2016. Flagpoles that flank either side of the Fulton promenade feature decorative radial brass bases in a style that is sympathetic to that of the Market Street Redevelopment Plan tree grate design. (Photograph by author, March 2016)

Image 157. UN Plaza, 2016, showing wayfinding signage added to the plaza. (Photograph by author, March 2016)

Image 158. UN Plaza, 2016, showing that lighting, which is not compatible with the design of the granite pillar lighting in the Fulton promenade or fountain lighting, has been inserted into the promenade's northwestern planting bed. (Photograph by author, March 2016)

Image 159. UN Plaza, 2016, showing that the granite monument adjacent to plaza fountain has been retained. (Photograph by author, March 2016)

Image 160. UN Plaza, 2016, features were added to the plaza to celebrate the 50th Anniversary of the United Nations in 1995. This includes the United Nation's symbol, embedded into the paving between the fountain and the southeastern entrance to the Fulton promenade. (Photograph by author, March 2016)

Image 161. UN Plaza, 2016, showing a stone monument added to the plaza as part of the anniversary renovation. (Photograph by author, March 2016)

5.5 Small Plazas of Market Street

Existing conditions for Market Street's small plazas include the status of landscape features associated with Robert Frost Plaza, Mechanics Plaza, Crocker Plaza, Mark Twain Plaza, and Market Street Plaza.

5.5.1 Robert Frost Plaza

The following summarizes existing conditions for Robert Frost Plaza in terms of Natural Systems and Features, Spatial Organization, Circulation, and Small-Scale Features.

5.5.1.1 Natural Systems and Features

Located in a triangular site created by the intersection of the discordant street grid, Robert Frost Plaza benefits from corridors of light channeled by the diagonal street grid.

5.5.1.2 Spatial Organization

Triangular in plan, Robert Frost Plaza is at the intersection of California, Drum, and Market Streets (**Image 162**). A street-level BART entrance is oriented parallel to Market Street along the southern boundary of the plaza, while the California Street cable car tracks and turnaround site are oriented parallel with the northeast boundary. The Robert Frost Monument is positioned in the triangular open space between the BART entrance and cable car turnaround, and a four-faced clock and 1995 advertising kiosk are located on the northwest boundary of the plaza.

5.5.1.3 Circulation

The plaza's pedestrian circulation area features herringbone pattern red brick paving that blends into the paving that is typical of the Market Street Redevelopment Plan streetscape. The street-level BART entrance on the plaza's southern boundary offers access to underground transportation. The California Street cable car turnaround site is in Robert Frost Plaza, jutting diagonally into the open space from California Street (**Image 164**).

5.5.1.4 Small-Scale Features

Notable small-scale features include retained Robert Frost monument and four-faced clock. The light pole with square translucent light and wood-slat bench are no longer present. An advertising kiosk (1995) is also present in the plaza (**Image 163**).

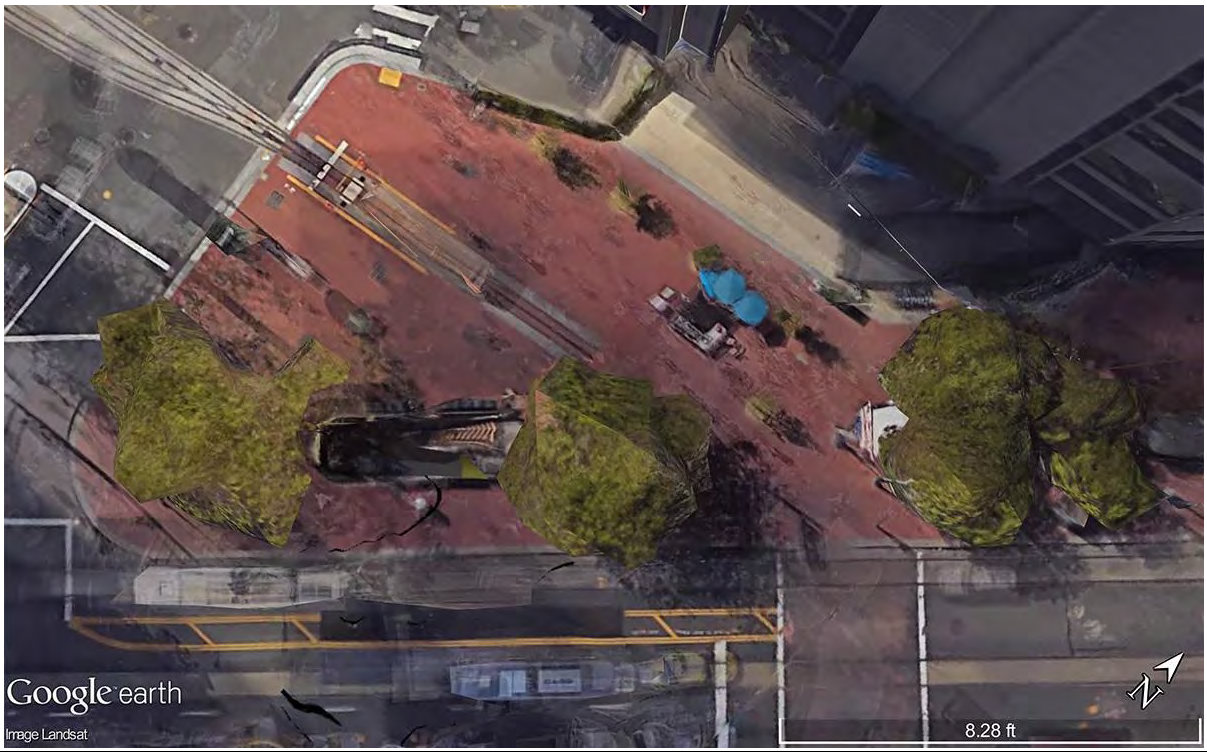

Image 162. Robert Frost Plaza, 2016, showing that triangular plans are retained, along with California Street cable car tracks (shown in upper left, projecting into the center), clock, monument, advertising kiosk (shown on left side between the cable car tracks), and the U-shaped BART street-level entrance (adjacent to street bottom center of the plaza). (Google Earth 2016)

Image 163. Robert Frost Plaza, 2016, at the corner of Market, California, and Drumm Streets. The Robert Frost monument (center) and four-faced clock remain present in the plaza, while an advertising kiosk has also been added to in the adjacent Market Street sidewalk area. (Photograph by author, July 2016)

Image 164. Robert Frost Plaza, 2016. Barriers currently obscure view of cable car tracks, but are removable. (Photograph by author, March 2016)

5.5.2 Mechanics Monument Plaza

The following summarizes existing conditions for Mechanics Plaza in terms of Natural Systems and Features, Spatial Organization, Circulation, Vegetation, and Small-Scale Features.

5.5.2.1 Natural Systems and Features

Located in a triangular site created by the intersection of the discordant street grid, Mechanics Plaza benefits from corridors of light channeled by the diagonal street grid.

5.5.2.2 Spatial Organization

Triangular in plan, Mechanics Plaza is bordered on all three sides by red brick laid in a herringbone pattern (**Image 165**). The plaza features placement of the Mechanics Monument in the southwest corner, granite steps on the south and west sides that terrace to the granite paved plaza. The northeast side (longest side of the triangle) is lined by London planetrees similar to those present on the Market Street streetscape. The stepped south and west sides also feature large squared pyramid bollard

5.5.2.3 Circulation

Mechanics Plaza features herringbone-pattern brick for pedestrian walk areas around the perimeter. Within the triangular plaza is square granite paving. A checkerboard-patterned paving element was added in the northeastern section of the plaza as part of the renovation (**Image 171**). Granite stairs allow pedestrians walking along Market Street to descend into the plaza.

5.5.2.4 Vegetation

London planetrees (*Platanus acerifolia*) line the northeast side of the plaza triangle. Ornamental grasses are planted in beds in the northwest and southeast corners of the plaza (the beds are also filled with chipped slate) (**Image 167**). Four square planters containing ornamental grasses are aligned on the south and west sides of the plaza (two on each side) (**Image 169**).

5.5.2.5 Small-Scale Features

Small-scale features present in Mechanics Plaza include the Mechanics Monument and six squared pyramid granite bollards aligned linearly along the southern and western boundaries of the plaza (**Image 166**). With removal of the original wood-slat benches, limited seating is available via square stone stools clustered along the northern perimeter of the plaza (**Image 168**). In addition to the stools, the northeast perimeter has metal tables that feature interpretive images. A solar-powered electronic device charging station is located in the northeast corner of the plaza (**Image 170**).

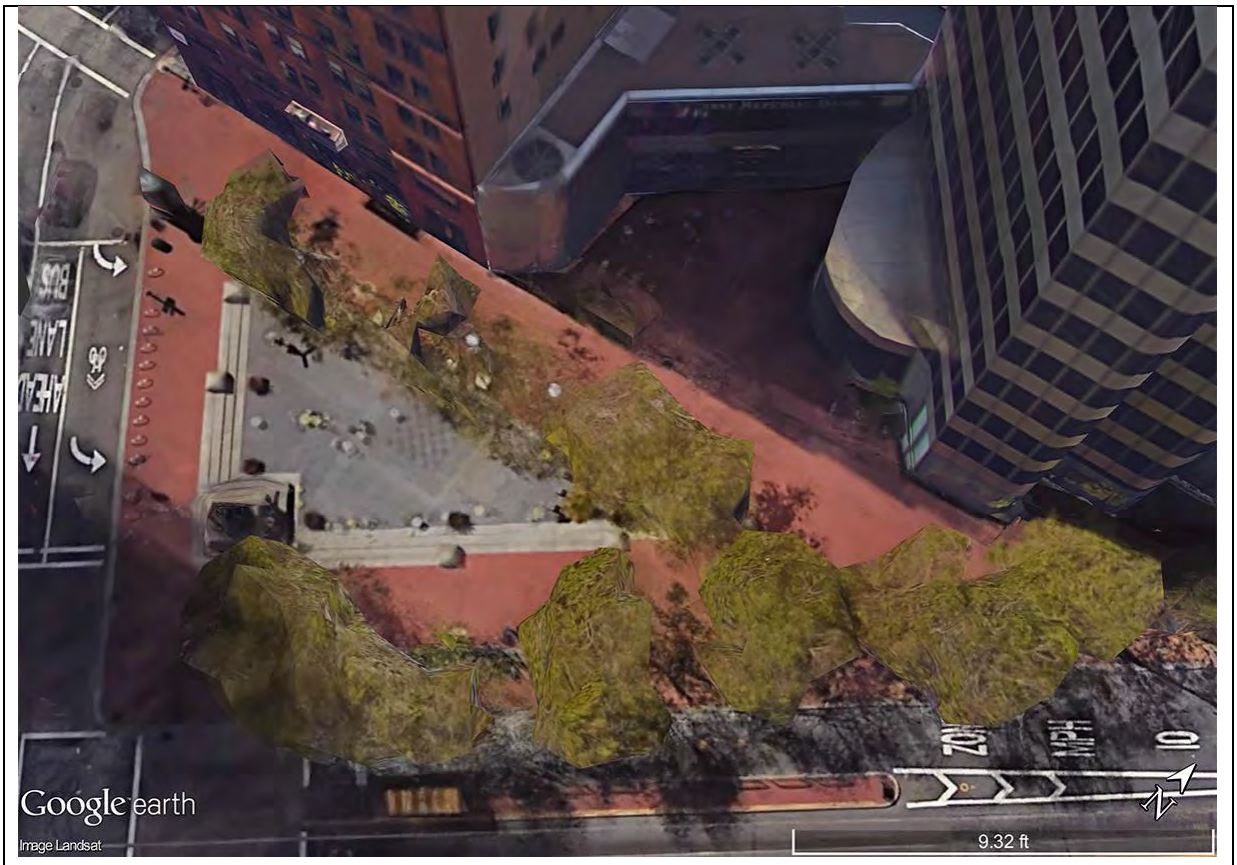

Image 165. Mechanics Monument Plaza, 2016. Triangular configuration of Mechanics Monument Plaza plan has been retained. Tree placement on northeastern boundary is intact, as are square pyramid bollards on east and south sides. (Google Earth 2016)

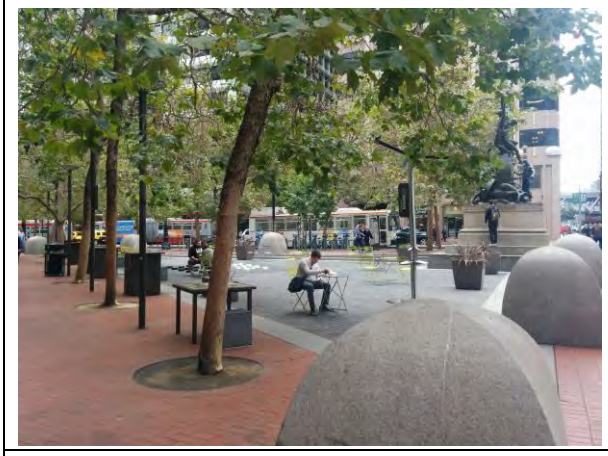

Image 166. Mechanics Monument Plaza, 2016, view of plaza from northwest corner showing bollard alignment on east side of plaza and tree alignment on northeast side of the plaza at street level (pictured right). (Photograph by author, July 2016)

Image 167. Mechanics Monument Plaza, 2016, showing post-Market Street Redevelopment Plan alterations to the plaza that include addition of a planting bed featuring ornamental grass in southeastern corner. (Photograph by author, March 2016)

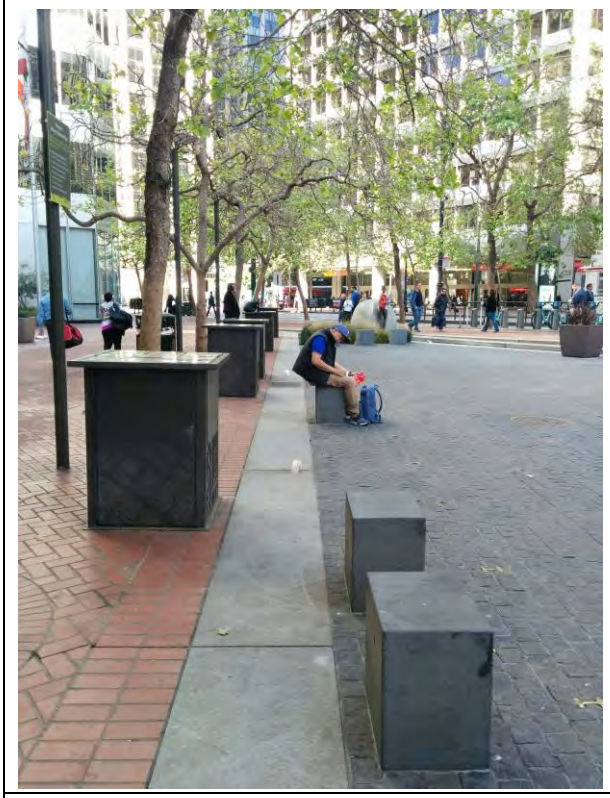

Image 168. Mechanics Monument Plaza, 2016, post-renovation showing replacement of wood-slat benches with post-Market Street Redevelopment Plan furnishings that include stone stools and metal tables (not moveable) on the northeastern boundary. (Photograph by author, March 2016)

Image 169. Mechanics Monument Plaza, 2016, showing addition of post-Market Street Redevelopment Plan planting tubs, which are not sympathetic to the design of Market Street Redevelopment Plan-era planting tubs. (Photograph by author, March 2016)

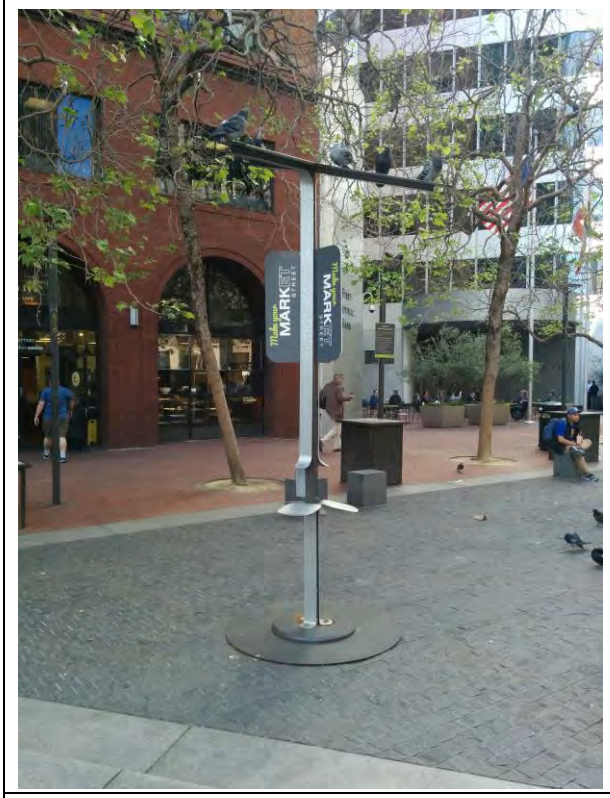

Image 170. Mechanics Monument Plaza, 2016, showing the solar-powered electronic device charging station added to the northern corner of the plaza. (Photograph by author, March 2016)

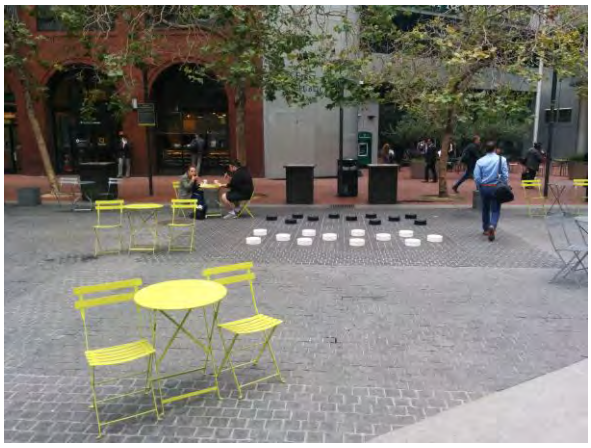

Image 171. Mechanics Monument Plaza, 2016, showing alterations to the plaza including modifications to the original paving to create a checkboard pattern. Removal of wood-slat benches provides for movable café seating in the plaza. (Photograph by author, July 2016)

5.5.3 Crocker Plaza

The following summarizes existing conditions for Crocker Plaza in terms of Spatial Organization, Circulation, Vegetation, Buildings and Structures, and Small-Scale Features.

5.5.3.1 Natural Systems and Features

Unlike plazas designed as part of the Market Street Redevelopment Plan, Crocker Plaza is not located on a triangular site that benefits from sunlight channeled by the diagonal street configuration. It is deeply shadowed by the building adjacent to its western boundary.

5.5.3.2 Spatial Organization

Crocker Plaza is located at One Post Street at the intersection of Post, Montgomery, and Market Streets. The site is roughly triangular with a two-tiered, octagon-shaped platform at street level and a sunken plaza one story below. The granite steps that create the plaza's octagonal platform, are used for seating and are backed by an iron fence (**Image 174**).

5.5.3.3 Circulation

Paving in pedestrian walking area around the granite platform is brick laid in a herringbone pattern, which blends with the adjacent Market Street sidewalk. Circulation from street level to the sunken plaza is via a granite stairway (**Image 176**). The pedestrian circulation area in the lower plaza includes a small platform for the stair landing, which is paved with red bricks laid on headers. Granite steps lead pedestrians down from the platform to the lowest level of the plaza, which is also paved with red bricks. The sunken plaza includes access to an entrance to the Montgomery Street BART/Muni station.

5.5.3.4 Vegetation

Street level vegetation includes trees at the southeast and southwest corners, still located in their original locations and differentiated from streetscape trees by their bronze octagonal tree grates, which mimic the plaza's octagonal shape (**Image 172**). Octagonal planting tubs clustered the trees are no longer present on in the plaza. The octagonal planting tub on the south side of the stairway is no longer extant, but a large circular planting tub is on the north side of the stair entrance. Trees planted in the sunken plaza also retain their original locations and have matching bronze octagonal grates. Octagonal planting tubs are no longer present in the sunken portion of the plaza.

5.5.3.5 Buildings and Structures

The street-level kiosk—square with curved roof—on the west side of the plaza appears to remain in terms of location, but may have altered materials and design details (**Image 175**).

5.5.3.6 Small-Scale Features

Octagonal trash receptacles in the sunken plaza have been removed. Two cylindrical trash receptacles flank the BART station entrance in the lower level of the plaza. The exact date of placement of these receptacles is not known. Square backless granite benches have been removed on the south side where the plaza joins the Market Street Redevelopment Plan streetscape. Signage has been altered over the stairway at street level and for retail shops in the sunken plaza (**Image 173**). The post-Market Street Redevelopment Plan signage that identifies the site as "One Post Plaza" has a more prominent character than original signage, featuring gold lettering arched over descending stairs with additional yellow retailer signage below.

Image 172. Crocker Plaza, 2016, retains original tree placement on the southern boundary, adjacent to Market Street, however, backless square stone benches have been removed. (Photograph by author, March 2016)

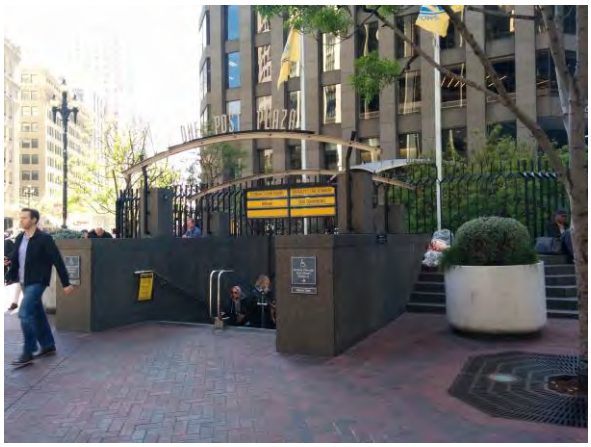

Image 173. Crocker Plaza, 2016, showing that signage has been altered, as have the street-level planting tubs. (Photograph by author, March 2016)

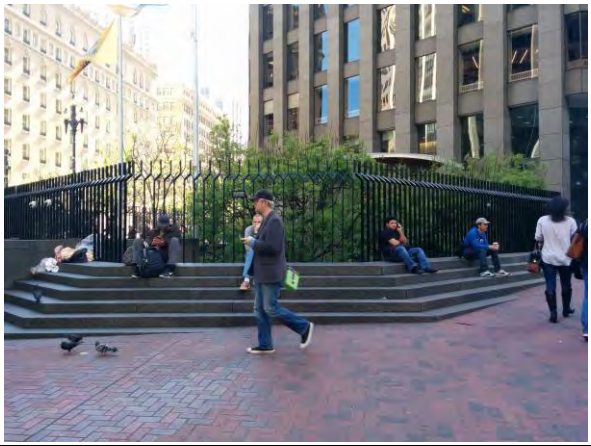

Image 174. Crocker Plaza, 2016, showing original design of the plaza's stepped platform remains intact. (Photograph by author, March 2016)

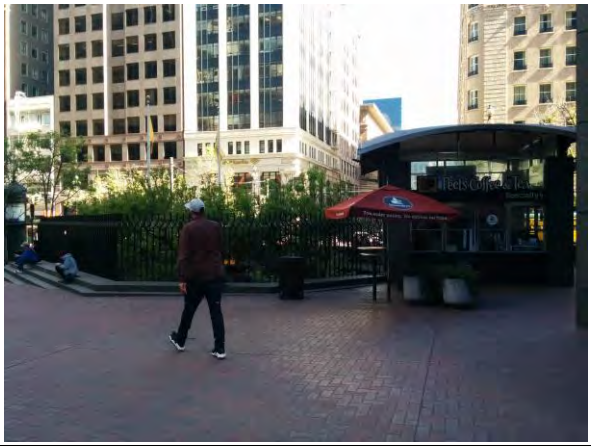

Image 175. Crocker Plaza, 2016, showing that the structure at western side of the plaza remains intact. (Photograph by author, March 2016)

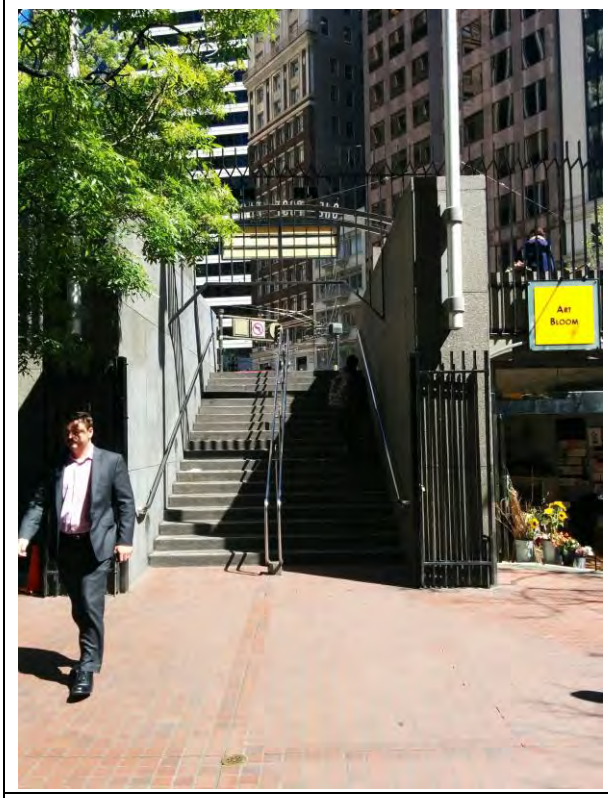

Image 176. Crocker Plaza, 2016, showing that configuration of vertical circulation from street level to lower level is retained. (Photograph by author, March 2016)

5.5.4 Mark Twain Plaza

The following summarizes existing conditions for Mark Twain Plaza in terms of Natural Systems and Features, Spatial Organization, Circulation, Vegetation, Buildings and Structures, and Small-Scale Features.

5.5.4.1 Spatial Organization

Mark Twain Plaza remains located between New Montgomery Street and 3rd Street. The plaza's name has reverted to Annie Street. The plaza features concrete benches, light poles, and planting beds that align with the linear orientation of the plaza's plan (**Image 177**).

5.5.4.2 Circulation

Mark Twain plaza includes red brick laid in a herringbone pattern in the pedestrian circulation areas, along with a concrete path between the building on the eastern boundary of the plaza and the plaza's granite benches.

5.5.4.3 Vegetation

Vegetation is minimal and limited to shrubs located in the plaza planting beds.

5.5.4.4 Buildings and Structures

The facades of adjacent buildings on the east and west sides of the plaza create a sense of enclosure for the space. This enclosure has been increased by an addition to the building on the west side, which encroaches into the plaza.

5.5.4.5 Small-Scale Features

Light poles in Mark Twain Plaza remain in place at their original locations, but the square translucent glass lights have been replaced. The advertising kiosk that was once present where the plaza joined the Market Street streetscape close to the west side of the plaza has been removed.

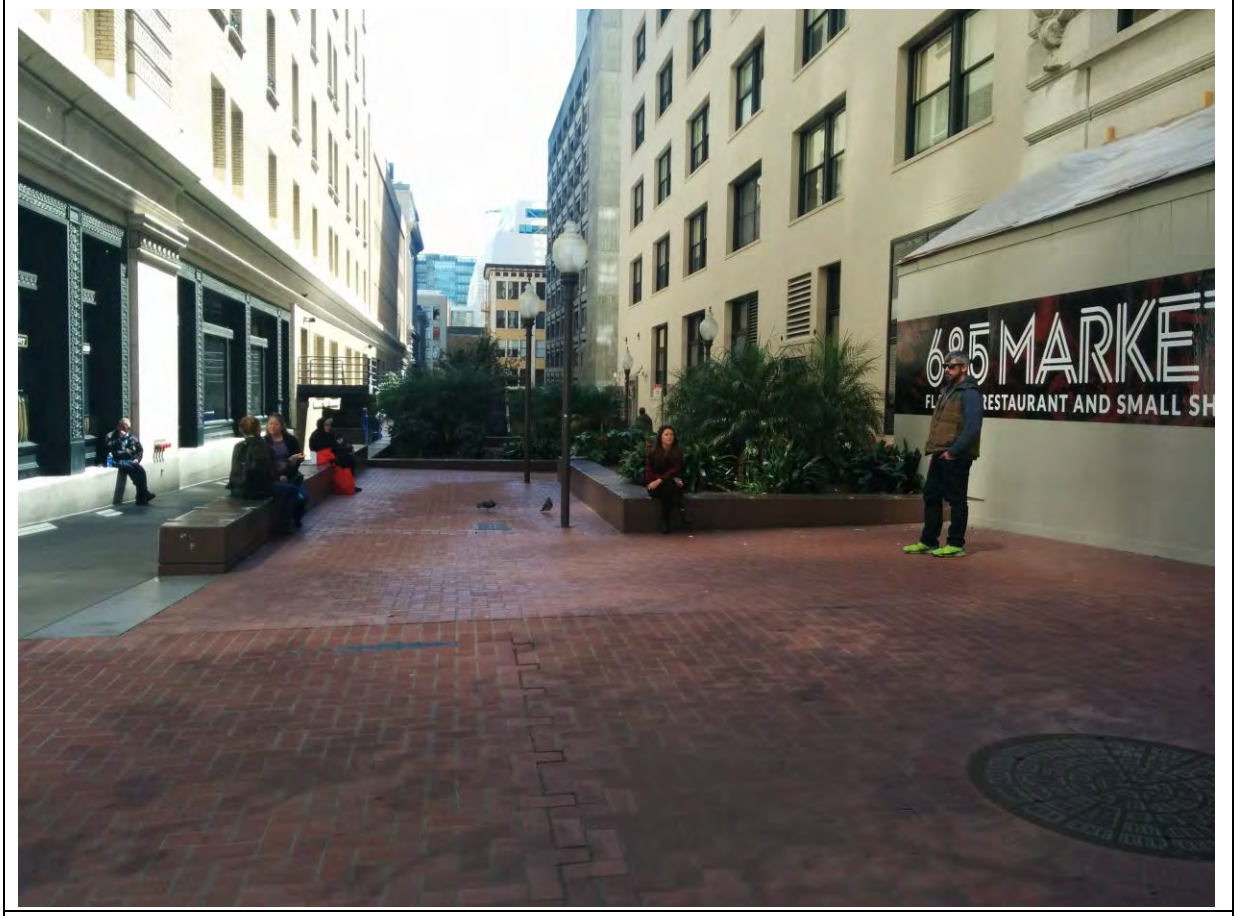

Image 177. Mark Twain Plaza, 2016, located between New Montgomery and 3rd Street, retains overall configuration, brick paving, concrete bench, and planting beds. Lighting placement is retained but glass lamp style is altered. The construction barrier on the western boundary that encroaches on plaza space is temporary. Market Street Redevelopment Plan-era advertising kiosk has been removed. (Photograph by author, March 2016)

5.5.5 Market Street Plaza

The site of Market Street Plaza is located on the south side of Market Street across from the intersection of Grant Avenue and Market (**Image 178**). While it is unclear if Market Street Plaza was completed as part of the Market Street Redevelopment Plan, or if its completion is more appropriately aligned with Yerba Buena Center development, research associated with the plaza's current condition indicates redesign of the space in 2005 by landscape architect, Walter Hood. The site includes a bosque, an allée, benches, a ramp, stairs, a canopy, an oculus fountain, a kiosk, bamboo plantings, and metal screens (Walter J. Hood Design 2015). During late afternoons, the corridor can become very windy. It is unclear if this natural system was present during the Market Street Redevelopment Plan-era or if renovation of the space has had any impact on channeling the wind. The location along the Market Street alignment on Yerba Buena Lane connecting Market and Mission Streets remains intact.

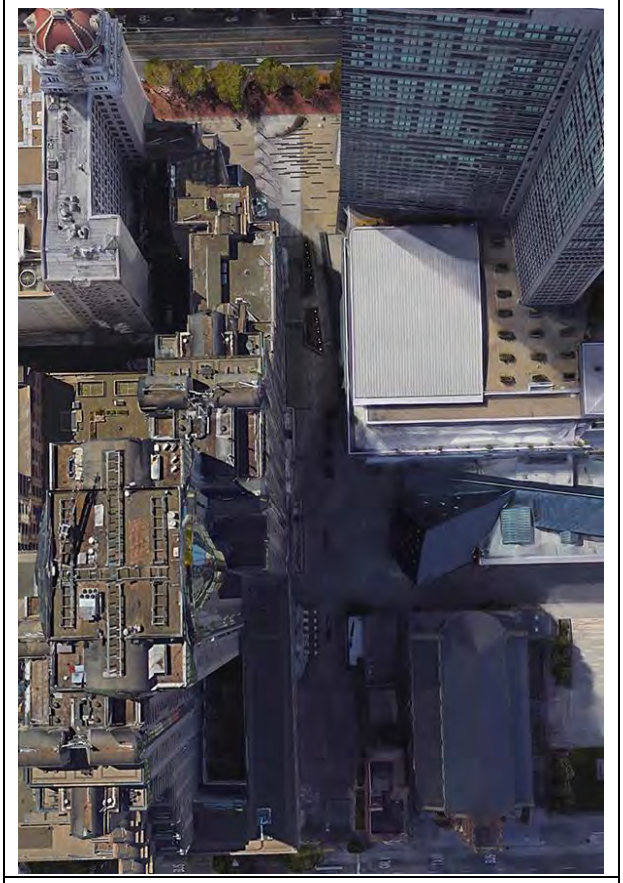

Image 178. Market Street Plaza was renovated in 2005 and is now known as Yerba Buena Lane (Google Earth 2016).

Chapter 6
Evaluation

The following evaluation of Market Street establishes three statements of significance and associated periods of significance based on Market Street's historical chronology (Section 4.1) and comparative contexts (Section 4.2). This chapter also identifies the landscape characteristics and character-defining features that date to Market Street's three periods of significance and, where present, convey Market Street's significance.

The discussion of character-defining features in this chapter also identifies landscape feature priority levels, which evaluate the relative importance of landscape features as indicators of significance for Market Street. Depending on the type of significance, the presence of some landscape characteristics and character-defining features are more critical to integrity than others (Page, Gilbert, and Dolan 1998:72).

This is true of Market Street and, as such, this evaluation categorizes landscape characteristics associated with Market Street using a hierarchy that establishes:

- **Priority 1** – Character-defining features are those features most critical to expressing association with a given area of significance and, subsequently, most essential to establishing integrity. For a landscape to be found to retain integrity, a majority of Priority 1 features must be retained.
- **Priority 2** – Character-defining features are those features that contribute meaningfully to expressing association with a given significance, where aggregate loss of these features can greatly diminish the ability to read Market Street's associations with history.
- **Priority 3** – Character-defining features are those features least essential to the expression of Market Street's associations with history, where loss will diminish Market Street's integrity, but not to the extent of making the landscape unreadable as a historic resource.

It is important to clarify, for a complex cultural landscape like Market Street, that a character-defining feature can express Market Street's significance in more than one of its three areas of significance and may be prioritized differently within each one of those significance areas. It is also important to recognize that cultural landscape evaluation methods acknowledge dynamic processes of evolution that are inherent in landscapes. Change itself can be a character-defining feature that expresses the resource's historical significance and, while physical change is typically interpreted as signifying loss of integrity for buildings, this alternative perspective is considered when assessing integrity for cultural landscapes.

With understanding of the character-defining features associated with each of Market Street's significance statements and how those features are prioritized, this chapter evaluates Market Street's integrity in terms of the seven aspects of integrity (described in Section 3.1). Integrity is determined by comparing historic context with existing conditions (described in Chapter 5) to assess if enough prioritized character-defining features dating to the period of significance remain to sufficiently convey Market Street's significance. This evaluation also considers how features that have been introduced into the landscape after the period of significance may negatively impact integrity. When evaluating integrity, it is important to not only consider changes to individual features, but also consider how such changes aggregate to affect the landscape as a whole. Even if

other character-defining features with lower priority rankings persist and incompatible elements obscuring character are reversed, without Priority 1 features intact, Market Street cannot sufficiently express its associations with history. Criterion Consideration G is applied in cases where Market Street's period of significance and associated character-defining features are less than 50 years old and the integrity of those features has been retained (described in Section 3.1.).

Given the complexity and volume of landscape features associated with the Market Street Redevelopment Plan period of significance, Feature Condition Analysis Tables in Sections 6.1.3, 6.2.3, and 6.4.3 are used to facilitate analysis of feature conditions relative to integrity. These sections also include Summary of Change narratives to clarify change present in the landscape. In addition, Integrity Analysis Tables are used in Section 6.4.3 for each of Market Street's components—the streetscape, large plazas, and small plazas—to organize integrity analysis that is then aggregated into the Overall Integrity Analysis in Section 6.4.4.

Based on this process, Market Street is found to be eligible for: NRHP/CRHR under Criterion A/1 for its role as San Francisco's main circulation artery and facilitator of urban development from 1847–1929; NRHP/CRHR under Criterion A/1 for its role as a venue for civic engagement in San Francisco and is found to meet Criterion Consideration G; NRHP/CRHR under Criterion C/3 as the work of master architects Mario Ciampi and John Warnecke and master landscape architect Lawrence Halprin and is found to meet Criterion Consideration G.

6.1 NRHP/CRHR Criterion A/1: Market Street as San Francisco's Main Circulation Artery and Facilitator of Urban Development

6.1.1 Statement of Significance

Market Street appears to be nationally significant under NRHP Criterion A and CRHR Criterion 1 for its historic role as San Francisco's main circulation artery and facilitator of urban development based on its association with the early urban and economic growth of San Francisco. As San Francisco's main circulatory artery, Market Street provided the physical foundation and transportation infrastructure mechanism that facilitated the city's development. Jasper O'Farrell's linear plan for Market Street, which formed an east-west axis joining the waterfront with the interior, helped spur early urban development from 1847–1860. Improvements to the street paving, municipal infrastructure, and introduction of multi-modal transportation prompted private investment along the corridor during a period of increasing urbanization from 1860–1906. Market Street provided organizing space need to facilitate rapid reconstruction after the 1906 earthquake and fire and, from 1906–1929, was the venue where new progressive-era public urban infrastructure was most aggressively introduced and new private investment in development of landmark-quality buildings was made.

6.1.2 Period of Significance

The period of significance is 1847–1929. This period spans from the street's creation by the O'Farrell survey in 1847 through the 1920s economic boom, ending in 1929 with the U.S. Stock Market Crash that led to the Great Depression and a national economic recession up until World

War II. This duration saw significant expansion of multi-modal transportation, urban infrastructure, and investment in public and private built environment development in San Francisco prior to the Depression. This period defines the span of time in which Market Street, as a circulation artery, has the greatest impact facilitating urban development in San Francisco.

6.1.3 Character-Defining Features

Character-defining features that date to the period of significance and express Market Street's role as San Francisco's main circulation artery—a function which facilitated the city's early urban and economic development—relate to Market Street's significance under NRHP Criterion A and CRHR Criterion 1. These character-defining features of the Market Street cultural landscape are described and analyzed in terms of condition and priority level (Priorities 1-3, as defined in the introduction to Chapter 6) in Table 6-1 below, followed by Summary of Change narrative.

Table 6-1. Feature Analysis Table: Market Street as a Main Circulation Artery

Description	Status	Priority Level	Comments/Analysis
Spatial Organization			
Alignment as axis	Extant	1	Market Street remains an axis connecting the eastern waterfront with the southwest interior, oriented diagonally, visually connecting Twin Peaks with the Ferry Building. Retained alignment contributes to integrity of location, design, feeling, and association.
Grid alignment	Extant	2	Market Street retains its alignment as a meeting place between two discordant grids laid over the city's typography, oriented perpendicularly to the street grid in the south. Retained alignment contributes to integrity of location, design, feeling, and association.
Linear plan	Extant	1	Market Street's linear plan from the eastern terminus of Market Street west to Castro Street remains intact as a transportation artery, contributing to integrity of location, design, feeling, and association.
Cluster Arrangements			
Presence of multi-modal transportation systems	Extant	1	While some specific transportation systems and specific associated features are not retained from the earliest eras of the period of significance, Market Street retains the presence of multi-modal transportation systems clustered along Market Street. These systems of movement express Market Street's role as San Francisco's main circulation artery. Retained arrangement contributes to integrity of design, setting, feeling, and association for the streetscape.

Description	Status	Priority Level	Comments/Analysis
Circulation			
Sidewalks	Partial	2	Market Street sidewalks retain integrity of location. Use of sidewalks as a system for pedestrian circulation support's Market Street's retention of integrity of association. However, the sidewalks have been altered since the period of significance and do not retain integrity of design (width), materials, workmanship, or feeling.
Roadway	Partial	2	Market Street retains the presence of roadways for use as a vehicle circulation system, which contributes to integrity of association. However, the roadway has been altered since the period of significance and do not retain integrity of design, materials, workmanship, or feeling.
Rails	Partial	2	Market Street retains the presence of rails for streetcar and cable car circulation, which contribute to integrity of association. However, the rails have been altered since the period of significance and do not retain integrity of design, materials, workmanship, or feeling.
Electric catenary wire system	Partial	2	Market Street retains the presence of electric catenary for streetcar circulation, which contribute to integrity of association. However, the electric catenary have been altered since the period of significance and does not retain integrity of design, materials, workmanship, or feeling.
Cable car turnarounds	Extant	2	Market Street retains the presence of cable car turnarounds, which contribute to integrity of design, material, workmanship, feeling, and association.
Topography			
Grade	Extant	3	Market Street's grade elevation increases from east to west as during its period of significance, and contributes to integrity of design, material, workmanship, feeling, and association.
Buildings and Structures			
Landmark buildings	Extant	1	Retention of buildings and structures constructed along Market Street for strategic advantage (practical utility of access to Market Street's main circulation artery, as well as for the purpose of displaying wealth and success) contributes to integrity of setting, design, material, workmanship, feeling, and association.

Description	Status	Priority Level	Comments/Analysis
Views and Vistas			
Line of sight from east to west	Extant	2	Line of sight from east to west is retained, including view of Twin Peaks and Sunset, and contributes to integrity of setting, design, feeling, and association.
Line of sight west to east	Extant	1	Line of sight from west to east is retained, including view of Market Street's length terminating at the Ferry Building, contributes to integrity of setting, design, feeling, and association.
View of Market Street from Twin Peaks	Extant	3	View of Market Street from points near the ridge and down the eastern slope of Twin Peaks are retained and contribute to the Market Street's integrity of setting, design, feeling, and association.
Constructed Water Features			
Lotta's Fountain	Extant	3	Retained from pre-Market Street Redevelopment Plan Market Street development and contributes to integrity of design, materials, feeling, and association for the streetscape.
Small-Scale Features			
Path of Gold Light Standards	Partial	1	Path of Gold Light Standards are replicas and do not retain integrity of materials and workmanship, but do retain integrity of location, design, feeling, and association. Thus, existing Path of Gold Light Standards from Justin Herman Plaza to Valencia Street contribute to Market Street's integrity of design, materials, workmanship, feeling, and association for the streetscape.
AWSS fire hydrants	Extant	3	AWSS, features retained from pre-Market Street Redevelopment Plan Market Street development, are in good condition. While they were present throughout the city during the period of significance and not exclusively components of Market Street, they are features that contribute to the streetscape's integrity of design, materials, workmanship, feeling, and association.
Samuel's Clock	Extant	3	Retained from pre-Market Street Redevelopment Plan Market Street development and contributes to integrity of design, materials, feeling, and association for the streetscape.

Description	Status	Priority Level	Comments/Analysis
Mechanics Monument	Extant	3	Retained from pre-Market Street Redevelopment Plan Market Street development and contributes to integrity of design, materials, workmanship, feeling, and association for the streetscape.
California Statehood Monument	Extant	3	Retained from pre-Market Street Redevelopment Plan Market Street development and contributes to integrity of design, materials, workmanship, feeling, and association for the streetscape.
Emergency call boxes	Extant	3	Retained from pre-Market Street Redevelopment Plan Market Street development and contributes to integrity of design, materials, workmanship, feeling, and association for the streetscape.

Summary of Change

The following summarizes changes to features outlined in *Table 6-1 Feature Analysis Table: Market Street as a Main Circulation Artery* relative to their priority levels.

- Of the 6 features determined to be Priority 1:
  - 5 are extant
  - 1 is partially extant
  - 0 are lost
- Of the 7 features determined to be Priority 2:
  - 3 are extant
  - 4 are partially extant
  - 0 are lost
- Of the 8 features determined to be Priority 3:
  - 8 are extant
  - 0 are partially extant
  - 0 are lost

All features were determined to be extant or partially extant. While status of Priority 2 features is split between those that are extant and those that are only partially extant, the majority of features in Priority 1 are extant and all of the Priority 3 features are extant. Overall, the majority of character-defining features were determined to be in extant.

6.1.4 Integrity Analysis

For Market Street to express its significance under NRHP Criterion A and CRHR Criterion 1 for its historic role as San Francisco's main circulation artery and facilitator of urban development, its character-defining features must retain integrity. Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. **Of these categories, it is most essential for integrity of location, setting, design, and association to be retained, as they best convey the place, physical context, forms, and processes associated with Market Street's performance as San Francisco's main circulation artery and facilitator of urban development during the period of 1847–1929.** The following integrity analysis is informed by the assessment of character-defining features and Summary of Change narrative in Section 6.1.3.

6.1.4.1 Location

Market Street's alignment as an axis connecting the eastern waterfront with the southwest interior and as the boundary that join's the city's discordant north and south grids are in good condition relative to the street's positioning during the 1847–1929 period. In addition, Market Street's linear plan from its eastern terminus to Castro Street is unchanged. Thus, Market Street retains a high degree of integrity of location.

6.1.4.2 Setting

Urban streets that serve as main circulation arteries and public venues for civic engagement with integrity of setting retain their physical relationship with associated cluster arrangements, spatial organization, and views and vistas that contribute to the historic setting. While the specific transportation systems from the period of significance are not present on the landscape, Market Street does retain the presence of multi-modal transportation systems clustered along the streetscape as it did from 1847–1929. These new systems continue to express Market Street as a setting for San Francisco's main artery of transportation. Many landmark buildings dating from 1909–1929, which were constructed for strategic advantage along Market Street, continue to be sited in the same footprints. These older buildings combine with newer buildings to form the streetscape's vertical walls and create the urban setting. While the height and density of the skyline has increased over time, the views of Market Street that mark the position and importance of the street within the larger city are still evident. The view down the eastern slope of Twin peaks is intact, and line of sight from Twin Peaks Vista Point looking east continues to include Market Street's length terminating at the Ferry Building. Similarly, the line of sight from the intersection of Market Street at Steuart Street looking west continues to include a view of Market Street's length terminating at Twin Peaks. Together, these features of the Market Street landscape contribute to a high integrity of setting.

6.1.4.3 Design

In addition to contributions to integrity of location, Market Street's alignment and plan also contribute to integrity of design as important planning features that were set as part of the O'Farrell survey in 1847. The retained axis connecting the northeastern waterfront with the southwest interior, oriented diagonally, as well as the grid alignment joining the northern and southern street grids contribute to integrity of design. The presence of multi-modal transportation also contributes to integrity of design, even if the specific infrastructure elements of the modes of transportation

designed into the landscape have evolved over time. Features such as the California Street and Powell Street cable car turnarounds, as well as trolley rails and electric streetcar catenary wires, remain intact as contributors to design integrity. The grade elevation, which increases from east to west, has also not been significantly altered since the period of significance. However, design of the street, sidewalks, crosswalks, curbs, and street furnishing have been altered since the 1847–1929 period of significance by the Market Street Redevelopment Plan project and other streetscape projects. The arrangements of small-scale features from the 1847–1929 period have been significantly altered, though the Path of Gold Light Standards, AWSS fire hydrants, Samuel's Clock, Mechanics Monument, California Statehood Monument, and emergency call boxes retain their placement on the sidewalks. Based on these retained and altered conditions, overall, Market Street has a moderate degree of design integrity.

6.1.4.4 Materials

Little streetscape material from the 1847–1929 period remains intact. Materials associated with the multi-modal transportation systems do not retain material integrity. The Path of Gold Light Standards are replicas, but the AWSS fire hydrants, Samuel's Clock, Lotta's Fountain, Mechanics Monument, and California Statehood Monument have been retained. Materials for street, sidewalk, crosswalk, and curbs dating to the 1847–1929 period were removed over time, particularly with implementation of the Market Street Redevelopment Plan project. As such, overall, Market Street has poor material integrity for the period of significance.

6.1.4.5 Workmanship

Features such as the AWSS fire hydrants, Samuel's Clock, Lotta's Fountain, Mechanics Monument, and California Statehood Monument appear to have been maintained and repaired with methods that preserved their integrity of materials, as well as their integrity of workmanship. Conversely, the Path of Gold Light Standards, which are replicas of those that were placed in the landscape during the 1847–1929 period of significance do not retain material integrity and, thus, also do not retain integrity of workmanship. Meanwhile, features associated with multi-modal transportation systems that date from 1847–1929 have been replaced with new infrastructure. Thus, it appears these features were not maintained and repaired with methods consistent with integrity of workmanship. Street paving, sidewalks, crosswalks, and curbs dating to the 1847–1929 period were removed over time, particularly with implementation of the Market Street Redevelopment Plan project, and current materials do not retain integrity of workmanship for the period of significance. As such, overall, Market Street has poor integrity of workmanship for the period of significance.

6.1.4.6 Feeling

While Market Street does retain the feeling of a main circulation artery, the composite of setting, design, materials, and workmanship does not convey the feeling of a main circulation artery from the 1847–1929 period.

6.1.4.7 Association

Market Street's spatial organization (alignment and plan), topography (grade), landmark buildings, views and vistas (lines of sight and view of Market Street from Twin Peaks), constructed water features (Lotta's Fountain), and small-scale features (Path of Gold Light Standards, AWSS fire hydrants, Samuel's Clock, Mechanics Monument, California Statehood Monument and emergency

call boxes) all contribute to integrity of association, in that they evoke the use and processes of Market Street as San Francisco's main circulation artery during the period of significance. In addition, while specific modes of transportation have evolved over time, the presence of multi-modal transportation cluster arrangements as character-defining features that expresses Market Street's role as San Francisco's main circulation artery are intact. Circulation features that date to the period of significance that contribute for integrity of association include sidewalks for pedestrian travel, roadways for vehicle travel, rails for trolleys and streetcars, overhead catenary wires for trolleys, and the cable car turnarounds at Powell Street and California Street. Circulation features added since the period of significance that diminish integrity of association include Market Street Redevelopment Plan-era traffic lights and signage, Muni high-low platforms, post-Market Street Redevelopment Plan bus shelters, bike and bus lanes, bike share kiosks, bike stands.

6.1.5 Criterion Consideration G

Criterion Consideration G evaluation is not required for Market Street's significance as San Francisco's Main Circulation Artery and Facilitator of Urban Development given that the period of significance is 1847–1929, which meets the 50-year threshold.

6.1.6 Eligibility Recommendation

Market Street continues to convey its significance as San Francisco's main circulation artery and foundational transportation infrastructure. While the status of some character-defining features associated with Market Street's role as San Francisco's main circulation artery and facilitator of urban development from 1847–1929 has resulted in categorization as partially extant, it is important to recognize that cultural landscape evaluation methods acknowledge the dynamic processes of evolution that are inherent in landscapes. In this case, Market Street's significance is tied directly to its role in facilitating development and specifically the location, setting, design, and association aspects of integrity. **Of these categories, it is most essential for integrity of location, setting, design, and association to be retained, as they best convey the place, physical context, forms, and processes associated with Market Street's performance as San Francisco's main circulation artery and facilitator of urban development during the period of 1847–1929.** Thus, changing materials and workmanship, which can result in loss of integrity of feeling, is acceptable within the context of expressing the resource's historical significance when integrity of location, design, setting, and association are intact. Thus, Market Street retains sufficient integrity to convey its significance as San Francisco's main circulation artery and facilitator of urban development from 1847–1929. As such, Market Street is eligible for listing in the NHRP under Criterion A and the CRHR under Criterion 1.

6.2 NRHP/CRHR Criterion A/1: Market Street as Venue for Civic Engagement in San Francisco

6.2.1 Statement of Significance

Market Street appears to be nationally significant under NRHP Criterion A and CRHR Criterion 1 for its historic role as venue for civic engagement in San Francisco based on association with the public demonstrations that elevated issues of LGBTQ rights to national attention beginning in the 1960s

through 1979 and locally significant for its association with public civic events and demonstrations that elevated civic discourse about other important themes in civil rights. The route from Justin Herman Plaza to Market Street and through UN Plaza to City Hall was used as a ceremonial and processional route through the city for protest marches, community celebrations, and civic parades. Historically notable protests and celebrations that used Market Street as a venue for public engagement related to issues of LGBTQ right included the Gay Freedom Day Parade (later known as Pride Parade) beginning procession along Market Street in 1977, and the May 21, 1979, White Night Riot.

In this role as venue for large public civic events such as political rallies, civic ceremonies, and public speeches, Market Street is also significant at the local level for association with social history themes including the labor rights and civil rights movements, war protest and peace celebration, and women's suffrage. Examples of these events include: Labor Day parades and labor protests by the Working Men's Party and anti-Chinese movement during the 1870s; the Preparedness Day Bombing July 11, 1916, during a parade held in anticipation of the United States imminent entry into World War I; the first Armistice Day Parade on November 11, 1918; suffrage activist parades during the 1900s–1920s; funeral procession for men killed during the July 5, 1934, "Bloody Thursday" Longshoremen's Association Strike; protests during the San Francisco General Strike, July 16–19, 1934; picketing in 1937 and 1938 in response to the Wagner Act of 1935; Victory Day Parade and associated rioting in 1945; Cuba Intervention protests crossing Market Street on April 19, 1961; Human Rights March on July 12, 1964; Torchlight Procession for Selma on March 14, 1965; Vietnam War Protest March on August 6, 1968; and the October 12, 1968, GI Protest March Against Vietnam.

6.2.2 Period of Significance

The period of significance is 1870s–1979. This period begins with labor rights protests in the 1870s and extends through the 1979 White Night Riot. The duration includes local protests associated with national movements, including women's suffrage (1840–1920), the modern civil rights movement (1954–1964), war protests and peace celebrations associated with World War I (1914–1918), World War II (1930–1945), the Cold War and Vietnam (1954–1975), and the LGBTQ rights movement beginning in 1960. This period defines the span of time in which Market Street, as a venue for civic engagement, had the greatest impact facilitating the action of protest and celebration by participants, as well as the observation of these activities by audiences.

6.2.3 Character-Defining Features

Character-defining features that express Market Street's role as processional route and venue for civic engagement—including protests associated with LGBTQ rights, labor rights, civil rights, war protest and peace celebration, and women's suffrage—relate to Market Street's significance under NRHP Criterion A and CRHR Criterion 1. These character-defining features of the Market Street Cultural Landscape are described and analyzed in terms of condition and priority level (Priorities 1-3, as defined in the introduction to Chapter 6) in Table 6-2 below, and followed by a Summary of Change narrative.

Table 6-2. Feature Analysis Table: Market Street as a Venue for Civic Engagement

Description	Condition	Priority Level	Comments/Analysis
Spatial Organization			
Verticality of streetscape	Extant	1	Buildings that line Market Street articulate vertical planes that define the space for procession at street level, but also establish Market Street as an amphitheater with an audience elevated within buildings above. As such, retained alignment contributes to integrity of setting for Market Street.
Alignment as axis	Extant	1	Market Street remains an axis connecting the eastern waterfront with the southwest interior, oriented diagonally to visually connect Twin Peaks with the Ferry Building. Retained alignment establishes integrity of location and contributing to integrity of location and design, feeling, and association.
Linear plan	Extant	2	Market Street's linear plan from the eastern terminus of Market Street west to Castro Street remain intact with no changes altering the street into being a more circuitous route, contributing to integrity of location, design, feeling, and association.
Grid alignment	Extant	1	Market Street retains its alignment as a meeting place between two discordant grids laid over the city's typography, oriented perpendicularly to the street grid in the south. Retained alignment contributes to integrity of location, design, feeling, and association.
Cluster Arrangements			
Plaza arrangement along Market Street	Extant	1	While Justin Herman Plaza, Robert Frost Plaza, Mechanics Monument Plaza, Mark Twain Plaza, Crocker Plaza, Hallidie Plaza, and UN Plaza were not present along Market Street during the entire period of significance, they were added as open spaces for public gathering during the period of significance and remain intact as places along the processional route for participant and audience gathering. Retained arrangement contributes to integrity of design, location, setting, feeling, and association for the streetscape.
North-south intersections	Extant	1	North-south intersections clustered along Market Street remain intact as locations that allow participants and audiences of civic engagement activities access to east-west processional route from the northern and southern street grids. As such, these

Description	Condition	Priority Level	Comments/Analysis
			intersections contribute to integrity of design, feeling, and association.
Circulation Features			
Sidewalks	Partial	1	Market Street retains the presence of sidewalks for pedestrian circulation and audience participation during public engagement events, which contribute to integrity of design and association. The sidewalks have been altered since the 1870s-1967 segment of the period of significance and do not retain integrity of design (width alteration), materials, workmanship or feeling. For the Market Street Redevelopment Plan era, sidewalks do retain integrity of design, materials, workmanship, feeling, and association.
Roadway	Partial	1	Market Street retains the presence of roadways used as the route for public procession in protest and celebration, which contribute to integrity of association. However, the roadway width has been altered since the 1870s-1967 segment of the period of significance and do not retain integrity of materials, workmanship, or feeling. For the Market Street Redevelopment Plan era, roadway does retain moderate integrity of design, materials, workmanship, feeling, and association.
Topography			
Grade	Extant	1	Market Street's grade remains relatively flat along Market Street from the Embarcadero to Castro Street, but increases from east to west as during its period of significance, and contributes to integrity of design, material, workmanship, feeling, and association.
Views and Vistas			
Broad view of streetscape	Partial	2	Broad view of streetscape from sidewalks and intersections remains intact, offering visual access to audience at street level and in buildings to processions down Market Street. However, the view is diminished slightly by the addition of Muni high-low structures in the street. As such, the vista contributes to integrity of design, feeling, and association.
Vista of City Hall from UN Plaza	Partial	1	Vista of City Hall from UN Plaza remains intact, offering visual connection between the plaza gathering space and the seat of government. However, the view is diminished slightly from some vantage points by the Bolivar statue

Description	Condition	Priority Level	Comments/Analysis
			which partially obstructs the view of City Hall when observers are standing in the UN Plaza Fulton promenade. As such, the vista contributes to integrity of design, feeling, and association.
Justin Herman Plaza open space	Extant	3	View of Justin Herman open space remains intact, offering visual access to mass gatherings. As such, the view contributes to the Market Street's integrity of design, feeling, and association.
Constructed Water Features			
Lotta's Fountain	Extant	3	Lotta's Fountain is retained from pre-Market Street Redevelopment Plan Market Street development and contributes to integrity of design, materials, feeling, and association for the streetscape.
Small-Scale Features			
Path of Gold Light Standards	Partial	3	Path of Gold Light Standards are replicas and do not retain integrity of materials and workmanship, but do retain integrity of location, design, feeling, and association. Thus, existing Path of Gold Light Standards from Justin Herman Plaza to Valencia street retain enough integrity overall to contribute to Market Street's integrity of design, materials, workmanship, feeling, and association for the streetscape.
AWSS fire hydrants	Extant	3	Retained infrastructure contributes to integrity of design, materials, workmanship, feeling, and association for the streetscape.
Samuel's Clock	Extant	3	Retained monument contributes to integrity of design, materials, workmanship, feeling, and association for the streetscape.
Mechanics Monument	Extant	3	Retained monument contributes to integrity of design, setting, feeling, and association for the streetscape.
California Statehood Monument	Extant	3	Retained monument contributes to integrity of design, setting, feeling, and association for the streetscape.

Summary of Change

The following summarizes change to features outlined in *Table 6-2 Feature Analysis Table: Market Street as a Venue for Civic Engagement* relative to their priority levels.

- Of the 9 features determined to be Priority 1:
  - 6 are extant
  - 3 are partially extant
  - 0 are lost
- Of the 2 features determined to be Priority 2:
  - 1 is extant
  - 1 is partially extant
  - 0 is lost
- Of the 7 features determined to be Priority 3:
  - 6 are extant
  - 1 is partially extant
  - 0 are lost

All features were determined to be extant or partially extant. While status of Priority 2 features is split, the majority of features in Priority 1 and Priority 3 categories are extant.

6.2.4 Integrity Analysis

For Market Street to express its significance under NRHP Criterion A and CRHR Criterion 1 for its historic role as venue for civic engagement in San Francisco, its character-defining features must retain integrity. Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. **Of these categories, it is most essential for integrity of location, setting, design, and association to be retained, as they best convey the place, physical context, forms, and processes associated with Market Street's performance as a venue for civic engagement during the period of 1870s–1979.** The following integrity analysis is informed by the assessment of character-defining features in Section 6.2.3.

6.2.4.1 Location

Market Street retains integrity of location through retention of the street's alignment as an axis and in relation to the northern and southern street grids. In addition, Market Street retains its integrity of location through retention of its linear plan, which spans from its eastern terminus at the intersection of Steuart Street and Justin Herman Plaza to Castro Street. Finally, although the large and small plazas added along the Market Street alignment as part of the Market Street Redevelopment Plan were not present during the entire period of significance, they retain integrity of location relative to their positioning during the 1968–1979 portion of the 1870s-1979 period of significance and contribute to Market Street's integrity of location.

6.2.4.2 Setting

The verticality of the streetscape remains intact, with building façade heights forming the vertical plane boundaries of the Market Street processional space and offering vantage from which audiences may observe street-level protest and celebrations. As such, Market Street retains integrity of setting for the 1870s–1979 period of significance.

6.2.4.3 Design

Market Street's alignment and linear plan have not significantly altered relative to its positioning during the period of significance. While Market Street Redevelopment Plan-era Plaza positioning along the Market Street alignment was not present during the early segment of the period of significance (before Market Street Redevelopment Plan completion in 1979), it is unaltered and retains integrity from the later segment of the period of significance (1968-1979). The plazas continue to provide multiple spaces along the processional route for gathering. North-south intersections along Market Street, which allow civic engagement access to the east-west processional route from the northern and southern street grids, remain intact. The grade elevation, which is relatively flat from Market Street from the Embarcadero to Castro Street, but increases from east to west, has not been significantly altered since the period of significance and remains a route that is easy for procession by groups marching in protest and celebration. The placement and orientation of the vista of City Hall from UN Plaza created as part of the Market Street Redevelopment Plan design is retained as a means of establishing visual connection between processional routes on Market Street and the rally destination. However, the view has been somewhat obscured by intrusion of the Bolivar statue. Similarly, the broad view of the streetscape enabled by Market Street's 120-foot width, which allows visual access to civic engagement activities along the processional route, is slightly diminished by the intrusion of Muni high-low structures, which obscure streetscape views. Meanwhile, the view of Justin Herman open space remains intact, offering visual access to mass gatherings by audiences observing from the sidewalks. Lotta's Fountain, Path of Gold Light Standards, AWSS fire hydrants, Samuel's Clock, Mechanics Monument, and the California Statehood Monument retain good condition and contribute to integrity of design.

While integrity of design for Market Street features associated with the street during the 1870s–1967 portion of the period of significance have been diminished by alterations from the Market Street Redevelopment Plan development-era and additions made post-Market Street Redevelopment Plan, the streetscape design retains a sufficient combination of elements that create its form, plan, space, structure, and style from the full duration of the period of significance to convey its significance as venue for civic engagement. Thus, overall, Market Street retains integrity of design from the period of significance.

6.2.4.4 Materials

Given the long period of significance associated with Market Street's role as venue for civic engagement (1870s–1979), the majority of physical material retained to convey that significance is from the 1968-1979 segment of time corresponding with the completion of the Market Street Redevelopment Plan design. Materials from the Market Street Redevelopment Plan segment of the period of significance also have suffered from loss of integrity of materials, particularly in terms of small-scale features (see Section 6.4). In terms of pre-Market Street Redevelopment Plan materials, the Path of Gold Light Standards are replicas and do not retain integrity of materials. Character-defining features from the pre-Market Street Redevelopment Plan portion of the period of

significance, which do retain material integrity, include Lotta's Fountain, AWSS fire hydrants, Samuel's Clock, Mechanics Monument, and the California Statehood Monument. Overall, Market Street has poor integrity of workmanship for the majority of the period of significance.

6.2.4.5 Workmanship

Materials for the roadway, sidewalks, crosswalks, and curbs dating from the early years of the period of significance until the Market Street Redevelopment Plan era, beginning in 1968 were removed over time, particularly with implementation of the Market Street Redevelopment Plan project from 1968–1979. Given AWSS fire hydrants, Samuel's Clock, Lotta's Fountain, Mechanics Monument, and California Statehood Monument appear to have been maintained and repaired with methods that have preserved their materiality, it appears that, in addition to integrity of material, they also retain integrity of workmanship. Conversely, the Path of Gold Light Standards, which are replicas of those that were placed in the landscape by 1929 do not retain integrity of material or workmanship. As such, overall, Market Street has poor integrity of workmanship for the majority of the 1870s-1979 period of significance.

6.2.4.6 Feeling

Integrity of feeling is expressed as a composite of setting, design, materials, and workmanship. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time, which results from the presence of physical features that, taken together, convey the property's historic character. While Market Street's setting and design reflect the site's historic use as a public venue for civic engagement, integrity of materials and workmanship for features that express association with the portion of the period of significance prior to the 1968-1979 Market Street Redevelopment Plan-era have been diminished. As such, overall, Market Street does not retain integrity of feeling for the majority of the 1870s-1979 period of significance.

6.2.4.7 Association

Integrity of association—the maintenance of a link to the past through continuation of a traditional use or occupation—is retained for Market Street through continued use of the traditional processional route and audience viewing areas—the linear roadway and parallel sidewalks. While plazas were added to the Market Street streetscape with the Market Street Redevelopment Plan development beginning in 1968, arrangement of these features added new spaces associated with the streetscape that were consistent with traditional use as a venue for civic engagement. Thus, overall, Market Street retains integrity of association.

6.2.5 Criterion Consideration G

Market Street retains its overall integrity of location, setting, design, materials, workmanship, feeling, and association, and conveys its historical significance as a venue for civic engagement in San Francisco. Market Street's period of significance for this area of significance is 1870s–1979, which makes character-defining features associated with the latter years of this period less than 50 years old. As such, Market Street's historical associations must be of "exceptional importance" to the City of San Francisco, State of California, western region of the United States, or the nation to be eligible for listing in the NRHP.

Market Street is exceptionally important under Criteria A for its role as a venue for civic engagement in San Francisco, particularly in terms of its use by the local LGBTQ community to achieve national recognition for social and political agendas associated with the equal rights for gay, lesbian, bisexual, transgender, and queer people. In addition, Market Street's role as a venue for civic engagement in San Francisco is exceptionally important at the local level in terms of facilitating local and regional participation in other national movements such as labor rights, women's suffrage, civil rights, war protest, and peace celebration. While Sacramento is California's state capital, San Francisco's significance as one of California's populous cultural and economic engines, its reputation as a politically progressive community, and its role in international affairs makes it a priority location for advocacy. Other streets within San Francisco could have served as parade or protest march courses, but no others offer the exceptional opportunity for audience provided by Market Street's wide route through the densely populated Financial District and direct access to the ultimate destination for articulation of advocacy messaging—City Hall. Market Street is exception as a venue for public engagement based on its starting point, route, and destination.

6.2.6 Eligibility Recommendation

Market Street continues to convey its significance as a venue for civic engagement in San Francisco. While the condition of some character-defining features associated with Market Street's role as venue for civic engagement from 1870s–1979 have been diminished, it is important to recognize that cultural landscape evaluation methods acknowledge the dynamic processes of evolution that are inherent in landscapes. In this case, Market Street's significance is tied directly to its role as a processional route in facilitating participation in and audience of political rallies, civic ceremonies, and public speeches. Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. **Of these categories, it is most essential for integrity of location, setting, design, and association to be retained, as they best convey the place, physical context, forms, and processes associated with Market Street's performance as a venue for civic engagement during the period of 1870s–1979.** As such, changing materials and workmanship, which can result in loss of integrity of materials, workmanship, and feeling, is acceptable within the context of expressing the resource's historical significance when integrity of location, design, setting, and association are intact. Thus, Market Street retains sufficient integrity to convey its significance as venue for civic engagement from 1870s–1985. As such, Market Street is eligible for listing in the NHRP under Criterion A and the CRHR under Criterion 1.

6.3 NRHP/CRHR Criterion B/2

Market Street does not appear to possess significance under NRHP Criterion B and CRHR Criterion 2. Research did not indicate Market Street to be associated with the productive life of any individual(s) important in the area of civic ritual events or urban renewal projects, or, more broadly, in history at the local, state, or national levels of significance. While many notable people have been involved in the public demonstrations recognized as significant events under NRHP Criterion A and CRHR Criterion 1, these individuals loaned their notoriety to the events and did not gain their notoriety through their participation. Additionally, even Justin Herman's redevelopment efforts to establish the plaza that was later named after him is insufficient to justify the listing of the property under Criterion B/2. Herman was the former regional director for the federal government's Housing and Home Finance Agency before he was recruited by Mayor George Christopher in 1959 to head the San

Francisco Redevelopment Agency. His 12-year tenure in this position coincided with the most active period in the nation's history for federal involvement in urban renewal projects. Herman was extremely effective in obtaining federal funding for redevelopment projects in San Francisco, such as Market Street, Diamond Heights, Golden Gateway, Western Addition, and Yerba Buena (Habert 1999). However, sites that might be significant for their association with Herman would be those projects that he was directly associated with and that represent the influence he had on San Francisco's urban environment.

6.4 NRHP/CRHR Criterion C/3: Market Street Redevelopment Plan Designed Landscape

6.4.1 Statement of Significance

Market Street appears significant at the national level under NRHP Criterion C and CRHR Criterion 3 for its association with the work of master architects John Carl Warnecke and Mario J. Ciampi, and master landscape architect Lawrence Halprin. As a collaboration of these designers, the Market Street Redevelopment Plan is significant for its early application of an interdisciplinary approach to urban design, which helped elevate the influence of landscape architecture as a discipline that provides perspective on modern urban planning.

At a time when federal redevelopment programs across the country were facilitating demolition of historic buildings at the neighborhood scale and privileging the needs of the automobile over the pedestrian, the Market Street Redevelopment Plan is significant as an early example of a designed urban landscape that prioritized the pedestrian experience and responded sympathetically to the existing historic context. We would not characterize the demolition of historic buildings for plaza development that occurred as part of this project as being consistent with preservation best practices today. However, during the time of construction preservation planning was in the early stages for professionalization and the Market Street Redevelopment Plan project was progressive within that context for its demonstration that modern transportation infrastructure could be integrated into a historic environment without *mass* demolition of historic buildings or widening of roads to accommodate more vehicular traffic. Rather, through integration of public spaces in the form of plazas, development of a unified streetscape aesthetic, incorporation of existing built environment features, expansion of sidewalks, and removal of street-level rail transit, an alternative approach to redevelopment was possible.

These approaches, which countered typical contemporary modern design practices, combined the strengths of the three joint venture masters, leveraging their professional expertise in the fields of architecture, urban planning, and landscape design to respond to the project's programmatic goal of fostering revitalization in San Francisco through redevelopment of its primary transportation artery, Market Street. While Halprin, Warnecke, and Ciampi acknowledged that improving deep-seated social and economic problems through a street redevelopment project was not always possible, they offered the Market Street Redevelopment Plan as a starting point. Each master brought essential sensibilities and expertise to the effort: Warnecke's early support for the elevation of interdisciplinary design as an essential component of urban planning and his leadership as a champion for sensitivity to historic context (Brown 2010b:142-143; Brown 2010a); Ciampi's extensive experience guiding San Francisco urban development projects that prioritized

development as to tool for economic and social impact (Brown 2010b:209; Temko 1991; Lowell 2011); and Halprin's innovative approaches to prioritizing human experience through creation of public spaces that are inspired by socially progressive ideals and design processes (Halprin 1963:216-217; Hirsch 2014:11-13; Hirsch 2014:4-5; Meyer 2008). Through the combination of these complimentary talents, the Market Street Redevelopment Plan for Market Street yielded a cultural landscape that offered an alternative to the destructive and divisive approach to urban redevelopment that preceded it. As such, Market Street appears to be significant under NRHP and CRHR Criterion C/3.

6.4.2 Period of Significance

The period of significance is 1979. This date corresponds with substantial completion of the Market Street Redevelopment Plan design as reflected by the commission of as-built photography from photographer Joshua Friewald by Lawrence Halprin & Associates. While components of the Market Street Redevelopment Plan project such as the large plazas (Justin Herman Plaza, Hallidie Plaza, and UN Plaza), small plazas (Robert Frost Plaza, Mechanics Plaza, Crocker Plaza, Mark Twain Plaza, and Market Street Plaza), and elements of the streetscape were completed throughout the 1970s, 1979 is the date when a critical volume of completed Market Street Redevelopment Plan components were present to physically express the design intent of the Market Street Joint Venture Architects for this project.

6.4.3 Character-Defining Features

Landscape characteristics that were added to Market Street as part of the Market Street Redevelopment Plan, as well as features that pre-date the Market Street Redevelopment Plan, which were conscientiously retained and incorporated into the joint venture design, convey Market Street's significance under NRHP Criterion C and CRHR Criterion 3 for association with the work of master landscape architect Lawrence Halprin and master architects Mario J. Ciampi and John C. Warnecke. The character defining features are described and analyzed in terms of status and priority level (Priorities 1-3, as defined in the introduction to Chapter 6) in the section that follows. Comparably detailed feature condition analysis tables that support individual integrity analysis for the three large plazas are included in the DPR 523 Forms for Justin Herman Plaza, Hallidie Plaza, and UN Plaza in Appendix A.

Table 6-3. Feature Analysis Table: Market Street Redevelopment Plan Landscape

Description	Status	Priority Level	Comments/Analysis
Natural Systems and Features			
Sunlight channeled through northern diagonal street grid into triangular plazas	Extant	3	Street alignment that allows this benefit remains intact and contributes to integrity of setting for the streetscape.
Spatial Organization			
Alignment of 120-foot-wide street, diagonally from east to west	Extant	1	Market Street remains in its Market Street Redevelopment Plan-era alignment and width, establishing integrity of location and contributing to integrity of design for the streetscape.

Description	Status	Priority Level	Comments/Analysis
Pedestrian-oriented separation of foot, vehicle, and rail traffic	Partial	1	Reintroduction of streetcar and trolley transit using electric overhead catenary wire to street-level undermines integrity of design, feeling, and association for the Market Street Redevelopment Plan-era streetscape.
Large Plazas			
• Justin Herman Plaza	Partial	1	Significant alterations to Justin Herman Plaza features, along with addition of new features undermine integrity of the plaza, but sufficient integrity of location, design, setting, materials, workmanship, feeling and association remain to express role as an organizing feature of Market Street.
• Hallidie Plaza	Partial	1	Alterations to Hallidie Plaza features, along with addition of new features undermine integrity of the plaza, but sufficient integrity of location, design, setting, materials, workmanship, feeling and association remain to express role as an organizing feature of Market Street.
• UN Plaza	Partial	1	Alterations to UN Plaza features, along with addition of new features undermine integrity of the plaza, but sufficient integrity of location, design, setting, materials, workmanship, feeling and association remain to express role as an organizing feature of Market Street.
Small Plazas			
• Robert Frost Plaza	Partial	1	Minor alteration to small-scale features undermine integrity of the plaza, but sufficient integrity of location, design, setting, materials, workmanship, feeling and association remain to express role as an organizing feature of Market Street.
• Mechanics' Monument Plaza	Partial	1	Redesign of the plaza has significantly undermined integrity of the plaza, but sufficient integrity of location, design, setting, materials, workmanship, feeling and association remain to express role as an organizing feature of Market Street.
• Crocker Plaza	Partial	1	Alterations to Crocker Plaza undermine integrity of the plaza, but sufficient integrity of location, design, setting, materials, workmanship, feeling and association remain to express role as an organizing feature of Market Street.
• Mark Twain Plaza	Extant	1	Mark Twain Plaza has suffered little post-Market Street Redevelopment Plan-era alteration. Sufficient integrity of location, design, setting, materials, workmanship,

Description	Status	Priority Level	Comments/Analysis
			feeling and association remain to express role as an organizing feature of Market Street.
• Market Street Plaza	-	-	Given construction may be more closely related to Yerba Buena Center redevelopment, status and priority level are not assigned.
Cluster Arrangements			
Plazas placement along length of Market Street	Extant	1	Arrangement of large and small plazas along market street remains consistent with Market Street Redevelopment Plan design and contributes to integrity of design, setting, feeling, and association for the streetscape.
Repeating pattern of BART/Muni subway entrances along length of Market Street	Extant	2	Arrangement of along the length of Market Street remains consistent with Market Street Redevelopment Plan design and contributes to design, setting, feeling, and association for the streetscape.
Repeating pattern of small-scale furnishings	Lost	2	With loss of some small-scale features, arrangement along the length of Market Street is not consistent with Market Street Redevelopment Plan design and diminishes integrity of design, setting, feeling, and association for the streetscape.
Repeating pattern of street signage (square and circular)	Partial	2	Few Market Street Redevelopment Plan-era street signs remain intact, thus repeating pattern is not discernable. This replacement of original signage undermines integrity of design, setting, feeling, and association for the streetscape.
Repeating pattern of traffic lights and traffic signage	Extant	2	Arrangement of traffic lights and traffic signage along the length of Market Street remains consistent with Market Street Redevelopment Plan design and contributes to design, setting, feeling, and association for the streetscape.
Arrangement of street trees in double and single rows down sidewalks	Extant	2	Arrangement in double- and single-tree allées along sidewalks flanking Market Street, appears to be intact and contributes to integrity of design, setting, feeling, and association for the streetscape.
Circulation			
Red brick paving in herringbone pattern that distinguishes pedestrian from vehicular space	Extant	1	Original brick paving continues to unify circulation sidewalk and plaza circulation routes, but is missing from crosswalks. Integrity of design, material, workmanship, feeling, and association are diminished slightly.

Description	Status	Priority Level	Comments/Analysis
Decorative paving at Market and Steuart Streets	Lost	3	The circular decorative paving is no longer present on the streetscape. Loss diminishes integrity of design, material, workmanship, feeling, and association.
Granite gutter, crosswalk edging, and lower Market centerline paving	Lost	3	This element is no longer present on the streetscape. Loss diminishes integrity of design, material, workmanship, feeling, and association.
Tree allées (double and single rows)	Extant	2	Trees continue to create pedestrian lanes on the sidewalks, contributing to integrity of design, feeling, and association.
Vertical circulation features (elevator, escalator, and stairs) of BART/Muni stations (Civic Center, Embarcadero, Montgomery, and Powell) and Muni-only station (Van Ness)	Extant	2	Vertical circulation features continue to allow pedestrian movement from street level to underground transit, contributing to integrity of design, feeling, and association.
Vegetation			
Street trees	Extant	1	Original species remains intact for street trees along Market Street, contributing to integrity of design, materials, workmanship, feeling, and association for the streetscape.
Buildings and Structures			
BART/Muni station street entrances: • Embarcadero Station, • Montgomery Station • Powell Station, • Civic Center Station	Partial	2	Minimalist design—form, location, and material selection—continues to reduce impact of transit presence on the street-level pedestrian experience and contributes to integrity of design, setting, feeling, and association, but some examples have security gate additions and alterations to finishes and railing that undermine integrity of design. (See UN Plaza and Hallidie Plaza Condition Analysis tables for evaluation of entrances that are incorporated into the plaza design.)
Van Ness Muni station street entrances	Partial	2	Minimalist design—form, location, and material selection—continues to reduce impact of transit presence on the street-level pedestrian experience and contributes to integrity of design, setting, materials, workmanship, feeling, and association.
Views and Vistas			
Retained view of City Hall from Market Street	Partial	1	Connection between pedestrians on Market Street and view of City Hall is retained, but integrity of design, setting, feeling, and

Description	Status	Priority Level	Comments/Analysis
			association are slightly diminished by presence of statue obstructing sightline.
Retained broad view of Market Street width	Partial	3	View remains unobstructed in many locations and allows visual connection between pedestrians, the streetscape. Obstructions have been introduced in some location in the form of Muni boarding structures and bus shelters. These additions slightly diminish integrity of design, setting, feeling, and association.
Constructed Water Features			
Lotta's Fountain	Extant	3	Retained water feature remains intact, contributes to integrity of design, setting, feeling, and association.
Small-Scale Features			
Wood slat benches	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Backless stone benches	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Granite bollards with chain links	Partial	2	Bollards contribute to integrity of design, workmanship, feeling, and association, but integrity of material is slightly diminished with missing chain links and paint covering stone in some locations.
Bronze bus shelters	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Granite and bronze drinking fountains	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Bronze BART/Muni street level elevators	Partial	2	Locations remain but design, materials and workmanship are altered.
Bronze light standards, poles with square translucent luminaries	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Bronze circular advertising kiosks	Lost	2	Loss of circular advertising kiosks on the Market Street streetscape diminishes integrity of design, feeling, and association.
Bronze four-sided street clocks	Extant	2	Presence on streetscape contributes to integrity of design, materials, feeling, and association.
Street signage	Partial	2	Presence on streetscape contributes to integrity of design, materials, workmanship, feeling, and association.
Semaphore-style traffic signage and traffic lights	Extant	2	Presence on streetscape contributes to integrity of design, materials,

Description	Status	Priority Level	Comments/Analysis
			workmanship, feeling, and association.
Bronze telephone booths	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Bronze tree grates	Partial	2	While the majority of tree locations retain their Market Street Redevelopment Plan-era grates, a notable number have been removed, diminishing integrity of design, materials, workmanship, feeling, and association.
Bronze trash receptacles	Lost	2	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Small-scale features retained from earlier periods			
• Path of Gold Light Standards	Extant	1	Retained features that pre-date the Market Street Redevelopment Plan remain intact, continue to contribute to integrity of design, setting, feeling, and association for the streetscape.
• AWSS fire hydrants	Extant	1	Retained features that pre-date the Market Street Redevelopment Plan remain intact, continue to contribute to integrity of design, setting, feeling, and association for the streetscape.
• Samuel's Clock	Extant	1	Retained features that pre-date the Market Street Redevelopment Plan remain intact, continue to contribute to integrity of design, setting, feeling, and association for the streetscape.
• California Statehood Monument	Extant	1	Retained features that pre-date the Market Street Redevelopment Plan remain intact, continue to contribute to integrity of design, setting, feeling, and association for the streetscape.
• Emergency call boxes	Extant	1	Retained features that pre-date the Market Street Redevelopment Plan remain intact, continue to contribute to integrity of design, setting, feeling, and association for the streetscape.
Post-Market Street Redevelopment Plan Features			
Trash receptacles	Non-contributing, added after period of significance	-	Addition of receptacle diminishes integrity of design, feeling, and association.

Description	Status	Priority Level	Comments/Analysis
Advertising kiosks	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Bike stands	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Bike lanes	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Bollards	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Bus shelters	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Flower stands	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Magazine and news stands	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.
Newspaper vending machines	Non-contributing, added after period of significance	-	Addition diminishes integrity of design, feeling, and association.

Summary of Change

The following summarizes change to features outlined in *Table 6-3 Feature Analysis Table: Market Street Redevelopment Plan Landscape*.

- Of the 18 features determined to be Priority 1:
  - 10 are extant
  - 8 are partially extant
  - 0 are lost
- Of the 23 features determined to be Priority 2:
  - 7 are extant
  - 7 are partially extant
  - 9 are lost
- Of the 6 features determined to be Priority 3:
  - 2 are extant
  - 1 are partially extant
  - 2 are lost

All of the Priority 1 features are extant or partially extant, and none are lost. While the distribution of Priority 2 features among the three status categories—extant, partially extant, and lost—is relatively balanced, combining the number of extant features (7) with partially extant features (7) and juxtaposing that group with lost features (9) indicates a majority of Priority 2 features to be present. Priority 3 features, which form the smallest of the three priority categories, are split between extant, partially extant and lost. Overall, the majority of character-defining features were determined to be extant or partially extant.

It is important to note, particularly in the case of landscapes significant under Criterion C/3, that integrity can be diminished by the addition of features introduced to the landscape after the period of significance. Table 6-3 includes nine post-Market Street Redevelopment Plan features that diminish integrity of design, feeling, and association.

6.4.4 Integrity Analysis

The following section analyzes the integrity of Market Street in terms of its significance for association with the work of master architects John Carl Warnecke, and Mario J. Ciampi, and master landscape architect Lawrence Halprin. Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. **Of these categories, it is most essential for integrity of location, design, materials, workmanship, and association to be retained, as they best convey the place, form, physical components, quality of labor, and processes associated with Market Street as a collaboration of the Market Street Joint Venture Architects on the Market Street Redevelopment Plan as an early application of an interdisciplinary approach, which helped elevate the influence of landscape architecture as a discipline that provides perspective on modern urban planning.** While the integrity of some of

the features that are components of the landscape as a whole have been diminished, or even lost, the aggregate integrity of Market Street is retained. This is particularly relevant where features identified as Priority 1 and 2 have sufficient integrity in terms of location, setting, design, materials, workmanship, setting, and association to express Market Street's historic significance as a cultural landscape associated with the works of masters architects Mario J. Ciampi and John Carl Warnecke and master landscape architect Lawrence Halprin.

6.4.4.1 Location

Market Street retains integrity of location. As such, the overall integrity of Market Street retains integrity of location. This is achieved though retention of the streetscape alignment and retained positions of large and small plazas along the alignment, relative to positioning when the Market Street Redevelopment Plan project was completed in 1979.

6.4.4.2 Setting

The Market Street streetscape, Hallidie Plaza, UN Plaza, Robert Frost Plaza, Mark Twain Plaza, Crocker Plaza, and Market Street Plaza all retain integrity of setting. As such, the overall integrity of Market Street retains integrity of setting. While these seven Market Street components have been diminished by some alterations and additions (detailed in Section 6.4.3, which includes feature condition analysis table), Market Street retains its overall physical relationship with associated natural systems and features, spatial organizations, the cluster arrangements, and views and vistas that do contribute to the street's historic setting. Although Justin Herman Plaza does not retain integrity of setting, it is not sufficient to undermine the overall integrity of setting established by the other seven Market Street components.

6.4.4.3 Design

Market Street streetscape retains integrity of design. As such, the overall integrity of Market Street retains integrity of design. While alterations and additions (detailed in Section 6.4.3, which includes feature analysis table) have introduced change to the Market Street landscape, the Market Street Redevelopment Plan design retains a sufficient combination of elements that create its form, plan, space, structure, and style to convey its significance. Of the seven categories of integrity, for evaluation of Criterion C/3, design is the most important. Features that express Market Street's integrity of design are associated with spatial organization, cluster arrangement, circulation, vegetation, buildings and structures, constructed water features, and small-scale features.

6.4.4.4 Materials

The Market Street streetscape retains integrity of materials. Although Justin Herman Plaza was not determined to retain its overall integrity of materials, it is not sufficient to undermine the overall integrity of materials for Market Street, which is established by the other seven Market Street components. As such, the overall integrity of Market Street retains integrity of materials. While the seven Market Street components that do retain integrity of materials have been diminished by some alterations and additions (detailed in Section 6.4.3, which includes feature condition analysis table), the Market Street Redevelopment Plan design retains a sufficient combination of physical materials to convey its significance.

Features that express Market Street's integrity of materials are associated spatial organization, cluster arrangement, circulation, vegetation, buildings and structures, constructed water features, and small-scale features.

6.4.4.5 Workmanship

The Market Street streetscape, Hallidie Plaza, UN Plaza, Robert Frost Plaza, Mark Twain Plaza, Crocker Plaza and Market Street Plaza retain integrity of workmanship. Although Justin Herman Plaza was not determined to retain its overall integrity of workmanship, it is not sufficient to undermine the overall integrity of workmanship for Market Street, which is established by the other seven Market Street components. As such, the overall integrity of Market Street retains integrity of workmanship.

While the seven Market Street components that do retain integrity of workmanship have been diminished by some alterations and additions (detailed in Section 6.4.3, which includes feature condition analysis tables), Market Street retains enough of the Market Street Redevelopment Plan-era construction to illustrate the workmanship associated with the design of Ciampi, Warneke and Halprin.

Features that express Market Street's integrity of workmanship are associated spatial organization, cluster arrangement, circulation, vegetation, buildings and structures, constructed water features, and small-scale features. Market Street features that express integrity of workmanship are the same as those that express integrity of materials (see list above).

6.4.4.6 Feeling

Market Street expresses the aesthetic sense of the Market Street Redevelopment Plan design through the composite of setting, design, materials, and workmanship. The street's urban setting, design, materials, and workmanship reflect the site's historic use as a main circulation artery and public venue for civic engagement upon completion of the Market Street Redevelopment Plan in 1979, The Market Street streetscape, Hallidie Plaza, UN Plaza, Robert Frost Plaza, Mark Twain Plaza, Crocker Plaza and Market Street Plaza retain integrity of feeling. Although Justin Herman Plaza was not determined to retain its overall integrity of feeling, it is not sufficient to undermine the overall integrity of feeling for Market Street, which is established by the other seven Market Street components. As such, the overall integrity of Market Street retains integrity of feeling.

While the seven Market Street components that do retain integrity of materials have been diminished by some alterations and additions (detailed in Section 6.4.3, which includes feature condition analysis tables), Market Street retains enough integrity of setting, design, materials, and workmanship to also retain integrity of feeling.

6.4.4.7 Association

All of the Market Street components—the Market Street streetscape, Justin Herman Plaza, Hallidie Plaza, UN Plaza, Robert Frost Plaza, Mark Twain Plaza, Crocker Plaza, and Market Street Plaza—retain integrity of association. The landscape continues to be used for its traditional purposes as a main circulation artery and venue for public engagement, particularly in terms of Market Street Redevelopment Plan-era features that facilitate these functions. As such, the overall integrity of Market Street retains integrity of association.

Features that express Market Street's integrity of association are associated with spatial organization, cluster arrangement, circulation, vegetation, buildings and structures, constructed water features, and small-scale features. Market Street features that express integrity of association are the same as those that express integrity of feeling (see list above).

6.4.5 Criterion Consideration G

Market Street retains its overall integrity of location, setting, design, materials, workmanship, feeling, and association, and conveys its historical significance at the national level as a cultural landscape associated with the works of masters architects Mario J. Ciampi and John Carl Warnecke and master landscape architect Lawrence Halprin. Market Street's period of significance for this association is 1968–1979, which makes character-defining features related to the latter years of this period less than 50 years old. As such, Market Street's historical associations must be of "exceptional importance" to the City of San Francisco, State of California, western region of the United States, or the nation to be eligible for listing on the NRHP.

Market Street is exceptionally important under Criteria C for its association with the work of master architects Mario J. Ciampi and John Carl Warnecke and master landscape architect Lawrence Halprin based on the uniqueness of the joint venture's early application of an interdisciplinary approach that helped elevate the influence of landscape architecture as a discipline that provides perspective on modern urban planning in the United States. The pedestrian-oriented design philosophy and sensitivity to historic settings knitted together the specializations of the joint venture partners and illustrated the viability of prioritizing sensitivity to the human experience and the existing built environment. These are considerations that have grown to be widely adopted as best practices within the urban planning and landscape design professions.

Market Street is particularly important as an exceptional project within Halprin's career. He went on to design additional streetscape and plaza projects, and this early work on Market Street was an experience that informed subsequent street interventions in places like Minneapolis (Hirsch 2014:75). Market Street provided a hometown laboratory for Halprin to develop techniques he was simultaneously considering for other projects (Hirsch 2014:83). The Market Street Redevelopment Plan may not be the most mature expression of design that is pedestrian-oriented and sympathetic to the existing historic context during the redevelopment-era within Halprin's canon of work. However, Market Street is exceptionally important as a remaining example (comparative projects, Nicollet Mall and the Portland Transit Mall were redesigned in 1990 and 2009, respectively) of Halprin's application of these design principles within the streetscape of his hometown, San Francisco, and one of the earliest examples of his streetscape designs.

6.4.6 Eligibility Recommendations

Market Street continues to convey its significance based on association with the work of master architects Mario J. Ciampi and John Carl Warnecke and master landscape architect Lawrence Halprin through the Market Street Redevelopment Plan design. Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. **Of these categories, it is most essential for integrity of location, design, materials, workmanship, and association to be retained, as they best convey the place, form, physical components, quality of labor, and processes associated with Market Street as a collaboration of the Market Street Joint Venture Architects on the Market Street Redevelopment Plan as an early application of an**

interdisciplinary approach, which helped elevate the influence of landscape architecture as a discipline that provides perspective on modern urban planning.

While integrity of the Market Street has been diminished by alteration, particularly in terms of the loss of Market Street Redevelopment Plan-era small-scale features and addition of post-Market Street Redevelopment Plan incompatible features, the majority of character-defining features remain intact. The features associated with the Market Street Redevelopment Plan include those associated with the landscape categories of natural systems and features, spatial organization, cluster arrangement, circulation, vegetation, views and vistas constructed water features, and small-scale features. Of these landscape feature categories, spatial organization has the most features considered to be Priority 1—most essential to expressing Market Street's integrity.

In addition, the majority of Priority 1 features, included in *Table 6-3 Feature Analysis Table: Market Street Redevelopment Plan Landscape* and summarized in *Summary of Change*, remain extant or partially extant. While considering Priority 2 status categories—extant, partially extant, and lost independently shows a majority of Priority 2 features to be lost, considering the extant and partially extant features together shows greater retention of features that are substantially present compared to those that are not. Priority 3 features are evenly split between extant, partially extant, and lost. Overall, the majority of character-defining features were determined to be extant or partially extant.

While the aggregate impact of diminished Priority 2 features and addition of post-Market Street Redevelopment Plan features can significantly reduce integrity, the overall location, setting, design, materials, workmanship, feeling, and association of features related to Market Street's Market Street Redevelopment Plan-era natural systems and features, spatial organization, circulation, vegetation, buildings and structures, views and vista, and constructed water features of Market Street retain enough integrity to convey its association with the work of master architects Mario Ciampi and John Warnecke and master landscape architect Lawrence Halprin. As such, Market Street is eligible for listing under NRHP Criterion C and CRHR Criterion 3.

6.5 NRHP/CRHR Criterion D/4

The potential for significance under NRHP Criterion D and CRHR Criterion 4, was not evaluated in this CLE.

Chapter 7
Personnel

Susan Lassell has 22 years of experience in historic preservation planning, and serves as the team supervisor for ICF's Cultural Resources practice in northern California. Ms. Lassell has been recognized for her ability to smoothly navigate projects through compliance with state and federal environmental laws, including the National Environmental Policy Act (NEPA), Section 106, Section 4(f), and CEQA. Ms. Lassell has conducted a wide variety of historic preservation projects, including built environment survey and evaluation reports, historic landscape evaluation and treatment plans, cultural resources management plans, HABS/HAER documentation, master plans for historic sites, and teaching environmental education courses. Through a combination of experience and her M.A. in historic preservation planning from Cornell University, Ms. Lassell meets the Secretary of the Interior's professional qualification standards for architectural history and history.

Aisha Rahimi-Fike meets the Secretary of the Interior's Professional Qualifications as an historian and architectural historian. Ms. Rahimi-Fike has a M.A. in public history from California State University, Sacramento. Ms. Rahimi-Fike has more than 6 years of experience in historic research, field inventory, and site assessment for Section 106 of the NHPA as well as CEQA compliance. She is experienced in research methods of primary and secondary documentation, and conducting historical research at local, state, and federal repositories. Mrs. Rahimi-Fike evaluates cultural resources for significance for the CRHR and the NRHP, and she has authored and co-authored numerous City of San Francisco technical reports. Since 2010, Ms. Rahimi-Fike has served as a board member for the non-profit organization, Documentation and Conservation of the Modern Movement (Docomomo U.S. Northern California Chapter). She also served as a walking tour docent for San Francisco Architectural Heritage in 2010–2011.

January Tavel, MHP, is an architectural historian with ICF in San Francisco, and she meets the Secretary of the Interior's Professional Qualifications as an Historian and Architectural Historian. Ms. Tavel has a MHP in historic preservation from University of Maryland, College Park, School of Architecture, Planning and Preservation. Ms. Tavel has more than 7 years of experience in the historic preservation field. In her current role, she applies professional cultural resource management and historic preservation expertise in service to public and private clients. Her responsibilities include: historic research in local, state, and regional libraries and archives; historic resources survey and assessment, including site inspections, research, photography, and evaluation under state and national criteria for historic significance; preparation of historic property inventory forms, including statements of significance and architectural descriptions; and preparation of CEQA, NEPA, and Section 106 regulatory documents. Ms. Tavel's specialization is cultural landscape evaluation. Ms. Tavel is a leader in the Bay Area preservation community, having served as Executive Director of Oakland Heritage Alliance, Chair of Historic American Landscape Survey Northern California Chapter, and a member of the 2012 California Preservation Foundation Conference Steering Committee.

During early stages of this study, Edward Yarbrough was a senior architectural historian with ICF International in San Francisco, and meets the Secretary of Interior's Professional Qualifications as an Historian and Architectural Historian. Mr. Yarbrough has a B.A. in architectural history from the University of California, Berkeley and an MS in Historic Preservation from the School of Architecture and Allied Arts, University of Oregon. Mr. Yarbrough has more than 24 years of

experience in the field of architectural history. He was the first historian for Keweenaw National Historical Park and worked with historic resource recordation and management there for 14 years. He has worked in Oregon, Michigan, and California developing historic resource stewardship programs and compliance for the NPS, the California Department of Transportation, counties, cities, developers, and additional government agencies. He serves on the Treatment Oversight Panel for the Presidio Parkway Project as representative of the San Francisco County Transportation Authority assuring Section 106 of NHPA compliance. His work is primarily instigated by NEPA, Section 106, and CEQA compliance requirements.

Timothy Yates is a historian with experience in cultural resources management. He meets the Secretary of the Interior's standards for work in history. Tim has experience in historic research, field inventory, and property evaluation for NHPA, Section 106, and CEQA compliance. He evaluates cultural resources for their potential eligibility for the NRHP and the CRHR, and has authored or co-authored numerous cultural resources technical reports, including historic resources, historic architectural evaluations, FOEs, and mitigation documentation. Tim is experienced in research methods of primary and secondary documentation, and conducts historical research at various local, state, and federal repositories. Prior to joining ICF International, Tim worked as a grant writer, instructor, and staff researcher for the University of California, Davis History Project's professional development program serving public-school history teachers. Tim's academic research interests have included topics such as spatial organization and representation in U.S. history; gender history; and geography, urban space, and disease in nineteenth and early twentieth-century medical thought. He has taught at the college level in the disciplines of history, American studies, and sociology. Tim is also a published author on the topics of alcohol use and temperance movements in American history.

Chapter 8
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Appendix A

DPR 523 Forms

BUILDING, STRUCTURE, AND OBJECT RECORD

Page 1 **of 6** ***Resource Name or** #(Assigned by recorder) Justin Herman Plaza
***Recorded by** January Tavel, ICF
***Date** March 30, 2016 ☐ Continuation ☐ Update

B1. Historic Name: Embarcadero Plaza, Ferry Park Plaza
B2. Common Name: Justin Herman Plaza
B3. Original Use: Pedestrian plaza B4. Present Use: Pedestrian Plaza
***B5. Architectural Style:** Modern
***B6. Construction History:** Vaillancourt fountain completed in 1971. Plaza completed in 1972. The plaza's setting was substantially altered in 1989 when the Loma Prieta earthquake damaged the Embarcadero Freeway and in 1991 when the Embarcadero Freeway was demolished. The allee of palm trees along the eastern boundary and along the pathway connecting Market Street to the Ferry Building the plaza were added by 2000. The southern boundary lawn was remodeled as a bocce court in November 2010. (See continuation sheets for further construction history)
***B7. Moved?** ☑ No ☐Yes ☐ Unknown **Date:** **Original Location:**
***B8. Related Features:** Market Street, the Embarcadero
B9a. Architect: Lawrence Halprin & Associates (architect) b. Builder: Unknown
***B10. Significance: Theme** Urban planning in the Twentieth Century
Area Architecture, Landscape Architecture
Period of Significance 1972 **Property Type** Site (designed landscape) **Applicable Criteria** C/3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Context Statement

Market Street Redevelopment Plan

Justin Herman Plaza was an individual project implemented as part of the City of San Francisco's broader effort to redevelop the Embarcadero area. Although it was funded separately, Justin Herman Plaza was included as a component of the design concept for the Market Street Redevelopment Plan (MSRP). The MSRP, which was designed by the Market Street Joint Venture Architects, Mario J. Ciampi & Associates, John Carl Warnecke & Associates, Lawrence Halprin & Associates, sought to resolve Market Street's economic importance as San Francisco's main circulation spine with its symbolic, social, commercial, and civic importance through plaza development, removal of visually cluttering commercial signage, and sidewalk landscape designs intended to blend new street-level Bay Area Rapid Transit (BART) facilities into the overall streetscape.

(See continuation sheets for further evaluation of significance)

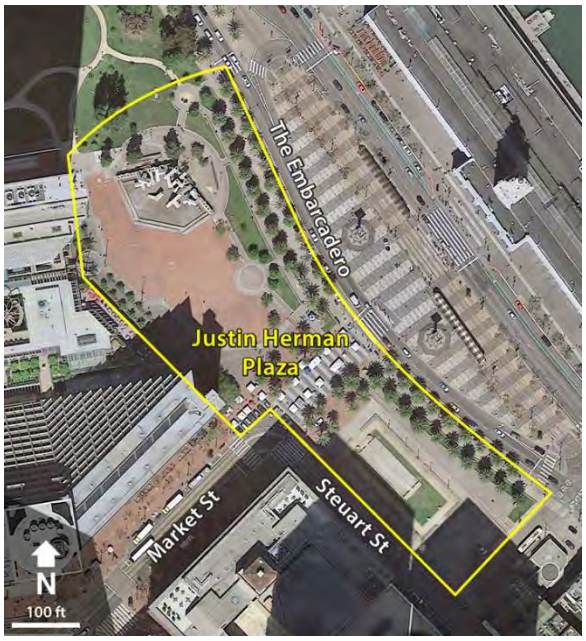
B11. Additional Resource Attributes: HP29, Landscape architecture; HP31, Urban Open Space;

***B12. References:**
See continuation sheets for references.

B13. Remarks: n/a
***B14. Evaluator:** January Tavel, ICF
***Date of Evaluation:** March 30, 2016

(This space reserved for official comments.)

(Sketch Map with north arrow required)



***B6. Construction History (cont.)**

Embarcadero Plaza (also referred to as Ferry Building Park), which was completed in 1972 and renamed Justin Herman Plaza in 1974 to honor Justin Herman, the director of the SFRA (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1974), was one of the most prominent elements of this MSRP redevelopment initiative. Designed by Lawrence Halprin, the Plaza was bounded in the east by the Embarcadero and the elevated Embarcadero Freeway, in the south by Don Chee Way, and in the north by the Embarcadero Freeway off-ramps to Clay and Washington Streets. The plaza's western boundary included the Embarcadero Center and Hyatt Regency buildings, as well as the eastern end of Market Street.

Prior to the construction of the Golden Gateway project, the site of Justin Herman Plaza was densely built with low-scale commercial and industrial buildings ranging from 1 to 4 stories in height. Buildings facing the Embarcadero on the block between Sacramento and Commercial Streets featured a series of small storefronts and restaurants, whereas buildings further west along Sacramento and Commercial included more industrial uses including a ship storage and service yard, several single story stores, storage structures, and a hotel. The block between Commercial Street and Clay Street included a one-story gas station at the corner of this block along the Embarcadero, and restaurants, stores and residential hotels further to the west. All of the properties on the site prior to construction of the plaza appear to have supported the workers and shipping/trade uses along the Embarcadero (**Image 1-4**) (1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheets 11 and 12).

While the Embarcadero Plaza was not part of the Market Street Reconstruction Project, conceptually, it served as the anchor to the Market Street Redevelopment Plan (MSRP) sequence, connecting the street to the Ferry Building and the waterfront despite the freeway obstruction (Hirsch 2014:17). The four-acre plaza was characterized by an irregular pentagon-shaped plan reminiscent of an Italian piazza. Pedestrian circulation through the plaza was structured along two axes—a primary axis along the pedestrian promenade connecting Market Street with the Ferry Building, and the north-south access through the Plaza. The sunken plaza consisted primarily of red brick laid in a running bond pattern, broken by double red brick courses radiating in a sunburst pattern from the fountain (**Image** 6). The lower plaza was edged in concrete and stairs from the upper plaza on the western boundary that descended down to the lower plaza were also concrete. Paving of the upper terrace on the western boundary was granite. The southeastern boundary of the main plaza included a terraced concrete platform (**Image 5**). The main plaza also featured a circular terraced concrete island platform near its southern boundary (**Image 5**).

Justin Herman Plaza featured modern light standards with semi-translucent square luminaires mounted on square, light-colored granite columns (**Images 7, 9, 10**). The pedestrian promenade that connected Market Street with the Ferry Building featured light standards symmetrically arranged along the allée. Original concrete bollards were square granite reflecting the style of the original light standards spanning the width of the pedestrian promenade that connects Market Street with the Ferry Building at both the east and west ends (**Image 8**). Vegetation within the plaza also included circular, 5-foot diameter stone flower tubs (**Images 10, 11**). A purchase list from The Marina Florist, dated May 29, 1970, records a variety of plants tagged for purchase for the Embarcadero Plaza: Lombardy Poplar (*Populus Nigra Italica)* – four 30" boxes and ten 24" boxes, twenty-seven 15 gallon buckets; Japanese black pine (*Pinus Thunbergii*) – one 24" box, one 15 gallon bucket; Austrian Pine (*Pinus Nigra)* – three 24" boxes; Scots pine (*Pinus Sylvestris)* – three 24" box; Monterey Pine (*Pinus Radiata*) – ten 24" boxes, thirty 15 gallon buckets; London planetree (*Platanus acerifolia*) – forty-one 15 gallon buckets, eighteen 20" boxes; and 42,000 square feet of sod (50% Windsor and 50% Newport) (*Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania* 1970b). While additional research would be required to discover the plaza's specific planting plan, in general, pines were planted along the property's eastern boundary (along the Embarcadero) and sycamores (London planetrees) were planted along the western boundary of the plaza and along Steuart Street (**Image 8**). A cluster of sycamores was also placed on either side of the pedestrian promenade's western entrance. In addition, the western boundary of Justin Herman Plaza's upper terrace, adjacent to the Embarcadero Center development, features wood benches (**Image 12**). Statues of Bautista de Anza and Carlos III of Spain were also present in Justin Herman Plaza. Correspondence between Lawrence Halprin and Justin Herman discussed the location of Juan Bautista de Anza statue at the southern end of the plaza adjacent to the lawn, but did not explicitly discuss where the Carlos III of Spain statue was placed within the plaza (**Image 13**) (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1968). Both statues were relocated from Justin Herman Plaza to Lake Merced in 2004 (San Francisco Visual Arts Committee 2004).

Halprin conceived of the plaza as an environment for public participation and hired Canadian-Québécois artist Armand J. R. Vaillancourt to design a Modernist fountain for the lower terrace. Vaillancourt was born on September 3, 1929 in the city of Black Lake, Quebec, Canada. He is widely known as a Quebecois sculptor, painter, and performance artist. He received formal training in art at the Ecole des beaux-arts de Montreal (Beaudry 2013). The fountain in Justin Herman Plaza has become a source of controversy since its inception. Completed in 1971, the fountain measures approximately 40 feet in height, 200 feet in length, and 140 feet in width. It is composed of steel and precast concrete square tubes arranged in irregular angles. The concrete finish was highly textured. The fountain was designed to pump one million gallons of water an hour through the tubes, which spill into a pool below. There were two walkways with stairs that allow the public to stand between the tubes and offer views overlooking the plaza. The fountain featured concrete square platforms within the pool, which allowed the public to venture between the fountain's back wall and tube projections.

The fountain has been used as a site for public gatherings and for making political statements. It is sometimes referred to as the "Québec libre!" sculpture. The name was the result of one of Vaillancourt's own political actions in which he painted in red letters the phrase "Québec libre!" on the fountain to voice his support for the Quebec sovereignty movement, and more largely his support for the freedom of all people. Similarly in 1987, U2 singer Bono climbed the fountain and wrote "Rock N Roll Stops Traffic" on the sculpture, sparking political controversy and denouncements from then mayor Dianne Feinstein (Cultural Landscape Foundation 2015; Woodbridge 1990:121-24). The plaza's fountain caused much lively public and media debate regarding its visual appeal and artistic merit upon its completion (Hirsch 2014:79-80).

At the time the plaza was completed, the double-deck Embarcadero Freeway served as a massive backdrop for the fountain, dominating the skyline and cutting the plaza off from the waterfront. The elevated freeway was an integral part of the plaza plan. Halprin saw an opportunity to integrate the freeway into the context of the city by situating Vaillancourt's fountain in the bend of the freeway ramp so that the ramp and the fountain enclosed the space that makes up the remainder of the plaza. One contemporary article described the aesthetic effectiveness of Halprin's plan in the following way: "Wheezing vehicles on the freeway seem to weave through the concrete sculpture, giving it kinetic urban essence and, at the same time, embracing and adding dimension to the freeway" (Hirsch 2014: 80).

The fountain was also designed to counter the noise of the nearby freeway with the natural sound of numerous waterfalls cascading into a large pool of water. To create these waterfalls, the fountain was constructed with mechanical equipment that could pump up to 30,000 gallons of water per minute (Katz 1989: 23). During the state's energy crisis in 2001, the city shut off the water supply to the fountain in an effort to conserve resources. During this time, critics of the fountain used the energy crisis to push for its demolition. Water was restored and plans to demolish the fountain were abandoned in 2004 (San Francisco Chronicle 2004), but, in 2014, San Francisco Recreation and Parks Department instituted measures to reduce water consumption and turned off water to Vaillancourt Fountain as part of that initiative (Elton Pon 2014). The space continues to serve as "a gathering place for large civic ritual events, including political rallies, speeches, ceremonies, concerts, and parade culmination or initiation" (Hirsch 2014: 80).

Halprin wrote of his design intent for the plaza and the fountain:

This work has been conceived as a total environment in which all the elements working together create a place for participation. The locus is the termination of Market Street—major boulevard in the city—the Embarcadero freeway encloses the space on the east in massive and dramatic concrete and includes the movement of cars. There will be an enormous building complex to the west with terraces, platforms, shops, restaurants focusing down to the plaza. Many people. The plaza is a theater for events to happen. The fountain is the pivotal point in the plaza. It has been purposely placed off the axis of Market Street to avoid the Renaissance quality of objects in visual static relationship and to one point perspective. The back wall defines the space it also serves as wind and sun trap. The sculpture is an outgrowth of the wall and not thought of as a separate element in space. It is an environmental event in which water, light and people are each a part of the sculpture as tare the solid forms. It is basically made of concrete because it must be part of the environment not an object within it (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1966: 190-193).

***B10. Significance (cont.):**

On June 6, 1962, a meeting of Market Street businessmen, property owners, and officers of San Francisco Planning and Urban Renewal Association, resulted in agreement on three objectives, "to transform Market Street into one of the world's most attractive boulevards; to rid Market Street of its shabby atmosphere; and to put new life into Market Street as a center of Bay Area business, shopping, and entertainment" (San Francisco Public Library 1962:5). Recognizing "the complexity of the problems of Market Street, the committee retained a team of consultants—urban planners, designers and real estate experts—to tackle the challenge of surveying and analyzing Market Street in the interest of defining its problems and suggesting an approach to revitalization.

In December 1962, *What To Do About Market Street* was published by Livingston and Blayney, City and Regional Planners, in association with Lawrence Halprin and Associates, Landscape Architects, Rockrise and Waston, Architects, and Larry Smith and Co., Real Estate Consultants. The document proposed a program of redevelopment that featured improvements to the environment including "better designed, more effective signs, both public and private," "more attractively designed street furniture, such as benches, newsstands, and litter cans," "beautiful landscaping, tree planting, fountains, and sculpture," and "squares, plazas, and arcades where people can gather and enjoy themselves" (San Francisco Public Library 1962:7).

What To Do About Market Street formally articulates Lawrence Halprin's first thoughts on the physical environment of Market Street, including the location where it met the Embarcadero, which he recorded in his "Monday meander on Market Street" notes from July 3, 1962 (Lawrence Halprin Collection, The Architectural Archives, University of *Pennsylvania* 1962). In his notes, Halprin comments on the need for a fountain adjacent to the Ferry Building such that "the objectionable qualities of the Embarcadero Freeway would be minimized" and remarks to "look into the question of depressing a plaza" (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1962).

The Market Street Joint Venture Architects—Mario J. Ciampi of Mario J. Ciampi & Associates, John Carl Warnecke of John Carl Warnecke & Associates, and Lawrence Halprin, of Lawrence Halprin & Associates—were hired to collaborate on development on the MSRP. The MSRP refers to the designed landscape that the joint venture architects created for the section of Market Street between the Embarcadero and Octavia Boulevard. The MSRP included design of the streetscape, design of two major plazas (UN Plaza and Hallidie Plaza), and design of four minor plazas (Robert Frost Plaza, Mechanics Plaza, Mark Twain Plaza, and Market Street Plaza). The MSRP incorporated Embarcadero Plaza/Justin Herman Plaza (funded through a separate redevelopment project) into its design concept footprint as an anchoring element of the Market Street corridor. The MSRP also incorporated Crocker Plaza, funded through a private project, into its design concept. The MSRP differs from the Market Street Reconstruction Project, which refers more specifically to the San Francisco Redevelopment Agency's 1967–1982 project associated with BART construction. The Market Street Reconstruction Project did not include Embarcadero/Justin Herman Plaza.

As the 1967 Market Street Design Plan Summary Report produced by the City and County of San Francisco in consultation with the design team explained:

Market Street has the potentiality of dynamic economic growth and, importantly, the possibilities of self-renewal. However, the construction of the new subways and new buildings will not in themselves produce a greater Street than there has been in the past. These natural assets can only be developed to their future civic possibilities through the reconstruction of the Street in the manner of a great thoroughfare. Attractive landscaping, paving, street furniture, and inviting public open spaces must be provided (San Francisco Public Library 1967:3).

In 1968, the Schematic Street Design Plan (included Embarcadero Plaza as a component) developed by the joint venture architects, was adopted by board of Supervisors (Res. 116-68) (Knight 1985:2). While the MSRP was not executed to the full extent envisioned in the Schematic Street Design Plans, the design sought to prioritize the pedestrian experience through plaza development, introduction of coordinated street furnishing amenities, removal of street-level Muni transit (streetcars, trolley buses, overhead wires), and blending of new street-level BART facilities into the overall streetscape.

Concurrent with the effort to redesign Market Street were plans to redevelop the Embarcadero area near Market Street. The Golden Gateway redevelopment project included construction of Embarcadero Center, a multi-block retail and office complex of five towers and two hotels adjacent to the Embarcadero just north of Market Street. Designed by John C. Portman, Jr., of John Portman and Associates, the project was built in stages from 1971-1973. The Redevelopment Agency saw an opportunity to establish a public open space/plaza between the waterfront and Embarcadero Center. This open space is what became known initially as Embarcadero Plaza, and later Justin Herman Plaza (Brown 2016b:47, 190, 245).

Justin Herman Plaza was created as part of the Ferry Building Park project. The *Ferry Building Park Preliminary Report*, prepared by a joint venture of Lawrence Halprin & Associates, Landscape Architects, John S. Bolles, Architect, FAIA, Mario J. Ciampi, Architect, FAIA, describe the goal of that redevelopment project within this context:

…it is intended that the Ferry Building Park would become part of a great development at the foot of Market Street and extend both north and south along the entire San Francisco waterfront. This waterfront should recapture for the people of the city this great resource of the Bay. It should contain marinas, shopping areas, great waterfront views, restaurants, waterfront activities of all kinds, and will go a long way towards making San Francisco that great city on the Bay which it has the potential to become (Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania 1964).

Urban Renewal and Revitalization through Landscape Design and Urban Planning in the United States and San Francisco, 1945-1980

Responding to federal redevelopment programs of the 1950s that privileged the needs of the automobile over the pedestrian, Justin Herman Plaza is an example of a designed urban landscape that prioritized the activities of pedestrians. "The failure of government-sponsored urban planning, the insensitive severity of Modernist planning and architecture, pent-up demands for racial equity, and the maturing of liberal-minded baby boomers were all forces that led to greater social responsiveness in the design professions beginning in the 1960s" (Pregill and Volkman 1999: 710). In 1966 the Demonstration Cities and Metropolitan Development Act established the Model Cities Program, which mandated citizen input into planning decisions and required neighborhood preservation rather than demolition be part of urban improvement. This project represents a transition to a new phase of urban renewal and revitalization through landscape design in the last half of the twentieth century that gave greater focus to pedestrian-oriented public spaces and increased responsiveness to context. Plazas were included among the site types that were most important during this era as designers looked to the creation of these and other spaces (mixed-use centers, the downtown mall, redeveloped waterfront) as key devices for bolstering urban economic and social activity (Pregill and Volkman 1999: 721).

In most cities, the task of coordinating urban renewal fell to newly created local redevelopment agencies. In San Francisco, Justin Herman directed the San Francisco Redevelopment Agency during a particularly active period from 1959 until 1971. As with other city redevelopment agencies throughout the country, the SFRA leveraged federal funding and new powers to acquire land through eminent domain to facilitate redevelopment by razing large sections of San Francisco. At the time, this large-scale clearance was considered a necessary technique, which provided an environment for the redeveloped area that would prevent it from returning to its former blighted condition. However, this method displaced thousands of residents and businesses, proving especially disruptive to San Francisco's low-income, black and Asian communities (Brown 2010b:41). Project examples included Western Addition A-1, Diamond Heights, Golden Gateway, and Yerba Buena Center.

By 1960s, local opposition to the devastation wrought by urban renewal to existing residents and historic fabric echoed nationwide criticism. Through the 1970s, projects across the country and in San Francisco began shifting focus to reuse and rehabilitation rather than full-scale neighborhood clearance (Brown 2010b:41-42). Lawrence Halprin received national attention for master planning an early San Francisco example—Ghirardelli Square complex near Fisherman's wharf (1962-1965)—which successfully adapted an industrial complex for commercial use (Knight 1975: 7; Brown 2010b:1949). In addition to pioneering the adaptive reuse concept, the project also leveraged landscape design for urban revitalization through design of fountains, lighting, planting, and outdoor performance spaces (Brown 2010b:149)

Justin Herman Plaza: Design of Master Landscape Architect, Lawrence Halprin

Although the three designers associated with the Market Street Redevelopment Plan in San Francisco—architect Mario Ciampi, architect John Carl Warnecke, and landscape architect Lawrence Halprin—collaborated on the development of the MSRP project, Halprin was the primary designer of Justin Herman Plaza (Hirsch 2014: 82-83). He developed his expertise as master landscape architect during the period of renewal and revitalization from 1945-1980 and within the context of increasing collaboration among design disciplines. He was a thought-leader in the environmental design community, applying new approaches to urban placemaking that modeled pedestrian-oriented design, harmonizing Modern design within historic settings, development of public spaces for positive economic and social impact, and collaborative design processes. Halprin's participation in the joint venture collaboration, including design of Justin Herman Plaza, helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrated the viability of prioritizing sensitivity to the human experience and the existing built environment as part of the urban redevelopment process.

Lawrence Halprin (1916–2009):

Born in New York City, Lawrence Halprin earned a B.S. in Plant Sciences from Cornell University in 1939 and continued his studies at University of Wisconsin where he earned a M.S. in Horticulture. As a graduate student, Halprin visited Taliesin, the home of master architect, Frank Lloyd Wright. This experience inspired his interest in design and motivated his enrollment at Harvard University's Graduate School of Design where he earned a Bachelor of Landscape Architecture degree in 1944 (Brown 2010b:270). Like Warnecke, Halprin studied under Walter Gropius at Harvard, as well as Marcel Breuer, who is also recognized as a master of Modernist architecture (Brown 2010b:760), During World War II, Halprin served in the Navy and was assigned to the USS Morris. When his ship was destroyed, Halprin was given leave in San Francisco, where he remained (Brown 2010b:270).

Halprin's design career in the San Francisco Bay Area began with a focus on residential garden design. From 1945-1949, Halprin worked with master landscape architect, Thomas Church (Brown 2010b:144-145). Collaboration included work on the Dewey Donnell Garden in Sonoma County (Brown 2010b:271), notable as a quintessential example of residential landscape design in the "California Style," which integrates the site with surrounding natural landscape through "repetition of forms or materials, and careful use of a variety of forms to link the hard, geometric lines of buildings with the more irregular, flowing lines of natural landscapes" (Pregill and Volkman 1999: 740-742).

In 1949, Halprin opened his own firm, Lawrence Halprin & Associates Landscape Architects in 1949. He escalated to designing large-scale planned residential complexes, such as the San Francisco projects Parkmerced (1949, with Thomas Church) and St. Francis Square (1961) (Brown 2010b:147-148), but is best known for his work at Sea Ranch (1962-1967) near Gualala, California. The iconic complex of condominiums at Sea Ranch is sited in a bucolic coast area of Sonoma County and is considered a master work of the Third Bay Tradition design. For this project, collaboration with the architectural firm, Esherick, Homsey, Dodge & Davis (EHDD), Lawrence Halprin created the landscape and development plan, which clustered buildings and provided large areas of community open space (Brown 2010b:133).

In the late 1930s into the 1950s, a growing collaboration between architects and landscape architects resulted in a new synthesis of buildings and landscapes (Brown 2010b:139-140). While residential landscape design formed the foundation of most landscape architects' practices before the 1940s, landscape architects in the post-WWII era increasingly expanded their practice to include master planning, campus planning, site planning, and regional planning (Brown 2010: 141). Through the work of his firm, Halprin reasserted the landscape architect's role as distinct from planners or architects in regenerating the American city by making vital social and pedestrian spaces out of formerly marginal sites such as historic industrial complexes or the spaces over or under freeways. "In doing so, they re-imagined a public realm for American cities that had been cleared by federal urban renewal programs and abandoned for new suburban developments" (Meyer 2008). Halprin's leadership included collaboration with Livingston and Blayney and George Thomas Rockrise on the 1962 *What to do about Market Street* planning proposal (Brown 2010b:247) and subsequent collaboration with Mario J. Ciampi and John Carl Warneke on the Market Street Redevelopment Plan.

Landscape designers helped play an important role in shaping the form, spatial configuration, and uses of corporate plazas, landscapes, and public spaces during the Modern period. In addition to his work associated with Market Street and associated plazas, the evolution of Halprin's career included commercial and corporate designed landscapes like the rooftop garden at the Fairmont Hotel (1961), Bank of America plaza (1967), the Yerba Buena Gardens Master Plan (1969), and Embarcadero Center Master Plan (including plazas and shopping center courtyards)(1969-1974), and design of the plaza at One Embarcadero Center (1967) (Brown 2010b:135, 138, 148-150).

Halprin is also recognized a pioneer of adaptive reuse design for his work on master planning for the Ghirardelli Square project (1962-1965), which transformed an industrial complex into public plaza and shopping center in the San Francisco Fisherman's Wharf area (completed 1968, included on the National Register of Historic Places in 1982) (Brown 2010b:149). In his book, Cities, Halprin wrote:

We need, in cities, buildings of different ages, reflecting the taste and culture of different periods, reminding us of our past as well as our future. Some buildings are beautiful or striking enough to have their useful periods artificially extended by preservation—almost like seed trees in a forest—so that succeeding generations can enjoy them, and through them maintain a sense of continuity with the past. Old buildings and old sections of cities establish a character, a flavor of their own, which often becomes the most interesting and provocative part of a city. Part of this is due to scale, since each age develops its own sense of scale and relationship of parts (Halprin 1963:216-217)

Halprin's work is marked by his attention to human scale, user experience, and social impact of his designs. He is credited for developing innovative design development processes such as "motation," and "RSVP Cycles." Motation offered an alternative to traditional devices for creating form such as plans and elevations. Instead, motation, used movement as a starting point to generate form (Hirsch 2014: 11-13). Similarly, RSVP cycles is a collaborative approach meant to guide the development of formal design and participatory process. It included the components of resources (preexisting site conditions and the act of inventorying them), scores (temporal-situational guidelines that structure unfolding performance), valuaction (a term Halprin coined for the critical feedback process that leads to consistent revision of the scores), and performance (acting out of the scores) (Hirsch 2014: 4-5).

As such, Halprin's projects are memorable for their striking forms and sequences that evoke multiple associations and recall varied references. The signature vocabulary that characterizes his work, particularly water features, includes a fractured urban ground terraced to choreograph the movement of bodies of water rendered in poured-in-place concrete that simultaneously evoke monumental geological forms and dynamic ecological processes (Meyer 2008). Many of his projects reflect these ideals, including those beyond the San Francisco Bay area.

Nicollet Mall (1962–1967), a 12-block pedestrian street and transit mall in the shopping and dining district of Minneapolis, was designed as the first transit mall in the United States and was created to help downtown retail compete with shopping in the suburbs. Like Market Street, Nicollet Avenue was historically Minneapolis's "parade street." For both of these projects, Halprin was given the chance to enhance the quality of civic rituals as collective participatory events (Hirsch 2014: 84). Although it was redesigned in 1990, Nicollet Mall is recognized as being the inspiration for similar projects in Portland, Oregon, and Denver, Colorado (Hirsch 2014: 90, 98). Four of Portland's public spaces were designed by Halprin: Lovejoy Plaza, a multi-block sequence of public fountains and outdoor rooms, featuring the Ira Keller Fountain; Pettigrove Park; Auditorium Forecourt; and the Transit Mall (1965–1978). The Transit Mall, which was a pair of one-way streets with exclusive bus lanes and widened landscaped sidewalks, was redesigned in 2009 (Biggs n.d.). Skyline Park (1975), a one-acre linear park and plaza in Denver, Colorado, was redesigned in 2003. Freeway Park in Seattle, Washington, is noted for its innovative approach to reclaiming an interstate right-of-way for park space (1976). The Downtown Mall in Charlottesville, Virginia, is a pedestrian-only zone contextualized along the city's historic Main Street (1976). His work also includes Heritage Park Plaza (1980) in Fort Worth, Texas, which is listed on the National Register of Historic Places, and the Franklin Delano Roosevelt Memorial in Washington, D.C. (1997), which contextualizes a modern design aesthetic within the Victorian Gothic Revival, and neo-Classical styles of surrounding monuments of the National Mall.

As a leader in his field, Halprin served on national commissions, including the White House Council on Natural Beauty and the Advisory Council on Historic Preservation (Meyer 2008). He also earned numerous awards and honors, such as the American Society of Landscape Architects (ASLA) Gold Medal (1978), the Thomas Jefferson Gold Medal in architecture (1979), and a Michelangelo Award (2005) (Brown 2010b:271).

Significance Summary

NRHP Criterion A and CRHR Criterion 1:
Research did not find that the plaza is associated with any event(s) considered important locally, statewide, or nationally. Although the plaza has been used as a site for public discourse, political protests, and civic gatherings (political rallies, rock concerts, civic ceremonies, and public speeches) in San Francisco during the late twentieth and early twenty-first centuries, none of the events associated directly with Justin Herman Plaza rise to the level of significance necessary for listing in the state or national registers under Criterion A/1. While Justin Herman plaza is used periodically as the starting point for parades and is part of the civic processional route down Market Street to City Hall, association with significant Market Street processional events that begin at Justin Herman Plaza confers historical association upon the plaza as a component of the Market Street processional route, but does not contribute to the plaza's individual significance. Long before the MSRP was established with Justin Herman Plaza as its eastern anchor, Market Street had been used as a ceremonial and processional route through the city. As such, Justin Herman Plaza is not independently significant at the local, state or national level as a venue for civic engagement in San Francisco under Criterion A/1.

NRHP Criterion B and CRHR Criterion 2:
Research did not indicate association with the productive life of any individual(s) important in the area of civic ritual events or urban renewal projects, or, more broadly, in history at the local, state, or national levels of significance. Although Vaillancourt and U2 singer Bono are well-known public figures, their efforts to raise awareness for the freedom of all people and the power of rock music through painted slogans on the fountain do not rise to the level of singular importance necessary to meet NRHP Criterion B or CRHR Criterion 2. Additionally, even Justin Herman's redevelopment efforts to establish a plaza that was later named after him is insufficient to justify the listing of the property under Criterion B/2. Herman was the former regional director for the federal government's Housing and Home Finance Agency (HHFA) before he was recruited by Mayor George Christopher in 1959 to head the San Francisco Redevelopment Agency. His 12-year tenure in this position coincided with the most activist period in the nation's history for federal involvement in urban renewal projects. Herman was extremely effective in obtaining federal funding for redevelopment projects in San Francisco—such as Market Street, Diamond Heights, Golden Gateway, Western Addition, and Yerba Buena (Habert 1999). However, sites that might be significant for association with Herman would be those projects that he was directly associated with and that represent the influence he had on San Francisco's urban environment. Sites that are named to commemorate significant people are rarely, if ever, recognized as historically significant. As such, the plaza lacks a significant association with Justin Herman under Criterion B/2.

NRHP Criterion C and CRHR Criterion 3:
Justin Herman Plaza is associated with the work of master landscape architect Lawrence Halprin and is significant as an example of how his work helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrate the viability of prioritizing sensitivity to human experience, and the existing built environment as part of the redevelopment

process. In the case of Justin Herman Plaza, this setting included the San Francisco Bay waterfront, Ferry Building, Embarcadero Freeway and Market Street. Halprin's design, including the Vaillancourt fountain, which invited pedestrian engagement, sought to aesthetically integrate transportation infrastructure into the urban landscape of the city and reconnect the city with the waterfront. Justin Herman Plaza is significant for its association with Halprin's canon of work particularly because these approaches were innovative during the redevelopment era, which prioritized automobiles over pedestrian experience and sought renewal though wholesale demolition instead of complementary integration with the existing context. Thus, for the application of these new approaches to urban design, Justin Herman Plaza appears to be significant at the under NRHP and CRHR Criterion C/3.

Existing Conditions

The following summarizes existing conditions for Justin Herman (Embarcadero) Plaza in terms of Natural Systems and Features, Spatial Organization, Cluster Arrangement, Circulation, Vegetation, Views and Vistas, Constructed Water Features, and Small-Scale Features.

Spatial Organization: Justin Herman Plaza is at the eastern terminus of Market Street adjacent to the Embarcadero. The plaza is bounded in the west by the Embarcadero Center and Hyatt Regency buildings and the eastern end of Market Street. The plaza is no longer bounded in the north by the Embarcadero Freeway Clay and Washington Streets off-ramps. Instead, the boundary is now marked by the terminus of Clay Street and Sue Bierman Park, a 5.3-acre open space that was designed following the 1989 Loma Prieta earthquake, which damaged and led to demolition of the freeway and off-ramps to Clay and Washington Streets in 1991 (**Image 14**). Sue Bierman Park was renovated and renamed in 2011 (San Francisco Parks and Recreation 2016). At the eastern boundary of the plaza, there is a green space buffering the plaza from the Embarcadero where the highway had been. The area was remodeled in 2003 and includes hardscaping that replaced the concrete platform on the southeastern boundary of the plaza and the concrete island that was also in the southern section of the main plaza (**Image 21**). The post-Market Street Redevelopment Plan hardscaping features concrete stairs, ADA-accessibility ramps, and a much narrower grassy area (**Image 19**). Justin Herman Plaza's southern boundary is Don Chee Way. The ground plane of the northern main plaza is characterized by an irregular, pentagon-shaped plan. A pedestrian promenade, which joins the eastern terminus of Market Street to the Embarcadero in front of the Ferry Building (**Image 15**), bisects the northern section of the plaza (main plaza with fountain) and the southern section of the plaza (former lawn area that was remodeled as bocce court in 2010) (**Image 16, 26**). The Vaillancourt-designed fountain is located in the northeast corner of the main plaza's lower terrace.

Circulation: Pedestrian circulation is structured along two axes—a primary axis along the pedestrian promenade connecting Market Street with the Ferry Building (**Image 17**), and the north-south access through the Plaza. The 4-acre brick plaza is terraced, with the upper terrace of concrete descending to the lower plaza via three concrete steps. The sunken lower plaza consists primarily of red brick laid in a running bond pattern. This pattern is broken by double red brick courses radiating in a sunburst pattern from the plaza's fountain (**Image 18**). The lower plaza is edged in concrete and stairs from the upper plaza down to the lower plaza are also concrete. The concrete island platform that was originally positioned in the southeast corner of the lower terrace has been removed and the location has been paved with brick to match the rest of the lower plaza. Other patches to the brick are incompatible materials – those which do not match original historic materials in consistent color, size, and style of original – in a few locations. This includes scored and dyed concrete. Original paving of the upper terrace was granite, which has since been replaced by concrete. Paving in the pedestrian promenade connecting Market Street with the Ferry Building has been replaced by bands of light and dark grey granite flanked by brick laid in a herringbone pattern, which visually extend the Market Street sidewalks.

Vegetation: The eastern boundary of the plaza is lined with Canary Island date palms (*Phoenix canariensis*), which have replaced the pine and poplars that originally divided the plaza and the Embarcadero Freeway (**Image 21**) (Ho 2013). The post-Market Street Redevelopment Plan double allée of palms on either side of the pedestrian promenade are also Canary Island date palms (**Image 23**). Light fixtures are mounted on their trunks. Potted trees clustered around the base of light poles in the main plaza appear to be Queen Palms (*Syagrus romanzoffiana*) (**Image 22**). These pots are not repurposed Market Street Redevelopment Plan-era flower tubs. The trees in the lower plaza area, which are positioned within tree grates that are similar, but not identical to Market Street Redevelopment Plan-era tree grates, appear to be London plane trees (*Platanus acerifolia*). These trees appear to have been added after the lower plaza island was removed. The double row of trees planted along the plaza's western boundary adjacent to the Embarcadero Center development appear to be Ginkgo (*Ginkgo biloba*) (**Image 30**). Trees planted adjacent to the bocce court along Steuart Street are London planetree.

Buildings and Structures: In 1995, a green metal toilet was installed near the eastern end of the pedestrian promenade (**Image 29**). The structure is positioned south of the main plaza and styled consistent with advertising kiosks introduced along Market Street at the same time.

Views and Vistas: Market Street Redevelopment Plan-era views of the Embarcadero Freeway are no longer extant given its collapse and subsequent demolition after the 1989 earthquake. The obstructed Market Street Redevelopment Plan-era view of the Ferry Building and Bay Bridge from Justin Herman Plaza has been opened up with the removal of the freeway. The east-to-west view of the Market Street

Alignment is visible from the Justin Herman Plaza promenade (**Image 24**). The view of Justin Herman Plaza fountain from the promenade is also intact.

Constructed Water Features: The Justin Herman Plaza fountain (also known as Vaillancourt Fountain) is in the northeastern corner of Justin Herman Plaza (**Image 25**). The fountain measures approximately 40 feet high, 200 feet long, and 140 feet wide. It is composed of steel and precast concrete to form an interactive grotto that allows visitors to move under and through the structure. The precast concrete square tubes are arranged in irregular angles and feature a concrete finish that is highly textured. While the fountain was designed to pump 1 million gallons of water an hour through the tubes and spill it into the pool below, currently no water is flowing. Two walkways with stairs allow the public to stand between the tubes and offer views overlooking the plaza. The fountain also features concrete square platforms within the pool area, which allow the public to venture between the fountain's back wall and tube projections. Guardrails have been added to prevent falls, but do not block access to walking through the fountain or climbing the stairs. At the time the plaza was completed, the double-deck Embarcadero Freeway served as a massive backdrop for the fountain, dominating the skyline and cutting the plaza off from the waterfront. The fountain was positioned in the bend of the freeway ramp so that the ramp and the fountain enclosed the space that makes up the remainder of the plaza. The freeway and ramps are no longer extant, having been demolished following the 1989 Loma Prieta earthquake.

Small-Scale Features: None of the original lighting—modern standards with semi-translucent square luminaires mounted on square, light-colored granite square pillars arranged along the pedestrian promenade that connects Market Street with the Ferry Building—remains intact. Replica Path of Gold Light Standards are now placed in the plaza's promenade. Original concrete bollards (square granite reflecting the style of the original light standards) spanning the width of the pedestrian promenade that connects Market Street with the Ferry Building at both the east and west ends have been replaced with circular concrete bollards (**Image 27**). Circular-shaped bronze tree grates in the lower plaza appear to have been added after the lower plaza island was removed (**Image 20**). In a few cases, trees have been removed and their subsequent holes cemented. Square receptacles with conical recycling tops, which are not original, have been placed in the plaza (**Image 28**). Juan Bautista de Anza and Carlos III of Spain statues are no longer present. They were relocated from Justin Herman Plaza to Lake Merced in 2004 (Visual Arts Committee 2004). Public art pieces that have been added to Justin Herman Plaza since its completion include large statues on the upper terrace adjacent to the Embarcadero Center development (**Image 31**) and the American Lincoln Brigade Memorial positioned on the east side of the plaza behind the fountain.

Integrity Evaluation

Feature Status Analysis

The following *Table 1. Feature Analysis Table: Justin Herman Plaza* discusses the plaza's condition in terms of features grouped into the following landscape categories: Spatial Organization, Circulation, Vegetation, Views and Vistas, Constructed Water Features, and Small Scale Features. The table identifies the status of each feature in terms of three status categories: extant, partially extant, or lost. The summary also quantifies the volume of new features added to the major plaza landscapes that undermine integrity.

Table 1. Feature Analysis Table: Justin Herman Plaza

Description	Status	Comments/Analysis
Spatial Organization		
Placement at the eastern-most boundary of Market Street	Extant	The plaza's placement remains consistent, contributing to integrity of location and setting.
Arrangement in an irregular pentagon-shaped plan with terraces, promenade and open space	Extant	The plaza's plan remains consistent, contributing to integrity of design, feeling, and association. Compare **Images 5, 6, 7, 8** with **Images 14, 15, 16.**
Located adjacent to Embarcadero Freeway	Lost	While plaza's location has not changed, the freeway has been demolished, diminishing setting. Compare **Image 6** with **Image 14**).
Placement of fountains, small-scale features and	Partial	The open space south of the promenade has been remodeled into bocce courts (Compare **Image 8** with **Images 16, 26**); the open space north of the main plaza has been remodeled but remains an open space (compare **Image 6** with **Image 14**); the

Description	Status	Comments/Analysis
plantings within the plaza		hardscaping on the eastern edge of the plaza has been remodeled but retains similar configuration, minus the island platform that is lost (Compare **Image 5** with **Images 14, 21**); Together these alterations diminish the plaza's integrity of design, feeling, and association.
Circulation		
Pedestrian circulation along two primary axis	Extant	Pedestrian circulation axis remains intact and contributes to integrity of design, feeling, and association.
Plaza paving	Partial	The lower main plaza retains its brick laid in running bond pattern as paving for pedestrian circulation areas, though integrity of material is diminished in some locations where patches are not made with brick (**Image 18**). Original paving of the upper terrace was once granite, but has been altered to concrete (Compare **Image 5, 12** with **Image 30**), further diminishing integrity of design, materials, workmanship, feeling, and association.
Promenade paving	Lost	Promenade paving integrity is lost (Compare **Image 7, 10** and **15, 17**). All original paving materials have been altered, undermining integrity of design, materials, workmanship, feeling, and association.
Vegetation		
Trees	Partial	Market Street Redevelopment Plan-era pine and poplar trees along the eastern boundary of the plaza have been replaced with palms (Compare **Images 6, 8** with **Image 21**), new double allées of palms have been added to the promenade (Compare **Image 7** with **Images 15, 17, 23**), London planetrees in circular tree grates appear to have been added to the lower plaza when the island was removed (compare **Image 5** with **Image 15**), and potted palms have been added to the lower plaza. Together, these alterations have significantly undermined integrity of design, materials, workmanship, feeling, and association.
Views and Vistas		
View of the Embarcadero Highway/Opening of view to Ferry Building and Bay Bridge	Partial	Removal of the highway following the 1989 earthquake resulted in loss of highway view and opening of views of the Ferry Building and Bay Bridge (Compare **Image 7** with **Image 24**). This alteration diminishes integrity of setting.
Constructed Water Features		
Justin Herman Plaza Fountain	Extant	Retaining its overall form and material, the fountain in Justin Herman Plaza contributes to integrity of design, material, and workmanship (Compare **Image 6, 9** with **Image 25**). Although the lack of water flow diminishes feeling, and association, it is not a permanent condition.
Small-Scale Features		
Market Street Redevelopment Plan-era light standards	Lost	Market Street Redevelopment Plan-era promenade lighting alignment has been removed (Compare **Images 7, 10** and **Images 15, 17**. Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Market Street Redevelopment Plan-era bollards	Lost	Loss diminishes integrity of design, materials, workmanship, feeling, and association.

Description	Status	Comments/Analysis
Juan Bautista de Anza and Carlos III of Spain statues	Lost	Loss diminishes integrity of design, feeling, and association.
Post-Market Street Redevelopment Plan Features		
Public toilet	Non-contributing, added after period of significance	Addition diminishes integrity of design, feeling, and association.
Trash receptacles	Non-contributing, added after period of significance	Addition diminishes integrity of design, feeling, and association.
Public art	Non-contributing, added after period of significance	Addition diminishes integrity of design, feeling, and association.

Feature Integrity Evaluation

Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. When considering eligibility under Criteria C/3, it is most essential for integrity of location, design, materials, workmanship, and association to be retained, as they best convey the place, form, physical components, quality of labor, and processes associated with Justin Herman Plaza's significance as an example of how Lawrence Halprin's work helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning, and illustrated the viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process.

While the integrity of some of the features that are components of the landscape as a whole have been diminished, or even lost, the aggregate integrity of Market Street is retained when an aggregate of features have sufficient integrity in terms of location, setting, design, materials, workmanship, feeling, and association to express Justin Herman Plaza's historic significance as a cultural landscape associated with the works of master landscape architect Lawrence Halprin.

Based on feature condition analysis, the following integrity evaluation analyzes integrity of Justin Herman Plaza based on location, design, setting, materials, workmanship, feeling, and association

- **Location:** Location is the place where the cultural landscape was constructed. Justin Herman Plaza retains integrity of location through retention of the plaza's position at the eastern terminus of Market Street, bounded in the east by The Embarcadero, in the north by Sue Bierman Park, and in the west by the Embarcadero Center and Hyatt Regency buildings. As such, Justin Herman Plaza has integrity of location.
- **Setting:** Setting is the physical environment of the cultural landscape. While integrity of setting is supported by Justin Herman Plaza's continued positioning as the eastern terminus of Market Street, Spatial Organization has diminished integrity relative to setting based on demolition of the Embarcadero freeway. In addition, altered views of the Embarcadero, Ferry Building, and Bay Bridge has diminished integrity of setting. Overall, Justin Herman Plaza does not retain integrity of setting.
- **Design:** Design is the combination of elements that create the form, plan, space, structure, and style of a cultural landscape. The Justin Herman Plaza Fountain contributes to the plaza's integrity of design. In addition, spatial organization of the irregular pentagon-shaped plan with terraces, promenade, and southern open space also supports integrity of design, as does retained pedestrian circulation along two primary axes. However, the following spatial organization features contribution to diminished integrity of design: the open space south of the promenade has been remodeled into bocce courts; the open space north of the main plaza has been remodeled but remains an open space; the hardscaping on the eastern edge of the plaza has been remodeled but retains similar configuration, minus the island platform that is lost. Together these alterations diminish the plaza's integrity of design. While retained brick paving in the plaza's lower terrace supports integrity of design, loss of granite paving in the plaza's upper terrace and promenade greatly diminishes integrity of design. Loss of Pine and poplar trees and replacement with palms on eastern boundary diminishes integrity of design, as does addition of palms as replacement for granite light standards in the promenade. Replacement of original square bollards with circular bollards further diminishes integrity of design. Loss of Juan Bautista de Anza and Carlos II of Spain statues diminishes integrity of design. Addition of potted palms, trash receptacles, public toilet, and public art also diminishes integrity of design. Overall, Justin Herman Plaza does not retain a sufficient combination of elements that create its form, plan, space, structure, and style from its period of significance to convey its association with the works of master landscape architect Lawrence Halprin.

- **Materials:** Materials are the physical elements that were combined during the particular period of time and in a particular pattern or configuration to form the cultural landscape. Retained Justin Herman Plaza Fountain contributes to the plaza's integrity of materials, but remodeling of the south lawn into bocce courts and hardscaping with island in the main plaza's lower terrace reduces integrity of materials. While the majority of the brick paving in the plaza's lower terrace is retained, locations where there has been patching with alternative materials diminishes integrity of materials. Loss of granite paving in the plaza's upper terrace and promenade greatly diminishes integrity of materials for Justin Herman Plaza. Loss of pine and poplar trees and replacement with palms on eastern boundary also diminishes integrity of materials, as does addition of palms as replacement for granite light standards in the promenade. Replacement of original square bollards with circular bollards further diminishes integrity of materials. Loss of Juan Bautista de Anza and Carlos II of Spain statues diminishes integrity of materials. Addition of potted palms, trash receptacles, public toilet, and public art further diminishes integrity of materials. Overall, Justin Herman Plaza does not retain integrity of materials.
- **Workmanship**: Workmanship is the physical evidence of the crafts of a particular culture or people during any given period of history. Retained Justin Herman Plaza Fountain contributes to the plaza's integrity of workmanship, but remodeling of the south lawn into bocce courts and hardscaping with island in the main plaza's lower terrace diminishes integrity of workmanship. The locations where there has been patching in the plaza's lower terrace with alternative materials also undermines integrity of workmanship. Loss of granite paving in the plaza's upper terrace and promenade greatly diminishes integrity of workmanship for Justin Herman Plaza. Loss of pine and poplar trees and replacement with palms on eastern boundary also diminishes integrity of workmanship, as does addition of palms as replacement for granite light standards in the promenade. Replacement of original square bollards with circular bollards further diminishes integrity of workmanship. Loss of Juan Bautista de Anza and Carlos II of Spain statues diminishes integrity of workmanship. Addition of potted palms, trash receptacles, public toilet, and public art further diminishes integrity of workmanship. Overall, Justin Herman Plaza does not retain integrity of workmanship.
- **Feeling:** Feeling is a cultural landscape's expression of the aesthetic or historic sense of a particular period of time. This expressed as a composite of setting, design, materials, and workmanship. Justin Herman Plaza's integrity has been diminished in all of these categories. Particularly important, the combination of removal of the Embarcadero Freeway and alterations to trees, paving, lighting, and remodeling of the southern lawn to bocce court greatly undermines integrity of feeling. As such, Justin Herman Plaza does not retain integrity of feeling.
- **Association:** Association is the direct link between the important historic event or person and a cultural landscape. This can be expressed by the maintenance of a link to the past through continuation of a traditional use or occupation. While many of the features within categories of spatial organization, circulation, vegetation, and small-scale features are only partially extant or lost, Justin Herman Plaza continues to be used as an open space for public gathering and retains integrity of association.

Thus, the majority of feature categories – spatial organization, circulation, vegetation, views and vistas, constructed water features, and small-scale features do not retain enough integrity to express Justin Herman Plaza's historic significance. As such, there is insufficient integrity of setting, design, materials, workmanship, and feeling to convey Justin Herman Plaza's historic significance.

Conclusions

While Justin Herman Plaza possesses significance under NRHP and CRHR Criterion C/3 for its association with master landscape architect, Lawrence Halprin, alterations to the plaza have greatly diminished its integrity such that it no longer conveys its historic significance as an example of how his work helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning, or as an example of his work that illustrates the viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process.

The property does not appear to be a historical resource for the purposes of the California Environmental Quality Act (CEQA) and has also been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code.

While the plaza does not retain enough integrity to convey its significance as an individually eligible resource, features of the plaza that do retain integrity contribute as components to the integrity of the Market Street cultural landscape. Thus, the proposed status code is 3D (Contributor to a district that has been fully documented according to OHP instructions and appears eligible for listing).

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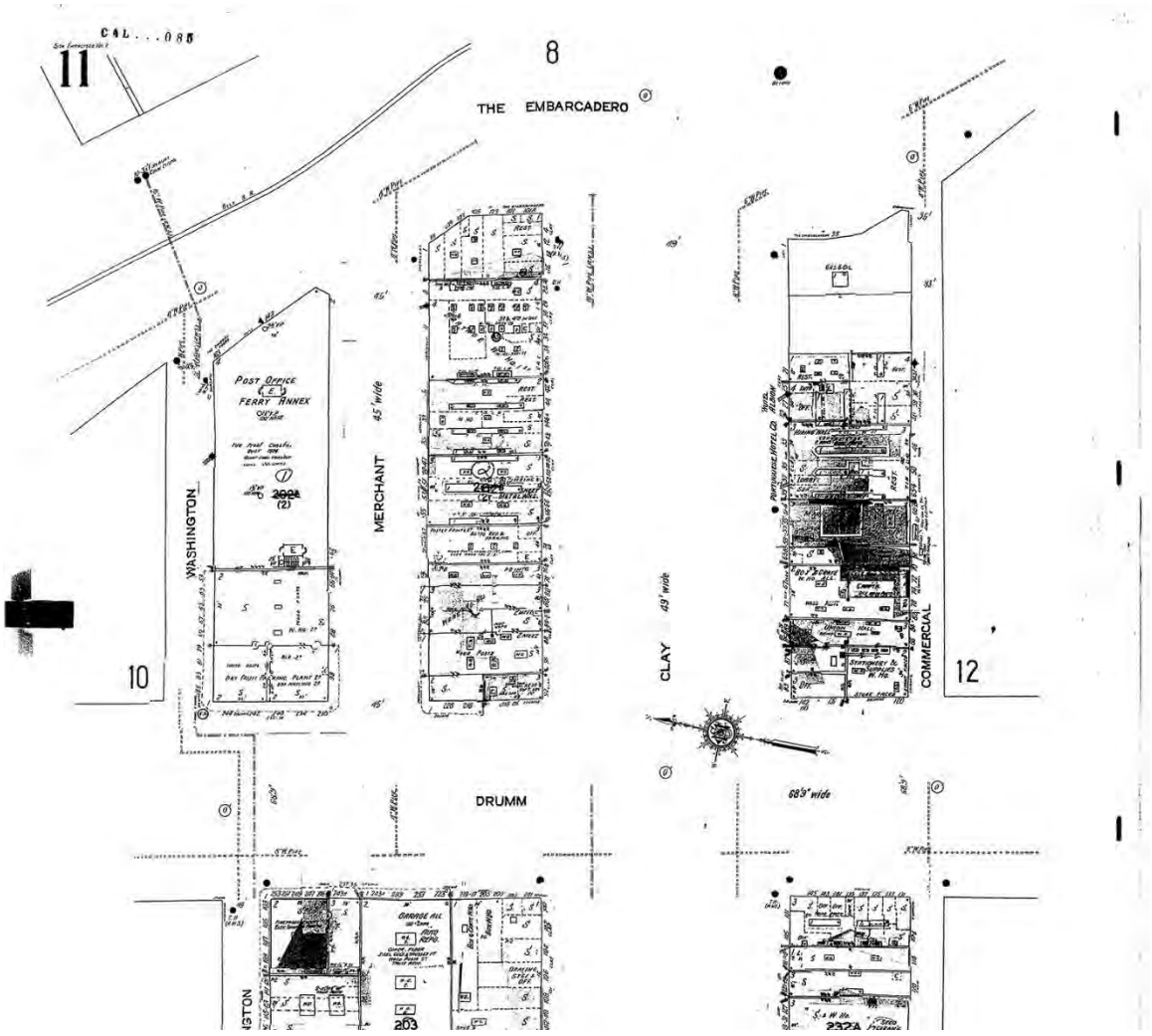

Image 1. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheets 11 shows area where Washington, Merchant, Clay, and Commercial Streets meet the Embarcadero (top left), illustrating existing properties demolished as part of the Embarcadero Center Redevelopment and construction of Embarcadero Plaza. (*San Francisco History Center, San Francisco Public Library*)

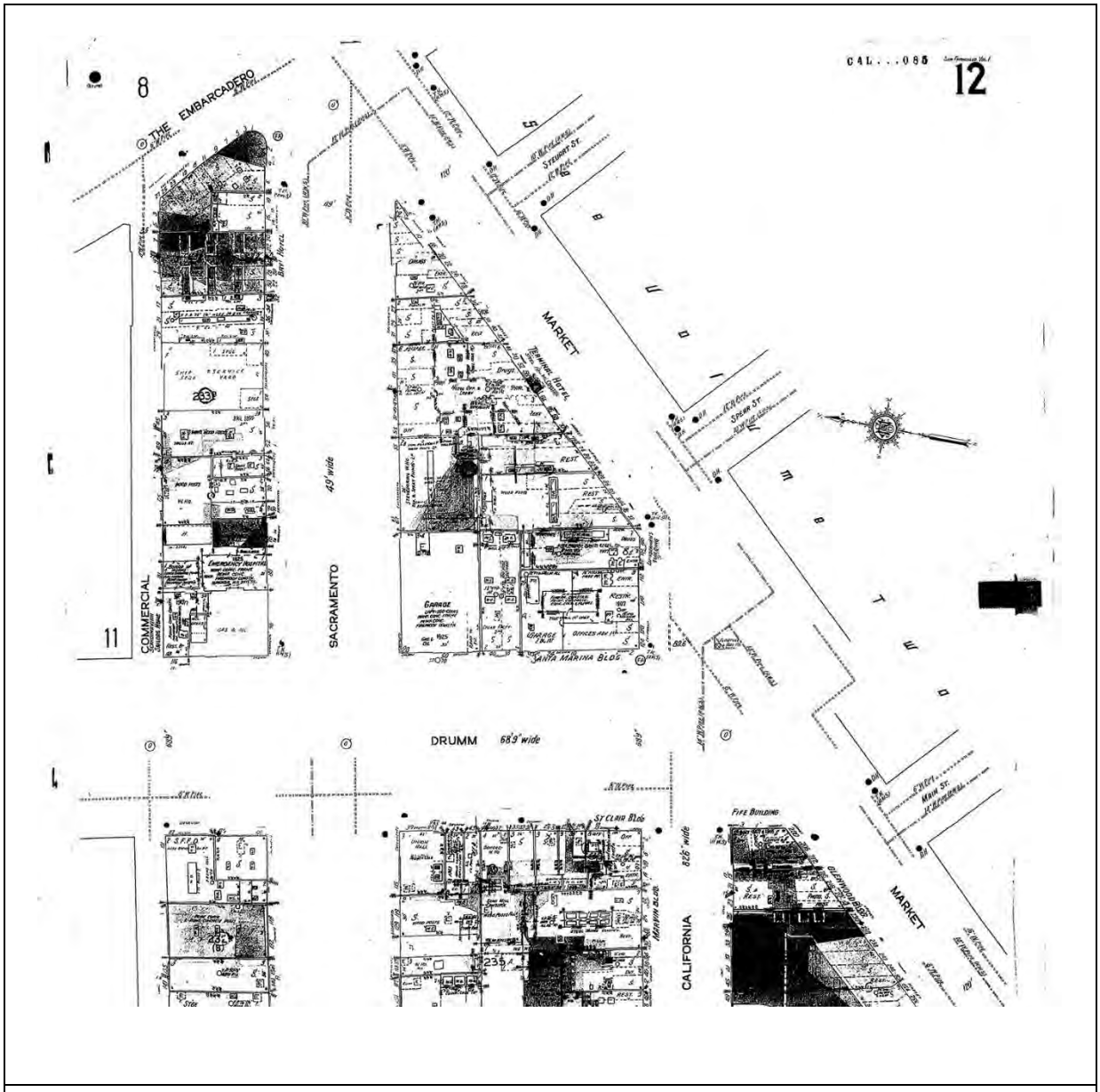

Image 2. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheets 12 shows area where Market, Sacramento, and Commercial Streets meet the Embarcadero (top left), illustrating existing properties demolished as part of the Embarcadero Center Redevelopment and construction of Embarcadero Plaza. (*San Francisco History Center, San Francisco Public Library*)

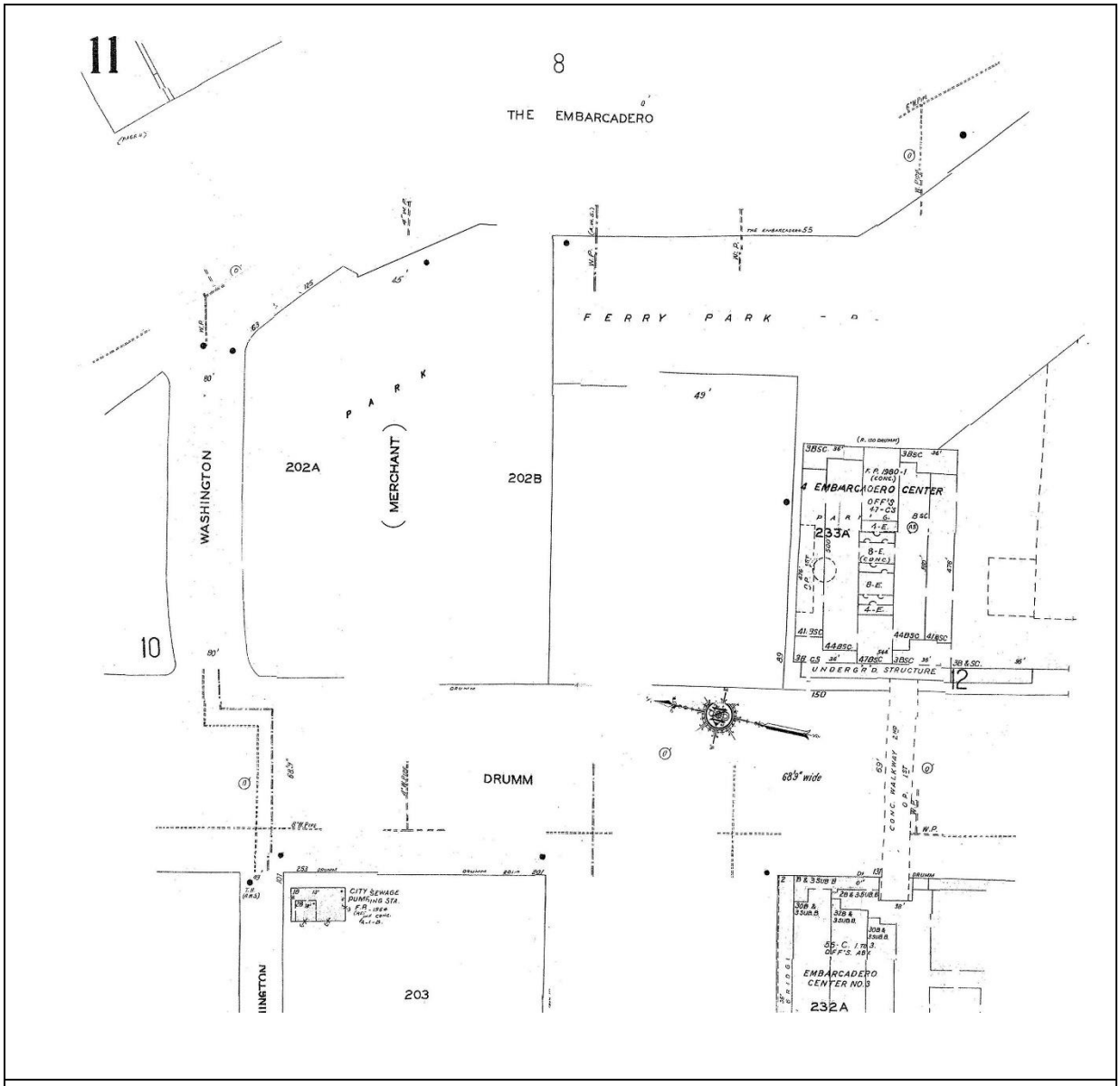

Image 3. 1998 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheet 11 shows the northern section of Justin Herman Plaza (indicated as Ferry Park), flanked on its western boundary by Embarcadero Center redevelopment and on its east by The Embarcadero. (*San Francisco History Center, San Francisco Public Library*)

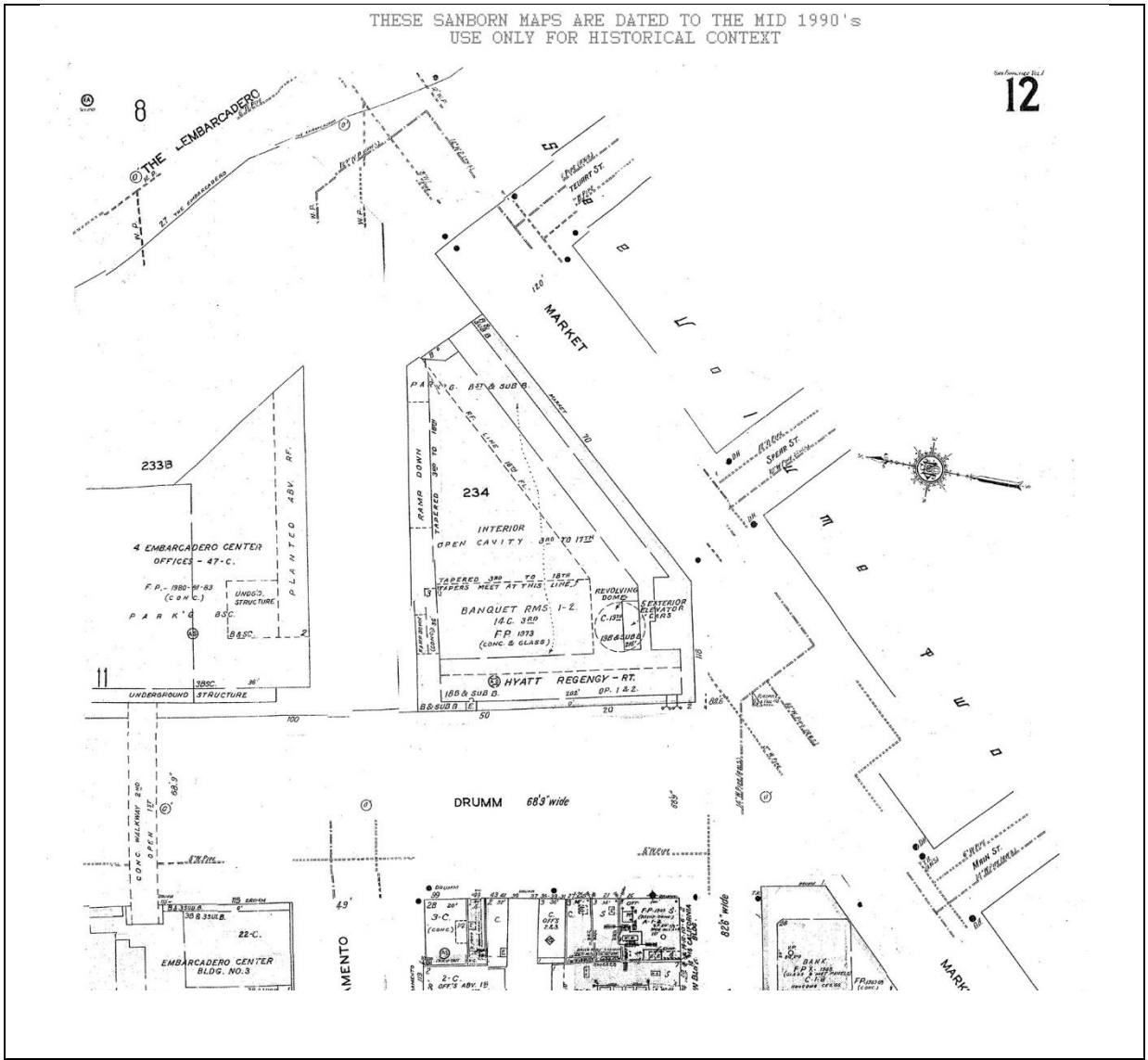

Image 4. 1998 San Francisco Sanborn Fire Insurance Map, Volume 1, Sheet 12 shows the center section of Justin Herman Plaza (unlabeled) where its western boundary is flanked by the Embarcadero Center redevelopment, Hyatt Recency, and eastern terminus of Market Street. (*San Francisco History Center, San Francisco Public Library*)

Image 5. Justin Herman Plaza, 1979, showing south end of the lower terrace, east of the eastern terminus of Market Street. Lower terrace was paved in brick and featured a concrete platform along its southeastern boundary and a concrete island in the center of its southern section (right). Upper terrace and pedestrian promenade was paved with granite (left). *(Photograph of Contact Sheet [cropped] by author. Slide 22E105, by Joshua Friedwald, dated 1979 [014.VI.22E.101-127], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 6. Justin Herman Plaza, 1979, showing north end of the lower terrace paved with brick, featuring Vaillancourt fountain position in the northeast corner with the Embarcadero Freeway ramp wrapping around the plaza's northern boundary. *(Photograph of Slide Sheet [cropped] by author. Slide 22E104, by Joshua Friedwald, dated 1979 [014.VI.22E.101-127], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.*

Image 7. The promenade of Justin Herman Plaza connected the eastern terminus of Market Street to the Embarcadero as a pedestrian space with the main terraced plaza to the north (left) and lawn in the south

Image 8. The southern section of the plaza featured a lawn open space backed by poplar trees on the eastern boundary and London planetrees on the western boundary. *(Photograph of Contact Sheet [cropped] by*

(right). *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R16-5, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 9. Justin Herman Plaza's upper terrace and promenade originally featured granite paving and square light poles with translucent glass. In addition, the Embarcadero Freeway off-ramps to Clay and Washington Street wrapped around the plaza's northern boundary, and pine and poplar trees lined the eastern boundary adjacent to the freeway. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R47, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

author. Sheet 1479R16-9, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)

Image 10. Small-scale features in Justin Herman plaza included stone planting tubs and square light poles with square translucent glass. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R22-3, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 11. Justin Herman Plaza, 1979, western boundary adjacent to Embarcadero Center development with concrete steps joining upper and lower terraces, featuring circular planters. *Photograph of Slide Sheet [cropped] by author. Slide 2C725, by Joshua Friedwald, dated 1979 [014.VI.2C.101-740], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania.*

Image 12. The western boundary of Justin Herman Plaza's upper terrace, adjacent to the Embarcadero Center development, featured granite paving and included wood benches. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R29-7, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania).*

Image 13. The statue of Juan Bautista de Anza was placed at the southern end of Justin Herman Plaza, adjacent to the lawn. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R6-10, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania).*

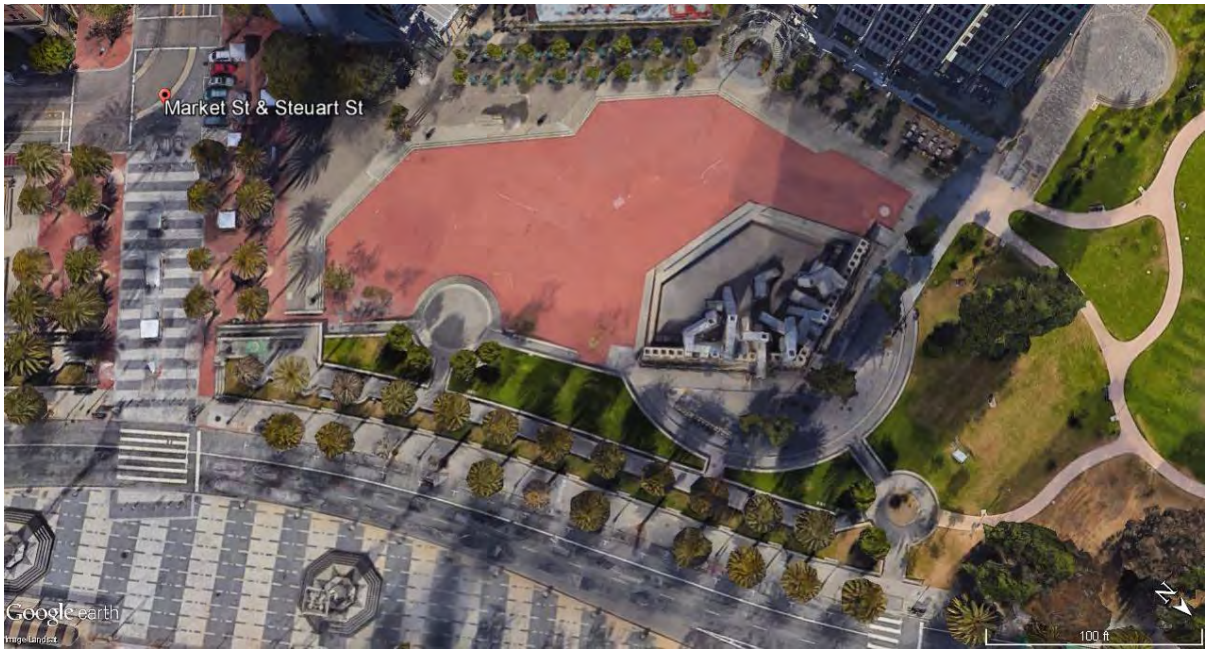

Image 14. Justin Herman Plaza, 2016, showing the northern section of the plaza that still features the main plaza with Valliancourt-designed fountain. However, the plaza has lost its center island and hardscaping along the eastern boundary also has been altered. The Embarcadero Freeway and off-ramps have been removed. (Google Earth 2016)

Image 15. Justin Herman Plaza, 2016, showing the center section (featuring the pedestrian promenade), which has been significantly altered since the MSRP era with removal of lighting, replacement of bollards and paving, and addition of palm trees. (Google Earth 2016)

Image 16. Justin Herman Plaza , 2016, showing the southern section of the plaza, which has been redeveloped with bocce courts (concrete hardscaping with decomposed granite and grass) and palm tree plantings. (Google Earth 2016)

Image 17. Justin Herman Plaza, 2016. Promenade pedestrian circulation space remains intact, but paving has been replaced, MSRP-era lighting has been

Image 18. Justin Herman Plaza, 2016, showing radiating pattern of brick in main plaza that has been retained. (Photograph by author, March 2016)

removed and paving has been altered. (Photograph by author, March 2016)	
Image 19. Justin Herman Plaza, 2016, showing the addition of stairs as part of the 2003 renovation. (Photograph by author, March 2016)	**Image 20.** Justin Herman Plaza, 2016, showing London planetrees in lower plaza. These may have been added when the lower plaza island was removed. (Photograph by author, March 2016)

Image 21. Justin Herman Plaza, 2016, showing palm trees along Embarcadero that have replaced poplars and pine trees. (Photographs by author joined into panorama with Photoshop image stitching, March 2016)

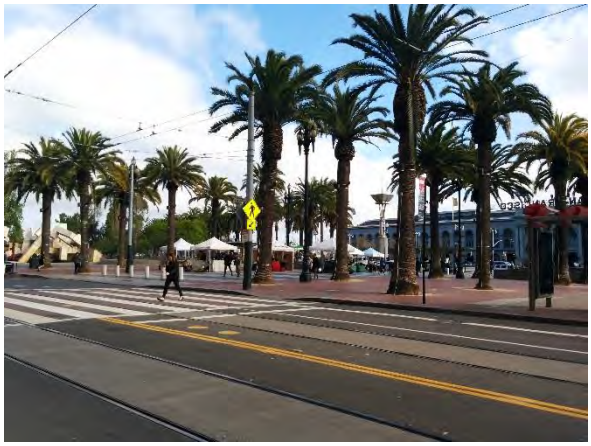

Image 22. Justin Herman Plaza, 2016, showing potted Queen palms clustered around light poles. (Photograph by author, March 2016)

Image 23. Justin Herman Plaza, 2016, showing Canary Island date palms lining the promenade. (Photograph by author, March 2016)

Image 24. Justin Herman Plaza, 2016, showing view of plaza, ferry building and bay bridge, and Embarcadero Center development. (Photographs by author joined into panorama with Photoshop image stitching, March 2016)

Image 25. Justin Herman Plaza, 2016, showing plaza fountain. (Photograph by author, March 2016)

Image 26. Justin Herman Plaza, 2016, showing bocce courts in the plaza's southern-most section. (Photograph by author, March 2016)

Image 27. Justin Herman Plaza, 2016, showing new bollards located at the Market Street entrance of the plaza's promenade. (Photograph by author, March 2016)

Image 28. Justin Herman Plaza, 2016, showing example of non-MSRP-era rash receptacle placed in plaza. (Photograph by author, March 2016)	**Image 29.** Justin Herman Plaza, 2016, showing new public toilet structure placed in plaza between the main plaza and the pedestrian promenade. (Photograph by author, March 2016)
Image 30. Justin Herman Plaza, 2016, showing patio dining tables and Ginkgo trees along boundary with Embarcadero Center that have replaced MSRP-era benches. (Photograph by author, March 2016)	**Image 31.** Justin Herman Plaza, 2016, showing new public artwork introduced to the plaza since its completion. (Photograph by author, March 2016)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary# _____
HRI # _____
NRHP Status Code(s) 3D_____

BUILDING, STRUCTURE, AND OBJECT RECORD

Page 1 **of 6** ***Resource Name or** #(Assigned by recorder) Hallidie Plaza
***Recorded by** January Tavel and Aisha Fike, ICF
***Date** March 29, 2015 ☐ Continuation ☐ Update

B1. Historic Name:
B2. Common Name: Hallidie Plaza
B3. Original Use: Pedestrian plaza B4. Present Use: Pedestrian Plaza
***B5. Architectural Style:** Modern
***B6. Construction History:** Constructed in 1973. Major alterations include the construction of a large exterior elevator near the entrance to the BART/Muni concourse and the removal of the benches and some of the trees in 1997. (See continuation sheets for further construction history.)

***B7. Moved?** ☑ No ☐Yes ☐ Unknown **Date:** **Original Location:**
***B8. Related Features:** Powell Bart Station, Market Street
B9a. Architect: Market Street Joint Venture Architects (Mario J. Ciampi & Associates, John Carl Warnecke & Associates, Lawrence Halprin & Associates)
b. Builder: Unknown
***B10. Significance: Theme** Urban planning in the Twentieth Century
Area Architecture, Landscape Architecture
Period of Significance 1973 **Property Type** Site (designed landscape) **Applicable Criteria** C/3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Context Statement

Market Street Redevelopment Plan

Hallidie Plaza, a three-level terraced plaza, was constructed in 1973 on the north side of Market Street at the intersection of Market and 5th Streets as part of the Market Street Redevelopment Plan (MSRP). The MSRP, which was designed by the Market Street Joint Venture Architects, Mario J. Ciampi & Associates, John Carl Warnecke & Associates, Lawrence Halprin & Associates, sought to resolve Market Street's economic importance as San Francisco's main circulation spine with its symbolic, social, commercial, and civic importance through plaza development, removal of visually cluttering commercial signage, and sidewalk landscape designs intended to blend new street-level Bay Area Rapid Transit (BART) facilities into the overall streetscape.

(See continuation sheets for further evaluation of significance)

B11. Additional Resource Attributes: HP29, Landscape architecture; HP31, Urban Open Space; HP28, Street furniture

***B12. References:**
See continuation sheets for references.

B13. Remarks: n/a
***B14. Evaluator:** January Tavel and Aisha Fike, ICF
***Date of Evaluation:** March 29, 2016

(This space reserved for official comments.)

(Sketch Map with north arrow required.

***B6. Construction History (cont.):**

Prior to the construction of Hallidie Plaza, the triangular-shaped block bounded by Market, Mason, Eddy, and Powell Streets was densely built out with commercial buildings that varied in height from three stories at the corner of Market and Powell Streets to eight stories in height along Mason Street. Buildings that were demolished to create Hallidie Plaza included large-footprint commercial buildings featuring several stores and restaurants at the ground floor, as well as a few 2-story commercial buildings including stores, restaurants, and a billiard hall/movie theater. All of the buildings on the west side of the block along Mason Street were retained and are present today. These buildings, described from the corner of Mason and Market Street north along Mason to Eddy Street, include: the 8-story Graystone building; the 7-story Garfield Building, which wraps around the back of the Graystone Building and includes a façade along Market Street that was heavily modified in 2007); and two 4-story mixed use commercial/hotel buildings. These buildings all date to 1907 and 1908 and featured various commercial uses including restaurants, stores, offices and a movie theater (**Images 1, 2**) (1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63; and 1998 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63).

Constructed in 1973, this plaza intended to serve as a major multi-modal transportation hub, providing pedestrian access to the underground Muni and BART Powell Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, busses, and the end of the Powell Street cable car line (**Image 3**). The plaza also was designed to act as the gateway to the retail section of Market Street. The design featured an entrance to the BART station from a sizeable underground concourse that opens into the plaza (**Image 8**), which is sunken below street level and accessible from the street by stairs and escalators. The 1967 Market Street Design Plan Summary Report called for the sunken plaza with "amphitheater-style steps" to serve as a venue that could accommodate seasonal events such as fashion shows, concerts, and fundraising affairs (San Francisco Public Library 1967:18). In addition, the vertical movement via stairs and escalators from street level to Hallidie Plaza's terrace levels was desirable to Halprin as a means of varying the potential monotony of walking along the flat ground-lane of Market Street (Hirsch 2014:81).

The Market Street Redevelopment Plan called for careful attention to the pedestrian connections and "leftover" triangular spaces where the diagonal Market Street intersected with streets of the northern grid. To rationalize traffic flow, the plan called for the closure of some of these streets. These closures resulted in the Powell Street mall, which forms Hallidie Plaza and comprises the block of Powell Street between Ellis and Market Street (Hirsch 2014:78).

The plaza is divided at street-level by Cyril Magnin Street. Below this overpass is a passageway that joins the east and west sides of the plaza's lowest level and includes space for a visitor center. Escalators are parallel to Market Street on both the eastern and western sides of the plaza (**Images 4, 7**). In addition to the stairs adjacent to the escalators, the plaza also features stairways independent of escalators, which parallel Cyril Magnin Street on both sides. The design also includes: stepped concrete-walled terraces serving as areas for landscaped vegetation (**Images 4, 5, 9**); red brick paving laid in a herringbone pattern (which unified the plaza with the Market Street Redevelopment Plan design as a whole); mezzanines on both sides of the plaza, which creates space for pedestrian traffic to circulate between stairs and offers a vantage to view the plaza floor below (**Image 9**); the below-street level passage that joins the east and west sides of the plaza and includes space for the visitors center (**Image 7**); circular flower tubs like those also found in Justin Herman Plaza (**Image 5, 6**); tree plantings along the plaza's northeastern boundary and in the sunken plaza with circular metal grates similar to those found throughout the Market Street Redevelopment Plan (**Images 6, 10**); and custom-designed wood-slat benches overlooking and within the plaza (**Images 6, 10**). Research did not reveal a Market Street Redevelopment Plan planting plan that identified precise locations of circular flower tubs and tree plantings, but, according to an edition of the Market Street Development Project newsletter, 18 additional trees were added to upgrade the image of Hallidie Plaza sometime between its dedication in 1973 and 1976 (San Francisco Public Library 19776e:241). Further research is required to determine if these trees correspond directly with the trees placed at the northern boundary.

Upon completion of the MSRP, *The New York Times* reporter Paul Goldberger criticized the Hallidie Plaza sunken design:

> *The real disappointment [with the Market Street Development Project] is not the street itself, which really must count as a serious effort, but the plazas along the route. At the foot of Powell Street where the cable cars swing around a turntable is a dreary hole in the ground called Hallidie Plaza, which on a recent visit was full of more litter than any public place in New York…even though an entrance to San Francisco's BART transit system was the nominal justification for the sunken plaza, no one ever considers a below-ground plaza worth much respect* (Goldberger 1979).

Similarly, in 1979 the architectural critics Allan Temko and Paul Goldberg considered it to be a mundane plaza and a "two-million dollar hole in the ground" because the plan did very little to entice shoppers to descend into the sunken space that was obscured "from the eyes on the street," as Jane Jacobs described it in *The Death and Life of Great American Cities* (Hirsch 2014: 81-82).

***B10. Significance (cont.):**

In December of 1962, "What To Do About Market Street" was published by Livingston and Blayney, City and Regional Planners, in association with Lawrence Halprin and Associates, Landscape Architects, Rockrise and Waston, Architects, and Larry Smith and Co., Real Estate Consultants. The document proposed a program of redevelopment that featured improvements to the environment that included, among other things, "squares, plazas, and arcades where people can gather and enjoy themselves" (San Francisco Public Library 1962:7).

The MSRP called for careful attention to the pedestrian connections and "leftover" triangular spaces where the diagonal Market Street intersected with streets of the northern grid. To rationalize traffic flow, the plan called for the closure of some of these streets. These closures resulted in the Powell Street mall, which forms Hallidie Plaza (Hirsch 2014: 78). Designed as part of the MSRP at the intersection of Market and 5th streets, adjacent to the Powell Street cable-car turnaround, Hallidie Plaza is a three-level terraced plaza. Dedicated in 1973, this plaza was intended to serve as a major multi-modal transportation hub, providing pedestrian access to the underground Muni Metro and Bay Area Rapid Transit (BART) Powell Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, busses, and the end of the Powell Street cable car line. The plaza also was designed to act as the gateway to the retail section of Market Street. The design featured entrance to the BART station from a sizeable underground concourse that opens into the plaza, which is sunken below street level and accessed from the street by stairs and escalators. While the design of Hallidie Plaza was a joint venture between Ciampi, Warnecke, and Halprin, it was Halprin specifically who promoted the concept of sinking the plaza below street level as a way to vary the potential monotony of walking along the flat ground-plane of Market Street (Hirsch 2014: 81).

Urban Renewal and Revitalization through Landscape Design and Urban Planning in the United States and San Francisco, 1945-1980

Responding to federal redevelopment programs of the 1950s that privileged the needs of the automobile over the pedestrian, Hallidie Plaza is an example of a designed urban landscape that prioritized the activities of pedestrians. "The failure of government-sponsored urban planning, the insensitive severity of Modernist planning and architecture, pent-up demands for racial equity, and the maturing of liberal-minded baby boomers were all forces that led to greater social responsiveness in the design professions beginning in the 1960s" (Pregill and Volkman 1999: 710). In 1966 the Demonstration Cities and Metropolitan Development Act established the Model Cities Program, which mandated citizen input into planning decisions and required neighborhood preservation rather than demolition be part of urban improvement. This project represents a transition to a new phase of urban renewal and revitalization through landscape design in the last half of the twentieth century that gave greater focus to pedestrian-oriented public spaces and increased responsiveness to context. Plazas were included among the site types that were most important during this era as designers looked to the creation of these and other spaces (mixed-use centers, the downtown mall, redeveloped waterfront) as key devices for bolstering urban economic and social activity (Pregill and Volkman 1999: 721).

In most cities, the task of coordinating urban renewal fell to newly created local redevelopment agencies. In San Francisco, Justin Herman directed the San Francisco Redevelopment Agency during a particularly active period from 1959 until 1971. As with other city redevelopment agencies throughout the country, the SFRA leveraged federal funding and new powers to acquire land through eminent domain to facilitate redevelopment by razing large sections of San Francisco. At the time, this large-scale clearance was considered a necessary technique, which provided an environment for the redeveloped area that would prevent it from returning to its former blighted condition. However, this method displaced thousands of residents and businesses, proving especially disruptive to San Francisco's low-income, black and Asian communities (Brown 2010b:41). Project examples included Western Addition A-1, Diamond Heights, Golden Gateway, and Yerba Buena Center.

By 1960s, local opposition to the devastation wrought by urban renewal to existing residents and historic fabric echoed nationwide criticism. Through the 1970s, projects across the country and in San Francisco began shifting focus to reuse and rehabilitation rather than full-scale neighborhood clearance (Brown 2010b:41-42). Lawrence Halprin received national attention for master planning an early San Francisco example—Ghirardelli Square complex near Fisherman's wharf (1962-1965)—which successfully adapted an industrial complex for commercial use (Knight 1975: 7; Brown 2010b:1949). In addition to pioneering the adaptive reuse concept, the project also leveraged landscape design for urban revitalization through design of fountains, lighting, planting, and outdoor performance spaces (Brown 2010b:149)

Hallidie Plaza: A Collaboration of Modern Design Masters

The three designers associated with the Market Street Redevelopment Plan in San Francisco—architect Mario Ciampi, architect John Carl Warnecke, and landscape architect Lawrence Halprin—developed their expertise as master architects during the period of renewal and revitalization from 1945-1980 and within the context of increasing collaboration among design disciplines. They were thought-leaders in the environmental design community, applying new approaches to urban placemaking that modeled pedestrian-oriented design,

harmonizing Modern design within historic settings, development of public spaces for positive economic and social impact, and collaborative design processes. The joint venture collaboration of these masters was an innovation as an early application of an interdisciplinary approach to design, bringing together masters in architecture and landscape architecture. Their effort helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrated the viability of prioritizing sensitivity to the human experience and the existing built environment as part of the urban redevelopment process.

John Carl Warnecke (1919–2010):

John Carl Warnecke was born and raised in Oakland, California. The son of a prominent San Francisco Architect, Carl I. Warnecke, he earned a bachelor's degree from Stanford University in 1941. While studying there, he met future president John F. Kennedy, and was a member of the 1940 Rose Bowl-winning Stanford Indians football team. During this time, he suffered an injury that would keep him from serving in WWII (Brown 2010b:251).

Warnecke was an early participant in the group, Telesis, which first formed in 1940 to foster collaboration among landscape architects, planners, and architects in the San Francisco Bay Area, and to stage an exhibition highlighting three main concepts that later guided local planning efforts: urban renewal in "slum" areas, preserving an urban greenbelt, and collaborative planning at the regional level. Telesis has been recognized by the American Planning Association as the first volunteer-based group to bring multiple fields together to work toward environmental development on a regional basis (Brown 2010b:142-143) and involvement with this group likely influenced Warnecke's approach to planning and interdisciplinary collaboration.

As a graduate student in the Master of Architecture program at Harvard University, Cambridge, Massachusetts, Warnecke studied with Walter Gropius, a German architect credited with founding the Bauhaus School and being among the pioneering masters of Modern architecture. Warnecke completed the three-year program in one year, earning his degree in 1942 (Grimes 2010).

Upon completing graduate school, Warnecke worked as a building inspector in Richmond, California and later worked as a draftsman in his father's firm. He was inspired by the progressive approaches of Second Bay Tradition architects such as William Wurster and Bernard Maybeck (Brown 2010b:251).

In 1950, Warnecke founded his own firm John Carl Warnecke and Associates in San Francisco. He built his practice as "an architect whose modernist approach was tempered by a sensitivity for history and the environment" (Brown 2010a). His firm grew to be one of the country's largest during the 1960s. In addition to his San Francisco location, the firm also had an office in New York City. The firm worked on projects throughout the country on a wide variety of project types—skyscrapers, airports, libraries, civic complexes, and shopping centers, among others. San Francisco project include Hilton Hotel Tower (1971) and the Federal Office Building at 450 Golden Gate Avenue (1959). Notable projects that touched on planning, landscape design, and contextualization challenges included the United States Naval Academy master plan and several buildings in Annapolis, Maryland (1965); the John F. Kennedy Eternal Flame memorial gravesite at Arlington National Cemetery (1967); and the Hawaii State Capitol building in Honolulu, Hawaii (1969).

Warnecke's prominence as an early proponent of contextualizing designs to adapt to their surroundings was solidified by work on Lafayette Square in Washington, DC. His role as designer of the project, which included integrating new designs for the Howard T. Markey National Courts Building (1967) and the New Executive Office Building (1969), arose through participation in the advocacy campaign, supported by First Lady Jaqueline Kennedy, that sought to prevent the U.S. General Services Administration from razing historic townhouses lining Lafayette Square to replace them with federal office buildings. Critics argued that the changes would destroy the character of the square. Warnecke's proposal included renovation of the rowhouses and construction of office buildings behind them. "The plan was ultimately hailed as an elegant solution to the problem of historic preservation in an age of rapid urban renewal" (Brown 2010a).

Mario Joseph Ciampi (1907–2006):

Ciampi was born in San Francisco to Italian immigrants—his mother, a seamstress for Levi Strauss, and his father, in the business of architectural stone—and grew up living on Twin Peaks. During the 1920s, Ciampi began drafting as an apprentice for architect Alexander Cantin and attended classes at the San Francisco Architectural Club. He applied for a scholarship to attend Harvard and was admitted to the graduate program even though he had no college degree. In 1932, Ciampi graduated from Harvard University and then received a scholarship for additional study at the Ecole des Beaux-Arts, Paris (Weinstein 2005).

Ciampi worked for Dodge A. Reidy Architects before founding his own firm, Mario Ciampi and Associates, in 1945 (Brown 2010b: 209; Weinstein 2005). Ciampi first gained professional prominence by designing schools, commercial buildings, and churches in San Francisco Bay Area. Projects in the city of San Francisco included Lawton Elementary School (1940), Storefront of 4463 Mission Street (1948), Crest Auto Parts at 5050 Mission Street (1948), Storefront at 4680-4690 Mission Street (1949), California Flower Market (1956), and Corpus

Christi Catholic Church (1953). Other local projects included a collaboration on the Westmoor High School (1956) in Daly City with MSRP joint venture partner, Lawrence Halprin (Brown 2010b:209).

Ciampi's focus later shifted to urban planning. He was involved in a number of significant planning projects including a master plan for San Mateo County's Jefferson High School District, St. Mary's College in Moraga, and the University of Alaska in Fairbanks (Lowell 2011). In this role of urban planner, Ciampi left a significant imprint on the San Francisco Bay Area, leading projects that employed a focus on developing public spaces for positive economic and social impact. He served as the consultant in charge of the city's 1965 draft San Francisco Downtown Plan (Brown 2010b:209). He also consulted on projects including Golden Gateway Redevelopment Project (1969-1974), Embarcadero Plaza (later named Justin Herman Plaza) (1972), Fisherman's Wharf, and Yerba Buena Center (1969). During the urban renewal and roadway expansion era, Ciampi conducted a freeway study for San Francisco with the California Department of Transportation. He also designed a series of overpasses and interchanges along Interstate 280 in California in 1965. "After public protest compelled state highway engineers to seek outside help for aesthetics, Ciampi's streamlined concrete structures…transformed a crude preliminary scheme into one of the most gracious freeways in the world" (Temko 1991). Ciampi's innovative approach to the design of road infrastructure appealed to the public and earned him the respect of his professional community. He was awarded an American Institute of Architects Honor Award for the Junipero Serra overpass for Highway 280 on the San Francisco Peninsula (Lowell 2011).

Lawrence Halprin (1916–2009):

Born in New York City, Lawrence Halprin earned a B.S. in Plant Sciences from Cornell University in 1939 and continued his studies at University of Wisconsin where he earned a M.S. in Horticulture. As a graduate student, Halpin visited Taliesin, the home of master architect, Frank Lloyd Wright. This experience inspired his interest in design and motivated his enrollment at Harvard University Graduate School of Design where he earned a Bachelor of Landscape Architecture degree in 1944 (Brown 2010b:270). Like Warnecke, Halprin studied under Walter Gropius at Harvard, as well as Marcel Breuer, who is also recognized as a master of Modernist architecture (Brown 2010b:760), During World War II, Halprin served in the Navy and was assigned to the USS Morris. When his ship was destroyed, Halprin was given leave in San Francisco, where he remained (Brown 2010b:270).

Halprin's design career in the San Francisco Bay Area began with a focus on residential garden design. From 1945-1949, Halprin worked with master landscape architect, Thomas Church (Brown 2010b:144-145). Collaboration included work on the Dewey Donnell Garden in Sonoma County (Brown 2010b:271).

In 1949, Halprin opened his own firm, Lawrence Halprin & Associates Landscape Architects in 1949. He escalated to designing large-scale planned residential complexes, such as the San Francisco projects Parkmerced (1949, with Thomas Church) and St. Francis Square (1961) (Brown 2010b:147-148), but is best known for his work at Sea Ranch (1962-1967) near Gualala, California. The iconic complex of condominiums at Sea Ranch is sited in a bucolic coast area of Sonoma County and is considered a master work of the Third Bay Tradition design. For this project, collaboration with the architectural firm, Esherick, Homsey, Dodge & Davis (EHDD), Lawrence Halprin created the landscape and development plan, which clustered buildings and provided large areas of community open space (Brown 2010b:133).

In the late 1930s into the 1950s, a growing collaboration between architects and landscape architects resulted in a new synthesis of buildings and landscapes (Brown 2010b:139-140). While residential landscape design formed the foundation of most landscape architects' practices before the 1940s, landscape architects in the post-WWII era increasingly expanded their practice to include master planning, campus planning, site planning, and regional planning (Brown 2010: 141). Through the work of his firm, Halprin reasserted the landscape architect's role as distinct from planners or architects in regenerating the American city by making vital social and pedestrian spaces out of formerly marginal sites such as historic industrial complexes or the spaces over or under freeways. "In doing so, they re-imagined a public realm for American cities that had been cleared by federal urban renewal programs and abandoned for new suburban developments" (Meyer 2008). Halprin's leadership included collaboration with Livingston and Blayney and George Thomas Rockrise on the 1962 *What to do about Market Street* planning proposal (Brown 2010b:247) and subsequent collaboration with Mario J. Ciampi and John Carl Warneke on the Market Street Redevelopment Plan.

Landscape designers helped play an important role in shaping the form, spatial configuration, and uses of corporate plazas, landscapes, and public spaces during the Modern period. In addition to his work associated with Market Street and associated plazas, the evolution of Halprin's career included commercial and corporate designed landscapes like the rooftop garden at the Fairmont Hotel (1961), Bank of America plaza (1967), the Yerba Buena Gardens Master Plan (1969), and Embarcadero Center Master Plan (including plazas and shopping center courtyards)(1969-1974), and design of the plaza at One Embarcadero Center (1967) (Brown 2010b:135, 138, 148-150).

Halprin is also recognized a pioneer of adaptive reuse design for his work on master planning for the Ghirardelli Square project (1962-1965), which transformed an industrial complex into public plaza and shopping center in the San Francisco Fisherman's Wharf area (completed 1968, included on the National Register of Historic Places in 1982) (Brown 2010b:149). In his book, Cities, Halprin wrote:

> *We need, in cities, buildings of different ages, reflecting the taste and culture of different periods, reminding us of our past as well as our future. Some buildings are beautiful or striking enough to have their useful periods artificially extended by preservation—almost like seed trees in a forest—so that succeeding generations can enjoy them, and through them maintain a sense of continuity with the past. Old buildings and old sections of cities establish a character, a flavor of their own, which often becomes the most interesting and provocative part of a city. Part of this is due to scale, since each age develops its own sense of scale and relationship of parts* (Halprin 1963:216-217)

Halprin's work is marked by his attention to human scale, user experience, and social impact of his designs. He is credited for developing innovative design development processes such as "motation," and "RSVP Cycles." Motation offered an alternative to traditional devices for creating form such as plans and elevations. Instead, motation, used movement as a starting point to generate form (Hirsch 2014: 11-13). Similarly, RSVP cycles is a collaborative approach meant to guide the development of formal design and participatory process. It included the components of resources (preexisting site conditions and the act of inventorying them), scores (temporal-situational guidelines that structure unfolding performance), valuaction (a term Halprin coined for the critical feedback process that leads to consistent revision of the scores), and performance (acting out of the scores) (Hirsch 2014: 4-5).

As such, Halprin's projects are memorable for their striking forms and sequences that evoke multiple associations and recall varied references. The signature vocabulary that characterizes his work, particularly water features, includes a fractured urban ground terraced to choreograph the movement of bodies of water rendered in poured-in-place concrete that simultaneously evoke monumental geological forms and dynamic ecological processes (Meyer 2008). Many of his projects reflect these ideals, including those beyond the San Francisco Bay area.

Nicollet Mall (1962–1967), a 12-block pedestrian street and transit mall in the shopping and dining district of Minneapolis, was designed as the first transit mall in the United States and was created to help downtown retail compete with shopping in the suburbs. Like Market Street, Nicollet Avenue was historically Minneapolis's "parade street." For both of these projects, Halprin was given the chance to enhance the quality of civic rituals as collective participatory events (Hirsch 2014: 84). Although it was redesigned in 1990, Nicollet Mall is recognized as being the inspiration for similar projects in Portland, Oregon, and Denver, Colorado (Hirsch 2014: 90, 98). Four of Portland's public spaces were designed by Halprin: Lovejoy Plaza, a multi-block sequence of public fountains and outdoor rooms, featuring the Ira Keller Fountain; Pettigrove Park; Auditorium Forecourt; and the Transit Mall (1965–1978). The Transit Mall, which was a pair of one-way streets with exclusive bus lanes and widened landscaped sidewalks, was redesigned in 2009 (Biggs n.d.). Skyline Park (1975), a one-acre linear park and plaza in Denver, Colorado, was redesigned in 2003. Freeway Park in Seattle, Washington, is noted for its innovative approach to reclaiming an interstate right-of-way for park space (1976). The Downtown Mall in Charlottesville, Virginia, is a pedestrian-only zone contextualized along the city's historic Main Street (1976). His work also includes Heritage Park Plaza (1980) in Fort Worth, Texas, which is listed on the National Register of Historic Places, and the Franklin Delano Roosevelt Memorial in Washington, D.C. (1997), which contextualizes a modern design aesthetic within the Victorian Gothic Revival, and neo-Classical styles of surrounding monuments of the National Mall.

As a leader in his field, Halprin served on national commissions, including the White House Council on Natural Beauty and the Advisory Council on Historic Preservation (Meyer 2008). He also earned numerous awards and honors, such as the American Society of Landscape Architects (ASLA) Gold Medal (1978), the Thomas Jefferson Gold Medal in architecture (1979), and a Michelangelo Award (2005) (Brown 2010b:271).

Significance Summary

NRHP Criterion A and CRHR Criterion 1:
Research did not find that the plaza is associated with any event(s) considered important locally, statewide, or nationally. As such, Hallidie Plaza does not rise to the level of significance necessary for listing in the state or national registers under Criterion A/1.

NRHP Criterion B and CRHR Criterion 2:
Research uncovered no individuals whose productive life is associated with the plaza in any significant way. Hallidie Plaza lacks a direct association with Andrew Smith Hallidie, the inventor and master engineer of the cable car system, since the establishment of the plaza post-dates Hallidie's invention. Additionally, the cable car turnaround on the Powell Street Mall lies just outside of the original limits of construction for the plaza as shown in the annotated drawing of the final 1971 plans (Figure 1). The plaza is indirectly associated with Justin Herman, former director of the San Francisco Redevelopment Agency, who was actively involved with the reconstruction of Market Street, under which Hallidie Plaza was completed. Herman was the former regional director for the federal government's Housing and Home Finance Agency (HHFA) before he was recruited by Mayor George Christopher in 1959 to head the San Francisco Redevelopment Agency. His 12-year tenure in this position coincided with the most activist period in the nation's history for federal involvement in urban renewal projects. Herman was extremely effective in obtaining federal funding for redevelopment projects in San Francisco, such as Market Street, Diamond Heights, Golden Gateway, Western Addition, and Yerba Buena (Habert 1999). However, sites that might be significant for their association

with Herman would be those projects that he was directly associated with and that represent the influence he had on San Francisco's urban environment. Lacking a direct association with Justin Herman or others, the plaza does not appear to be significant under Criterion B/2.

NRHP Criterion C and CRHR Criterion 3:
Hallidie Plaza is significant for its association with the master architects Mario J. Ciampi, John Carl Warnecke and master landscape architect Lawrence Halprin. Hallidie Plaza is an example of collaboration by these designers which helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning. As thought-leaders in the design community, the three joint venture masters applied a unique design approach that illustrated the viability of prioritizing sensitivity to the human experience and to the existing built environment as a part of the urban redevelopment process. The design of Hallidie Plaza was a joint venture between Ciampi, Warnecke, and Halprin, though it was Halprin specifically who promoted the concept of sinking the plaza below street level as a way to vary the potential monotony of walking along the flat ground-plane of Market Street (Hirsch 2014: 81).

Created during a time when federal redevelopment programs across the country were facilitating the wholesale demolition of historic buildings and prioritization of automobiles at the expense of pedestrians, Hallidie Plaza represents a reaction to the orthodox urban renewal policies of that time. By prioritizing the pedestrian experience through separation of pedestrian traffic from automobiles and rail transit, along with sympathy to the inherited historic environment as evidenced by retention of historically significant buildings and the Powell Street cable-car turnaround in the plaza's setting, the joint venture designers executed a unique approach to urban placemaking. Thus, for the application of this new approach to urban design, Hallidie Plaza appears to be significant under NRHP and CRHR Criterion C/3.

Existing Conditions

The following summarizes existing conditions for Hallidie Plaza in terms of Spatial Organization, Circulation; Vegetation; Buildings and Structures; Views and Vistas; Constructed Water Features; and Small Scale Features.

Spatial Organization: Hallidie Plaza is a three-level terraced plaza on the north side of Market Street at the intersection of Market and 5th Streets, adjacent to the Powell Street cable-car turnaround. The ground plane of the main plaza is characterized by a triangular-shaped plan. The plaza is divided at street-level by Cyril Magnin Street. Below this overpass is a passageway that joins the east and west sides of the plaza's lowest level and includes space for a visitor center (**Image 11**).

Circulation: The plaza serves as a major multi-modal transportation hub, providing pedestrian access to the underground Muni and BART Powell Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, busses, and the end of the Powell Street cable car line. The BART station is entered from the sizeable underground concourse that opens into the plaza, which is sunken below street level and accessed from the street by stairs and escalators. The plaza is divided at street-level by Cyril Magnin Street. A passageway below the Cyril Magnin Street overpass joins the east and west sides of the plaza's lowest level and includes space for a visitor center. Escalators parallel Market Street on both the eastern and western sides of the plaza. In addition to the stairs adjacent to the escalators, the plaza also features stairways independent of escalators, which parallel Cyril Magnin Street on both sides. As with the Market Street streetscape, red brick laid in a herringbone pattern paves the pedestrian circulation area throughout. Mezzanines on both sides of the plaza form the mid-level terrace and create space for pedestrian traffic to circulate between stairs and offers a vantage to view the plaza floor below. The below-street level passage that joins the east and west sides of the plaza includes space for the visitors center.

Vegetation: Stepped concrete-walled terraces include planting bed space for landscaped vegetation (shrubs on the western side of the plaza and ornamental grasses on the eastern side of the plaza) (**Images 15, 16**). Lower plaza tree plantings are London planetrees (Platanus acerifolia) like those found in the adjacent Market Street streetscape. Research did not reveal a Market Street Redevelopment Plan planting plan; accordingly, specific species for tub plantings and terrace planting beds are unknown. Few of the Market Street Redevelopment Plan-era flower tubs remain placed within the plaza and those that remain intact appear to have been moved. Historic images indicate there may have been a greater number of Market Street Redevelopment Plan-era flower tubs in the plaza, which were originally clustered in different locations than where they are found in Hallidie Plaza today. The majority of the tubs are relocated within the fenced café area at the northern boundary of the lower plaza (**Image 16**). While tree grates remain intact to indicate where missing trees were originally clustered, several of the below street-level tree plantings remain intact on both sides of the plaza. The row of trees along the plaza's northeastern boundary at street level were removed in 1998 (**Image 11, 12**) (King 2006).

Buildings and Structures: The plaza includes a large three-stop elevator, installed in 1997, to provide access to the subgrade plaza, the San Francisco Visitor Center, and the Powell Street BART/Muni stations (**Image 14**). The Post-Modern-style elevator was designed by MWA Architects of Oakland and features a sculpted form sheathed with perforated stainless steel screen walls. The elevator and its screen walls nearly obliterate the view of the sunken transit station steps and deeply beveled post and lintel entrances for pedestrians approaching from the lower level of the plaza. Additional structural components of the plaza include the terrace walls with rusticated granite characterized by evenly spaced vertical grooves, the Cyril Magnin overpass, and the Visitor Center structure below the overpass.

Small Scale Features: Hallidie Plaza retains an example of the original Market Street Redevelopment Plan advertising kiosks (street level on the northern corner of its west side) (**Image 13**), though its original bronze has been painted blue and gold. Café seating with a fence enclosure is present in the east side of the plaza at the lowest terrace level in one of the areas where original wood-slat benches were removed (**Image 16**). While the known date of wooden bench removal is 1998, the date for the addition of café tables is unknown. When trees were removed from the plaza's northeastern boundary in 1998, post-Market Street Redevelopment Plan lighting (gold poles and luminaries) were added to discourage illicit night-time activities in the area (King 2006).

Integrity Evaluation

Feature Status Analysis

The following *Table 1. Feature Analysis Table: Hallidie Plaza* discusses the plaza's integrity in terms of features grouped into the following landscape categories: Spatial Organization, Circulation, Vegetation, and Small Scale Features. The summary also quantifies the volume of new features added to the major plaza landscapes that undermine integrity and groups them in the category of Post-plaza Completion Features. The table identifies the status of each feature in terms of three status categories: extant, partially extant, or lost.

Table 1. Feature Analysis Table: Hallidie Plaza

Description	Status	Comments/Analysis
Spatial Organization		
Triangular, multi-level plan, bisected by Cyril Magnin Street	Extant	The plaza's plan and location remains consistent, contributing to integrity of design, feeling, and association (Compare **Image 3** with **Image 11**).
Circulation		
Plaza paving	Extant	The plaza retains its brick laid in herringbone pattern as paving for pedestrian circulation, contributing to integrity of design, materials, workmanship, feeling, and association.
Lower plaza level BART/Muni station entrance	Partial	While multi-level elevator obstruction (Compare **Image 3** and **Image 14**) diminishes integrity, retention of the lower plaza level BART/Muni station entrance (Compare **Image 8** and **Image 14**) supports integrity of design, materials, workmanship, feeling, and association.
Street-level transportation access (Powell Street cable car turn-around, busses, trolley, etc.)	Extant	Street-level access to transportation is retained and contributes to integrity of design and association (Compare **Image 3** with **Image 11**).
Vertical circulation from street-level to middle and lower plaza levels via escalator and stairs	Extant	Stairs and escalators intact and contributes to integrity of design, materials, workmanship, feeling, and association (Compare **Images 4, 5, 7, 8** with **Images 11, 16**).
Cyril Magnin Street (overpass at street level, underpass at lower plaza level)	Extant	Overpass/underpass continues to join east and west side of the plaza's lowest level and contributes to integrity of design, materials, workmanship, feeling, and association (Compare **Images 3, 7** with **Images 11**).
Mid-level terrace mezzanines	Extant	Terrace mezzanines intact and contributes to integrity of design, materials, workmanship, feeling, and association (Compare **Image 9** and **Image 12**).
Vegetation		
Trees	Partial	While retention of lower-level plaza trees as original species contributes (Compare **Image 5, 6** with **Image 14, 16**) to integrity, loss of trees along northern boundary (Compare **Image 4 with 16**), diminishes integrity of design, materials, workmanship, feeling, and association.

Description	Status	Comments/Analysis
Terrace planting bed and terrace wall ground plantings	Partial	Terrace planting beds remain intact, contributing to integrity of design, material, workmanship, feeling, and association (Compare **Image 4** with **Image 16**). None of the plantings that were placed at ground level adjacent to the street-level or mid-level terrace walls are intact and loss diminishes integrity of design, material, workmanship, feeling, and association Compare **Image 9** with **Image 12**).
Planting tubs	Partial	While original plant species are unknown, historic images show plants that differ significantly in character from those contained in tubs that do have plantings, and some tubs have no plantings (Compare **Images 5, 6** with **Images 15, 16**). This change diminishes integrity of design, material, workmanship, feeling, and association.
Buildings and Structures		
Terrace walls	Extant	Retention of terrace walls composed of rusticated granite with evenly spaced vertical grooves contributes to integrity of design, material, workmanship, feeling, and association.
Cyril Magnin overpass	Extant	Retention of Cyril Magnin overpass contributes to integrity of design, material, workmanship, feeling, and association.
Visitor Center structure	Extant	Retention of Visitor Center structure below the Cyril Magnin overpass contributes to integrity of design, material, workmanship, feeling, and association.
Small-Scale Features		
Wood slat benches	Lost	Loss of all wood-slat benches diminishes integrity of design, materials, workmanship, feeling, and association (Compare **Images 6, 9, 10** with **Images 12, 16**).
Advertising kiosk	Extant	Presence of Market Street Redevelopment Plan-era advertising kiosk contributes to integrity of design, materials, workmanship, feeling, and association.
Post-Plaza Completion Features		
Three-stop elevator (1997)	Added after period of significance	Addition of new elevator diminishes integrity of design, setting, feeling, and association (Compare **Image 3** with **Image 14**).
Light poles (1998)	Added after period of significance	Addition non-Market Street Redevelopment Plan-era light poles diminishes integrity of design, materials, workmanship, feeling, and association.
Café seating area with fence enclosure	Added after period of significance	Addition of café seating and fencing diminishes integrity of design, materials, workmanship, feeling, and association (Compare **Image 4, 6, 8** with **Image 16**).

Feature Integrity Evaluation

Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. When considering eligibility under Criteria C/3, it is most essential for integrity of location, design, materials, workmanship, and association to be retained, as they best convey the place, form, physical components, quality of labor, and processes associated with Hallidie Plaza's significance as an example of how Lawrence Halprin's work helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning, and illustrated the viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process.

While the integrity of some of the features that are components of the landscape as a whole have been diminished, or even lost, the aggregate integrity of Market Street is retained when an aggregate of features have sufficient integrity in terms of location, setting, design, materials, workmanship, feeling, and association to express its association with the master architects Mario J. Ciampi, John Carl

Warnecke and master landscape architect Lawrence Halprin as an example of collaboration by these designers, which helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning.

Based on feature condition analysis, the following integrity evaluation analyzes integrity of Hallidie Plaza based on location, design, setting, materials, workmanship, feeling, and association.

- **Location:** Location is the place where the cultural landscape was constructed. Hallidie Plaza remains located adjacent to the Powell Street cable-car turnaround on the north side of Market Street at the intersection of Market and 5th Streets. Hallidie Plaza retains integrity of location.

- **Setting:** Setting is the physical environment of the cultural landscape. While addition of elevator structure diminish integrity of setting, retention overall, setting retains integrity.

- **Design:** Design is the combination of elements that create the form, plan, space, structure, and style of a cultural landscape. Of the seven categories of integrity, for evaluation of Criterion C/3, design is the most important. Spatial organization of the plaza's triangular, multi-level plan, bisected by Cyril Magin Street supports integrity of design. With all of the circulation features extant or partially extant, this category of features significantly contributes to integrity of design. Integrity of design has been somewhat diminished with features in the vegetation category partially extant in all three cases. While retention of the advertising kiosk does support integrity of design, loss of wood-slat benches, which were more abundant small-scale features in the plaza than the kiosk, diminishes integrity of design significantly. In addition, the three-stop elevator, light poles, and café seating area, which were added to Hallidie Plaza after its completion, diminish integrity of design. Despite alterations and additions, Hallidie Plaza does retain a sufficient combination of elements that create its form, plan, space, structure, and style from its period of significance to convey its historic association with the master architects Mario J. Ciampi, John Carl Warnecke and master landscape architect Lawrence Halprin. Overall, Hallidie Plaza retains integrity of design.

- **Materials:** Materials are the physical elements that were combined during the particular period of time and in a particular pattern or configuration to form the cultural landscape. Retention of the brick laid in herringbone pattern as paving for pedestrian circulation, lower plaza level BART/Muni station entrance, escalators and stairs, Cyril Magnin Street overpass/underpass, and mid-level terrace mezzanines with walls composed of rusticated granite featuring evenly spaced vertical grooves. While retention of portions of the features represented by the vegetation category supports integrity of materials, integrity is also diminished by alteration to vegetation features. The loss of wood slat benches undermines integrity of materials, while retention of the advertising kiosk supports integrity. In addition, the three-stop elevator, light poles, and café seating area, which were added to Hallidie Plaza after its completion, diminish integrity of materials. Despite alterations and additions, Hallidie Plaza does retain a sufficient combination of elements to convey its historic association. Overall, Hallidie Plaza retains integrity of materials.

- **Workmanship:** Workmanship is the physical evidence of the crafts of a particular culture or people during any given period of history. While diminished integrity for vegetation features and loss of wood-slat benches undermines integrity of workmanship, retained and partially retained features in circulation, vegetation, and small-scale feature categories support integrity of workmanship such that, overall, Hallidie Plaza does retain integrity of workmanship.

- **Feeling:** Feeling is a cultural landscape's expression of the aesthetic or historic sense of a particular period of time. This is expressed as a composite of setting, design, materials, and workmanship. Despite some alterations and additions, the majority of features associated with spatial organization, circulation, vegetation, and small-scale features are extant or partially extant and support integrity of feeling. As such, Hallidie Plaza retains integrity of feeling.

- **Association:** Association is the direct link between the important historic event or person and a cultural landscape. This can be expressed by the maintenance of a link to the past through continuation of a traditional use or occupation. The majority of the features within categories of spatial organization, circulation, vegetation, and small-scale features are extant or partially extant and support integrity of association. The features associated with spatial organization and circulation are particularly important for expressing continuation of traditional use. Thus, Hallidie Plaza continues to be used as an open space, as well as a transportation hub.

As described above, all of feature categories retain enough integrity to express Hallidie Plaza's historic significance as an individually eligible resources. Despite some alterations, which have diminished the plaza's integrity, enough character defining features in the categories of Spatial Organization, Cluster Arrangement, Circulation, Vegetation, and Small Scale Features remain extant or partially extant to offer enough overall integrity of location, setting, design, materials, workmanship, feeling, and association to convey Hallidie Plaza's significance as an example of collaboration by master architects Mario J. Ciampi, John Carl Warnecke and master landscape architect Lawrence Halprin, which helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning.

Criteria G Consideration

Hallidie Plaza retains its overall integrity of location, setting, design, materials, workmanship, feeling, and association, and conveys its significance as an example of collaboration by the joint venture designers, Ciampi, Warnecke, and Halprin. Hallidie Plaza, both as a component of the MSRP design and as an individual resource, helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning. As thought-leaders in the design community, the three joint venture masters applied a unique design approach that illustrated the viability of prioritizing sensitivity to the human experience and existing built environment as a part of the urban redevelopment process. Hallidie Plaza's period of significance for this association is 1973. As such, it is less than 50 years old and its historical associations must be of "exceptional importance" to the City of San Francisco, California, the western region of the United States, or the nation to be eligible for listing on the National Register of Historic Places (Keller, Keller and Community Associates Charlottesville, Virginia: 25).

While Hallidie Plaza's significance and integrity contribute to the significance of the Market Street cultural landscape, which is of exceptional importance, the plaza is a component of that larger landscape and is not exceptionally significant as an individual resource.

Conclusions

Hallidie Plaza possesses significance under NRHP and CRHR Criterion C/3 for its association with the master architects Mario J. Ciampi and John Carl Warnecke and master landscape architect Lawrence Halprin. Hallidie Plaza is an example of collaboration by these designers which helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning. As thought-leaders in the design community, the three joint venture masters applied a unique design approach that illustrated the viability of prioritizing sensitivity to the human experience and existing built environment as a part of the urban redevelopment process. Despite loss of some character defining features, Hallidie Plaza retains enough integrity to express its historic significance. Consequently, Criteria Consideration G was applied. While Hallidie Plaza is an important component the Market Street landscape that contributes to the overall significance of the streetscape, Hallidie Plaza does not appear to be exceptionally important independent of Market Street. Thus, Hallidie Plaza does not appear be eligible for NRHP and the CRHR as an individual resource.

The property appears to be a historical resource for the purposes of the California Environmental Quality Act (CEQA) having been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code.

The proposed NRHP status codes is 3D (contributor to a district that has been fully documented according to OHP instructions and appears eligible for listing) as a contributor to the Market Street District.

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Photographs:

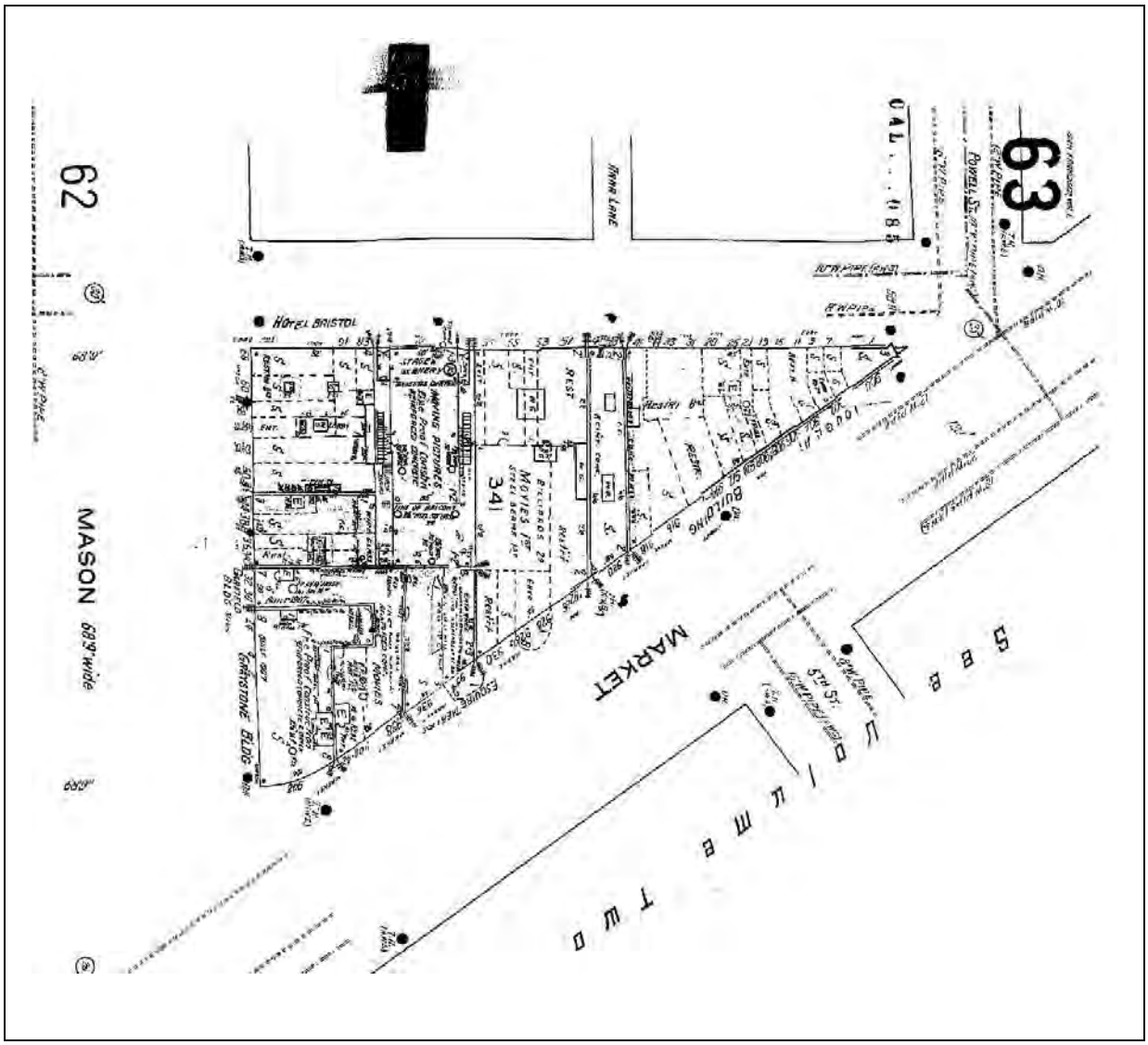

Image 1. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63 shows block on the north side of Market Street between Powell Street and Mason Street, illustrating existing properties demolished as part of the Hallidie Plaza construction. (*San Francisco History Center, San Francisco Public Library*)

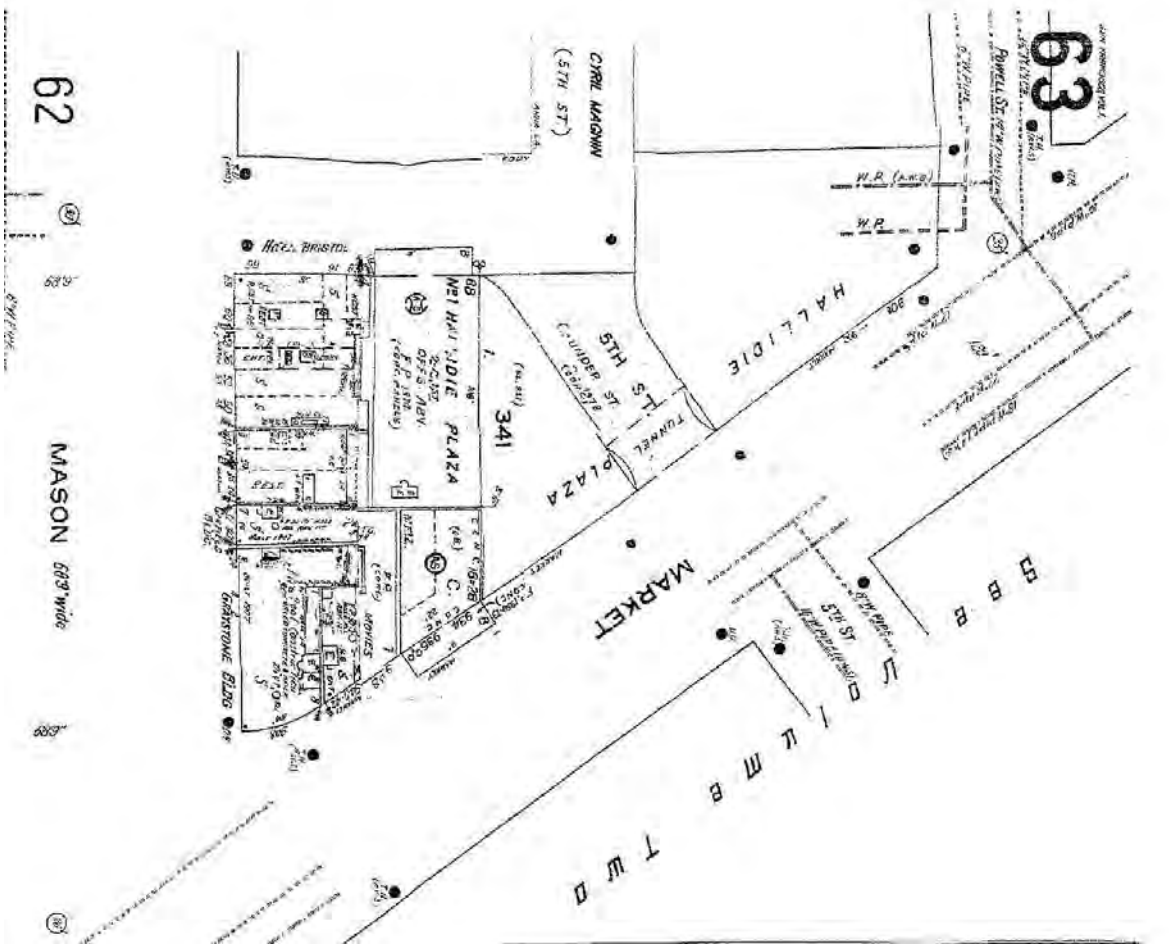

Image 2. 1998 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 63 shows location of Hallidie Plaza, bisected by Cyril Magnin Street and adjacent to Powell Street cable car turnaround. (*San Francisco History Center, San Francisco Public Library*)

Image 3. Hallidie Plaza, 1979, showing east side of the plaza with lower terrace entrance to BART Station (left) and Cyril Magin overpass forming space for Visitor Center below (center). *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R2-5, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 4. West side of Hallidie Plaza, 1979, showing landscaped terraces and stairs joining lower level of the plaza with middle and street level. This image also shows alignment of trees on northern street-level boundary of the plaza. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R2-2, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, Architectural Archives, University of Pennsylvania)*

Image 5. Hallidie Plaza, 1979, southwest view showing tree placement and planting tub arrangement, along with vertical features—escalator and stairs. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R1-1, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 6. Hallidie Plaza, 1979, east side of plaza showing wood-slat benches lining the wall on the lowest level and trees clustered with planting tubs at the foot of the eastern stairs. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R38-8, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 7. Hallidie Plaza, 1979, showing west side stair access to upper terrace levels on the northern boundary. This image also shows distinctive light poles with square shaped lamps at street level and wood-slat benches in the lower level. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R38-9, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	**Image 8.** Hallidie Plaza, 1979, view from within the BART station looking up to the northeastern corner of the plaza (toward the Powell Street cable car turnaround) showing broad width of BART entrance stairway. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R3-9, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*
Image 9. Hallidie Plaza, 1979, view of mid-level terrace on east side showing wood-slat benches, terrace plantings, and plaza's granite walls. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R38-1, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*	**Image 10.** Hallidie Plaza, 1979, showing street-level northern boundary that includes an alignment of street trees, wood-slat benches, and brick paving in a herringbone pattern to match Market Street streetscape. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R11-5, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

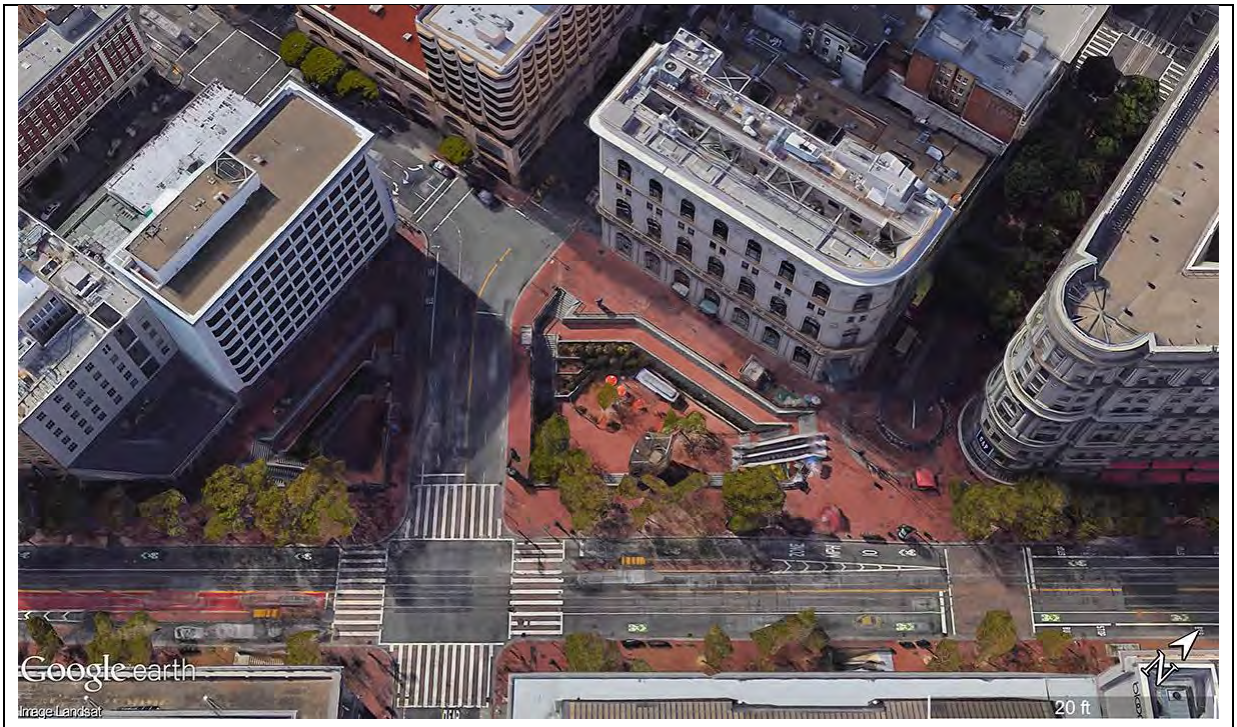

Image 11. Hallidie Plaza, 2016, retains it triangular plan, bisected by Cyril Magnin. Aerial view shows loss of tree row on northeastern boundary, as well as loss of original wood-slat benches. (Google Earth 2016)

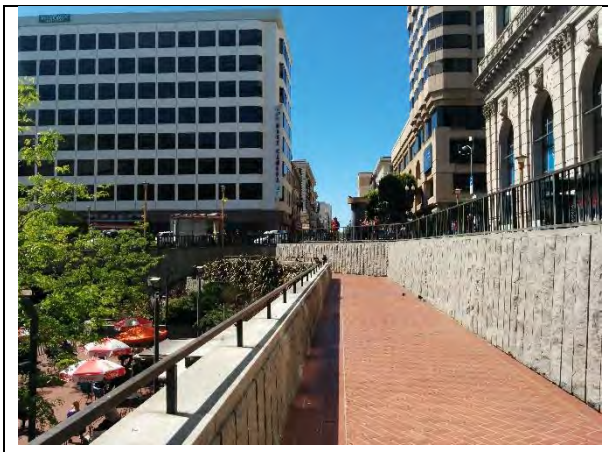

Image 12. Hallidie Plaza, 2016, east side view showing absence of trees lining the northeast boundary at street level, and absence of ground-level plantings and wood-slat benches on terrace. (Photograph by author, March 2016)

Image 13. Hallidie Plaza, 2016. Although it appears to have been painted, MSRP-era advertising kiosk has been retained at northern street-level stairway on eastern side of the plaza. Meanwhile new wayfinding BART signage has also been added. (Photograph by author, March 2016)

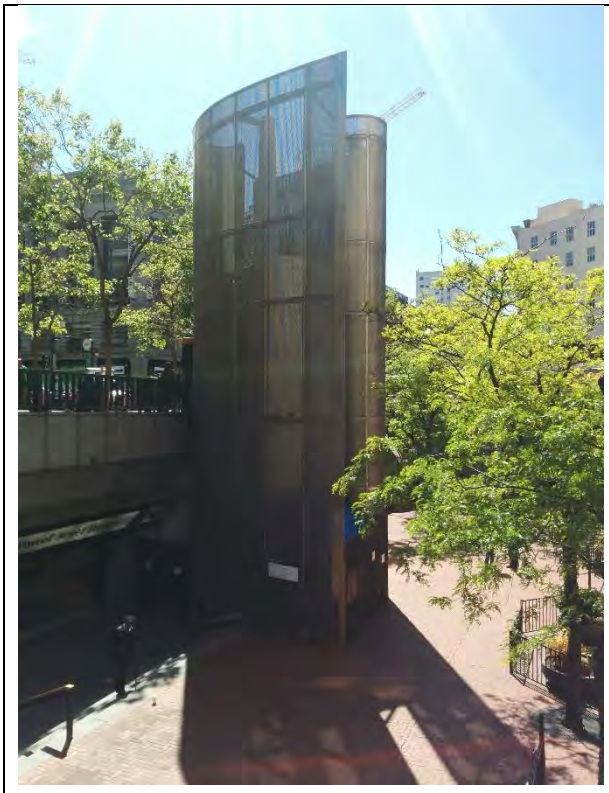

Image 14. Hallidie Plaza, 2016, showing multi-story elevator added to plaza on the southern boundary that blocks a portion of the lower-level BART station entrance and alters the open character of the plaza. (Photograph by author, March 2016)

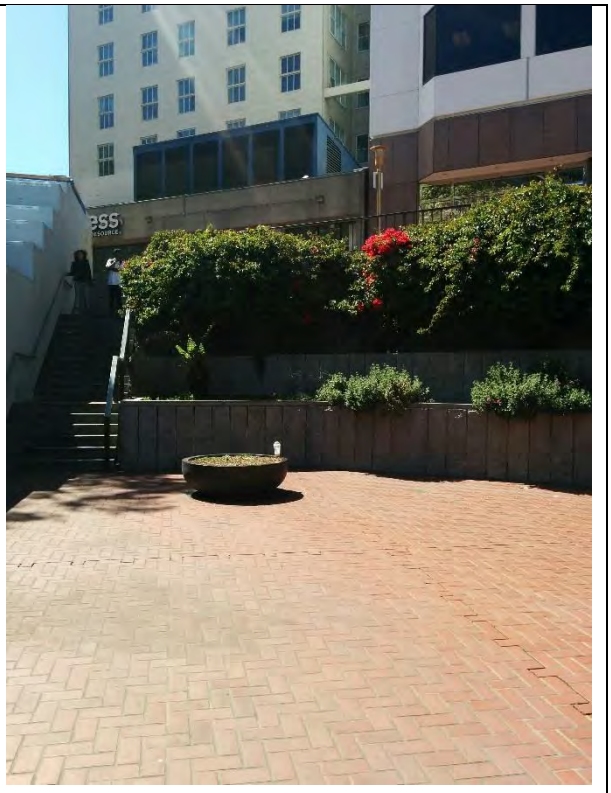

Image 15. Hallidie Plaza, 2016, showing eastern side of the plaza where wood-slat benches have been removed and cluster arrangement of planting tubs has been altered. Shrubby character of landscaped terrace beds is retained. (Photograph by author, March 2016)

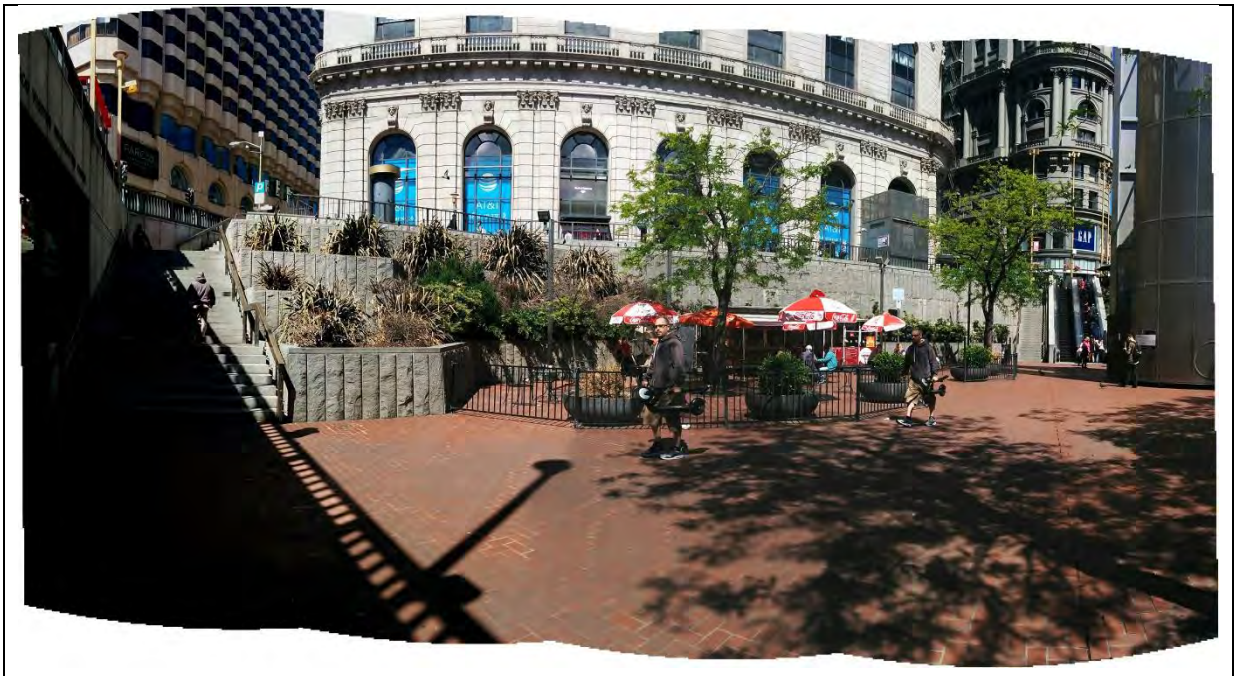

Image 16. Hallidie Plaza, 2016, showing eastern side of the plaza's lower level. With removal of wood-slat benches, café seating with fence enclosure has been added and planting tub arrangement has been altered. Terraced planting beds in eastern side of the plaza feature ornamental grasses. (Photograph by author, March 2016)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary# P-38-000984
HRI # _____
NRHP Status Code(s) 3S, 3D

BUILDING, STRUCTURE, AND OBJECT RECORD

Page 1 **of 6** ***Resource Name or** #(Assigned by recorder) United Nations Plaza
***Recorded by** January Tavel and Aisha Fike, ICF
***Date** March 29, 2016 ☐ Continuation ☐ Update

B1. Historic Name: United Nations Plaza
B2. Common Name: UN Plaza
B3. Original Use: Pedestrian plaza B4. Present Use: Pedestrian plaza
***B5. Architectural Style:** Modern
***B6. Construction History:** Completed in 1975. Major alterations occurred in 1995 and 2005. (See continuation sheet for further construction history).
***B7. Moved?** ☑ No ☐Yes ☐ Unknown **Date:** **Original Location:**
***B8. Related Features:** Civic Center BART/Muni Station, Market Street, Fulton Mall, Civic Center
B9a. Architect: Lawrence Halprin, Lawrence Halprin & Associates
***B10. Significance: Theme** Urban Planning in the Twentieth Century
Area Architecture, Landscape Architecture
Period of Significance 1976-1985 **Property Type** Site (designed landscape) **Applicable Criteria** C/3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Context Statement

Market Street Redevelopment Plan

Dedicated in 1976, the UN Plaza was established as part of the Market Street Redevelopment Plan (MSRP). The MSRP, which was designed by the Market Street Joint Venture Architects, Mario J. Ciampi & Associates, John Carl Warnecke & Associates, Lawrence Halprin & Associates, sought to resolve Market Street's economic importance as San Francisco's main circulation spine with its symbolic, social, commercial, and civic importance through plaza development, removal of visually cluttering commercial signage, and sidewalk landscape designs intended to blend new street-level Bay Area Rapid Transit (BART) facilities into the overall streetscape.

(See continuation sheets for further evaluation of significance)

B11. Additional Resource Attributes: HP29, Landscape architecture; HP31, Urban Open Space; HP30, Trees.

***B12. References:**
See continuation sheets for references.

B13. Remarks: n/a
***B14. Evaluator:** January Tavel and Aisha Fike, ICF International
***Date of Evaluation:** March 29, 2016

(This space reserved for official comments.)

(Sketch Map with north arrow required.

***B6. Construction History (cont.):**

Dedicated in 1976, UN Plaza was established to commemorate the 1945 founding of the United Nations at the San Francisco Civic Center (San Francisco Public Library 1976c:441-440). The 2.6-acre plaza served as a tree-lined approach to the Civic Center, as well as an open space for the Mid-Market Street area. Located between 7th and 8th Streets, it extended westward from Market Street to Hyde and Fulton Streets. UN Plaza was the pivot of the renovated Market Street and offered a processional way where parades could march on the urban boulevard, turning at UN Plaza to continue up the Mall to the Polk Street steps of City Hall, located adjacent to the Federal Building at 50 United National Plaza (Hirsch 2014:82-83).

United Nations Plaza was created on three existing city blocks and the site of the terminus of Fulton Street, which was abandoned at Hyde Street to create the plaza. Several historic buildings around the perimeter of the plaza site were retained and are still present today. These buildings are described in further detail below. The majority of the buildings on the existing triangular-shaped block bounded by Market, Hyde, Fulton, and Leavenworth Streets were demolished to make way for UN Plaza. Demolished buildings included several commercial buildings varying in height from one to four stories. Examples of these buildings included a drugstore at the corner of Hyde and Market, the Marshall Building featuring eight storefronts and a restaurant along Market Street, and several 1-story stores decreasing in size moving towards the gore corner at Leavenworth and Market Streets. Buildings that were retained on this block were limited to the 4-story Orpheum Theater at 1182-1192 Market Street (1925), and the adjacent 1-story Art Deco-style commercial building at 1 United National Plaza (1932) (MIG 2015: 27, 82-83). The Federal Building at 50 United Nations Plaza (1936) filled the entire block bounded by Hyde, McAllister, Leavenworth and Fulton Streets and was retained. This 4-story, Beaux Arts style civic building was constructed in 1936 by Arthur Brown, Jr. and established the northern edge of the plaza. The block formerly bounded by Leavenworth, McAllister, Jones, and Market Streets was bisected at 7th Street to create Charles J. Brenham Place, which established the east edge of the plaza. The majority of the buildings to the west of Charles J. Brenham Place were demolished and included commercial buildings (stores and restaurants), offices, and lodging houses ranging in height from one to five stories. The only building that was retained on this portion of the block was the 5-story Methodist Book Concern building (a former printing/publishing house) at 83 McAllister Street (1907). The 7-story hotel at 1100-1112 Market Street takes up the remainder of the triangular-shaped block to the east of Charles J. Brenham Place. This building, now known as the Renoir Hotel, was retained and was located outside of the boundaries of the plaza site (**Images 1, 2**) (1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95; and 1998 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95).

The Market Street Redevelopment Plan design for UN Plaza created a pedestrian approach from Market Street that offered a framed vista of the City Hall dome, a viewshed that serves as an important element of UN Plaza (**Image 3**). In addition to being the main gateway to the Civic Center, the plaza serves as major multi-modal transportation hub, providing vertical circulation via street access to the underground Muni and BART Civic Center Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, and busses.

As with creation of the Powell Street mall that forms Hallidie Plaza, the street closure established pedestrian connections and leveraged "leftover" triangular spaces where Market Street meets the northern street grid, and established the Fulton-Leavenworth mall, which formed UN Plaza (**Image 4**) (Hirsch 2014:78).

The plaza paving consisted primarily of red brick laid in a herringbone pattern similar to the material and design of the sidewalk paving along Market Street. Breaking the pattern at 40-foot intervals was a band of solid red brick courses on the Fulton Street central promenade. Additional granite paving with brass inlay was included in the original design near the southwest end of the fountain to indicate the city's latitude and longitude (**Image 5**). The central promenade aligned with Fulton Street between Hyde Street and what was formerly Leavenworth Street was originally designed with 16 granite light standards symmetrically arranged with eight fixtures per side placed at regular 40-foot intervals. The modernist light standards consisted of semi-translucent, hooded luminaires mounted on square, light-colored granite columns (**Image 6**). The 1973 plans indicate that there were 24 wooden-slat benches symmetrically placed along the central promenade with 12 benches per side arranged in a paired configuration. The custom-designed benches featured wooden slats and bronze-clad metal supports. Twenty-five concrete bollards linked with chain were placed along Hyde and McAllister Streets. Thirty-six decorative, circular-shaped bronze tree grates with a radial design were installed on Market Street as part of the larger Market Street Redevelopment Plan project. The grass-covered planting beds along the Fulton Street central promenade were established in 1936 and incorporated into the design of the plaza (**Image 4**). The planting area near the BART entrance was competed in 1975. At least 36 London plane trees were planted in the plaza in 1975. London Plane trees are a traditional choice for formally designed landscapes, and are a major feature of the public open spaces in the Civic Center district dating back to the Beaux Arts period. There is evidence of London planetrees planted as street trees in the district by 1916 (and some examples from that period remain). London planetrees were included by Thomas Church in his design for the War Memorial Courtyard in 1936 and by Douglas Baylis for Civic Center Plaza in 1960. Halprin's use of London Plane trees at UN Plaza was consistent with the historic plant palette in the area, marking his attention to the historic context of the site (MIG 2015:17, 29, 34, 45).

Lombardy poplar trees (*Populus nigra*) were also planted near Market Street. The stairwell and escalator to the BART subway station were built between 1973 and 1975. Two flagpoles with a radial pattern metal base and an advertisement kiosk were installed in 1975.

Pedestrian circulation was structured along two axes—a primary axis along Fulton Street, which Halprin saw as a processional parade route and pivot from Market Street to City Hall (**Image 3**), a secondary axis along Leavenworth Street. The UN Plaza Fountain, designed by Lawrence Halprin, was completed in 1975. The fountain features more than 100 blocks of granite clustered into five major masses that symbolize the major continents of the world, with the lower block in the center representing the mythical lost continent of Atlantis (**Image 7**). The pools of water surrounding the granite masses represented the Earth's major oceans. The tidal movement of the Earth's oceans was originally represented by a surge of water into the fountain basin, followed by a short pause at flood stage, then a rapid draining period. The original design called for the tidal cycle to be completed every 2 minutes, with a jet of water shooting up into the air to alert people that the surge was about to begin. Jets of water arching into the air were included in the original design to make the fountain more visible from Market Street and the surrounding plaza. The fountain area also included tall gold-colored spotlights. Pre-existing features within the street level of the UN Plaza that were left in place and incorporated into the overall plan for the plaza include: a red metal fire box dating to 1899 on Hyde Street; two fire hydrants on Hyde Street dating to 1909; sections of granite curbing on Market, Leavenworth, and Hyde Streets, dating to 1925; and 10 pre-1928 Path of Gold Light Standards on Market Street within the plaza boundaries (MIG 2015:82-84).

***B10. Significance (cont.)**

In December of 1962, "What To Do About Market Street" was published by Livingston and Blayney, City and Regional Planners, in association with Lawrence Halprin and Associates, Landscape Architects, Rockrise and Waston, Architects, and Larry Smith and Co., Real Estate Consultants. The document proposed a program of redevelopment featuring improvements to the environment that included, among other things, "squares, plazas, and arcades where people can gather and enjoy themselves" (San Francisco Public Library 1962:7).

Designed to commemorate the 1945 founding of the United Nations at the San Francisco Civic Center, the 2.6-acre plaza serves as a tree-lined approach to the Civic Center, as well as an open space for the Mid-Market Street area (San Francisco Public Library 1976:441-440). Located between 7th and 8th streets, extending westward from Market Street to Hyde and Fulton Streets, the plaza is part of the City's Market Street parade route from the Ferry Building to the Polk Street steps of City Hall, located adjacent to the Federal Building (50 United National Plaza). UN Plaza was designed as the "pivot of the renovated Market Street," intended to facilitate Market Street's role as a processional way where parades can march on the urban boulevard turning at UN Plaza to continue up the Mall to the City Hall (Hirsch 2014: 82-83). This pedestrian approach from Market Street offers a framed vista of the City Hall dome, a viewshed that serves as an important character-defining element of the UN Plaza. In addition to being the main gateway to the Civic Center, the plaza serves as major multi-modal transportation hub, providing vertical circulation via street access to the underground Muni Metro and Bay Area Rapid Transit (BART) Civic Center Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, and busses. As with creation of the Powell Street mall that formed Hallidie Plaza, the street closure was intended to establish pedestrian connections and leverage "leftover" triangular spaces where Market Street meets the northern street grid, established the Fulton-Leavenworth mall, which forms UN Plaza, (Hirsch 2014: 78).

Urban Renewal and Revitalization through Landscape Design and Urban Planning in the United States and San Francisco, 1945-1980

Responding to federal redevelopment programs of the 1950s that privileged the needs of the automobile over the pedestrian, United Nation's Plaza is an example of a designed urban landscape that prioritized the activities of pedestrians. "The failure of government-sponsored urban planning, the insensitive severity of Modernist planning and architecture, pent-up demands for racial equity, and the maturing of liberal-minded baby boomers were all forces that led to greater social responsiveness in the design professions beginning in the 1960s" (Pregill and Volkman 1999: 710). In 1966 the Demonstration Cities and Metropolitan Development Act established the Model Cities Program, which mandated citizen input into planning decisions and required neighborhood preservation rather than demolition be part of urban improvement. This project represents a transition to a new phase of urban renewal and revitalization through landscape design in the last half of the twentieth century that gave greater focus to pedestrian-oriented public spaces and increased responsiveness to context. Plazas were included among the site types that were most important during this era as designers looked to the creation of these and other spaces (mixed-use centers, the downtown mall, redeveloped waterfront) as key devices for bolstering urban economic and social activity (Pregill and Volkman 1999: 721).

In most cities, the task of coordinating urban renewal fell to newly created local redevelopment agencies. In San Francisco, Justin Herman directed the San Francisco Redevelopment Agency during a particularly active period from 1959 until 1971. As with other city redevelopment agencies throughout the country, the SFRA leveraged federal funding and new powers to acquire land through eminent domain to facilitate redevelopment by razing large sections of San Francisco. At the time, this large-scale clearance was considered a necessary technique, which provided an environment for the redeveloped area that would prevent it from returning to its former blighted condition. However, this method displaced thousands of residents and businesses, proving especially disruptive to San Francisco's low-income, black, and Asian communities (Brown 2010b:41). Project examples included Western Addition A-1, Diamond Heights, Golden Gateway, and Yerba Buena Center.

By 1960s, local opposition to the devastation wrought by urban renewal to existing residents and historic fabric echoed nationwide criticism. Through the 1970s, projects across the county and in San Francisco began shifting focus to reuse and rehabilitation rather than full-scale neighborhood clearance (Brown 2010b:41-42). Lawrence Halprin received national attention for master planning an early San Francisco example—Ghirardelli Square complex near Fisherman's wharf (1962-1965)—which successfully adapted an industrial complex for commercial use (Knight 1975: 7; Brown 2010b:1949). In addition to pioneering the adaptive reuse concept, the project also leveraged landscape design for urban revitalization through design of fountains, lighting, planting, and outdoor performance spaces (Brown 2010b:149)

UN Plaza: Design of Master Landscape Architect, Lawrence Halprin

Although the three designers associated with the Market Street Redevelopment Plan in San Francisco—architect Mario Ciampi, architect John Carl Warnecke, and landscape architect Lawrence Halprin—collaborated on the development of the MSRP project, Halprin was the

primary designer of UN Plaza (Hirsch: 82-83). He developed his expertise as master landscape architect during the period of renewal and revitalization from 1945-1980 and within the context of increasing collaboration among design disciplines. He was a thought-leader in the environmental design community, applying new approaches to urban placemaking that modeled pedestrian-oriented design, harmonizing Modern design within historic settings, development of public spaces for positive economic and social impact, and collaborative design processes. Halprin's participation in the joint venture collaboration, including design of UN Plaza, helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrated the viability of prioritizing sensitivity to the human experience and the existing built environment as part of the urban redevelopment process.

Lawrence Halprin (1916–2009):

Born in New York City, Lawrence Halprin earned a B.S. in Plant Sciences from Cornell University in 1939 and continued his studies at University of Wisconsin where he earned a M.S. in Horticulture. As a graduate student, Halprin visited Taliesin, the home of master architect, Frank Lloyd Wright. This experience inspired his interest in design and motivated his enrollment at Harvard University Graduate School of Design where he earned a Bachelor of Landscape Architecture degree in 1944 (Brown 2010b:270). Like Warnecke, Halprin studied under Walter Gropius at Harvard, as well as Marcel Breuer, who is also recognized as a master of Modernist architecture (Brown 2010b:760), During World War II, Halprin served in the Navy and was assigned to the USS Morris. When his ship was destroyed, Halprin was given leave in San Francisco, where he remained (Brown 2010b:270).

Halprin's design career in the San Francisco Bay Area began with a focus on residential garden design. From 1945-1949, Halprin worked with master landscape architect, Thomas Church (Brown 2010b:144-145). Collaboration included work on the Dewey Donnell Garden in Sonoma County (Brown 2010b:271).

In 1949, Halprin opened his own firm, Lawrence Halprin & Associates Landscape Architects. He escalated to designing large-scale planned residential complexes, such as the San Francisco projects Parkmerced (1949, with Thomas Church) and St. Francis Square (1961) (Brown 2010b:147-148), but is best known for his work at Sea Ranch (1962-1967) near Gualala, California. The iconic complex of condominiums at Sea Ranch is sited in a bucolic coast area of Sonoma County and is considered a master work of the Third Bay Tradition design. For this project, collaboration with the architectural firm, Esherick, Homsey, Dodge & Davis (EHDD), Lawrence Halprin created the landscape and development plan, which clustered buildings and provided large areas of community open space (Brown 2010b:133).

In the late 1930s into the 1950s, a growing collaboration between architects and landscape architects resulted in a new synthesis of buildings and landscapes (Brown 2010b:139-140). While residential landscape design formed the foundation of most landscape architects' practices before the 1940s, landscape architects in the post-WWII era increasingly expanded their practice to include master planning, campus planning, site planning, and regional planning (Brown 2010b: 141). Through the work of his firm, Halprin reasserted the landscape architect's role as distinct from planners or architects in regenerating the American city by making vital social and pedestrian spaces out of formerly marginal sites such as historic industrial complexes or the spaces over or under freeways. "In doing so, they re-imagined a public realm for American cities that had been cleared by federal urban renewal programs and abandoned for new suburban developments" (Meyer 2008). Halprin's leadership included collaboration with Livingston and Blayney and George Thomas Rockrise on the 1962 *What to do about Market Street* planning proposal (Brown 2010b:247) and subsequent collaboration with Mario J. Ciampi and John Carl Warneke on the Market Street Redevelopment Plan.

Landscape designers helped play an important role in shaping the form, spatial configuration, and uses of corporate plazas, landscapes, and public spaces during the Modern period. In addition to his work associated with Market Street and associated plazas, the evolution of Halprin's career included commercial and corporate designed landscapes like the rooftop garden at the Fairmont Hotel (1961), Bank of America Plaza (1967), the Yerba Buena Gardens Master Plan (1969), and Embarcadero Center Master Plan (including plazas and shopping center courtyards)(1969-1974), and design of the plaza at One Embarcadero Center (1967) (Brown 2010b:135, 138, 148-150).

Halprin is also recognized a pioneer of adaptive reuse design for his work on master planning for the Ghirardelli Square project (1962-1965), which transformed an industrial complex into public plaza and shopping center in the San Francisco Fisherman's Wharf area (completed 1968, included on the National Register of Historic Places in 1982) (Brown 2010b:149). In his book, Cities, Halprin wrote:

> *We need, in cities, buildings of different ages, reflecting the taste and culture of different periods, reminding us of our past as well as our future. Some buildings are beautiful or striking enough to have their useful periods artificially extended by preservation—almost like seed trees in a forest—so that succeeding generations can enjoy them, and through them maintain a sense of continuity with the past. Old buildings and old sections of cities establish a character, a flavor of their own, which often becomes the most interesting and provocative part of a city. Part of this is due to scale, since each age develops its own sense of scale and relationship of parts (Halprin 1963:216-217)*

Halprin's work is marked by his attention to human scale, user experience, and social impact of his designs. He is credited for developing innovative design development processes such as "motation," and "RSVP Cycles." Motation offered an alternative to traditional devices for creating form such as plans and elevations. Instead, motation, used movement as a starting point to generate form (Hirsch 2014: 11-13). Similarly, RSVP cycles is a collaborative approach meant to guide the development of formal design and participatory process. It included the components of resources (preexisting site conditions and the act of inventorying them), scores (temporal-situational guidelines that structure unfolding performance), valuaction (a term Halprin coined for the critical feedback process that leads to consistent revision of the scores), and performance (acting out of the scores) (Hirsch 2014: 4-5).

As such, Halprin's projects are memorable for their striking forms and sequences that evoke multiple associations and recall varied references. The signature vocabulary that characterizes his work, particularly water features, includes a fractured urban ground terraced to choreograph the movement of bodies of water rendered in poured-in-place concrete that simultaneously evoke monumental geological forms and dynamic ecological processes (Meyer 2008). Many of his projects reflect these ideals, including those beyond the San Francisco Bay area.

Nicollet Mall (1962–1967), a 12-block pedestrian street and transit mall in the shopping and dining district of Minneapolis, was designed as the first transit mall in the United States and was created to help downtown retail compete with shopping in the suburbs. Like Market Street, Nicollet Avenue was historically Minneapolis's "parade street." For both of these projects, Halprin was given the chance to enhance the quality of civic rituals as collective participatory events (Hirsch 2014: 84). Although it was redesigned in 1990, Nicollet Mall is recognized as being the inspiration for similar projects in Portland, Oregon, and Denver, Colorado (Hirsch 2014: 90, 98). Four of Portland's public spaces were designed by Halprin: Lovejoy Plaza, Pettigrove Park, Auditorium Forecourt, and the Transit Mall (1965-1978). Lovejoy Park was part of a larger urban web of linked open spaces oriented toward the experience of the pedestrian. The multi-block sequence of public fountains and outdoor rooms featured the Ira Keller Fountain. Halprin successfully convinced the representatives of the City of Portland to accept these Modern forms, as they had never been seen before in Portland's designed environment (Hirsch 2014:131). The Transit Mall, which was a pair of one-way streets with exclusive bus lanes and widened landscaped sidewalks, was redesigned in 2009 (Biggs n.d.). Skyline Park (1975), a one-acre linear park and plaza in Denver, Colorado, was redesigned in 2003. Freeway Park in Seattle, Washington, is noted for its innovative approach to reclaiming an interstate right-of-way for park space (1976). The Downtown Mall in Charlottesville, Virginia, is a pedestrian-only zone contextualized along the city's historic Main Street (1976). His work also includes Heritage Park Plaza (1980) in Fort Worth, Texas, which is listed on the National Register of Historic Places, and the Franklin Delano Roosevelt Memorial in Washington, D.C. (1997), which contextualizes a modern design aesthetic within the Victorian Gothic Revival, and neo-Classical styles of surrounding monuments of the National Mall. In 1974, Halprin was selected by the FDR Memorial Commission to design the 7.5-acre site adjacent to the Cherry Tree Walk on the western edge of the Tidal Basin in Washington, D.C. to commemorate the presidency of Franklin Delano Roosevelt. The memorial, which was dedicated in 1997, is a sequence of four galleries or garden rooms that include water features, 10 bronze sculptures, and 21 carved inscriptions. While Halprin is credited as creating a new type of memorial with this project, the concept builds upon his prior work on projects like UN Plaza, which feature procession, narrative, and symbolic water features (Cultural Landscape Foundation n.d.).

As a leader in his field, Halprin served on national commissions, including the White House Council on Natural Beauty and the Advisory Council on Historic Preservation (Meyer 2008). He also earned numerous awards and honors, such as the American Society of Landscape Architects (ASLA) Gold Medal (1978), the Thomas Jefferson Gold Medal in architecture (1979), and a Michelangelo Award (2005) (Brown 2010b:271).

Gay Liberation, Pride Celebration, and LGBTQ Political Protest in the United States and San Francisco, 1960-1995

The advances of the black civil rights movement encouraged racial minorities, women, and LGBTQ people to create their own visible, powerful movements for equality. Conceptualizing gay rights, and organizing for them, evolved and became more complex from the 1960s through the 1980s. Earlier homophile activists had worked on the premise that rights would be gained by arguing that sexual behavior was a private matter and only one small part of their identity; in all other ways they were the same as straight people—and should therefore be equal to them. The Gay Liberationist Movement that arose in America during the 1960s believed incorporating homosexuality into public behavior and discussing identity was important and could transform society in coalition with other progressive movements. Both the gay liberation and the gay pride or gay identity movements assumed the central importance of coming out publicly as gay or lesbian (Graves and Watson 2016:180).

As the Gay Liberation Movement grew in the United States, the gay community in San Francisco provided leadership. In 1966, the Society for Individual Rights established what is commonly described as the first gay community center at 83 6th Street in San Francisco. By the late 1960s, the organization had 900 members, had created an educational program on sexually transmitted diseases. However, within a few years, the Society for Individual Rights' campaign to methodically win gay rights was overshadowed by more militant gay liberation groups, which drew tactics from the civil rights struggle, black militancy, labor organizing, and anti-war movements. They further parted

from the assimilationist stance of earlier gay rights groups by publicly affirming, celebrating, and cultivating homosexual difference (Graves and Watson 2016:182).

Homophile organizers began to employ more assertive tactics in the 1960s that reflected those of other protest movements. San Francisco homophile groups organized one of their first public protests on Armed Forces Day in May 1966 at the plaza in front of the Federal Building (450 Golden Gate Avenue, extant) to protest the exclusion and dishonorable discharge of homosexuals from military service. The Mattachine Society, the Daughters of Bilitis, the Council on Religion and the Homosexual, and the Society for Individual Rights notified the San Francisco Police Department of their plans and distributed more than 20,000 leaflets to promote and explain the protest. The gathering drew more than 40 protestors and several hundred onlookers—the largest gay rights demonstration up to this point in San Francisco. The protest received extensive local print and television coverage, as well as articles in *The New York Times* and *Newsweek*. The crowd listened to speakers such as Glide Memorial Church's Rev. Cecil Williams, who announced, "There is a homosexual revolution here and across the land" (Graves and Watson 2016:181).

On June 28, 1969, the Stonewall Inn, a gay bar in New York City, was raided by the police. Nearly 400 people joined a riot that lasted 45 minutes and resumed on succeeding nights. The event spurred annual commemoration in the form of Gay Pride celebration parades and rallies in U.S. cities, as well as other countries (Levy 2009). While the first gay rights parade in San Francisco took place in June 1970 on an alternative route—from Aquatic Park to City Hall via Polk Street—beginning in 1977, the Gay Freedom Day Parades traveled west across Market Street from downtown, through UN Plaza, to City Hall. Inspired by antigay backlash, the parades of 1977 and 1978 drew record numbers—200,000 and 350,000 respectively—making it biggest annual parade in San Francisco. The 1978 parade has been called "the signal event of the gay emergence in San Francisco during the late 1970s" (Graves and Watson 2016:222). The *San Francisco Chronicle* reported that it "may have been the largest single political gathering in San Francisco, and possibly the country, in the 1970s" (Graves and Watson 2016:222). For that same parade, a group of artists created a rainbow flag based on a design by artist Gilbert Baker. In subsequent years, the rainbow flag gradually came to be recognized and used internationally as a symbol for LGBTQ pride (Graves and Watson 2016:222).

The AIDS epidemic is among the most significant events to shape the LGBTQ community. San Francisco, New York, and Los Angeles were the first American cities to face the AIDS crisis in 1981. A pathologist at the University of California, San Francisco (UCSF) identified the first diagnosis of Kaposi's Sarcoma in April 1981. Two months later the Center for Disease Control released a report on the disease. UCSF was also at the forefront of treating the disease, opening a specialty clinic in August 1981, which attracted patients from across Northern California. In 1982, the Kaposi's Sarcoma Research and Education Foundation (later renamed the San Francisco AIDS Foundation) formed to mobilize the gay community to address the threat and pressure the government for funding to support treatment and cure research. In 1984, the Center for Disease Control and Prevention reported that of nine cities surveyed, only San Francisco had the needed partnerships between community AIDS organizations and public health officials to develop effective prevention programs (Graves and Watson 2016:292-294).

In his book *Impure Science: AIDS, Activism, and the Politics of Knowledge*, sociologist Stephen Epstein describes AIDS activism as "the first social movement in the United States to accomplish the large-scale conversion of disease victims into activist-experts" (Graves and Watson 2016:301). Several protesters with ARC (AIDS Related Complex) and AIDS, in what has been described as the first use of civil disobedience against the AIDS epidemic anywhere in the world, chained themselves to the doors of the federal building housing the regional office of Health and Human Services at 50 UN Plaza on October 27, 1985. The protesters demanded national attention and funding from the U.S. government for research, care, and social services via a 10-year, 24-hour vigil. The vigil ended in 1995 when the UN Plaza encampment was damaged by a storm, just as effective antiretroviral treatments were becoming available (Graves and Watson 2016:303).

Significance Summary

United Nation's Plaza has been previously recorded under the Primary Number P-38-000984. It appears in the California Historical Resources Information System (CHRIS) database with a California Historical Resource Status Code of 1D, indicating that it is part of a district that is listed in the NRHP and the CRHR. This district is the Civic Center Historic District, which was listed in the NRHP by the Keeper of the National Register in 1978. A portion of the plaza was later included in the area of the Civic Center that was designated a National Historic Landmark (NHL) District in 1987. The UN Plaza is also part of a locally-designated landmark district that the City and County of San Francisco established in 1994. The period of significance for the NRHP Historic District is 1906 to 1933 (National Register of Historic Places 1978). The period of significance for the locally-designated district is 1906 to 1936 (Starrett and Pound 1994: 22). The period of significance for the NHL district is 1913 to 1951 (Charleton 1984: 357). Based on the existing periods of significance for these districts, and because the 1976 dedication date of the plaza falls outside of each of these periods of significance, the UN Plaza is not recorded as a contributor to the significance of any of these districts.

NRHP Criterion A and CRHR Criterion 1:

Although the plaza was established to commemorate the 1945 founding of the United Nations at the Civic Center in San Francisco, it lacks a direct association with that event. In 1945, the current plaza configuration did not exist and all built features directly associated with the plaza plan post-date the United Nation's 1945 founding. However, research indicates the plaza does have association with event(s) considered important locally, statewide, or nationally. Gay Freedom Day Parades traveled west across Market Street from downtown, through UN Plaza, to City Hall beginning in 1977. The parades of 1977 and 1978 drew record numbers, making them the biggest annual parades in San Francisco, with the 1978 event being among the largest political gatherings in the country during the 1970s (Bruce 1963:1). That event also inspired design of the rainbow flag, which became the international symbol for LGBTQ pride (Graves and Watson 2016:222). On October 27, 1985, the LGBTQ community chose United Nation's Plaza as the site for protesting government inaction in response to the national AIDS epidemic. In what has been described as the first use of civil disobedience against the AIDS epidemic anywhere in the world, protesters with ARC (AIDS Related Complex) chained themselves to the doors of the federal building housing the regional office of Health and Human Services at 50 United Nation's Plaza. The protesters demanded national attention and funding from the U.S. government for research, care and social services via a 10-year 24-hour vigil. The vigil UN Plaza ended in 1995 when the encampment was damaged by a storm, just as effective antiretroviral treatments were becoming available (Graves and Watson 2016: 303). Thus, UN Plaza has a significant linkage with that event under Criterion A/1.

NRHP Criterion B and CRHR Criterion 2:
Research uncovered no individuals whose productive life is associated with the plaza in any significant way. The plaza lacks a direct association with individuals of national importance, such as President Harry S. Truman, who were in attendance at the Civic Center U. N. conference. The plaza also lacks a direct association with Justin Herman, the former director of the San Francisco Redevelopment Agency. Herman was actively involved with the reconstruction of Market Street, under which UN Plaza was completed. Herman was the former regional director for the federal government's Housing and Home Finance Agency (HHFA) before he was recruited by Mayor George Christopher in 1959 to head the San Francisco Redevelopment Agency. His 12-year tenure in this position coincided with the most activist period in the nation's history for federal involvement in urban renewal projects. Herman was extremely effective in obtaining federal funding for redevelopment projects in San Francisco, such as Market Street, Diamond Heights, Golden Gateway, Western Addition, and Yerba Buena (Habert 1999). However, sites that might be significant for their association with Herman would be those projects that he was directly associated with and that represent the influence he had on San Francisco's urban environment. Lacking a direct association with Justin Herman, the plaza does not appear to be significant under Criterion B/2. In addition, research uncovered no other individuals whose productive life is associated with the plaza in any significant way. As such, the plaza does not appear to meet NRHP Criterion B or CRHR Criterion 2.

NRHP Criterion C and CRHR Criterion 3:
United Nation's Plaza is associated with the work of master landscape architect Lawrence Halprin. Although the plans for the MSRP were developed by the Market Street Joint Venture Architects, consisting of Mario J. Ciampi & Associates, John Carl Warnecke & Associates, and Lawrence Halprin & Associates, it appears Halprin was largely responsible for UN Plaza design and its fountain (Hirsch 2014: 82-83). Halprin's work is marked by his attention to human scale, user experience, and social impact of his designs, which was unique during the period of his practice during the urban redevelopment era. His projects are memorable for their striking forms and sequences that evoke multiple associations and recall varied references. The signature vocabulary that characterizes his work, particularly water features, includes a fractured urban ground terraced to choreograph the movement of bodies of water rendered in poured-in-place concrete that simultaneously evoke monumental geological forms and dynamic ecological processes (Meyer 2008). UN Plaza and the fountain were designed as choreographed spaces with rhythmic sequencing meant to inspire movement (through the Fulton Street and Leavenworth Street plaza routes, within the fountain, and below ground into the BART Station), as well as pause (observation of the fountain and use of benches). UN Plaza is significant for its association with Halprin as an example of how his worked helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrates viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process. UN Plaza's design integrates with the inherited environment, facilitates use of traditional pedestrian processional corridors (particularly, the ceremonial parade route along Market Street to the steps of City Hall), and preserves the important view corridor from Market Street to the City Hall dome. Thus for the application of these new approaches to urban design, UN Plaza appears to be significant under NRHP and CRHR Criterion C/3.

Existing Conditions

The following summarizes existing conditions for UN Plaza in terms of Spatial Organization, Circulation, Vegetation, Views and Vistas, Constructed Water Features, and Small-Scale Features.

Spatial Organization: The 2.6-acre UN Plaza spans the Market Street alignment between 7th and 8th Streets, extending westward from Market Street to Hyde and Fulton Streets. The ground plane of the main plaza is characterized by a triangular plan, but the site also includes two linear promenades projecting to the north and west. The main plaza includes a water feature—the UN Plaza Fountain—in its eastern section (**Image 8**).

Circulation: In addition to being the main pedestrian gateway from Market Street to the Civic Center, the plaza serves as major multi-modal transportation hub, providing street access to the underground Muni and BART Civic Center Station, as well as street-level stops adjacent to Market Street for Muni's historic F-line trolley, and busses. Vertical circulation consists of the stairwell and escalator to the BART/Muni subway station. Pedestrian circulation through the plaza remains structured along two axis—a primary east-west axis along Fulton Street and a secondary north-south axis along Leavenworth Street. As with the Market Street streetscape, the paving in areas of pedestrian traffic consists primarily of red brick laid in a herringbone pattern (**Image 8, 9, 10**).

Vegetation: The approach from United Nations Plaza to the Civic Center features original arrangement of trees organized in paired rows flanking single rows of lights aligned parallel within the pedestrian mall on the east-west Fulton Street axis (**Image 9**). The secondary linear arrangement of trees along the west side of the Leavenworth mall axis is also retained (**Image 10**). The grass-covered planting beds along the Fulton Street central promenade that were established in 1936 and retained by the Market Street Redevelopment Plan design remain in the plaza, though northern beds contain decomposed granite and southern beds contain grass (**Image 11**). The planting area near the BART entrance is also filled with decomposed granite instead of plantings. At least 36 London planetrees (*Platanus acerifolia*) were planted in the plaza in 1975. The rows of London planetrees remain intact, although they show the effects of the westerly winds that pass through the plaza. Lombardy poplar trees (*Populus nigra*) were also planted near Market Street and remain intact.

Buildings and Structures: A metal public toilet, added in 1995, is located at the southeastern edge of the plaza, adjacent to the Market Street sidewalk streetscape.

Views and Vistas: The original view of City Hall from UN Plaza, which was designed to maintain visual connection between the pedestrians in the plaza and civic center, is present when observed from Market Street (**Image 9**), but is partially obscured by the bronze equestrian monument of Simon Bolivar when the observer is positioned near the statue. The view from the west end of the Fulton promenade to UN Plaza fountain and Market Street beyond is open if the observer is not standing behind the Bolivar statue (**Image 16**).

Constructed Water Features: UN Plaza Fountain remains intact and located at the eastern end of UN Plaza (**Image 12, 13**). Arched jets of water shooting up from the center of the fountain remain intact, but the fountain's tidal effect, which was a component in producing the fountain's symbolism, is not currently functioning (MIG 2014:35).

Small-Scale Features: Small-scale features of UN Plaza include lighting, paving, seating, monuments, bollards, signage, and public toilet,

- Lighting: There are 16 granite light standards arranged symmetrically along the central promenade with eight fixtures per side placed at regular 40-foot intervals (**Images 9, 16**). While the lamps originally consisted of semi-translucent, hooded luminaires mounted on the square, light-colored granite columns, when the plaza's lighting scheme was altered in 1995, the original square Modernist hoods capping the luminaries were replaced with the frosted spherical globes that are in place now (**Image 14**). The square granite columns and the spatial arrangement of the light fixtures remain unchanged. Multi-story gold-colored light poles that feature multiple spotlight heads remain positioned around the fountain (**Image 12**). In addition, the light poles were added on the north side of the Fulton promenade in 2005 (Fagan 2005) and remain in place (**Image 20**).

- Paving: The granite paving with brass inlay indicating the city's latitude and longitude that is located near the southwest end of the fountain was included in the original design and remains intact (**Image 15**). The bands of granite and brass inlay quoting the Preamble to the United Nations charter that are placed in the Fulton Street promenade were added in 1995. The circular granite feature engraved with the United Nations symbol that is located at the intersection of the plaza's primary axis (**Image 22**) (Fulton Street promenade) and secondary axis (Leavenworth Street) was also placed into the paving during the 1995 renovation (MIG 2015:82-84).

- Monuments: The black monument pillar placed adjacent to the fountain is a feature of the original Market Street Redevelopment Plan design and remains intact (**Image 21**). The plaza also features a stone monument with the UN emblem and text in the plaza (**Image 23**). This was installed in 1995 to commemorate the 50th anniversary of the founding of the United Nations. (MIG 2015:82-84). There is a bronze equestrian monument of Simon Bolivar installed in 1984 at the west end of the plaza where the Fulton Street promenade meets Hyde Street (**Image 16**). The statue was a gift from Venezuela to the City of San Francisco to commemorate the 200th anniversary of Bolivar's birth and is not part of the original Market Street Redevelopment Plan design (MIG 2014:34).

- Flagpoles: Two flagpoles with a radial pattern metal were installed in 1975 as part of the Market Street Redevelopment Plan and remain present today (**Image 18**) (MIG 2014:81).

- Advertising kiosk: In addition to the flagpoles, an advertising kiosk was installed next to the plaza's BART/Muni entrance in 1975. This feature does not appear to be intact.

- Seating: The original wood-slat benches that were placed along the central promenade (12 benches per side arranged in a paired configuration) were removed from the central promenade sometime after 1999. No replacement seating has been added.

- Bollards: bollards with chain link adjacent to the BART/Muni entrance planting bed remain intact (**Image 17**).

- Signage: wayfinding signage with street map, points of interest and transit information has been added near the BART/Muni entrance. Precise date of addition is unknown (**Image 19**).

- Pre-Market Street Redevelopment Plan features: A few of the features within the ground plane of the UN Plaza that pre-date construction were retained and remain intact. These features include: one red metal fire box dating to 1899 on Hyde Street; two fire hydrants dating to 1909 on Hyde Street; and sections of granite curbing dating to 1925 on Market, Leavenworth, and Hyde Streets.

Integrity Evaluation

Feature Status Analysis

The following *Table 1. Feature Analysis Table: UN Plaza* discusses the plaza's condition in terms of features grouped into the following landscape categories: Spatial Organization, Circulation, Vegetation, Views and Vistas, Constructed Water Features, and Small Scale Features. The table identifies the status of each feature in terms of three status categories: extant, partially extant, or lost. The summary also quantifies the volume of new features added to the major plaza landscapes that undermine integrity.

Table 1. Feature Analysis Table: United Nations Plaza

Description	Status	Comments/Analysis
Spatial Organization		
Located along Market Street between 7th and 8th Street	Extant	The plaza's placement remains consistent, contributing to integrity of location (Compare **Images 1, 2** with **Image 8**).
Triangular plan with two linear promenades projecting north and west	Extant	The plaza's plan remains consistent, contributing to integrity of design, feeling, and association (Compare **Images 1, 2** with **Image 8**).
Placement of fountain in eastern section	Extant	Placement of the fountain remains consistent, contributing to integrity of design, feeling, and association (**Compare Image 5** with **Image 12**).
Circulation		
Multi-modal transportation access point	Extant	Access to multi-modal transportation remains intact, contributing to integrity of design, material, workmanship, feeling, and association.
Vertical circulation for Civic Center BART/Muni station including stair and escalator	Extant	Vertical circulation features remain intact, contributing to integrity of design, material, workmanship, feeling, and association.
Two pedestrian circulation axis	Extant	Fulton Street east-west and Leavenworth Street north-south axis configuration remains intact, contributing to integrity of design, material, workmanship, feeling, and association. (Compare **Images 3, 6** with **Image 8**)

Description	Status	Comments/Analysis
Red brick paving in herringbone pattern	Extant	Paving remains intact, contributing to integrity of design, material, workmanship, feeling, and association (Compare **Image 5, 6** and **Images 9, 15**)
Vegetation		
Trees	Extant	Tree rows remain intact, contributing to integrity of design, material, workmanship, feeling, and association (Compare Images (Compare **Images 3, 4** with Images **9, 11**).
Planting beds	Partial	Beds in Fulton promenade and adjacent to BART/Muni station remain intact, but grass is mostly replaced with decomposed granite, contributing to integrity of design, material, workmanship, feeling, and association (Compare **Images 3, 4** with Images **9, 11**).
Views and Vistas		
View of City Hall	Partial	View of City Hall obscured by Simon Bolivar Statue, diminishes integrity of design, setting, feeling, and association (Compare **Image 3** and **Images 8, 9, 16**).
Constructed Water Features		
UN Plaza Fountain	Extant	Fountain remains intact, contributing to integrity of design, materials, workmanship, feeling, and association (Compare **Images 3, 5, 7** with **Images 8, 12, 13**).
"Ocean pools" and "Earth Tides" water cycle of UN Plaza Fountain	Extant	Loss of "earth tide" cycle is not permanent and, therefore, does not significantly diminish integrity. Arched jets of water and "ocean pools" remain intact and contributes to integrity of design, feeling, and association (Compare **Image 7** with **Image 13**).
Small-Scale Features		
Granite light standards in Fulton promenade	Partial	Light standards have been modified, diminishing integrity of design, materials, workmanship, feeling, and association (Compare **Image 6** with **Image 14, 16**).
Light poles at fountain	Extant	Light poles are intact, contributing to integrity of design, materials, workmanship, feeling, and association (Compare **Images 3, 5** with **Image 12**).
Wood-slat benches	Lost	Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Flag poles with radial base design	Extant	Flag poles are intact, contributing to integrity of design, materials, workmanship, feeling, and association (Compare **Image 3** with **Images 9, 18**).
Granite paving with brass inlay	Extant	Market Street Redevelopment Plan-era granite paving with brass inlay is intact, contributing to integrity of design, materials, workmanship, feeling, and association (Compare **Image 5** with **Image 15**).
Stone monument	Extant	Market Street Redevelopment Plan-era stone monument intact, contributing to integrity of design, materials, workmanship, feeling, and association (Compare **Image 5** with **Image 12**).
Advertising kiosk	Lost	Market Street Redevelopment Plan-era advertising kiosk does not appear to be intact. Loss diminishes integrity of design, materials, workmanship, feeling, and association.
Bollards	Extant	Market Street Redevelopment Plan-era Bollards adjacent to BART/Muni entrance remain intact, contributing to integrity of design, materials, workmanship, feeling, and association.

Description	Status	Comments/Analysis
Post-plaza Completion Features		
Wayfinding signage	Added after period of significance	Addition diminishes integrity of design, materials, workmanship, feeling, and association.
Public toilet	Added after period of significance	Addition diminishes integrity of design, materials, workmanship, feeling, and association.
1995 United Nations 50th Anniversary stone monument	Added after period of significance	While new monument would typically diminish integrity, participation of designer Lawrence Halprin in the process mitigates reduced integrity.
Light poles	Added after period of significance	Addition diminishes integrity of design, materials, workmanship, feeling, and association.
Simon Bolivar equestrian statue	Added after period of significance	Addition diminishes integrity of design, feeling, and association.
1995 paving, including granite bands and brass inlay in Fulton promenade, circular granite UN symbol	Added after period of significance	While 1995 paving and brass inlay would typically diminish integrity of design, material, workmanship, feeling, and association, participation of designer Lawrence Halprin in the process mitigates reduced integrity.

Feature Integrity Evaluation

Integrity is expressed through the categories of location, setting, design, materials, workmanship, feeling, and association. When considering eligibility under Criteria C/3, it is most essential for integrity of location, design, materials, workmanship, and association to be retained, as they best convey the place, form, physical components, quality of labor, and processes associated with UN Plaza's significance as an example of how Lawrence Halprin's work helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning, and illustrated the viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process.

While the integrity of some of the features that are components of the landscape as a whole have been diminished, or even lost, the aggregate integrity of Market Street is retained. This is particularly relevant where features identified as Priority 1 and 2 have sufficient integrity in terms of location, setting, design, materials, workmanship, setting, and association to express UN Plaza's historic significance as a cultural landscape associated with the works of master landscape architect Lawrence Halprin.

Based on feature condition analysis, the following integrity evaluation analyzes integrity of UN Plaza based on location, design, setting, materials, workmanship, feeling, and association

- **Location:** Location is the place where the cultural landscape was constructed. UN Plaza retains integrity of location through retention of the plaza's position on the North side of Market Street between 7th and 8th Streets. As such, UN Plaza has integrity of location.

- **Setting:** Setting is the physical environment of the cultural landscape. Integrity of setting for UN Plaza is supported by plaza's continued positioning on the north side of Market Street between 7th and 8th Streets. In addition, the retained view of City Hall also supports integrity of setting.

- **Design:** Design is the combination of elements that create the form, plan, space, structure, and style of a cultural landscape. Retained UN Plaza Fountain contributes to the plaza's integrity of design. Of the seven categories of integrity, for evaluation of Criterion C/3, design is the most important. The retained triangular plan with two linear promenades projecting north and west, along with retained position of the fountain, support integrity of design. All the extant features in the circulation category also contribute to retained integrity of design. Although grass is missing from planting beds, retained beds and trees rows further contribute to integrity of design. Although the view of City Hall is slightly obscured by the Simon Bolivar Statue when observed near the statue within the Fulton promenade, the view is retained when observed from greater distance in the main plaza near the fountain. The UN Plaza Fountain is intact and supports integrity of design. Given loss of the "earth tide" cycle is not permanent it does not significantly diminish integrity of design. The fountain's arched jets of water and "ocean pools" remain

intact and contribute to integrity of design, feeling, and association. While the granite light standards in Fulton promenade have been altered and the wood-slat benches are lost, the majority of small-scale features are extant and support UN Plaza's integrity of design. While UN Plaza has been altered by features that have been added after the period of significance, overall, the plaza retains enough features in the categories of spatial organization, circulation, vegetation, views and vistas, constructed water features, and small scale features to have integrity of design.

- **Materials:** Materials are the physical elements that were combined during the particular period of time and in a particular pattern or configuration to form the cultural landscape. Despite loss of wood slat benches and the presence of features added after UN Plaza's period of significance, with features within the categories of circulation, vegetation, constructed water features, and small scale features identified as extant or partially extant, overall, UN Plaza retains integrity of materials.

- **Workmanship:** Workmanship is the physical evidence of the crafts of a particular culture or people during any given period of history. While the UN Plaza wood slat benches have been lost and features added to the plaza after the period of significance are present, integrity of workmanship is present in extant and partially extant features associated with categories of circulation, vegetation, constructed water features, and small scale features. Thus, UN Plaza retains integrity of workmanship.

- **Feeling:** Feeling is a cultural landscape's expression of the aesthetic or historic sense of a particular period of time. This expressed as a composite of setting, design, materials, and workmanship. UN Plaza's integrity is retained in all of these categories. Particularly important, the combination of extant features in spatial organization, circulation, and constructed water features contribute most to integrity of feeling. As such, UN Plaza does retains integrity of feeling.

- **Association:** Association is the direct link between the important historic event or person and a cultural landscape. This can be expressed by the maintenance of a link to the past through continuation of a traditional use or occupation. With the majority of features within categories of spatial organization, circulation, vegetation, views and vistas, constructed water features, and small-scale features identified as being extant or partially extant, despite the presence of features added after the period of significance, UN Plaza continues to be used as an open spaces for public gathering and retains integrity of association.

Thus, the all of the feature categories – spatial organization, circulation, vegetation, views and vistas, constructed water features, and small-scale features retain enough integrity to express UN Plaza's historic significance. As such, there is sufficient integrity of setting, design, materials, workmanship, and feeling to convey UN Plaza's historic significance as an example of how Lawrence Halprin's work helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning, and illustrated the viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process.

Criteria Consideration G

Because the UN Plaza is currently less than 50 years of age, and post-dates each of the periods of significance for the Civic Center historic district, the following historic context statement has been written to address the property's potential individual eligibility and status under NRHP Criteria Consideration G: Properties that Have Achieved Significance within the Last Fifty Years.

UN Plaza retains its overall integrity of location, setting, design, materials, workmanship, feeling and association, and conveys its role as venue for civic engagement in San Francisco, particularly in terms of its use by the local LGBTQ community to achieve national recognition for social and political agendas associated with the equal rights for gay, lesbian, bisexual, transgender and queer people. UN Plaza's period of significance for this association is 1979-1985. As such, UN Plaza is less than 50 years old and its historical associations must be of "exceptional importance" to the City of San Francisco, California, the western region of the United States, or the nation to be eligible for listing on the National Register of Historic Places (Keller, Keller and Community Associates Charlottesville, Virginia 1987: 25).

San Francisco's significance as one of California's most populous cultural and economic engines, its reputation as a politically progressive community and its role in international affairs makes it a priority location for advocacy. Other public spaces within San Francisco could have served as the location for the 1985 AIDS vigil protest, which sought to bring greater attention to the national epidemic, but no others offered the exceptional opportunity for advocacy messaging to relevant audiences provided by UN Plaza's location adjacent to the federal building and alignment as the pivot point of the processional axis between Market Street and City Hall in Civic Center.

UN Plaza also conveys its historical significance as a cultural landscape associated with the works of master landscape architect Lawrence Halprin. Specifically, UN Plaza is an example Halprin's work which helped elevate the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrates viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process. UN Plaza's period of significance for this association is 1975, which makes character defining features related to the latter years of this period less than 50 years old. As such, Market Street's

historical associations must be of "exceptional importance" to the City of San Francisco, California, the western region of the United States, or the nation to be eligible for listing on the National Register of Historic Places (Keller, Keller and Community Associates Charlottesville, Virginia 1987: 25).

UN Plaza is particularly important as an exceptional project within Halprin's career. He went on to design additional plaza projects, including the fountains and open spaces associated with the Franklin Delano Roosevelt Memorial in Washington, D.C. Early work on UN Plaza played an important role in helping him develop mature design concepts that placed him on the national stage as a designer of world-class urban environments that prioritize the human experience and respond to the existing built environment. "Market Street provided a hometown laboratory for Halprin to develop techniques he was simultaneously considering for other projects" (Hirsch 2014: 83). As a monumental public space design that incorporated the creation of a focal-point fountain feature, the reclamation of streets for use as pedestrian promenades, and prioritization of pedestrian views, UN Plaza is exceptionally important as a critical proof of concept in one of America's major metropolises that facilitated future high-profile work for Halprin.

Conclusions

UN Plaza possesses significance under NRHP and CRHR Criterion A/1 for its role as the venue used for nationally significant events important to the elevation of LGBTQ issues to nation-wide attention, including the Gay Freedom Day Parades and the first civil disobedience protest against the AIDS epidemic anywhere in the world. UN Plaza also possesses significance under NRHP and CRHR Criterion C/3 for its association with master landscape architect, Lawrence Halprin as an example of his work which elevated the influence of landscape architecture as a discipline that provides essential perspective on modern urban planning and illustrated viability of prioritizing sensitivity to human experience and the existing built environment as part of the redevelopment process. Although alterations have diminished its integrity in some categories, UN Plaza retains enough of its character defining features to convey its historic significance in both cases. Consequently, Criteria Consideration G was applied. UN Plaza is exceptionally important for being a unique place for advocacy messaging, which facilitated recognition of LGBTQ rights issues and AIDS epidemic nation-wide. UN Plaza is also exceptionally important for facilitating the development of the design approaches that helped build Halprin's reputation nationally and supported the development of an innovative memorial design type and as an important local example of his urban design work.

The property appears to be a historical resource for the purposes of the California Environmental Quality Act (CEQA) having been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. The proposed NRHP status codes are 3S (appears to be eligible for separate listing) for UN Plaza's individual significance and 3D (Contributor to a district that has been fully documented according to OHP instructions and appears eligible for listing) as a contributor to the Market Street District.

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Photographs:

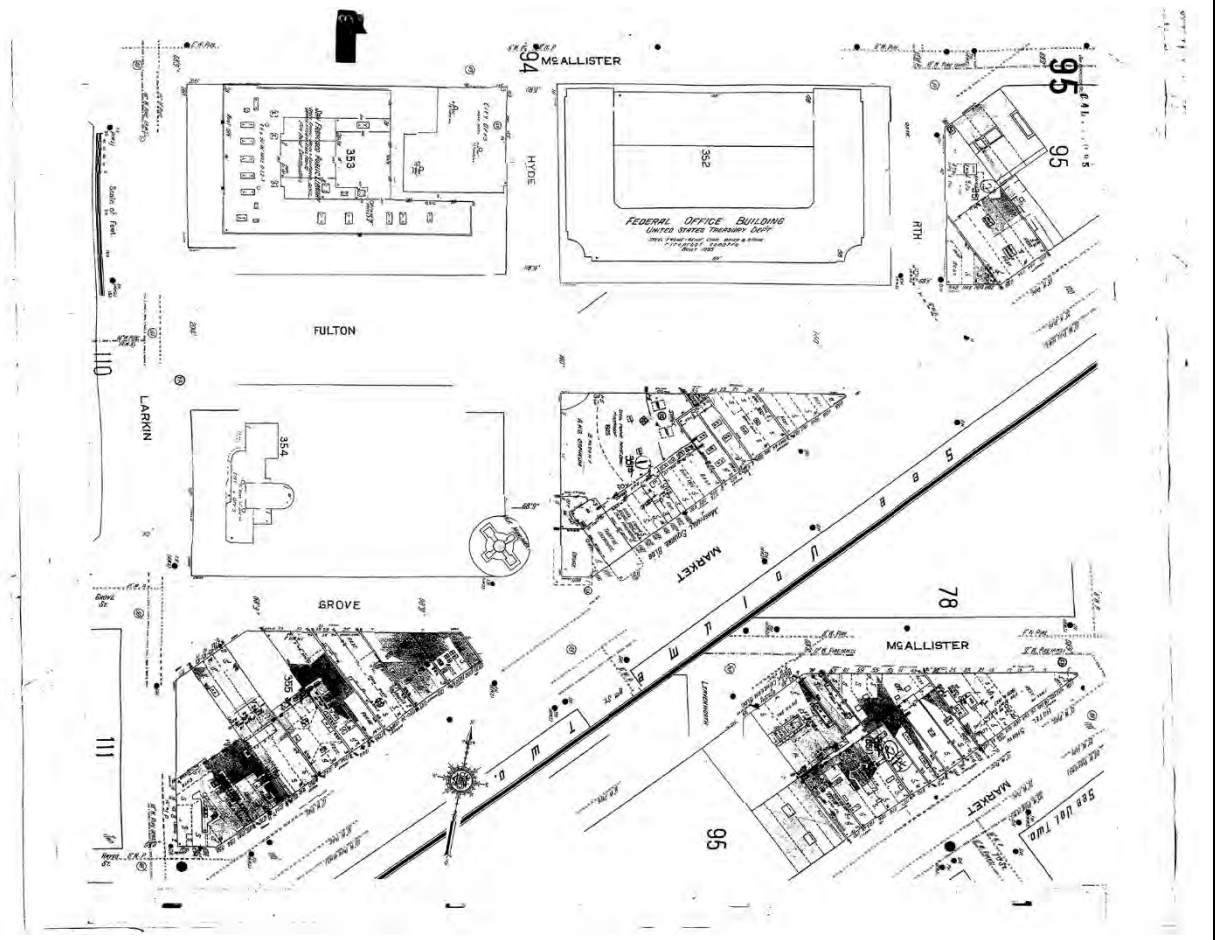

Image 1. 1913-1950 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95 shows site conditions prior to construction of UN Plaza, including structures demolished as part of the Market Street Redevelopment Plan. (San Francisco History Center, San Francisco Public Library)

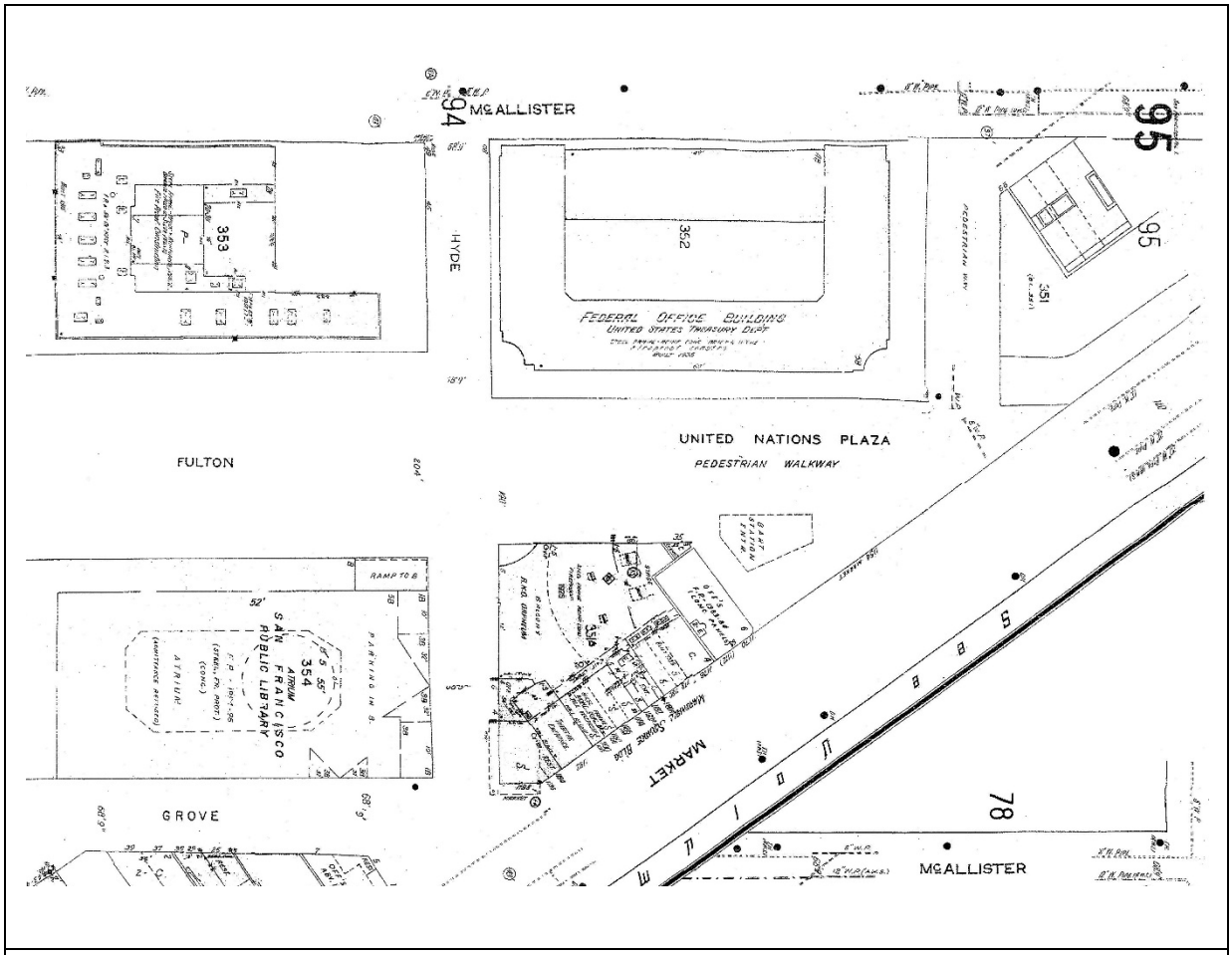

Image 2. 1998 San Francisco Sanborn Fire Insurance Map, Volume 1, sheet 95 shows site conditions after construction of United Nations Plaza, with Leavenworth and Fulton Streets repurposed as pedestrian malls. (San Francisco History Center, San Francisco Public Library)

Image 3. UN Plaza, 1979, showing orientation of fountain, monument, and Fulton Promenade (with lighting and tree rows) in relation to the view of City Hall. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R40-2*, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 4. Fulton Promenade, 1979, southeast view showing brick-paved areas for pedestrian traffic heading toward the fountain and BART station entrances, as well as trees aligned within grass-filled planting beds. *(Photograph of Contact Sheet [cropped] by author. Slide 56608, by Joshua Friedwald, dated 1979 [014.VI.5G.601-622], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 1. UN Plaza, 1979, showing herringbone brick pattern accompanied with granite and in-laid bronze. This image also shows a northeast view toward the plaza fountain, lighting, and monument. *(Photograph of Contact Sheet [cropped] by author. Sheet 1479R6-12, Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 6. Fulton Promenade, 1979, with lighting that features granite pillars with square, translucent glass lamps. *(Photograph of Contact Sheet [cropped] by author. Slide 56607, by Joshua Friedwald, dated 1979 [014.VI.5G.601-622], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 7. UN Plaza featured a Halprin-designed fountain, pictured here, with light poles featuring square translucent glass lamps lining its north side. *(Photograph of Contact Sheet [cropped] by author. Sheet* 1479R7-11, *Joshua Friedwald, dated 1979 [014.IV.A.90], Lawrence Halprin Collection, The Architectural Archives, University of Pennsylvania)*

Image 8. UN Plaza, 2016, showing the presence of features including retained fountain and monument cluster, Fulton and Leavenworth Streets promenades with tree plantings, BART entrance with planting bed and bollard. Brick paving remains intact, blending pedestrian plaza space with Market Street streetscape area. This image also shows placement of Bolivar statue at the end of the Fulton promenade in the upper left corner, as well as new granite paving features added between the promenade's tree allée. (Google Earth 2016)

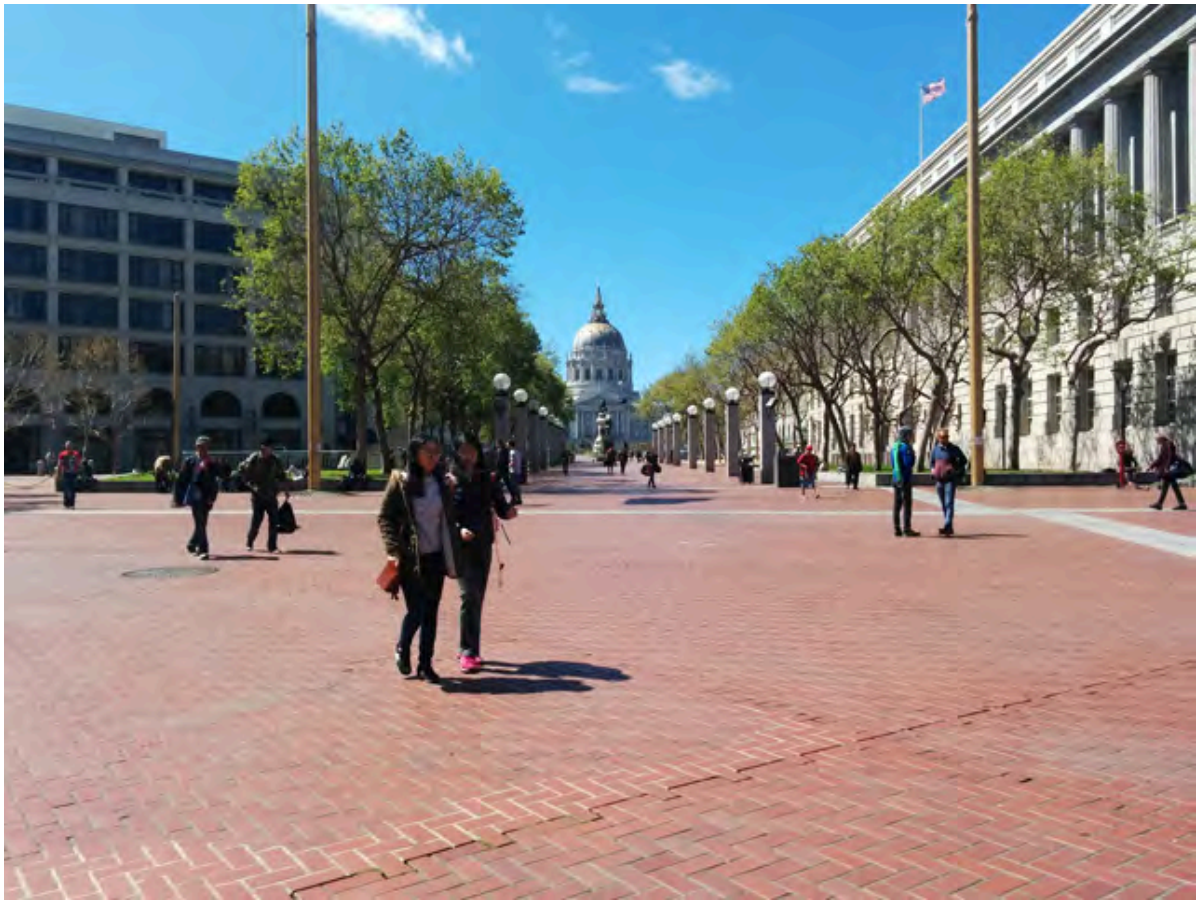

Image 9. UN Plaza, 2016. View of City Hall from UN Plaza is retained, though diminished by Bolivar statue obstruction (center). This image also shows placement of flag poles flanking Fulton promenade, as well as the altered lighting, with retained granite pillars and replaced circular glass lamps. (Photograph by author, March 2016)

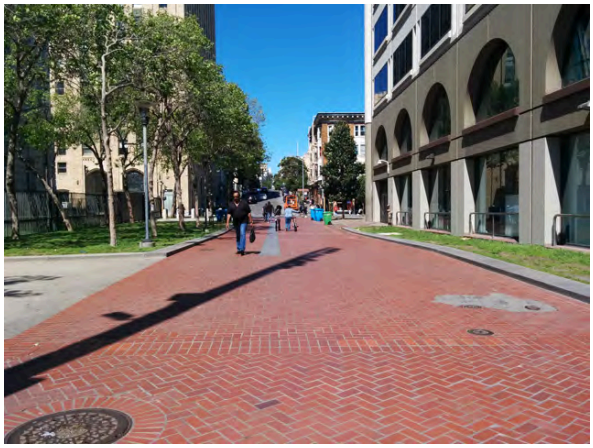

Image 10. UN Plaza, 2016, showing brick paving featured in the Leavenworth Promenade north of the UN Plaza fountain. (Photograph by author, March 2016)

Image 11. UN Plaza, 2016, showing decomposed granite that has replaced grass in Fulton Promenade planting beds. (Photograph by author, March 2016)

Image 12. UN Plaza, 2016, retains cluster arrangement with granite monument on southwest side and multi-story lighting retained on northern side. (Photograph by author, March 2016)

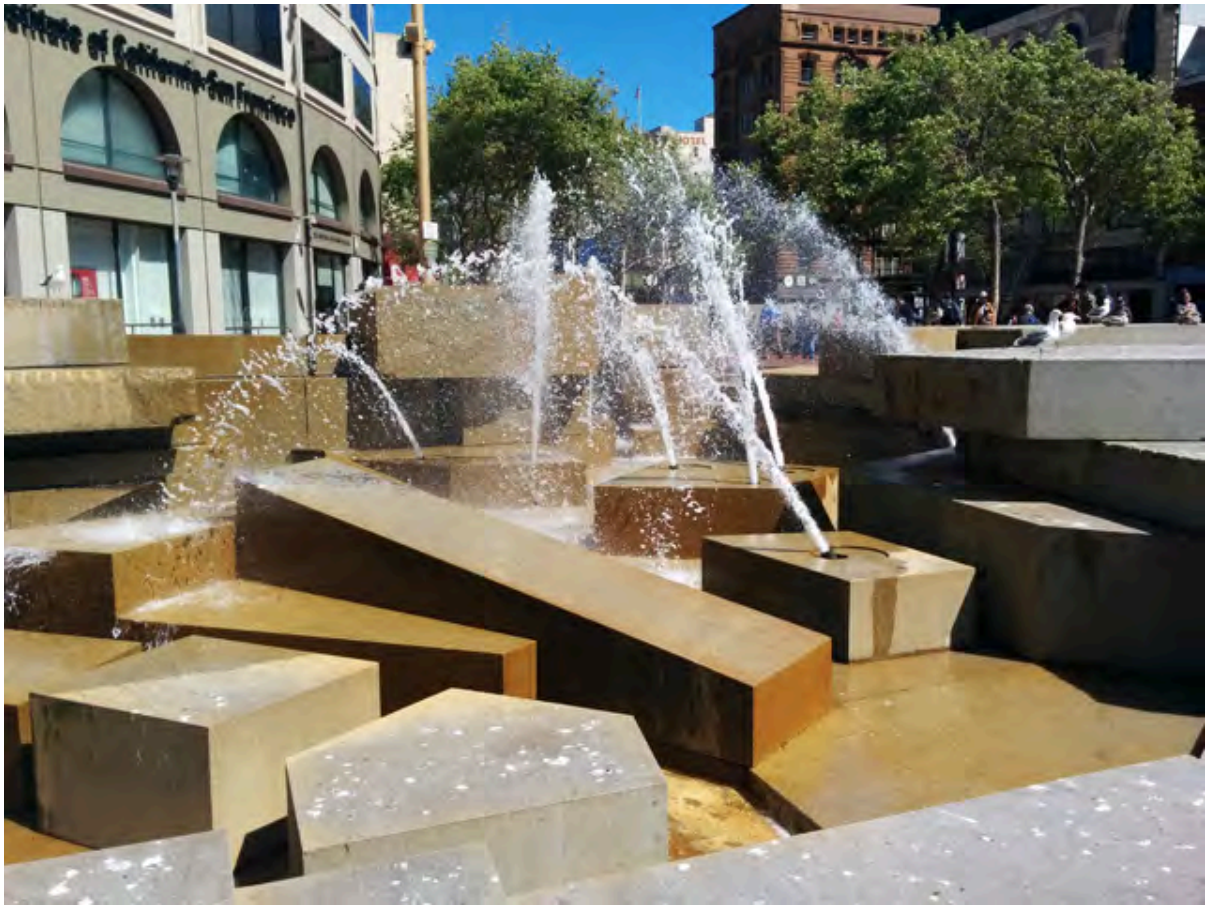

Image 13. UN Plaza, 2016, showing the design of UN Plaza fountain is intact. Although the “earth tides” water flow in the fountain’s pool is not currently operational, jets of water actively spray. (Photograph by author, March 2016)

Image 14. UN Plaza, 2016, showing Fulton promenade light standard with original granite base and altered circular glass light fixture. (Photograph by author, March 2016)

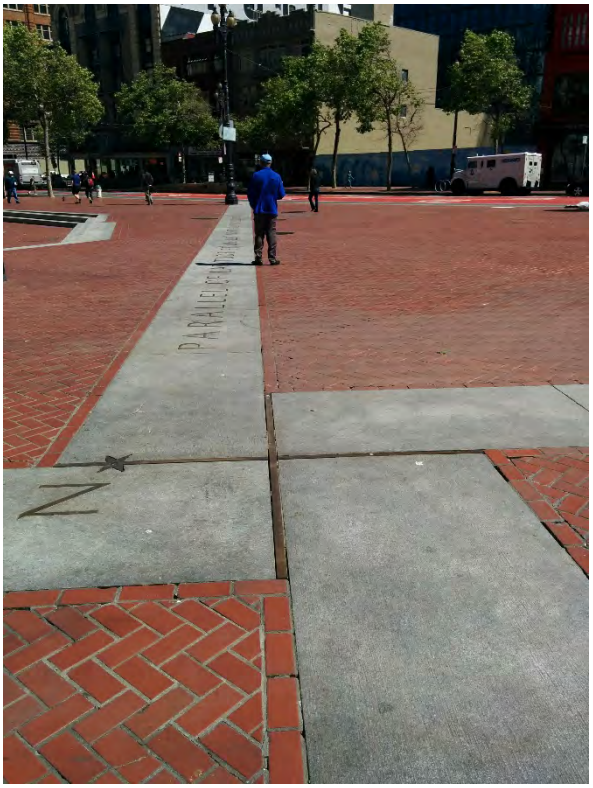

Image 15. UN Plaza, 2016. Although bands of granite with brass inlay in the Fulton promenade were added after the plaza was completed, the granite with brass latitude and longitude (pictured) are part of the original design. (Photograph by author, March 2016)

Image 16. UN Plaza, 2016, showing that the addition of Simon Bolivar statue obscures view from Civic Center through plaza to Market Street. (Photograph by author, March 2016)	**Image 17.** UN Plaza, 2016, showing that concrete bollards with chain links adjacent to BART entrance planting bed remain intact. (Photograph by author, March 2016)
Image 18. UN Plaza, 2016. Flag poles that flank either side of the Fulton promenade feature decorative radial brass bases in a style that is sympathetic to that of the MSRP tree grate design. (Photograph by author, March 2016)	**Image 19.** UN Plaza, 2016, showing new wayfinding signage added to the plaza. (Photograph by author, March 2016)

Image 20. UN Plaza, 2016, showing that new lighting, which is not sympathetic to the design of the granite pillar lighting in the Fulton promenade or fountain lighting, has been inserted into the promenade's northwestern planting bed. (Photograph by author, March 2016)

Image 21. UN Plaza, 2016, showing that the granite monument adjacent to plaza fountain has been retained. (Photograph by author, March 2016)

Image 22. UN Plaza, 2016. New features were added to the plaza to celebrate the 50th Anniversary of the United Nations, including the United Nation's symbol, embedded into the paving between the fountain and the southeastern entrance to the Fulton promenade. (Photograph by author, March 2016)

Image 23. UN Plaza, 2016, showing a new stone monument added to the plaza as part of the anniversary renovation. (Photograph by author, March 2016)

Appendix B

Market Street Transportation Development Timeline of Key Events

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Market Street Transportation Development Timeline of Key Events

The following timeline of key events highlights transportation development milestones for Market Street within context of other major local or national events. These highlights are described in more detail in Chapter 4, Historic Chronology and Comparative Contexts.

1847 – Jasper O'Farrell survey establishes Market Street alignment (JRP 2010:36; Lotchin 1974:7164-65; Woodbridge 2006:33).

1848 – California Gold Rush begins.

1849 – San Francisco experiences a particularly wet winter, terrible street conditions throughout the city include locations where mud is knee- and waist-deep. Brush and limbs from trees are cut down and thrown into the streets to mitigate conditions (Olmsted 1991:4).

1850 – Mission Delores Plank Road company constructs wood "highway" on Market Street composed of Oregon fir (Douglas fir) plans, three to four inches thick; Market Street Wharf extends 600 feet from the shore (Olmsted 1991:4, 6).

1853 – City of San Francisco adopts the Hoadley Grade of 6.7 feet above the high-water mark as baseline elevation for drainage (Hittell 1878: 436, 438; JRP 2010: 43).

1850s-1860s – Streets are paved with cobblestone (rounded river rocks) interspersed with rubble and flagstone walkways at intersections to delineate crosswalks (Olmsted 1991:6).

1860 – First set of pair rails laid in the center of Market Street for steam dummy (small steam engine) west of Montgomery Street by the privately owned Market Street Railroad Company (Laubscher 2016).

1860 (July 4) – San Francisco Market Street Railroad first operates steam railway from 3rd and Market Streets to 16th and Valencia Streets (Vielbaum, Hoffman, Ute, Townley 2004:7).

ca. 1863 – Horse-drawn streetcars supplant the steam engine on Market Street (Laubscher 2016).

ca. 1870 – Asphalt is used extensively for San Francisco sidewalks, but not considered heavy and strong enough for street paving (Olmsted 1991:10, 12).

1873 – Andrew Hallidie invents the cable car for use on steep hills, with later implementation on flat routes, including placement of cable machinery in underground conduit in the street (Laubscher 2016).

1873 – Municipal Order #1127 adopts cobblestones and stone blocks for construction of the pavement for streets in San Francisco, but does not specify stone type (Olmsted 1991:14).

1875 – San Francisco begins using basalt stone blocks for street paving (Olmsted 1991:12).

1882-1883 – Central Pacific Railroad acquires Market Street Railroad Company and renames it Market Street Cable Railway. Cable cars introduced on Market Street with main powerhouse complex built on south side of Market Street at intersection with Valencia Street (Laubscher 2016).

1883-1889 – Market Street Cable Railway Company introduces five cable lines on Market running west from the Ferry and branching out onto McAllister, Hayes, Haight, Valencia and Castro Streets (Laubscher 2016).

1889 – Municipal Order #2121 requires San Francisco's streets to be repaved with basalt block. (Olmsted 1991:14)

1892 – Electric streetcars first appear in San Francisco, though not on Market Street (Laubscher 2016).

1893 – Market Street Cable Railway Company renamed as Market Street Railway Company. San Francisco's major transit lines (formerly owned by multiple competing private companies) consolidate into ownership by Market Street Railway Company (Laubscher 2016).

1894-1903 – Ferry Building constructed as northeast terminus of Market Street at the San Francisco Bay.

1902 – Baltimore Syndicate acquires Market Street Railway Company and merges them with the Sutter Street Railway and the San Francisco & San Mateo Electric Railway. The consolidated company becomes known as United Railroads of San Francisco (Vielbaum, Hoffman, Ute, Townley 2004:7).

ca. 1906 – Market Street has two sets of cable car tracks running the length of the street from the Ferry to Sutter Street, with two horse-drawn streetcar tracks flanking two cable car tracks. Streets are paved with stone blocks with slabs of granite at intersections to delineate crosswalks (Laubscher 2016).

1906 (April 18) – Earthquake and fire destroys the cable car system along Market Street, including main powerhouse and cable-winding machinery at Valencia and Market Streets (Laubscher 2016). Re-establishment of the public transit system is deemed an essential priority for recovery and, within 10 days of the fire being extinguished, electric wires are strung to allow replacement of cable service on Market Street with electric trolley to facilitate reconstruction efforts (Ute, Hoffman, Beach, Townley, Vielbaum 2011:11-12). Earthquake damages the city's basalt paved streets, throwing the blocks out of alignment and requiring reconstruction (Olmsted 1991:15).

1906 (May) – Within 1 month of the earthquake, reconstruction of Market Street includes transition to electric streetcar system with overhead wires installed and electric streetcars routed over the cable car tracks. Street and sidewalk retain pre-earthquake widths and alignment (Laubscher 2016).

1906-1916 – Path of Gold Light Standards are installed along Market Street from the Ferry Building to Valencia Street. In addition to providing street lighting, the system's light poles support four parallel overhead streetcar power wires, as well as switching wires, for United Railroads' new electrified trolley system (Corbett 1979:241; Issel and Cherny 1986; 172-73; Laubscher 2016; San Francisco Planning Department 2010:2-3).

1909 – Bonds approve construction of San Francisco Municipal Railway (Muni), initially by acquiring a private cable car line running from Market Street to the Richmond District via Geary

Street. However, this line cannot extend east to the Ferry Terminal via Market because of United Railroad franchise rights on Market Street (Laubscher 2016).

1909-1912 – Construction of the Auxiliary Water Supply System installs more than 60 hydrants on Market Street between the Embarcadero and Octavia Boulevard (No Author 1922).

ca. 1910s – City begins using asphalt to pave both sides of the street for automobile use while keeping the center paving blocks exposed to protect cable cars and tracks and to simplify related repairs (Olmsted 1991:16).

1912 – Muni becomes the first publicly owned transit system to operate in a major American city with opening of Geary Street service. (Ute, Hoffman, Beach, Townley, Vielbaum 2011: 7).

1913 – Muni extends Geary Street service to the Ferry Terminal by acquiring the rights to horsecar tracks that flanked the United Railroads streetcar tracks east of Sutter Street (Ute, Hoffman, Beach, Townley, Vielbaum 2011:24). Horse car service on Market Street ends (Laubscher 2016).

1915 – The first "traffic indicator," a precursor to traffic signals and controlled manually by a traffic officer, is installed at the city's busiest intersection, Kearney and Market streets (Ute, Hoffman, Beach, Townley, Vielbaum 2011: 52).

1918 – Muni opens (what was then) the world's largest streetcar tunnel under Twin Peaks to facilitate commuters from western developed areas (present-day Sunset and Parkside Districts) to downtown San Francisco (Laubscher 2016).

ca. 1918 – Muni constructs its own new tracks beside United Railroad tracks along the entire length of Market Street to connect the J-Church streetcar line and the Twin Peaks tunnel portal at Castro Street to existing Muni tracks at Geary and Market Streets (Market Street Railway 2016).

1921 – Heavily in debt and plagued by corruption, United Railroads is bankrupt. Market Street Railway re-emerges as the railway operator. (Vielbaum, Hoffman, Ute, Townley 2004:7)

1925 – Bond issue to reduce streetcar traffic on Market Street by developing an underground subway is defeated. Automobile traffic on Market Street increases as personal vehicle ownership expands (Laubscher 2016).

1925 – Standard Gas & Power Company acquires Market Street Railway and hires the Byllesby Corporation to operate the railway. Byllesby, in turn, hires Samuel Kahn as executive vice president to modernize the system (Vielbaum, Hoffman, Ute, Townley 2004:7).

1929-1939 – Great Depression.

1930 – Initiative passes to give Market Street Railway a 25-year operating permit extension (Ute, Hoffman, Beach, Townley, Vielbaum 2011:61).

1941 – America enters World War II

1944 (September 29) – City of San Francisco Muni purchases private competitor, Market Street Railway Company, for $7.2 million. (Vielbaum, Hoffman, Ute, Townley 2004:7)

1945 – World War II ends.

1947 – Bond issue for transit used to replace two dozen streetcar lines with modern electric trolley buses. Electric selected instead of diesel for performance on hills. Trolley buses do not need tracks, but do continue to use overhead power supply system. Second wire is added to serve as an electrical ground (Laubscher 2016).

1947 – Outer pair of tracks on Market Street that are unused by electric trolley buses are removed (Laubscher 2016).

ca. 1949 – Market Street is converted to a three-lane thoroughfare, with streetcars in the center lane, electric trolley and motor coaches (buses) in the curb lane, and other automobile traffic in the middle (Ute, Hoffman, Beach, Townley, Vielbaum 2011:94).

1962 – As prospectus for redeveloping Market Street, *What To Do About Market Street* is published by Livingston and Blayney, City and Regional Planners, in association with Lawrence Halprin and Associates, Landscape Architects, Rockrise and Watson, Architects and Larry Smith and Co., Real Estate Consultants

(San Francisco Public Library 1962:7).

1967 – Construction begins on Market Street Bay Area Rapid Transit (BART) subway in San Francisco (Bay Area Rapid Transit 2015).

1967 (July 25) – Construction begins on BART and Muni subway along Market Street (Bay Area Rapid Transit 2015).

1968 – Schematic Street Design Plan developed as part of Market Street Redevelopment Plan by Joint Venture is adopted by the San Francisco Board of Supervisors (Res. 116-68) (Knight 1985:2).

1969 – Dedication of Crocker Plaza (San Francisco Public Library 1976d:251).

1972 – Dedication of Embarcadero Plaza (San Francisco Public Library 1976a:176)

1973 – Dedication of Mechanics Monument Plaza (San Francisco Public Library 1976d:665)

1973 – Dedication of Hallidie Plaza (San Francisco Public Library 1976d:387).

1973 (November 3) – A 7.5-mile San Francisco BART line with eight stations (including those on Market Street) opens, with expectation that transit would be removed from Market Street at surface level (Bay Area Rapid Transit 2015).

1974 – Renaming of Embarcadero Plaza to Justin Herman Plaza (San Francisco Public Library 1976a:176)

1976 – Dedication of United Nations Plaza (San Francisco Public Library 1976c:441-440).

1976 (May 27) – Embarcadero Station officially opens for revenue service (Bay Area Rapid Transit 2015).

1978 – Dedication of Robert Frost Plaza (San Francisco Public Library 1976f:39).

1978 – Dedication of Mark Twain Plaza (San Francisco Public Library 1976f:83, 113).

1978 – San Francisco Board of Supervisors amends Schematic Street Design Plan to require retention of trolley overhead wires (Res. 213-78) (Knight 1985:2).

1979 – Board of Supervisors empowers itself to control track and boarding island removals from the street (Res.846-79) (Knight 1985:2).

1981 – Board of Supervisors authorizes *Market Street Design Planning Study* (Res.240-81) to review transit operations and street design, including retention of streetcars (Knight 1985:2).

1983 – Board of Supervisors amends Market Street Beautification policy on removal of street-level transit by authorizing operation of four lanes of Muni service on Market Street east of Van Ness Avenue, supporting retention of surface streetcar operations, and upgrading streetcar tracks on Market Street east of Van Ness Avenue (Knight 1985:2)

1983 (June) – First of five summer San Francisco Historic Trolley Festivals operating historic streetcars from the Transbay Terminal at 1st and Mission Streets to Market Street, and up Market Street to Duboce Avenue (Knight 1985:2).

1984 – Market Street Planning Project launches, administered by San Francisco Public Utility Commission Planning and Development (Knight 1985:2).

1985 – *Market Street Planning Project Final Report* is published, which calls for a Transit Thoroughfare on Market Street. Recommendations include permanent reintroduction of streetcars (Knight 1985:1).

1985 (August 7) – Muni and Department of Public Works begin 9-month trial operation of four-lane service on Market Street between the Financial District and Civic Center, including Muni trolley coaches and buses two lanes in both directions, along with streetcar service; this effort involves the San Francisco Department of Public Works relocating boarding islands and curb stops to serve four lands of Muni vehicles (Knight 1985:1).

Appendix 6-4: Public Works Standard Archaeological Measures I-III

Public Works Standard Archaeological Measure I: Archaeological Discovery

The following requirements are applicable to:

- All projects that will include soil disturbance,
- Any discovery of a potential historical resource or of human remains, with or without an archeological monitor present.

Prior to ground disturbing activities:

A. Alert Sheet. Public Works shall, prior to any soils disturbing activities, distribute the Planning Department archeological resource "ALERT" sheet to each project contractor or vendor involved in project-related soils disturbing activities; ensure that each contractor circulates it to all field personnel; and provide the Environmental Review Officer (ERO) with a signed affidavit from each contractor confirming distribution to all field personnel.

Upon making a discovery:

B. Work Suspension. Should a potential archeological resource be encountered during project soils disturbing activity, with or without an archeological monitor present, the project Head Foreman shall immediately suspend soils-disturbing activities within 50 feet (15 meters) of the discovery in order to protect the find from further disturbance, and notify the Public Works Project Manager (PM) and/or environmental planning staff, who shall immediately notify the ERO for further consultation.

C. Qualified Archeologist. All archeological work conducted under this measure shall be performed by an archeologist who meets the Secretary of the Interior's Professional Qualifications Standards (36-CFR 61); consultants will be selected in consultation with the ERO and meeting the criteria or specialization required for the resource type as identified by the ERO in a manner consistent with Public Works's on-call contracting requirements.

D. Assessment and Additional Measures. If the ERO determines that the discovery is a potential archeological/historical resource, the archeologist, in consultation with the ERO, shall document the find, evaluate based on available information whether it qualifies as a significant historical resource under the CEQA criteria, and provide recommendations for additional treatment as warranted. The ERO will consult with Public Works and the qualified archeologist on these recommendations and may require implementation of additional measures as set forth below in Archeological Measures II and III, such as preparation and implementation of an Archeological Monitoring Plan, an Archeological Testing Plan, and/or an Archeological Data Recovery Plan, and including associated research designs, descendant group consultation, other reporting, curation, and public interpretation ofresults. Report Reviews. All plans and reports prepared by an archeological consultant, as specified herein, shall be submitted first and directly to the ERO for review and comment with a copy to the Public Works and shall be considered draft reports subject to revision until final approval by the ERO.

E. Draft and Final Archeological Resources Reports. For projects in which a significant archeological resource is encountered and treated during project implementation (see Archeological Measures II and III), the archeological consultant shall submit a draft Final Archeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological testing/monitoring/data recovery program(s) undertaken, research questions addressed, and research results. Information that may put at risk any archeological resource shall be provided in a separate, removable insert within the draft final report.

Once approved by the ERO, copies of the FARR shall be distributed as follows: two copies to the applicable California Historic Information System Information Center (CHRIS), one copy to each descendant group involved in the project, and documentation to the San Francisco Planning Department of transmittal of the above copies. In addition, the Planning Department shall be provided one bound, one unbound and one unlocked, searchable PDF copy on CD of the FARR, which shall include copies of any formal site recordation forms (CA DPR 523 series) and/or National Register of Historic Places/California Register of Historical Resources nominations.

F. Other Reports. In instances of high public interest or interpretive value, the ERO may require different or additional final report content, format, and distribution than that presented above.

G. Human Remains, Associated or Unassociated Funerary Objects. Public Works shall ensure that human remains and associated or unassociated funerary objects discovered during any soils disturbing activity are treated in compliance with applicable State and federal laws. In the event of the discovery of potential human remains, the construction contractor shall ensure that construction activity within 50 feet of the find is halted and the Public Works PM, ERO, and the County Coroner are notified immediately. If the Coroner determines that the remains are of Native American origin, he/she will notify the California State Native American Heritage Commission. Subsequent consultation on and treatment of the remains shall be conducted consistent with Public Resources Code Section 5097.98 and CEQA Guidelines Section 15064.5(d), in consultation with the ERO.

Public Works Standard Archaeological Measure II: Monitoring

A. Archeological Monitoring Plan (AMP). Where an archeological field investigation to identify expected buried or submerged resources cannot reasonably be carried out during project planning/ environmental review (for example, where definitive determination would require extensive street opening prior to construction), prior to any project-related soils- disturbing activities the qualified archeologist identified under Archeological Measure I.C. shall consult with Public Works and the ERO to develop an Archeological Monitoring Plan (AMP). The AMP which will be implemented in conjunction with soil-disturbing activities during construction. Preparation and implementation of an AMP also may be required based on the results of pre-construction archeological testing or upon a discovery during construction.

The AMP shall include the following elements, at minimum:

- Historical context and research design for assessment of resource types likely to be encountered;

- Project activities to be archeologically monitored and intensity of monitoring of each type and location of project construction activity; and

- Procedures for the documentation, significance and integrity assessment, treatment, interpretation and reporting of the types of resources likely to be encountered.

B. Reporting. Whether or not significant archeological resources are encountered, the archeological consultant shall submit a written report of the findings of the monitoring program to the ERO at the end of construction (See Archeological Measure I.E [Report Reviews] and I.F. [Draft and Final Archeological Research Report]).

C. Monitoring Authorities

- The archeological monitor will have the authority to halt construction activity at the location of a suspected resource for inspection, documentation, and assessment of the need for further measures as set forth in Archeological Measure III.

- The Archeological Monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis.

- The Archeological Monitor(s) shall be present on the project site according to a schedule identified in the AMP, subject to modification upon ERO concurrence, based on findings.

D. Testing/Data Recovery. In the event of a discovery during construction, if the ERO and archeological consultant determine that the discovery is a significant resource (that is, a resource that meets the eligibility criteria of the California Register of Historic Resources or qualifies as a unique archeological resource) that will be adversely affected (that is, where the project would result in loss of data potential) or that additional investigation is required to make this determination, all applicable elements of Archeological Measure III (Archeological Testing/Data Recovery) also shall be implemented.

Public Works Standard Archaeological Measure III: Testing/Data Recovery

The following provisions apply prior to or during construction when a significant archeological resource (as defined in Measure II.D) or an archeological resource of undetermined significance is expected to be present in the work area and the ERO, in consultation with the qualified archeologist, determines that an archeological field investigation is needed to determine: a) the presence of an archeological resource, b) whether it retains depositional integrity, and c) whether it qualifies as a legally significant resource under CEQA criteria. All archeological work under this Measure will be carried out by a qualified archeologist as identified in Archeological Measure I.C. Per Archeological Measure I.J, implementation of this measure shall not exceed four weeks except at the direction of the ERO and only if this is the only

feasible means to reduce potential effects on a significant archeological find to a less- than-significant level.

A. Archeological Testing Program. If an archeological investigation is required in order to verify resource location and/ or assess the significance of the resource, the archeological consultant shall consult with the ERO to prepare and implement an Archeological Testing Plan (ATP) that identifies:

- Key research questions and associated data needs,
- Testing/ sampling methods, and
- Testing locations.

Results of testing shall be presented to ERO in a written report following Measure I.E. If, based on the archeological testing program, the archeological consultant finds and the ERO concurs that significant archeological resources may be present, Measures III.B and/or III.C below will be implemented.

B. Treatment. If the project could adversely affect a significant (CRHR-eligible) archeological resource, preservation in place is the preferred manner of mitigating impacts, as detailed in CEQA Guidelines 15126.6(b) (3)(a) and (b).

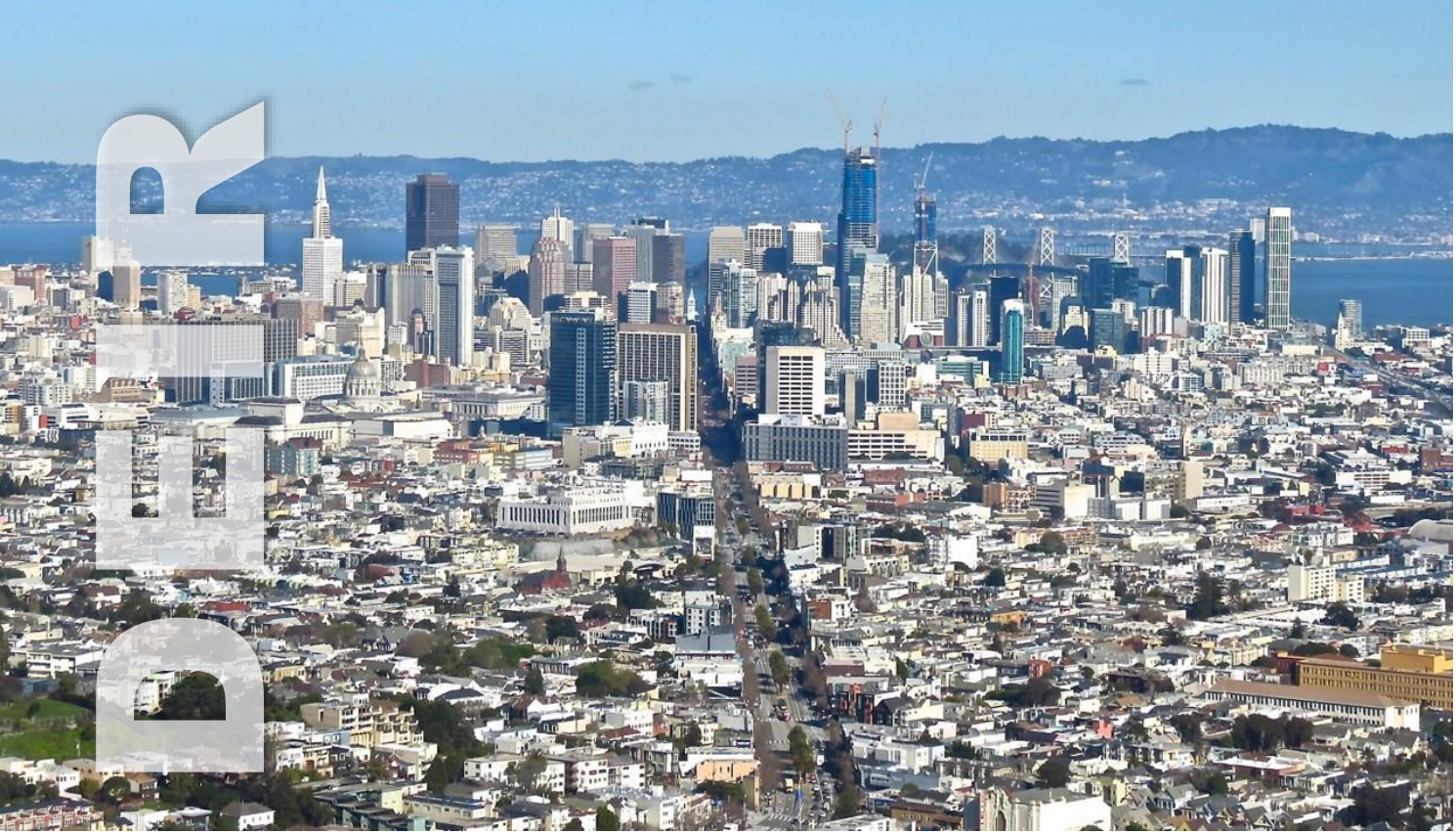
If preservation in place is determined to be infeasible, the Public Works at its discretion shall either:

- Re-design the proposed project so as to reduce the adverse effect to a less- than-significant level through preservation in place or other feasible measures; and/or
- For a resource important for its association with an important event or person, or which is of demonstrable public interest for both its scientific and historical values (e.g., a submerged ship), and where feasible, preserve the resource in
- place with appropriate documentation; or, if not feasible to preserve in place, systematically document and/or recover for interpretive use, at the discretion of the ERO, and/or;
- For an archeological resource significant primarily for its data potential, design and implement an archeological data recovery program, as detailed under Measure III.D, below.

C. Archeological Data Recovery Plan (ADRP). For resources for which the elected treatment is archeological data recovery, the archeological consultant, in consultation with the ERO, shall prepare and implement an ADRP. It will identify how the significant information the archeological resource is expected to contain will be recovered and preserved. Data recovery results will be reported in the FARR, as detailed in Measure I.F. The ADRP shall include the following elements:

- Historic context and research design
- Field methods and procedures, including sampling strategy
- Archeological monitoring recommendations for ongoing construction

- Cataloguing and laboratory analysis
- Discard, deaccession, and curation policy
- Interpretive program
- Security measures



DRAFT ENVIRONMENTAL IMPACT REPORT

Better Market Street Project EIR
APPENDIX 7: TRANSPORTATION SUPPORTING INFORMATION

PLANNING DEPARTMENT
CASE NO. 2014.0012E

STATE CLEARINGHOUSE NO. 2015012027

	Draft EIR Publication Date:	**February 27, 2019**
	Draft EIR Public Hearing Date:	**April 4, 2019**
	Draft EIR Public Comment Period:	**February 28, 2019 – April 15, 2019**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:
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christopher.thomas@sfgov.org

APPENDIX 7: TRANSPORTATION SUPPORTING INFORMATION

Better Market Street
Environmental Impact Report
Case Number 2014.0012E

Transportation Technical Appendix

Prepared for:

City and County of San Francisco
Planning Department

Prepared by:

Fehr & Peers
LCW Consulting
Parisi Transportation Consulting
CHS Consulting

January 2019

TRANSPORTATION TECHNICAL APPENDIX

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Attachment 1: Roadway Network Classifications

STREET NETWORK DESCRIPTION AND FUNCTIONAL CLASSIFICATION

Street	No. of Mixed-Flow Lanes	Direction of Travel	No. of Transit-Only Lane	Sidewalk Width	SF General Plan Classification			Bicycle Facility Class
					Transit	Vehicle	Pedestrian	
Market St, Octavia to 12th	6	EB/WB	0 to 2	16 feet	Transit Oriented	Major Arterial	Neighborhood Commercial/Citywide	II and III
Market St, 12th to 8th	2	EB/WB	2	26 feet	Transit Oriented	Transit Conflict	Neighborhood Commercial/Citywide	II
Market St, 8th to 5th	2	EB/WB	2	35 feet	Transit Oriented	Transit Conflict	Neighborhood Commercial/Citywide	III
Market St, 5th to Montgomery	2	EB/WB	0-2	35 feet	Transit Oriented	Transit Conflict	Neighborhood Commercial/Citywide	III
Market St, Montgomery to Steuart	3-4	EB/WB	0	25/35 feet	Transit Oriented	Transit Conflict	Neighborhood Commercial/Citywide	III
Mission St, Van Ness to 10th	4	EB/WB	0	15 feet	Transit Oriented	Transit Conflict	Neighborhood Commercial/Citywide	--
Mission St, 10th to Embarcadero	2-4	EB/WB	0 to 2	15 feet	Transit Oriented	Transit Conflict	Neighborhood Commercial/Citywide	--
Drumm Street	4	NB/SB	0	--	--	Major Arterial	--	--
California Street	2-4	EB/WB	0-2	--	Transit Oriented	--	Neighborhood Commercial/Citywide	--
Davis Street	3	SB	0	--	--	Major Arterial	--	--
Pine Street	2	WB	0-1 (part time)	--	Transit Important	Major Arterial	Neighborhood Commercial	--
Front Street	2-3	NB	0	--	--	--	--	--
Battery Street	3	SB	0	--	Transit Oriented	Secondary Arterial	Neighborhood Commercial	III
Bush Street	2	EB	0-1 (part time)	--	Transit Important	Major Arterial	--	--
Sansome Street	2	NB/SB	0	--	--	--	Neighborhood Commercial	III
Sutter Street	2	WB	1	--	Secondary Transit	Transit Conflict	Neighborhood Commercial	III
Montgomery Street	2	SB	0	--	--	--	--	--
Post Street	2	EB	0-1	--	Secondary Transit	--	Neighborhood Commercial	III
Kearny Street	4	NB	0	--	Transit Important	Major Arterial	--	--
Geary Street	1	WB	1	--	Transit Important	--	Neighborhood Commercial	--
Grant Avenue	2	NB	0	--	--	--	Neighborhood Commercial/Citywide	--
O'Farrell Street	2	EB	1	--	Transit Important	--	Neighborhood Commercial	--
Stockton Street	2	SB	1	--	Transit Oriented	--	Neighborhood Commercial	--

Street	No. of Mixed-Flow Lanes	Direction of Travel	No. of Transit-Only Lane	Sidewalk Width	SF General Plan Classification			Bicycle Facility Class
					Transit	Vehicle	Pedestrian	
Ellis Street	2	EB/WB	0	--	--	--	Neighborhood Commercial	--
Powell Street	0	NB/SB	2	--	Transit Oriented	--	--	--
Cyril Magnin Street	4	NB/SB	0	--	--	--	--	--
Eddy Street	2	EB	0	--	--	--	Neighborhood Commercial	--
Mason Street	1-2	SB	0-1	--	--	--	--	--
Turk Street	2	WB	0	--	--	--	--	IV
Taylor Street	3	NB	0	--	--	--	--	--
Golden Gate Avenue	3	EB	0	--	--	--	Neighborhood Commercial	II/IV
Jones Street	3-2	SB	0	--	--	Secondary Arterial	--	--
McAllister Street	2	EB/WB	0	--	Secondary Transit	Secondary Arterial	Neighborhood Commercial	III
Charles J. Brenham Pl.	3	NB/SB	0	--	--	Secondary Arterial	--	III
Hyde Street	3	SB	0	--	--	Secondary Arterial	--	--
Grove Street	2	EB/WB	0	--	--	--	--	II/III
Larkin Street	3	NB/SB	0	--	--	Secondary Arterial	--	III
Hayes Street	3	WB	0	--	--	--	--	--
Polk Street	2	SB	0	--	--	--	--	IV
Fell Street	3-2	EB	0	--	--	--	--	--
Van Ness Avenue	6	NB/SB	0	--	Transit Important	Major Arterial	Citywide	--
Franklin Street	3	NB	0	--		Major Arterial	Neighborhood Commercial	--
Page Street	2	EB/WB	0	--	Secondary Transit			III
Rose Street	1	WB	0	--	--	--	--	--
Gough Street	3	SB	0	--		Major Arterial	Neighborhood Commercial	--
Haight Street	2	WB	1	--	Secondary Transit		Neighborhood Commercial/Citywide	--
Octavia Boulevard	6	NB/SB	0	--		Major Arterial	Neighborhood Commercial	III
Steuart Street	2	NB/SB	0	--	Transit Oriented	Secondary Arterial	--	III
Spear Street	2	SB	0	--			--	--
Main Street	3	NB	0	--	Transit Important/ Oriented	Major Arterial	--	--
Beale Street	4-3	SB	0	--	Transit Important/ Oriented	Major Arterial	--	--
Fremont Street	3	NB	1	--	Transit Important	Major Arterial	--	--
First Street	2	SB	1	--	Transit Important	Major Arterial	Neighborhood Commercial	--

Street	No. of Mixed-Flow Lanes	Direction of Travel	No. of Transit-Only Lane	Sidewalk Width	SF General Plan Classification			Bicycle Facility Class
					Transit	Vehicle	Pedestrian	
Second Street	2-3	NB/SB	0	--	--	--	Neighborhood Commercial	II
New Montgomery St	2	SB	0	--	--	--	--	--
Third Street	3	NB	1	--	Transit Important	Major Arterial	Neighborhood Commercial/Citywide	--
Fourth Street	4	SB	0	--	Transit Important	Major Arterial	Neighborhood Commercial/Citywide	--
Fifth Street	4	NB/SB	0	--	--	Major Arterial	Neighborhood Commercial	III
Sixth Street	4	NB/SB	0	--	--	Major Arterial	Neighborhood Commercial	--
Seventh Street	2	NB	0	--	--	Major Arterial	Neighborhood Commercial	IV
Eighth Street	3	SB	0	--	--	Major Arterial	Neighborhood Commercial	IV
Ninth Street	4	NB	0	--	--	Major Arterial	Neighborhood Commercial	--
10th Street	4	SB	0	--	--	Major Arterial	Neighborhood Connection	III
11th Street	2	NB/SB	0	--	Secondary Transit	--	Neighborhood Connection	II
So. Van Ness Avenue	6	NB/SB	0	--	--		Citywide	--
12th Street	2	NB/SB	0	--	--	--	--	--
Gough Street	3	NB/SB	0	--	--	--	--	--
Brady Street	1	NB	0	--	--	--	--	--
Valencia Street	3	NB/SB	0	--	--	Secondary Arterial	Neighborhood Commercial	II
McCoppin Street	2	EB/WB	0	--	--	--	--	II
Otis Street	4	WB	0	--	Transit Oriented	--	Neighborhood Commercial	II

NOTES:

[a] San Francisco General Plan, Transportation Element
[b] CMP = Congestion Management Plan, MTS = Metropolitan Transportation System.
[c] Class II = bicycle lane, Class III = shared lane bicycle route.

SOURCE: SF General Plan.

Attachment 2: Traffic Volumes

Attachment 2a: All Scenarios

Better Market Street Private Auto Traffic Volumes - All Scenarios (PM Peak Period)
All study intersections

Intersection# - Consistent with Figure	Street Name	Turning Movement		2010-2012 Existing Volumes PM	2020 No Project Volumes PM	2020 Plus Project Volumes PM	Volume Difference 2020 PP - 2020 NP PM	2040 No Project Volumes PM	2040 Plus Project Volumes PM	Volume Difference 2040 PP - 2040 NP PM
1	Steuart	NB	LT	88	110	10	-100	120	20	-100
			TH	0	0	0	0	0	0	0
			RT	0	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	186	210	160	-50	240	190	-50
2	Spear	NB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	0	0	20	20	0	20	20
	Market	EB	LT	0	0	0	0	0	0	0
			TH	186	210	140	-70	240	170	-70
			RT	321	220	100	-120	240	120	-120
		WB	LT	2	0	0	0	0	0	0
			TH	86	110	10	-100	120	20	-100
			RT	0	0	0	0	0	0	0
3	Drumm-Main	NB	LT	221	210	0	-210	220	0	-220
			TH	334	440	440	0	480	500	20
			RT	89	90	0	-90	100	0	-100
		SB	LT	200	170	240	70	190	280	90
			TH	0	0	0	0	0	0	0
			RT	60	60	60	0	70	80	10
	Market	EB	LT	105	30	0	-30	30	0	-30
			TH	218	170	0	-170	190	10	-180
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	86	100	0	-100	110	10	-100
			RT	0	10	10	0	10	10	0
4	Davis-Beale	SW	LT	35	20	0	-20	20	0	-20
			TH	1263	1400	1500	100	1520	1620	100
			RT	83	40	0	-40	40	0	-40
			RT2	61	90	90	0	100	100	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	288	180	0	-180	200	10	-190
			RT	142	80	0	-80	90	0	-90
		WB	LT	0	0	0	0	0	0	0
			TH	205	210	40	-170	230	60	-170
			RT	162	160	20	-140	170	30	-140
5	Front-Fremont	NB	LT	20	20	20	0	30	40	10
			TH	1276	1020	1350	330	1090	1420	330
			RT	94	80	0	-80	90	0	-90
	Market	EB	LT	0	0	0	0	0	0	0
			TH	336	180	0	-180	200	10	-190
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	245	220	20	-200	230	30	-200
			RT	43	30	20	-10	40	30	-10
6	Battery-First	Battery - SB	LT	0	0	0	0	0	0	0
			TH	976	1150	950	-200	1260	1040	-220
			RT	0	0	0	0	0	0	0
		SB	LT	93	60	0	-60	70	0	-70
			TH	965	1250	1140	-110	1370	1260	-110
			RT	124	120	50	-70	130	50	-80
		Bush - EB	LT	0	0	0	0	0	0	0
			TH	206	280	190	-90	310	220	-90
			RT	0	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	243	120	0	-120	130	10	-120
			RT	203	170	10	-160	190	20	-170
		WB	LT	0	0	0	0	0	0	0
			TH	265	240	40	-200	260	70	-190
			RT	0	0	0	0	0	0	0
7	Sansome	Sansome - SB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	92	100	100	0	110	110	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	446	290	10	-280	320	30	-290
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	261	260	30	-230	290	60	-230
			RT	128	100	60	-40	100	60	-40
8	Second	NB	LT	16	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	193	280	0	-280	320	0	-320
	Market	EB	LT	0	0	0	0	0	0	0
			TH	253	80	10	-70	80	30	-50
			RT	307	220	10	-210	230	10	-220
		WB	LT	0	0	0	0	0	0	0
			TH	261	260	30	-230	290	60	-230
			RT	0	0	0	0	0	0	0

Better Market Street Private Auto Traffic Volumes - All Scenarios (PM Peak Period)
All study intersections

Intersection# - Consistent with Figure	Street Name	Turning Movement		2010-2012 Existing Volumes PM	2020 No Project Volumes PM	2020 Plus Project Volumes PM	Volume Difference 2020 PP - 2020 NP PM	2040 No Project Volumes PM	2040 Plus Project Volumes PM	Volume Difference 2040 PP - 2040 NP PM
9	Montgomery	Mont - SB	LT	0	0	0	0	0	0	0
			TH	810	1500	1300	-200	1580	1380	-200
			RT	0	0	0	0	0	0	0
		SB	LT	223	120	0	-120	130	0	-130
			TH	773	1560	1570	10	1660	1690	30
			RT	100	150	0	-150	160	0	-160
		Post - EB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	286	330	270	-60	370	310	-60
	Market	EB	LT	0	0	0	0	0	0	0
			TH	337	0	20	20	0	40	40
			RT	135	10	0	-10	30	0	-30
		WB	LT	0	0	0	0	0	0	0
			TH	277	260	30	-230	290	60	-230
			RT	0	0	0	0	0	0	0
10	Third-Kearny	Third - NB	LT	47	0	0	0	0	0	0
			TH	1701	1550	1600	50	1710	1760	50
			RT	98	0	0	0	0	0	0
		Kearny - NB	LT	386	320	330	10	370	380	10
			TH	1315	1230	1270	40	1340	1380	40
			RT	0	0	0	0	0	0	0
	Market	Market - EB	LT	0	0	0	0	0	0	0
			TH	374	10	20	10	30	40	10
			RT	0	0	0	0	0	0	0
		Geary - WB	LT	0	0	0	0	0	0	0
			TH	115	70	5	-65	80	5	-75
			RT	27	20	5	-15	20	5	-15
		Market - WB	LT	0	0	0	0	0	0	0
			TH	235	320	20	-300	360	50	-310
			RT	142	90	10	-80	100	10	-90
11	Grant-O'Farrell	O'Farrell - EB	LT	203	200	200	0	230	230	0
			TH	27	0	0	0	0	0	0
			RT	79	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	171	10	20	10	30	40	10
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	266	310	20	-290	350	50	-300
			RT	16	0	0	0	0	0	0
12	Fourth-Stockton	Stockton - SB	LT	2	0	0	0	0	0	0
			TH	943	920	920	0	970	970	0
			RT	0	0	0	0	0	0	0
			RT2	42	60	100	40	70	110	40
		Ellis - SB	LT	0	0	0	0	0	0	0
			TH	172	300	0	-300	330	0	-330
			RT	42	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	169	10	20	10	30	40	10
			RT	162	20	10	-10	30	20	-10
		WB	LT	0	0	0	0	0	0	0
			TH	293	310	20	-290	350	50	-300
			RT	0	0	0	0	0	0	0
13	Market at Powell	EB	LT	0	0	0	0	0	0	0
			TH	331	30	30	0	60	60	0
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	335	310	20	-290	350	50	-300
			RT	0	0	0	0	0	0	0
14	Fifth	NB	LT	0	0	0	0	0	0	0
			TH	496	800	700	-100	870	770	-100
			RT	109	0	0	0	0	0	0
		SB	LT	0	0	0	0	0	0	0
			TH	643	720	970	250	800	1050	250
			RT	95	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	222	30	30	0	60	60	0
			RT	52	50	40	-10	60	40	-20
		WB	LT	0	0	0	0	0	0	0
			TH	306	270	10	-260	310	40	-270
			RT	29	40	10	-30	40	10	-30
15	Mason	SB	LT	56	60	60	0	70	80	10
			RT	145	0	0	0	0	0	0
			RT2	70	70	70	0	80	80	0
	Turk	SB	LT2	0	0	100	100	0	110	110
			LT	0	0	0	0	0	0	0
			RT	0	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	218	20	10	-10	50	20	-30
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	235	240	10	-230	280	40	-240
			RT	166	30	0	-30	30	0	-30

Better Market Street Private Auto Traffic Volumes - All Scenarios (PM Peak Period)
All study intersections

Intersection# - Consistent with Figure	Street Name	Turning Movement		2010-2012 Existing Volumes PM	2020 No Project Volumes PM	2020 Plus Project Volumes PM	Volume Difference 2020 PP - 2020 NP PM	2040 No Project Volumes PM	2040 Plus Project Volumes PM	Volume Difference 2040 PP - 2040 NP PM
16	Sixth	NB	LT	0	0	0	0	0	0	0
			TH	990	1200	1240	40	1300	1340	40
			RT	77	0	0	0	0	0	0
	Taylor-Golden Gate	SB	LT2	50	50	50	0	60	60	0
			LT	0	0	0	0	0	0	0
			TH	825	980	980	0	1060	1060	0
			RT	31	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	141	20	10	-10	50	20	-30
			RT	125	240	10	-230	240	10	-230
		WB	LT	0	0	0	0	0	0	0
			TH	351	220	10	-210	260	40	-220
			RT	29	20	0	-20	20	0	-20
17	Jones	SB	LT	0	0	0	0	0	0	0
			RT	61	20	0	-20	20	0	-20
			RT2	130	130	150	20	150	170	20
	McAllister	SB	LT2	0	0	20	20	0	20	20
			LT	0	0	0	0	0	0	0
			RT	0	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	266	260	20	-240	290	30	-260
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	337	170	10	-160	210	30	-180
			RT	45	50	0	-50	50	10	-40
18	Seventh	NB	LT	91	0	0	0	0	0	0
			TH	1400	1600	1680	80	1750	1830	80
			RT	48	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	218	260	20	-240	290	30	-260
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	386	170	10	-160	210	30	-180
			RT	12	20	0	-20	20	0	-20
19	Market at UN Plaza	EB	LT	0	0	0	0	0	0	0
			TH	218	260	20	-240	290	30	-260
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	477	170	10	-160	210	30	-180
			RT	0	0	0	0	0	0	0
20	Eighth	Hyde - SB	LT	0	0	0	0	0	0	0
			TH	1380	1390	1620	230	1500	1740	240
			RT	25	30	40	10	30	40	10
		Grove - SB	LT	0	0	0	0	0	0	0
			TH	178	180	130	-50	210	160	-50
			RT	0	0	0	0	0	0	0
		Eighth - SB	LT	18	0	0	0	0	0	0
			TH	1447	1450	1750	300	1600	1900	300
			RT2	93	120	0	-120	110	0	-110
	Market	EB	LT2	0	0	0	0	0	0	0
			TH	200	260	20	-240	290	30	-260
			RT	159	160	0	-160	180	0	-180
		WB	LT2	0	0	0	0	0	0	0
			TH	477	170	10	-160	210	30	-180
			RT	0	0	0	0	0	0	0
21	Ninth	NB	LT2	119	50	0	-50	60	0	-60
			LT	1497	1750	1770	20	1930	1980	50
			RT	1496	1750	1920	170	1970	2170	200
			RT2	143	400	0	-400	450	0	-450
	Market	EB	LT	0	0	0	0	0	0	0
			TH	216	20	20	0	20	30	10
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	492	250	10	-240	280	30	-250
			RT	38	20	0	-20	20	0	-20
			RT2	40	20	0	-20	20	0	-20
22	Tenth	Polk - SB	LT	24	0	0	0	0	0	0
			TH	837	860	860	0	930	930	0
			RT	0	0	0	0	0	0	0
		Fell - SB	LT	0	0	0	0	0	0	0
			TH	887	930	900	-30	1060	1030	-30
			RT	16	70	0	-70	70	0	-70
	Market	EB	LT	0	0	0	0	0	0	0
			TH	192	20	20	0	20	30	10
			RT	281	270	320	50	310	350	40
		WB	LT	0	0	0	0	0	0	0
			TH	611	300	10	-290	340	30	-310
			RT	0	0	0	0	0	0	0
23	Eleventh	NB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	90	10	20	10	10	20	10
		SB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	0	0	0	0	0	0	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	383	280	320	40	320	360	40
			RT	50	120	30	-90	140	30	-110
		WB	LT	0	0	0	0	0	0	0
			TH	627	370	10	-360	410	30	-380
			RT	0	0	0	0	0	0	0

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24	Van Ness	NB	LT	0	0	0	0	0	0	0
			TH	1725	1830	1830	0	1930	1950	20
			RT	116	120	0	-120	140	0	-140
		SB	LT	0	0	0	0	0	0	0
			TH	1173	1280	980	-300	1390	1090	-300
			RT	188	230	400	170	250	420	170
	Market	EB	LT	0	0	0	0	0	0	0
			TH	317	280	350	70	320	390	70
			RT	40	40	40	0	40	40	0
		WB	LT	0	0	0	0	0	0	0
			TH	544	320	10	-310	340	30	-310
			RT	83	50	0	-50	70	0	-70
25 and 26	Twelfth-Franklin	NB	LT2	15	0	0	0	0	0	0
			LT	0	0	0	0	0	0	0
			RT	0	0	0	0	0	0	0
			RT2	12	10	20	10	10	20	10
	Page	SB	LT	24	20	20	0	20	20	0
			TH	59	50	0	-50	60	10	-50
			RT	5	10	10	0	10	10	0
	Market	EB	LT2	34	60	60	0	70	70	0
			LT	885	1000	1000	0	1100	1100	0
			TH	286	260	370	110	290	400	110
			RT	49	60	60	0	60	60	0
		WB	LT	0	0	0	0	0	0	0
			TH	654	470	350	-120	510	390	-120
			RT	40	40	30	-10	40	30	-10
			RT2	38	40	30	-10	40	30	-10
27	Gough	NB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	91	120	120	0	140	140	0
		SB	LT	49	40	40	0	50	50	0
			TH	697	760	840	80	840	920	80
			RT	671	790	1000	210	860	1070	210
			RT2	92	100	100	0	110	110	0
	Market	EB	LT	0	0	0	0	0	0	0
			TH	1114	1220	1330	110	1330	1440	110
			RT	77	100	100	0	110	110	0
		WB	LT	0	0	0	0	0	0	0
			TH	578	420	310	-110	460	350	-110
			RT	96	60	50	-10	60	50	-10
28	Valencia	NB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	291	450	390	-60	480	420	-60
	Market	EB	LT	0	0	0	0	0	0	0
			TH	900	870	1040	170	960	1130	170
			RT	30	130	160	30	140	170	30
		WB	LT	334	470	500	30	500	530	30
			TH	915	740	810	70	820	890	70
			RT	0	0	0	0	0	0	0
29	Octavia	NB	LT	0	0	0	0	0	0	0
			TH	1635	1780	1780	0	1950	1950	0
			RT	99	270	270	0	290	290	0
		SB	LT	0	0	0	0	0	0	0
			TH	1701	2010	2010	0	2240	2240	0
			RT	38	50	200	150	60	210	150
	Market	EB	LT	74	260	210	-50	290	240	-50
			TH	831	730	930	200	810	1010	200
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	885	690	780	90	760	850	90
			RT	30	50	30	-20	60	40	-20
30	Embarcadero	NB	LT	0	0	0	0	0	0	0
			TH	2551	2920	2920	0	3340	3340	0
			RT	0	0	0	0	0	0	0
		SB	LT	0	0	0	0	0	0	0
			TH	1687	1850	1860	10	2000	2010	10
			RT	195	220	220	0	230	230	0
	Mission	EB	LT	84	180	260	80	190	270	80
			TH	0	0	0	0	0	0	0
			RT	195	200	210	10	220	230	10
31	Steuart	SB	LT	79	80	70	-10	90	80	-10
			TH	78	90	70	-20	110	90	-20
			RT	29	40	20	-20	40	20	-20
	Mission	EB	LT	33	50	0	-50	60	10	-50
			TH	206	290	390	100	310	410	100
			RT	64	20	30	10	20	30	10
		WB	LT	21	70	70	0	70	70	0
			TH	112	80	120	40	90	130	40
			RT	55	60	10	-50	60	10	-50
32	Spear	SB	LT	44	30	10	-20	30	10	-20
			TH	249	170	90	-80	190	110	-80
			RT	60	30	10	-20	30	10	-20
	Mission	EB	LT	0	0	20	20	0	20	20
			TH	259	330	410	80	360	440	80
			RT	172	160	180	20	180	200	20
		WB	LT	47	10	10	0	10	10	0
			TH	94	110	130	20	120	140	20
			RT	0	0	10	10	0	10	10

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33	Main	NB	LT	194	210	190	-20	230	210	-20
			TH	430	530	280	-250	570	320	-250
			RT	79	120	180	60	140	200	60
	Mission	EB	LT	64	80	50	-30	90	60	-30
			TH	348	370	430	60	400	460	60
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	98	100	120	20	110	130	20
			RT	68	50	30	-20	50	30	-20
34	Beale	SB	LT	51	30	30	0	30	30	0
			TH	1227	1320	1340	20	1440	1450	10
			RT	151	150	150	0	160	160	0
	Mission	EB	LT	0	0	0	0	0	0	0
			TH	361	420	450	30	460	490	30
			RT	173	130	140	10	140	150	10
		WB	LT	51	30	30	0	30	30	0
			TH	241	280	280	0	310	310	0
			RT	0	0	0	0	0	0	0
35	Fremont	NB	LT	142	80	60	-20	80	60	-20
			TH	1124	820	1040	220	870	1090	220
			RT	77	60	60	0	70	70	0
	Mission	EB	LT	15	20	30	10	20	30	10
			TH	457	490	530	40	530	570	40
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	303	360	340	-20	390	370	-20
			RT	89	70	90	20	80	100	20
36	First	SB	LT	57	60	60	0	60	60	0
			TH	1002	1240	990	-250	1360	1100	-260
			RT	190	200	180	-20	220	200	-20
	Mission	EB	LT	0	0	0	0	0	0	0
			TH	415	450	500	50	490	540	50
			RT	283	370	410	40	400	460	60
		WB	LT	11	10	10	0	10	10	0
			TH	434	430	390	-40	460	420	-40
			RT	0	0	0	0	0	0	0
37	Second	NB	LT	159	0	0	0	0	0	0
			TH	145	210	50	-160	240	70	-170
			RT	135	120	200	80	140	220	80
		SB	LT	19	10	10	0	10	10	0
			TH	273	50	70	20	60	70	10
			RT	59	100	10	-90	110	20	-90
	Mission	EB	LT	7	10	10	0	10	10	0
			TH	489	590	620	30	650	680	30
			RT	181	50	50	0	50	50	0
		WB	LT	4	0	0	0	0	0	0
			TH	532	550	610	60	580	640	60
			RT	142	140	20	-120	160	40	-120
38	N. Mont	SB	LT	110	30	30	0	30	30	0
			TH	736	1600	1610	10	1720	1730	10
			RT	166	110	100	-10	120	110	-10
	Mission	EB	LT	0	0	0	0	0	0	0
			TH	567	620	650	30	680	710	30
			RT	245	300	270	-30	350	320	-30
		WB	LT	88	10	10	0	10	10	0
			TH	662	640	610	-30	700	670	-30
			RT	0	0	0	0	0	0	0
39	Third	NB	LT	103	290	350	60	320	380	60
			TH	1592	1430	1410	-20	1600	1580	-20
			RT	196	270	270	0	300	300	0
	Mission	EB	LT	46	50	80	30	50	80	30
			TH	616	650	650	0	730	730	0
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	576	580	500	-80	630	550	-80
			RT	252	110	150	40	120	160	40
40	Fourth	SB	LT	114	180	170	-10	190	180	-10
			TH	1079	960	700	-260	1040	750	-290
			RT	131	200	150	-50	210	160	-50
	Mission	EB	LT	0	0	0	0	0	0	0
			TH	548	520	560	40	590	630	40
			RT	186	180	200	20	180	200	20
		WB	LT	15	40	40	0	40	40	0
			TH	691	850	830	-20	920	900	-20
			RT	0	0	0	0	0	0	0
41	Fifth	NB	LT	8	10	10	0	10	10	0
			TH	346	500	420	-80	550	470	-80
			RT	174	130	130	0	140	140	0
		SB	LT	96	100	150	50	110	160	50
			TH	489	560	680	120	630	740	110
			RT	116	120	190	70	130	200	70
	Mission	EB	LT	9	10	10	0	10	10	0
			TH	621	660	680	20	740	760	20
			RT	196	210	230	20	240	260	20
		WB	LT	10	10	10	0	10	10	0
			TH	597	670	670	0	730	730	0
			RT	226	270	250	-20	290	270	-20

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42	Sixth	NB	LT	0	0	0	0	0	0	0
			TH	937	990	990	0	1080	1080	0
			RT	65	70	70	0	80	80	0
		SB	LT	0	0	0	0	0	0	0
			TH	939	1240	1030	-210	1310	1100	-210
			RT	117	110	90	-20	130	110	-20
	Mission	EB	LT	5	10	20	10	10	20	10
			TH	694	740	780	40	830	870	40
			RT	201	180	200	20	190	210	20
		WB	LT	4	10	10	0	10	10	0
			TH	554	560	600	40	620	660	40
			RT	133	200	230	30	210	240	30
43	Seventh	NB	LT	88	80	80	0	90	90	0
			TH	1394	1520	1590	70	1660	1730	70
			RT	130	180	180	0	210	210	0
	Mission	EB	LT	5	10	10	0	10	10	0
			TH	748	730	800	70	800	870	70
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	551	640	650	10	720	730	10
			RT	150	80	90	10	90	100	10
44	Eighth	SB	LT	260	250	200	-50	280	230	-50
			TH	1310	1370	1580	210	1520	1710	190
			RT	187	180	160	-20	190	170	-20
	Mission	EB	LT	0	0	0	0	0	0	0
			TH	498	510	630	120	550	670	120
			RT	204	180	210	30	210	240	30
		WB	LT	4	0	0	0	0	0	0
			TH	598	670	680	10	750	760	10
			RT	0	0	0	0	0	0	0
45	Ninth	NB	LT	49	70	70	0	70	70	0
			TH	2824	3420	3160	-260	3830	3570	-260
			RT	106	110	180	70	120	190	70
	Mission	EB	LT	3	0	0	0	0	0	0
			TH	619	590	690	100	650	750	100
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	515	520	510	-10	600	590	-10
			RT	297	360	360	0	380	380	0
46	Tenth	SB	LT	338	290	320	30	330	360	30
			TH	1685	1790	1770	-20	1990	1960	-30
			RT	128	130	140	10	150	160	10
	Mission	EB	LT	0	0	0	0	0	0	0
			TH	299	330	400	70	350	420	70
			RT	68	80	100	20	90	110	20
		WB	LT	8	10	10	0	10	10	0
			TH	550	570	560	-10	650	640	-10
			RT	0	0	0	0	0	0	0
47	Eleventh	NB	LT	132	180	180	0	200	200	0
			TH	95	70	80	10	80	90	10
			RT	92	100	100	0	110	110	0
		SB	LT	56	30	20	-10	30	20	-10
			TH	139	170	130	-40	210	150	-60
			RT	88	170	150	-20	180	160	-20
	Mission	EB	LT	8	10	10	0	10	10	0
			TH	211	290	390	100	310	410	100
			RT	44	50	50	0	60	60	0
		WB	LT	0	0	0	0	0	0	0
			TH	604	640	640	0	730	730	0
			RT	80	70	70	0	80	80	0
48	Van Ness	NB	LT	0	0	0	0	0	0	0
			TH	874	980	860	-120	980	860	-120
			RT	77	80	180	100	90	190	100
		SB	LT	0	0	0	0	0	0	0
			TH	1146	1220	920	-300	1320	1020	-300
			RT	107	140	140	0	150	150	0
	Mission	EB	UT	67	80	80	0	80	80	0
			LT	801	800	800	0	910	910	0
			TH	204	300	300	0	320	320	0
			RT	111	110	110	0	130	130	0
		WB	LT	150	140	140	0	140	140	0
			TH	488	660	640	-20	760	740	-20
			RT	196	200	200	0	220	220	0
49	Mission	NB	LT	0	0	0	0	0	0	0
			TH	695	760	760	0	860	860	0
			RT	423	460	460	0	520	520	0
		SB	UT	73	90	90	0	110	110	0
			LT	721	830	860	30	930	960	30
			TH	399	430	460	30	470	500	30
			RT	135	150	160	10	170	180	10
	Thirteenth Street	EB	LT	0	0	0	0	0	0	0
			TH	538	590	590	0	630	630	0
			RT	37	50	50	0	50	50	0
		WB	LT	0	0	0	0	0	0	0
			TH	567	630	610	-20	710	690	-20
			RT	415	440	440	0	480	480	0

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50	Gough	SB	LT	0	0	0	0	0	0	0
			TH	729	800	880	80	890	970	80
			RT	15	30	30	0	30	30	0
	McCoppin	EB	LT	11	10	10	0	10	10	0
			TH	0	0	0	0	0	0	0
			RT	89	100	100	0	110	110	0
	Otis	WB	LT	508	600	590	-10	680	670	-10
			TH	55	160	150	-10	180	170	-10
			RT	73	110	110	0	120	120	0
51	Cyril Magnin	NB	LT	465	500	430	-70	540	460	-80
			TH	173	200	280	80	220	310	90
			RT	118	140	0	-140	150	0	-150
		SB	LT	61	70	0	-70	80	0	-80
			TH	0	0	0	0	0	0	0
			RT	47	50	140	90	60	160	100
	Ellis	WB	LT	0	0	0	0	0	0	0
			TH	106	120	120	0	130	130	0
			RT	29	30	30	0	30	30	0
52	Grant	NB	LT	117	120	120	0	140	140	0
			TH	96	90	90	0	100	100	0
			RT	0	0	0	0	0	0	0
		SB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	144	170	170	0	190	190	0
	Geary	WB	LT	0	0	0	0	0	0	0
			TH	320	340	430	90	390	470	80
			RT	32	60	90	30	70	100	30
53	Grant	NB	LT	0	0	0	0	0	0	0
			TH	67	90	140	50	100	150	50
			RT	140	60	40	-20	70	50	-20
		SB	LT	74	40	40	0	50	50	0
			TH	51	60	60	0	70	70	0
			RT	0	0	0	0	0	0	0
	Post	EB	LT	135	160	190	30	170	200	30
			TH	506	380	330	-50	400	350	-50
			RT	85	110	110	0	120	120	0
54	Kearny	NB	LT	0	0	0	0	0	0	0
			TH	1386	1220	1220	0	1320	1320	0
			RT	34	30	40	10	40	50	10
	Post	EB	LT	197	180	180	0	190	190	0
			TH	409	300	230	-70	330	260	-70
			RT	0	0	0	0	0	0	0
55	Stockton	SB	LT	57	30	70	40	40	80	40
			TH	768	690	790	100	730	830	100
			RT	0	0	0	0	0	0	0
	O'Farrell	EB	LT	0	0	0	0	0	0	0
			TH	405	170	280	110	190	300	110
			RT	251	230	260	30	240	270	30
56	Mason	NB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	0	0	100	100	0	110	110
		SB	LT	310	350	350	0	390	390	0
			TH	143	80	80	0	90	100	10
			RT	0	0	0	0	0	0	0
	Eddy	EB	LT	0	0	0	0	0	0	0
			TH	311	370	450	80	410	490	80
			RT	123	50	50	0	60	60	0
57	Jones	NB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	0	0	20	20	0	20	20
		SB	LT	449	450	390	-60	480	420	-60
			TH	176	90	100	10	100	110	10
			RT	0	0	0	0	0	0	0
	Golden Gate	EB	LT	0	0	0	0	0	0	0
			TH	586	580	510	-70	640	570	-70
			RT	76	60	50	-10	70	60	-10
58	Franklin	NB	LT	0	0	0	0	0	0	0
			TH	1220	1080	1100	20	1150	1150	0
			RT	0	0	0	0	0	0	0
	Oak	EB	LT	1071	1290	1290	0	1420	1420	0
			TH	0	0	0	0	0	0	0
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	0	0	0	0	0	0	0
			RT	41	50	50	0	50	50	0
59	Franklin	NB	LT	247	280	280	0	310	310	0
			TH	1344	1530	1550	20	1650	1650	0
			RT	528	610	610	0	660	660	0
	Fell	EB	LT	23	30	30	0	40	40	0
			TH	186	340	360	20	390	410	20
			RT	0	0	0	0	0	0	0
		WB	LT	0	0	0	0	0	0	0
			TH	51	70	70	0	90	90	0
			RT	35	40	40	0	40	40	0
60	Gough	SB	LT	53	70	70	0	90	90	0
			TH	1382	1480	1710	230	1630	1860	230
			RT	0	0	0	0	0	0	0
	Oak	EB	LT	0	0	0	0	0	0	0
			TH	1126	1220	1220	0	1330	1330	0
			RT	174	210	270	60	230	290	60

Better Market Street Private Auto Traffic Volumes - All Scenarios (PM Peak Period)
All study intersections

Intersection# - Consistent with Figure	Street Name	Turning Movement		2010-2012 Existing Volumes PM	2020 No Project Volumes PM	2020 Plus Project Volumes PM	Volume Difference 2020 PP - 2020 NP PM	2040 No Project Volumes PM	2040 Plus Project Volumes PM	Volume Difference 2040 PP - 2040 NP PM
61	Van Ness	NB	LT	0	0	0	0	0	0	0
			TH	1602	1820	1780	-40	1910	1870	-40
			RT	41	60	50	-10	90	80	-10
		SB	LT	133	0	0	0	0	0	0
			TH	1407	1450	1240	-210	1580	1360	-220
			RT	106	110	110	0	130	130	0
	Fell	EB	LT	43	50	50	0	60	60	0
			TH	700	840	820	-20	920	900	-20
			RT	41	60	100	40	70	110	40
62	First	SB	LT	0	0	0	0	0	0	0
			TH	880	1040	910	-130	1140	1010	-130
			RT	409	580	540	-40	620	580	-40
	Howard	WB	LT	400	440	440	0	480	480	0
			TH	1291	1390	1400	10	1530	1540	10
			RT	0	0	0	0	0	0	0
63	Third	NB	LT	365	350	330	-20	390	370	-20
			TH	1582	1520	1520	0	1700	1700	0
			RT	0	0	0	0	0	0	0
	Howard	WB	LT	0	0	0	0	0	0	0
			TH	1731	1840	1800	-40	2020	1980	-40
			RT	323	300	350	50	330	380	50
64	Fifth	NB	LT	84	80	80	0	90	90	0
			TH	617	550	480	-70	600	530	-70
			RT	0	0	0	0	0	0	0
		SB	LT	0	0	0	0	0	0	0
			TH	579	650	800	150	720	820	100
			RT	213	130	170	40	140	180	40
	Howard	WB	LT	187	100	100	0	110	110	0
			TH	1170	1450	1480	30	1600	1630	30
			RT	241	90	80	-10	100	90	-10
65	Howard	WB	LT	0	0	0	0	0	0	0
			TH	1014	1120	1150	30	1230	1260	30
			RT	222	240	230	-10	260	250	-10
	Seventh	NB	LT	183	210	220	10	230	240	10
			TH	1390	1540	1600	60	1700	1760	60
			RT	0	0	0	0	0	0	0
66	Howard	WB	LT	0	0	0	0	0	0	0
			TH	774	840	870	30	920	950	30
			RT	483	640	640	0	700	700	0
	Ninth	NB	LT	112	150	140	-10	170	160	-10
			TH	2377	2960	2710	-250	3320	3070	-250
			RT	0	0	0	0	0	0	0
67	Folsom	EB	LT	109	120	120	0	130	130	0
			TH	1155	1250	1250	0	1380	1380	0
			RT	127	140	140	0	150	150	0
	Second	SB	LT	114	0	0	0	0	0	0
			TH	580	430	350	-80	470	390	-80
			RT	0	0	0	0	0	0	0
		NB	LT	0	0	0	0	0	0	0
			TH	280	400	400	0	440	440	0
			RT	97	110	110	0	120	120	0
68	Folsom	EB	LT	0	0	0	0	0	0	0
			TH	1640	1800	1800	0	1980	1980	0
			RT	274	320	320	0	350	350	0
	Fourth	SB	LT	187	200	220	20	220	240	20
			TH	1397	1350	1350	0	1490	1490	0
			RT	0	0	0	0	0	0	0
69	Folsom	EB	LT	86	100	100	0	110	110	0
			TH	1555	1680	1680	0	1850	1850	0
			RT	183	200	200	0	220	220	0
	Sixth	SB	LT	153	150	130	-20	170	150	-20
			TH	827	890	1040	150	980	1130	150
			RT	0	0	0	0	0	0	0
		NB	LT	0	0	0	0	0	0	0
			TH	918	950	1050	100	1050	1150	100
			RT	359	390	390	0	430	430	0
70	Folsom	EB	LT	0	0	0	0	0	0	0
			TH	1527	1580	1580	0	1740	1740	0
			RT	151	180	180	0	200	200	0
	Eighth	SB	LT	315	330	290	-40	360	320	-40
			TH	1110	1200	1450	250	1320	1570	250
			RT	0	0	0	0	0	0	0
71	Folsom	EB	LT	0	0	0	0	0	0	0
			TH	1210	1260	1260	0	1390	1390	0
			RT	76	100	100	0	110	110	0
	Tenth	SB	LT	478	510	490	-20	560	540	-20
			TH	1864	1930	1900	-30	2120	2090	-30
			RT	0	0	0	0	0	0	0

Attachment 2b: Comparison (2015-2012)

Better Market Street Traffic Volumes - All Scenarios (PM Peak Period)
Comparision of 'Existing' Volumes to 2015 Counts

Intersection# - Consistent with Figure	Intersection# - Old	Street Name	Turning Movement		2010-2012 Existing Volumes PM	2015 Count	Difference	Difference (Intersection)	Percent Difference
4	3	Davis-Beale	SW	LT	35	47	12	-222	-10%
				TH	1263	1001	-262		
				RT	83	90	7		
				RT2	61	104	43		
		Market	EB	LT	0	0	0		
				TH	288	213	-75		
				RT	142	189	47		
			WB	LT	0	0	0		
				TH	205	248	43		
				RT	162	125	-37		
9	8	Montgomery	Mont - SB	LT	0	0	0	357	12%
				TH	810	727	-83		
				RT	0	0	0		
			SB	LT	223	185	-38		
				TH	773	906	133		
				RT	100	110	10		
			Post - EB	LT	0	0	0		
				TH	0	0	0		
				RT	286	483	197		
		Market	EB	LT	0	0	0		
				TH	337	362	25		
				RT	135	249	114		
			WB	LT	0	0	0		
				TH	277	276	-1		
				RT	0	0	0		
18	16	Seventh	NB	LT	91	124	33	-364	-17%
				TH	1400	1133	-267		
				RT	48	26	-22		
		Market	EB	LT	0	0	0		
				TH	218	142	-76		
				RT	0	0	0		
			WB	LT	0	0	0		
				TH	386	356	-30		
				RT	12	10	-2		
22	19	Tenth	Polk - SB	LT	24	10	-14	-238	-8%
				TH	837	941	104		
				RT	0	0	0		
			Fell - SB	LT	0	0	0		
				TH	887	811	-76		
				RT	16	58	42		
		Market	EB	LT	0	0	0		
				TH	192	95	-97		
				RT	281	237	-44		
			WB	LT	0	8	8		
				TH	611	450	-161		
				RT	0	0	0		
42	38	Sixth	NB	LT	0	0	0	-246	-7%
				TH	937	917	-20		
				RT	65	93	28		
			SB	LT	0	0	0		
				TH	939	913	-26		
				RT	117	49	-68		
		Mission	EB	LT	5	4	-1		
				TH	694	591	-103		
				RT	201	163	-38		
			WB	LT	4	17	13		
				TH	554	497	-57		
				RT	133	159	26		

Attachment 3: VMT Information

SF-CHAMP Existing and 2040 VMT per capita for TAZs adjacent to Market Street project area

	Residential				Office				Retail			
TAZ	Existing	% below regional avg	2040	% below regional avg	Existing	% below regional avg	2040	% below regional avg	Existing	% below regional avg	2040	% below regional avg
242	4.5	74%	3.8	76%	7.6	60%	6.9	59%	8.9	40%	9.1	38%
578	3.7	78%	3.1	81%	7.6	60%	6.9	59%	8.9	40%	9.0	38%
591	3.1	82%	2.7	83%	7.7	60%	6.9	59%	9.0	40%	8.9	39%
608	2.5	85%	2.3	86%	7.6	60%	6.7	61%	8.3	44%	8.2	44%
620	2.1	88%	1.9	88%	7.5	61%	6.6	61%	8.3	44%	7.9	46%
621	2.0	88%	1.7	89%	7.4	61%	6.5	62%	8.0	46%	7.7	47%
666	1.9	89%	1.6	90%	7.4	61%	6.3	63%	7.2	52%	7.1	51%
667	1.5	91%	1.3	92%	7.5	61%	6.5	62%	5.4	64%	5.4	63%
684	1.5	91%	1.3	92%	7.7	60%	6.7	61%	5.1	66%	4.7	68%
744	1.5	91%	1.3	92%	7.8	59%	6.6	61%	3.8	74%	3.8	74%
742	1.6	91%	1.4	91%	7.9	59%	6.7	61%	3.4	77%	3.6	75%
740	2.4	86%	1.9	88%	7.8	59%	6.1	64%	9.0	40%	8.2	44%
773	2.4	86%	2.0	88%	7.8	59%	6.1	64%	8.7	42%	7.9	46%
774	2.4	86%	2.1	87%	7.8	59%	6.2	64%	9.1	39%	8.1	45%
775	2.4	86%	2.0	88%	7.9	59%	6.2	64%	9.2	38%	8.2	44%
776	2.4	86%	2.1	87%	7.9	59%	6.2	64%	9.3	38%	8.3	43%
777	2.4	86%	2.1	87%	7.9	59%	6.2	64%	9.3	38%	8.2	44%
806	2.2	87%	1.9	88%	7.9	59%	6.2	64%	9.1	39%	8.0	45%
955	2.3	87%	2.0	88%	7.9	59%	6.2	64%	9.3	38%	8.1	45%
953	2.4	86%	2.1	87%	7.8	59%	6.2	64%	9.0	40%	8.0	45%
950	2.3	87%	2.0	88%	7.7	60%	6.1	64%	8.8	41%	7.9	46%
941	2.3	87%	2.0	88%	7.7	60%	6.1	64%	8.8	41%	8.0	45%
939	2.0	88%	1.7	89%	7.7	60%	6.1	64%	8.6	42%	8.0	45%
938	1.9	89%	1.7	89%	7.7	60%	6.1	64%	8.5	43%	7.9	46%
935	1.8	90%	1.6	90%	7.7	60%	6.1	64%	8.5	43%	8.0	45%
931	1.8	90%	1.6	90%	7.6	60%	6.1	64%	8.1	46%	7.7	47%
751	1.9	89%	1.5	91%	7.5	61%	6.1	64%	7.8	48%	7.5	49%
679	1.9	89%	1.6	90%	7.4	61%	6.1	64%	7.3	51%	7.1	51%
296	2.0	88%	1.6	90%	7.2	62%	6.2	64%	7.8	48%	7.5	49%
286	2.1	88%	1.8	89%	7.2	62%	6.5	62%	7.7	48%	7.6	48%
647	2.5	85%	2.3	86%	7.6	60%	6.8	60%	8.1	46%	8.2	44%
588	3.5	80%	3.0	81%	7.6	60%	6.9	59%	8.3	44%	8.5	42%
587	3.8	78%	3.3	80%	7.6	60%	6.9	59%	8.5	43%	8.7	40%
Regional Avg	**17.2**		**16.1**		**19.1**		**17.0**		**14.9**		**14.6**	

SOURCE: San Francisco Planning Department Transportation Information Map (TIM), http://www.sftransportationmap.org.

VMT Outputs from DTA Model
Prepared by Fehr & Peers, October 2018

Timeslice	2:30 PM	2:35 PM	2:40 PM	2:45 PM	2:50 PM	2:55 PM	3:00 PM	3:05 PM	3:10 PM	3:15 PM	3:20 PM	3:25 PM
Baseline2020	5,120	10,434	12,004	12,084	12,675	12,608	12,502	12,458	12,834	12,487	12,586	12,282
Project2020	5,107	10,409	11,989	12,177	12,706	12,660	12,505	12,555	12,912	12,593	12,542	12,386

Timeslice	3:30 PM	3:35 PM	3:40 PM	3:45 PM	3:50 PM	3:55 PM	4:00 PM	4:05 PM	4:10 PM	4:15 PM	4:20 PM	4:25 PM
Baseline2020	13,851	16,316	17,334	17,357	17,591	17,921	18,114	18,434	18,334	18,182	18,444	18,497
Project2020	13,917	16,304	17,281	17,319	17,718	17,836	18,339	18,272	18,392	18,362	18,688	18,482

Peak Hour is highlighted

Timeslice	4:30 PM	4:35 PM	4:40 PM	4:45 PM	4:50 PM	4:55 PM	5:00 PM	5:05 PM	5:10 PM	5:15 PM	5:20 PM	5:25 PM
Baseline2020	18,943	19,165	19,273	19,227	19,256	19,427	19,556	20,152	20,283	20,414	20,199	20,064
Project2020	18,992	19,177	19,368	19,288	19,311	19,491	19,601	20,095	20,211	20,457	20,255	20,217

Peak Hour is highlighted

Timeslice	5:30 PM	5:35 PM	5:40 PM	5:45 PM	5:50 PM	5:55 PM	6:00 PM	6:05 PM	6:10 PM	6:15 PM	6:20 PM	6:25 PM
Baseline2020	20,144	19,983	20,178	20,035	19,971	20,027	19,697	19,440	19,342	19,272	19,343	19,174
Project2020	20,253	19,980	20,038	19,949	20,065	20,032	19,832	19,607	19,486	19,293	19,489	19,360

Timeslice	6:30 PM	6:35 PM	6:40 PM	6:45 PM	6:50 PM	6:55 PM	7:00 PM	7:05 PM	7:10 PM	7:15 PM	7:20 PM	7:25 PM	7:30 PM
Baseline2020	16,100	13,930	12,952	12,805	12,306	11,997	11,679	11,385	11,141	11,218	11,238	11,156	7,651
Project2020	16,656	14,338	13,299	12,769	12,417	11,915	11,606	11,479	11,409	11,451	11,360	11,196	7,720

2020 Conditions VMT Summary

Peak Hour	4:45 PM
Baseline2020	238,884
Project2020	239,195
Change	0.1%

Evening Period	2:30 PM to 7:30PM
Baseline2020	978,570
Project2020	982,910
Change	0.4%

Notes:
1. Evening period is the entire DTA model period and is more reflective of the daily conditions than the PM peak hour.

Attachment 4: Parking and Loading Information

Attachment 4a: Loading Recommendations Report

SFMTA
Municipal Transportation Agency

Edwin M. Lee, *Mayor*

Cheryl Brinkman, *Chairman*
Malcolm Heinicke, *Vice-Chairman*
Gwyneth Borden, *Director*
Lee Hsu, *Director*
Joél Ramos, *Director*
Cristina Rubke, *Director*
Art Torres, *Director*

Edward D. Reiskin, *Director of Transportation*

MEMORANDUM

TO: **File**

FROM: **Ian Trout, PE, Assistant Engineer**
Aishni Rao, Student Design Trainee 3

THROUGH: **Britt Tanner, PE, Senior Engineer**
Andrea (Tig) Glerum, PE, Project Manager 2
Amy Lam, AIA, Project Manager 2

DATE: **February 22, 2018**

SUBJECT: **Better Market Street Loading and Parking Recommendations:**

EXECUTIVE SUMMARY

This memorandum discusses current loading practices on Market Street, best measures based on a literature and peer city review, and the proposed loading recommendations for the Better Market Street (BMS) project, including loading for commercial vehicles (yellow zones), passengers (white zones) and people with disabilities (especially Paratransit). To achieve BMS project goals, 42 parking spaces are proposed for removal. Overall, all the cross streets and alleyways within one block of Market Street would have the maximum possible parking spaces allocated to loading while considering existing bus zones, bike share stations, blue parking zones and passenger loading zones. There could be up to 227 commercial loading zones, eight blue accessible parking zones, and 46 white passenger loading zones added near the Market Street corridor. Most of these new zones are currently general metered parking. Paratransit data was analyzed to identify six hot spot locations where paratransit loading would need to be accommodated on Market Street. Due to site constraints and project objectives, many of the existing loading bays on Market Street would be relocated or removed. Most remaining or relocated loading zones on Market Street would be redesigned to be flex zones, which are sidewalk-level mixed-use areas, available not only to pedestrians and bicyclists but also for loading and unloading vehicles. Market Street would have time-of-day restrictions and increased enforcement for the flex zones to promote safety, improve the pedestrian experience, and maximize throughput for people walking, taking transit and riding bicycles. In addition, nighttime loading (e.g. 10 p.m. to 6 a.m.) and the use of smaller delivery vehicles on Market Street would be incentivized. This memo describes all 22 of the remaining loading zones/flex zones proposed along Market Street after completion of the BMS project. For a summary of the proposed loading and parking changes, please refer to **Table 1** below. Recommendations and next steps are outlined in order to finalize a loading and parking strategy for Market Street.

Table 1. Potential Parking Changes Overview.

Type of Parking	Potential Parking Removal with BMS Project	Potential Loss of commercial loading with Hub Variant[1]	Potential new/converted Parking with BMS Project
Existing loading bays on Market	23		
Existing metered spaces on Market Street	6		
Existing metered spaces off of Market Street	36		
Flex zones on Market Street		3	22
Commercial loading zones not on Market Street			227
White passenger loading zones not on Market Street			46
Blue accessible parking spaces not on Market Street			8

[1]spaces would be designated for paratransit vehicles and taxis.

LITERATURE REVIEW OF BEST PRACTICES FOR LOADING

A review of literature related to commercial loading best practices has provided some insight as to how to manage loading activities for the BMS project. Some potential tools to use on Market Street are the following: flex zones, time-of-day restrictions, urban consolidation centers (UCC), graduated fees for use of loading bays, stricter enforcement, and alternative last mile delivery methods (e.g. smaller delivery vehicles, bicycle delivery). While some of these practices only require more enforcement and signage, other concepts require a new sub-fleet of delivery vehicles (e.g. e-bikes, electric vehicles) or available land (UCC). Each of these tools are explained in detail in the following paragraphs.

A flex zone is essentially a space that is designed to be "available not only to pedestrians but also for loading and unloading delivery vehicles" (San Francisco County Transportation Authority, 2010). Flex zones use bollards and other design features to clearly demarcate the pedestrian space from the flexible loading area.

Time-of-day and time limit restrictions are used throughout the world, including in San Francisco, to restrict the use of a loading zone during certain hours and for a specific duration. Currently the loading zones on Market Street are restricted to 6-wheel or greater and a time limit of 30 minutes in the space. However, other restrictions used might be late-night delivery, such as between 10 p.m. and 6 a.m. only. There have been studies and reports that agree that "off-hour/off-peak deliveries not only benefit the wider transport system, by moving traffic to less congested times of day, but also improve the efficient and cost effectiveness of deliveries" (Dack, Epstein, Hodge, Segev, & Wainwright, 2015).

Other best practices charge a varying fee based on how long a delivery vehicle is parked in a space. This would increase turnover, which in turn would allow loading spaces to be available for other deliveries. The graduated fees would incentivize delivery companies to be more efficient. Stricter enforcement would need to be undertaken in order to catch violators, promote compliance with time limits, prevent double parking, and provide a fair chance for all delivery companies to access precious curb space.

A UCC is a warehouse located in a central location that is used by freight companies to sort deliveries and reorganize them into smaller vehicles to reduce 'last-mile' truck traffic in the center core. Smaller vehicles have fewer blind spots, are more maneuverable, and take up less space in urban core's congested streets. UCC's can either be run under a Public Private Partnership (PPP) or privately, as is the case with larger delivery companies such as FedEx or UPS. A UCC that is created in collaboration with the Chamber of Commerce, the City and County of San Francisco, and freight companies would be able to attract various delivery companies to a central location, where deliveries can be sorted by destination so that fewer, smaller vehicles enter the downtown area. UCC's have been implemented in several countries with varying degrees of success. France has had some success with it, as it "offers the guarantee of an available and secure unloading area close to the commercial area in the city center" (Best Urban Freight Solutions, 2007). Additional information on the literature review and the sources can be found in the Reference section.

MARKET STREET PASSENGER, BLUE ZONES, & COMMERCIAL LOADING

Market Street is the most important multi-modal corridor in San Francisco. With three levels of rail transit and over a dozen local bus routes converging on the corridor, it provides an integrated transit network with BART, AC Transit, SamTrans, Golden Gate Transit and other regional transit services and shuttles. Over 400,000 people per day travel the Market Street corridor by transit. On a typical weekend near Powell Street, over 200,000 people walk along Market Street, getting to work, going shopping, visiting museums and enjoying the sights of the city. In addition, cyclists make up a significant share of the users of Market Street, outnumbering motor vehicles at various times during the day. Many people like the vibrancy and character of Market Street and the businesses help attract people to the street. Due to the high commercial and retail activity along the corridor, commercial, and paratransit loading is important for the continued success and vitality of Market Street.

With the advent of ride hail services or Transportation Network Companies (TNCs) such as Uber or Lyft, there has been an ever-increasing need to better manage commercial and passenger loading throughout the city of San Francisco, but in particular along Market Street due to it being the backbone of the city. A San Francisco County Transportation Authority (SFCTA) DRAFT report that analyzed TNC hot spots, found that "between 20-25% of all vehicle trips in [Supervisorial] Districts 3 & 6, which includes all of SOMA/Chinatown/FiDi/Civic Center/Union Square/North Beach, are TNC's" (San Francisco County Transportation Agency, 2017). Taxi data was not looked at due to the inaccuracy of the GPS data caused by tall buildings in downtown and the age of the GPS units mounted on taxicabs. Additional white passenger loading zones would be implemented with the BMS project and are discussed further down in this section.

<u>Current Loading Bay locations and usage</u>

There are 23 loading bays within the BMS project corridor of which 20 are for commercial loading only and three are a mixture of passenger and commercial loading (see **Table 2** below). Today, commercial loading bays on Market Street are restricted to commercial vehicles with 6-wheels or more with a 30 minute time limit, but they are unmetered. Paratransit may use all loading bays along Market Street today and in current practice paratransit vehicles load from the bicycle and travel lanes along much of Market Street. A 2003 study found that there were large amounts of illegal parking at the Market Street loading bays, but "at no time is more than 50% of the available [loading bay] capacity being used" (San Francisco County Transportation Authority, 2003). An additional loading video analysis is currently

underway to get more recent data but initial trends are showing that 36% of vehicles using the loading bays are not commercial vehicles. The video data has revealed that roughly 80% of all commercial vehicles on Market Street are 30 foot long trucks (SU-30).

Table 2. Existing Loading Bays. Note that regular metered parking spaces located at Steuart Street were not included.

Block Market	Side of Street	Loading bay length (ft.)[1]	Type	Approximate capacity of SU 30' trucks[2]
12th Street to Van Ness Ave	North	140	Commercial	3
9th to 8th streets	South	80	Passenger	2
8th to 7th streets	South	60	Commercial	1
	North	65	Commercial	1
7th to McAllister	South	55	Active loading and unloading only	1
McAllister to 6th streets	North	116	Commercial	3
	South	90	Commercial	2
6th to Mason streets	North	40	Commercial	1
	South	89	Commercial	2
Mason Street Intersection	South	52	Commercial	1
5th to 4th streets	North	57	Commercial	1
	South	58	Commercial	1
4th to O'Farrell streets	North	64	Commercial	1
O'Farrell Street Intersection	South	173	Commercial/Passenger	4
O'Farrell to 3rd streets	North	62	Commercial	1
Kearny to Montgomery streets	North	55	Commercial	1
	South	110	Commercial	2
Montgomery to 2nd streets	South	56	Commercial	1
2nd to Sutter streets	North	60	Commercial	1
Battery to Front streets	North	88	Commercial	2
Fremont to Beale streets	South	72	Commercial	2
Spear to Steuart streets	North	84[3]	Commercial	2
	South	50	Commercial	1
TOTAL	**23**	**1776**		**37**

1. Measured as parallel length along roadway without transitions
2. Assuming 40 feet needed for each SU-30 for buffer and maneuvering
3. Denotes that this length does not include the bus zone located at the end of the loading bay

Location of building doors from cross street parking

A key consideration in making commercial loading recommendations for the BMS project was to identify businesses that are more than 250 feet from a cross street parking space. The presumption is that should a loading zone be removed on Market Street, the nearest cross street parking space would be designated as a loading zone if it is not already one. In 2014, data was collected to count businesses that have doors more than 250 feet away from any cross street parking space and do not have a door onto a cross street or alley (see Attachment 1 for detailed list of businesses and locations). It is important to note that a few doorways may have shifted since 2014 due to new construction or renovations. Visual observations of back doors to alleyways such as Jessie or Stevenson streets were undertaken in June 2017. A study of building plans and interviews with property owners would need to be undertaken to fully understand if a business could use their back door access to the alleyways for loading/unloading. **Table 2** notes the 85 doorways that are greater than 250 feet away from a cross street parking space (not necessarily an existing commercial loading space).

Table 2. Existing Businesses >250' from Cross Street Loading Spaces.

Block of Market Street	Side	Addresses > 250' from Loading	# of Doorways
11th and 10th streets	North	1440 Market St	1
10th and 9th streets	South	1355 Market St	2
9th and 8th streets	South	1231 Market St	2
	North	between 1240-1254 Market St	4
8th and 7th streets	South	between 1117-1155 Market St	8
	North	1170 Market St	1
7th and 6th streets	South	between 1025-1073 Market St	10
6th and 5th streets	South	between 923-969 Market St	4
5th and 4th streets	South	between 815-871 Market St	12
	North	between 830-890 Market St	9
4th and 3rd streets	South	between 731-767 Market St	8
	North	726 Market St	4
3rd and New Montgomery streets	South	between 665-685 Market St	6
	North	between 650-690 Market St	7
New Montgomery and Sutter streets	South	575 Market St	1
	North	between 570-590 Market St	6

Table 2 above depicts businesses that could be more effected by the BMS project proposals for removal of loading bays due to their location away from a cross street. Many of the businesses listed in **Table 2** and **Figure 1** and **Figure 2** below are close to existing loading bays along Market Street. Targeted outreach, in addition to the general project-wide outreach, would need to be done to these businesses in order to try to accommodate their loading/unloading needs. Figures 1 and 2 show where existing loading bays are on Market Street and the 85 doorways that are located greater than 250 feet from a cross street parking space.

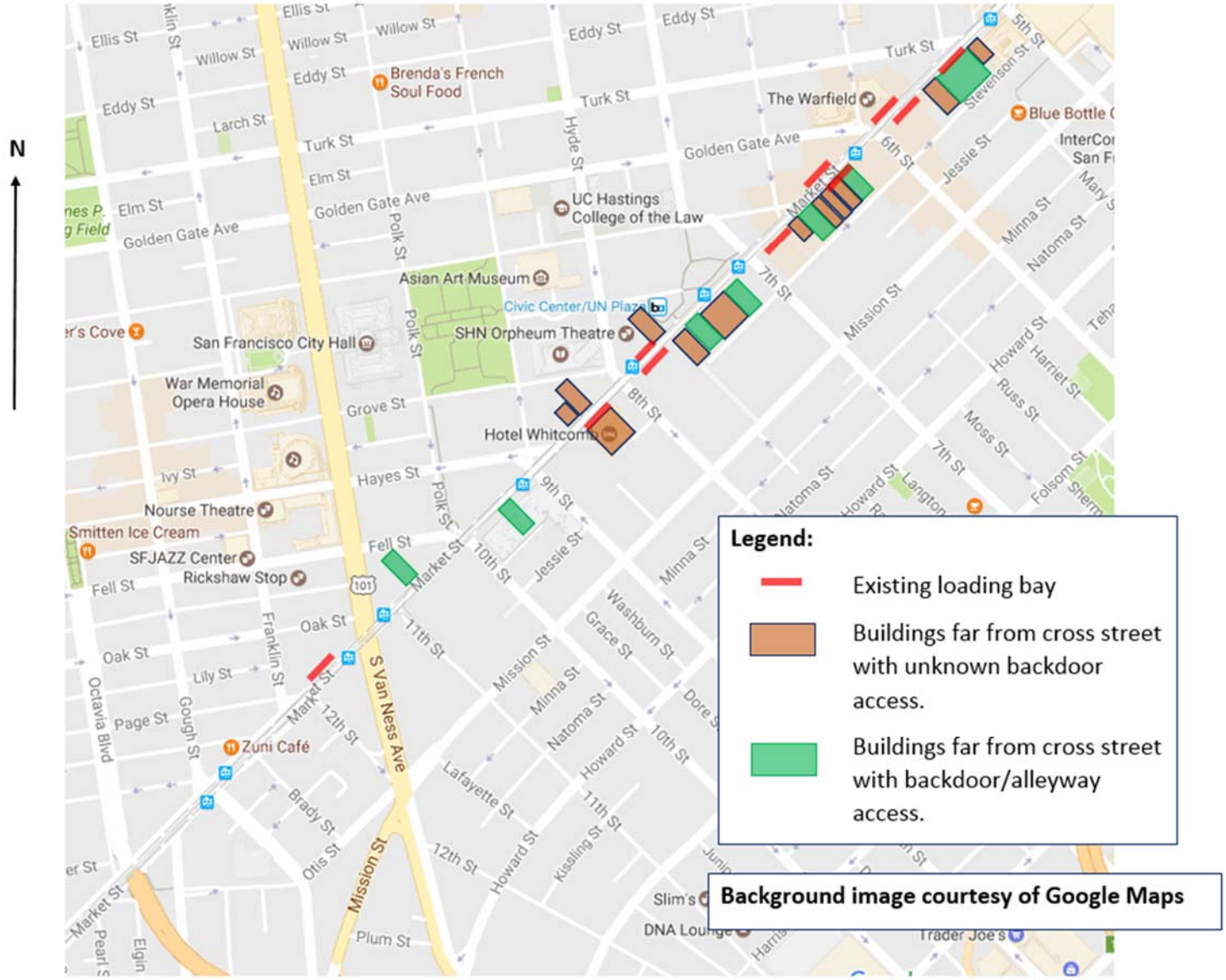

Figure 1. Buildings with entryways more than 250 feet from cross street parking space, and existing parking/loading bays from Octavia to 5th streets

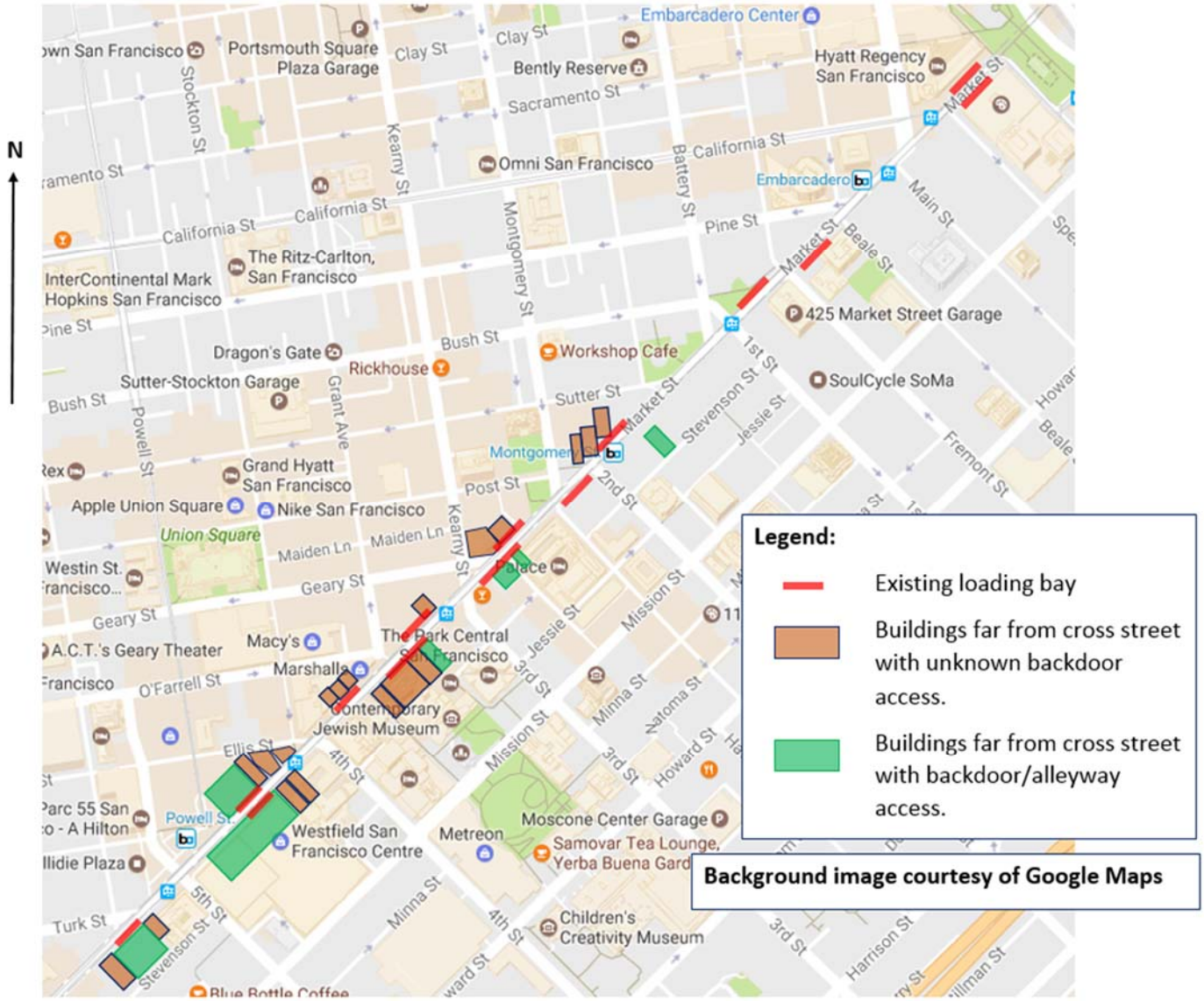

Figure 2. Businesses with entryway greater than 250 feet from cross street parking space, and existing parking/loading bays from 5th to Steuart streets

Proposed changes on the side streets to accommodate daylighting, project objectives, and bus zones.
The City and County of San Francisco has adopted the Vision Zero policy to eliminate traffic fatalities by 2024. One of the traffic engineering tools to achieve this policy goal is daylighting intersections so that pedestrians waiting at the corner are more visible to motorists. This is done by removing the parking space closest to the intersection so that pedestrians are not visually blocked by a parked vehicle. **Table 3** below lists the side streets and the metered spaces that could be removed for daylighting and also describes other parking removal due to the BMS project.

Table 3. Potential Parking Removal in the area near to Market Street

Street name	From Cross street	To Cross street	Side of street	Removal of yellow zone	Removal of general parking space	Notes
Spear	Market	Mission	East	12		1 space for blue zone & 11 for new Muni layover
Market	Spear	Steuart	North		6	Used today by art/street vendors
Main	Market	Mission	West	1		For proposed bulb-out at Market St
Davis	California	Market	West		1	For daylighting at Market St
Pine	Market	Front	North	2		For daylighting at Market and Front
Pine	Market	Front	South	1	1	For daylighting at Market and Front
Beale	Market	Mission	West	1		For daylighting at Market and Beale
Battery	Market	Pine	East	1		For daylighting at Market/Bush/Battery
1st	Market	Mission	East	1		For proposed bulb-out at Market
Sutter	Market	Montgomery	South	1		For daylighting at Montgomery and Sutter
Post	Market	Kearny	North	1		For daylighting at Montgomery/Post/Market
Post	Market	Kearny	South	1		For daylighting at Montgomery/Post/Market
Grant	Market	Geary	West	2		For daylighting at Grant and Geary
Jessie	4th	Jessie St East	South		1	Shift motorcycle spaces to daylight 4th/Jessie
Mason	Market	Eddy	East	2		For daylighting at Eddy and Mason
McAllister	Market	Leavenworth	North		3	For proposed boarding island
Jones	Golden Gate	Market	West		1	To create three 25' yellow zones
Hayes	Market	Polk	South		1	For daylighting Polk and Hayes
Valencia	Market	McCoppin	West	1		For daylighting McCoppin and Valencia
Valencia	Market	McCoppin	East		1	For proposed traffic calming island
TOTAL POTENTIAL REMOVED PARKING SPACES				**27**	**15**	

Capacity on the side streets to accommodate commercial loading activities.

Currently the cross streets that intersect Market Street have varying curbside parking allocations. These include blue zones, yellow zones, white zones, and regular metered spaces. Blue accessible parking zones are designated for disabled persons with a disabled parking placard, yellow zones are meant for commercial loading/unloading (3 min active loading is allowed for all vehicles) and can be limited to trucks with 6-wheels or more, and white zones represent areas where passenger loading/unloading,

including Paratransit loading occurs (5 min max). Several of the white zones on the side streets were installed as part of the Safer Market Street (SMS) project to provide space for informal drop offs/pickups since TNCs and regular motorists were prohibited from turning onto Market Street. **Figure 3** and **Figure 4** below detail the type of parking on the cross streets near Market Street as of April 2014. These figures depict metered parking spaces, motorcycle parking, yellow commercial metered parking, general metered parking, short term green metered parking, and blue accessible parking near the BMS corridor area.

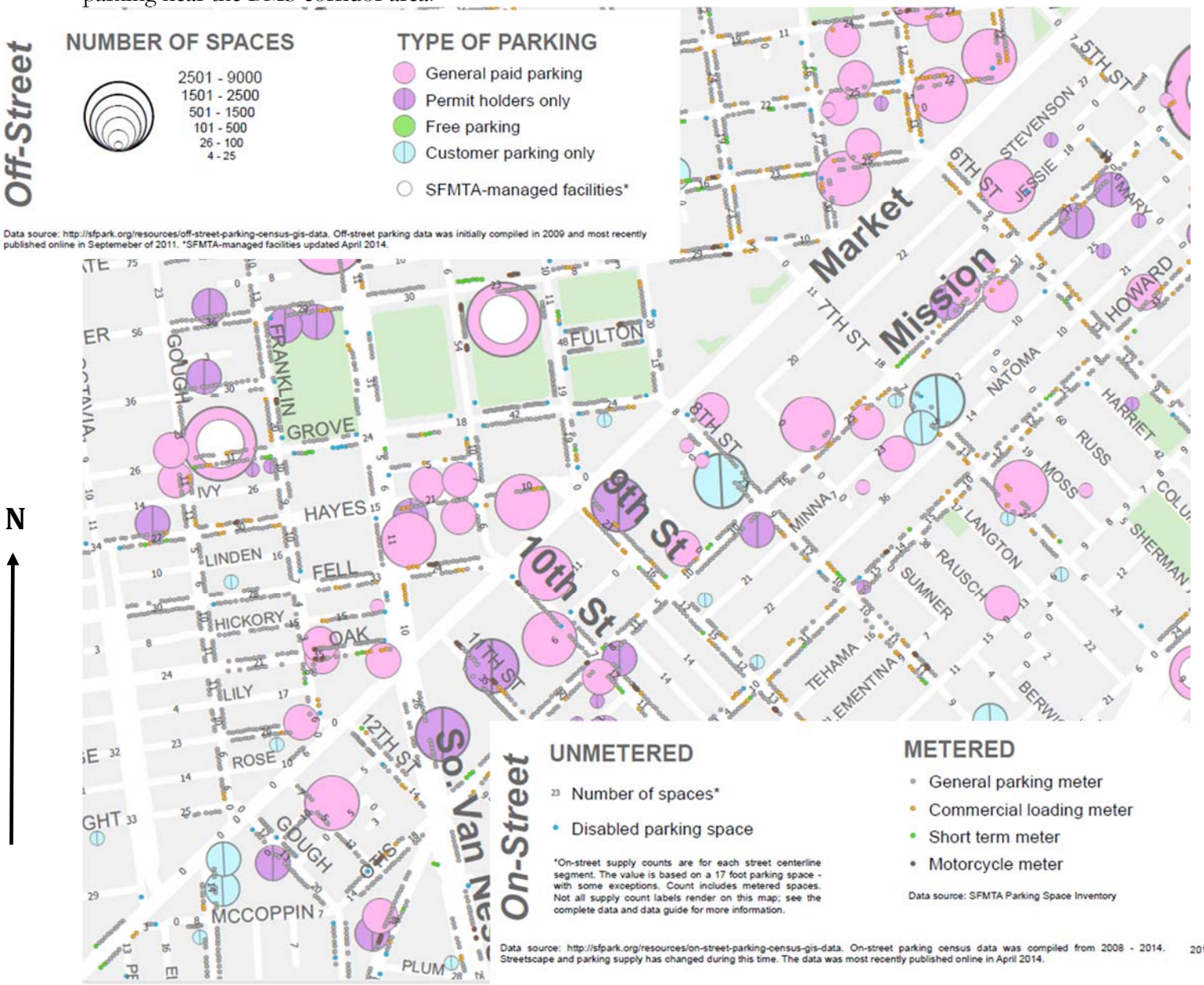

Figure 3. 2014 Parking census map, including metered loading zones – Market Street, from Octavia to 5th streets.

The side streets along Market Street also have truck deliveries; a more detailed occupancy study would need to be undertaken to determine if existing yellow loading zones along cross streets would able to

absorb the additional commercial loading demand created by the removal of some loading bays along Market Street. In total, there are approximately 1350 metered spaces within a block of Market Street.

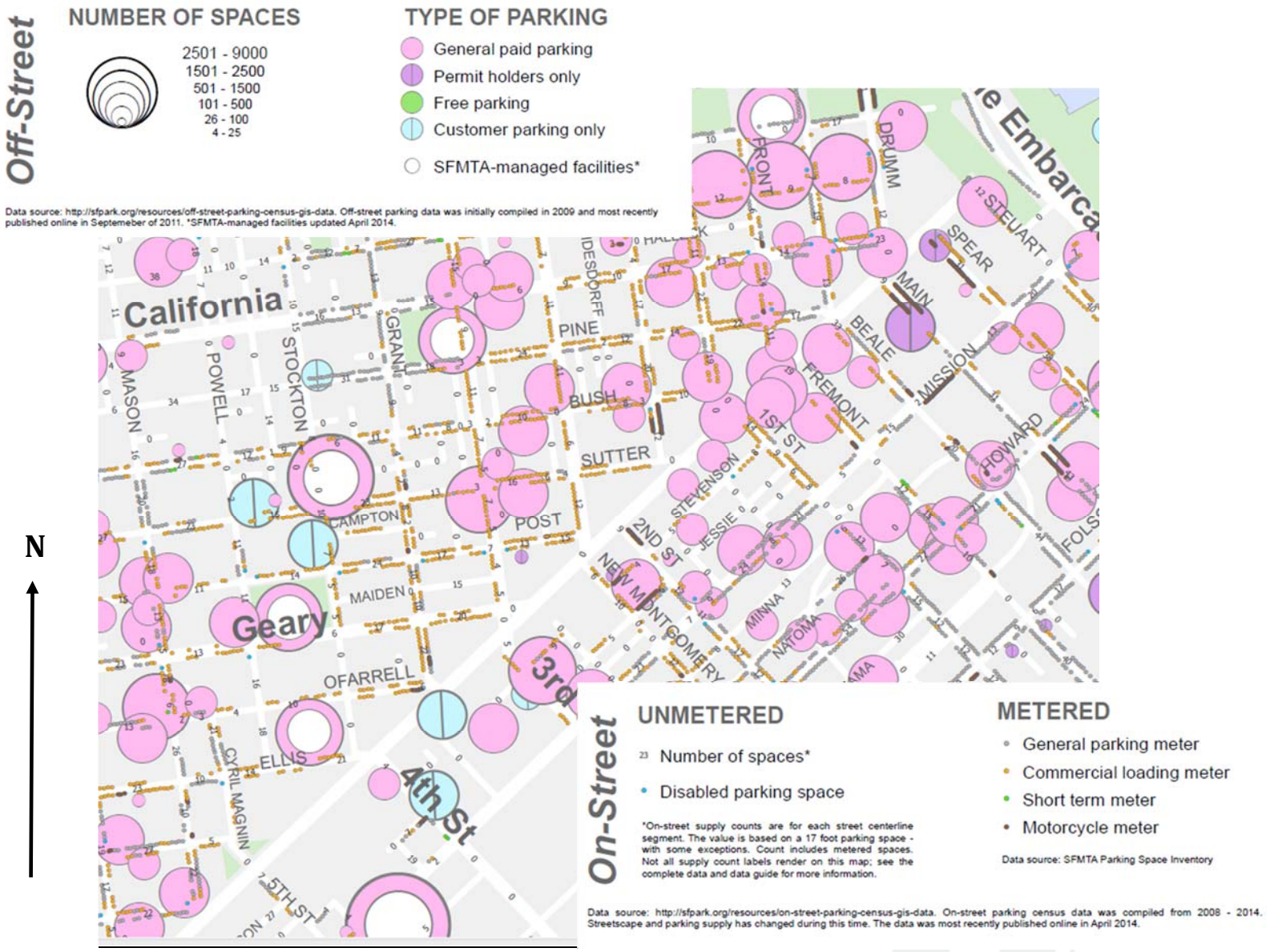

Figure 4. 2014 Parking census map, including metered loading zones --Market Street, from 5th to Steuart streets.

Please note that neither figure shows unmetered commercial loading zones as they are not differentiated between regular unmetered parking spaces. The 2014 census map gives the visual confirmation that there is a small amount of general metered parking spaces east of 5th Street (grey circles) and that there is a large amount of off-street parking (large circles). An important note is that since 2014 many of these cross streets have had their parking spaces changed for various reasons, such as sidewalk widening, addition of bike share stations, the SMS project, the 2nd Street improvement

project, etc. This reports' recommendations use the most current information that the SFMTA has on parking, which dates from May 2017.

As of May 2017 there are 29 cross streets in the project area that could have parking spaces converted into commercial loading spaces. The 32 other cross streets are already commercial loading zones, bus zones, do not have any parking spaces, or have motorcycle spaces. In addition, there are alleyways such as Jessie, Stevenson, and Annie streets that could accommodate additional commercial loading zones. Alleyways may not be able to accommodate larger commercial vehicles, but would be well suited for smaller vehicles that conduct freight activates. Whilst many commercial loading spaces in downtown are only 20-22 feet long, that is not long enough for an SU-30 to park. This leads to larger commercial vehicles either double parking or taking up multiple 20-22 foot commercial loading spaces. Given the wide variety of commercial vehicle lengths and variety of vehicles that a commercial space can serve, this report proposes minimal existing commercial loading zone resizing. **Table 4** below notes all the side street locations in more detail and gives the maximum possible number of spaces that could be converted to commercial loading. The analysis went a block in either direction from Market Street (e.g. north to next cross street, or south to Mission Street).

Table 4. Potential Additional Commercial Loading on Side Streets or Alleys

Street name	Side of street	Notes on restrictions	Parking spaces which may be converted to commercial[1]	Other notes
The Embarcadero (Washington to Don Chee)	West	Tow-away No Stopping Anytime between 7 to 9 a.m. & 3 to 6 p.m. (tow-away lane) Mon thru Fri	24	Potential spaces for art vendor loading/unloading
Drumm Street, (Market to Sacramento)	West		3	Replace spaces taken for white zone on block face
California Street (Drumm to Davis)	South		6	Cable Car line & layover
Main Street (Market to Mission)	West		2	Make these 6-wheel commercial
Beale Street (Market to Mission)	East		5	Spaces are between bike share station & 6-wheel commercial spaces
Davis Street (Market to California)	West	Tow-away No Stopping Anytime between 3 to 7 p.m. (Muni Richmond Express routes) Mon thru Fri	3	
Pine Street (Market to Front)	North	Tow-away No Stopping Anytime between 3 to 7 p.m. (Muni Richmond Express routes) Mon thru Fri	1	
Pine Street (Market to Front)	South		4	
Montgomery Street (Market to Sutter)	East		8	

Street name	Side of street	Notes on restrictions	Parking spaces which may be converted to commercial[1]	Other notes
Montgomery Street (Market to Sutter)	West	Tow-away No Stopping Anytime between 7 to 9 a.m. & 3 to 7 p.m. Mon thru Fri	11	Would remove the tow-away only
Stevenson Street (3rd to Annie streets)	North		2	Would need to be cognizant about large vehicle access.
Annie Street (Stevenson to Jessie)	East	Currently, the entire street is Tow-Away No Parking Anytime (narrow dead-end street)	Approximately 4	Recommend removing Tow-Away due to adequate street width. Would need to be cognizant about large vehicle access.
Grant Avenue (Market to Geary)	East		2	Replace spaces taken for daylighting on same block
Jessie Street (4th to 5th streets)	South	These spaces are Tow-Away No Parking Anytime, 12 a.m. to 10 a.m., Daily (morning loading dock activity)	2 spaces close to 4th and 4 spaces close to 5th	Would need to be cognizant about large vehicle access.
Eddy Street (Cyril Magnin to Mason)	South	Tow-away No Stopping Anytime between 3 to 6 p.m. (Former Muni 7X Express PM Layover) Mon thru Fri	2	Layover is no longer needed, so can make them 7 a.m.-6 p.m.
Stevenson Street (5th to 7th streets)	South	Currently 1 hour time limit, 7 a.m. to 6 p.m. Mon thru Sat	30-40	Non-metered blocks. Would need to be cognizant about large vehicle access.
Mason Street (Market to Eddy)	East		3	
Taylor Street (Market to Turk)	East		2	
Golden Gate Ave (Market to Jones)	North		2	Next to the Golden Gate Theatre and existing yellow zones
Golden Gate Ave (Market to Jones)	South		4	
Jones Street (Market to Golden Gate)	East		2	North of existing white zone
Jones Street (Market to Golden Gate)	West		3	In front of the old Hibernia Bank
McAllister Street (Market to Charles J. Brenham)	South		2	In front of Old Renoir Hotel
Stevenson Street (Angelo's Alley to 7th Street)	North	Currently 2-hour time limit 7 a.m. to 6 p.m. Mon thru Sat. Before November 2009, there were meters.	Approximately 20	US Federal Building on south side of Street
Hyde Street (Market to Fulton)	West	Spaces are reserved for Farmer's Market permit	4	

Street name	Side of street	Notes on restrictions	Parking spaces which may be converted to commercial[1]	Other notes
		holders 6 to 930 a.m., Wed, Fri, Sun		
Hyde Street (Market to Fulton)	East	Spaces are reserved for Farmer's Market permit holders 6 to 930 a.m., Wed, Fri, Sun	4	Next to the Orpheum Theatre
8th Street (Market to Mission)	East		5	Spaces would be dependent upon Trinity development project
Grove Street (Market to Larkin)	North		2	
Larkin Street (Market to Grove)	West		3	Next to Bill Graham Auditorium
Hayes Street (Market to Polk)	South		1	Next to post office and could convert to 6-wheel
Jessie Street (9th to 10th streets)	Either	Currently, the entire street is Tow-Away No Parking Anytime (narrow one-way street)	Approximately 4	Maybe access to The Market, Twitter, and other buildings
10th Street (Market to Mission)	East	Currently, the first 80 feet is Tow-Away No Parking Anytime (lane lines)	3	Assumes that the lane lines are shifted to create spaces
Fell Street (Market to Van Ness)	North	Currently, 2 of the spaces are part time loading zones	7	Convert all 7 spaces to full time loading zones
Van Ness Ave (Market to Fell)	West		2	Spaces associated with the VN BRT project
S Van Ness Ave (Market to Mission)	West		1	Space would be dependent upon 10 S Van Ness development and VN BRT projects
S Van Ness Ave (Market to Mission)	East		5	Space would be dependent upon 1500 Mission development project
Oak Street (Van Ness to Franklin)	South		2	Spaces would be dependent upon 1 Oak & 1554 Market development projects
12th Street (Market to S Van Ness)	East		4	Spaces would be dependent upon 10 S Van Ness redevelopment project
12th Street (Market to S Van Ness)	West		4	Convert 10 perpendicular to parallel spaces. Spaces would be dependent upon 1629 Market development project
Page Street (Market to Gough)	South		2	
Franklin Street (Market to Oak)	West		3	
Brady Street (Market to Stevenson)	East		3	Spaces would be dependent upon 1629 Market development project
Gough Street (Page to Market streets)	West		2	
Gough Street (Market to Otis streets)	East		1	Convert 4 angled parking spaces into 1 commercial loading space

Street name	Side of street	Notes on restrictions	Parking spaces which may be converted to commercial[1]	Other notes
Gough Street (Market to Otis streets)	West	1 space is currently a blue zone	3	After the blue zone & shift the blue zone past Stevenson St
Valencia Street (Market to McCoppin)	West		1	Due to daylighting at McCoppin intersection
TOTAL POSSIBLE COMMERCIAL SPACES ADDED			**227**	

[1]Note: Assumes that one commercial space was 40 feet on non-metered blocks, while metered blocks assumed that each existing space would be converted to one commercial space regardless of length

The above table does not include motorcycle or passenger loading spaces that could also be converted to commercial loading spaces. Those particular uses, along with blue accessible parking zones, bus zones, and green zones, serve a specific purpose due to their adjacent land use. A case-by-case analysis would need to be undertaken if the aforementioned spaces were to be considered for reallocation.

Capacity on the side streets to accommodate passenger loading activities.

As mentioned in the top of this section, with the advent of TNCs and the increased use of taxis and carpools, there is an ever increasing need for accommodate passenger loading. The BMS project would prohibit private vehicles and TNCs from travelling along Market Street between 10th and Drumm streets. As such, the BMS project would install additional white passenger zones at cross streets in order to provide a safe space for informal drop-offs and pickups. **Table 5** below describes possible passenger loading zones near Market Street. All the proposed passenger loading zones are currently general metered parking spaces unless otherwise noted.

Table 5. Proposed White Passenger Loading Zones near Market Street

Street name	Cross street	Cross street	Side of street	Number of 20' spaces	Notes
Embarcadero	Clay	Market	West	2	
Steuart	Market	Mission	West	3	Convert existing part time white zone to full time.
Drumm	Sacramento	California	West	3	Currently yellow zones
California	Davis	Drumm	South	2	
Davis	California	Pine	West	2	Convert 44' Taxi zone
Pine	Davis	Front	North	2	
Beale	Market	Mission	West	2	Currently yellow zones
1st	Market	Stevenson	West	2	Currently yellow zones. These spaces become tow-away between 7 to 9 a.m. & 3 to 7 p.m.
Montgomery	Sutter	Market	East	2	
Stevenson	2nd	New Montgomery	North	1	In what is currently a red zone

Street name	Cross street	Cross street	Side of street	Number of 20' spaces	Notes
Ellis	Market	Powell	North	3	Currently yellow zones. Due to westbound street conversion
Eddy	Mason	Cyril Magnin	South	2	Currently yellow zones.
Golden Gate Ave	Jones	Market	South	2	
Jones	Golden Gate	Market	West	2	
7th	Stevenson	Market	East	2	In front of new Yotel hotel
Larkin	Hayes	Grove	West	2	
Hayes	Market	Polk	South	1	Shift green meter closer to post office
10th Street	Market	Mission	East	2	Assumes that the lane lines are shifted to create spaces
10th Street	Market	Mission	West	1	Shifts existing blue zone down to Jessie St
Fell Street	Van Ness	Market	South	1	Convert existing part time white zone to full time.
11th	Mission	Market	East	3	
Franklin	Market	Oak	West	2	
Valencia	McCoppin	Market	East	2	
TOTAL POTENTIAL ADDITIONAL WHITE LOADING ZONES				**46**	

Capacity on the side streets to accommodate blue accessible parking activities (blue zone).
Per the DRAFT Public Right of Way Accessibility Guidelines (PROWAG) outlined by the United States Department of Justice (USDoJ), whenever metered parking is removed for a project, to the extent possible, 4% of remaining metered parking spaces should be blue accessible zones. There are currently 46 blue zones located near the BMS project corridor (up to 2 blocks in any direction from Market Street). When calculating all the metered parking spaces that border the BMS project (one block in either direction from Market St), the number of blue zones to meet DRAFT PROWAG recommendations would be 55. While there are currently no blue zones or metered parking on Market Street west of Spear Street, vehicles serving people with disabilities currently use the existing loading bays, block bus zones or bike lanes, and use parking spaces on cross streets. The BMS project would remove/repurpose cross street commercial and general parking spaces for daylighting, bulb-outs and additional commercial loading spaces as listed in **Table 3** and **Table 4** above. There are also streets proposed to be converted to two-way which opens up further opportunities for blue zones (the ADA requirements are that the passenger door has to fully open up onto sidewalk and there is an ADA-compliant curb ramp to the rear of the vehicle).**Table 6** depicts the potential blue zones that could be added as part of the BMS project in order to meet PROWAG recommendations. While **Table 6** lists eight potential locations, it does not provide the recommended nine additional blue zones that would meet the DRAFT PROWAG recommendation. This is due to the strict guidelines that govern blue zone placement. The project team will work to identify an additional potential blue zone to meet the DRAFT PROWAG recommendation as design progresses.

Table 6. Potential Additional Blue Accessible Zones near Market Street.

Street Name	Cross Street	Cross Street	Side of Street	Notes
Beale Street	Market	Mission	West	
Eddy Street	Mason	Cyril Magnin	South	Removal of the tow-away lane (bus layover)
Mason Street	Market	Eddy	East	Due to 2-way street conversion

Street Name	Cross Street	Cross Street	Side of Street	Notes
Jones Street	Market	Golden Gate	East	Due to 2-way street conversion
Embarcadero	Clay	Market	West	Dependent upon Embarcadero Improvement project
10th Street	Mission	Minna	West	
Van Ness Ave	Fell	Market	West	Shift existing blue zone from Hickory St onto Van Ness (to make it compliant)
Page Street	Gough	Franklin	South	
TOTAL POTENTIAL ADDITIONAL BLUE ZONES				**8**

PARATRANSIT

An evaluation of commercial and passenger loading activities must also consider access for people with disabilities, and in particular, paratransit services. A key consideration in making loading recommendations is the ability to accommodate and, to the extent possible, design for paratransit needs.

The BMS design includes features that would allow paratransit vehicles to stop at and provide access to most addresses along Market Street while minimizing disruptions for transit and bicycle traffic. The BMS project features a buffer space between the curb lane and bicycle facility along with flex zones to accommodate paratransit access along Market Street. Areas adjacent to curbside boarding islands and BART portals cannot accommodate paratransit today or under BMS. A Memorandum of Understanding (MOU) or other contractual agreement would be created to require that San Francisco paratransit providers train their operators in the proper ways of unloading/loading customers on Market Street, into the bike facility if necessary. Paratransit vehicles would be required to park in a loading zone, flex zone or other parking space on Market Street. San Francisco paratransit vehicle data was collected (including both paratransit vans and taxis) for all the pick-ups/drop-offs along Market Street for the year between October 2015 and October 2016. In total, there were roughly 13,700 pickups and drop-offs along Market St with 44% of them being drop offs. Paratransit activities are similar to commercial loading in that the vehicle prefers to be parked as close as possible to a doorway. Paratransit drivers normally assist their passengers to their destination's front door. Based on the paratransit activity data, paratransit flex zones could be located at five of the six most active locations in **Table 7** below, each of which had over 500 combined pickups/drop-offs during the year. The location on the south side of Market, between 4th and 5th cannot be accommodated due to physical constraints. Alternative locations for paratransit loading would be across Market Street or on Ellis, 4th, or 5th streets.

Table 7 High Paratransit Activity Locations along Market Street.

Block	Side	Annual Paratransit Pick-ups	Annual Paratransit Drop-offs	Potential Generators
10th -9th	north	313	304	Fox Plaza apartments and commerce, including US Post Office
7th -8th	both	1038	1358	Mayor's Office on Disability, Lighthouse for the Blind at 1155 Market Street, BART
4th -5th	both	414	613	retail, small doctors' facilities, BART
4th-3rd	south	214	293	retail and offices

For more information about the paratransit pickup analysis, please see Attachment 2.

OTHER LOADING DEMANDS

In addition to the paratransit activity and the doorway analysis, the BMS project team has received other loading requests via 311 or other means, and has also identified additional loading needs based on observations:

- Desire to have loading close to BART/Muni elevators at all 5 stations along the corridor, for example to avoid fare collection convoys continuing current practice of parking on the sidewalk or in travel lane near BART/Muni elevators.
- Desire to have loading between 10th and Van Ness Ave on the north and south sides due to Walgreens store with future Van Ness BRT street configuration and Uber headquarters.
- Request to maintain a dedicated passenger loading zone for the Ritz Carlton Residences due to no cross street access.

POTENTIAL FLEX ZONE LOCATIONS ON MARKET STREET

The BMS project team recommends the use of flex zones on Market Street. These zones are designed to accommodate a multitude of purposes depending on the time of day and week. Flex zones, as mentioned earlier in this report, would be designed to allow for bicyclists and vehicles to safely navigate along Market whilst accomplishing the loading demands. Flex zones would be designed, to the extent possible, to be 100 feet in length in order to accommodate two WB-40 tractor trailer trucks. The project team evaluated the available sidewalk space on Market Street and identified where flex zones could be constructed and would be logical to serve current business and accessibility/paratransit needs for Market Street. The flex zones would be for active paratransit/taxi/commercial vehicle loading only and would be restricted to minimize disruption to bicyclists and pedestrians during peak hours (paratransit would still be able to access the flex zones at any time). The specific peak hour restrictions are still to be determined via further data analysis and outreach but would be the a.m. peak period for the south side of Market Street and the p.m. peak period for the north side of Market Street.

Figure 5 below depicts the proposed flex zones that could be placed along the BMS corridor. Note that the flex zones are shown for illustrative purposes only and do not represent the actual length of the proposed zone. Also, Figure 5 shows the three flex zones that would be restricted to paratransit and taxis under the Hub variant. For more information on the proposed Market Street flex locations and the Hub variant, including side street/alleyway opportunities for additional loading areas, see **Table 8** below.

Figure 5 Existing and Potential Loading locations on Market Street.

There are some blocks of Market Street that are unable to accommodate a flex zone due to BART portals, proposed transit stop locations, or proximity to an intersection. However, with up to 22 potential flex zone locations proposed for BMS, there would be a minimal loss of one loading/flex zones on Market Street over the existing 23 loading bays.

The proposed flex zone locations represent an initial proposal; further analysis and outreach would be undertaken throughout the design process for the BMS project to inform the final configuration of commercial & accessible loading. Also, as in any dynamic environment, this memorandum does not preclude further changes to commercial loading practices as a result of adjacent land use changes, transportation projects, vehicle fleet changes (such as automated vehicles) or other changing circumstances.

Table 8. Proposed Potential Flex Zones on Market Street

Block	Side of Street	Notes	Cross street /alleyway Opportunities	Current land use
Franklin-Van Ness[1]	North	All the buildings here are being demolished as part of development projects	Oak, 12th, Franklin, Page streets	Currently being redeveloped; buildings can be designed to accommodate loading off Market
10th and 11th streets[2]	Both		11th Street	Walgreens, Uber, SFCTA
Polk-Hayes[1]	North	Constrained due to 120' boarding island & distance between intersections	Use loading zones currently on Hayes	Starbucks, Fox Plaza apartments, Paratransit hot spot, empty store fronts
9th and 8th streets	Both		9th, Grove, Larkin streets	Hotel Whitcomb & Sam's Diner
8th and 7th streets	Both	Civic Center plaza	Stevenson, Hyde streets	MOD, Lighthouse, BART, Paratransit hot spot
7th-6th	South	Constrained due to numerous closely spaces intersections/crosswalks & boarding island	Use Stevenson to the greatest extent possible, 6th, Jones, McAllister streets	Hotel (under construction), Huckleberry bicycles, Flying Falafel, Smoke shops, art museum
Golden Gate and Jones	North	Redevelopment project on part of north side	Golden Gate	The Hall
6th and Mason streets	Both	Redevelopment project on part of north side	Stevenson, Turk streets	The Warfield theater, The village
5th-4th	North	Constrained due to boarding islands, new midblock intersections, & BART portals/elevator	Use Ellis, Jessie, 4th, 5th streets	Paratransit hot spot, medical offices (above Westfield mall), Flood building, Converse, Diesel USA, GAP, Oakley
4th-3rd	South	Constrained due to boarding islands	Grant Ave, Stevenson (already used as a back entrance to Four Seasons Hotel) Street	Paratransit hot spot, Neiman Marcus Last Call, Four Seasons Hotel, CVS Pharmacy, Super Duper
3rd and O'Farrell streets	North	No access to buildings from Geary; have to load from Market		FedEx office, Walgreens
in the slip lane to go to Geary Street	North	No access to buildings from Kearny or Post streets		Ritz-Carlton Residences
2nd and Sutter streets	South		Stevenson Street	CVS pharmacy
Fremont and 1st streets	Both	No access to buildings from cross streets; loading has to occur from Market		AT&T, Bank of America, 1st Republic, offices
Fremont-Beale	South	Constrained due to BART portal & short distance between intersections		Wells Fargo, Starbucks, 333 Market Street

Block	Side of Street	Notes	Cross street /alleyway Opportunities	Current land use
Steuart and Spear streets	Both		Spear and Steuart streets	Dica Salon, 1 Market, bike rental. Philz coffee, offices

[1]This proposed flex zone could be restricted to paratransit/taxi use under the Hub variant.
[2]The proposed flex zone on the north side of Market could be restricted to paratransit/taxi use under the Hub variant.

There is a design variant, called the Hub variant which could restrict three flex zones near Van Ness Avenue to be accessible only via paratransit and taxis. This is due to the creation of a Muni, bicycle, pedestrian plaza between 11th and 12th streets on Market Street. The Hub variant would require all buses (except Muni) and commercial vehicles heading in the westbound direction to turn off Market Street at 9th/Hayes/Larkin. All vehicles except paratransit, taxis, emergency vehicles, Muni, bicycles heading in the eastbound direction would be required to turn either left onto Franklin Street or right onto 12th Street. Paratransit, taxis, emergency vehicles, Muni, bicycles would be able to continue straight along Market Street.

RECOMMENDATIONS

The BMS project is a major upgrade of one of the City's most vibrant commercial and transportation corridor. Continuing to maintain access for commercial and passenger loading is one of the BMS project goals. Accounting for all the above factors mentioned in this report, the BMS project team recommends adding 22 flex zones on Market Street, detailed in **Table 8** above. Under the Hub variant, 3 of them would be restricted to paratransit and taxis. As many short term (30 min or less) commercial loading spaces should be added within 100 foot of Market Street on the cross streets as possible, as detailed in **Table 4** above. In addition, commercial loading spaces should be created on the alleys south of Market to accommodate truck loading in order to promote more use of the alleyways to access the rear of Market Street buildings. This includes Angelo's Alley, Jessie (100 and 800 blocks), Stevenson (unit, 100, 200, 400, 500 and 600 blocks), and Annie streets (unit block). The alleyways may be better suited for smaller commercial vehicles and personal vehicles that perform freight activities. Up to 227 new or lengthened cross street and alleyway commercial loading spaces could be created to discourage commercial loading along Market Street. Careful consideration and outreach must be done to businesses along Market Street to encourage the use of alleyways if at all possible.

Time-of-day commercial loading restrictions on Market Street would be used to promote more efficient use of limited curb space and to avoid conflicts between loading activities and other modes during peak hour periods. Nighttime loading (e.g. 10 p.m. to 6 a.m.) should be incentivized as there are less conflicts between transit, paratransit, bicycles, and delivery vehicles which may mean faster delivery times. The use of smaller delivery trucks (no larger than SU-30's) should be incentivized as smaller vehicles have less blind spots, are more maneuverable, and take up less space in the urban core's congested streets. A UCC or last mile delivery methods such as by tricycle or electric vehicle may be more viable options in the future. An incentive program could be established in order to promote changing delivery schedules. Once the BMS project is built, a continued analysis effort would need to be undertaken, along with enforcement feedback, to ensure that commercial loading needs are being adequately addressed.

In addition, up to 46 proposed new passenger loading zones and eight new blue accessible parking zones listed in **Table 5** and **Table 6** would be created on cross streets as part of the BMS project. These zones would strive to meet PROWAG draft goals for blue zones and the project's goal of maintaining access for people in TNC's and private vehicles. The BMS project team would proceed with further evaluation and outreach with businesses and developing relationships that can be conducive for both the City and County of San Francisco (CCSF) and businesses alike while trying to promote loading on non-Market Street locations.

NEXT STEPS

- Proceed with the design of the flex zones and all the side street/alleyway white, yellow, and blue zone changes as noted in Tables 5, 6, 7, and 9 above.
- Proceed with further evaluation and outreach with businesses and developing relationships that can be conducive for both the City and County of San Francisco and businesses alike while trying to promote loading at non-Market Street locations.
- Conduct additional research and analysis to develop recommendations related to implementation considerations for flex zones including:
    - Definition in Transportation Code
    - Enforcement
    - Time of day and time limit restrictions
    - Strategies to promote or incentivize alternative hours of delivery
    - Paratransit loading
- Finalize the data analysis of current loading bays along Market Street and identify final cross street loading zones, time-of-day restrictions, and locations for flex zones that would remain on Market Street.

REFERENCES

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ATTACHMENT 1

DISTANCE FROM MARKET STREET DOORWAY TO CROSS STREET LOADING ZONE
MEASUREMENTS--NORTHSIDE

Block	building to building length	Business Name	Address	Business Type	Distance from cross street loading to corner		Distance from corner to door		total distance from loading on cross st to door		smallest total	Door on side street?	Loading within 250'?	Loading within 250'?	visual survey performed on 6/15/17
					West	East	West	East	West	East			Loading within 250'	Adjusted for ad'l door	Backdoor/alleyway access??
Van Ness to Fell/Polk	482	One Taste	1440		182	11	223	250	405	261	261		No	no	Yes
Hayes/Larkin to Grove/Hyde	519	Legal Services for Children	1254	service	45	13	216	299	261	312	261		No	no	No
Hayes/Larkin to Grove/Hyde	519	Subway		service	45	13	234	280	279	293	279		No	no	No
Hayes/Larkin to Grove/Hyde	519	Munch Maven		food	45	13	242	274	287	287	287		No	no	No
Hayes/Larkin to Grove/Hyde	519	1240 Market	1240	food	45	13	269	245	314	258	258		No	no	No
Grove/Hyde to Cj Brenham	unknown	Art Institute of SF	1170		17	150	268	1000	285	1150	285		No	no	No
Cyril Magnin to Ellis/Stockton	729	Gap_Door 1	890	retail	24	259	256	467	280	726	280		No	no	Yes
Cyril Magnin to Ellis/Stockton	729	_Door 2		retail	24	259	313	410	337	669	337		No	no	Yes
Cyril Magnin to Ellis/Stockton	729	Anthropologie		retail	24	259	396	329	420	588	420		No	no	?
Cyril Magnin to Ellis/Stockton	729	Flood Building	870		24	259	435	283	459	542	459		No	no	?
Cyril Magnin to Ellis/Stockton	729	Puma	856	retail	24	259	469	257	493	516	493		No	no	?
Cyril Magnin to Ellis/Stockton	729	Solstice	846	retail	24	259	498	228	522	487	487		No	no	?
Cyril Magnin to Ellis/Stockton	729	Aldo		retail	24	259	511	216	535	475	475		No	no	?
Cyril Magnin to Ellis/Stockton	729	For Lease			24	259	591	136	615	395	395		No	no	?
Cyril Magnin to Ellis/Stockton	729	Game Stop	830	retail	24	259	640	89	664	348	348		No	no	?
Ellis/Stockton to O'Farrell/Grant	454	Door			200	5	114	334	314	339	314		No	no	?
Ellis/Stockton to O'Farrell/Grant	454	Wells Fargo		service	200	5	126	322	326	327	326		No	no	?
Ellis/Stockton to O'Farrell/Grant	454	Starbucks	780	food	200	5	152	293	352	298	298		No	no	No
O'Farrell/Grant to Geary/Kearny	465	FedEx Office	726	retail	12	33	239	219	251	252	251		No	no	?
Geary/Kearny to Post/Montgome	481	Sprint	690	retail	201	11	52	423	253	434	253		No	no	No
Geary/Kearny to Post/Montgome	481	Doors			201	11	77	398	278	409	278		No	no	No
Geary/Kearny to Post/Montgome	481	Ritz Carlton Club		hotel	201	11	111	364	312	375	312		No	no	No
Geary/Kearny to Post/Montgome	481	660 Market	660		201	11	150	326	351	337	337		No	no	No
Geary/Kearny to Post/Montgome	481	Under Construction	658		201	11	168	309	369	320	320		No	no	No
Geary/Kearny to Post/Montgome	481	Radio Shack		retail	201	11	212	263	413	274	274		No	no	No
Geary/Kearny to Post/Montgome	481	Bun Mee	650	food	201	11	228	251	429	262	262		No	no	No
Post/Mont to Sutter/Sansome	517	Citi Bank	590	service	201	9	114	396	315	405	315		No	no	No
Post/Mont to Sutter/Sansome	517	582 Market	582		201	9	144	365	345	374	345		No	no	No
Post/Mont to Sutter/Sansome	517	Spicely		retail	201	9	180	333	381	342	342		No	no	No
Post/Mont to Sutter/Sansome	517	GNC		retail	201	9	191	316	392	325	325		No	no	No
Post/Mont to Sutter/Sansome	517	Creative Marketing	572		201	9	223	290	424	299	299		No	no	No
Post/Mont to Sutter/Sansome	517	Daiso Japan	570	retail	201	9	239	270	440	279	279		No	no	No

ATTACHMENT 1

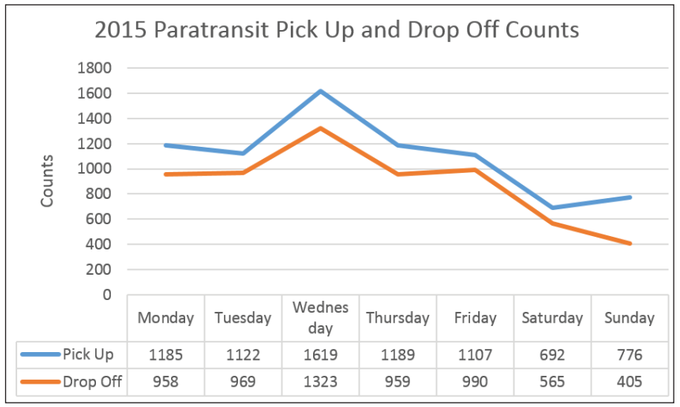
DISTANCE FROM MARKET STREET DOORWAY TO CROSS STREET LOADING ZONE MEASUREMENTS--SOUTHSIDE

visual survey performed on 6/15/17

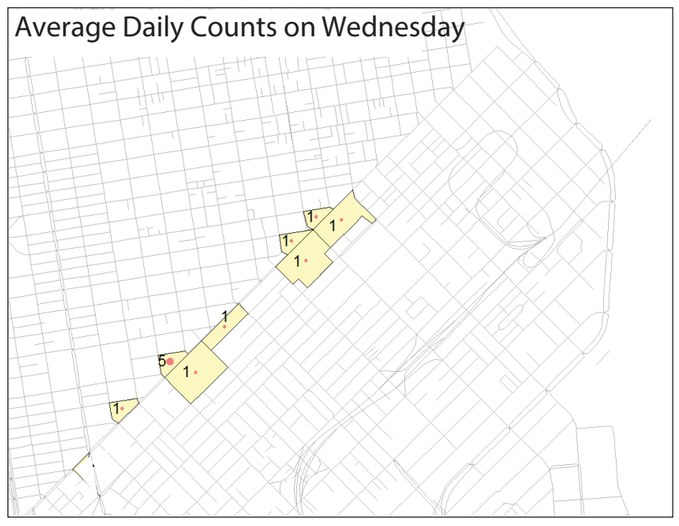
Block	building to building length	Business Name	Address	Business Type	Distance from cross street loading to corner		Distance from corner to door		total distance from loading on cross st to door		smallest total	Loading within 250'?	adjusted for having multiple doors	Backdoor/alleyway access??
					West	East	West	East	West	East				
10th to 9th	421	Door 1	1355		359	3	114	300	473	303	303	no	no	Yes
10th to 9th	421	Doors 2, 3, 4			359	3	155	249	514	252	252	no	no	Yes
9th to 8th	549	Sliding Doors-Witcomb		Hotel	156	86	356	189	512	275	275	no	no	Yes
9th to 8th	549	Revoloving Doors-Witcomb		Hotel	156	86	371	172	527	258	258	no	no	Yes
8th to 7th	829	1155 Market	1155		42	140	360	462	402	602	402	no	no	No
8th to 7th	829	Café Trinity- bar'd gate			42	140	409	416	451	556	451	no	no	?
8th to 7th	829	One Trinity center	1145		42	140	449	373	491	513	491	no	no	Yes
8th to 7th	829	Budget Inn	1139		42	140	499	327	541	467	467	no	no	No
8th to 7th	829	Tobacco for Less			42	140	512	315	554	455	455	no	no	?
8th to 7th	829	Dollar Store			42	140	532	291	574	431	431	no	no	?
8th to 7th	829	American Conservatory Theater	1119		42	140	680	145	722	285	285	no	no	Yes
8th to 7th	829	The Costume Shop	1117		42	140	699	125	741	265	265	no	no	Yes
7th to 6th	842	Huckleberry Bicycles	1073	retail	15	20	236	597	251	617	251	no	no	?
7th to 6th	842	Residence	1067		15	20	271	564	286	584	286	no	no	Yes
7th to 6th	842	Oriental Restaurant	1063	food	15	20	288	544	303	564	303	no	no	?
7th to 6th	842	Kaplan	1055		15	20	366	444	381	464	381	no	no	No
7th to 6th	842	Cigarrettes for Less	1053		15	20	414	418	429	438	429	no	no	No
7th to 6th	842	3 Potato 4	1051		15	20	441	392	456	412	412	no	no	?
7th to 6th	842	Door	1049		15	20	450	385	465	405	405	no	no	?
7th to 6th	842	Marinello School of Beauty			15	20	487	347	502	367	367	no	no	?
7th to 6th	842	Seligman Western Enterprise, LT	1035		15	20	540	288	555	308	308	no	no	?
7th to 6th	842	Int'l Art Museum of America	1025		15	20	595	237	610	257	257	no	no	Yes
6th to 5th	839	Wooden Doors/The Village	969		18	20	252	581	270	601	270	no	no	Yes
6th to 5th	839	Shiekh	929	retail	18	20	578	252	596	272	272	no	no	No
6th to 5th	839	929 market	929	office	18	20	600	232	618	252	252	no	no	No
6th to 5th	839	923 market	923		18	20	636	298	654	318	318	no	no	?
5th to 4th	835	4 Doors			8	128	259	566	267	694	267	no	no	?
5th to 4th	835	3 Copper doors			8	128	287	542	295	670	295	no	no	?
5th to 4th	835	Adidas	865	retail	8	128	319	511	327	639	327	no	no	No
5th to 4th	835	Tourneau		retail	8	128	367	463	375	591	375	no	no	Yes
5th to 4th	835	Westfield Entrance		retail	8	128	413	412	421	540	421	no	no	Yes
5th to 4th	835	Copper Door			8	128	461	368	469	496	469	no	no	Yes
5th to 4th	835	Timberland		retail	8	128	510	319	518	447	447	no	no	Yes
5th to 4th	835	SFSU	835	institution	8	128	542	284	550	412	412	no	no	?
5th to 4th	835	James Bong Building	833		8	128	563	265	571	393	393	no	no	Yes
5th to 4th	835	Walgreens	825	retail	8	128	614	200	622	328	328	no	no	Yes
5th to 4th	835	Levis Two Big Double Door Sets		retail	8	128	645	187	653	315	315	no	no	?
5th to 4th	835	Levis	815	retail	8	128	676	150	684	278	278	no	no	?
4th to 3rd	840	Nieman Marcus	767	retail	3	55	325	510	328	565	328	no	no	?
4th to 3rd	840	St. John		retail	3	55	373	459	376	514	376	no	no	?
4th to 3rd	840	four Seasons		hotel	3	55	441	382	444	437	437	no	no	Yes
4th to 3rd	840	Sports Club/LA		service	3	55	474	356	477	411	411	no	no	No
4th to 3rd	840	Golfsmith		retail	3	55	520	312	523	367	367	no	no	No
4th to 3rd	840	735 Market			3	55	543	292	546	347	347	no	no	No
4th to 3rd	840	Bancroft Building			3	55	562	272	565	327	327	no	no	No
4th to 3rd	840	CVS	731	retail	3	55	591	242	594	297	297	no	no	Yes
3rd to New Montgom	511	Lens Crafters_Door 1	685	retail	200	10	65	447	265	457	265	no	no	Yes
3rd to New Montgom	511	La Boulange		food	200	10	107	401	307	411	307	no	no	Yes
3rd to New Montgom	511	Monadnock			200	10	125	379	325	389	325	no	no	Yes
3rd to New Montgom	511	Yocup		food	200	10	148	360	348	370	348	no	no	Yes
3rd to New Montgom	511	Jeffrey's Toys & Comics		retail	200	10	188	320	388	330	330	no	no	Yes
3rd to New Montgom	511	Corner Bakery and Café	665	food	200	10	248	260	448	270	270	no	no	?
2nd to 1st	832	575 Market	575		2	19	272	556	274	575	274	no	no	Yes

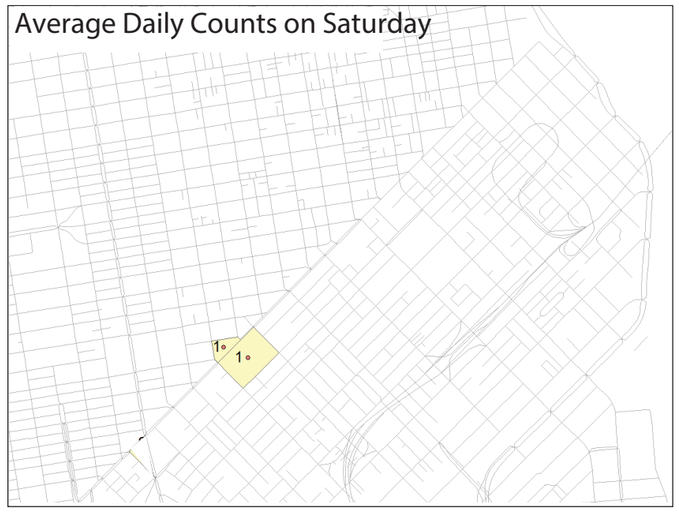
2015 Paratransit Drop Off Counts Analysis

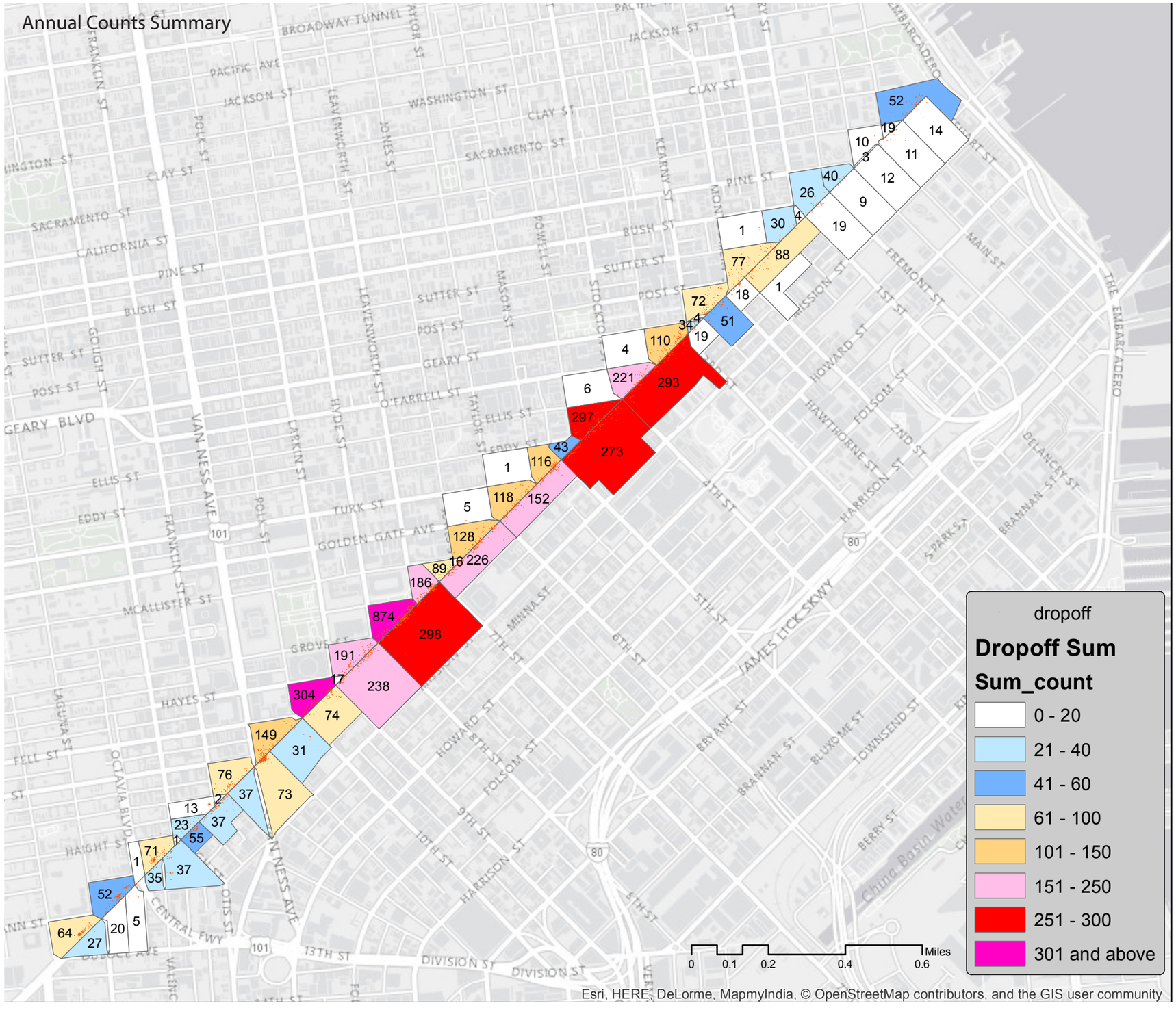
Attachment 2



	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Pick Up	1185	1122	1619	1189	1107	692	776
Drop Off	958	969	1323	959	990	565	405

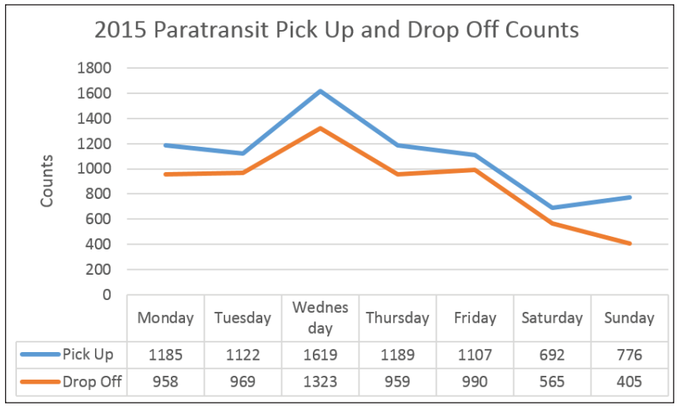




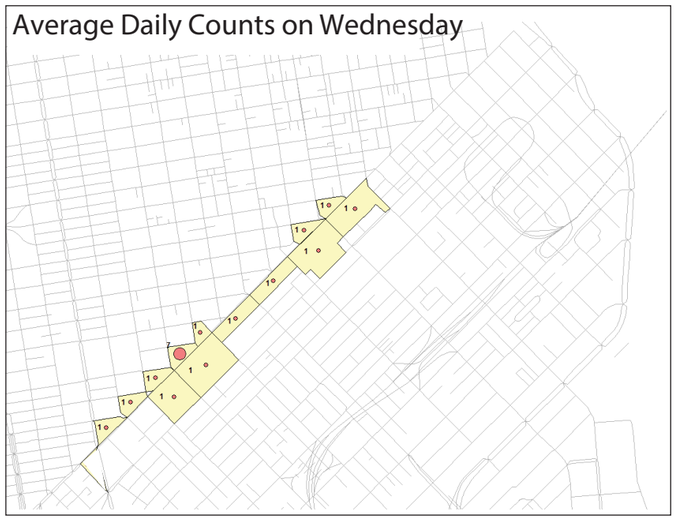


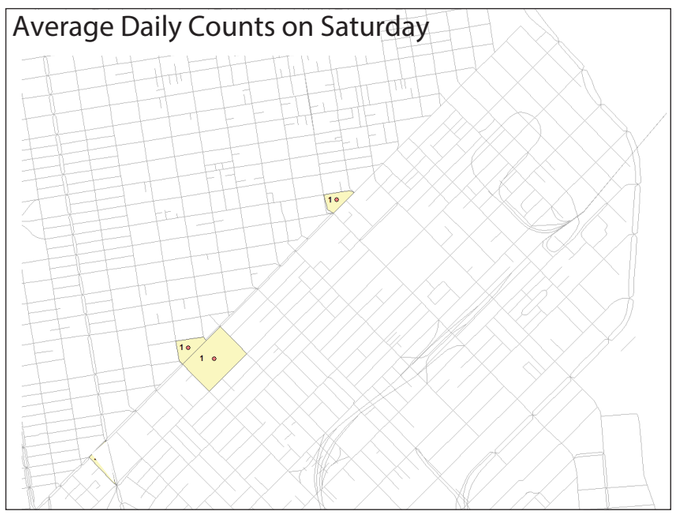
2015 Paratransit Pick Up Counts Analysis

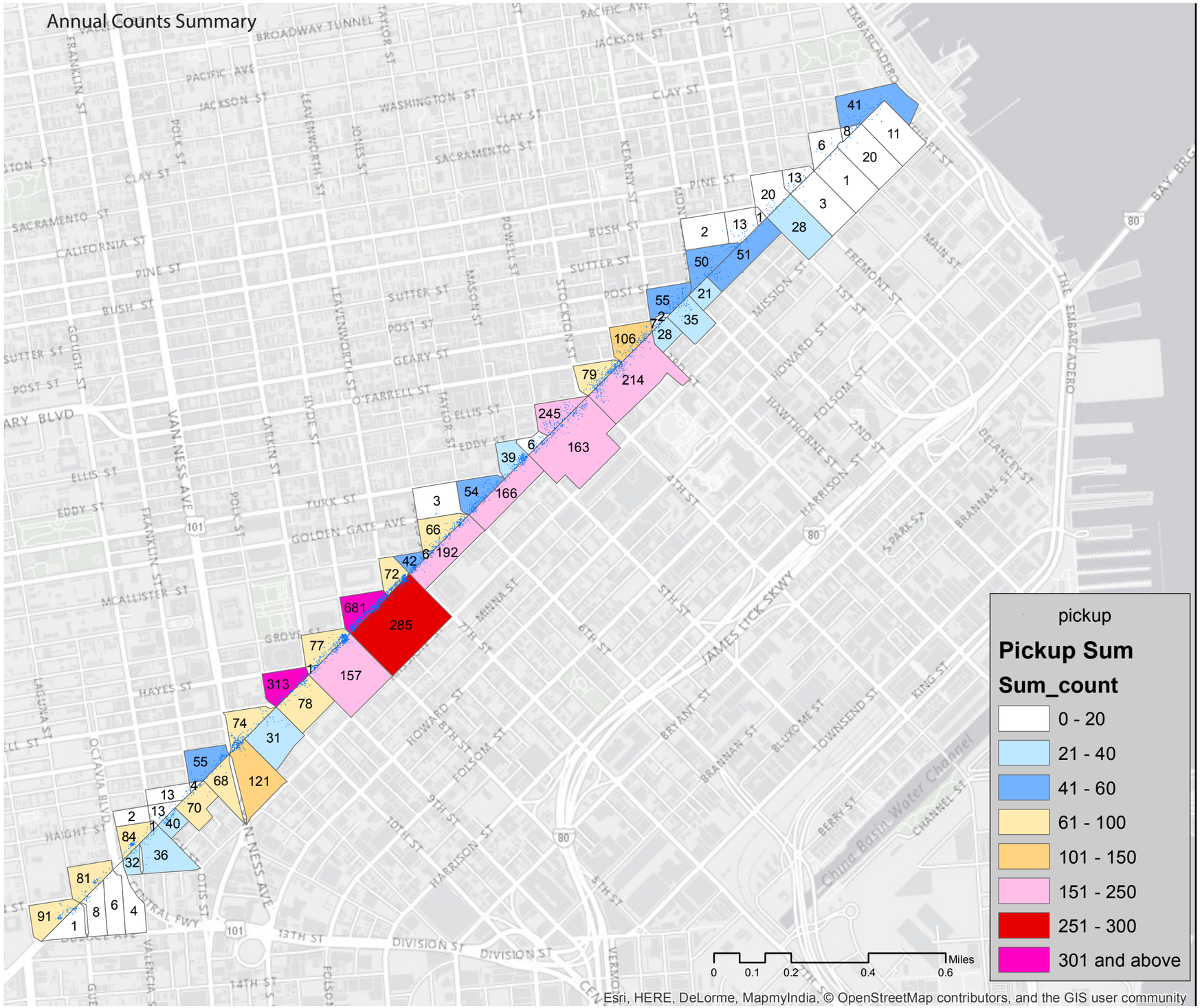
Attachment 2



	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Pick Up	1185	1122	1619	1189	1107	692	776
Drop Off	958	969	1323	959	990	565	405







Attachment 4b: Pipeline Development List

List of Development Projects in Transportation Study Area that were Considered in Determining Increase in Loading Demand within Market Street Loading Zones for 2020 Baseline Conditions

ID	Planning Dept. Case #	APN	Address	OCT 2017 Status	Included in 2020 Baseline
1302		APN 0342001	950 - 974 MARKET ST	BP FILED	X
1399		APN 0350002	1028 MARKET ST	PL APPROVED	X
1411		APN 3703066	1053 MARKET ST	PL FILED	
1418		APN 0350003	1066 MARKET ST	PL APPROVED	X
1421		APN 3703062	1075 MARKET ST	CONSTRUCTION	X
1431		APN 3703059	1095 MARKET ST	CONSTRUCTION	X
1437		APN 0351001	1100 MARKET ST	CONSTRUCTION	X
8	2013.0511U	APN 3702047	1125 MARKET ST	PL FILED	
1370		APN 3702391	1177 Market St (Trinity Plaza)	CONSTRUCTION	X
319		APN 0836002	1500 MARKET ST	BP FILED	
233		APN 0836007	1546 - 1564 MARKET ST	BP ISSUED	X
249	2015-005848PPA	APN 3505001	1601 - 1637 MARKET ST/53 COLTON ST	PL FILED	
267	2014.0484U	APN 3504030	1699 MARKET ST	BP ISSUED	X
271	2013.1179U	APN 0855016	1700 MARKET ST	BP FILED	X
337	2014.0409U	APN 0855010	1740 MARKET ST	BP FILED	

PL FILED:	Application Filed with Planning Department
PL APPROVED:	Application Approved by Planning Department
BP FILED:	Building Permit Application Filed with Department of Building Inspection
BP APPROVED:	Building Permit Application Approved by Department of Building Inspection
BP ISSUED:	Approved Building Permit Application Issued by Department of Building Inspection
BP REINSTATED:	Lapsed Building Permit Application is "re-instated" by Department of Building Inspection
CONSTRUCTION:	Project is Under Construction

Attachment 4c: Loading and Parking Tables

Street	From	To	Side of Street	Parking Spaces converted to commercial spaces
Embarcadero	Washington	Don Chee	West	24
Drumm Street	Market	Sacramento	West	3
California Street	Drumm	Davis	South	6
Main Street	Market	Mission	West	2
Beale Street	Market	Mission	East	5
Davis Street	Market	California	West	3
Pine Street	Market	Front	North	1
Pine Street	Market	Front	South	4
Montgomery Street	Market	Sutter	East	8
Montgomery Street	Market	Sutter	West	11
Stevenson Street	3rd	Annie	North	2
Annie Street	Stevenson	Jessie	East	4
			Segment Total	***73***
Grant Avenue	Market	Geary	East	2
Jessie Street	4th	5th	South	6
Eddy Street	Cyril Magnin	Mason	South	2
Stevenson Street	5th	7th	South	40
Mason Street	Market	Eddy	East	3
Taylor Street	Market	Turk	East	2
Golden Gate Avenue	Market	Jones	North	2
Golden Gate Avenue	Market	Jones	South	4
Jones Street	Market	Golden Gate	East	2
Jones Street	Market	Golden Gate	West	3
McAllister Street	Market	Charles J. Brenham	South	2
Stevenson Street	Angello's Alley	7th	North	20
Hyde Street	Market	Fulton	West	4
Hyde Street	Market	Fulton	East	4
8th Street	Market	Mission	East	5
			Segment Total	***101***
Grove Street	Market	Larkin	North	2
Larkin Street	Market	Grove	West	3
Hayes Street	Market	Polk	South	1
Jessie Street	9th	10th	Either	4
10th Street	Market	Mission	East	3
Fell Street	Market	Van Ness	North	7
Van Ness Avenue	Market	Fell	West	2
S Van Ness Avenue	Market	Mission	West	1
S Van Ness Avenue	Market	Mission	East	5
Oak Street	Van Ness	Franklin	South	2
12th Street	Market	S Van Ness	East	4
12th Street	Market	S Van Ness	West	4
Page Street	Market	Gough	South	2
Franklin Street	Market	Oak	West	3
Brady Street	Market	Stevenson	East	3
Gough Street	Page	Market	West	2
Gough Street	Market	Otis	East	1
Gough Street	Market	Otis	West	3
Valencia Street	Market	McCoppin	West	1
			Segment Total	***53***
		Total		**227**

Better Market Street EIR - Parking and Loading Analysis
Changes in on-street general parking, commercial vehicle, and passenger loading spaces

Increase in commercial loading spaces

227	spaces	Table 4	convert general parking to commercial vehicle spaces
-12	spaces	Table 5	less - covert commercial spaces to passenger loading
-27	spaces	Table 3	less - removal of commercial spaces due to daylighting, etc
188	net increase in commerical loading spaces		

Passenger Loading - Table 5

23	zones		
46	spaces		

Removal of General Parking Spaces

6	spaces	Table 3	on Market St
9	spaces	Table 3	on other streets
15			
227	spaces	Table 4	convert general parking spaces to commercial vehicle spaces
46	spaces	Table 5	total number of new passenger loading spaces
-12	spaces	Table 5	less - convert commercial to passenger spaces, rest is general parking conversion
34	spaces	convert general parking spaces to passenger loading spaces	

Source: SFMTA Better Market Street Loading and Parking Recommendations Memorandum, February 22, 2018

Attachment 5: Analysis Methodology

Attachment 5a: 2020 Baseline Conditions Projects

Better Market Street EIR
Transportation and Development Projects included in 2020 Baseline Conditions

Reasonably Foreseeable Transportation Projects included in the Transportation Analysis

- Central Subway Project
- Van Ness Bus Rapid Transit/Van Ness Improvement Project
- Transit Center District Plan Streetscape Improvements
- Polk Street Streeetscape Project
- Vision Zero Improvements to Sixth and Jessie streets
- SFMTA Mission St/So. Van Ness Avenue/Otis Street Intersection Improvements
- Bay Area Bike Share System

Background Growth Assumed for intersection Volumes

- SF-CHAMP Travel Demand Model output for 2020 Baseline Conditions

Development Projects Included in the Transportation Analysis – Loading Demand

- 950-974 Market Street
- 1028 Market Street
- 1066 Market Street
- 1075 Market Street
- 1095 Market Street
- 1100 Market Street
- 1177 Market Street
- 1546 -1564 Market Street
- 1699 Market Street
- 1700 Market Street

Attachment 5b: Methodology and Validation for Market/Mission Street VISSIM Model

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DATE: **January 30, 2012**

TO: **Better Market Street Team**

FROM: **Greg Riessen**

RE: **Methodology and Validation for Market/Mission Street VISSIM Model**

This memorandum explains the methodology of the creation of the existing conditions Market/Mission Street VISSIM model, as well as the validation of the model.

The model simulates existing conditions during the weekday PM peak period, including transit, private vehicles, trucks, bicycles, and pedestrians. The extent of the model includes every intersection along Market and Mission Street, from the Embarcadero and Steuart Street in the east, to Octavia Boulevard and Division Street in the west. The simulation includes a 30-minute seeding period, and then runs for two hours, simulating the time period from 4:00 to 6:00 PM.

Below, each element of the VISSIM model is summarized, including assumptions and any modifications to default VISSIM parameters.

At the end of this document is a summary of the validation results. Transit and auto travel times were validated using SFMTA's recent Muni travel time surveys and SFCTA's Spring 2011 Level of Service monitoring, respectively.

Aerials and Scale

The model was built to-scale based on satellite photos. The model extent is depicted in Figure 1.

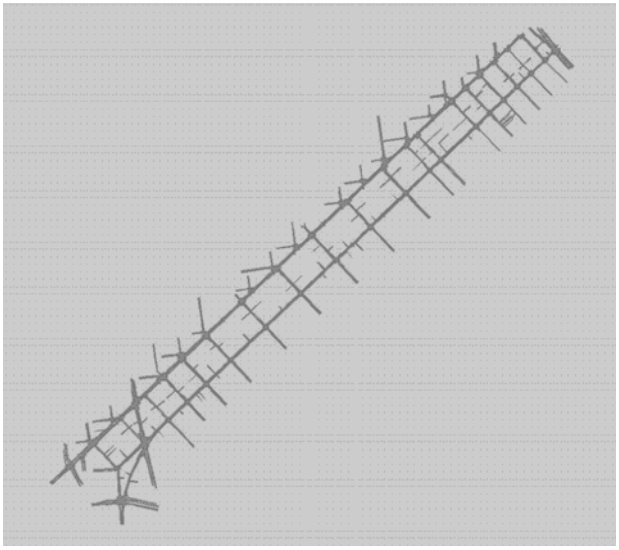

Figure 1: Model Extents
Market Streets from Steurart to Octavia – Mission Street from Embarcadero to Division

Vehicle Inputs (traffic volumes) and Routing Decisions (turning movements)

Traffic volumes for almost every intersection along Market and Mission streets were obtained from a collection of existing PM peak period turning movement counts. These were input into a Synchro file (only for purposes of volume balancing as explained below). See the "Unbalanced" Synchro file, which contains the raw traffic counts as assembled by Fehr & Peers. This includes volumes that only certain vehicles can legally perform, i.e. left turns off of Mission Street and driving straight on eastbound Market at Tenth and Sixth streets.

Four intersections are missing from this Synchro file: Fremont/Market, Fifth/Mission, Eleventh/Mission and Eleventh/Market. Volumes at these intersections were interpolated based on adjacent intersections, and also based on volumes contained within the SFMTA downtown Synchro file.

Both along Market and Mission streets, and along north-south streets, driveways and alleys were included on block segments where a parking garage or alley exists (driveways and alleys are collectively referred to as "driveways" in the remainder of this memo). On block segments with more than one driveway, they were consolidated into a single driveway for simplicity. Generally, the driveway location matches up with the actual location, but in a few instances where a driveway was located immediately downstream of an intersection, the driveway was shifted downstream (in order to avoid unrealistically abrupt lane changes within VISSIM).

Once all the raw intersection volumes and driveways were coded into Synchro, the volumes were balanced. See the "Balanced" Synchro file. Volumes were primarily balanced by utilizing the driveways, while checking against SFMTA's off-street parking survey to ensure that the amount of traffic entering or leaving a driveway was realistic based on the size of the parking garage accessed from the driveway. The traffic volumes as shown in the "Balanced" Synchro file were directly coded into VISSIM as described below.

In VISSIM, two functions were used to code in the traffic volumes. The "Volume Input" (subsequently known as Input) is the amount of vehicles per hour entering a roadway on the edge of a network, or entering from a driveway. Inputs were directly coded based on the amount of vehicles on a link entering the network as shown in Synchro. The Inputs were coded as stochastic inputs, which creates randomness in vehicle arrivals over the course of simulation (but generally matching the total volume over the course of an hour), which simulates a Peak Hour Factor effect.

The second function is the "Static Routing Decision" (subsequently known as Route) that determines the path of vehicles within the network. Routes can be as short as turning left, right or straight through an intersection or driveway (and coding vehicles to consecutively travel one routing decision after another at each intersection), or Routes can be as long as a route across the entire network, through multiple intersections.

The Routes were initially coded as a separate Route for every intersection and every driveway, in order to exactly match the "Balanced" Synchro file. See the "Individual Routing Decision" VISSIM file, which has each individual Routes. This VISSIM file matches up with the "Balanced" Synchro file.

Next, the Routes within VISSIM were consolidated into fewer, longer Routes using the Combine Routes feature. Using longer Routes prevents erratic lane changes in VISSIM, and also will enable

for Routes to be easily shifted from Market onto Mission when creating the alternatives. On Market and Mission streets, Routes were combined to be one block long, including any driveways on that block. On north-south streets, routes were combined so that a route would extend across both Market and Mission streets, including any driveways along the Route. After this step the Inputs and Routes are complete.

Note that the process outlined above directly coded into VISSIM the balanced intersection turning movement counts. The SFCTA CHAMP model was not utilized in the development of this Existing Conditions model (although the CHAMP model could be utilized later during development of the alternatives). This means that the traffic volumes in the VISSIM model exactly match the balanced turning movement counts, and therefore the traffic volumes in the model are validated by definition.

Traffic Composition

The San Francisco passenger vehicle fleet, as developed for the Geary Bus Rapid Transit traffic microsimulation, was coded into the model.[1] The fleet includes a mix of vehicles (sedans, SUVs, motorcycles, etc.) that is different from the default VISSIM (German) vehicle fleet. Of the private vehicle fleet, 99.5% is personal vehicles (57% sedans, 35% SUVs, 5% sports cars, and 3% motorcycles) while 0.5% is trucks (67% two-axle and 33% three-axle).

As described below under **Transit Lanes**, 70% of auto traffic on Market Street was observed as private autos, while 29.5% was taxis, shuttles and other vehicles allowed in the transit lane, and 0.5% trucks as described above. Therefore, the proportion of all auto traffic that is private autos *which obey the transit lane regulation* is 56% (70% x 80%), the proportion that is taxis/shuttles *and private autos that disobey the transit lane* is 43.5% (29.5% + (70.5% x 20%)), and the proportion that is trucks (which are coded to obey the transit lane) is 0.5%. These are the three components of the auto traffic composition, and are graphically depicted in the model as dark blue, light blue, and pink vehicles, respectively.

Boarding Islands

Boarding islands were coded on Market Street (and also Fremont, Seventh, and Bush Streets) by coding a two-lane link, and then disallowing lane changes at the island. This allows vehicles to realistically choose the less-congested lane (unless a vehicle is not permitted to enter a transit lane, see **Transit Lanes** below). Note that some vehicles (especially streetcars) appear to slide into the left lane at a slight angle while approaching the boarding island, or vehicles occasionally appear to be driving on the boarding island. This effect is due to the way the boarding island had to be coded (there is no explicit function within VISSIM). This phenomenon is visual only and does not affect the analysis.

[1] Memorandum from Fehr & Peers to Geary BRT Project Team. *Geary BRT – Existing Conditions VISSIM Model Calibration and Validation*. March 8, 2011.

Desired Speeds (free flow speeds)

Desired speeds for general auto traffic and trucks were coded at 23-27 mph for all streets. Desired speeds for buses were set at 18-22 mph. For streetcars, the desired speed was set at 14-16 mph, and also the acceleration of the streetcar was reduced by 50% from the default value, because the default represents a modern streetcar rather than a historic streetcar.

Reduced Speed Zones (turns)

Reduced speed zones were coded at all turns. Wide Turns (generally left turns) were coded at 14-16 mph for cars and 12-14 mph for trucks and buses. Tight turns (generally right turns) were coded at 8-10 mph for cars and 6-8 mph for trucks and buses.

Reduced speed zones were also coded for streets crossing Market Street at skewed intersections, and to simulate congested situations at some locations (see **Cross Street Congestion**) below. Reduced speed zones were also coded for streetcars and trolleybuses traversing overhead wire switches and crossings, see **Overhead Contact System** below.

Conflict Areas (yielding behavior)

Conflict areas were used to simulate vehicle/vehicle, vehicle/pedestrian and vehicle/bicycle merging, crossing and diverging conflicts. Default values were used, except for vehicle/pedestrian conflicts, where the Front Gap and Rear Gap was increased from the default 0.5 seconds to 1.0 second. This is because vehicles generally require a larger gap when crossing a pedestrian conflict than when crossing a vehicle conflict.

Transit Routes

All transit routes within the network area were coded, specifically: Muni routes 2, 5, 5L, 6, 8X, 9, 9L, 10, 12, 14, 14L, 16X, 19, 21, 27, 30, 30X, 38, 38L, 41, 45, 47, 49, 71, 71L, and F, as well as Samtrans 292, 391 and KX, and Golden Gate Transit 70/80 and commuter service. Transit routes that cross Market Street and have the same vehicle type and same stops were consolidated for simplicity (i.e. the 30 and 45 were combined into a single route). Transit vehicles were coded as 40′ diesel, 40′ electric, 60′ articulated diesel, and 60′ articulated electric vehicles (diesel and electric vehicles are coded as having the same default operating characteristics). For routes where the inbound and outbound direction are entirely within the model extents (specifically the 2, 5, 6, 9/9L, 14/14L, 21, 31, 38/38L, and 71/71L) the layover area was also coded.

Muni service frequencies were obtained from the SFMTA website, included as the "Muni Weekday Frequency Guide". Routes were determined from the "Market Street Transit Map", also obtained from the SFMTA website. Golden Gate Transit and Samtrans stops and frequencies were obtained from their websites.

Transit vehicles were coded to have a random arrival within the network. Also, vehicles were coded to arrive in a bunch of two vehicles, occurring 50% of the time, based on guidance from SFMTA.

Within the model, Muni streetcars are orange, Muni diesel buses are red, Muni electric buses are purple, Samtrans buses are maroon, and Golden Gate Transit vehicles are dark green.

Transit Stops

The Market Street speed/delay survey provided valuable information on dwell times at stops, and also variation in dwell times. SFMTA provided this information in a spreadsheet, included as "Muni Dwell Time Raw".

A review of the dwell times in the spreadsheet indicated that the F streetcar line tends to have longer dwell times than the buses, whereas the various bus lines tended to have similar dwell times at any given stop. In other words, at any given stop, bus route X and bus route Y were observed to generally have similar dwell times. Therefore, the average dwell times across all bus routes (as supplied by SFMTA) was coded into each transit stop for all bus routes serving that stop. However, the transit routes that were utilized for the transit travel time validation (see **Validation**) *did* have their individual dwell times coded in for each stop. Specifically, this included the F streetcar and the 9/9L, 14, 21, and 71 bus routes.

The dwell times and standard deviations were rounded to the nearest 5-second value, see "Muni Dwell Time Rounded" spreadsheet. Within VISSIM, values for dwell time and standard deviation were created for each of these combinations. These were then assigned to each transit stop.

Dwell times at transit stop locations that were not surveyed (such as along cross streets, and for Golden Gate Transit and Samtrans) were assumed to be 20 seconds with a standard deviation of 20 seconds.

The F streetcar also occasionally must stop at disabled access ramps and lifts along Market Street, before stopping again at the adjacent boarding island. At transit stops with disabled ramps or lifts, the streetcar was coded to have a 5% chance of stopping. At locations with ramps the dwell was coded as 90 seconds, and locations with lifts was coded as 180 seconds.

The boarding islands along Market Street are generally 100 feet long. Based on field observations, two 60' buses are able to load simultaneously, because the rear bus operator usually can open only the front door for boarding passengers. However, operators of the F streetcar were observed as more likely to only allow loading if the entire length of the streetcar was able to reach the boarding island. This phenomenon was coded with separate (overlapping) transit stops for bus routes (130' in length) and the streetcar (100' in length). Also (as noted under **Driving Behavior**) the average standstill distance was decreased for buses and increased for streetcars.

Based on field observations, transit vehicles in the curb lanes on Market Street sometimes cannot pull into their stop due to private vehicles temporarily parking in them (i.e. taxis dropping off passengers). This phenomenon was simulated by placing parking spaces within the transit stops. This effect also simulates sporadic, localized congestion, as described under **Sporadic Congestion** below.

Transit Lanes

The center-running transit lanes on Market Street were coded into the model. Based on field observations during the PM peak period, it was determined that approximately 70% of auto traffic on Market Street is private autos, while 29.5% of auto traffic is taxis, shuttles and other vehicles that are permitted to use the transit lanes, and 0.5% are trucks. Of the private auto traffic, 80% was observed to obey the transit lane, while 20% was observed to illegally drive in the transit lane. This was coded into the model (see **Vehicle Composition**).

Transit lanes on Mission Street were not coded, because it is not possible in VISSIM to code a curb-lane transit lane which vehicles can enter the lane to turn right or access a driveway, but are otherwise not permitted to use the lane. The capabilities of VISSIM are limited to two options: either code 100% of all auto traffic in the center lane (i.e. full obedience of the transit lane), or code 100% of traffic as using either lane (i.e. no obedience of the transit lane). Based on field observations, obedience of transit lanes on Mission Street is not as high as on Market Street. This is especially true at intersections, where right-turning vehicles are delayed by pedestrians, which causes through-vehicles (which should not enter the transit lane) to shift into the center lane to bypass the queue. Therefore, the latter coding option (not coding in any transit lane) was considered to better match reality.

Streetcar Track Switches

Streetcars must come to a stop for five seconds before any track switch where they can turn left or right. This occurs on inbound Market nearside 11th Street, and at outbound Market nearside 11th Street. This was coded as a STOP sign with a five second dwell.

Overhead Contact System Trolley Switches

Streetcars and trolleybuses must proceed at reduced speed across an OCS turn switch or crossing in order to minimize the possibility of the trolley losing contact with the wire. At every turn switch and every crossing along Market, Mission and all cross streets, this was coded as a 7 mph reduced speed zone, 5 feet in length. Switch locations along Market Street were provided in spreadsheet format by SFMTA, and is included in the Data Collection folder.

Driving Behavior

Default driving behavior settings were generally used, with a few exceptions.

Lane Change behavior was modified based on recommendations from the software developer, to simulate congested lane-changing behavior. The Cooperative Braking was increased and the Headway Reduction Factor was decreased. This allows vehicles to change lanes while in queues, rather than unrealistically block the lane while waiting for a gap.

Average standstill distance for buses was reduced, because bus operators were observed to pull up close to the vehicle in front of them at a boarding island (in order to fit two buses at a boarding

island, as discussed under **Transit Stops**). For streetcars, the average standstill distance was increased, to simulate observed behavior of streetcar operators.

Traffic Signals

Traffic signals were coded in based on signal timing cards provided by SFMTA. Signal timing for intersections on Mission Street were created based on the timing cards. Signal timing for intersections on Market Street was already embedded within SFMTA's 2006 Market Street VISSIM model; these timings were double-checked and updated as necessary, and imported.

At the majority of intersections, the pedestrian flashing DON'T WALK phase was reduced from the value shown on the signal timing card (generally ten to fifteen seconds) to five seconds, based on guidance from SFMTA. In other words, pedestrians were coded to begin to cross the intersection until only five seconds remained on the countdown timer. This is to replicate observed pedestrian behavior. At very large intersections, the flashing DON'T WALK phase was only reduced to ten seconds.

At some congested locations (specifically, Main/Market and 10th/Mission), the yellow time for vehicles was reduced and/or the WALK time for pedestrians was reduced, to simulate vehicles running the yellow light and simulate more vehicles merging through heavy pedestrian volumes.

Pedestrians

Pedestrian volumes for intersections along Market Street were embedded within SFMTA's 2006 VISSIM model, and were not modified. For intersections along Mission Street, volumes were estimated based on location. From Steuart to 4th, volumes were assumed at 300 pedestrians per hour per direction (total 600 per crosswalk). From 5th to South Van Ness, volumes were assumed at 200 pedestrians per hour per direction, while at other locations they were assumed at 100 pedestrians per hour per direction. Pedestrian walking speeds were set at 2-4 mph. Pedestrians are shown as yellow in the model.

Bicycles

Bicycle volumes were obtained from SFMTA's annual counts, which indicated that the intersections of Market/Eleventh and Market/Fifth had approximately 800 bicycles during the peak hour. This was coded as 300 eastbound and 500 westbound bicycles on Market Street, with origins and destinations split between Valencia and Upper Market. 100 bicycles per hour per direction were assumed on Mission, Eleventh, Fifth, Second, and Sansome/Battery streets. Bicycle speeds were coded as 10-15 mph.

On streets without bike lanes, bicycles are coded to take the curb lane; except on very wide one-lane segments (e.g. eastbound Mission Street east of Main Street) vehicles generally must shift lanes to pass bikes in the curb lane. Bikes are able to overtake queued cars at red lights. Bike boxes are simulated with a second set of traffic signal heads. Bicycles are shown as green in the model.

Sporadic Congestion:

Sporadic, localized congestion due to traffic signals, loading buses, conflicting movements, etc, is inherently modeled within the simulation.

Double-parked vehicles were observed to frequently but temporarily block traffic, primarily along Market Street and along cross-streets.[2] This was simulated in the model by coding in short-term parking spaces within the travel lane. As described under **Transit Stops** the parking spaces were also coded in the curbside transit lanes in order to simulate stopped vehicles blocking bus access to the stop.

Cross-street Congestion:

The traffic volumes obtained from the Synchro file represent the number of cars that was counted as passing through the intersection. At several bottleneck locations crossing Market Street, the demand is higher, but not all vehicles can be processed, resulting in a queue. This phenomenon regularly occurs at Market/Hyde, Market/Stockton, Market/Montgomery, and Market/Octavia.

To simulate these bottlenecks and the resulting queues, reduced speed areas and double-parked vehicles (as described above under **Sporadic Congestion**) were coded in, until the traffic volume was observed as just barely making it through, without creating a queue. Then, 100 or 200 additional vehicles were added to the volume input, creating the queue.

The cross-street congestion of streets described above generally does not affect the operation of Market or Mission streets, unlike the congested segments described below which were coded differently.

Recurring Congestion/Queues:

Based on field observations, there are three segments within the study area that exhibit major congestion and long vehicle queues occur on a regular basis. Two of the three segments are from southbound congestion on First Street (traffic destined for the Bay Bridge), which routinely forms long queues that spill back onto both eastbound Mission and eastbound Market streets. The third segment is northbound Third Street, which regularly backs up and spills back onto westbound Mission Street.

On First Street, the congestion was simulated with a "dummy" metering traffic signal on southbound First Street south of Mission Street. In regular operation the signal only gives several seconds of green time to First Street, which meters traffic and causes queues to form along First Street that spill back onto eastbound Mission and eastbound Market streets. Vehicle queue detectors are placed on eastbound Mission and Market streets, just downstream of Second Street. When the queue on either eastbound Mission or Market reaches as far back as Second Street, the

[2] Vehicles were also observed to illegally park on Mission Street within the peak-period tow-away lane, but this generally does not affect traffic flow on Mission Street because it does not block a travel lane. Therefore illegal parking was not coded on Mission Street.

detector is tripped and the metering signal holds the green for a long period, flushing out the accumulated queue. When the tripped detector no longer detects a queue, the metering signal resumes normal metering operation. This cycle repeats throughout the simulation, which creates fluctuating queues that simulate the effect of the congestion on Market and Mission streets.

Similarly, on Third Street, a "dummy" metering signal was coded on Kearny Street north of Market Street. The queue backs up on Third Street and back onto westbound Mission Street. A queue detector is placed on westbound Mission Street just downstream of New Montgomery Street, which maintains the queue length

Validation:

As described above, the traffic volumes within the network were coded directly from the turning movement counts, and are therefore validated by definition. The transit and auto travel times are the only elements that require a validation exercise.

Transit travel times from the SFMTA survey were determined by taking the sum of the Average Running Time for each segment. The sum of each segment equals the total running time. See "Muni Travel Time Raw". Note that transit travel time data was only available east of Van Ness Avenue.

Auto travel times were obtained from the SFCTA Level of Service monitoring, which also provided an average running time for each block segment. Note that auto travel time data was not available for inbound Market Street from Tenth to Sixth streets or from Main to Steuart streets.

Four transit routes in both directions (eight routes total) were analyzed within the simulation: the F streetcar on Market Street, a center-lane bus route (the 9/9L in both direction), a curb-lane bus route (the 21 outbound, the 71 inbound from Van Ness Avenue to First Street, and the 21 inbound from First Street to Steuart Street) and the 14 on Mission Street. Transit travel segments were analyzed from Tenth to Seventh Street, from Seventh to Fourth Street, from Fourth to First Street, and from First to Spear or Steuart Street.

Auto travel times were analyzed on both Market and Mission streets, in both directions. Auto travel segments were analyzed from Octavia Boulevard or Division Street to Tenth Street, from Tenth to Seventh or Sixth Street, from Seventh or Sixth to Fourth Street, from Fourth to First Street, and from First to Main or Steuart Street.

Travel time surveys were placed within the model to collect travel times. The model was run for two hours (with a 30-minute seeding period), a total of 10 times (with different random seeds). The average travel time across the ten runs for each segment was compared against the surveyed time. Detailed travel time outputs are contained within the "Validation Results" spreadsheet.

There are a total of 51 travel time segments. To be considered validated, at least 85% of the travel time segments should be within 15% of the surveyed travel times. Of the 51 travel time segments, 47 were within 15% of the surveyed travel time. Therefore 92% of the segments meet or exceed the criteria, and the model is considered validated. The worst segment was 21% off the surveyed time, and the average segment was 7% off.

Baseline Model

After completion of the validated Existing Conditions model, a new Baseline model was created, which is the Existing Conditions model with several modifications to reflect planned or recently-implemented changes to the street network.

Three changes were coded:

- Two-way McAllister Street, including rerouting of the inbound 5 Fulton bus route via McAllister Street, and modifications to signal timing and lane configuration at the intersections of Market/McAllister/Jones and Market/Seventh;
- Two-way Haight Street, including rerouting of the inbound 6 Parnassus and 71/71L Haight-Noriega bus routes via Haight Street, and modifications to signal timing and lane configuration at Market/Haight/Gough;
- Construction of the Transbay Transit Center bus plaza between Beale and Fremont streets, including rerouting of the 5 Fulton, 38 and 38L Geary, 71/71L Haight-Noriega, and Golden Gate Transit bus routes to approach the plaza via Market – First – Mission – Beale and depart the plaza via Fremont – Market. (At the intersection of Market/First streets, the inbound travel time segment for the 71 bus was relocated to account for its shifted inbound route via First Street instead of Beale Street.)

This Baseline model should be utilized to extract Measures of Effectiveness from the simulation. These MOE's would then be compared against the MOE's from the Project alternatives, which will be developed in the next phase of the Better Market Street study.

Travel Times

Travel Time Segment Name	Travel Time Segment Number	Distance (feet)	Travel Time							Average Speed (mph)	85th Percentile (mph)
			Average (seconds)	Surveyed (seconds)	% Accuracy	Pass/Fail	Standard Deviation (seconds)	Min (seconds)	Max (seconds)		
Inbound Streetcar											
IB F Octavia-10th	101	2393.6	282.9	(no data)			27.4	213.2	369.6	5.8	7.7
IB F 10th-7th	102	2040.9	252.2	263	**-4%**	**Pass**	35.4	160.4	333.5	5.5	8.7
IB F 7th-4th	103	2689.7	320.6	339	**-6%**	**Pass**	62.1	173.1	479.5	5.7	10.6
IB F 4th-1st	104	2733.1	313.6	356	**-14%**	**Pass**	66.3	183	543.2	5.9	10.2
IB F 1st-Steurart	105	1690.8	206.1	207	**0%**	**Pass**	50.8	115.4	401.7	5.6	10
Outbound Streetcar											
OB F Steurart-1st	151	1757.7	274	257	**6%**	**Pass**	44.1	157.8	408.2	4.4	7.6
OB F 1st-4th	152	2809.9	274.7	303	**-10%**	**Pass**	41.4	185.5	374.7	7	10.3
OB F 4th-7th	153	2629.7	266.1	275	**-3%**	**Pass**	42.5	179.3	426.3	6.7	10
OB F 7th-10th	154	2101.2	223	226	**-1%**	**Pass**	39.1	126.8	342.7	6.4	11.3
OB F 10th-Octavia	155	2317.2	295.5	(no data)			43.6	236.6	436.6	5.3	6.7
Inbound Center Lane Bus											
IB 9 10th-7th	202	2040.7	215.6	214	**1%**	**Pass**	37.5	110.3	328.3	6.5	12.6
IB 9 7th-4th	203	2687.9	285.8	280	**2%**	**Pass**	58.4	170.8	482.7	6.4	10.7
IB 9 4th-1st	204	2732	309.3	323	**-4%**	**Pass**	74.2	160	515.7	6	11.6
IB 9 1st-Spear	205	1396.1	170.5	135	**21%**	**Fail**	51.3	96.8	312.4	5.6	9.8
Outbound Center Lane Bus											
OB 9 Main-1st	251	1065.1	123.4	137	**-11%**	**Pass**	23.9	78.2	228.4	5.9	9.3
OB 9 1st-4th	252	2808.6	255.9	284	**-11%**	**Pass**	52.9	174.2	423.5	7.5	11
OB 9 4th-7th	253	2629.4	265.3	274	**-3%**	**Pass**	52	167.5	428.9	6.8	10.7
OB 9 7th-10th	254	2101.2	205.8	221	**-7%**	**Pass**	42.3	116.5	325.7	7	12.3
Inbound Curb Lane Bus											
IB 71 10th-7th	302	2040.6	209.9	224	**-7%**	**Pass**	39.1	102.4	336.2	6.6	13.6
IB 71 7th-4th	303	2688.4	259.1	289	**-12%**	**Pass**	41	171	408	7.1	10.7
IB 71 4th-1st	304	2732.5	358.6	372	**-4%**	**Pass**	107.3	217.2	811.5	5.2	8.6
IB 21 1st-Spear	305	1396.3	179	141	**21%**	**Fail**	52	92.3	340.3	5.3	10.3
Outbound Curb Lane Bus											
OB 21 Steurart-1st	351	1758.8	268.9	265	**1%**	**Pass**	54.1	170.9	424.5	4.5	7
OB 21 1st-4th	352	2810.4	317.5	333	**-5%**	**Pass**	48	192.4	448.1	6	10
OB 21 4th-7th	353	2628.9	269.3	301	**-12%**	**Pass**	40.3	185.7	366.2	6.7	9.7
OB 21 7th-9th	354	1460.4	142.4	129	**9%**	**Pass**	37.5	79.5	279.8	7	12.5
Inbound Mission Bus											
IB 14 S Van Ness-7th	402	3141	320	336	**-5%**	**Pass**	40.3	236.8	437.3	6.7	9
IB 14 7th-4th	403	2714.5	258.9	281	**-9%**	**Pass**	44.7	181.6	381.4	7.1	10.2
IB 14 4th-1st	404	2722.1	347.4	320	**8%**	**Pass**	116.5	224.2	853.5	5.3	8.3
IB 14 1st-Main	405	1058.1	122.1	113	**7%**	**Pass**	35.2	74.9	258.5	5.9	9.6
Outbound Mission Bus											
OB 14 Steurart-1st	451	1787.5	230.9	244	**-6%**	**Pass**	36.1	139.7	348.6	5.3	8.7
OB 14 1st-4th	452	2724.2	317.3	351	**-11%**	**Pass**	82.6	178.7	526.8	5.9	10.4
OB 14 4th-7th	453	2716.5	258.8	268	**-4%**	**Pass**	38.9	186.4	391.6	7.2	9.9
OB 14 7th-S Van Ness	454	3159.7	391.6	430	**-10%**	**Pass**	57.3	250.1	539.4	5.5	8.6
Inbound Market Cars											
IB Market Cars Octavia-10th	501	2391.8	174.5	169	**3%**	**Pass**	48.8	96.4	361.3	9.3	16.9
IB Market Cars 10th - 6th	502	2950.2	196	(no data)			32.9	113.3	317.7	10.3	17.7
IB Market Cars 6th-4th	503	1780.5	144.9	140	**3%**	**Pass**	42.6	89.5	298.5	8.4	13.6
IB Market Cars 4th-1st	504	2732.8	236.7	273	**-15%**	**Fail**	72.7	108.9	479.3	7.9	17.1
IB Market Cars 1st-Main	505	1091.1	107.2	87	**19%**	**Fail**	49	33	336.4	6.9	22.6
Outbound Market Cars											
OB Market Cars Main-1st	551	1062.9	92.5	83	**10%**	**Pass**	32.2	41.5	169.5	7.8	17.5
OB Market Cars 1st-4th	552	2810.2	212.6	192	**10%**	**Pass**	51.9	105.2	359.2	9	18.2
OB Market Cars 4th-7th	553	2628.4	190.7	178	**7%**	**Pass**	55.8	87	426	9.4	20.6
OB Market Cars 7th-10th	554	2101	140.2	127	**9%**	**Pass**	43.3	57.1	321.2	10.2	25.1
OB Market Cars 10th-Octavia	555	2317.8	206.8	213	**-3%**	**Pass**	57.6	81.3	358.5	7.6	19.4
Inbound Mission Cars											
IB Mission Cars Division - 10th	601	2208.3	129.8	118	**9%**	**Pass**	39.9	76	216.1	11.6	19.8
IB Mission Cars 10th - 7th	602	2030.2	98.4	103	**-5%**	**Pass**	19.2	54.5	190.1	14.1	25.4
IB Mission Cars 7th-4th	603	2714.4	140.5	156	**-11%**	**Pass**	16.6	118	199.2	13.2	15.7
IB Mission Cars 4th - 1st	604	2722.2	205.5	184	**10%**	**Pass**	89.1	112	593.5	9	16.6
IB Mission Cars 1st - Steurart	605	1780.6	145.5	133	**9%**	**Pass**	26	110.5	264.7	8.3	11
Outbound Mission Cars											
OB Mission Cars Steurart - 1st	651	1788.9	135.5	149	**-10%**	**Pass**	29.5	72.3	220.6	9	16.9
OB Mission Cars 1st - 4th	652	2724	182.1	180	**1%**	**Pass**	76.1	72.2	547.1	10.2	25.7
OB Mission Cars 4th - 7th	653	2715.4	117.6	106	**10%**	**Pass**	19.1	92.5	172.6	15.7	20
OB Mission Cars 7th-10th	654	2031.1	119.8	125	**-4%**	**Pass**	21.1	75.1	189.7	11.6	18.4
OB Mission Cars 10th - Division	655	2432.3	144.6	140	**3%**	**Pass**	41.2	76.3	283.5	11.5	21.7

51 Total

4 Fail

47 Pass

92% Pass Rate

Attachment 5c: Better Market Street VISSIM Modeling Approach

FEHR PEERS

MEMORANDUM

Date:	August 10, 2016 *(Revised October 31, 2018)*
To:	City of San Francisco Department of Public Works
	Better Market Street Project Team
From:	Matt Goyne, Fehr & Peers
CC:	Andrew Lee, Parisi Transportation Consulting
Subject:	Better Market Street VISSIM Modeling Approach

SF13-0715

OCTOBER 2018 UPDATE

The August 10, 2016 version of this memorandum was updated in October 2018 for the purpose of including it within the appendices of the Better Market Street Draft Environmental Impact Report (Better Market Street DEIR). The October 2018 memorandum includes the following changes:

- Updates the purpose for the VISSIM analysis, changes references to match scenario names in the DEIR document, and removes references to Alternatives 1 through 3 from the 2016 alternative screening analysis;
- Revises traffic volumes for the 2020 baseline and 2020 baseline plus project VISSIM models based on the latest DTA models, as described in the memorandum *Better Market Street Forecasting Approach* (Fehr & Peers, October 31, 2018);
- Updates transit routing and stop spacing plans for the 2020 Plus Project VISSIM models to reflect the revised stop spacing plan presented in **Attachment E**;
- Includes additional information on 2040 cumulative conditions VISSIM analysis.

INTRODUCTION

The VISSIM operations analysis models for the Better Market Street DEIR were used to evaluate multi-modal operations and estimate transit travel times on Market and Mission streets, while the Synchro traffic operations software was used to conduct isolated intersection analysis for study

intersections located to the north and south of Market and Mission streets. Specifically, outputs from the VISSIM models included estimated transit travel times for transit operating along Market and Mission streets and the intersection delay on the north-south streets. The Synchro models were used to estimate vehicular delay within mixed-flow lanes at intersections within the transportation study area to the north and south of Market and Mission streets. The rest of this memorandum focuses on the inputs to the VISSIM models for each of the following four scenarios:

- **Existing conditions (2012)** – This model was calibrated to existing conditions in 2012 and was used as the foundation to support the development of future year models;
- **2020 baseline conditions** – This model is used to establish a baseline for impact evaluation;
- **2020 baseline plus project conditions** - This model is used to assess the near-term impacts of the proposed project;
- **2040 cumulative conditions** - This model is used to assess the long-term impacts of the proposed project in combination with other reasonably foreseeable development.

The results of the VISSIM analysis are presented with the transit and traffic analysis in the Better Market Street DEIR appendix.

EXISTING CONDITIONS (2012)

Fehr & Peers received the model files and a memo dated January 30, 2012 titled "Methodology and Validation for Market/Mission Street VISSIM Model" (San Francisco Planning Department). The model is bounded by the Embarcadero/Steuart Street in the east and Octavia Boulevard/Division Street in the west and contains every intersection in between on Market and Mission Streets. The model simulates the 4:00 PM to 6:00 PM peak period and includes all bus traffic crossing Mission Street and Market Street. The Planning Department's VISSIM model included an "Existing Conditions" scenario, which represented conditions as they were at the time the data was collected. No changes were made to this scenario. Fehr & Peers was able to re-run this model and re-produce the results included in the documentation. Traffic counts collected along Market Street in 2015 confirmed that the traffic volumes had not changed substantially since the January 2012 memorandum, as shown in **Attachment A**.

2020 BASELINE CONDITIONS

The Planning Department's VISSIM model and documentation also included a "Baseline Conditions" model, which reflects the same travel demand conditions, but includes implementation of several near-term roadway projects that may affect travel behavior, including:

- Two-way McAllister Street, including rerouting of the inbound 5 Fulton bus route via McAllister Street, and modifications to signal timing and lane configuration at the intersections of Market/McAllister/Jones and Market/Seventh;
- Two-way Haight Street, including rerouting of the inbound 6 Parnassus and 71/71L Haight-Noriega bus routes via Haight Street, and modifications to signal timing and lane configuration at Market/Haight/Gough;
- Construction of the Transbay Transit Center bus plaza between Beale and Fremont Streets, including rerouting of the 5 Fulton, 38 and 38R Geary, and 7/7R Haight-Noriega bus routes to approach the plaza via Market – First – Mission – Beale and depart the plaza via Fremont – Market.

Fehr & Peers also used a dynamic traffic assignment (DTA) model provided by the SFCTA to generate 2020 baseline vehicle volume forecasts.[1] No Project forecasts were developed by initially comparing the 2020 baseline model output to the 2012 existing model output, and adding/subtracting that difference to/from the existing volumes. The second check was to ensure that the restricted movements between Third and Eighth streets due to Safer Market Street were reflected in the forecasts. These volumes were then balanced throughout the study area. As the evaluation occurs in VISSIM, a connected microsimulation network, the forecasts must balance without exception.

At the request of SFMTA and the project team, several additional changes were made in 2016 to the Baseline Conditions model files provided Planning Department. As shown in **Attachment B**, transportation improvements that were proposed subsequent to the completion of the DTA and VISSIM modelling process were not incorporated within the quantitative analysis models. Justification for each of the 2020 improvements is provided in footnotes and supporting

[1] The calibration and validation of the DTA model for the Better Market Street study area are described in the memorandum *Dynamic Traffic Assignment Model PM Peak Period Validation for Better Market Street Project* (Fehr & Peers, October 30, 2015).

documentation and plans can be found in **Attachment C**. The 2020 baseline VISSIM models include the following planned near-term transit and streetscape changes:

- Van Ness Avenue Bus Rapid Transit, including center-running transit lanes north of Mission Street, a reduction from three to two mixed flow lanes north of Mission Street, conversion of the northbound shared through-right turn lane to a right-turn only lane, a 200 foot right-turn pocket on westbound Mission Street at South Van Ness Avenue, and signal timing changes to account for a protected southbound right transit-only phase with a westbound right overlap phase;[2]
- Signal timing updates on Market Street to reflect the planned increase from 60 to 90 second cycle lengths. The signal timing changes on Market Street are based on the signal timing cards provided by SFMTA staff in April 2016, which are scheduled for implementation in 2016-17;[3]
- Signal timing updates on Mission Street to reflect the planned increase from 60 to 90 second cycle lengths and the addition of leading pedestrian intervals along the corridor. The signal timing changes on Mission Street were developed in coordination with SFMTA staff in June 2016;[3,4]

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[2] SFMTA recommended modifying the signal timing at South Van Ness Avenue and Mission Street to include an overlapping eastbound right-turn arrow during the actuated transit phase to reflect the Van Ness BRT project, which will start construction in 2016, and the Mission Muni Forward Project's right turn pocket, which was legislated in December 2015.

[3] As discussed with SFMTA staff in the May 26, 2016 meeting, transit signal priority (TSP) will not be coded into VISSIM on Market or Mission streets under any 2020 or 2040 scenario. This is due to the limits of VISSIM to model TSP on streets with a high number of transit vehicles where TSP is therefore called most cycles such as Market and Mission streets under the PM peak hour.

[4] SFMTA applied for and received a grant in late 2015 to retime the NoMa/SoMa networks, increasing the cycle length to 90 seconds on Mission Street (and all of SoMa) to accommodate leading pedestrian intervals (LPIs), upgrading the yellow and all-red-times, and control vehicular speeds while maintaining decent traffic progression. These changes will be implemented with the Second Street Improvement Project in advance of 2020. The SFMTA provided new signal timing cards for Second Street (near-term change) and 11th Street (new split phasing in operation). For the remaining intersections, Mission Street signals were coded to include the following assumptions: similar split ratios as existing conditions, four second LPIs on all approaches, and four seconds protected right turn phases for vehicles at congested turning locations, Intersections that currently don't have LPIs include: Ninth, Sixth (only for Sixth Street), Fremont, Beale, Main, Spear, and Steuart streets.

- Transbay Center District Plan improvements to eastbound Mission Street to accommodate additional bus and pedestrian traffic associated with the opening of the new transbay terminal, including the addition of a near-side inbound Mission Street boarding island at Fremont Street;[5]
- Second Street Improvement Project, including a road diet from two to one through lane with right-turn pockets in each direction, cycletracks in each direction, and new protected right-turn phases on Second Street;[6]
- Golden Gate Avenue Road Diet, including reduction from two lanes to one lane approaching Market Street and the addition of an eastbound bicycle lane;[7]
- Eighth Street bicycle lane and road diet from four to three lanes south of Market Street and a bus boarding island at Eighth Street / Market Street;[8]
- Polk Street contra-flow bike lane completed in May 2014, which provided two-way bicycle access to Market Street at Polk Street;
- Safer Market Street plan changes completed in August 2015, including additional turn restrictions and vehicle routing decision changes at Market Street (as reflected in the DTA model) and geometry changes to Third Street approaching Mission Street (one northbound shared through/left lane converted to northbound left turn lane) and Market Street (reduction from four to three through mixed-flow lanes across Market Street);

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[5] The boarding island is funded by the Transbay Joint Powers Authority (TJPA) and includes a 13 foot curb lane inside the island, and a 12 foot wide lane to the outside of the island. The curbside lane, south side, between First and Fremont streets, will be built by the Salesforce Tower project (scheduled to open in 2018), and curbs legislated, funded, and built by Salesforce.

[6] SFMTA recommended modifying the lane geometry and signal timing along Second Street between Market and Mission streets to include the Second Street Improvement Project. This proposal was approved by SFTMA Board of Directors in August 2015 and the construction duration is Winter 2017 to Fall 2018.

[7] SFMTA recommended including the Golden Gate Ave Safety Project, which removed a travel lane to create an eastbound buffered bike lane between Polk and Market streets. This project covers a busy pedestrian corridor and ranks high on Vision Zero priority streets. The project was implemented in June 2016.

[8] SFMTA recommended modifying the lane geometry on Eighth Street to include a new 160 foot long boarding island at the southwest corner of Market/8th/Hyde/Grove, per the recommendation by the Bike Strategic plan to create bus boarding islands whenever possible when a bike lane is along a Muni bus line. This project is part of the bike spot improvement program and is included due to the acceleration of the construction schedule of this island prior to 2020.

- Inclusion of mid-block signal at Jessie Street and Sixth Street.[9]

In addition, the following changes were made to reflect new data for model file inputs and changes in service for the transit agencies:

- Updated Golden Gate Transit and SamTrans dwell times based on data provided by the respective agencies (see **Attachment D**). Golden Gate Transit and SamTrans services and frequencies have been updated as of January 27, 2014 based on the information contained on their respective websites;
- Increased area of influence and decreased speed for trolley buses crossing at a switch (3-5 mph);
- Addition of the 5R, 14X, 16X, and 19 routes;
- Adjusted stop locations for several SFMTA routes to reflect current operations, which have changed slightly from 2012 (Existing Conditions model)
- Updated service frequencies for Market Street and Mission Street Muni routes as of June 2014 based on the information contained on the SFMTA website;
- Bike volumes were increased 70 percent from the 2015 existing volumes to represent bicycle growth.[10]

The following parameters were used to calibrate the existing conditions model and will not change under 2020 or 2040 scenarios, except where specifically noted above. The parameters are described in more detail in the memorandum titled "Methodology and Validation for Market/Mission Street VISSIM Model" (San Francisco Planning Department, January 2012).

- Traffic composition (i.e. proportion of passenger vehicles, trucks, etc.);
- Transit Lane violator rate;
- Bus boarding island location and size;
- Bus stop locations (for all routes);
- Desired vehicle speeds;

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[9] The physical hardware for the Jessie Street signal was constructed in 2016 as a part of the Vision Zero high-priority pedestrian safety improvements. The signal is expected to be turned on in 2017. Per June 23, 2016 conference call, Fehr & Peers will use the Sixth Street / Minna Street timing card as a reference for this signal.

[10] As described in the memorandum "Better Market Street 2020 VISSIM Bicycle Projections (Final Draft)" (Parisi Transportation Consulting, July 14, 2016, revised August 5, 2016).

- Reduced speed zones;
- Conflict areas;
- Transit Lanes;
- Streetcar track switches;
- Overhead Contact System trolley switches;
- Vehicle driver behavior;
- Pedestrian volumes;
- Sporadic congestion simulation;
- Cross-street congestion simulation;
- Recurring congestion simulation.

In addition, curb side transit-only lanes along Mission Street were coded as regular mixed traffic flow lanes in the Existing model (as documented in the 2012 memo). Since the model was calibrated to existing conditions with this assumption in place, this assumption will be used for other models that have curb side transit-only lanes.

Additional Forecast Adjustments for VISSIM

Additional adjustments to the forecasts were completed in August 2016 as a part of the development of the 2020 baseline VISSIM model. While most outputs from the Better Market Street VISSIM models represent the PM peak hour conditions, such as peak hour volume served and intersection delay, the travel time runs along Market and Mission Street are recorded in VISSIM over a two-hour period in order to provide a greater sample size. Therefore, the final step to finalizing the forecasts for the VISSIM models included determining the volumes entering the network during the hour following the PM peak hour. The 2020 baseline DTA model shows an eight percent decrease in the total volumes entering the study area during this second hour.[11] Therefore, the study area forecasts were decreased by eight percent across entire VISSIM networks for all 2020 and 2040 scenarios. In a congested network with peak hour volumes that last for two hours, congestion would continue to increase as queues entering the network or within the network continue to grow. This adjustment to the second hour volumes allows the VISSIM model to more accurately model real-world conditions

[11] The eight percent decrease from the peak hour to the following hour is representative of the fact that the study area has high levels of vehicle demand spread across the entire evening peak period. This is atypical as the peak hour of the commute period in most environments is usually much busier than subsequent hours.

where congestion peaks at the end of the peak hour and gradually decreases during the second hour.

2020 BASELINE PLUS PROJECT CONDITIONS

From the 2020 baseline model files, Fehr & Peers built a 2020 baseline plus project model. The proposed project includes the updated transit spacing plan, signal phasing changes (including new signals at Market Street / 11th Street and Market Street / Steuart Street), a new rail loop for the F-Short line, and additional turn restrictions on Market Street.[12] DTA forecasts were completed for this scenario with the additional turn restrictions along Market Street as described in the *Better Market Street Forecasting Approach* (Fehr & Peers, October 31, 2018). The initial details for this model was provided by the SFMTA and confirmed in June and July 2016. The final transit stop locations and lane assignment on Market Street were updated in the VISSIM models based on new information provided by the SFMTA in October 2018. Signal phases were also revised to reflect draft timing cards provided by SFMTA staff in June 2016. This includes a leading bike interval (LBI) for eastbound bicycles at Market Street/8th Street.

Transit stops were modeled such that two vehicles would be able to stop at an outbound transit stop and three vehicles would be able to stop at an inbound transit stop. Dwell times for all Market Street transit vehicles were increased to account for greater ridership at each transit stop, though overall corridor dwell times typically decrease due to the improved station spacing. Detailed changes to the transit dwell times are provided in **Attachment D**.

The development of the VISSIM models occurred prior to the adoption of a cycletrack into the proposed project design. Therefore, bicyclists operate within the curb-side mixed-flow lane similar to 2020 baseline conditions.

2040 CUMULATIVE CONDITIONS

The additional transit vehicles due to the Muni Forward service enhancements and the additional riders generated by cumulative land use changes would affect transit operating conditions on

[12] Transit stop locations, transit route lane operations, and private vehicle turn restrictions are shown in **Attachment E**. The signal phasing changes along Market Street were provided by SFMTA staff as draft signal timing cards in June 2016.

Market Street under 2040 cumulative conditions. Other transportation projects and land use changes projected by 2040 would not substantially affect transit operating conditions on Market Street due to the proposed project's private vehicle turn restrictions. Therefore, transit operations for 2040 cumulative conditions were assessed for Market Street by updating the 2020 baseline plus project VISSIM network to reflect the proposed service enhancements under Muni Forward (including headway and fleet mix changes) anticipated to occur between 2020 and 2040 cumulative conditions. In addition, 2040 cumulative transit operations also account for the increased transit ridership along Market Street due to the anticipated land use changes by 2040. The inputs for 2040 cumulative conditions are presented in **Attachment F**.

It should be noted that travel demand forecasts used in the analysis of 2040 cumulative conditions do not include the influence of new disruptive trends in transportation that could affect future travel demand, including travel modes. As discussed above, these forecasts rely on previously observed travel behavior and presumes that behavior continues under future conditions. In reality, a number of trends including app-based ride hailing services (e.g., Uber and Lyft) and autonomous vehicles could influence how people travel in the future. The City is currently conducting multi-agency planning efforts such as the Emerging Mobility Strategy to plan for the growing popularity of emerging mobility services such as app-based ride hailing services or bike/scooter sharing services and the introduction of new technologies such as autonomous vehicles, robot delivery, or drones.[17] However, the time horizon for these services and technologies, such as increased use of autonomous vehicles, the level of automation in the vehicle fleet, or the popularity and competitiveness of non-auto modes, is currently uncertain. Additionally, when adding the influence of demographics (e.g., residential or workplace shifts, millennial and future generational preferences, etc.), there could be shifts in travel behavior in the future that cannot be accurately predicted in the models used for this project.

[17] SFCTA, *Emerging Mobility Evaluation Report, Evaluating Emerging Mobility Services and Technologies in San Francisco*, July 2018. Accessed on October 31, 2018. Available at https://www.sfcta.org/emerging-mobility/evaluation.

ATTACHMENT A
EXISTING TRAFFIC COUNT VALIDATION

Better Market Street Traffic Volumes - All Scenarios (PM Peak Period)
Comparision of 'Existing' Volumes to 2015 Counts

Intersection# - Consistent with Figure	Intersection# - Old	Street Name	Turning Movement		2010-2012 Existing Volumes PM	2015 Count	Difference	Difference (Intersection)	Percent Difference
4	3	Davis-Beale	SW	LT	35	47	12	-222	-10%
				TH	1263	1001	-262		
				RT	83	90	7		
				RT2	61	104	43		
		Market	EB	LT	0	0	0		
				TH	288	213	-75		
				RT	142	189	47		
			WB	LT	0	0	0		
				TH	205	248	43		
				RT	162	125	-37		
9	8	Montgomery	Mont - SB	LT	0	0	0	357	12%
				TH	810	727	-83		
				RT	0	0	0		
			SB	LT	223	185	-38		
				TH	773	906	133		
				RT	100	110	10		
			Post - EB	LT	0	0	0		
				TH	0	0	0		
				RT	286	483	197		
		Market	EB	LT	0	0	0		
				TH	337	362	25		
				RT	135	249	114		
			WB	LT	0	0	0		
				TH	277	276	-1		
				RT	0	0	0		
18	16	Seventh	NB	LT	91	124	33	-364	-17%
				TH	1400	1133	-267		
				RT	48	26	-22		
		Market	EB	LT	0	0	0		
				TH	218	142	-76		
				RT	0	0	0		
			WB	LT	0	0	0		
				TH	386	356	-30		
				RT	12	10	-2		
22	19	Tenth	Polk - SB	LT	24	10	-14	-238	-8%
				TH	837	941	104		
				RT	0	0	0		
			Fell - SB	LT	0	0	0		
				TH	887	811	-76		
				RT	16	58	42		
		Market	EB	LT	0	0	0		
				TH	192	95	-97		
				RT	281	237	-44		
			WB	LT	0	8	8		
				TH	611	450	-161		
				RT	0	0	0		
42	38	Sixth	NB	LT	0	0	0	-246	-7%
				TH	937	917	-20		
				RT	65	93	28		
			SB	LT	0	0	0		
				TH	939	913	-26		
				RT	117	49	-68		
		Mission	EB	LT	5	4	-1		
				TH	694	591	-103		
				RT	201	163	-38		
			WB	LT	4	17	13		
				TH	554	497	-57		
				RT	133	159	26		

ATTACHMENT B
RECENT AND FUTURE PLANNED TRANSPORTATION PROJECTS

Recent and Future Planned Transportation Projects within the Transportation Study Area

Transportation Plan/Project	2020 Baseline				2040 Cumulative	
	SF-CHAMP [1]	DTA [2]	VISSIM/ Synchro [3]	Qualitative Only	SF-CHAMP [4]	Qualitative Only
"Existing Conditions" - Projects completed 2011 through 2018 [5]						
Folsom Road Diet 4th to 11th [6]	X	X	X		X	
Minor Restriping Projects (Harrison at 11th, Sixth from Folsom to Market, Beale bike lane from Folsom to Bryant) [6]	X	X	X		X	
Haight Contraflow Transit Lane [6]	X	X	X		X	
Muni, Golden Gate, and SamTrans Transit Service Changes (Muni Forward or otherwise) [6]	X	X	X		X	
Two-Way McAllister Street (part of Muni Forward) [6]	X	X	X		X	
Signal Timing Changes on Market and Mission Streets	X	X	X		X	
Salesforce Transit Center [6]	X	X	X		X	
Safer Market Street [7,8]		X	X		X	
Golden Gate Avenue Safety Project [8,9]			X			X
Eighth Street Safety Project [8,10]		X	X			X
Second Street Improvement Project [7,8, 11]		X	X		X	
Seventh Street Safety Project [8,10]				X		X
Turk Street Safety Project [8,12,13]				X		X
Upper Market Street Safety Project [8,13,14]				X		X
Eddy Street Two-Way Conversion Project [8,15]				X		X
Powell Streetscape Project [8,13,16]				X		X
2020 Reasonably Foreseeable Projects						
Central Subway Project [6]	X	X	X		X	
Van Ness BRT Project/Van Ness Improvement Project [6]	X	X	X		X	
Transit Center District Plan Streetscape Improvements [7,8]		X	X		X	
Polk Street Streetscape Project [7,8,13]				X	X	
Vision Zero improvements to Sixth and Jessie streets [8]			X		X	
SFMTA Mission Street/South Van Ness Avenue/Otis Street Intersection Improvements [8,17]			X			X
Bay Area Bike Share System [18]				X		X

Recent and Future Planned Transportation Projects within the Transportation Study Area

Transportation Plan/Project	2020 Baseline				2040 Cumulative	
	SF-CHAMP [1]	DTA [2]	VISSIM/ Synchro [3]	Qualitative Only	SF-CHAMP [4]	Qualitative Only
2040 Reasonably Foreseeable Projects						
Sixth Street Road Diet Project [7]					X	
San Francisco Bicycle Plan short-term improvements to Fifth Street [7]					X	
Central SoMa Plan Street Network Changes [7]					X	
Muni Forward (Travel Time Reduction Projects) [6,7]					X	
Geary Rapid and Bus Rapid Transit Projects [7,19]					X	
Safer Taylor Street [8,20]						X
Hub Plan Street Network Changes [8, 21]						X

Notes: All websites shown below were current as of June 29, 2018, as confirmed by Fehr & Peers.

1. SF-CHAMP assumptions are presented in memorandums *Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run* (SFCTA, May 11, 2015) and *Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run* (SFCTA, July 17, 2015). This table only includes projects within the transportation study area. Additional projects outside of the study area that were included in the SF-CHAMP models are documented within these memorandums.
2. The DTA model validation and calibration processes is described in the memorandum *Dynamic Traffic Assignment Model PM Peak Period Validation for Better Market Street Project* (Fehr & Peers, October 30, 2015).
3. *Final Better Market Street 2020 VISSIM Model Updates and Changes* (Fehr & Peers, September 29, 2016).
4. SF-CHAMP was the only analysis model prepared for 2040 cumulative conditions as forecasting long-range conditions is fraught with uncertainty that diminishes the value of analyzing the scale differences due to the proposed project. For 2040 transportation conditions, tools with detailed inputs and outputs such as DTA and VISSIM have input variable ranges that would be larger than the measurable effects of the proposed project.
5. "Existing conditions" in the EIR represents the conditions as they are in 2018, or the most recent information available. This section is intended for clarification about what has changed since the existing validation and calibration efforts were completed for the VISSIM model in 2011/2012 as documented in the memorandum *Methodology and Validation for Market/Mission Street VISSIM Model* (San Francisco Planning Department, January 30, 2012).
6. Project described in *Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run* (SFCTA, May 11, 2015).
7. Project described in *Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run* (SFCTA, July 17, 2015).
8. Project or Plan was not reasonably foreseeable at the time the SF-CHAMP and/or DTA models were completed in 2015.
9. Golden Gate Avenue was adopted approved in May 2016, after the completion of the SF-CHAMP and DTA models were completed in 2015. The project was completed in 2016. More details on project are shown here: https://www.sfmta.com/projects/golden-gate-avenue-safety-project

Recent and Future Planned Transportation Projects within the Transportation Study Area

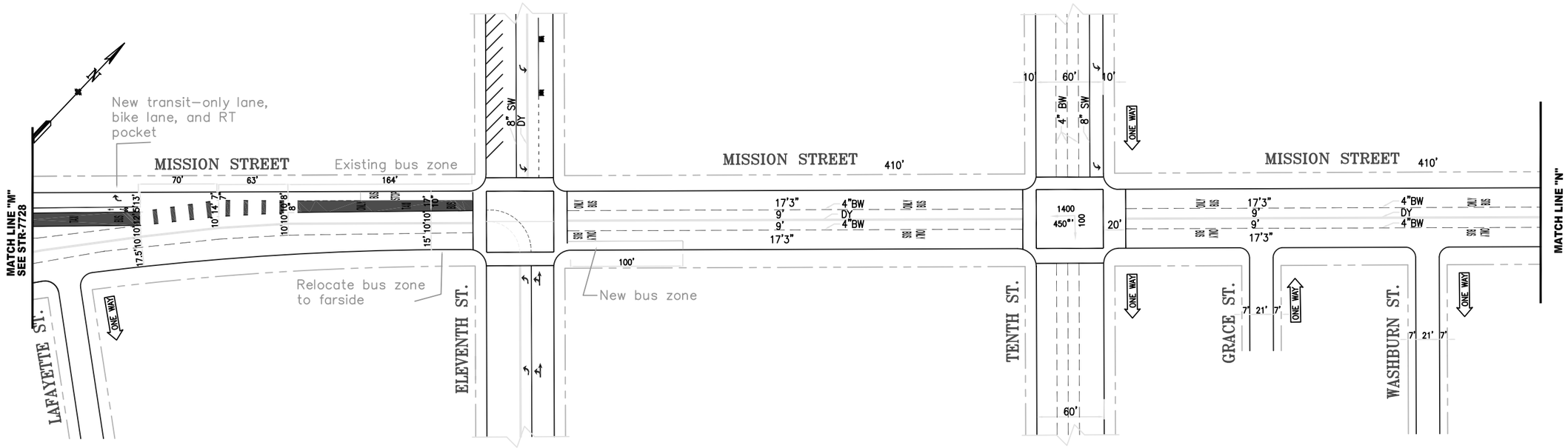
Transportation Plan/Project	2020 Baseline				2040 Cumulative	
	SF-CHAMP [1]	DTA [2]	VISSIM/ Synchro [3]	Qualitative Only	SF-CHAMP [4]	Qualitative Only

10. Phase 1 of the Seventh and Eighth Street Near Term Safety Project received approval from the SFMTA Board on November 15, 2016, after the VISSIM models were completed. Phase 1 was constructed between March and May 2017. More details are on the project webpage: https://www.sfmta.com/projects/7th-street-8th-street-near-term-safety-project. Accessed by Fehr & Peers on May 25, 2018. Preliminary planning and funding for the Eighth Street Phase 1 component was completed in 2015, hence why it was incorporated into the DTA and VISSIM models at that time, before the Eighth Street portion was incorporated into the broader project.
11. Initial turn restrictions for Second Street Improvement Project were implemented in March 2016. The complete project is expected to be complete in 2019 and is therefore included within the 2020 baseline analysis. More details on project are shown here: https://www.sfpublicworks.org/project/second-street-improvements-project
12. The Turk Street Safety project was approved in January 2018 and was therefore not reasonably foreseeable at the time any of the analysis models were completed. More details are on the project webpage: https://www.sfmta.com/projects/turk-street-safety-project
13. While the Turk Street, Polk Street, Upper Market Street Safety, and Powell Streetscape projects are directly adjacent to the study area, they do not touch the VISSIM or Synchro study locations.
14. The Upper Market Street Safety Project includes near-term improvements implemented in 2015 and spring of 2018, starting west of Octavia Boulevard. Long-term improvements were approved by the SFMTA Board of Directors in May 2017 and are expected to be constructed by 2020. More details are on the project webpage: https://www.sfmta.com/projects/upper-market-street-safety-project
15. The Eddy Street Two-Way Conversation Project received approval from the SFMTA Board in July 2017, after the analysis was completed. More details are on the project webpage: https://www.sfmta.com/projects/eddy-street-two-way-conversion-project. Accessed by Fehr & Peers on June 29, 2018.
16. The Powell Streetscape Project included elements completed in November 2015 after the SF-CHAMP and DTA models were completed. Additional elements are currently under consideration for implementation by an estimated Early 2021 as described on the project's webpage: https://www.sfmta.com/projects/powell-streetscape-project. Accessed by Fehr & Peers on June 29, 2018.
17. SF-CHAMP does not include the model parameters in order to incorporate this local streetscape project.
18. While a general increase in biking is included in future year models to reflect the buildout of the network, a bikeshare system is not a specific model parameter that can be included in these models.
19. The Geary Rapid Project is expected to be implemented by 2021 according to the project's website. The Geary Bus Rapid Transit project is the related project that includes longer term improvements west of Stanyan Street, outside of the transportation study area. More details are on the project webpage: https://www.sfmta.com/projects/geary-rapid-project
20. Safer Taylor Street is expected to go before the SFMTA Board of Directors in the Fall of 2018. More details are on the project webpage: https://www.sfmta.com/projects/safer-taylor-street
21. Hub Plan Street Network Changes are part of the Market Street Hub project, which is currently in the planning stages. More details are on the project webpage: http://sf-planning.org/market-street-hub-project

Source: SF Planning Department, Fehr & Peers. 2018.

ATTACHMENT C
2020 NO PROJECT – PLANNED IMPROVEMENTS

Mission Street / Otis Street / South Van Ness Avenue



NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

DESIGNED: DATE:
DRAWN: DATE:
CHECKED: DATE:

APPROVED
SECTION ENGINEER DATE:
CITY TRAFFIC ENGINEER DATE:

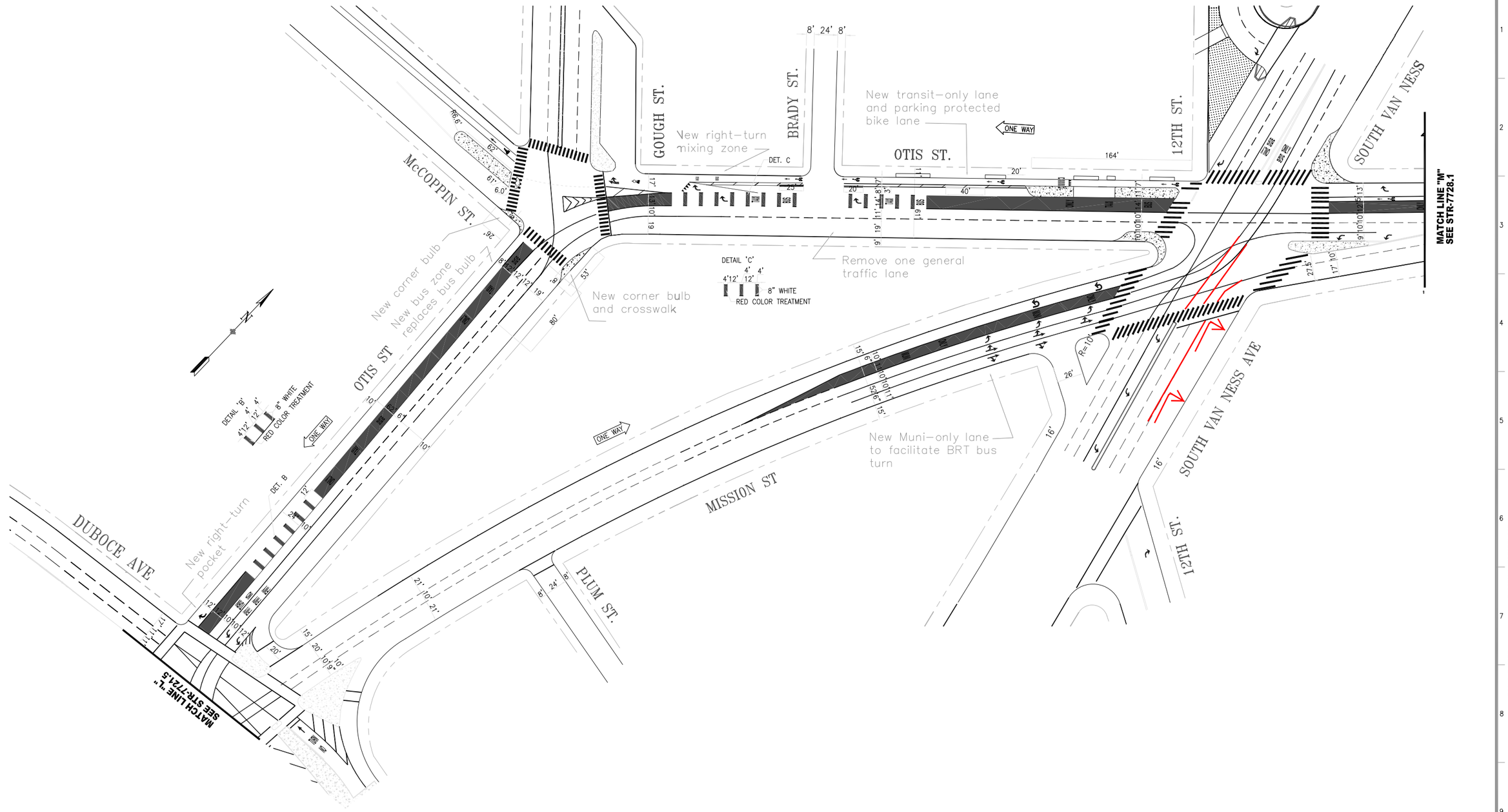
SCALE: 1"=50'
SHEET OF SHEETS

TTRP PROPOSALS

MISSION STREET
11TH STREET TO 7TH STREET

CONTRACT NO.
DRAWING NO.
FILE NO.
REV. NO. 0

EXTERNAL REFERENCES:
SCALE FACTOR:
ORIGIN:
FILE NAME:
DATE:



NO.	DATE	DESCRIPTION	BY	APP.
1	–			

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

DESIGNED: DATE:
DRAWN: DATE:
CHECKED: DATE:

APPROVED
SECTION ENGINEER DATE:
CITY TRAFFIC ENGINEER DATE:

SCALE: 1"=50'

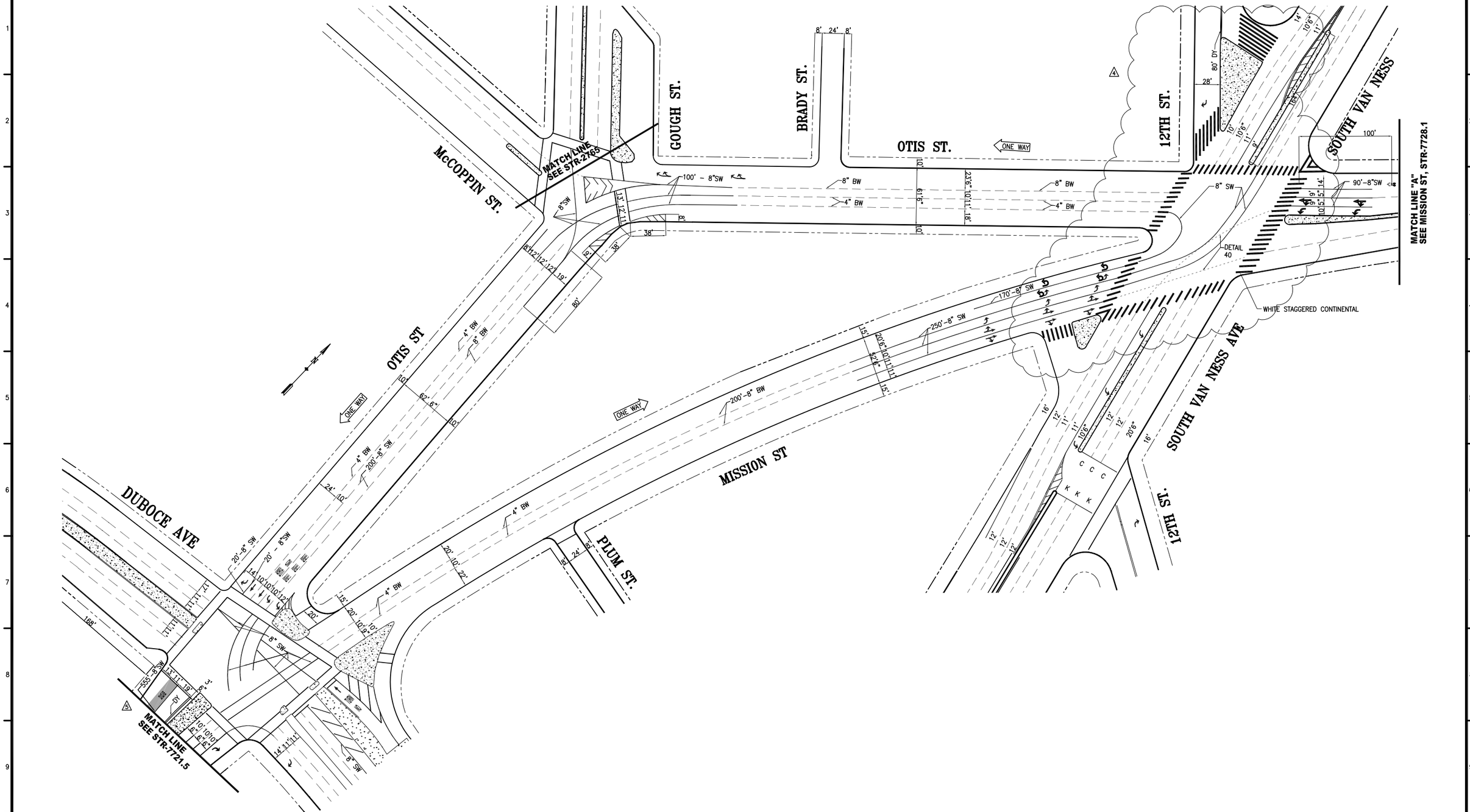
SHEET OF SHEETS

TTRP PROPOSALS

MISSION STREET
MISSION / OTIS / SOUTH VAN NESS AVENUE

CONTRACT NO.
DRAWING NO.
FILE NO.
REV. NO. 1

EXTERNAL REFERENCES: FONTS USED:
SCALE FACTOR: PLOT SCALE:
ORIGIN:
FILE NAME: DATE:



****** UPDATED PER FIELD CONDITIONS

NO.	DATE	DESCRIPTION	BY	APP.
5	02/18/16	RESTRIPED MISSION AND ADDED RED BUS LANES	JVT	CL
4	xx/xx/16	ADDED STAGGERED CONTINENTALS @ S. VAN NESS, 12TH & OTIS	DCarr	GD
3	******	UPDATED PER FIELD CONDITIONS	AW	BBD
2	2/17/10	ADDED SHARED USE LANE MARKINGS SVN – 11TH	PKO	DRC
1	*****	REMOVED "KC" MESSAGE AT GOUGH/OTIS STS. REPAVED	TA	MG

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

REFERENCE INFORMATION & FILE NO. OF SURVEYS

SUPERCEDES STR-4602 REV 25

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

DESIGNED:	DATE:
DRAWN: T.A	DATE: 2007
CHECKED: R.O	DATE: 2007

APPROVED
THOMAS P FOLKS 5/27/07
SECTION ENGINEER DATE:
JACK L. FLECK 5/27/07
CITY TRAFFIC ENGINEER DATE:

SCALE: 1"=50'

SHEET OF SHEETS

TRAFFIC STRIPING

MISSION STREET
MISSION / OTIS / SOUTH VAN NESS AVENUE

CONTRACT NO.

DRAWING NO. STR-7728

FILE NO.

REV. NO. 4

FILE NAME: T:\T_e_files\Off_rec\dwgs\A_Z\m\mission\str-7728
DATE:
ORIGIN: OPERATIONS
SCALE FACTOR:
PLOT SCALE:
EXTERNAL REFERENCES:
FONTS USED:

12th St, Mission, Otis, & S. Van Ness

DRAFT for VN BRT 2020 BASELINE CONDITIONS

CHANGE XXXX
Intersection No. 24358000
ENGINEER: Ian Trout
Date: 11/7/2014
Programmed by:
Installed by:
Date Completed:

NOTES:

PHASE	STREET NAME	Emer Flash	Prog Flash
2	S. Van Ness NB	R	N/A
3	Mission WBRT	R	N/A
4	Mission EB	R	N/A
6	Van Ness SB	R	N/A
7	Mission EBLT	R	N/A
8	Mission WB/WBLT	R	N/A
15T	Van Ness BRT SB	R	N/A

Controller: 2070
Cabinet MSF
Oper. Date: 8/31/1951
System: Isolated
Master: TBC GPS
Cascade: n/a

12th St, Mission, Otis, & S. Van Ness

ATTACHMENTS

[X] Base Timing [X] Actuation [ ] Transit Priority [ ] Preemption

OPERATION TIMES
PLAN ONE (1)

X = YES -- = NO	S	M	T	W	T	F	S	CYCLE	SPLIT	OFFSET	FLASH
AT ALL TIMES	X	X	X	X	X	X	X	1	1	1	--

STREET	PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
S. Van Ness NB	2	R	G				Y	R															
Mission WBRT	3	OFF							f	OFF													
Mission EB	4	R																	G			Y	R
Van Ness SB	6	R	G				Y	R															
Mission EBLT	7	R																	G			Y	R
Mission WB/WBLT	8	R											G + G			Y	R						
Van Ness BRT SB	15T	--							|	F |	--												
Peds Xing Mission ES--n half	2P	W			FRH	RH													W		FRH	RH	
Peds Xing S. Van Ness SS	4P	RH																	W		FRH	RH	
Peds Xing Mission St WS	6P	W													FRH	RH							
Peds Xing S. Van Ness NS	8P	RH										W		FRH		RH							
Peds Xing Mission St ES--s ha	9P	W			FRH	RH						W			FRH	RH							
Peds Xing Otis St	11P	W		FRH		RH																	
																						ws 3.5	

CSO	CYCLE (sec)	OFFSET (sec)	SIGNAL INTERVALS (seconds)																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
111	160.0	0	3.0	29.5	2.0	3.0	8.0	4.0	3.5	11.5	4.0	3.5	3.0	9.0	12.0	5.0	8.0	4.0	3.0	6.5	19.0	11.0	4.0	3.5

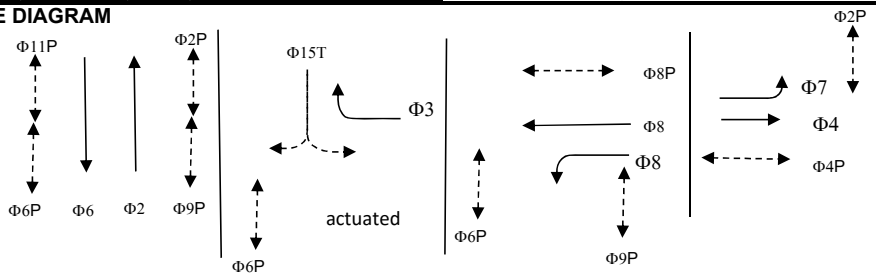
CHANGE XX

PAGE 2: BASE TIMING, ACTUATION, COORDINATION SETTINGS

Use this card only when you have Actuation, Priority or Preempts, or want Custom Transitioning.

12th St, Mission, Otis, & S. Van Ness Page 2 of 9

PHASE DIAGRAM



Are there conflicting protected left turn phases? no

BASE TIMINGS:

Phase	1	2	3-OVL	4	5	6	7	8	9P	11P		15T
Movement		NB	WBRT	EB		SB	EBLT	WB	ESP	WSP		BRT
Absolute Min Green (whole #)		34	11	36		34	36	30				11
Yellow		4.0		4.0		4.0	4.0	4.0	4.0	4.0		4.0
Red Clearance		3.5		3.5		3.5	3.5	3.0	3.5	3.5		3.5
Absolute Min Walk		8		6		8		5	7	8		
FRH		11		30		13		25	8	13		

ACTUATION: ** if Actuation setting vary by plan, use special comments.

Phase	1	2	3-OVL	4	5	6	7	8	9P	11P		15P
Vehicle Det Type		None	None	None		None	None	None				Sensys
Ped Detection		None		None		None		None	None	None		None
Vehicle Recall (Max, Min, Soft or None)		Max		Max		Max	Max	Max				None
Absolute Min Green (same as above)		34	11	36		34	36	30				11
Vehicle Extension (seconds)												11
Max Green (only used for FREE)												
Pedestrian Recall (Yes or No)		Yes		Yes		Yes		Yes	Yes	Yes		
Ped Recycle (Yes or No)		Yes		Yes		Yes		Yes	Yes	Yes		
"WALK EXPAND" (Yes or No)		Yes		Yes		Yes		Yes	Yes	Yes		

CUSTOM TRANSITIONING (phase splits = Max G + Y + R Clearance)

Phase	1-8 Cycle length	1	2	3	4	5	6	7	8
Dial 1 Splits									
Max Trans									
Min Trans									
Dial 2 Splits									
Max Trans									
Min Trans									
Dial 3 Splits									
Max Trans									
Min Trans									
Coordinated Phases									

Special Comments

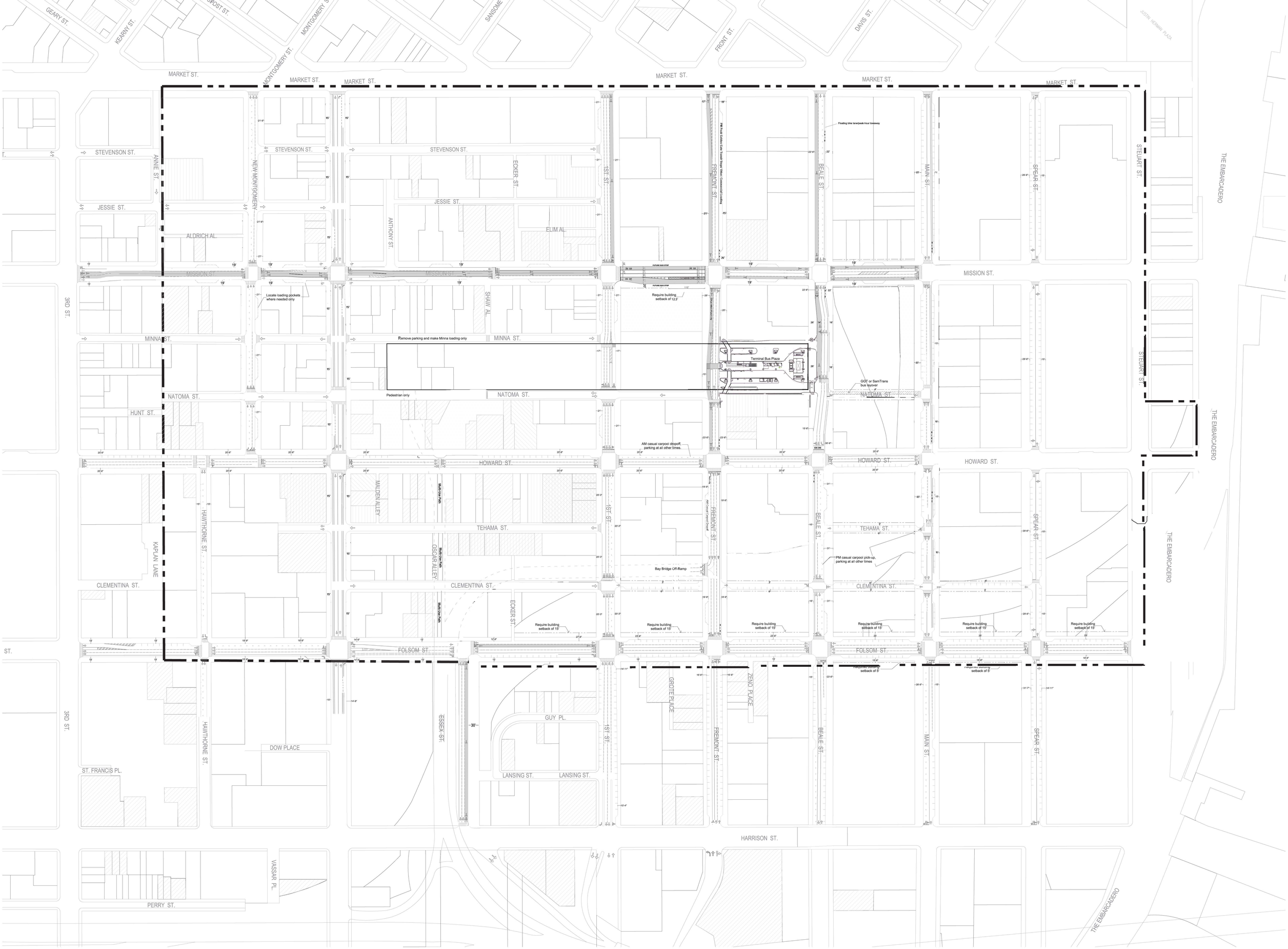
Start Flash = 0 seconds; Start Red = 6 seconds
3 second LPI for 8P, 9P, 11P, 13P, 15P.

12th St, Mission, Otis, & S. Van Ness

Change

xxxx

Transbay Center District Plan



Street Configuration Plan - DRAFT

May 2012

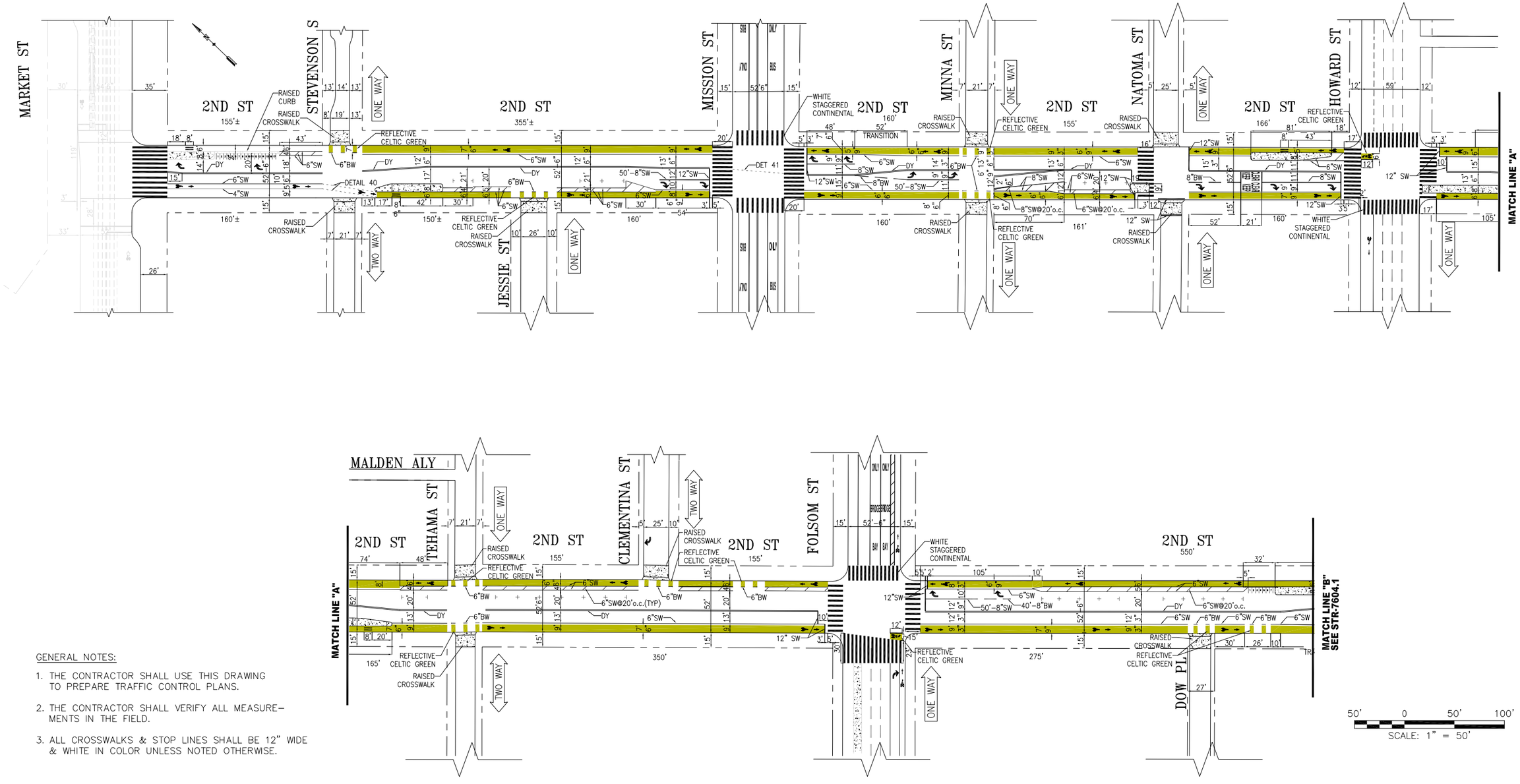
Notes:

- Curb bulb outs are conceptual, and may be removed where necessary
- Location and size of loading pockets to be determined; dependent on land uses, driveway locations, etc.
- "T" : transit-only lane

N

0 50 100 200 400 ft

Second Street Road Diet



GENERAL NOTES:

1. THE CONTRACTOR SHALL USE THIS DRAWING TO PREPARE TRAFFIC CONTROL PLANS.
2. THE CONTRACTOR SHALL VERIFY ALL MEASUREMENTS IN THE FIELD.
3. ALL CROSSWALKS & STOP LINES SHALL BE 12" WIDE & WHITE IN COLOR UNLESS NOTED OTHERWISE.

50' 0 50' 100'
SCALE: 1" = 50'

NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

DRAWN: DATE: EER/DM 12/15
CHECKED: DATE: MS 12/15

APPROVED
SECTION ENGINEER DATE:
CITY TRAFFIC ENGINEER DATE:

SCALE: 1" = 50'
SHEET OF SHEETS 3 OF 4

SECOND STREET IMPROVEMENTS PROJECT

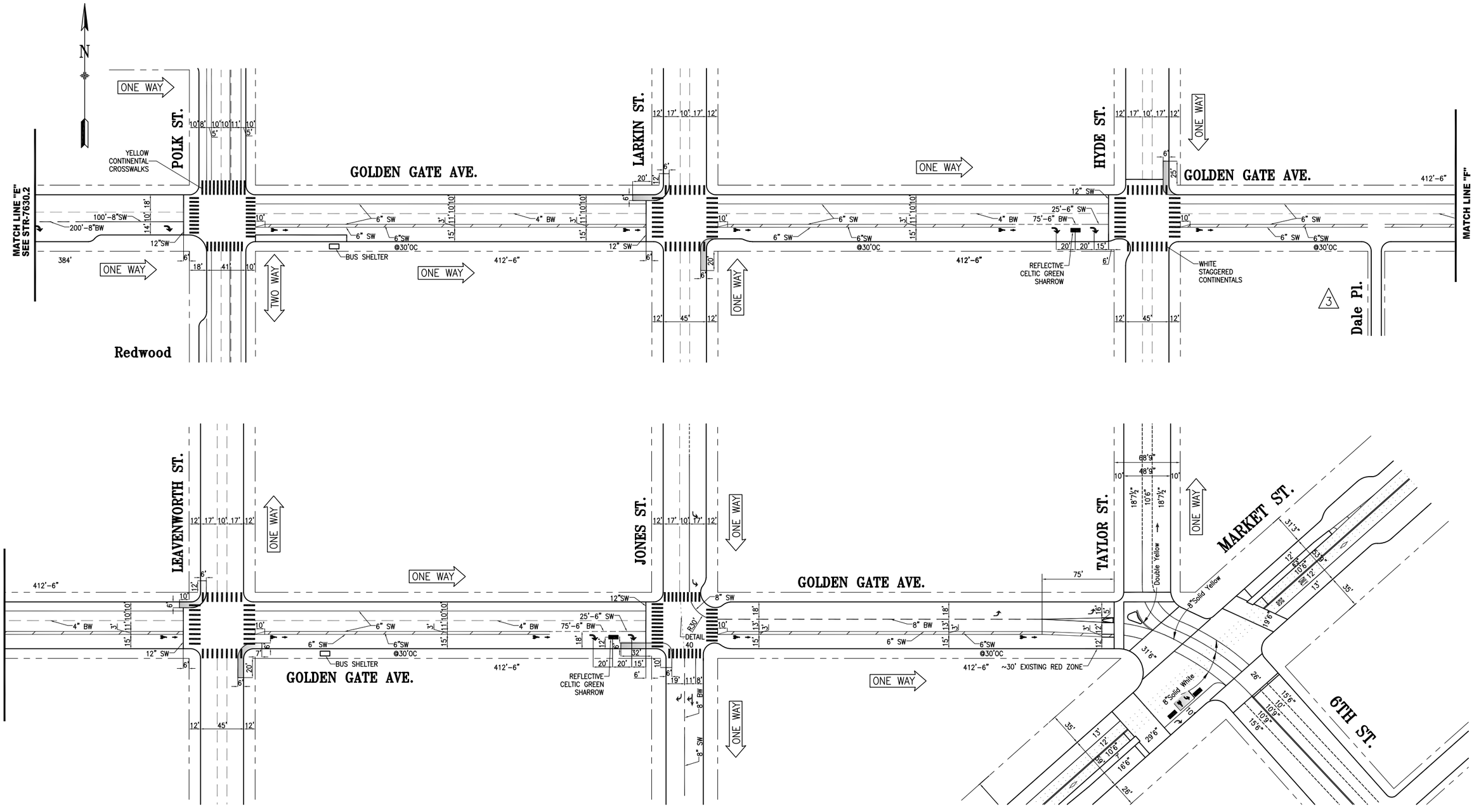
-DRAFT- NEW TRAFFIC STRIPING

MARKET STREET TO DOW PLACE

CONTRACT NO. 1064J
DRAWING NO. T-3
FILE NO.
REV. NO. 0

EXTERNAL REFERENCES: XREFS
FONTS USED: FONTS
SCALE FACTOR: XX
PLOT SCALE: X:X
ORIGIN: LIVABLE STREETS
FILE NAME:
DATE: --/--/--

Golden Gate Avenue Road Diet



NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

SUPERCEDES STR-1841 REV. "4" & STR-1841.1 REV."10"

MS	05/01	
DRAWN:	DATE:	
DY	05/01	
CHECKED:	DATE:	
AKW	05/01	

APPROVED

SENIOR ENGINEER DATE:

CITY TRAFFIC ENGINEER DATE:

SCALE: 1"=50'

SHEET OF SHEETS 4 OF 5

TRAFFIC STRIPING

GOLDEN GATE AVENUE
POLK STREET TO MARKET STREET

CONTRACT NO.

DRAWING NO.

FILE NO.

REV. NO.

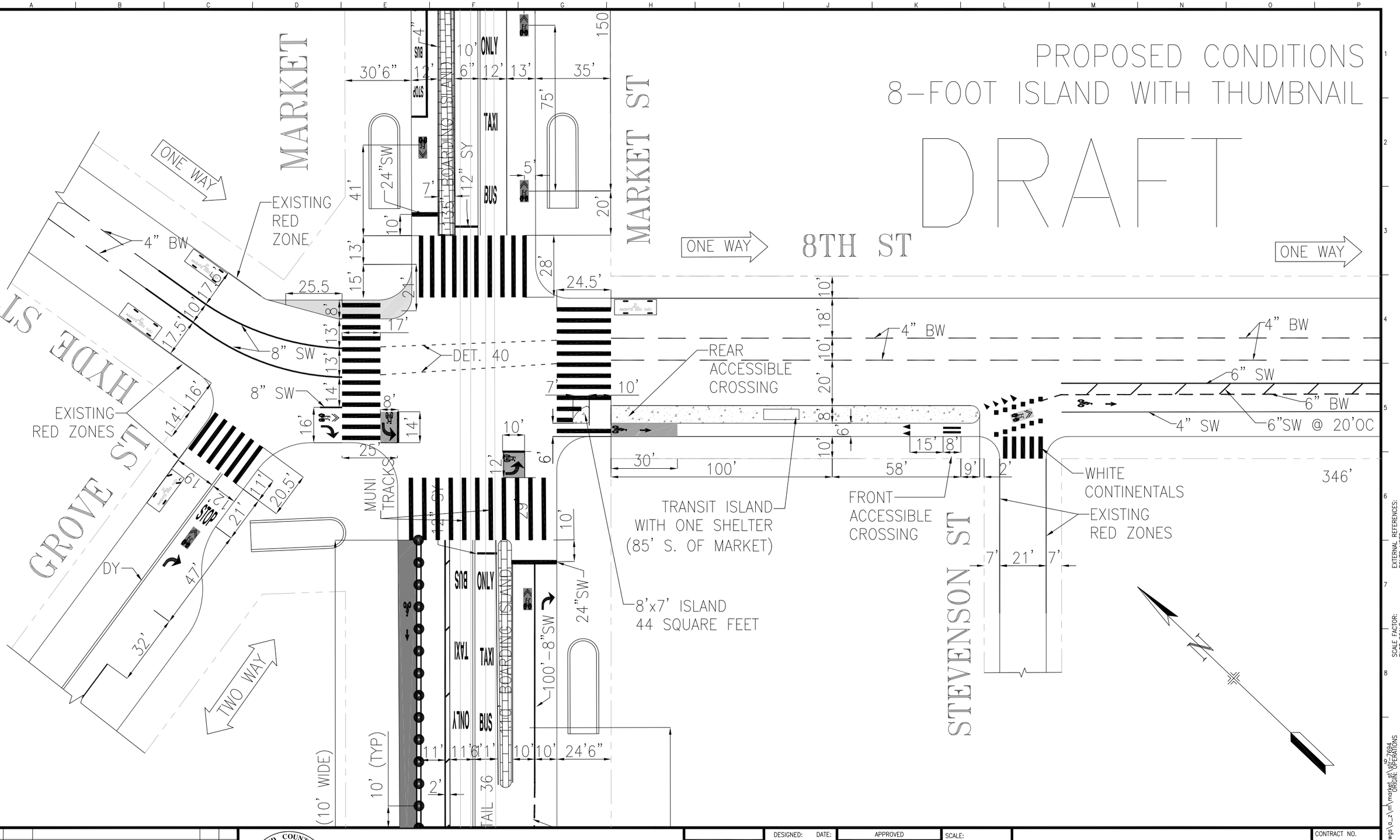
EXTERNAL REFERENCES:
FONTS USED:

SCALE FACTOR:
PLOT SCALE: 1=1

ORIGIN: OPERATIONS

FILE NAME: T_e\offic_rec\dwgs\o_z\0\str-7630.3
DATE: 05/02

Eighth Street & Market Re-striping and Bus Island



NO.	DATE	DESCRIPTION	BY	APP.

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

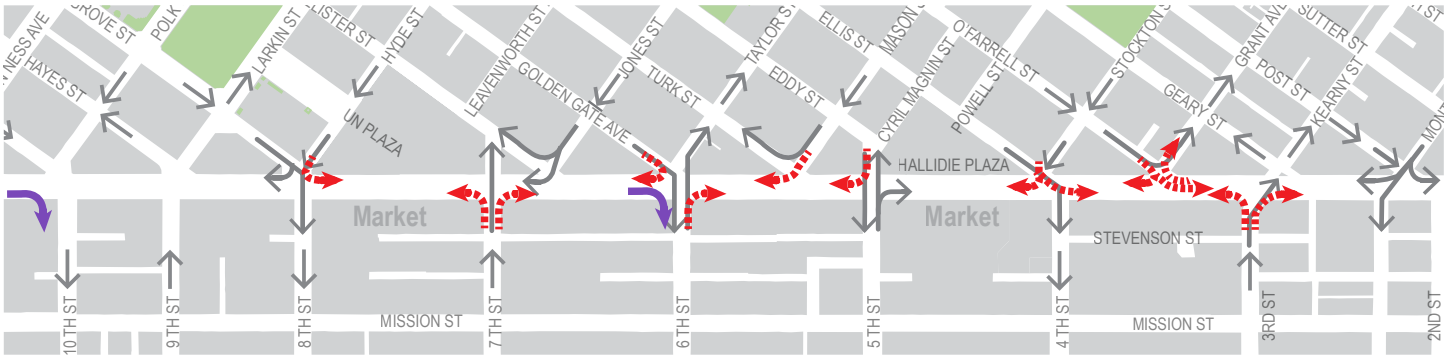
DESIGNED: DATE:	APPROVED	SCALE: 1"=20'	PROPOSED TRAFFIC STRIPING
DRAWN: DATE: DRAFT 01/2016	SECTION ENGINEER DATE:	SHEET OF SHEETS	EIGHTH STREET AT MARKET, GROVE, AND HYDE STREETS
CHECKED: DATE:	CITY TRAFFIC ENGINEER DATE:		

CONTRACT NO.
DRAWING NO.
FILE NO.
REV. NO. 12

EXTERNAL REFERENCES:
FONTS USED:
SCALE FACTOR:
PLOT SCALE:
FILE NAME: T_e\Off_rec\dwgs\a_z\m\market st\str-7694
DATE:
ORIGIN: OPERATIONS

Safer Market Street Plan Turn Restrictions

Turn Restrictions



Legal movement | Existing required turn | New turn restriction

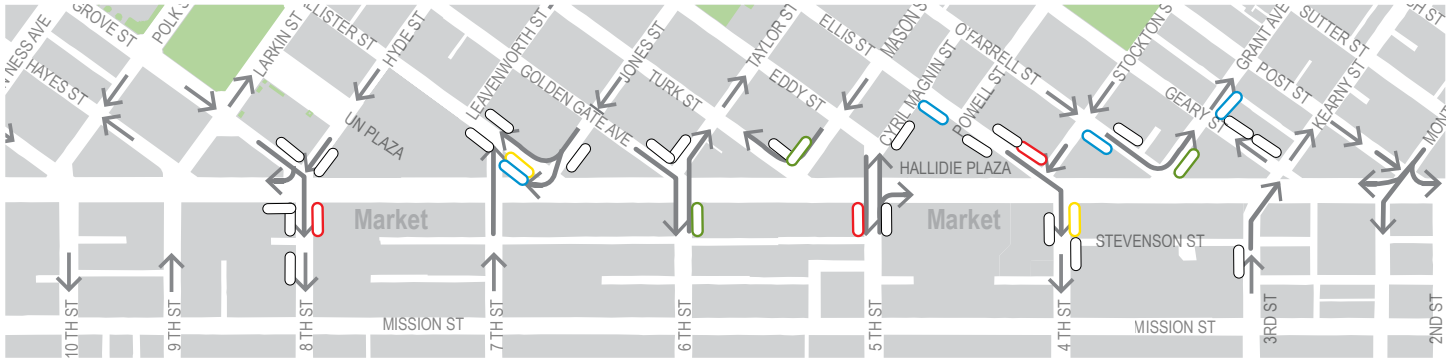
Safer Market Street covers the segment of Market between 3rd - 8th streets and the upcoming turn restrictions in addition to the existing required turns limit private vehicle access. Transit, paratransit, taxis, bicycles and emergency and commercial vehicles would be exempt. All motorists are free to cross Market Street; the objective is to divert traffic off of Market to reduce conflicts between road users.

Transit-only Lanes

Upcoming transit-only lane | Existing transit-only lane

The extension of the existing transit-only lanes gives buses dedicated space increasing transit efficiency and improving service reliability. It additionally reduces problems caused by lane weaving.

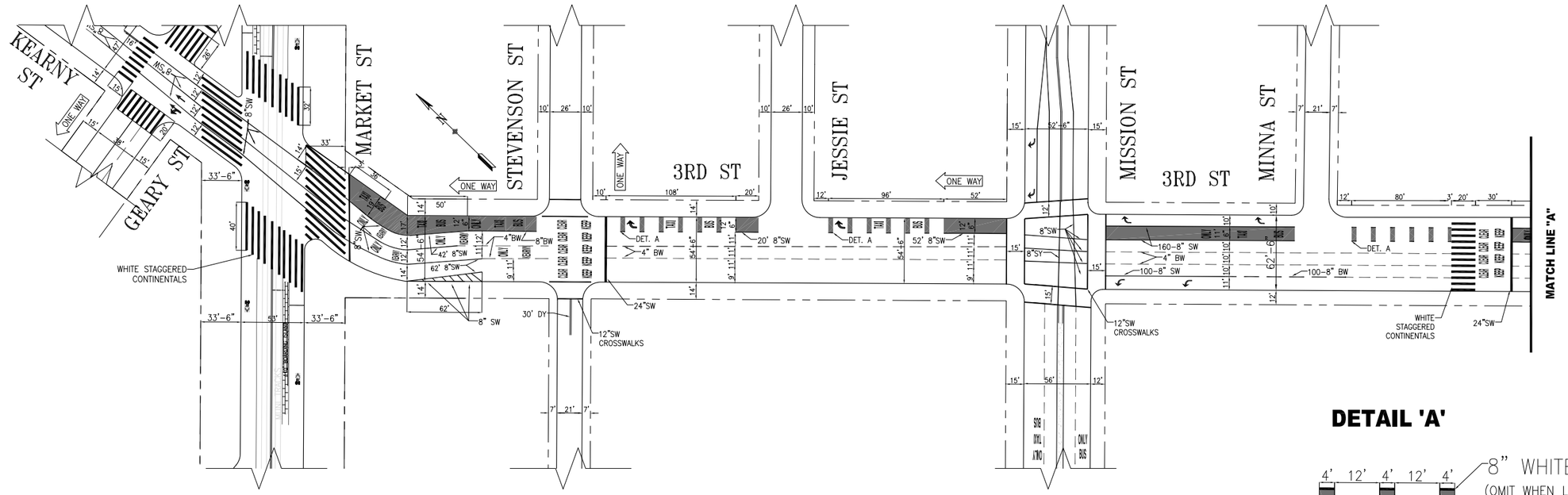
Loading Zones

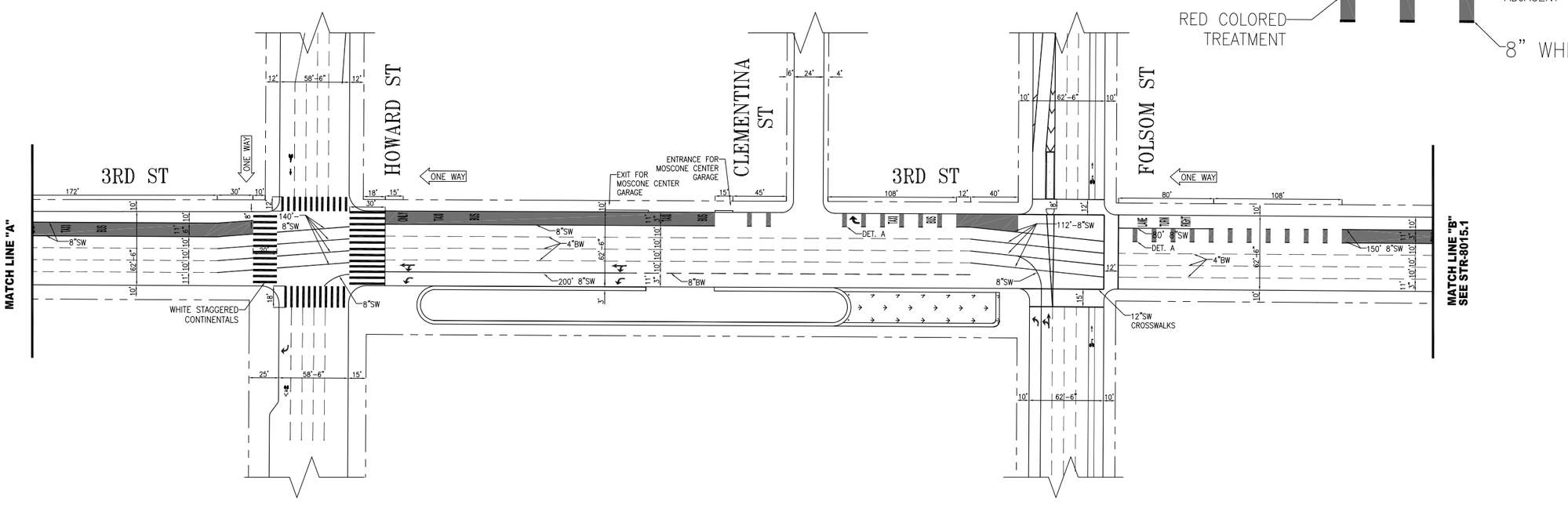


Existing white zone adjacent to Market | Existing white zone to be yellow | New blue zone
New white zone | New upcoming white zone | Delayed due to Central Subway

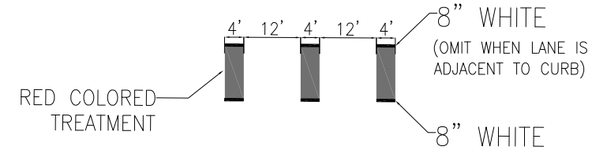
The project team collaborated with hotels and merchants and as part of a pilot program is creating additional loading zones to encourage safe loading and unloading of private vehicles off of Market Street. New blue zones increase access for people with disabilities.

Third Street Re-Striping Plan





DETAIL 'A'



NO.	DATE	DESCRIPTION	BY	APP.
3	7/19/15	RECONFIGURED MARKET INTERSECTION GUIDELINES, ADDED RED TRANSIT LANE AND ADJUSTED STRIPING FROM MISSION TO MARKET. REMOVED TOW-AWAY LANE BETWN. MISSION & MARKET	IRT	KK
2	-/-/15	UPGRADED TO WHITE STAGGERED CONTINENTALS @ MARKET	AU	GD
1	11/10/14	UPGRADED TO WHITE STAGGERED CONTINENTALS @ HOWARD	AU	GD
0	3/22/14	NEW STRIPING DRAWING	JJK	BT

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

SUPERSEDES STR-6143 REV. 20

DRAWN:	DATE: JJK 03/2014
CHECKED:	DATE: BT 03/2014

APPROVED

C. LIU 03/10/2014
SENIOR ENGINEER DATE:

R. OLEA 03/10/2014
CITY TRAFFIC ENGINEER DATE:

SCALE: 1" = 50'

SHEET OF SHEETS: 1 OF 2

TRAFFIC STRIPING

THIRD STREET
MARKET STREET TO FOLSOM STREET

CONTRACT NO.

DRAWING NO. STR-8015

FILE NO.

REV. NO. 2

EXTERNAL REFERENCES: FONTS USED:

SCALE FACTOR: PLOT SCALE: 1=1

ORIGIN: TRANSIT ENGINEERING

FILE NAME: --/--/--
DATE:

ATTACHMENT D
TRANSIT DWELL TIMES

Line	Stop	Existing Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.
2	1st Street	15	10	1st Street	15	10
	Beale Street	25	25	Main-Beale Street	25	25
	Total	***40***		***Total***	***40***	
5	7th Street	15	10			
	6th Street	15	5	4th Street	45	25
	5th Street	25	10	3rd Street	30	20
	4th Street	15	10			
	3rd Street	15	10	1st Street	10	5
	1st Street	10	5			
	Total	***95***		***Total***	***85***	
6	Van Ness Avenue	20	15	Van Ness Avenue	20	15
	9th Street	20	15	9th Street	20	15
	8th Street	25	15	7th Street	40	20
	7th Street	25	15	6th Street	25	10
	6th Street	20	10	5th Street	25	30
	5th Street	30	35	4th Street	25	15
	4th Street	35	35	New Montgomery Street	30	20
	3rd Street	25	20	1st Street	20	10
	2nd Street	20	10	Main-Beale Street	25	25
	1st Street	15	10			
	Beale Street	25	25			
	Total	***260***		***Total***	***230***	
9	11th Street/Market	25	15	11th Street/Market	25	15
	9th Street	20	15			
	8th Street	15	5	7th Street	45	25
	7th Street	30	20			
	6th Street	20	10	4th Street	45	25
	5th Street	45	25	3rd Street	45	25
	4th Street	20	10			
	3rd Street	25	20	1st Street	15	10
	New Montgomery Street	10	5	Main-Beale Street	25	25
	1st Street	10	5			
	Beale Street	25	25			
	Total	***245***		***Total***	***200***	
9R	11th Street/Market	25	15	11th Street/Market	25	15
	9th Street	20	15	7th Street	40	20
	8th Street	15	5	4th Street	25	15
	7th Street	30	20	3rd Street	20	10
	6th Street	20	10	1st Street	20	10
	5th Street	45	25	Main-Beale Street	25	25
	4th Street	20	10			
	3rd Street	25	20			
	New Montgomery Street	10	5			
	1st Street	10	5			
	Beale Street	25	25			
	Total	***245***		***Total***	***155***	
21	9th Street	20	15	9th Street	20	15
	8th Street	25	15	7th Street	40	20
	7th Street	25	15	6th Street	20	10
	6th Street	20	10	5th Street	30	35
	5th Street	30	35	4th Street	35	35
	4th Street	35	35	New Montgomery Street	35	20
	3rd Street	25	20	1st Street	20	10
	New Montgomery Street	20	15	Main-Beale Street	25	25
	1st Street	15	10			
	Beale Street	25	25			
	Total	***240***		***Total***	***225***	

Line	Stop	Existing Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.
31	5th Street	30	35	5th Street	30	30
	4th Street	35	35	4th Street	35	35
	3rd Street	25	20	New Montgomery Street	30	20
	New Montgomery Street	20	15	1st Street	20	10
	1st Street	15	10	Main-Beale Street	25	25
	Beale Street	25	25			
	Total	***150***		***Total***	***140***	
38	3rd Street	25	20	New Montgomery Street	30	20
	New Montgomery Street	15	10	1st Street	15	10
	1st Street	10	5			
	Total	***50***		***Total***	***45***	
38R	New Montgomery Street	15	10	New Montgomery Street	15	10
	1st Street	10	5	1st Street	10	5
	Total	***25***		***Total***	***25***	
7	Van Ness Avenue	25	15	Van Ness Avenue	25	15
	9th Street	25	15	9th Street	25	15
	8th Street	25	15	7th Street	25	15
	7th Street	15	10	6th Street	15	10
	6th Street	15	10	5th Street	10	10
	5th Street	10	10	4th Street	25	15
	4th Street	25	10	New Montgomery Street	20	10
	4th Street	25	15	1st Street	25	15
	3rd Street	20	10			
	1st Street	15	10			
	Total	***200***		***Total***	***170***	
F	Gough Street - 90	25	10	Gough Street - 90	25	10
	Van Ness Avenue - 90	25	10	Van Ness Avenue - 90	40	20
	9th Street	25	10	7th Street - 90	45	25
	8th Street	30	10	5th Street - 90	45	25
	7th Street - 90	30	20	3rd Street - 90	30	20
	6th Street	25	10	1st Street - 90	30	20
	5th Street - 180	45	25	Main-Beale Street - 90	40	25
	4th Street	60	45			
	3rd Street - 90	35	35			
	New Montgomery Street	25	15			
	1st Street - 180	20	15			
	Main Street - 90	40	25			
	Total	***385***		***Total***	***255***	
	Where 90 (disabled ramps) or 180 (disabled lifts) is shown with stop, there is a 5 percent chance that the streetcar stops to load a disabled passenger. It stops again at the boarding island.			There is now a 10 percent chance that streetcar stops at mini-highs before advancing to the boarding island.		
5R				4th Street	30	20
				3rd Street	15	10
				1st Street	20	15
	Total			***Total***	***65***	
16X/7X				4th Street	25	20
				3rd Street	20	15
				1st Street	20	15
				Main-Beale Street	25	25
	Total			***Total***	***90***	
19				7th Street	40	20

Line	Stop	Existing Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Mission Street.						
Line	Stop	Existing Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound Dwell Time (seconds) Average	Std. Dev.
14	13th Street	25	15	13th Street/Mission	25	20
	South Van Ness	20	15	South Van Ness/Mission/11th	20	10
	11th Street	20	15	11th Street/Market	25	20
	9th Street	20	10	9th Street	25	20
	8th Street	25	15	7th Street	30	20
	7th Street	20	15	6th Street	25	20
	6th Street	25	15	5th Street	30	20
	5th Street	25	15	4th Street	25	20
	4th Street	25	20	3rd Street	30	20
	3rd Street	15	5	1st Street	15	10
	2nd Street	15	5	Main-Beale Street	10	5
	1st Street	15	5	Steuart Street	10	5
	Main Street	10	5			
	Steuart Street & Market St	10	5			
	Total	***270***		***Total***	***270***	
14R	11th Street	20	15			
	8th Street	25	15	11th Street/Market	25	20
	5th Street	25	15	7th Street	30	20
	4th Street	25	20	5th Street	30	20
	3rd Street	15	5	3rd Street	25	20
	2nd Street	15	5	1st Street	25	20
	1st Street	15	5	Main-Beale Street	15	10
	Main Street	15	5	Steuart Street	15	10
	Steuart Street & Market St	15	5			
	Total	***170***		***Total***	***165***	
14X	Does not operate inbound in PM Peak					
	Total	***0***		***Total***	***0***	
292/KX	9th Street	20	20	9th Street	25	25
	7th Street	20	20	7th Street	25	25
	5th Street	20	20	5th Street	25	25
	3rd Street	20	20	3rd/New Montgomery Street	25	25
	2nd Street	20	20	1st Street	20	20
	1st Street	20	20			
	Total	***120***		***Total***	***120***	
GGT Basic	8th Street	20	20	7th Street	35	35
	7th Street	20	20	5th Street	35	35
	5th Street	20	20	3rd/New Montgomery Street	35	35
	4th Street	20	20	1st Street	35	35
	3rd Street	20	20			
	2nd Street	20	20			
	1st Street	20	20			
	Total	***140***		***Total***	***140***	

Line	Stop	Existing Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Van Ness, Mission, or 11th streets.						
Line	Stop	Existing Inbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound Dwell Time (seconds) Average	Std. Dev.
47	11th/Mission	15	10	Van Ness Ave/Market	45	35
	Van Ness Ave/Market	40	30			
	Total	***55***		***Total***	***45***	
49	13th Street	20	10	13th Street/Mission	20	10
	Van Ness Ave/Market	45	35	Van Ness Ave/Market	45	35
	Total	***65***		***Total***	***65***	

Line	Stop	Existing Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.
2	Drumm Street	30	20	Drumm Street	30	20
	Front Street	25	15	Front Street	25	15
	Total	***55***		***Total***	***55***	
5	Front Street	20	20	Montgomery Street	45	25
	Sutter Street	25	20			
	Montgomery Street	30	15			
	Grant Avenue	25	15	Cyril Magnin Street	45	25
	Powell Street	40	15			
	Mason Street	20	10			
	Total	***160***		***Total***	***90***	
6	Drumm Street	30	20	Drumm Street	30	20
	Battery Street	25	15	Front Street	25	15
	Montgomery Street	20	10	Sansome Street	20	10
	Kearny Street	25	10	Kearny Street	25	10
	Stockton Street	35	15	Grant Avenue	35	15
	Taylor Street	25	15	Cyril Magnin Street	25	15
	Jones Street	25	15	Taylor Street	25	15
	Hyde Street	30	20	Hyde Street	30	20
	Larkin Street	20	15	Larkin Street	20	15
	Van Ness Avenue	30	15	Van Ness Avenue	30	15
	Total	***265***		***Total***	***265***	
9	Front Street	20	15	Drumm Street	15	10
	Montgomery Street	20	10	Front Street	30	15
	Kearny Street	20	5	Montgomery Street	45	15
	Stockton Street	25	10			
	Cyril Magnin Street	30	15			
	Taylor Street	25	10	Cyril Magnin Street	30	15
	Jones Street	25	10			
	Hyde Street	25	15	Hyde Street	45	25
	Larkin Street	20	10			
	11th Street/Market	25	15	11th Street/Market	25	15
	11th Street/Mission	10	5	11th Street/Mission	10	5
	Total	***245***		***Total***	***200***	
9R	Front Street	25	15	Front Street	25	15
	Montgomery Street	20	10	Montgomery Street	30	15
	Kearny Street	25	10	Cyril Magnin Street	45	15
	Stockton Street	35	15	Hyde Street	40	20
	Cyril Magnin Street	35	20	11th Street/Market	25	15
	Taylor Street	25	15			
	Jones Street	25	15			
	Hyde Street	30	20			
	Larkin Street	20	15			
	11th Street/Market	25	15			
	Total	***265***		***Total***	***165***	
21	Drumm Street	30	20	Drumm Street	30	20
	Fremont Street	20	10	Front Street	20	10
	Sansome Street	20	10	Sansome Street	25	20
	Montgomery Street	25	20	Kearny Street	25	15
	Grant Avenue	25	20	Grant Avenue	25	20
	Powell Street	40	20	Cyril Magnin Street	45	15
	Mason Street	15	10	Taylor Street	20	10
	Jones Street	20	10	Hyde Street	25	15
	Hyde Street	25	20			
	Total	***220***		***Total***	***215***	

Line	Stop	Existing Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.
31	Drumm Street	30	20	Drumm Street	30	20
	Fremont Street	25	15	Front Street	25	15
	Sansome Street	25	20	Sansome Street	25	20
	Montgomery Street	30	15	Kearny Street	30	15
	Grant Avenue	25	15	Grant Avenue	25	15
	Powell Street	40	15	Cyril Magnin Street	40	15
	Total	***175***		***Total***	***175***	
38	Sansome Street	25	20	Sansome Street	25	20
	Montgomery Street	30	15	Kearny Street	30	15
	Total	***55***		***Total***	***55***	
38R	Montgomery Street	30	15	Montgomery Street	30	15
	Sansome Street	25	20	Sansome Street	25	20
	Total	***55***		***Total***	***55***	
7	Front Street					
	Montgomery Street	20	10	Sansome Street	20	10
	Kearny Street	25	10	Kearny Street	25	10
	Stockton Street	35	15	Grant Avenue	35	15
	Cyril Magnin Street	35	20	Cyril Magnin Street	35	20
	Taylor Street	25	15	Taylor Street	25	15
	Jones Street	25	15	Hyde Street	40	20
	Hyde Street	30	20	Larkin Street	20	15
	Larkin Street	20	15	Van Ness Avenue	30	15
	Van Ness Avenue	30	15			
	Total	***245***		***Total***	***230***	
F	Drumm Street - 90	45	25	Drumm Street - 90	50	25
	Front Street	25	10	Montgomery Street	30	15
	Montgomery Street	20	10	Cyril Magnin Street - 180	60	45
	Kearny Street - 90	25	10	Hyde Street - 90	45	30
	Stockton Street	35	15	Van Ness Avenue - 90	40	20
	Cyril Magnin Street - 180	45	20	Gough Street - 90	25	10
	Taylor Street	25	15			
	Jones Street	20	15			
	Hyde Street - 90	30	30			
	Larkin Street	25	15			
	Van Ness Avenue - 90	30	15			
	Gough Street - 90	25	10			
	Total	***350***		***Total***	***250***	
	Where 90 (disabled ramps) or 180 (disabled lifts) is shown with stop, there is a 5 percent chance that the streetcar stops to load a disabled passenger. It stops again at the boarding island.			There is now a 10 percent chance that streetcar stops at mini-highs before advancing to the boarding island.		
5R				Montgomery Street	25	20
				Cyril Magnin Street	30	15
	Total			***Total***	***55***	
16X/7X				Front Street	20	10
				Sansome Street	25	20
				Kearny Street	15	10
				Grant Avenue	15	10
				Cyril Magnin Street	30	15
	Total			***Total***	***105***	
19				Hyde Street	40	20

Line	Stop	Existing Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Mission Street.						
Line	Stop	Existing Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound Dwell Time (seconds) Average	Std. Dev.
14	Spear/Main Street	15	10	Drumm Street	25	20
	Beale Street	20	10	Front Street	25	20
	1st Street	25	20	Montgomery Street	25	20
	2nd Street	20	10	Kearny Street	35	30
	3rd Street	20	10	Grant Avenue	25	20
	4th Street	30	15	Cyril Magnin Street	35	20
	5th Street	30	15	Taylor Street	25	15
	6th Street	40	25	Hyde Street	35	30
	7th Street	35	20	Larkin Street	25	15
	8th Street	20	20	11th Street/Market	35	30
	9th Street	25	15	Otis/Van Ness Avenue	30	20
	11th Street	30	25	Otis/Mc Coppin streets	25	15
	Van Ness Avenue	30	20			
	Otis/Mc Coppin streets	25	15			
	Total	***365***		***Total***	***345***	
14R	Spear/Main Street	15	10	Drumm Street	40	30
	Beale Street	20	10	Montgomery Street	40	30
	1st Street	25	20	Cyril Magnin Street	40	30
	2nd Street	20	10	Hyde Street	40	30
	3rd Street	20	10	11th Street/Market	30	25
	4th Street	30	15	Otis/Van Ness Avenue	20	20
	5th Street	30	15			
	8th Street	20	20			
	11th Street	30	25			
	Total	***210***		***Total***	***210***	
14X	Spear Street	20	20	Montgomery Street	45	30
	1st Street	20	20	Cyril Magnin Street	45	30
	2nd Street	20	20			
	3rd Street	20	20			
	4th Street	20	20			
	5th Street	20	20			
	Total	***120***		***Total***	***90***	
292/KX	1st Street	20	20	Montgomery Street	20	20
	2nd Street	20	20	Kearny Street	25	25
	3rd Street	20	20	Cyril Magnin Street	25	25
	5th Street	20	20	Hyde Street	25	25
	7th Street	20	20	9th Street	25	25
	9th Street	20	20			
	Total	***120***		***Total***	***120***	
GGT Basic	1st Street	20	20	Montgomery Street	25	25
	2nd Street	20	20	Kearny Street	25	25
	4th Street	20	20	Cyril Magnin Street	30	30
	5th Street	20	20			
	Total	***80***		***Total***	***80***	

Line	Stop	Existing Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Van Ness, Mission, or 11th streets.						
Line	Stop	Existing Outbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound Dwell Time (seconds) Average	Std. Dev.
47	Van Ness Ave/Market	25	20	Van Ness Ave/Market	25	20
	11th/Mission	15	10	11th/Mission	15	10
	Total	***40***		***Total***	***40***	
49	Van Ness/Market	25	20	Van Ness/Market	25	20
	Otis/Van Ness Avenue	10	5	Otis/Van Ness Avenue	10	5
	Otis/Mc Coppin streets	10	5	Otis/Mc Coppin streets	10	5
	Total	***45***		***Total***	***45***	

Golden Gate Transit - Dwell Times at Mission & 1st - 1/28/14

Outbound/Westbound - Pick-Up Only

Route	Time	Patrons	Seconds	S/Patron	S/Trip
10	3:30p	3	15	5	
101	3:36p	3	33	11	
70	3:38p	2	36	18	+1 bike
70	4:05p	1	11	11	
101	4:06p	0	0	-	
10	4:25p	0	0	-	
101	4:34p	1	24	24	
70	5:03p	0	0	-	
101	5:09p	2	24	12	
10	5:30p	0	0	-	
70	5:32p	0	0	-	
Average	11	12	143	11.92	13.00

Inbound/Eastbound - Drop-Off Only

Route	Time	Patrons	Seconds	S/Patron	S/Trip
70	5:03p	2	8	4	
Average	1	2	8	4.00	8.00

Average of All Pick-Up Only Trips:

Seconds/Patron: 14.03 Seconds/Trip: 28.81

Golden Gate Transit - Dwell Times at 7th & Market - 2/20/14

Outbound/Northbound - Pick-Up Only

Route	Time	Patrons	Seconds	S/Patron	S/Trip
93	4:05p	0	0	-	
92	4:12p	4	80	20	
70	4:13p	1	15	15	
101	4:14p	1	9	9	
10	4:32p	0	0	-	
93	4:35p	2	13	6.5	
101	4:41p	1	8	8	
54	5:02p	2	42	21	
92	5:12p	1	19	19	
70	5:13p	6	130	21.67	
101	5:14p	4	20	5	+1 bike
10	5:37p	0	0	-	
70	5:43p	6	59	9.83	
Average	13	28	395	14.11	30.38

Average of All 7th & Market Trips:

Seconds/Patron: 14.42 Seconds/Trip: 35.50

Golden Gate Transit - Dwell Times at 7th & Market - 2/25/14

Outbound/Northbound - Pick-Up Only

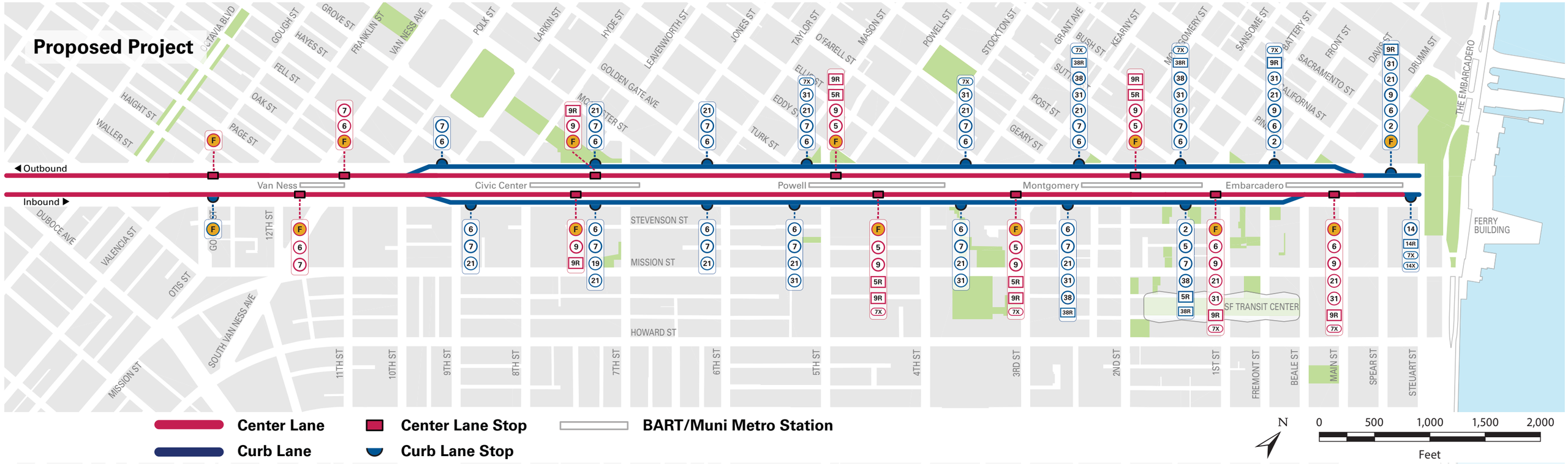
Route	Time	Patrons	Seconds	S/Patron	S/Trip
93	4:05p	1	20	20	
92	4:11p	4	30	7.5	
70	4:14p	1	19	19	
101	4:18p	6	65	10.83	
10	4:32p	1	18	18	
93	4:35p	2	36	18	
101	4:41p	2	18	9	
54	5:05p	2	23	11.5	
92	5:11p	1	16	16	
70	5:14p	5	74	14.8	+1 bike
101	5:14p	4	61	15.25	+1 bike
10	5:37p	2	12	6	
70	5:44p	5	136	27.2	
Average	13	36	528	14.67	40.62

Note: All seconds listed are from time door opens until time door closes. Dwell time associated with waiting for traffic signal with door closed is NOT included.

SamTrans Stop	Average Dwell (seconds)
10TH ST & HOWARD ST	19
11th & MARKET	20
9TH ST & FOLSOM ST	21
9TH ST & HARRISON ST	10
FOLSOM & BEALE (Dropoff)	1,085
MAIN & FOLSOM (Westside)	971
MISSION ST & 1ST ST	42
MISSION ST & 2ND ST	25
MISSION ST & 3RD ST	25
MISSION ST & 4TH ST	8
MISSION ST & 5TH ST	16
MISSION ST & 7TH ST	14
MISSION ST & 8TH ST	13
MISSION ST & 9TH ST	19
MISSION ST & NEW MONTGOMERY	11
POTRERO AVE & 16TH ST	16
POTRERO AVE & 18TH ST	19
POTRERO AVE & 22ND ST	10
POTRERO AVE & 24TH ST	19

ATTACHMENT E
2020 BASELINE PLUS PROJECT INPUTS

Transit Stop Locations and Lane Assignment



The following changes were provided by MTA staff on October 29, 2018: Route 19 Polk should be shown in outbound direction at Civic Center stops and the 9R is not present at the curb outbound stop between Spear and Steuart streets.

Private Vehicle Turn Restrictions

VEHICLE CIRCULATION

SURVEY QUESTION 6

Private vehicles proposed to be restricted on Market Street:

- Eastbound between 10th Street and Spear Street
- Westbound between Steuart Street and Van Ness Avenue

Safer Market Street implemented private vehicle turn restrictions between 3rd and 8th streets in 2015. To increase safety for all users of the street and improve transit, Better Market Street proposes to extend restrictions west to Van Ness Avenue and east to Steuart Street. Additionally, some existing one-way streets would be converted to two-way streets to maintain access. The permitted vehicles — Muni, paratransit, taxis, commercial vehicles and bicycles — are not subject to the restrictions.

The project proposes to accommodate passenger loading by private vehicles, including Uber and Lyft, at cross street and side street passenger loading zones. The project plans to install 46 new passenger white zones on streets adjacent to Market.

What are Private Vehicles?

Personal cars, trucks, vans, scooters and motorocycles including Uber, Lyft and similar companies.

UBER lyft scoot

What are Commercial Vehicles?

Trucks and vans with commercial license plates; shuttle buses with 10 or more passengers

Commercial plates have 1 letter and 6 numbers

ATTACHMENT F
2040 CUMULATIVE INPUTS

At Market/First Screenline (2020 vs 2040 Capacity Test)

Route	Year 2020 (PM Peak)			Year 2040 Capacity Test (Muni Forward)			
	Frequency	Buses/hr (one-way)	Buses/hr (two-way)	Frequency	Buses/hr (one-way)	Buses/hr (two-way)	
2 Clement	7.5	8	16	7.5	8	16	15 Diesel and 15 Electric
5 Fulton	7.5	8	16	6	10	20	
5R Fulton Rapid	7.5	8	16	6	10	20	
6 Haight	12	5	10	12	5	10	
9 San Bruno	10	6	12	10	6	12	
9R San Bruno Rapid	10	6	12	8	8	16	
7, 7R Haight/Noriega, Rapid	7	9	18	7.5	8	16	
7X Noriega Express	9	7	14	10	6	12	
21 Hayes	9	7	14	9	7	14	
31 Balboa	12	5	10	12	5	10	
38 Geary	6	10	20	6	10	20	
38R Geary Rapid	5	12	24	2.5	24	48	
F Market/Wharves	10	6	12	8	8	16	
F Short/Loop	10	6	12	8	8	16	
Total	**-**	**103**	**206**	**-**	**123**	**246**	

Table 1 Muni Vehicle Fleet Changes (2040)			
Bus Line	**2020 Vehicle Length (feet)**	**2040 Vehicle Length (feet)**	**Change to Electric Trolley Bus?**
2 Clement	40	40	Half
5 Fulton	40	60	Yes
5R Fulton Rapid	60	60	Yes
7, 7R Haight/Noriega, Rapid	40	60	No
14 Mission	60	60	Motorcoach
14R Mission Rapid	60	60	Yes
30 Stockton	40	60	No
30X Marina Express	40	60	No
38AX Geary A Express	40	60	No
47 Van Ness	40	60	No

Source: SFMTA, March 2016, Revised in August 2016

Line	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2040) Dwell Time (seconds) Average	Std. Dev.
2	1st Street	15	10	1st Street	17	10
	Main-Beale Street	25	25	Main-Beale Street	28	25
	Total	***40***		***Total***	***45***	
5	4th Street	45	25	4th Street	45	25
	3rd Street	30	20	3rd Street	45	25
	1st Street	10	5	1st Street	14	5
	Total	***85***		***Total***	***104***	
6	Van Ness Avenue	20	15	Van Ness Avenue	33	15
	9th Street	20	15	9th Street	33	15
	7th Street	40	20	7th Street	45	20
	6th Street	25	10	6th Street	40	10
	5th Street	25	30	5th Street	40	30
	4th Street	25	15	4th Street	40	15
	New Montgomery Street	30	20	New Montgomery Street	40	20
	1st Street	20	10	1st Street	33	10
	Main-Beale Street	25	25	Main-Beale Street	40	25
	Total	***230***		***Total***	***344***	
9	11th Street/Market	25	15	11th Street/Market	34	15
	7th Street	45	25	7th Street	45	25
	4th Street	45	25	4th Street	45	25
	3rd Street	45	25	3rd Street	45	25
	1st Street	15	10	1st Street	20	10
	Main-Beale Street	25	25	Main-Beale Street	34	25
	Total	***200***		***Total***	***223***	
9R	11th Street/Market	25	15	11th Street/Market	40	15
	7th Street	40	20	7th Street	45	20
	4th Street	25	15	4th Street	40	15
	3rd Street	20	10	3rd Street	36	10
	1st Street	20	10	1st Street	36	10
	Main-Beale Street	25	25	Main-Beale Street	40	25
	Total	***155***		***Total***	***237***	
21	9th Street	20	15	9th Street	32	15
	7th Street	40	20	7th Street	45	20
	6th Street	20	10	6th Street	32	10
	5th Street	30	35	5th Street	40	35
	4th Street	35	35	4th Street	40	35
	New Montgomery Street	35	20	New Montgomery Street	40	20
	1st Street	20	10	1st Street	32	10
	Main-Beale Street	25	25	Main-Beale Street	40	25
	Total	***225***		***Total***	***301***	

Line	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2040) Dwell Time (seconds) Average	Std. Dev.
31	5th Street	30	30	5th Street	32	30
	4th Street	35	35	4th Street	37	35
	New Montgomery Street	30	20	New Montgomery Street	32	20
	1st Street	20	10	1st Street	21	10
	Main-Beale Street	25	25	Main-Beale Street	26	25
	Total	***140***		***Total***	***148***	
38	New Montgomery Street	30	20	New Montgomery Street	40	20
	1st Street	15	10	1st Street	20	10
	Total	***45***		***Total***	***60***	
38R	New Montgomery Street	15	10	New Montgomery Street	17	10
	1st Street	10	5	1st Street	11	5
	Total	***25***		***Total***	***28***	
7	Van Ness Avenue	25	15	Van Ness Avenue	33	15
	9th Street	25	15	9th Street	33	15
	7th Street	25	15	7th Street	33	15
	6th Street	15	10	6th Street	20	10
	5th Street	10	10	5th Street	15	10
	4th Street	25	15	4th Street	40	15
	New Montgomery Street	20	10	New Montgomery Street	32	10
	1st Street	25	15	1st Street	32	10
	Total	***170***		***Total***	***238***	
F	Gough Street - 90	25	10	Gough Street - 90	25	10
	Van Ness Avenue - 90	40	20	Van Ness Avenue - 90	40	20
	7th Street - 90	45	25	7th Street - 90	45	25
	5th Street - 180	45	25	5th Street - 180	45	25
	3rd Street - 180	30	20	3rd Street - 180	30	20
	1st Street - 180	30	20	1st Street - 180	30	20
	Main-Beale Street - 90	40	25	Main-Beale Street - 90	40	25
	Total	***255***		***Total***	***255***	
	There is now a 10 percent chance that streetcar stops at mini-highs before advancing to the boarding island.			There is now a 10 percent chance that streetcar stops at mini-highs before advancing to the boarding island.		
5R	4th Street	30	20	4th Street	40	20
	3rd Street	15	10	3rd Street	21	10
	1st Street	20	15	1st Street	28	15
	Total	***65***		***Total***	***89***	
16X/7X	4th Street	25	20	Does not operate inbound in PM Peak		
	3rd Street	20	15			
	1st Street	20	15			
	Main-Beale Street	25	25			
	Total	***90***		***Total***	***0***	
19	7th Street	40	20	7th Street	45	20

Line	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2040) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Mission Street.						
Line	Stop	Proposed Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound Dwell Time (seconds) Average	Std. Dev.
14	13th Street/Mission	25	20	13th Street/Mission	30	20
	South Van Ness/Mission/11th	20	10	South Van Ness/Mission/11th	24	10
	11th Street/Market	25	20	11th Street/Market	30	20
	9th Street	25	20	9th Street	30	20
	7th Street	30	20	7th Street	36	20
	6th Street	25	20	6th Street	30	20
	5th Street	30	20	5th Street	36	20
	4th Street	25	20	4th Street	30	20
	3rd Street	30	20	3rd Street	36	20
	1st Street	15	10	1st Street	18	10
	Main-Beale Street	10	5	Main-Beale Street	12	5
	Steuart Street	10	5	Steuart Street	12	5
	Total	***270***		***Total***	***324***	
14R	11th Street/Market	25	20	11th Street/Market	30	20
	7th Street	30	20	7th Street	36	20
	5th Street	30	20	5th Street	36	20
	3rd Street	25	20	3rd Street	30	20
	1st Street	25	20	1st Street	30	20
	Main-Beale Street	15	10	Main-Beale Street	18	10
	Steuart Street	15	10	Steuart Street	18	10
	Total	***165***		***Total***	***198***	
14X						
	Total	***0***		***Total***	***0***	
292/KX	9th Street	25	25	9th Street	31	25
	7th Street	25	25	7th Street	31	25
	5th Street	25	25	5th Street	31	25
	3rd/New Montgomery Street	25	25	3rd/New Montgomery Street	31	25
	1st Street	20	20	1st Street	25	20
	Total	***120***		***Total***	***149***	
GGT Basic	7th Street	35	35	7th Street	43	35
	5th Street	35	35	5th Street	43	35
	3rd/New Montgomery Street	35	35	3rd/New Montgomery Street	43	35
	1st Street	35	35	1st Street	43	35
	Total	***140***		***Total***	***174***	

Line	Stop	Proposed Inbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2040) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Van Ness, Mission, or 11th streets.						
Line	Stop	Proposed Inbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Inbound(2040) Dwell Time (seconds) Average	Std. Dev.
47	Van Ness Ave/Market	45	35	Van Ness Ave/Market	45	35
	Total	***45***		***Total***	***45***	
49	13th Street/Mission	20	10	13th Street/Mission	34	10
	Van Ness Ave/Market	45	35	Van Ness Ave/Market	45	35
	Total	***65***		***Total***	***79***	

Line	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2040) Dwell Time (seconds) Average	Std. Dev.
2	Drumm Street	30	20	Drumm Street	40	20
	Front Street	25	15	Front Street	36	15
	Total	***55***		***Total***	***76***	
5	Montgomery Street	45	25	Montgomery Street	45	25
	Cyril Magnin Street	45	25	Cyril Magnin Street	45	25
	Total	***90***		***Total***	***90***	
6	Drumm Street	30	20	Drumm Street	30	20
	Front Street	25	15	Front Street	25	15
	Sansome Street	20	10	Sansome Street	20	10
	Kearny Street	25	10	Kearny Street	25	10
	Grant Avenue	35	15	Grant Avenue	35	15
	Cyril Magnin Street	25	15	Cyril Magnin Street	25	15
	Taylor Street	25	15	Taylor Street	25	15
	Hyde Street	30	20	Hyde Street	30	20
	Larkin Street	20	15	Larkin Street	20	15
	Van Ness Avenue	30	15	Van Ness Avenue	30	15
	Total	***265***		***Total***	***265***	
9	Drumm Street	15	10	Drumm Street	15	10
	Front Street	30	15	Front Street	39	15
	Montgomery Street	45	15	Montgomery Street	45	15
	Cyril Magnin Street	30	15	Cyril Magnin Street	39	15
	Hyde Street	45	25	Hyde Street	45	25
	11th Street/Market	25	15	11th Street/Market	33	15
	11th Street/Mission	10	5	11th Street/Mission	13	5
	Total	***200***		***Total***	***229***	
9R	Front Street	25	15	Front Street	28	15
	Montgomery Street	30	15	Montgomery Street	37	15
	Cyril Magnin Street	45	15	Cyril Magnin Street	45	15
	Hyde Street	40	20	Hyde Street	45	20
	11th Street/Market	25	15	11th Street/Market	31	15
	Total	***165***		***Total***	***186***	
21	Drumm Street	30	20	Drumm Street	40	20
	Front Street	20	10	Front Street	30	10
	Sansome Street	25	20	Sansome Street	38	20
	Kearny Street	25	15	Kearny Street	38	15
	Grant Avenue	25	20	Grant Avenue	38	20
	Cyril Magnin Street	45	15	Cyril Magnin Street	45	15
	Taylor Street	20	10	Taylor Street	30	10
	Hyde Street	25	15	Hyde Street	38	15
	Total	***215***		***Total***	***297***	

Line	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2040) Dwell Time (seconds) Average	Std. Dev.
31	Drumm Street	30	20	Drumm Street	39	20
	Front Street	25	15	Front Street	32	15
	Sansome Street	25	20	Sansome Street	32	20
	Kearny Street	30	15	Kearny Street	39	15
	Grant Avenue	25	15	Grant Avenue	32	15
	Cyril Magnin Street	40	15	Cyril Magnin Street	45	15
	Total	***175***		***Total***	***219***	
38	Sansome Street	25	20	Sansome Street	34	15
	Kearny Street	30	15	Kearny Street	28	25
	Total	***55***		***Total***	***62***	
38R	Montgomery Street	30	15	Montgomery Street	34	15
	Sansome Street	25	20	Sansome Street	28	25
	Total	***55***		***Total***	***62***	
7	Sansome Street	20	10	Sansome Street	25	10
	Kearny Street	25	10	Kearny Street	30	10
	Grant Avenue	35	15	Grant Avenue	40	15
	Cyril Magnin Street	35	20	Cyril Magnin Street	40	20
	Taylor Street	25	15	Taylor Street	28	15
	Hyde Street	40	20	Hyde Street	45	20
	Larkin Street	20	15	Larkin Street	25	15
	Van Ness Avenue	30	15	Van Ness Avenue	33	15
	Total	***230***		***Total***	***266***	
F	Drumm Street - 90	50	25	Drumm Street - 90	50	25
	Montgomery Street	30	15	Montgomery Street	32	15
	Cyril Magnin Street - 180	60	45	Cyril Magnin Street - 180	60	45
	Hyde Street - 90	45	30	Hyde Street - 90	45	30
	Van Ness Avenue - 90	40	20	Van Ness Avenue - 90	45	20
	Gough Street - 90	25	10	Gough Street - 90	27	10
	Total	***250***		***Total***	***259***	
	There is now a 10 percent chance that streetcar stops at mini-highs before advancing to the boarding island.			There is now a 10 percent chance that streetcar stops at mini-highs before advancing to the boarding island.		
5R	Montgomery Street	25	20	Montgomery Street	29	20
	Cyril Magnin Street	30	15	Cyril Magnin Street	35	15
	Total	***55***		***Total***	***64***	
16X/7X	Front Street	20	10	Front Street	26	10
	Sansome Street	25	20	Sansome Street	33	20
	Kearny Street	15	10	Kearny Street	20	10
	Grant Avenue	15	10	Grant Avenue	20	10
	Cyril Magnin Street	30	15	Cyril Magnin Street	40	15
	Total	***105***		***Total***	***139***	
19	Hyde Street	40	20	Hyde Street	45	20

Line	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2040) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Mission Street.						
Line	Stop	Proposed Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound Dwell Time (seconds) Average	Std. Dev.
14	Drumm Street	25	20	Drumm Street	40	20
	Front Street	25	20	Front Street	40	20
	Montgomery Street	25	20	Montgomery Street	40	20
	Kearny Street	35	30	Kearny Street	40	30
	Grant Avenue	25	20	Grant Avenue	40	20
	Cyril Magnin Street	35	20	Cyril Magnin Street	40	20
	Taylor Street	25	15	Taylor Street	40	15
	Hyde Street	35	30	Hyde Street	40	30
	Larkin Street	25	15	Larkin Street	40	15
	11th Street/Market	35	30	11th Street/Market	40	30
	Otis/Van Ness Avenue	30	20	Otis/Van Ness Avenue	40	20
	Otis/Mc Coppin streets	25	15	Otis/Mc Coppin streets	40	15
	Total	***345***		***Total***	***480***	
14R	Drumm Street	40	30	Drumm Street	45	30
	Montgomery Street	40	30	Montgomery Street	45	30
	Cyril Magnin Street	40	30	Cyril Magnin Street	45	30
	Hyde Street	40	30	Hyde Street	45	30
	11th Street/Market	30	25	11th Street/Market	40	25
	Otis/Van Ness Avenue	20	20	Otis/Van Ness Avenue	30	20
	Total	***210***		***Total***	***250***	
14X	Montgomery Street	45	30	Montgomery Street	45	30
	Cyril Magnin Street	45	30	Cyril Magnin Street	45	30
	Total	***90***		***Total***	***90***	
292/KX	Montgomery Street	20	20	Montgomery Street	23	20
	Kearny Street	25	25	Kearny Street	29	25
	Cyril Magnin Street	25	25	Cyril Magnin Street	29	25
	Hyde Street	25	25	Hyde Street	29	25
	9th Street	25	25	9th Street	29	25
	Total	***120***		***Total***	***141***	
GGT Basic	Montgomery Street	25	25	Montgomery Street	29	25
	Kearny Street	25	25	Kearny Street	29	25
	Cyril Magnin Street	30	30	Cyril Magnin Street	35	30
	Total	***80***		***Total***	***94***	

Line	Stop	Proposed Outbound(2020) Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2040) Dwell Time (seconds) Average	Std. Dev.
The following bus routes run along Van Ness, Mission, or 11th streets.						
Line	Stop	Proposed Outbound Dwell Time (seconds) Average	Std. Dev.	Stop	Proposed Outbound(2040) Dwell Time (seconds) Average	Std. Dev.
47	Van Ness Ave/Market	25	20	Van Ness Ave/Market	27	20
	11th/Mission	15	10	11th/Mission	16	10
	Total	***40***		***Total***	***43***	
49	Van Ness/Market	25	20	Van Ness/Market	40	20
	Otis/Van Ness Avenue	10	5	Otis/Van Ness Avenue	20	5
	Otis/Mc Coppin streets	10	5	Otis/Mc Coppin streets	20	5
	Total	***45***		***Total***	***80***	

Attachment 5d: Dynamic Traffic Assignment Model PM Peak Period Validation for Better Market Street Project

FEHR PEERS

MEMORANDUM

Date: October 30, 2015

To: Simon Bertrang, City of San Francisco Department of Public Works
Manoj Madhavan and Wade Wietgrefe, San Francisco Planning Department

From: Dennis Lee, Dan Hennessey, and Chris Mitchell, Fehr & Peers

Cc: Andrew Lee, Parisi Transportation Consulting

Subject: Dynamic Traffic Assignment Model PM Peak Period Validation for Better Market Street Project

SF13-0715

San Francisco County Transportation Authority (SFCTA) staff have provided Fehr & Peers with the raw network and demand files for use in a Dynamic Traffic Assignment (DTA) model for the Better Market Street (BMS) Project (Project). The DTA files were based on the San Francisco Chained Activity Modeling Process (SF-CHAMP) model and generated using an automated process developed by the SFCTA. The DTA model will be used to forecast shifts in demand and traffic flow caused by implementation of the Project. The major component of the Project is the closure of Market Street to vehicular traffic.

This memorandum summarizes the calibration process and validation results for the PM peak period traffic assignment.

TECHNICAL APPROACH

Most transportation demand forecasting (TDF) models, such as SF-CHAMP, rely on static assignment to determine the traffic volumes on the transportation roadway network and identify potential areas for needed capacity improvements. Therefore, the demand is allowed to exceed the capacity of individual roadways (though there are congestion functions to approximate resistance to additional traffic). In addition, static assignment typically does not account for the influence of departure time, varying capacity over time, or the effects of congestion on actual travel time. Other issues with static assignment include lack of representation of spill-back effects upstream from

bottlenecks or changing conditions throughout a peak period. These limitations result in static assignments being of limited benefit in informing the effects of the Project.

To address these limitations, DTA was implemented using Dynameq software for the Better Market Street Project. Dynamic assignment accounts for congestion, signal timing, delay due to transit, individual lane assignments, queuing, and other factors that directly influence the routes and reliability of vehicle assignment.

SUBAREA EXTRACTION

Fehr & Peers worked with SFCTA staff to size the DTA network appropriately, keeping the area small enough that the model would run in a reasonable amount of time but large enough to assess broad route shifts due to implementation of the Project. The borders were determined to encompass the northeastern corner of the City of San Francisco, with the San Francisco Bay to the north and east, Divisadero Street to the west, and 22nd Street to the south. The subarea extraction also includes regional facilities, including the Bay Bridge (I-80) to the east, and US-101 and I-280 to the south.

CALIBRATION PROCESS

The "as received" transportation system network and vehicle demand, automatically generated by the SFCTA process, were developed for a static assignment. This network included signal timing and a dynamic demand profile. Both of these elements were designed exclusively for DTA application. As such, both transportation system network and vehicle demand were refined to more accurately reflect the 2012 base year conditions.

Prior to an initial DTA model run, the transportation system network within and near the study area was reviewed for errors carried over from the auto-generation process. Various corrections were made, including:

- Lane geometry
- Allowable turning movements at intersection
- Signal timing

After the initial DTA model run, the results from the modified network were reviewed. Specifically, queue, vehicle volume, and travel time information were reviewed at key segments within the study

area as well as major gateways at the network edge near the study area. The review resulted in the following observations:

- Queues were not present for approaches leading to and on eastbound Bay Bridge
- Queues were not present at the southbound US-101 merge with westbound I-80
- Vehicle volumes were very high along Market Street in the section east of Third Street
- Vehicle volumes were low on the major north/south arterials in the western section of the study area

The calibration/validation processes are iterative, and the changes from "as received" to the final calibrated/validated transportation system network and vehicle demand are presented below. To calibrate the input data and improve the validation, the following steps were taken:

- The Bay Bridge and southbound US-101 segments are gateway links that lead off-network. Because of this, the network cannot produce downstream congestion that would occur under existing conditions. To address this issue, the capacity of these two facilities were reduced to approximately match vehicle volume counts taken from 2012 from the Caltrans PeMS database. This capacity modification resulted in realistic queues for both highway facilities and local approaches to those facilities.
- The network was coded to have centroid connectors load volume directly on to Market Street. This is not realistic, as Market Street does not contain any driveways. Most demand for Market Street locations load onto side streets. To address this issue, centroid connectors along Market Street were removed. This centroid removal resulted in more realistic volumes along both Market and Mission Streets, particularly in the eastern section of the corridor.
- The major north/south arterials in the western section of the study area were examined to ensure realistic network attributes and vehicle trip patterns. Several errors were corrected on alternative north/south routes outside of the study area which increased the vehicular volume within the study area.

VALIDATION GUIDELINES AND RESULTS

In order to evaluate the model's performance in replicating existing conditions, two comparisons were made. First, the model results were compared to the model validation thresholds from the

current *California Regional Transportation Plan (RTP) Guidelines* (2010)[1]. It is important to note that the thresholds in the RTP Guidelines were developed to be applied to regional- or city-scale models and not to a model that is used only for a small project-specific study area; however, the thresholds can still provide a useful indication of how well the model results match the existing demand volumes in the study area. Our goal is not to meet all of the thresholds, but rather to confirm or improve the model's performance within our project study area.

Table 1 compares the base year model results to the observed volumes at 26 link locations throughout the study area; as shown, the updated DTA model met all of the validation thresholds in the PM peak hour. The validation results are quite good, particularly in light of the fact that this is an application of a Citywide model to a localized study area. Model volumes and results on a link-by-link basis are attached to the end of this memo.

TABLE 1 BASE YEAR MODEL VALIDATION

Validation Measure	Result	Threshold
Model Volume-to-Demand Ratio (Sum of all Locations) [1]	0.94	None specified[2]
Percent of Links within Caltrans Deviation Allowance[1]	77%	At least 75%
Percent Root Mean Square Error[1]	30%	Below 40%
Correlation Coefficient[1]	0.90	At least 0.88
Number of Links / Validation Locations	26	

Notes:
1. Static Validation Criteria and Thresholds, *California Regional Transportation Plan Guidelines,* 2010, California Transportation Commission.
2. Although no specific threshold is specified, Fehr & Peers uses a threshold "within 10%" of the sum of all locations.
Source: Fehr & Peers, 2015.

Second, the travel speeds estimated by the model along study corridors were compared to travel speeds from the *2013 San Francisco Congestion Management Program* (CMP). Travel speeds estimated by the model were generally two to five miles per hour higher than the average speeds listed in the CMP. The consistent but mild overestimation indicates that the model assigned realistic volumes across the CMP segments. Overestimation is appropriate because the DTA model does not account for pedestrian friction at intersections. At pedestrian-heavy, downtown intersections,

[1] http://www.catc.ca.gov/programs/rtp/2010_RTP_Guidelines.pdf

this may cause the DTA model to underestimate link delay and thus overestimate speeds. Additionally, CMP segment speeds and DTA link speeds represent slightly different evaluations. A table comparing the CMP and model travel speeds for each of the corridors is attached to the end of this memo.

As a result of these two comparisons, we propose to move ahead using this version of the model to develop forecasts for this Project. Please call Chris Mitchell or Dan Hennessey at (415) 348-0300 with any questions or comments.

Map Location	Street Name	Location			Model Volume	Traffic Count	Model / Count	Maximum Deviation	Within Deviation	Model - Count
A	Fremont	Mission	to	Market	1584	1390	1.14	0.313	Yes	194
B	1st	Market	to	Mission	1287	1249	1.03	0.34	Yes	38
C	Market	1st	to	2nd	390	261	1.49	0.575	Yes	129
D	Market	2nd	to	1st	332	446	0.74	0.52	Yes	-114
E	3rd	Mission	to	Market	2193	1846	1.19	0.286	Yes	347
G	4th	Market	to	Mission	1563	1324	1.18	0.325	Yes	239
H	Market	4th	to	5th	509	335	1.52	0.575	Yes	174
I	Market	5th	to	4th	191	331	0.58	0.575	Yes	-140
J	Mission	4th	to	5th	723	833	0.87	0.41	Yes	-110
K	Mission	5th	to	4th	499	734	0.68	0.44	Yes	-235
L	7th	Mission	to	Market	960	1539	0.62	0.303	No	-579
N	7th	Howard	to	Mission	1364	1757	0.78	0.286	Yes	-393
O	Market	7th	to	8th	516	477	1.08	0.52	Yes	39
P	Market	8th	to	7th	60	218	0.28	0.63	No	-158
Q	Mission	7th	to	8th	353	602	0.59	0.475	Yes	-249
R	Mission	8th	to	7th	349	753	0.46	0.41	No	-404
S	Van Ness	Mission	to	Market	1787	1841	0.97	0.286	Yes	-54
T	Van Ness	Market	to	Mission	709	1253	0.57	0.325	No	-544
U	Mission	1st	to	2nd	713	678	1.05	0.44	Yes	35
V	Mission	2nd	to	1st	479	698	0.69	0.44	Yes	-219
X	5th	Mission	to	Market	1230	605	2.03	0.475	No	625
Y	5th	Market	to	Mission	645	701	0.92	0.44	Yes	-56
Z	6th	Mission	to	Market	1512	1067	1.42	0.359	No	445
AA	6th	Market	to	Mission	1406	1056	1.33	0.359	Yes	350
BB	9th	Mission	to	Market	2860	3255	0.88	0.235	Yes	-395
CC	10th	Market	to	Mission	1638	2151	0.76	0.27	Yes	-513

Model/Count Ratio =	**0.94**	
Percent Within Caltrans Maximum Deviation =	**77%**	> 75%
Percent Root Mean Square Error =	**30%**	< 40%
Correlation Coefficient =	**0.897**	> 0.88
Total Count	26	
Link Within Deviation	20	
Link Outside Deviation	6	

Corridor	From	To	2011 CMP Avg Speed (mph)	2013 CMP Avg Speed (mph)	Model Avg Speed (mph)	Difference (Model to 2013) (mph)
Fremont	Harrison	Market	10.6	18.4	18.0	-0.4
1st	Market	Harrison	18.2	15.3	14.7	-0.6
2nd	Market	Brannan	12.2	6		
2nd	Brannan	Market	13.3	3.1		
3rd	Terry Francois	Market	12.9	15.4	19.0	3.6
4th	O'Farrell	Harrison	15.1	13.9	15.7	1.8
4th	Harrison	Channel	14.9	14.2		
5th	Market	Brannan	13.8	5.4	19.9	14.5
5th	Brannan	Market	14.7	4	20.7	16.7
6th	Market	Brannan	9.6	14.4	18.3	3.9
6th	Brannan	Market	11	14.2	20.1	5.9
7th	Brannan	Market	20.9	17	19.6	2.6
8th	Market	Bryant	23.8	18.1	21.3	3.2
9th	Brannan	Market	13.4	15.8	22.5	6.7
10th	Market	Brannan	20.4	23.3	21.3	-2.0
Market	Van Ness	Drumm	10.6	15.9	17.9	2.0
Market	Drumm	Van Ness	12.1	13.6	18.0	4.4
Mission	Embarcadero	3rd	11	14	18.0	4.0
Mission	3rd	Embarcadero	10.9	15.2	17.0	1.8
Mission	3rd	9th	14.4	16.1	19.5	3.4
Mission	9th	3rd	12.4	16.8	20.2	3.4

Attachment 5e: Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run

San Francisco County Transportation Authority

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Memorandum

DATE: 05.11.2015

TO: Better Market Street Team

FROM: Dan Tischler, Senior Transportation Planner, Technology, Data & Analysis, SFCTA

SUBJECT: Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run

Summary and Context

The purpose of this memo is to document inputs used in the SF-CHAMP 5.1 regional travel demand model for the purpose of modeling a 2020 Baseline Scenario to be used to evaluate the feasibility of implementing the Better Market Street project.

STUDY OVERVIEW

Market Street is a primary multi-modal corridor in San Francisco. The current design accommodates the demands of various modes of travel such as walking, bicycling, transit, and driving, but it falls well short of the potential of the street.

The Better Market Street project offers a special opportunity to envision a new Market Street. The goal of the project is to revitalize Market Street from Octavia Boulevard to The Embarcadero and reestablish the street as the premier cultural, civic and economic center of San Francisco and the Bay Area. The transportation system analysis will include blocks south and north of Market and Mission streets. The new design should create a comfortable, universally accessible, sustainable, and enjoyable place that attracts more people on foot, bicycle and public transit to visit shops, adjacent neighborhoods and area attractions.

SCENARIO DESCRIPTION

The 2020 Baseline Scenario is designed to reflect projected baseline conditions in the San Francisco Bay Area in the year 2020. More detail is provided within the City of San Francisco than elsewhere in the San Francisco Bay Area and the scenario will be used for focused analysis of travel in the Better Market Street corridor.

LAND USE

2020 land use assumptions are derived from the "Jobs-Housing-Connections Strategy" (JHCS) projections developed by ABAG and MTC. While ABAG/MTC Jobs-Housing Connections Strategy Land Use numbers for population, employment, employed residents and jobs are used at a TAZ (close

to Census Tract size) level of geographic granularity outside San Francisco, the San Francisco Planning Department (SF Planning) uses the ABAG/MTC Jobs-Housing Connections Strategy control totals to allocate base year land use data within San Francisco. SF Planning makes use of numerous commercial datasets to refine initial ABAG distribution within San Francisco.

The land use inputs are saved on a server at SFCTA at:

Y:\champ\landuse\p2011\SCS.JobsHousingConnection.Spring2014update\2020\runinputs_champ5parkingUpdate

TRANSPORTATION NETWORKS

This section discusses 2020 Baseline assumptions for transit, and assumptions for other San Francisco and regional road, and toll policy projects. The transportation networks used in the 2020 Baseline Scenario reflect a representative baseline from our current understanding of projects scheduled for implementation by the year 2020. Project implementation dates are not always able to be determined exactly, and shift during the planning and construction processes. This section discusses the near-term baseline assumptions for San Francisco and Regional road projects, transit projects, and tolling policies.

NETWORK PROJECTS NOT INCLUDED IN THIS SCENARIO

The projects included in the SF-CHAMP 2020 Baseline Scenario reflect projects funded and approved by February 2015. Better Market Street EIR analysis for the 2020 Baseline Alternative also assumes several additional projects approved or implemented between February 2015 and October 2015. These projects include Safer Market Street and the 2nd Street Project. These projects are not included in the SF-CHAMP 2020 Baseline scenario, but are accounted for in EIR analysis. SF-CHAMP is used to develop travel demand and mode choice forecasts for project scenarios. Since Safer Market Street and the 2nd Street project are unlikely to have significant effects on travel demand or mode choice decisions a revised SF-CHAMP model run is not required to analyze how these projects will change 2020 Baseline transportation conditions. Subsequent modeling steps include dynamic traffic assignment and traffic microsimulation for core areas of San Francisco. These subsequent modeling steps both include the Safer Market Street and 2nd Street Projects and will adequately and comprehensively reflect traffic routing changes and traffic operational changes related to these projects.

ROAD NETWORK

Table 1 presents San Francisco street and road projects anticipated for completion before 2020. SF-CHAMP also assumes regional roadway project implementation in accordance with the most recent Regional Transportation Plan.

Table 1: Roadway Projects in San Francisco Completed before 2020

Network Project	Description
Fell/Oak Bikeways (Bike Plan) *BikePlan\Bike_FellOakBikeways*	Bike lane addition and general purpose lane removal on Fell and Oak between Baker and Scott.
Cesar Chavez Streetscape (Bike Plan)	Bike lane addition and general purpose lane removal on Cesar Chavez between Guerrero and

BikePlan\Streetscape_CesarChavez	Hampshire.
Sansome Contraflow Transit Lane (TEP/Muni Forward[1]) *TEP_SansomeContraflow*	Contraflow bus-only lane on Sansome between Broadway and Washington.
Folsom Road Diet, 19th to 26th *RoadDiets\Folsom19thTo26th*	Bike lane addition and general purpose lane removal on Folsom from 19th to 26th.
Folsom Road Diet 4th to 11th *RoadDiets\Folsom4thTo11th*	Bike lane addition and general purpose lane removal on Folsom from 4th to 11th.
Doyle Drive / Presidio Parkway Rebuild *DoyleDrive*	Construction of new Presidio Parkway and on/off ramps
Mariposa Ramp, Mission Bay *MissionBay_MariposaRamp*	Increase Hwy 101 offramp to Mariposa from 1 to 2 lanes.
Mission Bay Street Grid *MissionBayGrid*	Build out Mission Bay grid street network between 16th and the channel.
Minor Restriping Projects *DPW_Restriping*	Left turn lane on WB Harrison at 11th, removal of EB lane Removal of NB Tow-away lane on 6th from Folsom to Market Bike lane SB on Beale from Folsom to Bryant
Haight Contraflow Transit Lane *TwoWayHaight*	Add a contraflow bus-only lane on easternmost block of Haight, between Octavia and Gough/Market.
Alemany Bike Lanes *BikePlan\2014*	Bike lanes are added to Alemany Blvd between Rousseau and Putnam. Sharrows are added between Putnam and Bayshore Blvd. To accommodate the new bike lanes, one general-purpose lane is removed on eastbound Alemany between Rousseau and Putnam and westbound Alemany between Putnam and Ellsworth.
San Bruno Bike Lanes *BikePlan\2014*	A southbound bike lane and northbound sharrows are added to San Bruno between Silver and Dwight/Paul. There are no lane reductions.
Bike Plan 2014 *BikePlan\2014*	Expansion of sharrows and bike lanes throughout the city from the San Francisco Bicycle Plan.

REGIONAL TRANSIT NETWORK

[1] Muni TEP has been renamed "Muni Forward".

By 2020, several regional transit improvements are anticipated. These projects include BART extensions and the first phase of SMART. Table 2: lists regional transit projects assumed in the 2020 Baseline Scenario.

Table 2: Regional Transit Agency Projects Completed before 2020

Network Project	Description
eBART *BART_eBART*	eBART line from Pittsburg to Antioch
BART Irvington Station *BART_Irvington*	Add Irvington station between Fremont and Warm Springs
BART Metro Bayfair *BART_Metro_Bayfair*	Increase PM Frequency on the Green Line (Daily City-Fremont) and replace evening service on the Blue Line (Dublin/Pleasanton-Daly City) with new Dublin-Bayfair service
BART Oakland Airport Connector *BART_OAC*	Replace AirBART with the Oakland Airport Connector
BART Warm Springs Station *BART_WarmSprings*	Extend BART service from Fremont to Warm Springs
BART Berryessa Extension *BART_SanJose (Phase 1)*	Extend BART service from Warm Springs to Milpitas and Berryessa
SMART Phase 1 *SMART*	Phase 1 of SMART, providing service from San Rafael to Santa Rosa.

MUNI NETWORK

The MUNI transit network has several planned service expansions and improvements scheduled by 2020. Muni will implement the projects listed in Table 3: :

Table 3: MUNI Transit Projects Completed Before 2020

Network Project	Description
Transit Effectiveness Project/Muni Forward) *Muni_TEP*	Muni service changes consistent with the Transit Effectiveness Project (TEP) EIR[2]. Projects and their corresponding service changes attached in Table 4: Headways of Muni routes .
Muni Transit Signal Priority *Muni_TSP\Future*	Transit Signal Priority along Muni Rapid bus routes.
Muni Treasure Island Service *Muni_TI*	Muni service between the Transbay Terminal and Treasure Island and Civic Center and Treasure Island.
Central Subway *Muni_CentralSubway*	Central Subway will run above ground from 4th and King to 4th and Harrison, and below ground from 4th and Harrison, along Stockton, to Chinatown. Phase 1 will have 7.5 minute headways on a short (Chinatown to 3rd and 18th/19th Street) and long route

[2] The Transit Effectiveness Project EIR cleared a set of improvements that are now being implemented through the "Muni Forward" program.

	(Chinatown to Bayshore). Full build will have 5 minute headways.
Lincoln/Crossover Transit-only Left-turn *Muni_Lincoln_Crossover*	Muni-only left-turn from Lincoln Way onto 19th/Crossover Drive.
Muni Low Floor Buses *Muni_LowFloorBuses*	Muni fleet will be replaced by all low-floor buses by 2020.
Van Ness Bus Rapid Transit *Muni_VanNessBRT*	Center A Variation on Van Ness from Mission to Lombard. Project scheduled to be completed by 2019.
Transbay Terminal Bus Ramps *TransbayTerminalBusRamps*	Bus-only ramps to the Transbay Terminal from the Bay Bridge.

TRANSIT FREQUENCY

Table 4: Headways of Muni routes lists assumptions for Muni line headways after services changes planned under "Muni Forward" have been implemented. These headways are assumed in the 2020 Baseline Scenario. This also assumes realignment of transit routes that have been approved and funded as of January 2015.

Table 4: Headways of Muni routes at full implementation of Muni Forward (in minutes)

	Time of Day		
Muni Line	**AM Period**	**Midday Period**	**PM Period**
1 California	7	5	6
2 Clement	7.5	10	7.5
3 Jackson	15	30	15
5 Fulton	3	5	3.5
6 Haight-Parnassus	12	15	12
7R Haight/Noriega Rapid	7.5	8	7.5
8AX Bayshore 'A' Express	6	--	7
8BX Bayshore 'B' Express	6	--	7
8 Bayshore	--	7.5	--
9 San Bruno	10	12	10
9L San Bruno Rapid	10	12	10
10 Townsend	6	10	6
11 Downtown Connector	15	15	15
14R Mission Rapid	7.5	9	7.5
14X Mission Express	7.5	0	7.5

21 Hayes	8	12	9
22 Fillmore	6	7.5	8
24 Divisadero	9	10	9
28 19th Avenue	9	9	9
28R 19th Avenue Rapid	9	9	9
29 Sunset	8	15	10
30 Stockton	3.5	4	4
30X Marina Express	4	--	7
31 Balboa	12	15	12
33 Ashbury-18th	12	12	12
35 Eureka	20	20	20
37 Corbett	15	20	15
38 Geary	6	7.5	6
38R Geary Rapid	5	5	5
41 Union	7	--	7
43 Masonic	8	12	10
44 O'Shaughnessy	7.5	12	8
47 Van Ness	7.5	9	7.5
48 Quintara/24th Street	15	15	15
52 Excelsior	20	20	20
54 Felton	15	20	15
55 16th Street	15	15	15
57 Parkmerced	20	20	15
F Market & Wharves	7.5	6	5
J Church	8	10	9
K Ingleside (KT)	8	10	8
L Taraval	7.5	10	7.5
M Oceanview	8.5	10	8.5
N Judah	5.5	10	6

TOLLS

SF-CHAMP assumes that Bay Area Bridge tolls increase in line with inflation over the long term. For future year scenarios, SF-CHAMP tolls are assessed at values that are constant in real terms. In addition to this assumption, scheduled toll changes are also assumed in the model. SF-CHAMP assumes the scheduled 2018 Golden Gate Bridge toll increase. Starting in 2018, Golden Gate Bridge tolls will be $8.00 for two-axle vehicles and $5.00 for high occupancy vehicles in 2018$ terms.

Attachment 5f: Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run

San Francisco County Transportation Authority

1455 Market Street, 22nd Floor
San Francisco, California 94103
415.522.4800 FAX 415.522.4829
info@sfcta.org www.sfcta.org

Memorandum

DATE: 07.17.2015

TO: Better Market Street Team

FROM: Dan Tischler, Senior Transportation Planner, Technology, Data & Analysis, SFCTA

SUBJECT: DRAFT Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run

Summary and Context

The purpose of this memo is to document inputs used in the SF-CHAMP 5.1 regional travel demand model for the purpose of modeling a 2040 Baseline Scenario to be used to evaluate the feasibility of implementing the Better Market Street project.

STUDY OVERVIEW

Market Street is a primary multi-modal corridor in San Francisco. The current design accommodates the demands of various modes of travel such as walking, bicycling, transit, and driving, but it falls well short of the potential of the street.

The Better Market Street project offers a special opportunity to envision a new Market Street. The goal of the project is to revitalize Market Street from Octavia Boulevard to The Embarcadero and reestablish the street as the premier cultural, civic and economic center of San Francisco and the Bay Area. The transportation system analysis will include blocks south and north of Market and Mission streets. The new design should create a comfortable, universally accessible, sustainable, and enjoyable place that attracts more people on foot, bicycle and public transit to visit shops, adjacent neighborhoods and area attractions.

This memo describes the 2040 Baseline Scenario. For brevity, this memo summarizes differences between the 2040 Baseline Scenario and the 2020 Baseline Scenario. See the memo titled "Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run" (2020 Baseline Input Memo) for additional detail on the 2020 Baseline Scenario.

SCENARIO DESCRIPTION

The 2040 Baseline Scenario is designed to reflect projected baseline conditions in the San Francisco Bay Area in the year 2040. More detail is provided within the City of San Francisco than elsewhere in the San Francisco Bay Area and the scenario will be used for focused analysis of travel in the Better Market Street corridor.

LAND USE

2040 land use assumptions are derived from the Jobs-Housing-Connections projections developed by ABAG and MTC. While ABAG/MTC Jobs-Housing Connections Strategy Land Use numbers for population, employment, employed residents and jobs are used at a TAZ (close to Census Tract size) level of geographic granularity outside San Francisco, the San Francisco Planning Department (SF Planning) uses the ABAG/MTC Jobs-Housing Connections Strategy control totals to allocate base year land use data within San Francisco. SF Planning makes use of numerous commercial datasets to refine initial ABAG distribution within San Francisco.

The land use inputs are saved on a server at SFCTA at:

Y:\champ\landuse\p2011\SCS.JobsHousingConnection.Spring2014update\2040\runinputs_champ5parkingUpdate

TRANSPORTATION NETWORKS

This section discusses 2040 Baseline assumptions for transit, and assumptions for other San Francisco and regional road, and toll policy projects. The 2040 Baseline Scenario includes all transportation projects assumed in the 2020 Baseline Scenario, plus additional transportation projects expected to be implemented between 2020 and 2040.

ROAD NETWORK

Table 1 presents San Francisco street and road projects anticipated for completion between 2020 and 2040. SF-CHAMP also assumes regional roadway project implementation in accordance with the most recent Regional Transportation Plan.

Table 1: Roadway Projects in San Francisco Completed Between 2020 and 2040

Project	Description
Safer Market Street	• No turns allowed onto Market Street between 8th and 3rd Streets with the exception of southbound Jones Street onto westbound Market Street. • Streets, such as Mason or O'Farrell, will have required turns onto Turk and Grant respectively. • No left turn onto Market Street from southbound Hyde Street. • Commercial vehicles, transit, bicycles, and taxis would be exempt from these proposed turn restrictions. • The following turn restriction would apply to all vehicles: No right turn onto Grant Ave from Market Street.
Sixth Street	Between Market Street and Howard Street, convert four travel lanes to two travel lanes; add a new bicycle lane in each direction with sidewalks widened by 3 to 6 feet (3 to 4 feet at block corners and 6 feet along the block). Traffic signal cycle lengths would be increased from 60 to 90 seconds, and the offsets would be adjusted.

Polk Street	Between McAllister Street and Union Street, various changes will happen depending on location, including road diets, turn restrictions, and bicycle facilities.
Annie Street	• The existing mini-plaza at the intersection of Annie St and Market St will be expanded to Stevenson Street • Between Mission Street and Ambrose Bierce Alley, Annie Street would be closed to vehicular traffic and transformed into a new pedestrian plaza • The remainder of Annie St between the two plazas would retain vehicular traffic but be redesigned as a single-surface shared street
Treasure Island	Reconstruct Treasure Island street network per full build-out plan for Treasure Island
Transit Center District Plan	Road diets, transit facilities, and bike facilities consistent with the Transit Center District Plan
2nd Street Bike Lanes (Bike Plan) *BikePlan\2ndStreet*	Bike lanes on 2nd Street between Market and Townsend
5th Street Bike Lanes (Bike Plan) *BikePlan\5thStreet*	Bike lanes on 5th Street between Market and Townsend
16th Street	• Between Church and Bryant streets, create a side running transit-only lane in the westbound direction through lane conversion. • Between Bryant and Mississippi streets, create center-lane transit only lanes in both directions through lane conversion. • Between 7th/Mississippi and Third streets, create side running transit-only lane in both directions through lane conversion. • Along the length of the corridor, add traffic signals, add left turn restrictions, and add some left turn pockets.
Move Bike Lane from 16th to 17th (Bike Plan) *MoveBikeLaneFrom16thTo17th*	Move Bike Lane from 16th Street to 17th Street between Kansas and Mississippi
Brannan (Central SoMa) *CentralCorridor\Brannan*	Brannan St between 2nd and 6th, 1 auto lane and 1 protected cycletrack for each direction
Harrison/Bryant (Central SoMa) *CentralCorridor\Harrison_Bryant*	Harrison between 3rd and 6th, Bryant between 2nd and 6th, 4 travel lanes and 1 transit lane during Peak hours, 3 travel lanes and 2 parking lanes off-peak
Howard/Folsom One-Way (Central SoMa) *CentralCorridor\Howard_Folsom_OneWay*	Howard Lane reduction to 2 travel lanes(3 during peak), and protected bidirectional cycletrack; Folsom 2 travel lanes, 1 bus lane during peak and protected bidirectional cycletrack

3rd/4th (Central SoMa) *CentralCorridor\Third_4th_st*	3rd St from King St to Market St, 4th from Market St to Harrison St, 3 auto lanes, 1 bike lane, 1 bus lane
Treasure Island Ramps *TI_Ramps*	Reconstruction and realignment of Treasure Island freeway ramps according to TI-TIP.
Masonic Boulevard Option *Fix_Masonic*	The Boulevard Option on Masonic between Geary and Fell, reducing travel lanes to 2 in both directions and eliminating additional peak-period lanes.
19th Avenue Corridor	Tier 4C projects from the 19th Avenue Corridor Study: • 19th Ave / Holloway Ave – add a fourth southbound lane • 19th Ave / Crespi Dr – fourth southbound lane will be extended and converted into a through-right into Crespi • 19th Ave / Junipero Serra Blvd – add a fourth lane for southbound right-turn onto Junipero Serra
Harney Way Rebuild *HarneyRebuild*	Harney expansion to 3-lanes WB, 2-lanes EB for 4 links north of the 101 interchange, plus BRT lanes & TSP North/East of Alana
Palou Transit Lane and Transit Signal Priority *TransitLaneTSP_Palou*	Transit Signal Priority and transit-only lane on Palou between Phelps and Fitch.
Geneva Transit Preferential Treatment	This section is the Geneva Four-Lane Option: two general-purpose lanes and one transit lane in each direction. (TEP transit treatment west of Santos: one general-purpose lane and one side-running transit lane.)
Geneva Extension	• Geneva will be extended over Tunnel Ave and the Recology site, with connections to US 101 ramps. • Two general-purpose lanes in each direction; three during the PM peak period. • Transit-only lanes • Class II bicycle facility • Two pedestrian bridges will connect Bayshore/Sunnydale and Bayshore/MacDonald with Tunnel Ave
Mission Transit Lane (TEP)	Side-running transit lanes on Mission between 11th to 16th St. Note: this project is included as a subset within the MUNI Travel Time Reduction Program (Project-level Expanded) project
Candlestick Point / Hunters Point Shipyard Street Grid Rebuild *Candlestick_HuntersPoint*	Rebuild of the street grid per the Candlestick Point / Hunters Point Shipyard Transportation Plan using the no-stadium variant. Includes separated transitways or center-running transit lane corridor for the 28L.
Candlestick Interchange Rebuild	• Geneva will extend under the US 101 to Harney Way • Between the Geneva Extension and Alana, two general-purpose lanes and one transit-only lane in each direction. • Between Alana and Harney, three general-purpose travel lanes in each direction • Alana becomes transit-only between Harney and Geneva • On/off ramps will be single-lane with no transit treatment

Yosemite Slough Bridge *Yosemite_Slough*	Transit, bike, and pedestrian bridge connecting Candlestick Point and Hunters Point Shipyard

REGIONAL TRANSIT NETWORK

Between 2020 and 2040, Caltrain, SMART, BART and WETA will each provide expanded services to new stations and terminals. Table 2: Regional Transit Agency Projects lists these projects.

Table 2: Regional Transit Agency Projects Completed Between 2020 and 2040

Project	Description
Caltrain DTX	Caltrain Electrification and Downtown Extension
Caltrain Electrification *Caltrain_Electrification*	Service increase resulting from Caltrain Electrification project.
SamTrans Caltrain Shuttle Frequency *Samtrans_ShuttleFreq*	Double the frequency of Samtrans' Caltrain shuttle.
WETA Expansion Phase 2 *WETA_Expansion_Phase2*	New ferry lines: Berkeley-SF, Hercules-SF, Redwood City-SF, Richmond-SF.
BART: Silicon Valley Phase 2	BART extended from Berryessa to Alum Rock, Downtown San Jose, Diridon, and Santa Clara
SMART: Larkspur to San Rafael	SMART - Extend SMART from San Rafael to Larkspur
SMART: Santa Rosa to Cloverdale	SMART - Extend SMART from Santa Rosa to Cloverdale

MUNI NETWORK

The MUNI transit network has several planned service expansions and improvements scheduled for the period between 2020 and 2040. Table 3: MUNI Transit Projects summarizes projects assumed in the SF-CHAMP 2040 Baseline Scenario.

Table 3: MUNI Transit Projects to be Completed Between 2020 and 2040

Project	Description

19th Avenue Corridor (M Ocean View split service)	Tier 4C Transit projects from the 19th Avenue Corridor Study:
	• M Ocean View realignment
	  ○ Diverts into Parkmerced at 19th Ave / Holloway Ave
	  ○ Relocate SFSU station into Parkmerced
	  ○ Two new Parkmerced stations
	  ○ Split tracks in Parkmerced and split end-of-line service between Parkmerced and Balboa Park BART

Travel Time Reduction Program (Programmatic Expanded) *Muni_TTRP\ProgrammaticExpanded*	Muni TEP: Travel Time Reduction Program, Expanded level (programmatic)
Travel Time Reduction Program (Project-level Expanded)	Muni TEP: Travel Time Reduction Program, Expanded level (project-level)

Muni_TTRP\ProjectLevelExpanded	
Treasure Island	Increased line 25 service, new line 109, and ferry service to the Ferry Building
AC Transit Treasure Island Service *AC_TI*	AC Transit Service to Treasure Island
Geary Bus Rapid Transit *Muni_GearyBRT\LPA*	Geary Side-Running BRT west of 25th Avenue and east of Stanyan, and Center-Running BRT between 25th and Stanyan.
Candlestick Point Express *Muni_CPX*	Express bus service between Downtown/SoMa and Candlestick Point
Hunters Point Express *Muni_HPX*	Express bus service between Downtown/SoMa and Hunters Point.
Candlestick Point/Hunters Point Shipyard Muni Extensions *Muni_CSP_HP_LineExtensions*	Extensions of 24-Divisadero, 23-Monterey, 44-O'Shaughnessy, 48-Quintara, and 29-Sunset into Candlestick Point and Hunters Point Shipyard neighborhoods
Parkmerced Shuttles *Parkmerced_Shuttle*	Free shuttle service between Parkmerced and Daly City BART, and between Parkmerced and nearby shopping centers.
Muni F to Fort Mason	Extend F Line to Fort Mason
T-Third Extension to Caltrain	The T-Third will be extended from Sunnydale to Bayshore Caltrain Station
16th St BRT	Realignment of the 22-Fillmore along 16th St to 3rd St

TOLLS

SF-CHAMP assumes that Bay Area bridge tolls increase in line with inflation over the long term. For future year scenarios, SF-CHAMP tolls are assessed at values that are constant in real terms. 2040 toll assumptions are the same in real terms as 2020 toll assumptions.

Attachment 5g: Forecasting Approach Memorandum

FEHR PEERS

MEMORANDUM

Date: August 26, 2016 *(Revised October 6, 2016 and October 31, 2018)*

To: City of San Francisco Public Works
Better Market Street Project Team

From: Matt Goyne, Fehr & Peers

CC: Andrew Lee, Parisi Transportation Consulting

Subject: Better Market Street Forecasting Approach

SF13-0715

OCTOBER 2018 UPDATE

This memorandum was updated for the purposes of including it within the appendices of the Better Market Street Environmental Impact Report. This includes the following changes:

- Replaced Alternatives 1 through 3 from the 2016 alternative screening analysis with proposed project.
- Removed the section describing 2040 VISSIM model documentation as this is presented within the memorandum *Better Market Street VISSIM Modeling Approach* (Fehr & Peers, October 31, 2018). **Attachment A** shows the transportation plans and projects assumed under each scenario as presented in the "Recent and Future Planned Transportation Projects within Transportation Study Area".
- Updated the 2020 baseline plus project DTA analysis to reflect fixes to the model completed in September 2018.

INTRODUCTION

The purpose of this memo is to describe the traffic volume forecasting methodology that was used for 2020 Baseline and Cumulative Conditions (Year 2040). This memorandum is a supplement to the information presented for 2020 conditions in the *Better Market Street VISSIM Modeling Approach* (Fehr & Peers, October 31, 2018).

BETTER MARKET STREET FORECASTING APPROACH

As shown in **Figure 1**, the following transportation planning models were used to forecast future year transportation conditions for the Better Market Street project: SF-CHAMP, Dynameq/DTA, Synchro, and VISSIM. The specific approach used to develop future 2020 baseline and 2040 cumulative traffic volume forecasts for use in the Better Market Street travel time (operations) analysis are described in more depth in the following sections.

SF-CHAMP

The SF-CHAMP model is an activity-based travel demand model that has been developed and validated by SFCTA using household travel survey information to represent existing and future transportation conditions in San Francisco. The model predicts all person travel for a full day (a typical weekday) based on total and locations of population, housing units and employment, which are then allocated to different periods throughout the day, using time of day sub-models. The SF-CHAMP model predicts person travel by mode for auto, transit, walk and bicycle trips. The SF-CHAMP model also provides forecasts of vehicular traffic on regional freeways, major arterials and on the study area local roadway network considering the available roadway capacity, origin-destination demand and travel speeds when assigning the future travel demand to the roadway network.

SF-CHAMP divides San Francisco into 981 geographic areas, known as Transportation Analysis Zones (TAZ). It also includes zones outside of San Francisco, for which it uses the same geography as the current Metropolitan Transportation Commission (MTC) Model: "Travel Model One." For each TAZ, the model estimates the travel demand based on TAZ population and employment assumptions developed by ABAG. Within San Francisco, the San Francisco Planning Department is responsible for allocating ABAG's countywide growth forecast to each TAZ for the future cumulative year model, based upon existing zoning and approved plans, using an area's potential zoning capacity, and the anticipated extent of redevelopment of existing uses. The current cumulative future year of 2040 has been used consistently for recent large transportation studies in San Francisco. The ABAG assumptions used for this study are from the Projections, Jobs-Housing Connection, May 2012 (i.e., P2012).

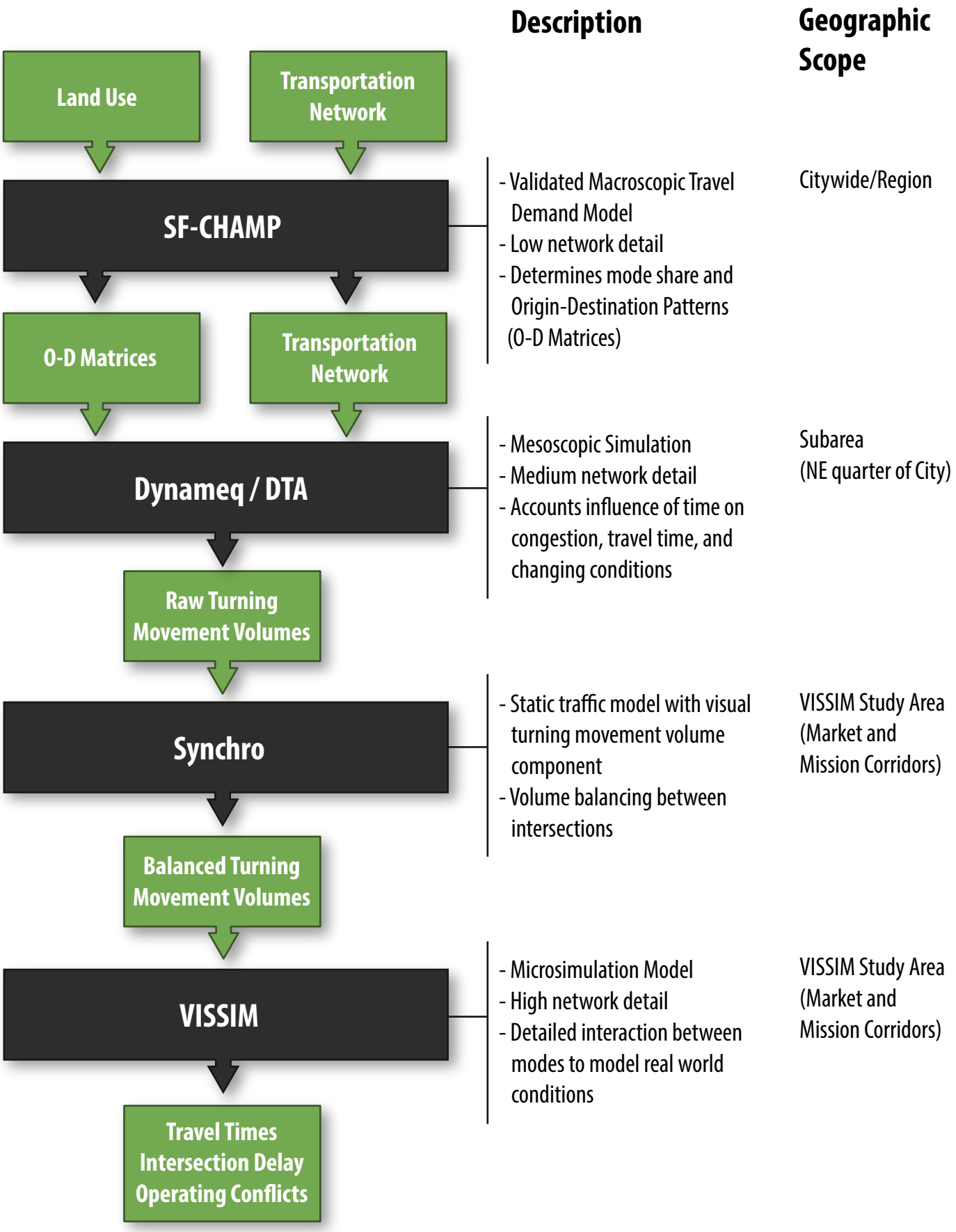

Figure 1

Modeling Process for Better Market Street

For the "project" scenario, the SF-CHAMP model run was coded to include the changes to the transportation network proposed in the project. These network changes were modified to best reflect the street network changes (i.e., changes to the turn restrictions, transit stop spacing, total number of travel lanes, etc.). The proposed project is a transportation project and not a land use project, and therefore, would not generate new trips by any mode. Thus, the primary changes between the "project" and "no project" scenarios are the redistribution of auto trips due to private auto restrictions on Market Street.

Regional travel demand models such as SF-CHAMP are designed to be able to represent citywide and regional trends and do not always capture localized improvements to transit, such as those proposed by the project, nor do they represent an intersection level of analysis commensurate with projecting specific vehicle turning movements. Instead, the SF-CHAMP model provides traffic demand outputs that can then be modeled in other traffic modeling software (such as Dynameq, VISSIM, or Synchro), to account for network effects of intersection bottlenecks, queuing, etc. Therefore, the SF-CHAMP traffic demand outputs for each scenario were used as inputs for the Dynameq/Dynamic Traffic Assignment (DTA) model to develop intersection turning movement forecasts as described below. Additionally, as SF-CHAMP was not sensitive to the operational transit improvements proposed by the project, transit ridership was forecast separately based on the results on the VISSIM operations analysis. For the purposes of this study, the SF-CHAMP traffic forecasts do not account for a substantial change in travel modes (e.g., from driving to walking, bicycling or transit, or from walking to bicycling or vice versa).

Dynameq

Most transportation demand forecasting models, such as SF-CHAMP, rely on static assignment to determine the traffic volumes on the transportation roadway network and identify potential areas for needed capacity improvements. Therefore, the demand is allowed to exceed the capacity of individual roadways, though there are some congestion functions to approximate resistance to additional traffic. In addition, static assignment typically does not account for the influence of departure time, varying capacity over time, or the effects of congestion on actual travel time. Other issues with static assignment include lack of representation of spill-back effects upstream from bottlenecks or changing conditions throughout a peak period. These limitations result in static assignments being of limited benefit in informing the effects of the proposed project due to the complex interactions of vehicle traffic within the study area.

To address these limitations, a Dynamic Traffic Assignment (DTA) model was implemented using Dynameq software for the proposed project. Dynamic assignment accounts for congestion, signal timing, delay due to transit, individual lane assignments, queuing, and other factors that directly influence the routes and reliability of vehicle assignment. The DTA files were based on the SF-CHAMP model and generated using an automated process developed by the SFCTA. The existing DTA model went through a calibration and validation process before being coded with the proposed project, reasonably foreseeable transportation projects, and future year vehicle travel demand to produce future year turning movement forecasts for the study area.[1,2] The approach used to develop the 2020 and 2040 future year forecasts for each mode are described below.

After sizing the DTA model network to an appropriate size that captured the broad route shifts due to the proposed project, the existing DTA model went through a calibration and validation process. This entailed comparing traffic volumes and queues produced by the model with observed traffic volumes and queues within and around the study area. Where volumes and queues differed significantly, the network was inspected and fixed for coding issues that may have caused unrealistic traffic behavior such as incorrect signal timing, driver behavior, segment or turning movement capacities. After completion of the calibration and validation process on the existing network, the model was determined to be adequate for the purposes of forecasting future year turning movement forecasts for the study area.

The transportation network in the existing base year DTA model was then updated to include the transportation projects that were funded and anticipated to be completed by 2020 or reasonably foreseeable to be completed by 2040. Additionally, the proposed project was coded into the "plus project" scenarios. Separately, the vehicle trip origin-destination model inputs were updated based on information from the SF-CHAMP model for each scenario. The DTA models were then run with the new transportation network and vehicle demand assumptions to create preliminary turning movement forecasts for each scenario.

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[1] The model validation and calibration processes are described in more detail in the memorandum *Dynamic Traffic Assignment Model PM Peak Period Validation for Better Market Street Project,* dated October 30, 2015, presented in Appendix 7 of the Draft Better Market Street EIR.

[2] Additional details about these projects are presented in the following memorandums: *Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run* (SFCTA, May 11, 2015) and *Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run* (SFCTA, July 17, 2015). These are presented in Appendix 7 of the Draft Better Market Street EIR.

Vehicle Forecasts

Forecasts of vehicle trips for use in the impact analysis were developed by using observed vehicle turning movement counts and adding differences in growth from the DTA model output between a 'no project' scenario, and a 'plus project' scenario. This ensures that each scenario is evaluated against a standard set of numbers that is rooted in observed data. These DTA outputs, each compared against observed data, were evaluated and adjusted using professional judgment and identified methodology for developing forecasts. Thus, 2020 travel demand forecasts for vehicles for each analysis scenario (as defined below) were estimated as follows:

- Separate SF-CHAMP runs were conducted for existing and 2020 baseline to create existing and 2020 baseline vehicle demand matrices for the study area.
- The DTA models were run as follows: the existing model used the existing vehicle demand matrix and the existing transportation network; the 2020 baseline model used the 2020 baseline vehicle demand matrix and the 2020 baseline transportation network; the 2020 baseline plus project model used the 2020 baseline vehicle demand matrix and the 2020 baseline plus project transportation network.
- The "2020 baseline" traffic volumes were estimated by subtracting the existing DTA model volumes from the baseline DTA model volumes and adding this difference to the observed existing turning movement volumes.
- The "2020 baseline plus project" traffic volumes were estimated by subtracting the baseline DTA model volumes from the baseline plus project DTA model volumes and adding this difference to the observed existing turning movement volumes.

The development of 2040 cumulative conditions followed a similar approach to the 2020 baseline conditions. However, due to the higher vehicle demand under the 2040 scenario, DTA model runs resulted in network gridlock, where much of the vehicle demand was not able to reach the desired path or destination. The 2040 cumulative no project vehicle demand exceeded the DTA model parameters, and therefore the use of the DTA model was not used for this analysis.[3] Instead, the 2040 travel demand forecasts were estimated by allocating the estimated traffic growth between

[3] Fehr & Peers, in coordination with SFCTA, SFMTA, and Planning Department staff, reviewed several alternative approaches in February 2016 and determined that this was the most effective approach to capture the results and potential delays associated with the 2040 vehicle demand. The percentage changes to the traffic volumes entering the networks are presented in Appendix 6.

2020 and 2040 from SF-CHAMP to roadways entering the study area. This growth was then allocated to downstream turning movements, accounting for turn restrictions.

The traffic volume outputs from the SF-CHAMP and DTA models reflects any changes to traffic volumes that could result from the proposed project, including diversions from one street to another, or shifts in vehicle travel from inside the study area to outside the study area. In addition to the application of a standard methodology, creating forecasts from model output involves engineering judgment, past experience, and knowledge of the transportation characteristics of the study area. The processing of raw SF-CHAMP and DTA model outputs to determine vehicle turning movement volumes or roadway growth for each scenario was performed consistent with methodologies defined in National Cooperative Highway Research Program (NCHRP Report 255), Highway Traffic Data for Urbanized Area Project Planning and Design, Pedersen, N.J. and Samdahl, D.R., Transportation Research Board, 1982, specifically, those outlined in Chapter Eight, Turning Movement Procedures.

Traffic volumes at the study intersections are projected to increase by an average of 10 percent of the p.m. peak-period vehicles between 2020 baseline and 2040 cumulative conditions. The projected growth in traffic volumes is slightly higher on a percentage basis on the north-south streets in the eastern half of the study area than in the western half. This generally reflects the relative land use change in the eastern versus the western half of the study area due to the Transit Center District Plan, the Central SoMa Plan and other development projects to the south in Mission Bay (e.g., Mission Rock, etc.). The number of vehicles on Mission Street are projected to increase more on the western half of the street due to the limited capacity for additional vehicles on the eastern half of the street. Market Street volumes generally were consistent between 2020 and 2040 due to the turn restrictions that limit non-transit vehicles. The percentage changes to the traffic volumes on Mission Street and entering the networks are presented in **Attachment B**.

ATTACHMENT A
RECENT AND FUTURE PLANNED TRANSPORTATION PROJECTS WITHIN THE TRANSPORTATION STUDY AREA

Recent and Future Planned Transportation Projects within the Transportation Study Area

Transportation Plan/Project	2020 Baseline				2040 Cumulative	
	SF-CHAMP [1]	DTA [2]	VISSIM/ Synchro [3]	Qualitative Only	SF-CHAMP [4]	Qualitative Only
"Existing Conditions" - Projects completed 2011 through 2018 [5]						
Folsom Road Diet 4th to 11th [6]	X	X	X		X	
Minor Restriping Projects (Harrison at 11th, Sixth from Folsom to Market, Beale bike lane from Folsom to Bryant) [6]	X	X	X		X	
Haight Contraflow Transit Lane [6]	X	X	X		X	
Muni, Golden Gate, and SamTrans Transit Service Changes (Muni Forward or otherwise) [6]	X	X	X		X	
Two-Way McAllister Street (part of Muni Forward) [6]	X	X	X		X	
Signal Timing Changes on Market and Mission Streets	X	X	X		X	
Salesforce Transit Center [6]	X	X	X		X	
Safer Market Street [7,8]		X	X		X	
Golden Gate Avenue Safety Project [8,9]			X			X
Eighth Street Safety Project [8,10]		X	X			X
Second Street Improvement Project [7,8, 11]		X	X		X	
Seventh Street Safety Project [8,10]				X		X
Turk Street Safety Project [8,12,13]				X		X
Upper Market Street Safety Project [8,13,14]				X		X
Eddy Street Two-Way Conversion Project [8,15]				X		X
Powell Streetscape Project [8,13,16]				X		X
2020 Reasonably Foreseeable Projects						
Central Subway Project [6]	X	X	X		X	
Van Ness BRT Project/Van Ness Improvement Project [6]	X	X	X		X	
Transit Center District Plan Streetscape Improvements [7,8]		X	X		X	
Polk Street Streetscape Project [7,8,13]				X	X	
Vision Zero improvements to Sixth and Jessie streets [8]			X		X	
SFMTA Mission Street/South Van Ness Avenue/Otis Street Intersection Improvements [8,17]			X			X
Bay Area Bike Share System [18]				X		X

Recent and Future Planned Transportation Projects within the Transportation Study Area

Transportation Plan/Project	2020 Baseline				2040 Cumulative	
	SF-CHAMP [1]	DTA [2]	VISSIM/ Synchro [3]	Qualitative Only	SF-CHAMP [4]	Qualitative Only
2040 Reasonably Foreseeable Projects						
Sixth Street Road Diet Project [7]					X	
San Francisco Bicycle Plan short-term improvements to Fifth Street [7]					X	
Central SoMa Plan Street Network Changes [7]					X	
Muni Forward (Travel Time Reduction Projects) [6,7]					X	
Geary Rapid and Bus Rapid Transit Projects [7,19]					X	
Safer Taylor Street [8,20]						X
Hub Plan Street Network Changes [8, 21]						X

Notes: All websites shown below were current as of June 29, 2018, as confirmed by Fehr & Peers.

1. SF-CHAMP assumptions are presented in memorandums *Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run* (SFCTA, May 11, 2015) and *Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run* (SFCTA, July 17, 2015). This table only includes projects within the transportation study area. Additional projects outside of the study area that were included in the SF-CHAMP models are documented within these memorandums.
2. The DTA model validation and calibration processes is described in the memorandum *Dynamic Traffic Assignment Model PM Peak Period Validation for Better Market Street Project* (Fehr & Peers, October 30, 2015).
3. *Final Better Market Street 2020 VISSIM Model Updates and Changes* (Fehr & Peers, September 29, 2016).
4. SF-CHAMP was the only analysis model prepared for 2040 cumulative conditions as forecasting long-range conditions is fraught with uncertainty that diminishes the value of analyzing the scale differences due to the proposed project. For 2040 transportation conditions, tools with detailed inputs and outputs such as DTA and VISSIM have input variable ranges that would be larger than the measurable effects of the proposed project.
5. "Existing conditions" in the EIR represents the conditions as they are in 2018, or the most recent information available. This section is intended for clarification about what has changed since the existing validation and calibration efforts were completed for the VISSIM model in 2011/2012 as documented in the memorandum *Methodology and Validation for Market/Mission Street VISSIM Model* (San Francisco Planning Department, January 30, 2012).
6. Project described in *Input Assumptions for Better Market Street 2020 Baseline SF-CHAMP Model Run* (SFCTA, May 11, 2015).
7. Project described in *Input Assumptions for Better Market Street 2040 Baseline SF-CHAMP Model Run* (SFCTA, July 17, 2015).
8. Project or Plan was not reasonably foreseeable at the time the SF-CHAMP and/or DTA models were completed in 2015.
9. Golden Gate Avenue was adopted approved in May 2016, after the completion of the SF-CHAMP and DTA models were completed in 2015. The project was completed in 2016. More details on project are shown here: https://www.sfmta.com/projects/golden-gate-avenue-safety-project

Recent and Future Planned Transportation Projects within the Transportation Study Area

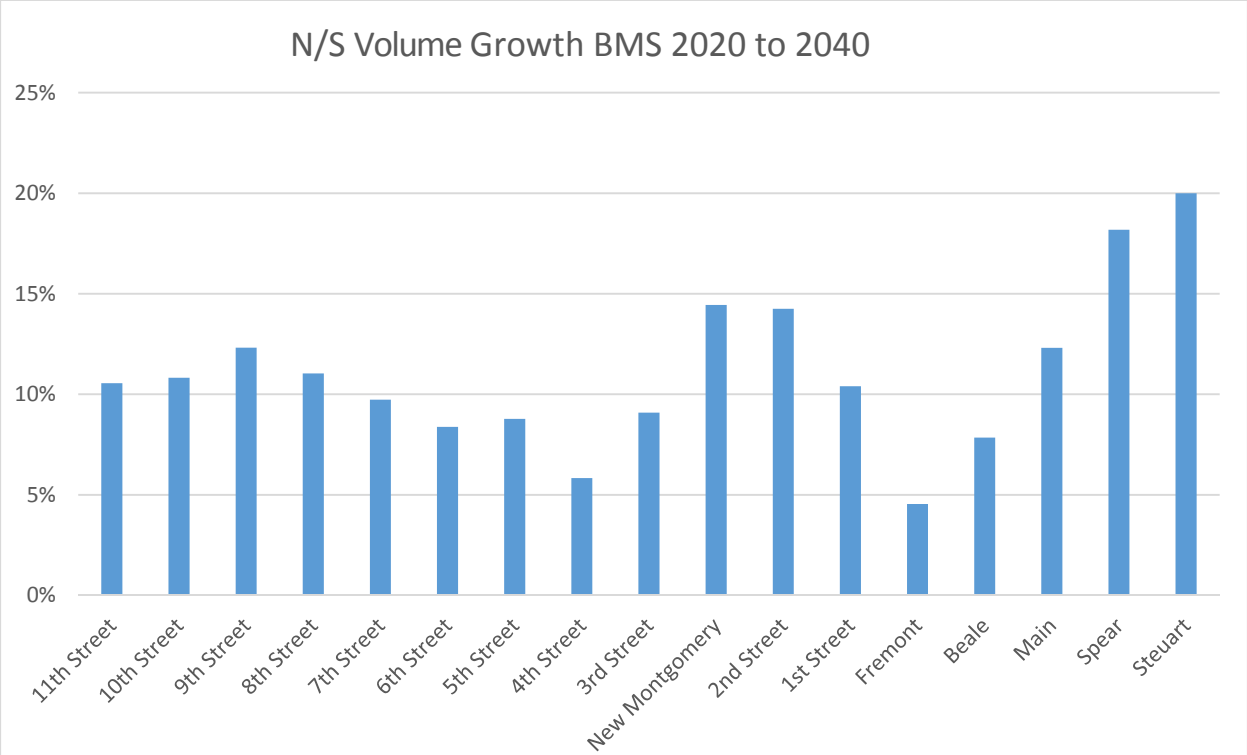
Transportation Plan/Project	2020 Baseline				2040 Cumulative	
	SF-CHAMP [1]	DTA [2]	VISSIM/ Synchro [3]	Qualitative Only	SF-CHAMP [4]	Qualitative Only

10. Phase 1 of the Seventh and Eighth Street Near Term Safety Project received approval from the SFMTA Board on November 15, 2016, after the VISSIM models were completed. Phase 1 was constructed between March and May 2017. More details are on the project webpage: https://www.sfmta.com/projects/7th-street-8th-street-near-term-safety-project. Accessed by Fehr & Peers on May 25, 2018. Preliminary planning and funding for the Eighth Street Phase 1 component was completed in 2015, hence why it was incorporated into the DTA and VISSIM models at that time, before the Eighth Street portion was incorporated into the broader project.
11. Initial turn restrictions for Second Street Improvement Project were implemented in March 2016. The complete project is expected to be complete in 2019 and is therefore included within the 2020 baseline analysis. More details on project are shown here: https://www.sfpublicworks.org/project/second-street-improvements-project
12. The Turk Street Safety project was approved in January 2018 and was therefore not reasonably foreseeable at the time any of the analysis models were completed. More details are on the project webpage: https://www.sfmta.com/projects/turk-street-safety-project
13. While the Turk Street, Polk Street, Upper Market Street Safety, and Powell Streetscape projects are directly adjacent to the study area, they do not touch the VISSIM or Synchro study locations.
14. The Upper Market Street Safety Project includes near-term improvements implemented in 2015 and spring of 2018, starting west of Octavia Boulevard. Long-term improvements were approved by the SFMTA Board of Directors in May 2017 and are expected to be constructed by 2020. More details are on the project webpage: https://www.sfmta.com/projects/upper-market-street-safety-project
15. The Eddy Street Two-Way Conversation Project received approval from the SFMTA Board in July 2017, after the analysis was completed. More details are on the project webpage: https://www.sfmta.com/projects/eddy-street-two-way-conversion-project. Accessed by Fehr & Peers on June 29, 2018.
16. The Powell Streetscape Project included elements completed in November 2015 after the SF-CHAMP and DTA models were completed. Additional elements are currently under consideration for implementation by an estimated Early 2021 as described on the project's webpage: https://www.sfmta.com/projects/powell-streetscape-project. Accessed by Fehr & Peers on June 29, 2018.
17. SF-CHAMP does not include the model parameters in order to incorporate this local streetscape project.
18. While a general increase in biking is included in future year models to reflect the buildout of the network, a bikeshare system is not a specific model parameter that can be included in these models.
19. The Geary Rapid Project is expected to be implemented by 2021 according to the project's website. The Geary Bus Rapid Transit project is the related project that includes longer term improvements west of Stanyan Street, outside of the transportation study area. More details are on the project webpage: https://www.sfmta.com/projects/geary-rapid-project
20. Safer Taylor Street is expected to go before the SFMTA Board of Directors in the Fall of 2018. More details are on the project webpage: https://www.sfmta.com/projects/safer-taylor-street
21. Hub Plan Street Network Changes are part of the Market Street Hub project, which is currently in the planning stages. More details are on the project webpage: http://sf-planning.org/market-street-hub-project

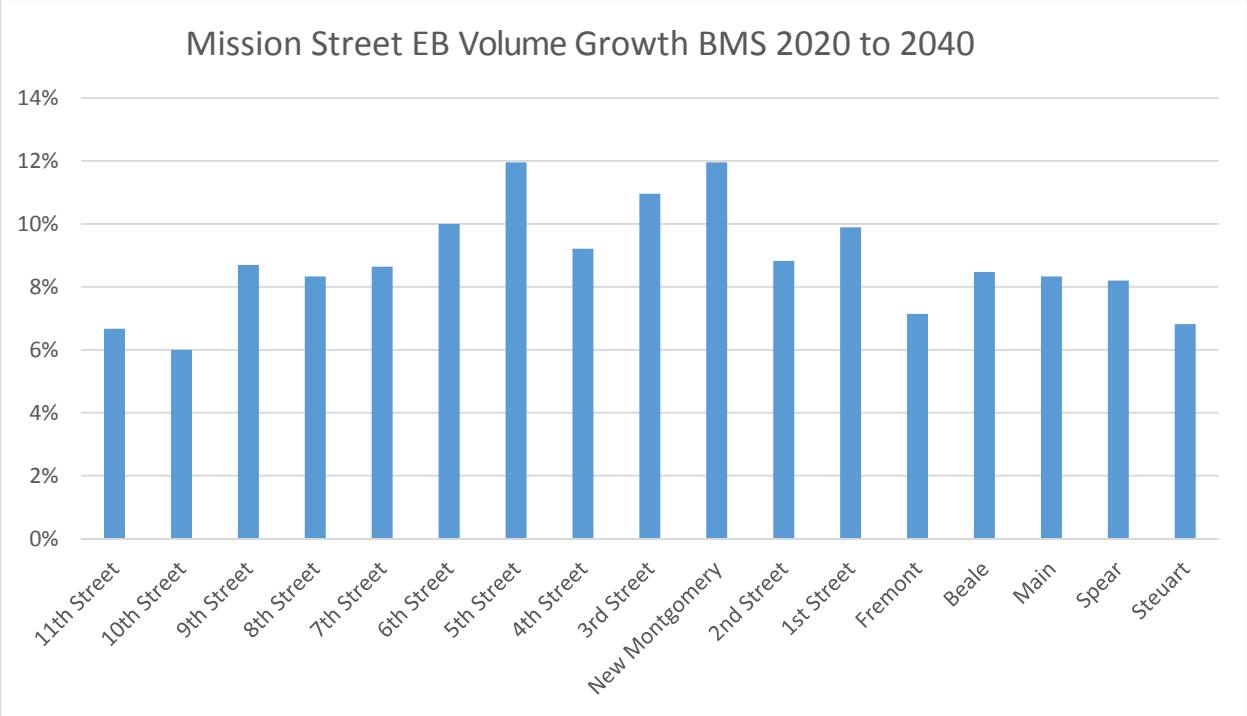
Source: SF Planning Department, Fehr & Peers. 2018.

ATTACHMENT B
2020 TO 2040 GROWTH

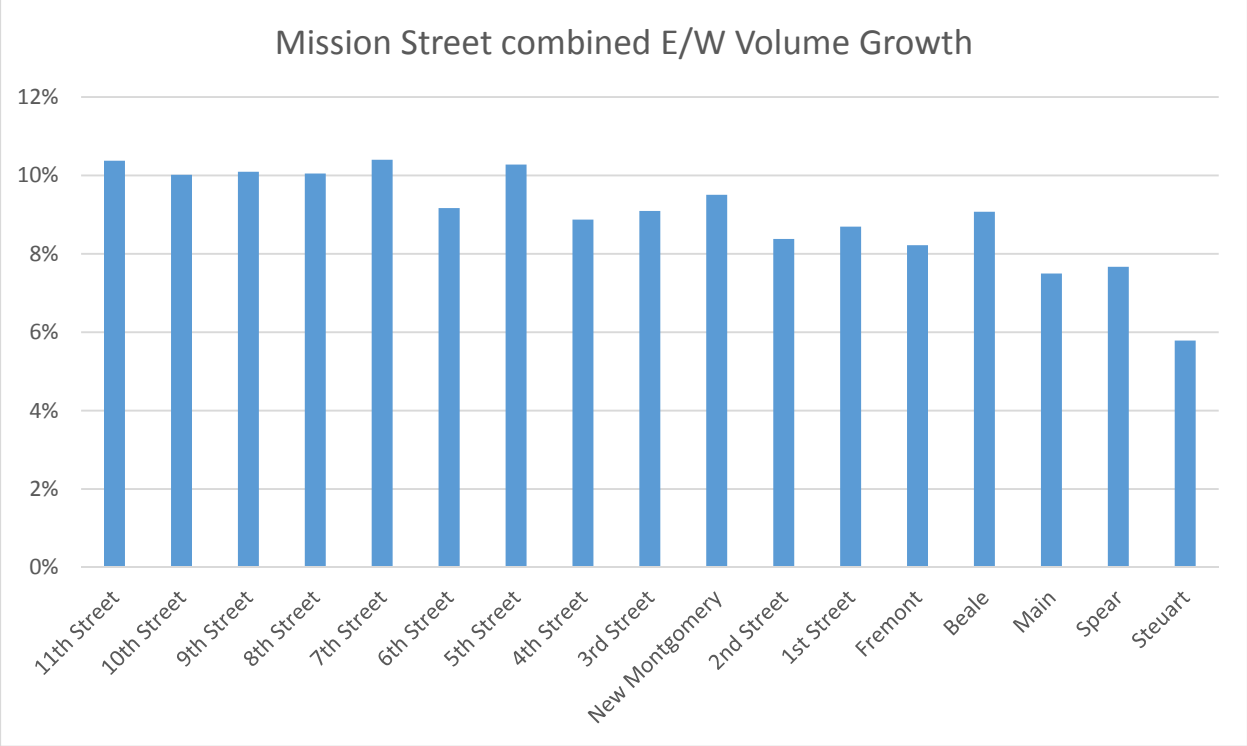
Summary of forecasted volume growth from 2020 to 2040 for Better Market Street



* Main Street, Spear street, and Steuart Street have higher-than-average % growth due to low initial volume. Raw volume increase is consistent with nearby intersections.



Mission Street WB Volume Growth BMS 2020 to 2040
16%
14%
12%
10%
8%
6%
4%
2%
0%
11th Street
10th Street
9th Street
8th Street
7th Street
6th Street
5th Street
4th Street
3rd Street
New Montgomery
2nd Street
1st Street
Fremont
Beale
Main
Spear
Steuart


Mission Street combined E/W Volume Growth
12%
10%
8%
6%
4%
2%
0%
11th Street
10th Street
9th Street
8th Street
7th Street
6th Street
5th Street
4th Street
3rd Street
New Montgomery
2nd Street
1st Street
Fremont
Beale
Main
Spear
Steuart

Attachment 6: Transit Analysis

Attachment 6a: VISSIM and Synchro Movement Delays

Route by Route Transit Delay Analysis

2020 Transit Travel Time Summary - Market and Mission Streets

Purple indicates lane change along the route		No Project			NP Travel Time						Project			Project Travel Time						
Route - direction	Vehicle Type	Lane Position	Entrance	Exit	Octavia - 10th	10th - 7th	7th - 4th	4th -1st	1st - Spear/Main/ Steuart	Total Travel Time	Lane Position	Entrance	Exit	Octavia - 10th	10th - 7th	7th - 4th	4th -1st	1st - Spear/Main/ Steuart	Total Travel Time	TT Difference
Market Street																				
F Market & Wharves - inbound	streetcar	center	Castro	Steuart	06:13	05:16	06:48	06:28	04:13	**28:58**	center	Castro	Steuart	06:39	03:13	05:04	05:21	03:34	**23:51**	-05:07
F Market & Wharves - outbound	streetcar	center	Steuart	Castro	05:36	03:57	05:16	05:35	06:52	**27:16**	center	Steuart	Castro	05:33	02:14	03:49	04:46	04:09	**20:31**	-06:45
2 Clement - inbound	trolleybus	center	Montgomery	1st				02:40		**02:40**	curb	Montgomery	1st				03:15		**03:15**	00:35
2 Clement - outbound	trolleybus	curb	Steuart	Sutter					07:15	**07:15**	curb	Steuart	Sutter					05:12	**05:12**	-02:03
5 Fulton - inbound	motorcoach	curb	McAllister	1st			05:55	07:53		13:48	center	McAllister	2nd			04:11	02:07		06:18	
		-	-	-						**13:48**	curb	2nd	1st				03:15		**09:33**	-04:16
5 Fulton - outbound	motorcoach	curb	Fremont	McAllister			05:53	06:48		**12:41**	center	Fremont	McAllister			03:45	04:28		**08:13**	-04:28
5R Fulton Rapid - inbound	trolleybus	curb	McAllister	1st			05:55	07:53		13:48	center	McAllister	2nd			04:11	02:07		06:18	
		-	-	-						**13:48**	curb	2nd	1st				03:15		**09:33**	-04:16
5R Fulton Rapid - outbound	trolleybus	curb	Fremont	McAllister			05:53	06:48		**12:41**	center	Fremont	McAllister			03:45	04:28		**08:13**	-04:28
6 Haight/Parnassus - inbound[1]	trolleybus	center	Haight	1st			05:41	05:19		11:00	center	Haight	10th						00:00	
		curb	1st	Spear					02:58	02:58	curb	10th	1st			05:39	06:29		12:08	
		-	-	-						**13:58**	center	1st	Spear					02:45	**14:53**	00:55
6 Haight/Parnassus - outbound[1]	trolleybus	curb	Steuart	1st					07:15	07:15	curb	Steuart	10th		02:36	05:19	05:35	05:12	18:42	
		center	1st	Haight		02:08	04:58	04:57		**19:18**	center	10th	Haight						**18:42**	-00:36
7 Haight/Noriega - inbound[1]	motorcoach	center	Haight	7th						00:00	center	Haight	10th						00:00	
		curb	7th	1st			05:55	07:53		**13:48**	curb	10th	1st			05:39	06:29		**12:08**	-01:40
7 Haight/Noriega - outbound[1]	motorcoach	center	Fremont	Haight			04:58	04:57		**09:55**	curb	Fremont	10th			05:19	05:35		**10:54**	00:59
		-	-	-						00:00	center	10th	Haight						00:00	
7X Noriega Express - outbound[2]	motorcoach	curb	Main	Turk			02:57	06:48	07:15	**17:00**	curb	Main	Turk			02:40	05:35	05:12	**13:26**	-03:33
9 San Bruno - inbound[1]	motorcoach	center	11th	1st		04:13	05:41	05:19		15:13	center	11th	Spear		02:48	04:11	04:14	02:45	13:58	
		curb	1st	Spear					03:12	**18:25**	-	-	-						**13:58**	-04:27
9 San Bruno - outbound[1]	motorcoach	curb	Main	1st					07:15	07:15	curb	Steuart	1st					05:12	05:12	
		center	1st	11th		03:12	04:58	04:57		**20:22**	center	1st	11th		02:44	03:45	04:28		**16:09**	-04:13
9R San Bruno Rapid - inbound[1]	motorcoach	center	11th	1st		04:13	05:41	05:19		15:13	center	11th	Spear		02:48	04:11	04:14	02:45	13:58	
		curb	1st	Spear					03:12	**18:25**	-	-	-						**13:58**	-04:27
9R San Bruno Rapid - outbound[1]	motorcoach	curb	Main	1st					07:15	07:15	curb	Main	1st					05:12	05:12	
		center	1st	11th		03:12	04:58	04:57		**20:22**	center	1st	11th		02:44	03:45	04:28		**16:09**	-04:13
21 Hayes - inbound[1]	trolleybus	center	Polk/10th	1st			05:41	05:19		11:00	curb	Polk/10th	1st			05:39	06:29		12:08	
		curb	1st	Spear					03:12	**14:12**	center	1st	Spear					02:45	**14:53**	00:41
21 Hayes - outbound	trolleybus	curb	Steuart	Hayes		02:48	05:53	06:48	07:15	**22:44**	curb	Steuart	Hayes		02:36	05:19	05:35	05:12	**18:42**	-04:02
31 Balboa - inbound	trolleybus	center	Turk	1st			02:51	05:19		08:09	curb	Turk	1st			02:50	06:29		09:18	
		curb	1st	Spear					03:12	**11:22**	center	1st	Spear					02:45	**12:03**	00:42
31 Balboa - outbound	trolleybus	curb	Steuart	Turk			02:57	06:48	07:15	**17:00**	curb	Steuart	Turk			02:40	05:35	05:12	**13:26**	-03:33
38 Geary - inbound	motorcoach	curb	O'Farrell	1st				03:57		**03:57**	curb	O'Farrell	1st				03:15		**03:15**	-00:42
38 Geary - outbound	motorcoach	curb	Fremont	Geary				03:24		**03:24**	curb	Fremont	Geary				02:47		**02:47**	-00:37
38R Geary Rapid - inbound	motorcoach	curb	O'Farrell	1st				03:57		**03:57**	curb	O'Farrell	1st				03:15		**03:15**	-00:42
38R Geary Rapid - outbound	motorcoach	curb	Fremont	Geary				03:24		**03:24**	curb	Fremont	Geary				02:47		**02:47**	-00:37
Mission Street																				
14 Mission - inbound[3]	motorcoach	curb	S. Van Ness	Main		05:45	05:10	08:50	02:14	**21:59**	curb	S. Van Ness	Main		05:55	05:22	07:17	02:14	**20:48**	-01:11
14 Mission - outbound[3]	motorcoach	curb	Steuart	S. Van Ness		07:58	05:00	05:04	04:07	**22:09**	curb	Steuart	S. Van Ness		07:14	04:56	05:04	04:08	**21:22**	-00:47
14R Mission Rapid - inbound[3]	trolleybus	curb	S. Van Ness	Main		05:45	05:10	08:50	02:14	**21:59**	curb	S. Van Ness	Main		05:55	05:22	07:17	02:14	**20:48**	-01:11
14R Mission Rapid - outbound[3]	trolleybus	curb	Steuart	S. Van Ness		07:58	05:00	05:04	04:07	**22:09**	curb	Steuart	S. Van Ness		07:14	04:56	05:04	04:08	**21:22**	-00:47
14X Mission Express - inbound	motorcoach	curb	6th	Main			05:10	08:50	02:14	**16:14**	curb	6th	Main			05:22	07:17	02:14	**14:53**	-01:21
14X Mission Express - outbound	motorcoach	curb	Steuart	6th			05:00	05:04	04:07	**14:11**	curb	Steuart	6th			04:56	05:04	04:08	**14:08**	-00:03

[1] Gray shaded cells indicate locations where travel time comparisons were not available. There are not any bus routes that run the length of the Market Street travel time segment from Octavia Blvd to 10th Street, therefore it was not feasible to record the travel times for buses this segment in order to extrapolate travel times for those that do run on a portion of this segment (e.g., the 6 and 7). In a similar manner, there are not any bus routes that run the length of the Market Street travel time segment between 10th to 7th streets in the inbound curb lane (the curb transit lane currently starts east of 8th Street). Therefore, the travel time comparison for Baseline and 2020 Plus Project scenarios is based on the segments starting at 10th Street for the 6 Haight/Parnassus and 7 Haight/Noriega, and at 7th Street for inbound routes that travel in the curb lane.

[2] 7X inbound is not analyzed here because it does not operate in the PM.

[3] The western most travel time segment for Mission Street is from 7th to South Van Ness, instead of 10th Street or Octavia. Therefore, the travel times extend to South Van Ness.

2040 Transit Travel Time Summary - Market and Mission Streets

Purple indicates lane change along the route[3]		No Project			2020 Baseline Travel Times (no 2040 Baseline modeled)[4]						Project			2040 Project Travel Time						TT Difference (2020 Baseline to 2040 PP)
Route - direction	Vehicle Type	Lane Position	Entrance	Exit	Octavia - 10th	10th - 7th	7th - 4th	4th - 1st	1st - Spear/Main/ Steuart	Total Travel Time	Lane Position	Entrance	Exit	Octavia - 10th	10th - 7th	7th - 4th	4th - 1st	1st - Spear/Main/ Steuart	Total Travel Time	
Market Street																				
F Market & Wharves - inbound	streetcar	center	Castro	Steuart	06:13	05:16	06:48	06:28	04:13	**28:58**	center	Castro	Steuart	06:35	03:15	05:09	05:36	03:48	**24:23**	-04:35
F Market & Wharves - outbound	streetcar	center	Steuart	Castro	05:36	03:57	05:16	05:35	06:52	**27:16**	center	Steuart	Castro	05:36	02:15	04:03	04:53	04:08	**20:55**	-06:21
2 Clement - inbound	trolleybus	center	Montgomery	1st				02:40		**02:40**	curb	Montgomery	1st				03:29		**03:29**	00:49
2 Clement - outbound	trolleybus	curb	Steuart	Sutter					07:15	**07:15**	curb	Steuart	Sutter					05:33	**05:33**	-01:42
5 Fulton - inbound	motorcoach	curb	McAllister	1st			05:55	07:53		13:48	center	McAllister	2nd			04:38	02:42		07:20	
		-	-	-						**13:48**	curb	2nd	1st				03:29		**10:48**	-03:00
5 Fulton - outbound	motorcoach	curb	Fremont	McAllister			05:53	06:48		**12:41**	center	Fremont	McAllister			04:00	04:46		**08:46**	-03:55
5R Fulton Rapid - inbound	trolleybus	curb	McAllister	1st			05:55	07:53		13:48	center	McAllister	2nd			04:38	02:42		07:20	
		-	-	-						**13:48**	curb	2nd	1st				03:29		**10:48**	-03:00
5R Fulton Rapid - outbound	trolleybus	curb	Fremont	McAllister			05:53	06:48		**12:41**	center	Fremont	McAllister			04:00	04:46		**08:46**	-03:55
6 Haight/Parnassus - inbound[1]	trolleybus	center	Haight	1st			05:41	05:19		11:00	center	Haight	10th						00:00	
		curb	1st	Spear					02:58	02:58	curb	10th	1st			06:02	06:57		12:59	
		-	-	-						**13:58**	center	1st	Spear					03:22	**16:21**	02:23
6 Haight/Parnassus - outbound[1]	trolleybus	curb	Steuart	1st					07:15	07:15	curb	Steuart	10th		02:42	05:22	07:50	05:33	21:27	
		center	1st	Haight		02:08	04:58	04:57		**19:18**	center	10th	Haight						**21:27**	02:09
7 Haight/Noriega - inbound[1]	motorcoach	center	Haight	7th						00:00	center	Haight	10th						00:00	
		curb	7th	1st			05:55	07:53		**13:48**	curb	10th	1st			06:02	06:57		**12:59**	-00:49
7 Haight/Noriega - outbound[1]	motorcoach	center	Fremont	Haight			04:58	04:57		**09:55**	curb	Fremont	10th			05:22	07:50		**13:12**	03:17
		-	-	-						00:00	center	10th	Haight						00:00	
7X Noriega Express - outbound[2]	motorcoach	curb	Main	Turk			02:57	06:48	07:15	**17:00**	curb	Main	Turk			02:41	07:50	05:33	**16:04**	-00:55
9 San Bruno - inbound[1]	motorcoach	center	11th	1st		04:13	05:41	05:19		15:13	center	11th	Spear		02:54	04:38	05:23	03:22	16:17	
		curb	1st	Spear					03:12	**18:25**	-	-	-						**16:17**	-02:08
9 San Bruno - outbound[1]	motorcoach	curb	Main	1st					07:15	07:15	curb	Steuart	1st					05:33	05:33	
		center	1st	11th		03:12	04:58	04:57		**20:22**	center	1st	11th		02:47	04:00	04:46		**17:06**	-03:16
9R San Bruno Rapid - inbound[1]	motorcoach	center	11th	1st		04:13	05:41	05:19		15:13	center	11th	Spear		02:54	04:38	05:23	03:22	16:17	
		curb	1st	Spear					03:12	**18:25**	-	-	-						**16:17**	-02:08
9R San Bruno Rapid - outbound[1]	motorcoach	curb	Main	1st					07:15	07:15	curb	Main	1st					05:33	05:33	
		center	1st	11th		03:12	04:58	04:57		**20:22**	center	1st	11th		02:47	04:00	04:46		**17:06**	-03:16
21 Hayes - inbound[1]	trolleybus	center	Polk/10th	1st			05:41	05:19		11:00	curb	Polk/10th	1st			06:02	06:57		12:59	
		curb	1st	Spear					03:12	**14:12**	center	1st	Spear					03:22	**16:21**	02:09
21 Hayes - outbound	trolleybus	curb	Steuart	Hayes		02:48	05:53	06:48	07:15	**22:44**	curb	Steuart	Hayes		02:42	05:22	07:50	05:33	**21:27**	-01:17
31 Balboa - inbound	trolleybus	center	Turk	1st			02:51	05:19		08:09	curb	Turk	1st			03:01	06:57		09:58	
		curb	1st	Spear					03:12	**11:22**	center	1st	Spear					03:22	**13:20**	01:58
31 Balboa - outbound	trolleybus	curb	Steuart	Turk			02:57	06:48	07:15	**17:00**	curb	Steuart	Turk			02:41	07:50	05:33	**16:04**	-00:55
38 Geary - inbound	motorcoach	curb	O'Farrell	1st				03:57		**03:57**	curb	O'Farrell	1st				03:29		**03:29**	-00:28
38 Geary - outbound	motorcoach	curb	Fremont	Geary				03:24		**03:24**	curb	Fremont	Geary				03:55		**03:55**	00:31
38R Geary Rapid - inbound	motorcoach	curb	O'Farrell	1st				03:57		**03:57**	curb	O'Farrell	1st				03:29		**03:29**	-00:28
38R Geary Rapid - outbound	motorcoach	curb	Fremont	Geary				03:24		**03:24**	curb	Fremont	Geary				03:55		**03:55**	00:31

[1] Gray shaded cells indicate locations where travel time comparisons were not available. There are not any bus routes that run the length of the Market Street travel time segment from Octavia Blvd to 10th Street, therefore it was not feasible to record the travel times for buses this segment in order to extrapolate travel times for those that do run on a portion of this segment (e.g., the 6 and 7). In a similar manner, there are not any bus routes that run the length of the Market Street travel time segment between 10th to 7th streets in the inbound curb lane (the curb transit lane currently starts east of 8th Street). Therefore, the travel time comparison for Baseline and 2020 Plus Project scenarios is based on the segments starting at 10th Street for the 6 Haight/Parnassus and 7 Haight/Noriega, and at 7th Street for inbound routes that travel in the curb lane.

[2] 7X inbound is not analyzed here because it does not operate in the PM.

[3] Mission Street transit would operate within center-running transit only lanes in the future based on the Muni Forward project.

[4] 2020 no project conditions are used as a proxy to conservatively represent 2040 no project conditions. 2040 conditions without the project would have slower travel times compared to the 2020 shown here due to growth in traffic using Market Street.

Transit Delay Analysis Summary

		PM Peak Hour									
	Route	3	10	12 / 11	19	27	41 / 30X[1]	82X[2]	24 / 54 / 92 / 93	FiDi	TT[3]
2020 Baseline Plus Project	Inbound										
	Baseline Travel Delay	04:04	05:08	23:47	02:16	06:17	00:45		12:02	17:10	17:19
	Baseline Plus Project Travel Delay	04:16	03:54	22:40	03:12	06:28	00:40		12:40	14:11	16:13
	Delay Added by Project	+0:11	-1:14	-1:06	+0:55	+0:11	-0:05		+0:37	-2:59	-1:05
	Transit Headway	15:00	06:00	15:00	15:00	15:00	08:00		15:00	12:00	30:00
	Delay as Percent of Headway	1%	-21%	-7%	6%	1%	-1%		4%	-25%	-4%
	Significant Impact?	NO	NO	NO	NO	NO	NO		NO	NO	NO
	Outbound										
	Baseline Travel Delay	03:43	06:35	06:16	01:43	01:57	02:25	00:45	02:11	04:21	15:42
	Baseline Plus Project Travel Delay	03:55	06:25	06:14	02:19	05:28	01:30	00:40	05:03	04:22	17:22
	Delay Added by Project	+0:12	-0:10	-0:02	+0:36	+3:32	-0:55	-0:05	+2:52	+0:01	+1:40
	Transit Headway	15:00	06:00	15:00	15:00	15:00	08:00	15:00	15:00	12:00	30:00
	Delay as Percent of Headway	1%	-3%	0%	4%	24%	-11%	-1%	19%	0%	6%
	Significant Impact?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Notes: Transit headways current as of December 2017. Golden Gate Transit headways reflect the shortest headway of all routes along each shared alignment.

1. 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is not assessed with the cross-street travel time analysis.

2. Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.

3. Golden Gate Transit Transbay Terminal (TT) routes' "travel delay" includes total travel time along Mission Street rather than solely delay.

Source: Fehr & Peers, 2018

Transit Delay - 2020 Baseline Conditions (in minutes)

Route [1,2]	3	10	12 / 11	19	27	41 / 30X[3]	82X[4]	24 / 54 / 92 / 93	FiDi	TT[5]
PM Peak Hour										
Inbound										
Intersection Delay	04:04.4	05:07.8	23:34.9	02:13.9	06:10.7	00:45.3		11:54.1	17:00.8	17:16.1
Re-Entry Delay	00:00.0	00:00.5	00:12.0	00:02.5	00:06.0	00:00.0		00:08.0	00:09.5	00:02.5
Total Travel Delay	04:04.4	05:08.3	23:46.9	02:16.4	06:16.7	00:45.3		12:02.1	17:10.3	17:18.6
Outbound										
Intersection Delay	03:43.4	06:34.7	06:16.4	01:38.0	01:49.7	02:23.4	00:45.3	02:06.4	04:20.0	15:37.7
Re-Entry Delay	00:00.0	00:00.0	00:00.0	00:05.0	00:07.0	00:01.5	00:00.0	00:04.5	00:01.5	00:04.5
Total Travel Delay	03:43.4	06:34.7	06:16.4	01:43.0	01:56.7	02:24.9	00:45.3	02:10.9	04:21.5	15:42.2

Notes:

1. Passenger Loading Delay is not included in this analysis because passenger loads are not anticipated to change between Existing and Plus Project conditions.
2. The Muni 47, 49, 30, 45, and 8 routes also provide cross-street transit service. However, they are not included in this analysis because their routes are in dedicated transit-only lanes through the Better Market Street study area.

3. 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is not assessed with the cross-street travel time analysis.
4. Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.
5. Golden Gate Transit Transbay Terminal (TT) routes' "travel delay" includes total travel time along Mission Street rather than solely delay.

Source: Fehr & Peers, 2018

Intersection Delay Calculations by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Hardcode inputs based on SFMTA route maps and Existing Transit Facilities Figure

Unsignalized intersections (the delay is manually removed from the Total Delay calculations)

Delay over 100 seconds

Corridor / HOV Adjust = Delay adjustments applied per SF Bike Plan methodology to account for transit-only Lanes ("HOV") or three intersections in a row with LOS F approaches.

2020 Baseline PM

Line No	Direction	Input	Study Intersections													Total Delay Signal	Total Delay Unsig	Ave Delay Signal	Ave Delay Unsig	Non-Study Signal	Non-Study Unsig	Final Delay
3	Inbound	Intersection	Grant/Post	Kearny/Post	Sansome/Sutter											3				0	0	
		Approach	EB	EB	SW																	
		Appr. Delay	6.5	14.5	223.4											244						
		Appr. V/C	0.23	0.30	-																	
		Adjusted Delay	6.5	14.5	223.4																	
		Corridor/HOV Adjust																				
		Final Delay	6.5	14.5	223.4											244	0	1				244
	Outbound	Intersection	Sansome/Sutter													1				0	0	
		Approach	SW																			
		Appr. Delay	223.4													223						
		Appr. V/C	-																			
		Adjusted Delay	223.4																			
		Corridor/HOV Adjust																				
		Final Delay	223.4													223	0	1				223
10	Inbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter								6				0	0	
		Approach	NB	NB	NB	NB	EB	WB														
		Appr. Delay	39.6	49.0	58.4	112.7	29.8	18.3								308						
		Appr. V/C	0.94	0.98	-	-	-	-														
		Adjusted Delay	39.6	49.0	58.4	112.7	29.8	18.3														
		Corridor/HOV Adjust																				
		Final Delay	39.6	49.0	58.4	112.7	29.8	18.3								308	0	1				308
	Outbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter								6				0	0	
		Approach	SB	SB	SB	WB	WB	SW														
		Appr. Delay	17.1	39.4	61.6	34.9	18.3	223.4								395						
		Appr. V/C	0.70	0.98	-	-	-	-														
		Adjusted Delay	17.1	39.4	61.6	34.9	18.3	223.4														
		Corridor/HOV Adjust																				
		Final Delay	17.1	39.4	61.6	34.9	18.3	223.4								395	0	1				395
12 / 11	Inbound	Intersection	10th/Folsom	9th/Folsom	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	3rd/Folsom	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	13				0	0	
		Approach	EB	EB	EB	EB	EB	EB	EB	EB	EB	NB	NB	NB	EB							
		Appr. Delay	28.9	23.0	17.0	51.1	85.1	160.3	235.5	213.9	192.3	49.0	58.4	112.7	29.8	1257						
		Appr. V/C	0.80	0.82	0.83	0.98	1.13	1.33	1.52	1.45	1.37	0.98	-	-	-							
		Adjusted Delay	28.9	23.0	17.0	51.1	85.1	240.0	240.0	240.0	240.0	49.0	58.4	112.7	29.8							
		Corridor/HOV Adjust																				
		Final Delay	28.9	23.0	17.0	51.1	85.1	240.0	240.0	240.0	240.0	49.0	58.4	112.7	29.8	1415	0	1				1415
	Outbound	Intersection	Sansome/Sutter	2nd/Market	2nd/Mission	2nd/Howard	2nd/Folsom									5				0	0	
		Approach	SW	WB	SB	SB	SB															
		Appr. Delay	223.4	34.9	61.6	39.4	17.1									376						
		Appr. V/C	-	-	-	0.98	0.70															
		Adjusted Delay	223.4	34.9	61.6	39.4	17.1															
		Corridor/HOV Adjust																				
		Final Delay	223.4	34.9	61.6	39.4	17.1									376	0	1				376
19	Inbound	Intersection	7th/Howard	7th/Mission	7th/Market	8th/Market	9th/Market									5				0	0	
		Approach	NB	NB	NB	WB	WB															
		Appr. Delay	15.0	34.7	76.7	40.0	34.2									201						
		Appr. V/C	0.70	-	-	-	-															
		Adjusted Delay	15.0	34.7	76.7	40.0	34.2															
		Corridor/HOV Adjust			66.7																	
		Final Delay	15.0	34.7	10.0	40.0	34.2									134	0	1				134
	Outbound	Intersection	Hyde/Market	8th/Mission	8th/Howard	8th/Folsom										4				0	0	
		Approach	SW	SB	SB	SB																
		Appr. Delay	20.1	32.0	26.0	19.9										98						
		Appr. V/C	-	-	0.94	0.86																
		Adjusted Delay	20.1	32.0	26.0	19.9																
		Corridor/HOV Adjust																				
		Final Delay	20.1	32.0	26.0	19.9										98	0	1				98
27	Inbound	Intersection	6th/Folsom	5th/Folsom	5th/Howard	5th/Mission	5th/Market	Cyril Magnin/Ellis								6				0	0	
		Approach	NB	EB	NB	NB	NB	NB														
		Appr. Delay	30.6	160.3	11.0	19.4	49.1	20.6								291						
		Appr. V/C	0.92	1.33	0.50	-	-	0.30														
		Adjusted Delay	30.6	240.0	11.0	19.4	49.1	20.6														
		Corridor/HOV Adjust																				
		Final Delay	30.6	240.0	11.0	19.4	49.1	20.6								371	0	1				371
	Outbound	Intersection	Mason/Eddy	5th/Market	5th/Mission	5th/Howard										4				0	0	
		Approach	SB	SB	SB	SB																
		Appr. Delay	7.1	18.8	73.0	10.8										110						
		Appr. V/C	0.23	-	-	0.50																
		Adjusted Delay	7.1	18.8	73.0	10.8																
		Corridor/HOV Adjust																				
		Final Delay	7.1	18.8	73.0	10.8										110	0	1				110

Intersection Delay Calculations by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Hardcode inputs based on SFMTA route maps and Existing Transit Facilities Figure

Unsignalized intersections (the delay is manually removed from the Total Delay calculations)

Delay over 100 seconds

Corridor / HOV Adjust = Delay adjustments applied per SF Bike Plan methodology to account for transit-only Lanes ("HOV") or three intersections in a row with LOS F approaches.

2020 Baseline PM

Line No	Direction	Input	Study Intersections								Total Delay Signal	Total Delay Unsig	Ave Delay Signal	Ave Delay Unsig	Non-Study Signal	Non-Study Unsig	Final Delay
41 / 30X*	Inbound	Intersection	Davis/Market	Beale/Mission							2				0	0	
		Approach	SW	SB													
		Appr. Delay	35.3	43.8							79						
		Appr. V/C	-	-													
		Adjusted Delay	35.3	43.8													
		Corridor/HOV Adjust		33.8													
		Final Delay	35.3	10.0							45	0	1				45
	Outbound	Intersection	Main/Mission	Main/Market							2				0	0	
		Approach	NB	NB													
		Appr. Delay	70.7	72.7							143						
		Appr. V/C	-	-													
		Adjusted Delay	70.7	72.7													
		Corridor/HOV Adjust															
		Final Delay	70.7	72.7							143	0	1				143
82X	Inbound	Intersection									0				0	0	
		Approach															
		Appr. Delay									0						
		Appr. V/C															
		Adjusted Delay															
		Corridor/HOV Adjust															
		Final Delay									0	0	#DIV/0!				0
	Outbound	Intersection	Davis/Market	Beale/Mission							2				0	0	
		Approach	SW	SB													
		Appr. Delay	35.3	43.8							79						
		Appr. V/C	-	-													
		Adjusted Delay	35.3	43.8													
		Corridor/HOV Adjust		33.8													
		Final Delay	35.3	10.0							45	0	1				45
24 / 54 / 92 / 93	Inbound	Intersection	8th/Market	8th/Mission	8th/Howard	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	8				0	0	
		Approach	SW	SB	SB	SB	EB	EB	EB	EB							
		Appr. Delay	20.1	32.0	26.0	19.9	51.1	85.1	160.3	235.5	630						
		Appr. V/C	-	-	0.94	0.86	0.98	1.13	1.33	1.52							
		Adjusted Delay	20.1	32.0	26.0	19.9	51.1	85.1	240.0	240.0							
		Corridor/HOV Adjust															
		Final Delay	20.1	32.0	26.0	19.9	51.1	85.1	240.0	240.0	714	0	1				714
	Outbound	Intersection	7th/Howard	7th/Mission	7th/Market						3				0	0	
		Approach	NB	NB	NB												
		Appr. Delay	15.0	34.7	76.7						126						
		Appr. V/C	0.70	-	-												
		Adjusted Delay	15.0	34.7	76.7												
		Corridor/HOV Adjust															
		Final Delay	15.0	34.7	76.7						126	0	1				126
FiDi	Inbound	Intersection	Battery/Market	1st/Mission	1st/Howard	2nd/Howard	3rd/Howard	4th/Howard	4th/Folsom		7				0	0	
		Approach	SW	SB	SB	WB	WB	WB	SB								
		Appr. Delay	382.6	458.2	102.9	120.7	90.4	55.6	42.2		1253						
		Appr. V/C	-	-	0.96	1.23	1.16	0.89	0.98								
		Adjusted Delay	382.6	458.2	200.0	240.0	90.4	55.6	42.2								
		Corridor/HOV Adjust		448.2													
		Final Delay	382.6	10.0	200.0	240.0	90.4	55.6	42.2		1021	0	1				1021
	Outbound	Intersection	2nd/Folsom	Fremont/Mission	Fremont/Market						3				0	0	
		Approach	EB	NB	NB												
		Appr. Delay	192.3	33.3	47.6						273						
		Appr. V/C	1.37	-	-												
		Adjusted Delay	240.0	33.3	47.6												
		Corridor/HOV Adjust		23.3	37.6												
		Final Delay	240.0	10.0	10.0						260	0	1				260
TT	Inbound	Intersection	Hyde/Market	8th/Mission	7th to Main	Beale/Mission					4				0	0	
		Approach	SW	SB	*uses travel times*	EB											
		Appr. Delay	20.1	32.0		64.9					117						
		Appr. V/C	-	-		-											
		Adjusted Delay	20.1	32.0		64.9											
		Corridor/HOV Adjust				54.9											
		Final Delay	20.1	32.0	974.0	10.0					1036	0	9				1036
	Outbound	Intersection	Fremont/Mission	Steuart to 7th	7th/Market						3				0	0	
		Approach	NB	*uses travel times*	NB												
		Appr. Delay	33.3		76.7						110						
		Appr. V/C	-		-												
		Adjusted Delay	33.3		76.7												
		Corridor/HOV Adjust	23.3														
		Final Delay	10.0	851.0	76.7						938	0	9				938

*Note: 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is not assessed with the cross-street travel time analysis.

Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.

Re-Entry Delay by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Grey Shaded Cells are hardcode inputs

Unsignalized intersection

Far side stops - Use downstream intersection volume. Otherwise, the stop is near side and the approach volume for the nearest intersection to the stop is used.

"Stop Present" refers to stops where buses have to pull out of the travel lane. Stops with bulb outs, boarding islands, or transit-only lanes (and therefore without re-entry delay) are noted with "Bulb".

2020 Baseline PM

Line No	Direction	Input	Study Intersections													Total
3	Inbound	Intersection	Grant/Post	Kearny/Post	Sansome/Sutter											3
		Approach	EB	EB	SW											
		Stop Present?	Bulb		Y											2
		Appr. Lanes			1											
		Appr. Volume			91											
		Vol/Lane Round			100											
		Re-Entry Delay			0.0											0
	Outbound	Intersection	Sansome/Sutter													1
		Approach	SW													
		Stop Present?	Y													1
		Appr. Lanes	1													
		Appr. Volume	91													
		Vol/Lane Round	100													
		Re-Entry Delay	0.0													0
10	Inbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter								6
		Approach	NB	NB	NB	NB	EB	WB								
		Stop Present?		Bulb		Bulb		Y								3
		Appr. Lanes						2								
		Appr. Volume						299								
		Vol/Lane Round						150								
		Re-Entry Delay						0.5								1
	Outbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter								6
		Approach	SB	SB	SB	WB	WB	SW								
		Stop Present?		Bulb		Bulb		Y								3
		Appr. Lanes						1								
		Appr. Volume						91								
		Vol/Lane Round						100								
		Re-Entry Delay						0.0								0
12 / 11	Inbound	Intersection	10th/Folsom	9th/Folsom	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	3rd/Folsom	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	13
		Approach	EB	EB	EB	EB	EB	EB	EB	EB	EB	NB	NB	NB	EB	
		Stop Present?		Bulb	Bulb	Bulb	Bulb	Y	Y	Bulb		Bulb		Bulb	Y	10
		Appr. Lanes						3	4						2	
		Appr. Volume						2,050	2,120						284	
		Vol/Lane Round						700	550						150	
		Re-Entry Delay						7.0	4.5						0.5	12
	Outbound	Intersection	Sansome/Sutter	2nd/Market	2nd/Mission	2nd/Howard	2nd/Folsom									5
		Approach	SW	WB	SB	SB	SB									
		Stop Present?	Y	Bulb		Bulb										3
		Appr. Lanes	1													
		Appr. Volume	91													
		Vol/Lane Round	100													
		Re-Entry Delay	0.0													0
19	Inbound	Intersection	Hyde/Market	8th/Mission	8th/Howard	8th/Folsom										4
		Approach	SW	SB	SB	SB										
		Stop Present?	Y	Bulb	Bulb	Bulb										4
		Appr. Lanes	4													
		Appr. Volume	1,398													
		Vol/Lane Round	350													
		Re-Entry Delay	2.5													3
	Outbound	Intersection	7th/Howard	7th/Mission	7th/Market	8th/Market	9th/Market									5
		Approach	NB	NB	NB	WB	WB									
		Stop Present?	Bulb	Y	Bulb	Y										4
		Appr. Lanes		3		2										
		Appr. Volume		1,836		173										
		Vol/Lane Round		600		100										
		Re-Entry Delay		5.0		0.0										5

Re-Entry Delay by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Grey Shaded Cells are hardcode inputs

Unsignalized intersection

Far side stops - Use downstream intersection volume. Otherwise, the stop is near side and the approach volume for the nearest intersection to the stop is used.

"Stop Present" refers to stops where buses have to pull out of the travel lane. Stops with bulb outs, boarding islands, or transit-only lanes (and therefore without re-entry delay) are noted with "Bulb".

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Line No	Direction	Input	Study Intersections								Total
27	Inbound	Intersection	6th/Folsom	5th/Folsom	5th/Howard	5th/Howard	5th/Mission	5th/Market	Cyril Magnin/Ellis		7
		Approach	NB	EB	NB	NB	NB	NB	NB		
		Stop Present?	Bulb		Y	Y	Y	Bulb			5
		Appr. Lanes			2	2	2				
		Appr. Volume			630	630	646			Note that the 5th/Howard delay is counted twice because the stop at 5th/Folsom is a far side stop on the	
		Vol/Lane Round			300	300	300			northbound leg after the 27 Bryant turns from Folsom to 5th Street.	
		Re-Entry Delay			2.0	2.0	2.0				6
	Outbound	Intersection	Mason/Eddy	5th/Market	5th/Mission	5th/Howard					4
		Approach	SB	SB	SB	SB					
		Stop Present?		Y	Y	Y					3
		Appr. Lanes		2	2	3					
		Appr. Volume		722	755	780					
		Vol/Lane Round		350	400	250					
		Re-Entry Delay		2.5	3.0	1.5					7
41 / 30X*	Inbound	Intersection	Davis/Market	Beale/Mission							2
		Approach	SW	SB							
		Stop Present?		Bulb							1
		Appr. Lanes									
		Appr. Volume									
		Vol/Lane Round									
		Re-Entry Delay									0
	Outbound	Intersection	Main/Mission	Main/Market							2
		Approach	NB	NB							
		Stop Present?		Y							1
		Appr. Lanes		3							
		Appr. Volume		688	*Note: 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one					
		Vol/Lane Round		250	block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is					
		Re-Entry Delay		1.5	not assessed with the cross-street travel time analysis.						2
82X	Inbound	Intersection									0
		Approach									
		Stop Present?									0
		Appr. Lanes	Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.								
		Appr. Volume									
		Vol/Lane Round									
		Re-Entry Delay									0
	Outbound	Intersection	Davis/Market	Beale/Mission							2
		Approach	SW	SB							
		Stop Present?		Bulb							1
		Appr. Lanes									
		Appr. Volume									
		Vol/Lane Round									
		Re-Entry Delay									0
24 / 54 / 92 / 93	Inbound	Intersection	8th/Market	8th/Mission	8th/Howard	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	8
		Approach	SW	SB	SB	SB	EB	EB	EB	EB	
		Stop Present?	Y	Bulb			Bulb			Y	4
		Appr. Lanes	3							4	
		Appr. Volume	1,398							2,120	
		Vol/Lane Round	450							550	
		Re-Entry Delay	3.5							4.5	8
	Outbound	Intersection	7th/Howard	7th/Mission	7th/Market						3
		Approach	NB	NB	NB						
		Stop Present?			Y						1
		Appr. Lanes			3						
		Appr. Volume			1,620						
		Vol/Lane Round			550						
		Re-Entry Delay			4.5						5

Re-Entry Delay by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Grey Shaded Cells are hardcode inputs

Unsignalized intersection

Far side stops - Use downstream intersection volume. Otherwise, the stop is near side and the approach volume for the nearest intersection to the stop is used.

"Stop Present" refers to stops where buses have to pull out of the travel lane. Stops with bulb outs, boarding islands, or transit-only lanes (and therefore without re-entry delay) are noted with "Bulb".

2020 Baseline PM

Line No	Direction	Input	Study Intersections							Total
FiDi	Inbound	Intersection	Battery/Market	1st/Mission	1st/Howard	2nd/Howard	3rd/Howard	4th/Howard	4th/Folsom	7
		Approach	SW	SB	SB	WB	WB	WB	SB	
		Stop Present?	Y	Y		Y			Y	4
		Appr. Lanes	3	4		4			4	
		Appr. Volume	654	1,013		1,985			1,550	
		Vol/Lane Round	200	250		500			400	
		Re-Entry Delay	1.0	1.5		4.0			3.0	10
	Outbound	Intersection	2nd/Folsom	Fremont/Mission	Fremont/Market					3
		Approach	EB	NB	NB					
		Stop Present?	Bulb		Y					2
		Appr. Lanes			4					
		Appr. Volume			1,081					
		Vol/Lane Round			250					
		Re-Entry Delay			1.5					2
TT	Inbound	Intersection	Hyde/Market	8th/Mission	7th to Main	Beale/Mission				4
		Approach	SW	SB	*uses travel times*	EB				
		Stop Present?	Y	Bulb						2
		Appr. Lanes	4							
		Appr. Volume	1,398							
		Vol/Lane Round	350							
		Re-Entry Delay	2.5		in int. delay					3
	Outbound	Intersection	Fremont/Mission	Steuart to 7th	7th/Market					3
		Approach	NB	*uses travel times*	NB					
		Stop Present?	Bulb		Y					2
		Appr. Lanes			3					
		Appr. Volume			1,620					
		Vol/Lane Round			550					
		Re-Entry Delay		in int. delay	4.5					5

Transit Delay - 2020 Baseline Plus Project Conditions (in minutes)

Route [1,2]	3	10	12 / 11	19	27	41 / 30X[3]	82X[4]	24 / 54 / 92 / 93	FiDi	TT[5]
PM Peak Hour										
Inbound										
Intersection Delay	04:15.7	03:54.1	22:29.0	03:08.6	06:22.2	00:40.2		12:30.5	14:01.2	16:10.4
Re-Entry Delay	00:00.0	00:00.0	00:11.5	00:03.0	00:05.5	00:00.0		00:09.0	00:10.0	00:03.0
Total Travel Delay	04:15.7	03:54.1	22:40.5	03:11.6	06:27.7	00:40.2		12:39.5	14:11.2	16:13.4
Outbound										
Intersection Delay	03:55.4	06:24.8	06:14.2	02:14.3	05:19.9	01:29.4	00:40.2	04:59.1	04:20.0	17:18.3
Re-Entry Delay	00:00.0	00:00.0	00:00.0	00:04.5	00:08.5	00:00.5	00:00.0	00:04.0	00:02.5	00:04.0
Total Travel Delay	03:55.4	06:24.8	06:14.2	02:18.8	05:28.4	01:29.9	00:40.2	05:03.1	04:22.5	17:22.3

Notes:

1. Passenger Loading Delay is not included in this analysis because passenger loads are not anticipated to change between Existing and Plus Project conditions.
2. The Muni 47, 49, 30, 45, and 8 routes also provide cross-street transit service. However, they are not included in this analysis because their routes are in dedicated transit-only lanes through the Better Market Street study area.

3. 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is not assessed with the cross-street travel time analysis.
4. Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.
5. Golden Gate Transit Transbay Terminal (TT) routes' "travel delay" includes total travel time along Mission Street rather than solely delay.

Source: Fehr & Peers, 2018

Intersection Delay Calculations by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Hardcode inputs based on SFMTA route maps and Existing Transit Facilities Figure

Unsignalized intersections (the delay is manually removed from the Total Delay calculations)

Delay over 100 seconds

Corridor / HOV Adjust = Delay adjustments applied per SF Bike Plan methodology to account for transit-only Lanes ("HOV") or three intersections in a row with LOS F approaches.

2020 Baseline Plus Project PM

Line No	Direction	Input	Study Intersections												Total Delay Signal	Unsig	Final Delay
3	Inbound	Intersection	Grant/Post	Kearny/Post	Sansome/Sutter										3		
		Approach	EB	EB	SW												
		Appr. Delay	6.4	13.9	235.4										256		
		Appr. V/C	0.23	0.25	-												
		Adjusted Delay	6.4	13.9	235.4												
		Corridor/HOV Adjust															
		Final Delay	6.4	13.9	235.4										256	0	256
	Outbound	Intersection	Sansome/Sutter												1		
		Approach	SW														
		Appr. Delay	235.4												235		
		Appr. V/C	-														
		Adjusted Delay	235.4														
		Corridor/HOV Adjust															
		Final Delay	235.4												235	0	235
10	Inbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter							6		
		Approach	NB	NB	NB	NB	EB	WB									
		Appr. Delay	39.6	48.1	56.6	57.0	22.3	10.5							234		
		Appr. V/C	0.94	1.05	-	-	-	-									
		Adjusted Delay	39.6	48.1	56.6	57.0	22.3	10.5									
		Corridor/HOV Adjust															
		Final Delay	39.6	48.1	56.6	57.0	22.3	10.5							234	0	234
	Outbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter							6		
		Approach	SB	SB	SB	WB	WB	SW									
		Appr. Delay	13.3	29.8	46.2	49.6	10.5	235.4							385		
		Appr. V/C	0.57	0.79	-	-	-	-									
		Adjusted Delay	13.3	29.8	46.2	49.6	10.5	235.4									
		Corridor/HOV Adjust															
		Final Delay	13.3	29.8	46.2	49.6	10.5	235.4							385	0	385
12 / 11	Inbound	Intersection	10th/Folsom	9th/Folsom	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	3rd/Folsom	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome		13		
		Approach	EB	EB	EB	EB	EB	EB	EB	EB	EB	NB	NB	NB	EB				
		Appr. Delay	28.9	23.0	17.0	51.1	85.1	160.3	235.5	213.7	191.8	48.1	56.6	57.0	22.3		1190		
		Appr. V/C	0.80	0.82	0.83	0.98	1.13	1.33	1.52	1.45	1.37	1.05	-	-	-				
		Adjusted Delay	28.9	23.0	17.0	51.1	85.1	240.0	240.0	240.0	240.0	48.1	56.6	57.0	22.3				
		Corridor/HOV Adjust																	
		Final Delay	28.9	23.0	17.0	51.1	85.1	240.0	240.0	240.0	240.0	48.1	56.6	57.0	22.3		1349	0	1349
	Outbound	Intersection	Sansome/Sutter	2nd/Market	2nd/Mission	2nd/Howard	2nd/Folsom										5		
		Approach	SW	WB	SB	SB	SB												
		Appr. Delay	235.4	49.6	46.2	29.8	13.3										374		
		Appr. V/C	-	-	-	0.79	0.57												
		Adjusted Delay	235.4	49.6	46.2	29.8	13.3												
		Corridor/HOV Adjust																	
		Final Delay	235.4	49.6	46.2	29.8	13.3										374	0	374
19	Inbound	Intersection	7th/Howard	7th/Mission	7th/Market	8th/Market	9th/Market										5		
		Approach	NB	NB	NB	WB	WB												
		Appr. Delay	15.5	103.3	180.3	36.3	23.5										359		
		Appr. V/C	0.73	-	-	-	-												
		Adjusted Delay	15.5	103.3	180.3	36.3	23.5												
		Corridor/HOV Adjust			170.3														
		Final Delay	15.5	103.3	10.0	36.3	23.5										189	0	189
	Outbound	Intersection	Hyde/Market	8th/Mission	8th/Howard	8th/Folsom											4		
		Approach	SW	SB	SB	SB													
		Appr. Delay	29.8	37.6	34.9	32.1											134		
		Appr. V/C	-	-	0.98	0.98													
		Adjusted Delay	29.8	37.6	34.9	32.1													
		Corridor/HOV Adjust																	
		Final Delay	29.8	37.6	34.9	32.1											134	0	134
27	Inbound	Intersection	6th/Folsom	5th/Folsom	5th/Howard	5th/Mission	5th/Market	Cyril Magnin/Ellis									6		
		Approach	NB	EB	NB	NB	NB	NB											
		Appr. Delay	44.3	160.3	11.0	19.9	48.6	18.4									303		
		Appr. V/C	1.02	1.33	0.49	-	-	0.42											
		Adjusted Delay	44.3	240.0	11.0	19.9	48.6	18.4											
		Corridor/HOV Adjust																	
		Final Delay	44.3	240.0	11.0	19.9	48.6	18.4									382	0	382
	Outbound	Intersection	Mason/Eddy	5th/Market	5th/Mission	5th/Howard											4		
		Approach	SB	SB	SB	SB													
		Appr. Delay	8.5	100.1	198.8	12.5											320		
		Appr. V/C	0.09	-	-	0.63													
		Adjusted Delay	8.5	100.1	198.8	12.5													
		Corridor/HOV Adjust																	
		Final Delay	8.5	100.1	198.8	12.5											320	0	320

Intersection Delay Calculations by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Hardcode inputs based on SFMTA route maps and Existing Transit Facilities Figure

Unsignalized intersections (the delay is manually removed from the Total Delay calculations)

Delay over 100 seconds

Corridor / HOV Adjust = Delay adjustments applied per SF Bike Plan methodology to account for transit-only Lanes ("HOV") or three intersections in a row with LOS F approaches.

2020 Baseline Plus Project PM

Line No	Direction	Input	Study Intersections								Total Delay Signal	Total Delay Unsig	Final Delay
41 / 30X*	Inbound	Intersection	Davis/Market	Beale/Mission							2		
		Approach	SW	SB									
		Appr. Delay	30.2	43.3							74		
		Appr. V/C	-	-									
		Adjusted Delay	30.2	43.3									
		Corridor/HOV Adjust		33.3									
		Final Delay	30.2	10.0							40	0	40
	Outbound	Intersection	Main/Mission	Main/Market							2		
		Approach	NB	NB									
		Appr. Delay	50.5	38.9							89		
		Appr. V/C	-	-									
		Adjusted Delay	50.5	38.9									
		Corridor/HOV Adjust											
		Final Delay	50.5	38.9							89	0	89
82X	Inbound	Intersection									0		
		Approach											
		Appr. Delay									0		
		Appr. V/C											
		Adjusted Delay											
		Corridor/HOV Adjust											
		Final Delay									0	0	0
	Outbound	Intersection	Davis/Market	Beale/Mission							2		
		Approach	SW	SB									
		Appr. Delay	30.2	43.3							74		
		Appr. V/C	-	-									
		Adjusted Delay	30.2	43.3									
		Corridor/HOV Adjust		33.3									
		Final Delay	30.2	10.0							40	0	40
24 / 54 / 92 / 93	Inbound	Intersection	8th/Market	8th/Mission	8th/Howard	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	8		
		Approach	SW	SB	SB	SB	EB	EB	EB	EB			
		Appr. Delay	29.8	37.6	34.9	32.1	51.1	85.1	160.3	235.5	666		
		Appr. V/C	-	-	0.98	0.98	0.98	1.13	1.33	1.52			
		Adjusted Delay	29.8	37.6	34.9	32.1	51.1	85.1	240.0	240.0			
		Corridor/HOV Adjust											
		Final Delay	29.8	37.6	34.9	32.1	51.1	85.1	240.0	240.0	751	0	751
	Outbound	Intersection	7th/Howard	7th/Mission	7th/Market						3		
		Approach	NB	NB	NB								
		Appr. Delay	15.5	103.3	180.3						299		
		Appr. V/C	0.73	-	-								
		Adjusted Delay	15.5	103.3	180.3								
		Corridor/HOV Adjust											
		Final Delay	15.5	103.3	180.3						299	0	299
FiDi	Inbound	Intersection	Battery/Market	1st/Mission	1st/Howard	2nd/Howard	3rd/Howard	4th/Howard	4th/Folsom		7		
		Approach	SW	SB	SB	WB	WB	WB	SB				
		Appr. Delay	308.7	366.5	82.0	124.4	98.5	59.7	42.3		1082		
		Appr. V/C	-	-	0.84	1.23	1.17	0.90	0.98				
		Adjusted Delay	308.7	366.5	82.0	240.0	98.5	59.7	42.3				
		Corridor/HOV Adjust		356.5									
		Final Delay	308.7	10.0	82.0	240.0	98.5	59.7	42.3		841	0	841
	Outbound	Intersection	2nd/Folsom	Fremont/Mission	Fremont/Market						3		
		Approach	EB	NB	NB								
		Appr. Delay	191.8	37.7	54.3						284		
		Appr. V/C	1.37	-	-								
		Adjusted Delay	240.0	37.7	54.3								
		Corridor/HOV Adjust		27.7	44.3								
		Final Delay	240.0	10.0	10.0						260	0	260
TT	Inbound	Intersection	Hyde/Market	8th/Mission	7th to Main	Beale/Mission					4		
		Approach	SW	SB	*uses travel times*	EB							
		Appr. Delay	29.8	37.6		64.4					132		
		Appr. V/C	-	-		-							
		Adjusted Delay	29.8	37.6		64.4							
		Corridor/HOV Adjust				54.4							
		Final Delay	29.8	37.6	893.0	10.0					970	0	970
	Outbound	Intersection	Fremont/Mission	Steuart to 7th	7th/Market						3		
		Approach	NB	*uses travel times*	NB								
		Appr. Delay	37.7		180.3						218		
		Appr. V/C	-		-								
		Adjusted Delay	37.7		180.3								
		Corridor/HOV Adjust	27.7										
		Final Delay	10.0	848.0	180.3						1038	0	1038

*Note: 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is not assessed with the cross-street travel time analysis.

Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.

Re-Entry Delay by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Grey Shaded Cells are hardcode inputs

Unsignalized intersection

Far side stops - Use downstream intersection volume. Otherwise, the stop is near side and the approach volume for the nearest intersection to the stop is used.

"Stop Present" refers to stops where buses have to pull out of the travel lane. Stops with bulb outs, boarding islands, or transit-only lanes (and therefore without re-entry delay) are noted with "Bulb".

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Line No	Direction	Input	Study Intersections													Total
3	Inbound	Intersection	Grant/Post	Kearny/Post	Sansome/Sutter											3
		Approach	EB	EB	SW											
		Stop Present?	Bulb		Y											2
		Appr. Lanes			1											
		Appr. Volume			85											
		Vol/Lane Round			100											
		Re-Entry Delay			0.0											0
	Outbound	Intersection	Sansome/Sutter													1
		Approach	SW													
		Stop Present?	Y													1
		Appr. Lanes	1													
		Appr. Volume	85													
		Vol/Lane Round	100													
		Re-Entry Delay	0.0													0
10	Inbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter								6
		Approach	NB	NB	NB	NB	EB	WB								
		Stop Present?		Bulb		Bulb		Y								3
		Appr. Lanes						2								
		Appr. Volume						47								
		Vol/Lane Round						0								
		Re-Entry Delay						0.0								0
	Outbound	Intersection	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	Sansome/Sutter								6
		Approach	SB	SB	SB	WB	WB	SW								
		Stop Present?		Bulb		Bulb		Y								3
		Appr. Lanes						1								
		Appr. Volume						85								
		Vol/Lane Round						100								
		Re-Entry Delay						0.0								0
12 / 11	Inbound	Intersection	10th/Folsom	9th/Folsom	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	3rd/Folsom	2nd/Folsom	2nd/Howard	2nd/Mission	2nd/Market	Market/Sansome	13
		Approach	EB	EB	EB	EB	EB	EB	EB	EB	EB	NB	NB	NB	EB	
		Stop Present?		Bulb	Bulb	Bulb	Bulb	Y	Y	Bulb		Bulb		Bulb	Y	10
		Appr. Lanes						3	4						2	
		Appr. Volume						2,050	2,120						27	
		Vol/Lane Round						700	550						0	
		Re-Entry Delay						7.0	4.5						0.0	12
	Outbound	Intersection	Sansome/Sutter	2nd/Market	2nd/Mission	2nd/Howard	2nd/Folsom									5
		Approach	SW	WB	SB	SB	SB									
		Stop Present?	Y	Bulb		Bulb										3
		Appr. Lanes	1													
		Appr. Volume	85													
		Vol/Lane Round	100													
		Re-Entry Delay	0.0													0
19	Inbound	Intersection	Hyde/Market	8th/Mission	8th/Howard	8th/Folsom										4
		Approach	SW	SB	SB	SB										
		Stop Present?	Y	Bulb	Bulb	Bulb										4
		Appr. Lanes	4													
		Appr. Volume	1,699													
		Vol/Lane Round	400													
		Re-Entry Delay	3.0													3
	Outbound	Intersection	7th/Howard	7th/Mission	7th/Market	8th/Market	9th/Market									5
		Approach	NB	NB	NB	WB	WB									
		Stop Present?	Bulb	Y	Bulb	Y										4
		Appr. Lanes		3		2										
		Appr. Volume		1,666		39										
		Vol/Lane Round		550		0										
		Re-Entry Delay		4.5		0.0										5

Re-Entry Delay by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Grey Shaded Cells are hardcode inputs

Unsignalized intersection

Far side stops - Use downstream intersection volume. Otherwise, the stop is near side and the approach volume for the nearest intersection to the stop is used.

"Stop Present" refers to stops where buses have to pull out of the travel lane. Stops with bulb outs, boarding islands, or transit-only lanes (and therefore without re-entry delay) are noted with "Bulb".

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Line No	Direction	Input	Study Intersections								Total
27	Inbound	Intersection	6th/Folsom	5th/Folsom	5th/Howard	5th/Howard	5th/Mission	5th/Market	Cyril Magnin/Ellis		7
		Approach	NB	EB	NB	NB	NB	NB	NB		
		Stop Present?	Bulb		Y	Y	Y	Bulb			5
		Appr. Lanes			2	2	2				
		Appr. Volume			560	560	540			Note that the 5th/Howard delay is counted twice because the stop at 5th/Folsom is a far side stop on the	
		Vol/Lane Round			300	300	250			northbound leg after the 27 Bryant turns from Folsom to 5th Street.	
		Re-Entry Delay			2.0	2.0	1.5				6
	Outbound	Intersection	Mason/Eddy	5th/Market	5th/Mission	5th/Howard					4
		Approach	SB	SB	SB	SB					
		Stop Present?		Y	Y	Y					3
		Appr. Lanes		2	2	3					
		Appr. Volume		828	880	970					
		Vol/Lane Round		400	450	300					
		Re-Entry Delay		3.0	3.5	2.0					9
41 / 30X*	Inbound	Intersection	Davis/Market	Beale/Mission							2
		Approach	SW	SB							
		Stop Present?		Bulb							1
		Appr. Lanes									
		Appr. Volume									
		Vol/Lane Round									
		Re-Entry Delay									0
	Outbound	Intersection	Main/Mission	Main/Market							2
		Approach	NB	NB							
		Stop Present?		Y							1
		Appr. Lanes		3							
		Appr. Volume		464		*Note: 30X operates along the same segment as the 41 in the outbound direction in mixed flow lanes through the study area. The 30X outbound also travels along Market Street for one					
		Vol/Lane Round		150		block then exits the study area at Pine Street. The 30X operates in transit only lanes within the study area in the inbound direction, from Market at Bush Street to Beale Street; therefore, is					
		Re-Entry Delay		0.5		not assessed with the cross-street travel time analysis.					1
82X	Inbound	Intersection									0
		Approach									
		Stop Present?									0
		Appr. Lanes				Not studied because 82X is a peak-direction-only express route so only the 82X outbound operates during the PM peak hour.					
		Appr. Volume									
		Vol/Lane Round									
		Re-Entry Delay									0
	Outbound	Intersection	Davis/Market	Beale/Mission							2
		Approach	SW	SB							
		Stop Present?									0
		Appr. Lanes									
		Appr. Volume									
		Vol/Lane Round									
		Re-Entry Delay									0
24 / 54 / 92 / 93	Inbound	Intersection	8th/Market	8th/Mission	8th/Howard	8th/Folsom	7th/Folsom	6th/Folsom	5th/Folsom	4th/Folsom	8
		Approach	SW	SB	SB	SB	EB	EB	EB	EB	
		Stop Present?	Y	Bulb			Bulb			Y	4
		Appr. Lanes	3							4	
		Appr. Volume	1,699							2,120	
		Vol/Lane Round	550							550	
		Re-Entry Delay	4.5							4.5	9
	Outbound	Intersection	7th/Howard	7th/Mission	7th/Market						3
		Approach	NB	NB	NB						
		Stop Present?			Y						1
		Appr. Lanes			3						
		Appr. Volume			1,543						
		Vol/Lane Round			500						
		Re-Entry Delay			4.0						4

Re-Entry Delay by Line

Notes:

Per SF Bike Plan methodology, intersection approach delay is used for transit delay calculation.

Grey Shaded Cells are hardcode inputs

Unsignalized intersection

Far side stops - Use downstream intersection volume. Otherwise, the stop is near side and the approach volume for the nearest intersection to the stop is used.

"Stop Present" refers to stops where buses have to pull out of the travel lane. Stops with bulb outs, boarding islands, or transit-only lanes (and therefore without re-entry delay) are noted with "Bulb".

2020 Baseline Plus Project PM

Line No	Direction	Input	Study Intersections							Total
FiDi	Inbound	Intersection	Battery/Market	1st/Mission	1st/Howard	2nd/Howard	3rd/Howard	4th/Howard	4th/Folsom	7
		Approach	SW	SB	SB	WB	WB	WB	SB	
		Stop Present?	Y	Y		Y			Y	4
		Appr. Lanes	3	4		4			4	
		Appr. Volume	768	1,046		1,995			1,570	
		Vol/Lane Round	250	250		500			400	
		Re-Entry Delay	1.5	1.5		4.0			3.0	10
	Outbound	Intersection	2nd/Folsom	Fremont/Mission	Fremont/Market					3
		Approach	EB	NB	NB					
		Stop Present?	Bulb		Y					2
		Appr. Lanes			4					
		Appr. Volume			1,381					
		Vol/Lane Round			350					
		Re-Entry Delay			2.5					3
TT	Inbound	Intersection	Hyde/Market	8th/Mission	7th to Main	Beale/Mission				4
		Approach	SW	SB	*uses travel times*	EB				
		Stop Present?	Y	Bulb						2
		Appr. Lanes	4							
		Appr. Volume	1,699							
		Vol/Lane Round	400							
		Re-Entry Delay	3.0		in int. delay					3
	Outbound	Intersection	Fremont/Mission	Steuart to 7th	7th/Market					3
		Approach	NB	*uses travel times*	NB					
		Stop Present?	Bulb		Y					2
		Appr. Lanes			3					
		Appr. Volume			1,543					
		Vol/Lane Round			500					
		Re-Entry Delay		in int. delay	4.0					4

VISSIM travel time results

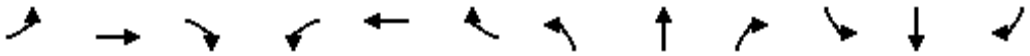
		Travel Time (mm:ss)					
Mode	Description	Distance (ft)	2020 No Project	2020 Proposed Project[1]	Change from 2020NP	2020 Proposed Project - 2040 Transit Changes	Change from 2020NP
Streetcar Center Lane Market	IB F Octavia-10th	2,390	06:13	06:39		06:35	
	IB F 10th-7th	2,040	05:16	03:13		03:15	
	IB F 7th-4th	2,690	06:48	05:04		05:09	
	IB F 4th-1st	2,730	06:28	05:21		05:36	
	IB F 1st-Steuart	1,690	04:13	03:34		03:48	
	Total	**11,540**	**29:00**	**24:00**	**-17%**	**24:30**	**-16%**
Streetcar Center Lane Market	OB F Steuart-1st	1,760	06:52	04:09		04:08	
	OB F 1st-4th	2,810	05:35	04:46		04:53	
	OB F 4th-7th	2,630	05:16	03:49		04:03	
	OB F 7th-10th	2,100	03:57	02:14		02:15	
	OB F 10th-Octavia	2,320	05:36	05:33		05:36	
	Total	**11,620**	**27:30**	**20:30**	**-25%**	**21:00**	**-24%**
Bus Center Lane Market	IB 9R 10th-7th	2,040	04:13	02:48		02:54	
	IB 9R 7th-4th	2,690	05:41	04:11		04:38	
	IB 9R 4th-1st	2,730	05:19	04:14		05:23	
	IB 9R 1st-Spear	1,400	02:53	02:45		03:22	
	Total	**8,860**	**18:00**	**14:00**	**-22%**	**16:30**	**-8%**
Bus Center Lane Market	OB 9R Main-1st	1,070	02:20	02:39		02:45	
	OB 9R 1st-4th	2,810	04:57	04:28		04:46	
	OB 9R 4th-7th	2,630	04:58	03:45		04:00	
	OB 9R 7th-10th	2,100	03:12	02:44		02:47	
	Total	**8,610**	**15:30**	**13:30**	**-13%**	**14:30**	**-6%**
Bus Curb Lane Market	IB 7/21 10th-7th[2]						
	IB 7/21 7th-4th[2]	2,690	05:55	05:39		06:02	
	IB 7/21 4th-1st[2]	2,730	07:53	06:29		06:57	
	IB 21 1st-Spear	1,400	03:12	02:58		03:28	
	Total	**6,820**	**17:00**	**15:00**	**-12%**	**16:30**	**-3%**
Bus Curb Lane Market	OB 21 Steuart-1st	1,760	07:15	05:12		05:33	
	OB 21 1st-4th	2,810	06:48	05:35		07:50	
	OB 21 4th-7th	2,630	05:53	05:19		05:22	
	OB 21 7th-9th	1,550	02:48	02:36		02:42	
	Total	**8,750**	**22:30**	**18:30**	**-18%**	**21:30**	**-4%**
Bus Mission	IB 14 S Van Ness-7th	3,140	05:45	05:55		05:53	
	IB 14 7th-4th	2,720	05:10	05:22		05:17	
	IB 14 4th-1st	2,720	08:50	07:17		07:19	
	IB 14 1st-Main	1,060	02:14	02:14		02:00	
	Total	**9,640**	**22:00**	**21:00**	**-5%**	**20:30**	**-7%**
Bus Mission	OB 14 Steuart-1st	1,790	04:07	04:08		03:54	
	OB 14 1st-4th	2,720	05:04	05:04		05:24	
	OB 14 4th-7th	2,720	05:00	04:56		05:02	
	OB 14 7th-S Van Ness	3,160	07:58	07:14		07:13	
	Total	**10,390**	**22:00**	**21:30**	**-2%**	**21:30**	**-2%**
Taxis Market	IB Market Cars Octavia-10th	2,390	03:19	04:48		04:46	
	IB Market Cars 10th-6th	2,950	04:12	02:43		02:53	
	IB Market Cars 6th-4th	1,780	03:55	03:08		03:14	
	IB Market Cars 4th-1st	2,730	05:24	04:20		04:41	
	IB Market Cars 1st-Main	1,090	01:49	01:52		01:54	
	Total	**10,940**	**18:30**	**17:00**	**-8%**	**17:30**	**-5%**
Taxis Market	OB Market Cars Main-1st	1,060	01:36	01:25		01:26	
	OB Market Cars 1st-4th	2,810	04:22	04:05		04:30	
	OB Market Cars 4th-7th	2,630	04:18	03:35		03:43	
	OB Market Cars 7th-10th	2,100	02:36	02:11		02:10	
	OB Market Cars 10th-Octavia	2,320	02:43	02:34		02:34	
	Total	**10,920**	**15:30**	**14:00**	**-10%**	**14:30**	**-6%**
Cars Mission	IB Mission Cars S Van Ness - 7th	3,140	02:29	02:37		N/A	
	IB Mission Cars 7th-4th	2,720	03:11	03:11			
	IB Mission Cars 4th - 1st	2,720	05:42	05:18			
	IB Mission Cars 1st - Main	1,090	01:46	01:53			
	Total	**9,670**	**13:00**	**13:00**	**0%**		
Cars Mission	OB Mission Cars Steurart - 1st	1,790	02:06	02:08			
	OB Mission Cars 1st - 4th	2,720	03:32	03:40			
	OB Mission Cars 4th - 7th	2,720	02:12	02:10			
	OB Mission Cars 7th- S Van Ness	3,160	04:53	04:37			
	Total	**10,390**	**12:30**	**12:30**	**0%**		
Bikes Market	**Inbound Total**	11,700	20:30	19:30	**-5%**		
	Outbound Total	11,610	20:00	19:30	**-3%**		
Bikes Mission	**Inbound Total**	11,310	20:00	18:30	**-8%**		
	Outbound Total	11,450	17:30	17:00	**-3%**		

Notes:

[1] The proposed project analysis is based on the initial roadway design, which assumed that bicyclists would travel in the curb mixed-flow travel lane (rather than in a separated bikeway) and that the One Bush Driveway connecting to Market Street would be closed. The current proposed project provides a separated bikeway and allows the One Bush driveway at Market Street to remain open. The separated bikeway would likely improve transit travel times as there would be fewer conflicts between transit vehicles and people bicycling in the curb lane. With the One Bush driveway to Market Street remaining open, there would be an additional 50 vehicles (or less than one per minute) traveling the block of Market Street in the curb lane before turning onto Sutter Street during the PM peak hour. This change would have negligible affect on corridor transit operations due to the low traffic volumes on this short segment.

[2] Line 7 travel times are used for No Project (no data available for 10th-7th segment) ; Line 21 travel times are used for Proposed Project (10th-7th segment not reported).

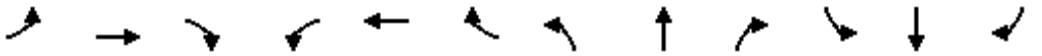
Synchro intersection delay results - 2020 No Project



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	300	0	0	0	0	0	1220	30	0	0	0
Future Volume (vph)	180	300	0	0	0	0	0	1220	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0						2.4				
Lane Util. Factor	0.91	0.91						0.86				
Frpb, ped/bikes	1.00	1.00						0.99				
Flpb, ped/bikes	0.62	0.97						1.00				
Frt	1.00	1.00						1.00				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	892	2950						5703				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	892	2950						5703				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	312	0	0	0	0	0	1271	31	0	0	0
RTOR Reduction (vph)	33	16	0	0	0	0	0	5	0	0	0	0
Lane Group Flow (vph)	129	323	0	0	0	0	0	1297	0	0	0	0
Confl. Peds. (#/hr)	782								646			
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Actuated Green, G (s)	20.0	20.0						31.6				
Effective Green, g (s)	22.0	22.0						33.6				
Actuated g/C Ratio	0.37	0.37						0.56				
Clearance Time (s)	4.0	4.0						4.4				
Lane Grp Cap (vph)	327	1081						3193				
v/s Ratio Prot								c0.23				
v/s Ratio Perm	c0.14	0.11										
v/c Ratio	0.39	0.30						0.41				
Uniform Delay, d1	14.1	13.5						7.5				
Progression Factor	0.96	0.93						1.00				
Incremental Delay, d2	3.5	0.7						0.4				
Delay (s)	17.0	13.3						7.9				
Level of Service	B	B						A				
Approach Delay (s)		14.5			0.0			7.9			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.4
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

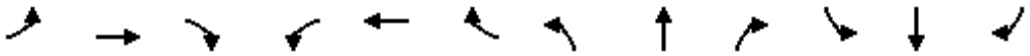
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	340	60	120	90	0	0	0	170
Future Volume (vph)	0	0	0	0	340	60	120	90	0	0	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.7		3.1	3.1				3.5
Lane Util. Factor					1.00		1.00	1.00				1.00
Frpb, ped/bikes					0.92		1.00	1.00				1.00
Flpb, ped/bikes					1.00		0.36	1.00				1.00
Frt					0.98		1.00	1.00				0.86
Flt Protected					1.00		0.95	1.00				1.00
Satd. Flow (prot)					1512		579	1676				1450
Flt Permitted					1.00		0.95	1.00				1.00
Satd. Flow (perm)					1512		579	1676				1450
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	378	67	133	100	0	0	0	189
RTOR Reduction (vph)	0	0	0	0	10	0	76	0	0	0	0	55
Lane Group Flow (vph)	0	0	0	0	435	0	57	100	0	0	0	134
Confl. Peds. (#/hr)						444	926					926
Turn Type					NA		Perm	NA				Prot
Protected Phases					6			8				4
Permitted Phases							8					
Actuated Green, G (s)					22.8		23.5	23.5				23.5
Effective Green, g (s)					25.3		25.9	25.9				25.5
Actuated g/C Ratio					0.42		0.43	0.43				0.42
Clearance Time (s)					8.2		5.5	5.5				5.5
Lane Grp Cap (vph)					637		249	723				616
v/s Ratio Prot					c0.29			0.06				0.09
v/s Ratio Perm							c0.10					
v/c Ratio					0.68		0.23	0.14				0.22
Uniform Delay, d1					14.1		10.8	10.3				10.9
Progression Factor					1.00		1.00	1.00				0.74
Incremental Delay, d2					5.8		2.2	0.4				0.8
Delay (s)					19.9		12.9	10.7				8.9
Level of Service					B		B	B				A
Approach Delay (s)		0.0			19.9			12.0			8.9	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

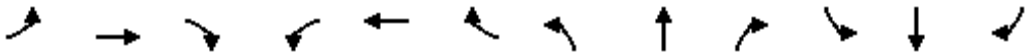
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	170	230	0	0	0	0	0	0	30	690	0
Future Volume (vph)	0	170	230	0	0	0	0	0	0	30	690	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5								2.0	
Lane Util. Factor		0.86	0.86								0.95	
Frpb, ped/bikes		0.96	0.91								1.00	
Flpb, ped/bikes		1.00	1.00								0.99	
Frt		0.94	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		3918	1117								3137	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		3918	1117								3137	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	177	240	0	0	0	0	0	0	31	719	0
RTOR Reduction (vph)	0	71	71	0	0	0	0	0	0	0	216	0
Lane Group Flow (vph)	0	226	49	0	0	0	0	0	0	0	534	0
Confl. Peds. (#/hr)			100							100		
Turn Type		NA	Perm							Perm	NA	
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								4.5	
Effective Green, g (s)		24.5	24.5								7.0	
Actuated g/C Ratio		0.41	0.41								0.12	
Clearance Time (s)		5.0	5.0								4.5	
Lane Grp Cap (vph)		1599	456								365	
v/s Ratio Prot		c0.06										
v/s Ratio Perm			0.04								0.17	
v/c Ratio		0.14	0.11								1.46	
Uniform Delay, d1		11.1	11.0								26.5	
Progression Factor		1.00	1.00								1.00	
Incremental Delay, d2		0.2	0.5								222.4	
Delay (s)		11.3	11.5								248.9	
Level of Service		B	B								F	
Approach Delay (s)		11.4			0.0			0.0			248.9	
Approach LOS		B			A			A			F	

Intersection Summary			
HCM 2000 Control Delay	164.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

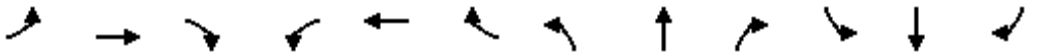
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	580	60	0	0	0	0	0	0	450	90	0
Future Volume (vph)	0	580	60	0	0	0	0	0	0	450	90	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.5							2.0	2.0	
Lane Util. Factor		0.95	1.00							0.91	0.91	
Frpb, ped/bikes		1.00	0.85							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	0.97	
Satd. Flow (prot)		3539	1341							1610	3273	
Flt Permitted		1.00	1.00							0.95	0.97	
Satd. Flow (perm)		3539	1341							1610	3273	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	630	65	0	0	0	0	0	0	489	98	0
RTOR Reduction (vph)	0	0	49	0	0	0	0	0	0	163	163	0
Lane Group Flow (vph)	0	630	16	0	0	0	0	0	0	81	180	0
Confl. Peds. (#/hr)			100							185		
Turn Type		NA	Perm							Prot	NA	
Protected Phases		2								7	4	
Permitted Phases			2									
Actuated Green, G (s)		12.5	12.5							17.5	17.5	
Effective Green, g (s)		15.0	14.5							20.0	20.0	
Actuated g/C Ratio		0.25	0.24							0.33	0.33	
Clearance Time (s)		4.5	4.5							4.5	4.5	
Lane Grp Cap (vph)		884	324							536	1091	
v/s Ratio Prot		c0.18								0.05	c0.05	
v/s Ratio Perm			0.01									
v/c Ratio		0.71	0.05							0.15	0.16	
Uniform Delay, d1		20.5	17.5							14.0	14.1	
Progression Factor		1.00	1.00							1.00	1.00	
Incremental Delay, d2		4.9	0.3							0.6	0.3	
Delay (s)		25.4	17.7							14.6	14.4	
Level of Service		C	B							B	B	
Approach Delay (s)		24.7			0.0			0.0			14.5	
Approach LOS		C			A			A			B	

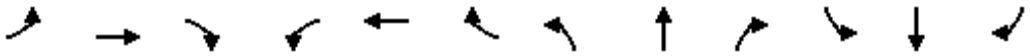
Intersection Summary				
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1680	200	0	0	0	0	950	390	150	890	0
Future Volume (vph)	100	1680	200	0	0	0	0	950	390	150	890	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	12	12	12	10	12	12	10	12
Total Lost time (s)		3.3						1.0	1.5		2.5	
Lane Util. Factor		0.86						0.95	1.00		0.91	
Frpb, ped/bikes		0.99						1.00	0.93		1.00	
Flpb, ped/bikes		1.00						1.00	1.00		1.00	
Frt		0.98						1.00	0.85		1.00	
Flt Protected		1.00						1.00	1.00		0.99	
Satd. Flow (prot)		5344						3004	1361		4340	
Flt Permitted		1.00						1.00	1.00		0.67	
Satd. Flow (perm)		5344						3004	1361		2933	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	108	1806	215	0	0	0	0	1022	419	161	957	0
RTOR Reduction (vph)	0	29	0	0	0	0	0	0	98	0	0	0
Lane Group Flow (vph)	0	2100	0	0	0	0	0	1022	321	0	1118	0
Confl. Peds. (#/hr)	66		81	81		66	100		61	61		100
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	4%	4%	4%
Bus Blockages (#/hr)	0	3	0	0	0	0	0	6	0	0	6	0
Turn Type	Split	NA						NA	Perm	Prot	NA	
Protected Phases	2	2						4		3	8	
Permitted Phases									4			
Actuated Green, G (s)		21.2						21.5	21.5		34.0	
Effective Green, g (s)		22.7						24.0	23.5		36.5	
Actuated g/C Ratio		0.35						0.37	0.36		0.56	
Clearance Time (s)		4.8						3.5	3.5		5.0	
Lane Grp Cap (vph)		1866						1109	492		1895	
v/s Ratio Prot		c0.39						c0.34			c0.10	
v/s Ratio Perm									0.24		0.23	
v/c Ratio		1.13						0.92	0.65		0.59	
Uniform Delay, d1		21.1						19.6	17.3		9.3	
Progression Factor		1.00						1.00	1.00		1.00	
Incremental Delay, d2		64.0						13.7	6.6		1.4	
Delay (s)		85.1						33.3	23.9		10.7	
Level of Service		F						C	C		B	
Approach Delay (s)		85.1			0.0			30.6			10.7	
Approach LOS		F			A			C			B	

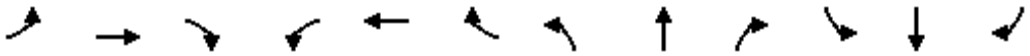
Intersection Summary			
HCM 2000 Control Delay	50.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.8
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	50	0	0	0	0	0	0	350	80	0
Future Volume (vph)	0	370	50	0	0	0	0	0	0	350	80	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0									2.0	
Lane Util. Factor		0.91									0.95	
Frpb, ped/bikes		0.97									1.00	
Flpb, ped/bikes		1.00									0.88	
Frt		0.98									1.00	
Flt Protected		1.00									0.96	
Satd. Flow (prot)		4369									2685	
Flt Permitted		1.00									0.96	
Satd. Flow (perm)		4369									2685	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	402	54	0	0	0	0	0	0	380	87	0
RTOR Reduction (vph)	0	29	0	0	0	0	0	0	0	0	119	0
Lane Group Flow (vph)	0	427	0	0	0	0	0	0	0	0	348	0
Confl. Peds. (#/hr)			268							268		
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									32.0	
Effective Green, g (s)		22.5									33.5	
Actuated g/C Ratio		0.38									0.56	
Clearance Time (s)		3.5									3.5	
Lane Grp Cap (vph)		1638									1499	
v/s Ratio Prot		c0.10										
v/s Ratio Perm											0.13	
v/c Ratio		0.26									0.23	
Uniform Delay, d1		13.0									6.7	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.4									0.4	
Delay (s)		13.4									7.1	
Level of Service		B									A	
Approach Delay (s)		13.4			0.0			0.0			7.1	
Approach LOS		B			A			A			A	

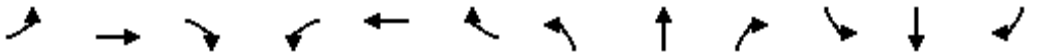
Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



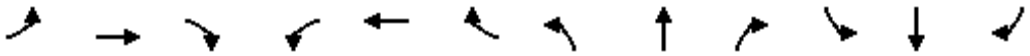
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1840	300	350	1520	0	0	0	0
Future Volume (vph)	0	0	0	0	1840	300	350	1520	0	0	0	0
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	12	12	12	12	10	12	10	10	12	12	12	12
Total Lost time (s)					2.0		2.0	2.0				
Lane Util. Factor					0.86		0.81	0.81				
Frpb, ped/bikes					0.96		1.00	1.00				
Flpb, ped/bikes					1.00		1.00	1.00				
Frt					0.98		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					4402		1046	4245				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					4402		1046	4245				
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	0	0	1859	303	354	1535	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	13	13	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2162	0	306	1557	0	0	0	0
Confl. Peds. (#/hr)	382		366	366		382	370		748	748		370
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	3	0	0	35	0	0	0	0
Turn Type					NA		Split	NA				
Protected Phases					8		6	6				
Permitted Phases												
Actuated Green, G (s)					23.0		24.0	24.0				
Effective Green, g (s)					25.5		30.5	30.5				
Actuated g/C Ratio					0.42		0.51	0.51				
Clearance Time (s)					4.5		8.5	8.5				
Lane Grp Cap (vph)					1870		531	2157				
v/s Ratio Prot					c0.49		0.29	c0.37				
v/s Ratio Perm												
v/c Ratio					1.16		0.58	0.72				
Uniform Delay, d1					17.2		10.3	11.5				
Progression Factor					1.13		1.00	1.00				
Incremental Delay, d2					70.9		4.5	2.1				
Delay (s)					90.4		14.7	13.6				
Level of Service					F		B	B				
Approach Delay (s)		0.0			90.4			13.8			0.0	
Approach LOS		A			F			B			A	

Intersection Summary			
HCM 2000 Control Delay	54.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



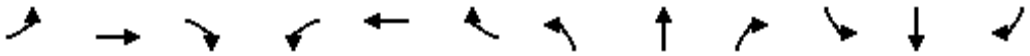
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	440	1390	0	0	0	0	0	1040	580
Future Volume (vph)	0	0	0	440	1390	0	0	0	0	0	1040	580
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	12	12	12	11	11	11	12	12	12	11	11	11
Total Lost time (s)					2.0						2.0	2.0
Lane Util. Factor					*0.70						0.95	1.00
Frpb, ped/bikes					1.00						1.00	0.82
Flpb, ped/bikes					0.96						1.00	1.00
Frt					1.00						1.00	0.85
Flt Protected					0.99						1.00	1.00
Satd. Flow (prot)					3390						2431	897
Flt Permitted					0.99						1.00	1.00
Satd. Flow (perm)					3390						2431	897
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	1511	0	0	0	0	0	1130	630
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	1963	0	0	0	0	0	1130	624
Confl. Peds. (#/hr)				250								250
Turn Type				Perm	NA						NA	Perm
Protected Phases					6						8	
Permitted Phases				6								8
Actuated Green, G (s)					25.5						27.0	27.0
Effective Green, g (s)					27.0						29.0	29.0
Actuated g/C Ratio					0.45						0.48	0.48
Clearance Time (s)					3.5						4.0	4.0
Lane Grp Cap (vph)					1525						1174	433
v/s Ratio Prot											0.46	
v/s Ratio Perm					0.58							c0.70
v/c Ratio					1.29						0.96	1.44
Uniform Delay, d1					16.5						15.0	15.5
Progression Factor					1.00						1.00	1.00
Incremental Delay, d2					134.4						18.7	211.6
Delay (s)					150.9						33.7	227.1
Level of Service					F						C	F
Approach Delay (s)		0.0			150.9			0.0			102.9	
Approach LOS		A			F			A			F	

Intersection Summary			
HCM 2000 Control Delay	128.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	103.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



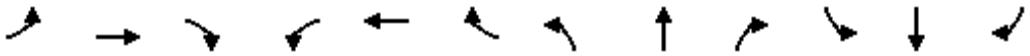
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	380	110	0	0	0	0	90	60	40	60	0
Future Volume (vph)	160	380	110	0	0	0	0	90	60	40	60	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.4			4.4	
Lane Util. Factor		0.91						1.00			1.00	
Frt		0.97						0.95			1.00	
Flt Protected		0.99						1.00			0.98	
Satd. Flow (prot)		4896						1762			1826	
Flt Permitted		0.99						1.00			0.85	
Satd. Flow (perm)		4896						1762			1575	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	413	120	0	0	0	0	98	65	43	65	0
RTOR Reduction (vph)	0	51	0	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	0	656	0	0	0	0	0	123	0	0	108	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		34.5						16.6			16.6	
Effective Green, g (s)		34.5						16.6			16.6	
Actuated g/C Ratio		0.58						0.28			0.28	
Clearance Time (s)		4.5						4.4			4.4	
Lane Grp Cap (vph)		2815						487			435	
v/s Ratio Prot								c0.07				
v/s Ratio Perm		0.13									0.07	
v/c Ratio		0.23						0.25			0.25	
Uniform Delay, d1		6.3						16.9			16.9	
Progression Factor		1.00						1.15			1.00	
Incremental Delay, d2		0.2						1.2			1.4	
Delay (s)		6.5						20.5			18.2	
Level of Service		A						C			B	
Approach Delay (s)		6.5			0.0			20.5			18.2	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.9
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



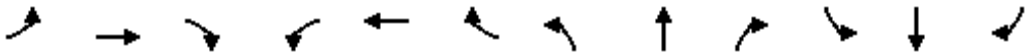
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1260	100	0	0	0	0	0	0	510	1930	0
Future Volume (vph)	0	1260	100	0	0	0	0	0	0	510	1930	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	12	12	12	12	12	12	12	10	12
Total Lost time (s)		2.5	2.5								2.5	
Lane Util. Factor		0.91	1.00								0.86	
Frpb, ped/bikes		1.00	0.94								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								0.99	
Satd. Flow (prot)		4435	1309								5607	
Flt Permitted		1.00	1.00								0.99	
Satd. Flow (perm)		4435	1309								5607	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1326	105	0	0	0	0	0	0	537	2032	0
RTOR Reduction (vph)	0	0	15	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	1326	90	0	0	0	0	0	0	0	2559	0
Confl. Peds. (#/hr)	28		51	51		28	39		43	43		39
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	3	0	0	0	0	0	0	0	0	0	0
Turn Type		NA	Perm							Split	NA	
Protected Phases		2								4	4	
Permitted Phases			2									
Actuated Green, G (s)		31.0	31.0								49.0	
Effective Green, g (s)		33.5	33.5								51.5	
Actuated g/C Ratio		0.37	0.37								0.57	
Clearance Time (s)		5.0	5.0								5.0	
Lane Grp Cap (vph)		1650	487								3208	
v/s Ratio Prot		c0.30									c0.46	
v/s Ratio Perm			0.07									
v/c Ratio		0.80	0.18								0.80	
Uniform Delay, d1		25.3	19.0								15.1	
Progression Factor		1.00	1.00								1.00	
Incremental Delay, d2		4.3	0.8								2.2	
Delay (s)		29.6	19.9								17.3	
Level of Service		C	B								B	
Approach Delay (s)		28.9			0.0			0.0			17.3	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



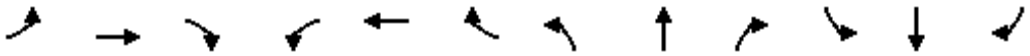
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱								↰↑↑↑	
Traffic Volume (vph)	0	1580	180	0	0	0	0	0	0	330	1200	0
Future Volume (vph)	0	1580	180	0	0	0	0	0	0	330	1200	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	12	12	12	12	12	12	10	12
Total Lost time (s)		2.0	2.5								2.0	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.93								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								0.99	
Satd. Flow (prot)		4392	1375								4218	
Flt Permitted		1.00	1.00								0.99	
Satd. Flow (perm)		4392	1375								4218	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	1736	198	0	0	0	0	0	0	363	1319	0
RTOR Reduction (vph)	0	0	14	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	1736	184	0	0	0	0	0	0	0	1667	0
Confl. Peds. (#/hr)	73		79	79		73	109		67	67		109
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	7%	7%	7%
Bus Blockages (#/hr)	0	3	0	0	3	0	0	0	0	0	4	0
Turn Type		NA	Perm							Split	NA	
Protected Phases		2								4	4	
Permitted Phases			2									
Actuated Green, G (s)		26.0	26.0								25.0	
Effective Green, g (s)		28.5	28.0								27.5	
Actuated g/C Ratio		0.48	0.47								0.46	
Clearance Time (s)		4.5	4.5								4.5	
Lane Grp Cap (vph)		2086	641								1933	
v/s Ratio Prot		c0.40									c0.40	
v/s Ratio Perm			0.13									
v/c Ratio		0.83	0.29								0.86	
Uniform Delay, d1		13.7	9.8								14.6	
Progression Factor		1.00	1.00								1.00	
Incremental Delay, d2		4.1	1.1								5.4	
Delay (s)		17.7	11.0								19.9	
Level of Service		B	B								B	
Approach Delay (s)		17.0			0.0			0.0			19.9	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	72.6%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



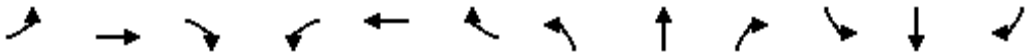
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1290	0	0	0	0	50	0	1080	0	0	0	0
Future Volume (vph)	1290	0	0	0	0	50	0	1080	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.5					2.5		2.0				
Lane Util. Factor	0.94					1.00		0.91				
Frt	1.00					0.86		1.00				
Flt Protected	0.95					1.00		1.00				
Satd. Flow (prot)	4990					1611		5085				
Flt Permitted	0.95					1.00		1.00				
Satd. Flow (perm)	4990					1611		5085				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1358	0	0	0	0	53	0	1137	0	0	0	0
RTOR Reduction (vph)	48	0	0	0	0	17	0	0	0	0	0	0
Lane Group Flow (vph)	1310	0	0	0	0	36	0	1137	0	0	0	0
Turn Type	Perm					Perm		NA				
Protected Phases								2				
Permitted Phases	4					8						
Actuated Green, G (s)	42.5					42.5		37.0				
Effective Green, g (s)	45.5					45.5		40.0				
Actuated g/C Ratio	0.51					0.51		0.44				
Clearance Time (s)	5.5					5.5		5.0				
Lane Grp Cap (vph)	2522					814		2260				
v/s Ratio Prot								c0.22				
v/s Ratio Perm	c0.26					0.02						
v/c Ratio	0.52					0.04		0.50				
Uniform Delay, d1	14.9					11.3		17.9				
Progression Factor	0.48					1.00		1.00				
Incremental Delay, d2	0.5					0.1		0.8				
Delay (s)	7.7					11.4		18.7				
Level of Service	A					B		B				
Approach Delay (s)		7.7			11.4			18.7			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	110.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



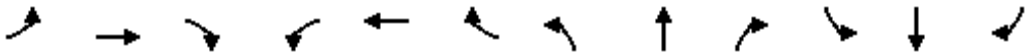
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	840	60	0	0	0	0	1820	60	0	1450	110
Future Volume (vph)	50	840	60	0	0	0	0	1820	60	0	1450	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.5						1.5			2.5	
Lane Util. Factor		0.95						0.95			0.95	
Frt		0.99						1.00			0.99	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		3496						3522			3502	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		3496						3522			3502	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	55	923	66	0	0	0	0	2000	66	0	1593	121
RTOR Reduction (vph)	0	5	0	0	0	0	0	3	0	0	6	0
Lane Group Flow (vph)	0	1039	0	0	0	0	0	2063	0	0	1708	0
Parking (#/hr)	0		10						10			
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		26.0						55.0			54.0	
Effective Green, g (s)		28.5						57.5			56.5	
Actuated g/C Ratio		0.32						0.64			0.63	
Clearance Time (s)		5.0						4.0			5.0	
Vehicle Extension (s)		3.0						1.0			3.0	
Lane Grp Cap (vph)		1107						2250			2198	
v/s Ratio Prot								c0.59			0.49	
v/s Ratio Perm		0.30										
v/c Ratio		0.94						0.92			0.78	
Uniform Delay, d1		29.9						14.2			12.2	
Progression Factor		0.79						1.00			1.00	
Incremental Delay, d2		14.1						7.4			2.8	
Delay (s)		37.8						21.6			14.9	
Level of Service		D						C			B	
Approach Delay (s)		37.8			0.0			21.6			14.9	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



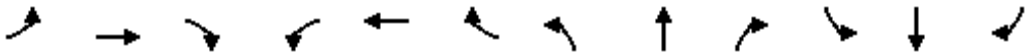
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1800	320	0	0	0	0	0	0	200	1350	0
Future Volume (vph)	0	1800	320	0	0	0	0	0	0	200	1350	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	12	12	12	12	12	12	10	10	12
Total Lost time (s)		1.8	1.8							2.8	2.8	
Lane Util. Factor		0.91	1.00							0.86	0.86	
Frpb, ped/bikes		1.00	1.00							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		4392	1373							1295	3939	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		4392	1373							1295	3939	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	2022	360	0	0	0	0	0	0	225	1517	0
RTOR Reduction (vph)	0	0	77	0	0	0	0	0	0	56	35	0
Lane Group Flow (vph)	0	2022	283	0	0	0	0	0	0	146	1505	0
Confl. Peds. (#/hr)	95		159	159		95	255		228	228		255
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	3	0	0	0	0	0	0	0	0	27	0
Turn Type		NA	Prot							Split	NA	
Protected Phases		2	2							4	4	
Permitted Phases												
Actuated Green, G (s)		24.2	24.2							33.2	33.2	
Effective Green, g (s)		27.2	27.2							35.2	35.2	
Actuated g/C Ratio		0.30	0.30							0.39	0.39	
Clearance Time (s)		4.8	4.8							4.8	4.8	
Lane Grp Cap (vph)		1327	414							506	1540	
v/s Ratio Prot		c0.46	0.21							0.11	c0.38	
v/s Ratio Perm												
v/c Ratio		1.52	0.68							0.29	0.98	
Uniform Delay, d1		31.4	27.6							18.8	27.0	
Progression Factor		1.00	1.00							1.00	1.00	
Incremental Delay, d2		239.6	8.8							1.4	18.1	
Delay (s)		271.0	36.4							20.2	45.1	
Level of Service		F	D							C	D	
Approach Delay (s)		235.5			0.0			0.0			42.2	
Approach LOS		F			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	153.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.6
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	840	640	150	2960	0	0	0	0
Future Volume (vph)	0	0	0	0	840	640	150	2960	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	10	10	12	10	12	12	12	12
Total Lost time (s)					2.0	2.0		2.0				
Lane Util. Factor					0.91	1.00		0.81				
Frpb, ped/bikes					1.00	0.90		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					4478	1257		6633				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					4478	1257		6633				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	0	875	667	156	3083	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	19	0	19	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	875	648	0	3220	0	0	0	0
Confl. Peds. (#/hr)	92		91	91		92	104		205	205		104
Confl. Bikes (#/hr)						60						
Bus Blockages (#/hr)	0	0	0	0	3	0	0	4	0	0	0	0
Turn Type					NA	Perm	Split	NA				
Protected Phases					6		8	8				
Permitted Phases						6						
Actuated Green, G (s)					25.0	25.0		25.0				
Effective Green, g (s)					28.0	28.0		28.0				
Actuated g/C Ratio					0.47	0.47		0.47				
Clearance Time (s)					5.0	5.0		5.0				
Lane Grp Cap (vph)					2089	586		3095				
v/s Ratio Prot					0.20			c0.49				
v/s Ratio Perm						c0.52						
v/c Ratio					0.42	1.11		1.04				
Uniform Delay, d1					10.6	16.0		16.0				
Progression Factor					0.46	0.38		1.00				
Incremental Delay, d2					0.5	66.1		27.9				
Delay (s)					5.3	72.2		43.9				
Level of Service					A	E		D				
Approach Delay (s)		0.0			34.3			43.9			0.0	
Approach LOS		A			C			D			A	

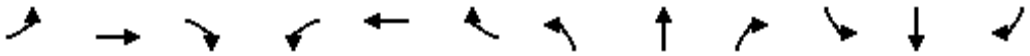
Intersection Summary			
HCM 2000 Control Delay	40.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1220	210	0	0	0	0	0	0	70	1480	0
Future Volume (vph)	0	1220	210	0	0	0	0	0	0	70	1480	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.0	
Lane Util. Factor		0.91									0.86	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.98									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		4867									6354	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		4867									6354	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1284	221	0	0	0	0	0	0	74	1558	0
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	1500	0	0	0	0	0	0	0	0	1615	0
Confl. Peds. (#/hr)			200							200		
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		39.5									40.0	
Effective Green, g (s)		39.5									40.0	
Actuated g/C Ratio		0.44									0.44	
Clearance Time (s)		5.5									5.0	
Lane Grp Cap (vph)		2136									2824	
v/s Ratio Prot		c0.31										
v/s Ratio Perm											0.25	
v/c Ratio		0.70									0.57	
Uniform Delay, d1		20.5									18.6	
Progression Factor		1.00									1.00	
Incremental Delay, d2		2.0									0.8	
Delay (s)		22.4									19.5	
Level of Service		C									B	
Approach Delay (s)		22.4			0.0			0.0			19.5	
Approach LOS		C			A			A			B	

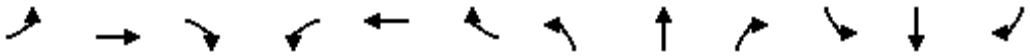
Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	110.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1120	240	210	1540	0	0	0	0
Future Volume (vph)	0	0	0	0	1120	240	210	1540	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)					2.0			2.0				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					0.98			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4277			5577				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4277			5577				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	0	1143	245	214	1571	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1387	0	0	1765	0	0	0	0
Confl. Peds. (#/hr)	142		160	160		142	241		254	254		241
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	3	0	0	0	0	0	0	0
Turn Type					NA		Split	NA				
Protected Phases					6		8	8				
Permitted Phases												
Actuated Green, G (s)					26.0			24.0				
Effective Green, g (s)					29.0			27.0				
Actuated g/C Ratio					0.48			0.45				
Clearance Time (s)					5.0			5.0				
Lane Grp Cap (vph)					2067			2509				
v/s Ratio Prot					c0.32			c0.32				
v/s Ratio Perm												
v/c Ratio					0.67			0.70				
Uniform Delay, d1					11.9			13.3				
Progression Factor					0.59			1.00				
Incremental Delay, d2					1.4			1.7				
Delay (s)					8.4			15.0				
Level of Service					A			B				
Approach Delay (s)		0.0			8.4			15.0			0.0	
Approach LOS		A			A			B			A	

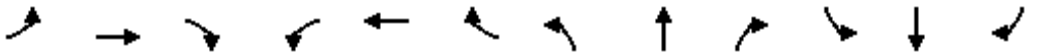
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	120	30	500	200	140	70	0	50
Future Volume (vph)	0	0	0	0	120	30	500	200	140	70	0	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5		3.5	3.5	3.5		3.0	
Lane Util. Factor					1.00		1.00	1.00	1.00		1.00	
Frpb, ped/bikes					0.89		1.00	1.00	0.42		1.00	
Flpb, ped/bikes					1.00		1.00	1.00	1.00		1.00	
Frt					0.97		1.00	1.00	0.85		0.94	
Flt Protected					1.00		0.95	1.00	1.00		0.97	
Satd. Flow (prot)					1610		1770	1863	658		1708	
Flt Permitted					1.00		0.95	1.00	1.00		0.35	
Satd. Flow (perm)					1610		1770	1863	658		619	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	0	132	33	549	220	154	77	0	55
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	94	0	62	0
Lane Group Flow (vph)	0	0	0	0	150	0	549	220	60	0	70	0
Confl. Peds. (#/hr)						438	64		688			
Turn Type					NA		Split	NA	Perm	Perm	NA	
Protected Phases					8		6	6			2	
Permitted Phases									6	2		
Actuated Green, G (s)					17.5		23.5	23.5	23.5		9.0	
Effective Green, g (s)					17.5		23.5	23.5	23.5		9.0	
Actuated g/C Ratio					0.29		0.39	0.39	0.39		0.15	
Clearance Time (s)					3.5		3.5	3.5	3.5		3.0	
Lane Grp Cap (vph)					469		693	729	257		92	
v/s Ratio Prot					c0.09		c0.31	0.12				
v/s Ratio Perm									0.09		c0.11	
v/c Ratio					0.32		0.79	0.30	0.23		0.76	
Uniform Delay, d1					16.6		16.1	12.6	12.2		24.5	
Progression Factor					1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2					1.8		9.0	1.1	2.1		44.1	
Delay (s)					18.4		25.1	13.7	14.4		68.5	
Level of Service					B		C	B	B		E	
Approach Delay (s)		0.0			18.4			20.6			68.5	
Approach LOS		A			B			C			E	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

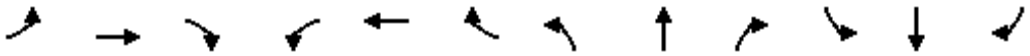
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1250	140	0	0	0	0	400	110	0	430	0
Future Volume (vph)	120	1250	140	0	0	0	0	400	110	0	430	0
Ideal Flow (vphpl)	1500	1500	1500	1700	1700	1700	1500	1500	1500	1500	1500	1500
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)		3.5						3.5			3.5	
Lane Util. Factor		*0.65						1.00			1.00	
Frpb, ped/bikes		0.98						0.91			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.97			1.00	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		3198						1083			1228	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		3198						1083			1228	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1316	147	0	0	0	0	421	116	0	453	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1571	0	0	0	0	0	536	0	0	453	0
Confl. Peds. (#/hr)	230		120				463		836	836		463
Confl. Bikes (#/hr)									100			100
Bus Blockages (#/hr)	0	3	0	0	0	0	0	10	0	0	10	0
Parking (#/hr)									10			10
Turn Type	Split	NA						NA			NA	
Protected Phases	2	2						4			8	
Permitted Phases												
Actuated Green, G (s)		20.0						30.0			30.0	
Effective Green, g (s)		21.5						31.5			31.5	
Actuated g/C Ratio		0.36						0.52			0.52	
Clearance Time (s)		5.0						5.0			5.0	
Lane Grp Cap (vph)		1145						568			644	
v/s Ratio Prot		c0.49						c0.49			0.37	
v/s Ratio Perm												
v/c Ratio		1.37						0.94			0.70	
Uniform Delay, d1		19.2						13.4			10.7	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		173.0						26.2			6.3	
Delay (s)		192.3						39.6			17.1	
Level of Service		F						D			B	
Approach Delay (s)		192.3			0.0			39.6			17.1	
Approach LOS		F			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	129.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

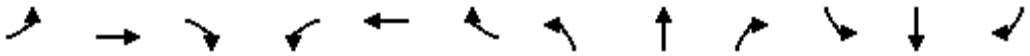
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	1450	90	80	550	0	0	650	130
Future Volume (vph)	0	0	0	100	1450	90	80	550	0	0	650	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					2.0	2.0		2.0			2.0	
Lane Util. Factor					0.86	1.00		0.95			0.95	
Frpb, ped/bikes					1.00	0.87		1.00			0.97	
Flpb, ped/bikes					1.00	1.00		0.99			1.00	
Frt					1.00	0.85		1.00			0.98	
Flt Protected					1.00	1.00		0.99			1.00	
Satd. Flow (prot)					6368	1371		3459			3304	
Flt Permitted					1.00	1.00		0.77			1.00	
Satd. Flow (perm)					6368	1371		2692			3304	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	109	1576	98	87	598	0	0	707	141
RTOR Reduction (vph)	0	0	0	0	0	43	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	1685	55	0	685	0	0	847	0
Confl. Peds. (#/hr)				237		159	295		193	193		295
Bus Blockages (#/hr)	0	0	0	0	3	0	0	5	0	0	5	0
Turn Type				Split	NA	Perm	Perm	NA			NA	
Protected Phases				2	2			4			4	
Permitted Phases						2	4					
Actuated Green, G (s)					23.0	23.0		28.0			28.0	
Effective Green, g (s)					25.5	25.5		30.5			30.5	
Actuated g/C Ratio					0.42	0.42		0.51			0.51	
Clearance Time (s)					4.5	4.5		4.5			4.5	
Lane Grp Cap (vph)					2706	582		1368			1679	
v/s Ratio Prot					c0.26						c0.26	
v/s Ratio Perm						0.04		0.25				
v/c Ratio					0.62	0.09		0.50			0.50	
Uniform Delay, d1					13.5	10.3		9.7			9.8	
Progression Factor					1.51	2.38		1.00			1.00	
Incremental Delay, d2					0.1	0.0		1.3			1.1	
Delay (s)					20.5	24.6		11.0			10.8	
Level of Service					C	C		B			B	
Approach Delay (s)		0.0			20.7			11.0			10.8	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

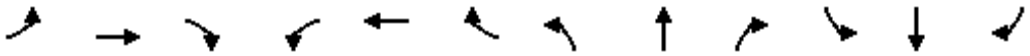
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	340	0	0	70	40	280	1530	610	0	0	0
Future Volume (vph)	30	340	0	0	70	40	280	1530	610	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.5			-0.5	2.1			
Lane Util. Factor		0.95			1.00			0.81	0.81			
Frt		1.00			0.95			0.99	0.85			
Flt Protected		1.00			1.00			0.99	1.00			
Satd. Flow (prot)		3525			1772			5913	1282			
Flt Permitted		0.91			1.00			0.99	1.00			
Satd. Flow (perm)		3233			1772			5913	1282			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	370	0	0	76	43	304	1663	663	0	0	0
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	236	0	0	0
Lane Group Flow (vph)	0	403	0	0	97	0	0	2159	235	0	0	0
Turn Type	Perm	NA			NA		Perm	NA	custom			
Protected Phases		4			8			2 1	1			
Permitted Phases	4						2 1					
Actuated Green, G (s)		18.5			18.5			57.4	42.4			
Effective Green, g (s)		21.0			20.5			59.9	44.9			
Actuated g/C Ratio		0.23			0.23			0.67	0.50			
Clearance Time (s)		9.5			9.5				4.6			
Lane Grp Cap (vph)		754			403			3935	639			
v/s Ratio Prot					0.05				0.18			
v/s Ratio Perm		c0.12						0.37				
v/c Ratio		0.53			0.24			0.55	0.37			
Uniform Delay, d1		30.2			28.4			7.9	13.8			
Progression Factor		1.00			1.69			1.13	3.12			
Incremental Delay, d2		2.7			1.2			0.5	1.4			
Delay (s)		32.9			49.1			9.4	44.7			
Level of Service		C			D			A	D			
Approach Delay (s)		32.9			49.1			15.7			0.0	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

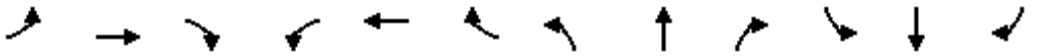
Synchro intersection delay results - 2020 Plus Project



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	230	0	0	0	0	0	1220	40	0	0	0
Future Volume (vph)	180	230	0	0	0	0	0	1220	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0						2.4				
Lane Util. Factor	0.91	0.91						0.86				
Frpb, ped/bikes	1.00	1.00						0.99				
Flpb, ped/bikes	0.62	0.93						1.00				
Frt	1.00	1.00						1.00				
Flt Protected	0.95	0.99						1.00				
Satd. Flow (prot)	892	2828						5681				
Flt Permitted	0.95	0.99						1.00				
Satd. Flow (perm)	892	2828						5681				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	240	0	0	0	0	0	1271	42	0	0	0
RTOR Reduction (vph)	33	27	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	106	262	0	0	0	0	0	1306	0	0	0	0
Confl. Peds. (#/hr)	782								646			
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Actuated Green, G (s)	20.0	20.0						31.6				
Effective Green, g (s)	22.0	22.0						33.6				
Actuated g/C Ratio	0.37	0.37						0.56				
Clearance Time (s)	4.0	4.0						4.4				
Lane Grp Cap (vph)	327	1036						3181				
v/s Ratio Prot								c0.23				
v/s Ratio Perm	c0.12	0.09										
v/c Ratio	0.32	0.25						0.41				
Uniform Delay, d1	13.7	13.3						7.5				
Progression Factor	0.97	0.93						1.00				
Incremental Delay, d2	2.6	0.6						0.4				
Delay (s)	15.9	12.9						7.9				
Level of Service	B	B						A				
Approach Delay (s)		13.9			0.0			7.9			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.4
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

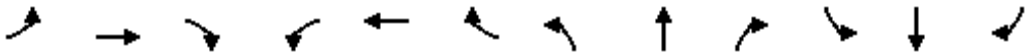
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	430	90	120	90	0	0	0	170
Future Volume (vph)	0	0	0	0	430	90	120	90	0	0	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.7		3.1	3.1				3.5
Lane Util. Factor					1.00		1.00	1.00				1.00
Frpb, ped/bikes					0.91		1.00	1.00				1.00
Flpb, ped/bikes					1.00		0.36	1.00				1.00
Frt					0.98		1.00	1.00				0.86
Flt Protected					1.00		0.95	1.00				1.00
Satd. Flow (prot)					1488		579	1676				1450
Flt Permitted					1.00		0.95	1.00				1.00
Satd. Flow (perm)					1488		579	1676				1450
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	478	100	133	100	0	0	0	189
RTOR Reduction (vph)	0	0	0	0	13	0	76	0	0	0	0	55
Lane Group Flow (vph)	0	0	0	0	565	0	57	100	0	0	0	134
Confl. Peds. (#/hr)						444	926					926
Turn Type					NA		Perm	NA				Prot
Protected Phases					6			8				4
Permitted Phases							8					
Actuated Green, G (s)					22.8		23.5	23.5				23.5
Effective Green, g (s)					25.3		25.9	25.9				25.5
Actuated g/C Ratio					0.42		0.43	0.43				0.42
Clearance Time (s)					8.2		5.5	5.5				5.5
Lane Grp Cap (vph)					627		249	723				616
v/s Ratio Prot					c0.38			0.06				0.09
v/s Ratio Perm							c0.10					
v/c Ratio					0.90		0.23	0.14				0.22
Uniform Delay, d1					16.2		10.8	10.3				10.9
Progression Factor					1.00		1.00	1.00				0.74
Incremental Delay, d2					18.5		2.2	0.4				0.8
Delay (s)					34.7		12.9	10.7				8.9
Level of Service					C		B	B				A
Approach Delay (s)		0.0			34.7			12.0			8.9	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

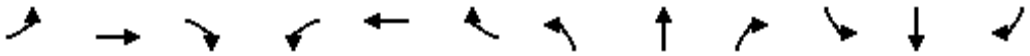
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	280	260	0	0	0	0	0	0	70	790	0
Future Volume (vph)	0	280	260	0	0	0	0	0	0	70	790	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5								2.0	
Lane Util. Factor		0.86	0.86								0.95	
Frpb, ped/bikes		0.97	0.91								1.00	
Flpb, ped/bikes		1.00	1.00								0.97	
Frt		0.95	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		4003	1117								3090	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		4003	1117								3090	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	292	271	0	0	0	0	0	0	73	823	0
RTOR Reduction (vph)	0	80	80	0	0	0	0	0	0	0	216	0
Lane Group Flow (vph)	0	348	55	0	0	0	0	0	0	0	680	0
Confl. Peds. (#/hr)			100							100		
Turn Type		NA	Perm							Perm	NA	
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								4.5	
Effective Green, g (s)		24.5	24.5								7.0	
Actuated g/C Ratio		0.41	0.41								0.12	
Clearance Time (s)		5.0	5.0								4.5	
Lane Grp Cap (vph)		1634	456								360	
v/s Ratio Prot		c0.09										
v/s Ratio Perm			0.05								0.22	
v/c Ratio		0.21	0.12								1.89	
Uniform Delay, d1		11.5	11.0								26.5	
Progression Factor		1.00	1.00								1.00	
Incremental Delay, d2		0.3	0.5								409.8	
Delay (s)		11.8	11.6								436.3	
Level of Service		B	B								F	
Approach Delay (s)		11.7			0.0			0.0			436.3	
Approach LOS		B			A			A			F	

Intersection Summary			
HCM 2000 Control Delay	272.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

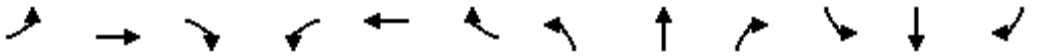
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	510	50	0	0	0	0	0	20	390	100	0
Future Volume (vph)	0	510	50	0	0	0	0	0	20	390	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.5						2.0	2.0	2.0	
Lane Util. Factor		0.95	1.00						1.00	0.97	1.00	
Frpb, ped/bikes		1.00	0.74						1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00						1.00	0.67	1.00	
Frt		1.00	0.85						0.86	1.00	1.00	
Flt Protected		1.00	1.00						1.00	0.95	1.00	
Satd. Flow (prot)		3539	1167						1611	2308	1863	
Flt Permitted		1.00	1.00						1.00	0.95	1.00	
Satd. Flow (perm)		3539	1167						1611	2308	1863	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	554	54	0	0	0	0	0	22	424	109	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	14	274	0	0
Lane Group Flow (vph)	0	554	13	0	0	0	0	0	8	150	109	0
Confl. Peds. (#/hr)			100							185		
Turn Type		NA	Perm						Perm	Perm	NA	
Protected Phases		2									4	
Permitted Phases			2						8	4		
Actuated Green, G (s)		12.5	12.5						20.0	19.5	19.5	
Effective Green, g (s)		15.0	14.5						22.0	22.0	22.0	
Actuated g/C Ratio		0.24	0.23						0.35	0.35	0.35	
Clearance Time (s)		4.5	4.5						4.0	4.5	4.5	
Lane Grp Cap (vph)		856	272						571	818	661	
v/s Ratio Prot		c0.16									0.06	
v/s Ratio Perm			0.01						0.00	c0.07		
v/c Ratio		0.65	0.05						0.01	0.18	0.16	
Uniform Delay, d1		21.1	18.4						13.0	13.8	13.7	
Progression Factor		1.00	1.00						1.00	1.00	1.00	
Incremental Delay, d2		3.8	0.3						0.0	0.5	0.5	
Delay (s)		24.9	18.7						13.0	14.3	14.2	
Level of Service		C	B						B	B	B	
Approach Delay (s)		24.3			0.0			13.0			14.3	
Approach LOS		C			A			B			B	

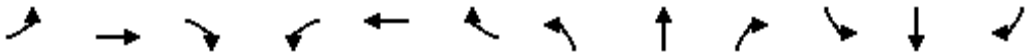
Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	62.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1680	200	0	0	0	0	1050	390	130	1040	0
Future Volume (vph)	100	1680	200	0	0	0	0	1050	390	130	1040	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	12	12	12	10	12	12	10	12
Total Lost time (s)		3.3						1.0	1.5		2.5	
Lane Util. Factor		0.86						0.95	1.00		0.91	
Frpb, ped/bikes		0.99						1.00	0.93		1.00	
Flpb, ped/bikes		1.00						1.00	1.00		1.00	
Frt		0.98						1.00	0.85		1.00	
Flt Protected		1.00						1.00	1.00		0.99	
Satd. Flow (prot)		5344						3004	1361		4348	
Flt Permitted		1.00						1.00	1.00		0.68	
Satd. Flow (perm)		5344						3004	1361		2961	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	108	1806	215	0	0	0	0	1129	419	140	1118	0
RTOR Reduction (vph)	0	29	0	0	0	0	0	0	109	0	0	0
Lane Group Flow (vph)	0	2100	0	0	0	0	0	1129	310	0	1258	0
Confl. Peds. (#/hr)	66		81	81		66	100		61	61		100
Heavy Vehicles (%)	5%	5%	5%	2%	2%	2%	5%	5%	5%	4%	4%	4%
Bus Blockages (#/hr)	0	3	0	0	0	0	0	6	0	0	6	0
Turn Type	Split	NA						NA	Perm	Prot	NA	
Protected Phases	2	2						4		3	8	
Permitted Phases									4			
Actuated Green, G (s)		21.2						21.5	21.5		34.0	
Effective Green, g (s)		22.7						24.0	23.5		36.5	
Actuated g/C Ratio		0.35						0.37	0.36		0.56	
Clearance Time (s)		4.8						3.5	3.5		5.0	
Lane Grp Cap (vph)		1866						1109	492		1908	
v/s Ratio Prot		c0.39						c0.38			c0.12	
v/s Ratio Perm									0.23		0.25	
v/c Ratio		1.13						1.02	0.63		0.66	
Uniform Delay, d1		21.1						20.5	17.2		9.9	
Progression Factor		1.00						1.00	1.00		1.00	
Incremental Delay, d2		64.0						31.6	6.0		1.8	
Delay (s)		85.1						52.1	23.2		11.7	
Level of Service		F						D	C		B	
Approach Delay (s)		85.1			0.0			44.3			11.7	
Approach LOS		F			A			D			B	

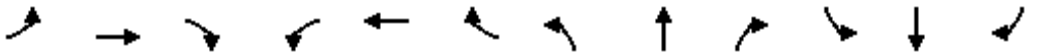
Intersection Summary			
HCM 2000 Control Delay	53.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.8
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	450	50	0	0	0	0	0	100	350	80	0
Future Volume (vph)	0	450	50	0	0	0	0	0	100	350	80	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0							2.0	2.0	2.0	
Lane Util. Factor		0.91							1.00	1.00	1.00	
Frpb, ped/bikes		0.96							1.00	1.00	1.00	
Flpb, ped/bikes		1.00							1.00	0.85	1.00	
Frt		0.99							0.86	1.00	1.00	
Flt Protected		1.00							1.00	0.95	1.00	
Satd. Flow (prot)		4331							1450	1353	1676	
Flt Permitted		1.00							1.00	0.95	1.00	
Satd. Flow (perm)		4331							1450	1353	1676	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	489	54	0	0	0	0	0	109	380	87	0
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	10	87	0	0
Lane Group Flow (vph)	0	521	0	0	0	0	0	0	99	293	87	0
Confl. Peds. (#/hr)			268							268		
Turn Type		NA							Perm	Perm	NA	
Protected Phases		4									6	
Permitted Phases									2	6		
Actuated Green, G (s)		21.0							31.5	32.0	32.0	
Effective Green, g (s)		22.5							33.5	33.5	33.5	
Actuated g/C Ratio		0.38							0.56	0.56	0.56	
Clearance Time (s)		3.5							4.0	3.5	3.5	
Lane Grp Cap (vph)		1624							809	755	935	
v/s Ratio Prot		c0.12									0.05	
v/s Ratio Perm									0.07	c0.22		
v/c Ratio		0.32							0.12	0.39	0.09	
Uniform Delay, d1		13.3							6.3	7.5	6.2	
Progression Factor		1.00							1.00	1.00	1.00	
Incremental Delay, d2		0.5							0.3	1.5	0.2	
Delay (s)		13.8							6.6	9.0	6.4	
Level of Service		B							A	A	A	
Approach Delay (s)		13.8			0.0			6.6			8.5	
Approach LOS		B			A			A			A	

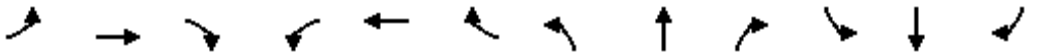
Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



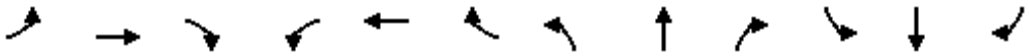
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1800	350	330	1520	0	0	0	0
Future Volume (vph)	0	0	0	0	1800	350	330	1520	0	0	0	0
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	12	12	12	12	10	12	10	10	12	12	12	12
Total Lost time (s)					2.0		2.0	2.0				
Lane Util. Factor					0.86		0.81	0.81				
Frpb, ped/bikes					0.95		1.00	1.00				
Flpb, ped/bikes					1.00		1.00	1.00				
Frt					0.98		1.00	1.00				
Flt Protected					1.00		0.95	1.00				
Satd. Flow (prot)					4353		1046	4245				
Flt Permitted					1.00		0.95	1.00				
Satd. Flow (perm)					4353		1046	4245				
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	0	0	0	1818	354	333	1535	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	13	13	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2172	0	287	1555	0	0	0	0
Confl. Peds. (#/hr)	382		366	366		382	370		748	748		370
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	3	0	0	35	0	0	0	0
Turn Type					NA		Split	NA				
Protected Phases					8		6	6				
Permitted Phases												
Actuated Green, G (s)					23.0		24.0	24.0				
Effective Green, g (s)					25.5		30.5	30.5				
Actuated g/C Ratio					0.42		0.51	0.51				
Clearance Time (s)					4.5		8.5	8.5				
Lane Grp Cap (vph)					1850		531	2157				
v/s Ratio Prot					c0.50		0.27	c0.37				
v/s Ratio Perm												
v/c Ratio					1.17		0.54	0.72				
Uniform Delay, d1					17.2		10.0	11.4				
Progression Factor					1.13		1.00	1.00				
Incremental Delay, d2					78.9		3.9	2.1				
Delay (s)					98.5		13.9	13.6				
Level of Service					F		B	B				
Approach Delay (s)		0.0			98.5			13.6			0.0	
Approach LOS		A			F			B			A	

Intersection Summary			
HCM 2000 Control Delay	59.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



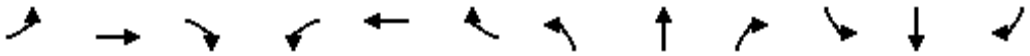
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	440	1400	0	0	0	0	0	910	540
Future Volume (vph)	0	0	0	440	1400	0	0	0	0	0	910	540
Ideal Flow (vphpl)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Lane Width	12	12	12	11	11	11	12	12	12	11	11	11
Total Lost time (s)					2.0						2.0	2.0
Lane Util. Factor					*0.70						0.95	1.00
Frpb, ped/bikes					1.00						1.00	0.82
Flpb, ped/bikes					0.96						1.00	1.00
Frt					1.00						1.00	0.85
Flt Protected					0.99						1.00	1.00
Satd. Flow (prot)					3391						2431	897
Flt Permitted					0.99						1.00	1.00
Satd. Flow (perm)					3391						2431	897
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	478	1522	0	0	0	0	0	989	587
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	0	0	0	1961	0	0	0	0	0	989	582
Confl. Peds. (#/hr)				250								250
Turn Type				Perm	NA						NA	Perm
Protected Phases					6						8	
Permitted Phases				6								8
Actuated Green, G (s)					25.5						27.0	27.0
Effective Green, g (s)					27.0						29.0	29.0
Actuated g/C Ratio					0.45						0.48	0.48
Clearance Time (s)					3.5						4.0	4.0
Lane Grp Cap (vph)					1525						1174	433
v/s Ratio Prot											0.41	
v/s Ratio Perm					0.58							c0.65
v/c Ratio					1.29						0.84	1.34
Uniform Delay, d1					16.5						13.5	15.5
Progression Factor					1.00						1.00	1.00
Incremental Delay, d2					133.7						7.4	169.5
Delay (s)					150.2						20.9	185.0
Level of Service					F						C	F
Approach Delay (s)		0.0			150.2			0.0			82.0	
Approach LOS		A			F			A			F	

Intersection Summary			
HCM 2000 Control Delay	120.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



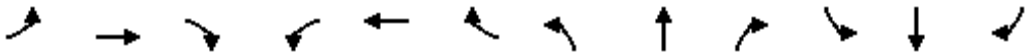
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	330	110	0	0	0	0	140	40	40	60	0
Future Volume (vph)	190	330	110	0	0	0	0	140	40	40	60	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.4			4.4	
Lane Util. Factor		0.91						1.00			1.00	
Frt		0.97						0.97			1.00	
Flt Protected		0.99						1.00			0.98	
Satd. Flow (prot)		4878						1807			1826	
Flt Permitted		0.99						1.00			0.83	
Satd. Flow (perm)		4878						1807			1555	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	359	120	0	0	0	0	152	43	43	65	0
RTOR Reduction (vph)	0	51	0	0	0	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	635	0	0	0	0	0	178	0	0	108	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)		34.5						16.6			16.6	
Effective Green, g (s)		34.5						16.6			16.6	
Actuated g/C Ratio		0.58						0.28			0.28	
Clearance Time (s)		4.5						4.4			4.4	
Lane Grp Cap (vph)		2804						499			430	
v/s Ratio Prot								c0.10				
v/s Ratio Perm		0.13									0.07	
v/c Ratio		0.23						0.36			0.25	
Uniform Delay, d1		6.2						17.4			16.9	
Progression Factor		1.00						1.06			1.00	
Incremental Delay, d2		0.2						1.7			1.4	
Delay (s)		6.4						20.2			18.3	
Level of Service		A						C			B	
Approach Delay (s)		6.4			0.0			20.2			18.3	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.9
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



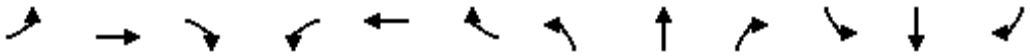
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1260	100	0	0	0	0	0	0	490	1900	0
Future Volume (vph)	0	1260	100	0	0	0	0	0	0	490	1900	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	12	12	12	12	12	12	12	10	12
Total Lost time (s)		2.5	2.5								2.5	
Lane Util. Factor		0.91	1.00								0.86	
Frpb, ped/bikes		1.00	0.94								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								0.99	
Satd. Flow (prot)		4435	1309								5608	
Flt Permitted		1.00	1.00								0.99	
Satd. Flow (perm)		4435	1309								5608	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1326	105	0	0	0	0	0	0	516	2000	0
RTOR Reduction (vph)	0	0	15	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	1326	90	0	0	0	0	0	0	0	2506	0
Confl. Peds. (#/hr)	28		51	51		28	39		43	43		39
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	3	0	0	0	0	0	0	0	0	0	0
Turn Type		NA	Perm							Split	NA	
Protected Phases		2								4	4	
Permitted Phases			2									
Actuated Green, G (s)		31.0	31.0								49.0	
Effective Green, g (s)		33.5	33.5								51.5	
Actuated g/C Ratio		0.37	0.37								0.57	
Clearance Time (s)		5.0	5.0								5.0	
Lane Grp Cap (vph)		1650	487								3209	
v/s Ratio Prot		c0.30									c0.45	
v/s Ratio Perm			0.07									
v/c Ratio		0.80	0.18								0.78	
Uniform Delay, d1		25.3	19.0								14.9	
Progression Factor		1.00	1.00								1.00	
Incremental Delay, d2		4.3	0.8								2.0	
Delay (s)		29.6	19.9								16.8	
Level of Service		C	B								B	
Approach Delay (s)		28.9			0.0			0.0			16.8	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



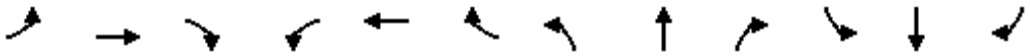
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱								↰↑↑↑	
Traffic Volume (vph)	0	1580	180	0	0	0	0	0	0	290	1450	0
Future Volume (vph)	0	1580	180	0	0	0	0	0	0	290	1450	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	12	12	12	12	12	12	12	12	10	12
Total Lost time (s)		2.0	2.5								2.0	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.93								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								0.99	
Satd. Flow (prot)		4392	1375								4228	
Flt Permitted		1.00	1.00								0.99	
Satd. Flow (perm)		4392	1375								4228	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	1736	198	0	0	0	0	0	0	319	1593	0
RTOR Reduction (vph)	0	0	14	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	1736	184	0	0	0	0	0	0	0	1897	0
Confl. Peds. (#/hr)	73		79	79		73	109		67	67		109
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	7%	7%	7%
Bus Blockages (#/hr)	0	3	0	0	3	0	0	0	0	0	4	0
Turn Type		NA	Perm							Split	NA	
Protected Phases		2								4	4	
Permitted Phases			2									
Actuated Green, G (s)		26.0	26.0								25.0	
Effective Green, g (s)		28.5	28.0								27.5	
Actuated g/C Ratio		0.48	0.47								0.46	
Clearance Time (s)		4.5	4.5								4.5	
Lane Grp Cap (vph)		2086	641								1937	
v/s Ratio Prot		c0.40									c0.45	
v/s Ratio Perm			0.13									
v/c Ratio		0.83	0.29								0.98	
Uniform Delay, d1		13.7	9.8								16.0	
Progression Factor		1.00	1.00								1.00	
Incremental Delay, d2		4.1	1.1								16.2	
Delay (s)		17.7	11.0								32.1	
Level of Service		B	B								C	
Approach Delay (s)		17.0			0.0			0.0			32.1	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



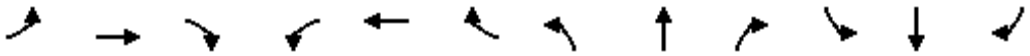
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1290	0	0	0	0	50	0	1100	0	0	0	0
Future Volume (vph)	1290	0	0	0	0	50	0	1100	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.5					2.5		2.0				
Lane Util. Factor	0.94					1.00		0.91				
Frt	1.00					0.86		1.00				
Flt Protected	0.95					1.00		1.00				
Satd. Flow (prot)	4990					1611		5085				
Flt Permitted	0.95					1.00		1.00				
Satd. Flow (perm)	4990					1611		5085				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1358	0	0	0	0	53	0	1158	0	0	0	0
RTOR Reduction (vph)	45	0	0	0	0	16	0	0	0	0	0	0
Lane Group Flow (vph)	1313	0	0	0	0	37	0	1158	0	0	0	0
Turn Type	Perm					Perm		NA				
Protected Phases								2				
Permitted Phases	4					8						
Actuated Green, G (s)	42.5					42.5		37.0				
Effective Green, g (s)	45.5					45.5		40.0				
Actuated g/C Ratio	0.51					0.51		0.44				
Clearance Time (s)	5.5					5.5		5.0				
Lane Grp Cap (vph)	2522					814		2260				
v/s Ratio Prot								c0.23				
v/s Ratio Perm	c0.26					0.02						
v/c Ratio	0.52					0.05		0.51				
Uniform Delay, d1	14.9					11.3		18.0				
Progression Factor	0.46					1.00		1.00				
Incremental Delay, d2	0.5					0.1		0.8				
Delay (s)	7.3					11.4		18.8				
Level of Service	A					B		B				
Approach Delay (s)		7.3			11.4			18.8			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



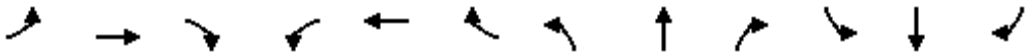
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	820	100	0	0	0	0	1780	50	0	1240	110
Future Volume (vph)	50	820	100	0	0	0	0	1780	50	0	1240	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.5						1.5			2.5	
Lane Util. Factor		0.95						0.95			0.95	
Frt		0.98						1.00			0.99	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		3475						3525			3496	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		3475						3525			3496	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	55	901	110	0	0	0	0	1956	55	0	1363	121
RTOR Reduction (vph)	0	10	0	0	0	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	1056	0	0	0	0	0	2009	0	0	1477	0
Parking (#/hr)	0		10						10			
Turn Type	Perm	NA						NA			NA	
Protected Phases		4						2			6	
Permitted Phases	4											
Actuated Green, G (s)		26.0						55.0			54.0	
Effective Green, g (s)		28.5						57.5			56.5	
Actuated g/C Ratio		0.32						0.64			0.63	
Clearance Time (s)		5.0						4.0			5.0	
Vehicle Extension (s)		3.0						1.0			3.0	
Lane Grp Cap (vph)		1100						2252			2194	
v/s Ratio Prot								c0.57			0.42	
v/s Ratio Perm		0.30										
v/c Ratio		0.96						0.89			0.67	
Uniform Delay, d1		30.2						13.6			10.8	
Progression Factor		0.94						1.00			1.00	
Incremental Delay, d2		17.2						5.9			1.7	
Delay (s)		45.5						19.5			12.5	
Level of Service		D						B			B	
Approach Delay (s)		45.5			0.0			19.5			12.5	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



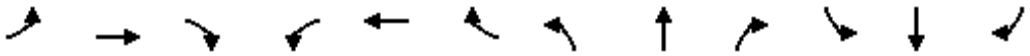
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1800	320	0	0	0	0	0	0	220	1350	0
Future Volume (vph)	0	1800	320	0	0	0	0	0	0	220	1350	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	10	10	12	12	12	12	12	12	10	10	12
Total Lost time (s)		1.8	1.8							2.8	2.8	
Lane Util. Factor		0.91	1.00							0.86	0.86	
Frpb, ped/bikes		1.00	1.00							1.00	1.00	
Flpb, ped/bikes		1.00	1.00							1.00	1.00	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		4392	1373							1295	3939	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		4392	1373							1295	3939	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	2022	360	0	0	0	0	0	0	247	1517	0
RTOR Reduction (vph)	0	0	77	0	0	0	0	0	0	62	35	0
Lane Group Flow (vph)	0	2022	283	0	0	0	0	0	0	160	1507	0
Confl. Peds. (#/hr)	95		159	159		95	255		228	228		255
Heavy Vehicles (%)	4%	4%	4%	2%	2%	2%	2%	2%	2%	6%	6%	6%
Bus Blockages (#/hr)	0	3	0	0	0	0	0	0	0	0	27	0
Turn Type		NA	Prot							Split	NA	
Protected Phases		2	2							4	4	
Permitted Phases												
Actuated Green, G (s)		24.2	24.2							33.2	33.2	
Effective Green, g (s)		27.2	27.2							35.2	35.2	
Actuated g/C Ratio		0.30	0.30							0.39	0.39	
Clearance Time (s)		4.8	4.8							4.8	4.8	
Lane Grp Cap (vph)		1327	414							506	1540	
v/s Ratio Prot		c0.46	0.21							0.12	c0.38	
v/s Ratio Perm												
v/c Ratio		1.52	0.68							0.32	0.98	
Uniform Delay, d1		31.4	27.6							19.0	27.0	
Progression Factor		1.00	1.00							1.00	1.00	
Incremental Delay, d2		239.6	8.8							1.6	18.3	
Delay (s)		271.0	36.4							20.7	45.4	
Level of Service		F	D							C	D	
Approach Delay (s)		235.5			0.0			0.0			42.3	
Approach LOS		F			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	153.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	7.6
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	870	640	140	2710	0	0	0	0
Future Volume (vph)	0	0	0	0	870	640	140	2710	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	10	10	12	10	12	12	12	12
Total Lost time (s)					2.0	2.0		2.0				
Lane Util. Factor					0.91	1.00		0.81				
Frpb, ped/bikes					1.00	0.90		1.00				
Flpb, ped/bikes					1.00	1.00		1.00				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		1.00				
Satd. Flow (prot)					4478	1257		6633				
Flt Permitted					1.00	1.00		1.00				
Satd. Flow (perm)					4478	1257		6633				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	0	906	667	146	2823	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	19	0	19	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	906	648	0	2950	0	0	0	0
Confl. Peds. (#/hr)	92		91	91		92	104		205	205		104
Confl. Bikes (#/hr)						60						
Bus Blockages (#/hr)	0	0	0	0	3	0	0	4	0	0	0	0
Turn Type					NA	Perm	Split	NA				
Protected Phases					6		8	8				
Permitted Phases						6						
Actuated Green, G (s)					25.0	25.0		25.0				
Effective Green, g (s)					28.0	28.0		28.0				
Actuated g/C Ratio					0.47	0.47		0.47				
Clearance Time (s)					5.0	5.0		5.0				
Lane Grp Cap (vph)					2089	586		3095				
v/s Ratio Prot					0.20			c0.44				
v/s Ratio Perm						c0.52						
v/c Ratio					0.43	1.11		0.95				
Uniform Delay, d1					10.7	16.0		15.4				
Progression Factor					0.44	0.38		1.00				
Incremental Delay, d2					0.5	65.8		8.4				
Delay (s)					5.2	71.9		23.8				
Level of Service					A	E		C				
Approach Delay (s)		0.0			33.5			23.8			0.0	
Approach LOS		A			C			C			A	

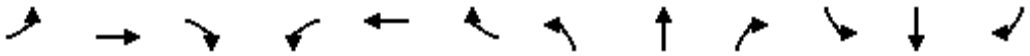
Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1220	270	0	0	0	0	0	0	70	1710	0
Future Volume (vph)	0	1220	270	0	0	0	0	0	0	70	1710	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.0	
Lane Util. Factor		0.91									0.86	
Frpb, ped/bikes		0.97									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		4816									6361	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		4816									6361	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1284	284	0	0	0	0	0	0	74	1800	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	1566	0	0	0	0	0	0	0	0	1857	0
Confl. Peds. (#/hr)			200							200		
Turn Type		NA								Perm	NA	
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		39.5									40.0	
Effective Green, g (s)		39.5									40.0	
Actuated g/C Ratio		0.44									0.44	
Clearance Time (s)		5.5									5.0	
Lane Grp Cap (vph)		2113									2827	
v/s Ratio Prot		c0.33										
v/s Ratio Perm											0.29	
v/c Ratio		0.74									0.66	
Uniform Delay, d1		21.0									19.6	
Progression Factor		1.00									1.00	
Incremental Delay, d2		2.4									1.2	
Delay (s)		23.4									20.8	
Level of Service		C									C	
Approach Delay (s)		23.4			0.0			0.0			20.8	
Approach LOS		C			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



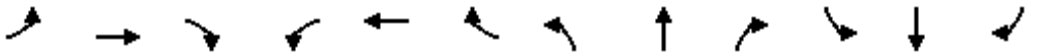
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	1150	230	220	1600	0	0	0	0
Future Volume (vph)	0	0	0	0	1150	230	220	1600	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	12	12	12	12	10	12	12	10	12	12	12	12
Total Lost time (s)					2.0			2.0				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					0.98			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4287			5577				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4287			5577				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	0	1173	235	224	1633	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1407	0	0	1837	0	0	0	0
Confl. Peds. (#/hr)	142		160	160		142	241		254	254		241
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	3	0	0	0	0	0	0	0
Turn Type					NA		Split	NA				
Protected Phases					6		8	8				
Permitted Phases												
Actuated Green, G (s)					26.0			24.0				
Effective Green, g (s)					29.0			27.0				
Actuated g/C Ratio					0.48			0.45				
Clearance Time (s)					5.0			5.0				
Lane Grp Cap (vph)					2072			2509				
v/s Ratio Prot					c0.33			c0.33				
v/s Ratio Perm												
v/c Ratio					0.68			0.73				
Uniform Delay, d1					11.9			13.5				
Progression Factor					0.59			1.00				
Incremental Delay, d2					1.4			1.9				
Delay (s)					8.4			15.5				
Level of Service					A			B				
Approach Delay (s)		0.0			8.4			15.5			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	120	30	430	280	0	0	0	140
Future Volume (vph)	0	0	0	0	120	30	430	280	0	0	0	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5		3.5	3.5			3.0	
Lane Util. Factor					1.00		1.00	1.00			1.00	
Frpb, ped/bikes					0.89		1.00	1.00			1.00	
Flpb, ped/bikes					1.00		1.00	1.00			1.00	
Frt					0.97		1.00	1.00			0.86	
Flt Protected					1.00		0.95	1.00			1.00	
Satd. Flow (prot)					1610		1770	1863			1611	
Flt Permitted					1.00		0.95	1.00			1.00	
Satd. Flow (perm)					1610		1770	1863			1611	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	0	132	33	473	308	0	0	0	154
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	0	0	113	0
Lane Group Flow (vph)	0	0	0	0	150	0	473	308	0	0	41	0
Confl. Peds. (#/hr)						438	64		688			
Turn Type					NA		Split	NA	Perm		NA	
Protected Phases					8		6	6			2	
Permitted Phases									6	2		
Actuated Green, G (s)					17.5		23.5	23.5			9.0	
Effective Green, g (s)					17.5		23.5	23.5			9.0	
Actuated g/C Ratio					0.29		0.39	0.39			0.15	
Clearance Time (s)					3.5		3.5	3.5			3.0	
Lane Grp Cap (vph)					469		693	729			241	
v/s Ratio Prot					c0.09		c0.27	0.17			c0.03	
v/s Ratio Perm												
v/c Ratio					0.32		0.68	0.42			0.17	
Uniform Delay, d1					16.6		15.2	13.3			22.2	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					1.8		5.4	1.8			1.5	
Delay (s)					18.4		20.5	15.1			23.8	
Level of Service					B		C	B			C	
Approach Delay (s)		0.0			18.4			18.4			23.8	
Approach LOS		A			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



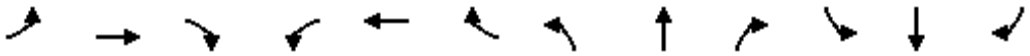
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1250	140	0	0	0	0	400	110	0	350	0
Future Volume (vph)	120	1250	140	0	0	0	0	400	110	0	350	0
Ideal Flow (vphpl)	1500	1500	1500	1700	1700	1700	1500	1500	1500	1500	1500	1500
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)		3.5						3.5			3.5	
Lane Util. Factor		*0.65						1.00			1.00	
Frpb, ped/bikes		0.98						0.91			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.97			1.00	
Flt Protected		1.00						1.00			1.00	
Satd. Flow (prot)		3198						1083			1228	
Flt Permitted		1.00						1.00			1.00	
Satd. Flow (perm)		3198						1083			1228	
Peak-hour factor, PHF	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1316	147	0	0	0	0	421	116	0	368	0
RTOR Reduction (vph)	0	19	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1570	0	0	0	0	0	536	0	0	368	0
Confl. Peds. (#/hr)	230		120				463		836	836		463
Confl. Bikes (#/hr)									100			100
Bus Blockages (#/hr)	0	3	0	0	0	0	0	10	0	0	10	0
Parking (#/hr)									10			10
Turn Type	Split	NA						NA			NA	
Protected Phases	2	2						4			8	
Permitted Phases												
Actuated Green, G (s)		20.0						30.0			30.0	
Effective Green, g (s)		21.5						31.5			31.5	
Actuated g/C Ratio		0.36						0.52			0.52	
Clearance Time (s)		5.0						5.0			5.0	
Lane Grp Cap (vph)		1145						568			644	
v/s Ratio Prot		c0.49						c0.49			0.30	
v/s Ratio Perm												
v/c Ratio		1.37						0.94			0.57	
Uniform Delay, d1		19.2						13.4			9.7	
Progression Factor		1.00						1.00			1.00	
Incremental Delay, d2		172.6						26.2			3.7	
Delay (s)		191.8						39.6			13.3	
Level of Service		F						D			B	
Approach Delay (s)		191.8			0.0			39.6			13.3	
Approach LOS		F			A			D			B	

Intersection Summary			
HCM 2000 Control Delay	132.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	100	1480	80	80	480	0	0	800	170
Future Volume (vph)	0	0	0	100	1480	80	80	480	0	0	800	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					2.0	2.0		2.0			2.0	
Lane Util. Factor					0.86	1.00		0.95			0.95	
Frpb, ped/bikes					1.00	0.87		1.00			0.97	
Flpb, ped/bikes					1.00	1.00		0.99			1.00	
Frt					1.00	0.85		1.00			0.97	
Flt Protected					1.00	1.00		0.99			1.00	
Satd. Flow (prot)					6368	1371		3462			3293	
Flt Permitted					1.00	1.00		0.70			1.00	
Satd. Flow (perm)					6368	1371		2455			3293	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	109	1609	87	87	522	0	0	870	185
RTOR Reduction (vph)	0	0	0	0	0	42	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	1718	45	0	609	0	0	1054	0
Confl. Peds. (#/hr)				237		159	295		193	193		295
Bus Blockages (#/hr)	0	0	0	0	3	0	0	5	0	0	5	0
Turn Type				Split	NA	Perm	Perm	NA			NA	
Protected Phases				2	2			4			4	
Permitted Phases						2	4					
Actuated Green, G (s)					23.0	23.0		28.0			28.0	
Effective Green, g (s)					25.5	25.5		30.5			30.5	
Actuated g/C Ratio					0.42	0.42		0.51			0.51	
Clearance Time (s)					4.5	4.5		4.5			4.5	
Lane Grp Cap (vph)					2706	582		1247			1673	
v/s Ratio Prot					c0.27						c0.32	
v/s Ratio Perm						0.03		0.25				
v/c Ratio					0.63	0.08		0.49			0.63	
Uniform Delay, d1					13.6	10.3		9.6			10.7	
Progression Factor					1.52	2.48		1.00			1.00	
Incremental Delay, d2					0.1	0.0		1.4			1.8	
Delay (s)					20.7	25.4		11.0			12.5	
Level of Service					C	C		B			B	
Approach Delay (s)		0.0			20.9			11.0			12.5	
Approach LOS		A			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	360	0	0	70	40	280	1550	610	0	0	0
Future Volume (vph)	30	360	0	0	70	40	280	1550	610	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.5			-0.5	2.1			
Lane Util. Factor		0.95			1.00			0.81	0.81			
Frt		1.00			0.95			0.99	0.85			
Flt Protected		1.00			1.00			0.99	1.00			
Satd. Flow (prot)		3525			1772			5914	1282			
Flt Permitted		0.92			1.00			0.99	1.00			
Satd. Flow (perm)		3240			1772			5914	1282			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	391	0	0	76	43	304	1685	663	0	0	0
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	236	0	0	0
Lane Group Flow (vph)	0	424	0	0	97	0	0	2181	235	0	0	0
Turn Type	Perm	NA			NA		Perm	NA	custom			
Protected Phases		4			8			2 1	1			
Permitted Phases	4						2 1					
Actuated Green, G (s)		18.5			18.5			57.4	42.4			
Effective Green, g (s)		21.0			20.5			59.9	44.9			
Actuated g/C Ratio		0.23			0.23			0.67	0.50			
Clearance Time (s)		9.5			9.5				4.6			
Lane Grp Cap (vph)		756			403			3936	639			
v/s Ratio Prot					0.05				0.18			
v/s Ratio Perm		c0.13						0.37				
v/c Ratio		0.56			0.24			0.55	0.37			
Uniform Delay, d1		30.4			28.4			8.0	13.8			
Progression Factor		1.00			1.71			1.12	3.09			
Incremental Delay, d2		3.0			1.3			0.5	1.4			
Delay (s)		33.4			49.9			9.5	44.1			
Level of Service		C			D			A	D			
Approach Delay (s)		33.4			49.9			15.6			0.0	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Attachment 6b: Western Variant Analysis

See "Attachment 7c: Western Variant Analysis" for the volume changes with the Western Variant compared to the Project

Corridor Travel Times - Hub Variant

Better Market Street Environmental Review
Prepared by Fehr Peers, 1/28/2019

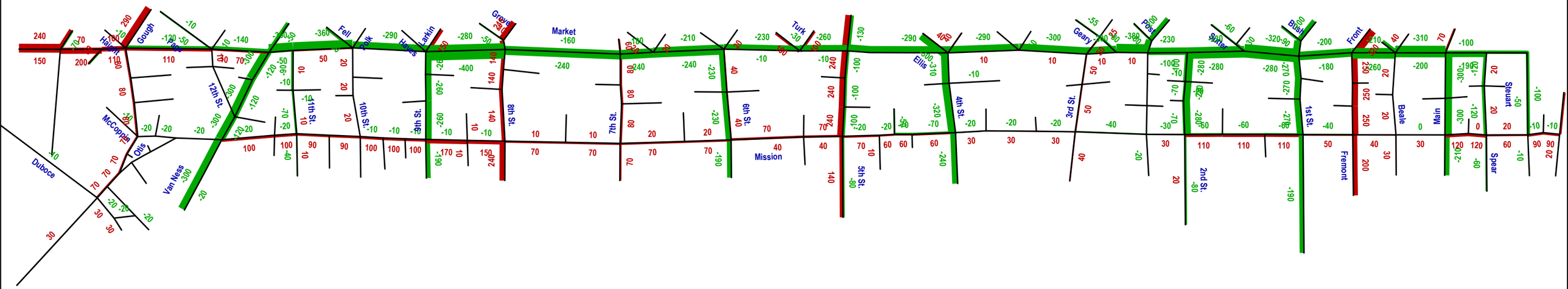
		Travel Time (mm:ss)					
Mode	Description	Distance (ft)	2020 No Project	2020 Proposed Project	Change from 2020NP (%)	2020 Proposed Project - Hub Circulation	Change from 2020 Proposed Project (%)
Streetcar Center Lane	**Inbound Total**	**11,540**	**29:00**	**24:00**	**-17%**	**23:30**	**-2%**
Streetcar Center Lane	**Outbound Total**	**11,620**	**27:30**	**20:30**	**-25%**	**20:00**	**-2%**
Bus Center Lane	**Inbound Total**	**8,860**	**18:00**	**14:00**	**-22%**	**14:00**	**0%**
Bus Center Lane	**Outbound Total**	**8,610**	**15:30**	**13:30**	**-13%**	**13:30**	**0%**
Bus Curb Lane	**Inbound Total***	**6,820**	**17:00**	**15:00**	**-12%**	**15:00**	**0%**
Bus Curb Lane	**Outbound Total**	**8,750**	**22:30**	**18:30**	**-18%**	**18:30**	**0%**

** Line 7 travel times are used for No Project (no data available for 10th-7th segment) ; Line 21 travel times are used for Proposed Project (10th-7th segment not reported).*

Attachment 7: Traffic Analysis

Attachment 7a: Traffic Redistribution

See "Attachment 2a: Traffic Volumes All Scenarios" for the turn by turn volume changes due to the proposed project.



This plot shows the difference between the 2020 Proposed Project and 2020 No Project alternatives. Increases are shown in red and decreases are shown in green. The volumes are PM peak one-hour volumes. These volumes were used in the VISSIM traffic analysis.

VolCompare_v4.ver	Date: 10.22.2018

Attachment 7b: Unserved Vehicles

Volume Served at Network Entry Points

			2020 No Project					Proposed Project				
				Demand	Served	% Served[1]			Demand	Served	% Served[1]	
		Total		35,200	31,900	91%			35,100	31,500	90%	
		Southbound Toward Market		17,200	15,800	92%			17,400	15,900	91%	
		Northbound Toward Market		18,000	16,100	89%			17,700	15,600	88%	
	Appro	**Street Name**	**#Lanes**	**Demand**	**Served**	**% Served[1]**	**Queue Length (ft)[2]**	**#Lanes**	**Demand**	**Served**	**% Served[1]**	**Queue Length (ft)[2]**
Market Street Intersections (Southbound Approaches)	SB	Drumm	3	230	230	100%	0	2	300	300	100%	0
	SW	Davis	4	1,550	1,590	103%	0	4	1,590	1,580	99%	60
	SW	Battery	4	1,150	650	57%	3,130	4	950	770	81%	1,130
	SE	Bush	2	280	250	89%	380	2	190	190	100%	0
	SW	Sansome	1	100	90	90%	250	1	100	80	80%	500
	SW	Montgomery	4	1,500	1,380	92%	750	4	1,300	1,290	99%	60
	SE	Post	2	330	240	73%	1,130	2	270	210	78%	750
	SE	O'Farrell	2	200	190	95%	130	2	200	200	100%	0
	SW	Stockton	2	980	970	99%	130	2	1,020	1,000	98%	250
	SB	Cyril Magnin	2	720	720	100%	0	2	970	830	86%	1,750
	SW	Mason	1	130	120	92%	250	1	130	110	85%	500
	SE	Golden Gate	1	1,030	910	88%	3,000	1	1,030	900	87%	3,250
	SW	Jones	1	150	150	100%	0	1	150	150	100%	0
	SW	Hyde	3	1,420	1,400	99%	170	3	1,660	1,700	102%	0
	SE	Grove	1	180	180	100%	0	1	130	120	92%	250
	SW	Polk	2	860	860	100%	0	2	860	850	99%	130
	SE	Fell	3	1,000	960	96%	330	3	900	860	96%	330
	SB	Van Ness	2	1,510	1,260	83%	3,130	2	1,380	980	71%	5,000
	SE	Page	1	80	70	88%	250	1	30	30	100%	0
	SW	Gough	4	1,690	1,520	90%	1,060	4	1,980	1,630	82%	2,190
	SB	Octavia	2	2,060	2,020	98%	500	2	2,210	2,110	95%	1,250
Mission Street Intersections (Northbound Approaches)	NB	Main	3	860	820	95%	330	3	650	660	102%	0
	NB	Fremont	4	960	920	96%	250	4	1,160	1,150	99%	60
	NB	Second	1	330	320	97%	250	1	250	240	96%	250
	NB	Third	4	1,990	1,340	67%	4,060	4	2,030	1,480	73%	3,440
	NB	Fifth	2	640	650	102%	0	2	560	540	96%	250
	NB	Sixth	2	1,060	1,040	98%	250	2	1,060	1,050	99%	130
	NB	Seventh	3	1,780	1,840	103%	0	3	1,850	1,670	90%	1,500
	NB	Ninth	5	3,600	3,040	84%	2,800	5	3,410	2,790	82%	3,100
	NB	Eleventh	2	350	360	103%	0	2	360	370	103%	0
	NB	S. Van Ness	2	1,060	550	52%	6,380	2	1,040	490	47%	6,880
	EB	13th/Duboce	3	640	620	97%	170	3	640	650	102%	0
	NB	Mission @ Duboce	3	1,220	1,090	89%	1,080	3	1,220	1,100	90%	1,000
	WB	13th/Duboce/Off-Ramp	4	1,070	1,000	93%	440	4	1,050	980	93%	440
	NB	Valencia	2	450	490	109%	0	2	390	390	100%	0
	NB	Octavia	3	2,050	2,040	100%	80	3	2,050	2,040	100%	80

Notes

1 Demand served tends to fluctuate as a part of the model process. Any demand served percentage within 10 percentage points of 100 percent is considered fully served.

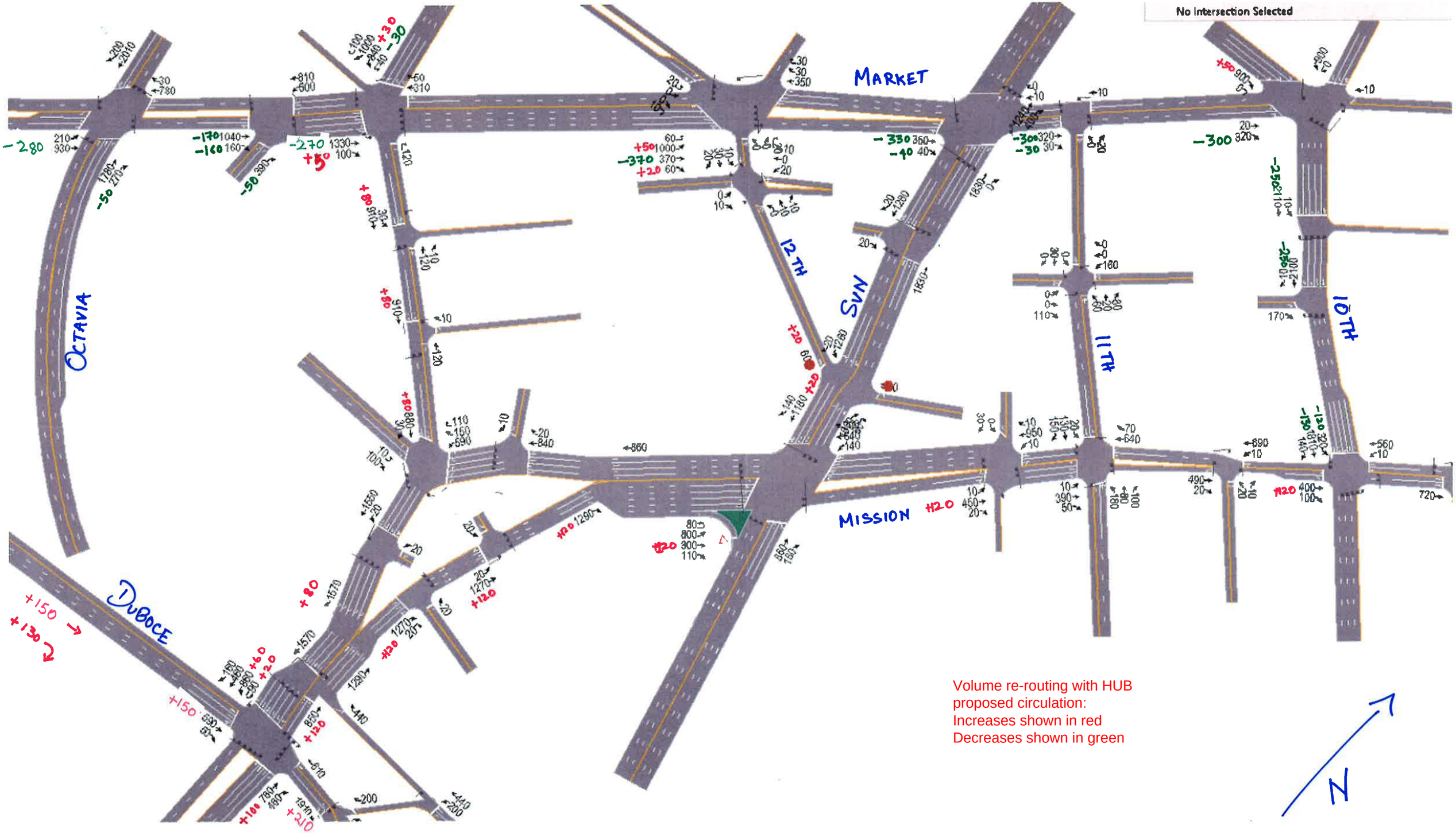
2 Queue length is calculated as a function of the number of cars in queue (i.e., number of vehicles not served), multiplied by an average vehicle length of 25 feet, and divided by the number of available lanes for queue storage.

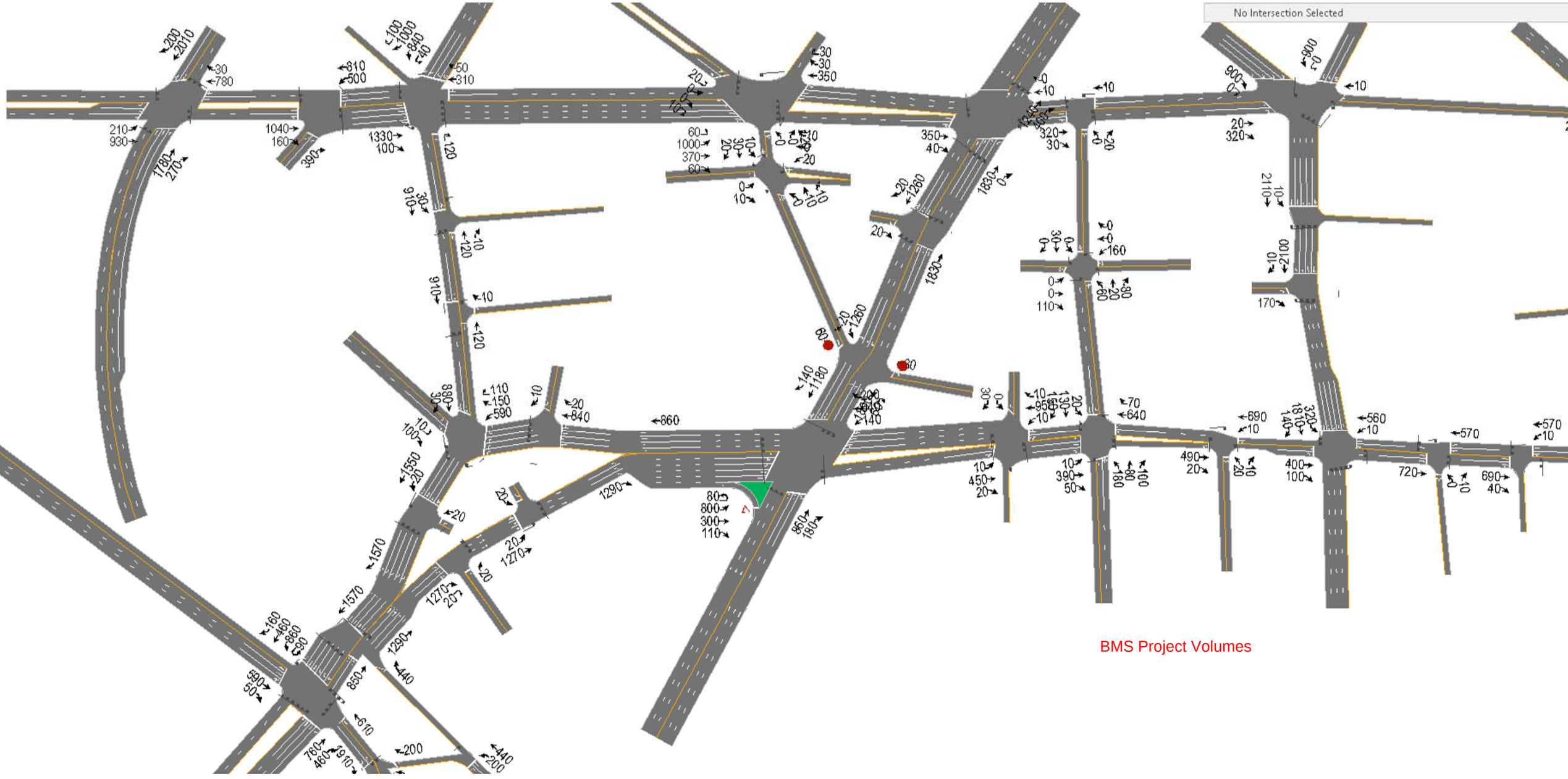
Attachment 7c: Western Variant Analysis

Western Variant redistribution of vehicle trips due to forced eastbound right-turn on 12th Street

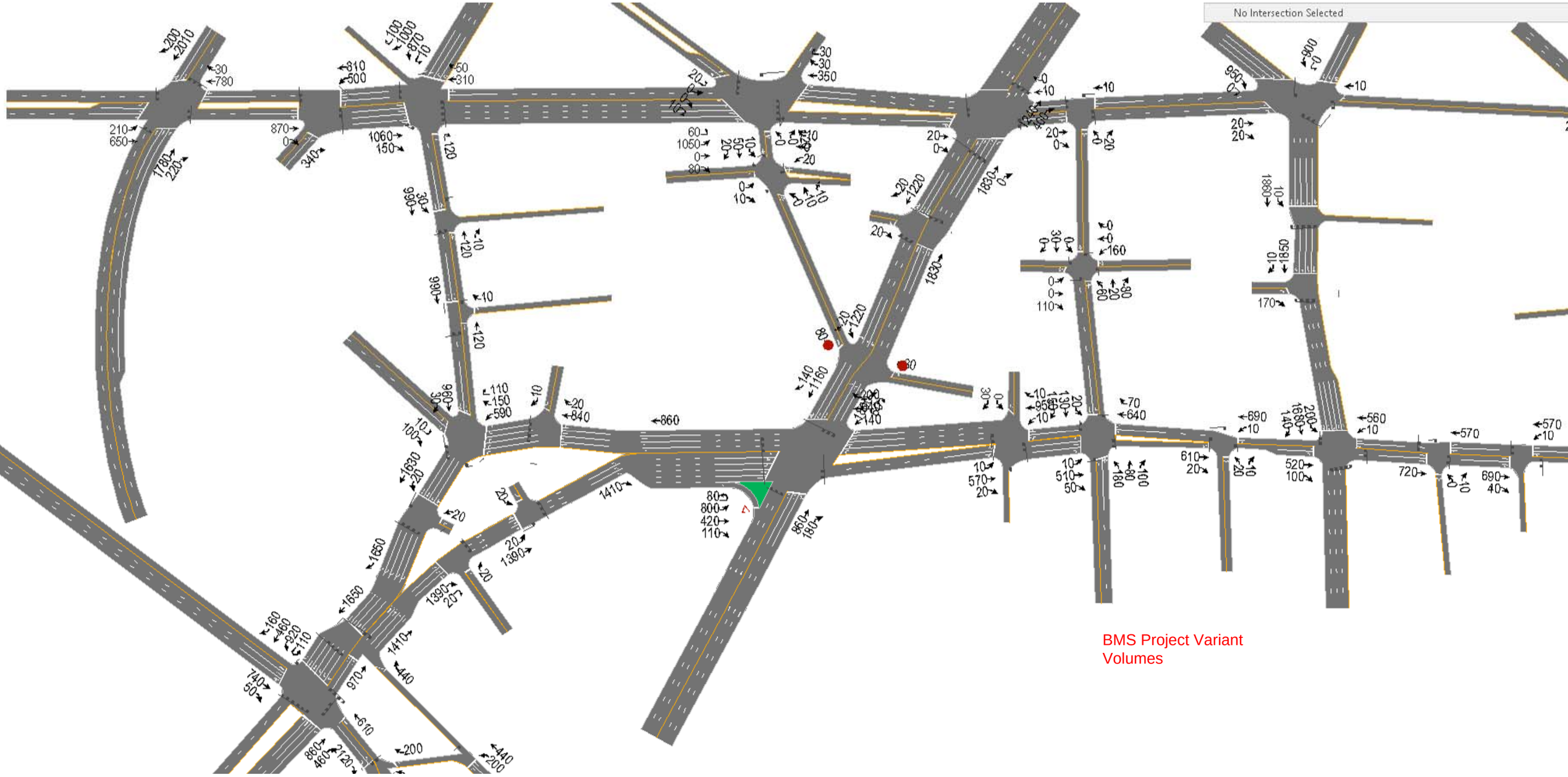
The following information is provided in this Attachment:

- Three maps of volume changes
- Meeting notes describing changes


No Intersection Selected
MARKET
OCTAVIA
12TH
SVN
11TH
10TH
MISSION
DUBOCE
Volume re-routing with HUB
proposed circulation:
Increases shown in red
Decreases shown in green
N



BMS Project Volumes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BMS Project Variant
Volumes

Better Market Street

12th Street BMS/Hub VISSIM Test Results Meeting Notes

February 8, 2018 – 3:00pm-4:00pm
Location: Fehr & Peers Office, 332 Pine Street 4th Floor, San Francisco, CA 94104

1. Discuss 12th Street BMS and Hub VISSIM Test results
    a. Review input changes to VISSIM test, including volume redistribution, roadway geometry, and land use assumptions [FP]

City agrees with 2020 volume redistribution, roadway geometry and land assumptions.

2040 assumptions were discussed briefly, as they related to the vehicle distribution of the three 12th Street projects in place (30 Otis, 1629 Market, 10 South Van Ness). These volumes will be a part of the 2040 qualitative conditions discussed below.

    b. Review preliminary draft results, including visual review of model and summary of changes to transit travel times along Market Street [FP]

No change to travel times on Market Street. Results show that 2020 conditions would not create any substantial change to transit conditions or most other modes (loading still TBD).

Loading on Project Variant – Ian Trout (MTA) mentioned that the Project Variant section on Market from Hayes to SVN would likely require freight/paratransit loading through flex zones in both directions. There was also the question of whether taxis would be allowed on this section. These uses are allowed for the rest of the length of the corridor in the curb lane, but this section is the only one with just one lane in each direction. Planning Department and MTA will meet to sort this out for the consulting team. This will not affect the VISSIM analysis, but will impact the rest of the EIR assessment.

Fehr & Peers to prepare additional scope of work to document 2020 conditions on Westbound Market Street associated with the proposed SBR restriction from Van Ness to Westbound Market, as follows:

- *Conduct new 2020 DTA run to determine the effects of incorporating the proposed SBR restriction from Van Ness to Westbound Market.*
- *We think that most of this traffic will go to Gough and Octavia, or go straight through on SVN to Otis. Confirm via DTA.*
- *Add queue lengths to VISSIM outputs for these locations for Project Variant.*
- *Qualitatively discuss changes on Hayes Street which includes 21 Hayes transit, and is the only potentially impacted transit line.*

Better Market Street

12th Street BMS/Hub VISSIM Test Results Meeting Notes

- *No VISSIM because this will improve things on WB Market, which we can describe qualitatively in the EIR. But will need to address this in report because Caltrans will be especially concerned with limiting vehicles off their street.*

Per follow up discussion between Fehr & Peers and EP (Wade and Manoj) on February 15th, 2040 conditions as they relate to the Project Variant would be discussed qualitatively. This qualitative discussion would cover conditions on Market and 12th Street with the addition of vehicles generated by the proposed 12th Street land uses. The combination of the Project Variant and the proposed land uses would not generate any new significant impacts as the Project Variant separates private vehicles from transit vehicles and bicycles on Market Street between 12th and Valencia Streets. Therefore, any vehicle queues turning right from eastbound Market Street to 12th Street would be contained within this storage area and would not create additional delay to transit vehicles or conflicts to bicycles. In the unlikely scenario that vehicle queues extend all the way back to block the F-Line west of Valencia, increased delay to the F-Line would be much smaller than the net gain the Project and Project Variant provide to the F-line along the rest of Market Street.

The City will continue to refine the design of 12th Street to improve accessibility to the proposed land uses along that street, such as a mini-roundabout to allow vehicles to turn around at Stevenson or Keep Clear Zone on South Van Ness to allow vehicles to exit. Additional VISSIM tests may be required in the future to assist with this planning portion of the project not associated with the CEQA/NEPA documents.

2. Strategize how the test results get wrapped into the BMS EIR
    a. How do Proposed Project versus new Project Variant compare? [FP]
    b. Information that will change and need to be presented separately (go through each mode) [FP/LCW]
    c. High-level schedule and budget impacts [FP/LCW]

This will be in the project variant in the EIR. Schedule changes to be finalized pending the review of the above 2020 items.

3. Next Steps

4. Summary and Action Item Review

Action Items – Schedule highlighted in bold

- *FP to prepare scope of work for the 2020 effort through the Hub. Draft scope will be discussed with City on 2/15 Hub conference call and delivered to City for review* ***on 2/16. City will need to review by 2/22.*** *The additional analysis will take approximately* ***2***

weeks from *authorization date. This will be incorporated into the EIR section at that time.*

- *Manoj (EP) to send spreadsheet showing what elements of project are included in Hub and which are in BMS.* ***Due 2/22.***
- *City Planning to prepare 12th Street traffic circle design as a part of the Hub.* ***Date TBD as not required for CEQA process.***
- *Matt (FP) and Luba to evaluate schedule impacts of Project Variant with ICF and transportation team.* ***Due by 2/22 BMS team check-in.***
- *EP/MTA to determine loading conditions for BMS Project Variant.* ***Due by 2/22 BMS team check-in.***

Western Variant redistribution of vehicle trips due to restricted southbound right-turn onto westbound Market Street

The following information is provided in this Attachment

- Write-up of effects of closing turn
- One map showing the volume changes

Analysis of Better Market Street Hub Variant – Part 2

3/8/18

This memorandum summarizes the traffic operational effects of restricting the southbound right turn at the intersection of Market Street and South Van Ness Avenue. The analysis is based on the year 2020 analysis prepared for the Better Market Streets project alternative scenario.

Traffic Volume Shifts

Figure 1 summarizes the estimated traffic volume shifts (during the PM peak hour) that would result from restricting the SBR movement. These shifts are based on the outputs and traffic patterns suggested by the DTA model run. They have been post-processed taking into account the volumes developed for the year 2020 Better Market Streets project alternative. Key traffic shifts include:

- Approximately 350 vph would shift from SBR at Market/Van Ness to SBR at Market/Gough.
- The reduced demand on Van Ness would allow for approximately 100 vph to shift from southbound 10th Street to southbound Van Ness.
- The DTA also suggests a shift of 50 vph that used the "jug handle" turn from northbound 9th Street to westbound Market Street via Hayes Street and Southbound Van Ness. With the southbound right turn from Van Ness to Market Street unavailable, these trips would shift to other routes outside of the study area.

Queue Length Results

Table 1 summarizes the updates to queue length estimates prepared as part of the Better Market Streets project alternative analysis. These queue length estimates are based on a deterministic approach that considers the "unserved" demand reported by the Vissim microsimulation model. The queue length estimates reflect the updated unserved demand due to the traffic volume shifts resulting from restricting the SBR movement at Market/Van Ness.

Table 1: Queue Length Estimates

Location	Queue Length (feet) (BMS Proposed Project)	Queue Length (feet) (Project Variant)	Difference (feet)
Southbound Van Ness	5,000	1,100	-3,900
Southbound Gough	2,200	4,400	+2,200

In summary, our assessment based on the DTA outputs is that restricting the southbound right turn at Market/Van Ness would result in nearly all of the right turning vehicles shifting to Gough Street. The queue lengths would decrease on Van Ness and increase on Gough Street. Gough Street has one additional lane (for private vehicles) in the southbound direction compared to Van Ness, hence the difference in queue lengths.

Impacts to Line 21

The DTA outputs suggest that there will be a slight decrease in vehicular demand on Hayes Street (in part due to the traffic volume shift on 9th Street). Therefore, there will be no impacts to Muni Line 21.

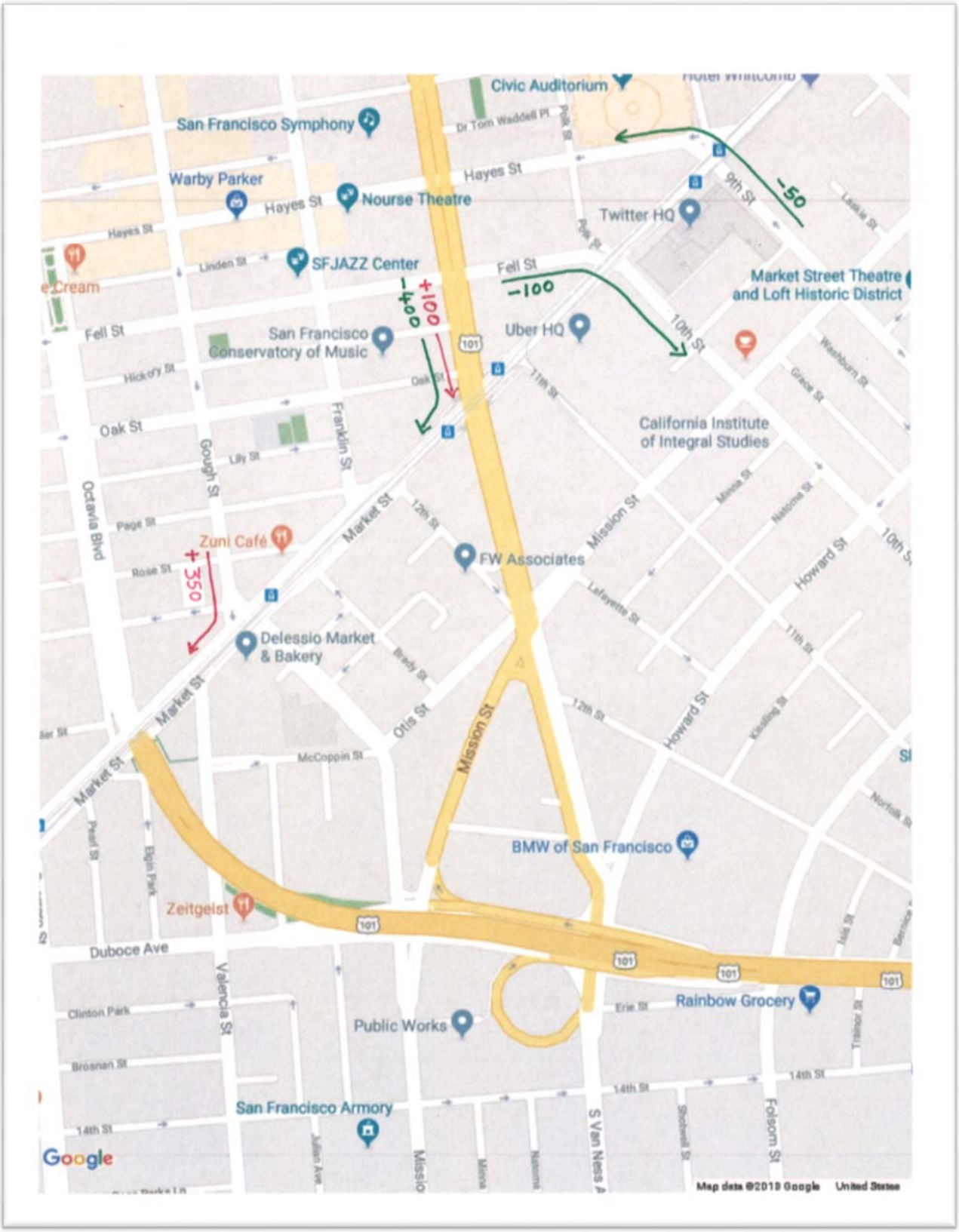


Figure 1: Traffic Volume Shifts Resulting from SBR Restriction at Market/Van Ness

Attachment 8: Pedestrian Analysis

Market Street Crosswalk Inventory: Existing Conditions and Proposed Project Improvements

Intersection	Existing Crosswalk Condition	Proposed Project Crosswalk Condition	Project Variant Crosswalk Condition[1]
Octavia Boulevard	Straight forward	No change	
Valencia Street	Missing crosswalk (crossing Market Street, east leg)	Longer crossing southwest leg. Shorter crossing Valencia south leg.	
Gough Street	Traffic island crosswalk (crossing Market)	Longer crossing, west leg. Shorter crossing, east leg.	
12th Street/Page Street/Franklin Street	Traffic island crosswalk (crossing Market Street)	Larger traffic island (Page / Franklin). East crosswalk removed.	Shorter east leg across Market
Van Ness Avenue	Straight forward	No change	Shorter crossing across Market
11th Street	Missing crosswalk (Market Street east and west)	New crosswalk, Market Street east leg	
10th Street	Straight forward	No change	Shorter crossing across Market
9th Street/Hayes Street/Larkin Street	Interrupted island crossing (crossing Hayes Street)	New direct crossing between Larkin and Hayes streets	
8th Street/Grove Street/Hyde Street	Straight forward	Longer crossing, east leg. New Hyde crosswalk.	
7th Street	Straight forward	Longer crossing, east and west legs	
Jones Street/ McAllister Street	Interrupted island crossing (crossing McAllister Street)	Smaller traffic island (northeast corner), pedestrian refuge, southeast corner). New east crosswalk across Market.	
Golden Gate Ave/Taylor Street/6th Street	Straight forward	Longer crossing, east and west legs. Shorter crossing south leg.	
Turk Street /Mason Street	Interrupted island crossing (crossing Turk Street)	Realigned straight forward crossing with modified traffic island	
Cyril Magnin Street/5th Street	Straight forward	Longer crossing, east and west legs. Shorter crossing, south leg	
Powell Street	Straight forward	Longer crossing; new midblock crossing	

Intersection	Existing Crosswalk Condition	Proposed Project Crosswalk Condition	Project Variant Crosswalk Condition[1]
Stockton Street/Ellis Street/4th Street	Straight forward	Longer crossing, east and west legs. Shorter crossing, north and south legs	
O'Farrell Street/Grant Avenue	Missing crosswalk (crossing Market Street east leg)	Missing crosswalk (east leg). Longer crossing, west leg. Shorter crossing, north leg	
Geary Street/Kearny Street/3rd Street	Interrupted island crossing (crossing Geary Street)	Interrupted island crossing. Longer crossing, east and west legs.	
Montgomery Street/New Montgomery Street	Straight forward	Longer crossing, east and west legs. Shorter crossing, north leg	
2nd Street	Straight forward	Longer crossing, east and west legs.	
Sutter Street / Sansome Street	Interrupted crossing (crossing Sutter Street), missing crosswalk (crossing Market Street east leg)	Longer crossing, north leg. Direct crossing across Sutter Street at Market Street (north crosswalk)	
Bush Street/Battery Street/1st Street	Island crossing (crossing Battery Street)	Island crossing removed. Longer crossing, east and west legs. Shorter crossing, south leg	
Front Street/Fremont Street	Straight forward	Longer crossing, east and west legs	
Pine Street/Davis Street/Beale Street	Straight forward	Longer crossing, west leg. Shorter crossing, north and south leg	
Drumm Street / Main Street	Straight forward	Shorter crossing, north leg. New crossing at east leg.	
Spear Street	Straight forward	No change	
Steuart Street	Straight forward	New signal	
Eddy Street / Mason Street (off-Market)	Straight forward.	Shorter crossings.	

1. Same as Proposed Project unless otherwise noted.

Market Street Curb Ramp Deficiency Inventory: Existing Conditions and Proposed Project Improvements

Intersection	Existing Curb Ramp Deficiency	Proposed Project Improvements
Page Street / Franklin Street /12th Street	Missing curb ramp across Market Street at southeast corner. Island on north side is not ADA accessible.	East crosswalk removed. Island improved to ADA standard.
9th Street/Hayes Street/Larkin Street	Incorrectly positioned EB and WB curb ramps at north Larkin crosswalk Missing NB curb ramp at west Hayes crosswalk	Correctly positioned EB and WB curb ramps aligned within the north Larkin crosswalk. New NB curb ramp at north Hayes crosswalk
Golden Gate Ave/Taylor Street/6th Street	Missing NB curb ramp at west Golden Gate crosswalk Missing WB curb ramp at Taylor crosswalk Non-compliant SB curb ramp at corner of Golden Gate / Taylor	New NB curb ramp at west Golden Gate crosswalk New WB curb ramp at Taylor crosswalk New directional curb ramps at corner of Golden Gate / Taylor
Turk Street /Mason Street	Missing SB curb ramp at Turk/Mason west crosswalk	New SB curb ramp at Turk/Mason west crosswalk
Geary Street/Kearny Street/3rd Street	Missing EB curb ramp at Kearny / Geary east crosswalk	New EB curb ramp at Kearny / Geary east crosswalk
2nd Street	Incorrectly positioned curb ramps at east Market crosswalk	Correctly positioned curb ramps aligned within the east Market crosswalk
Sutter Street / Sansome Street	Missing SB curb ramp at Sutter / Sansome west crosswalk	Missing SB curb ramp at Sutter / Sansome west crosswalk
Battery Street / Bush Street	Non-ADA compliant curb ramps at corners or missing curb ramps.	
Pine Street/Davis Street/Beale Street	Missing NB curb ramp at west Pine crosswalk	New NB curb ramp at west Pine crosswalk

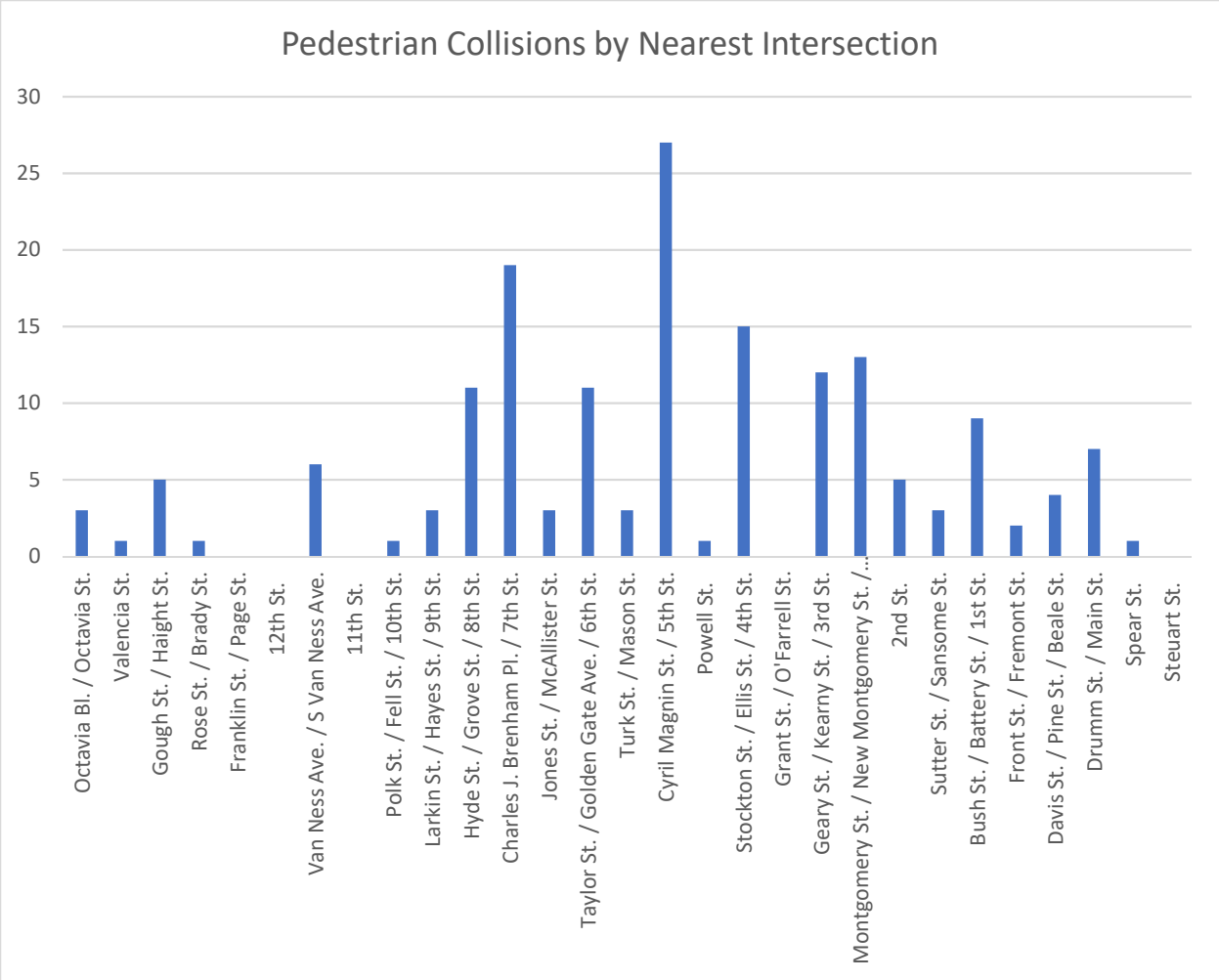
Source: Parisi Transportation Consulting, 2018.

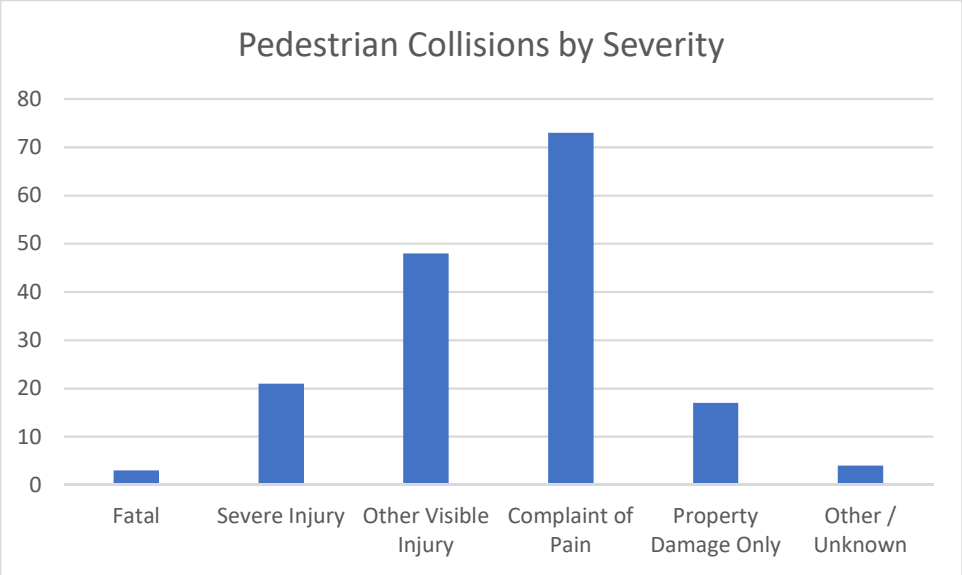
Market Street Pedestrian-Involved Collisions, January 2012-December 2016

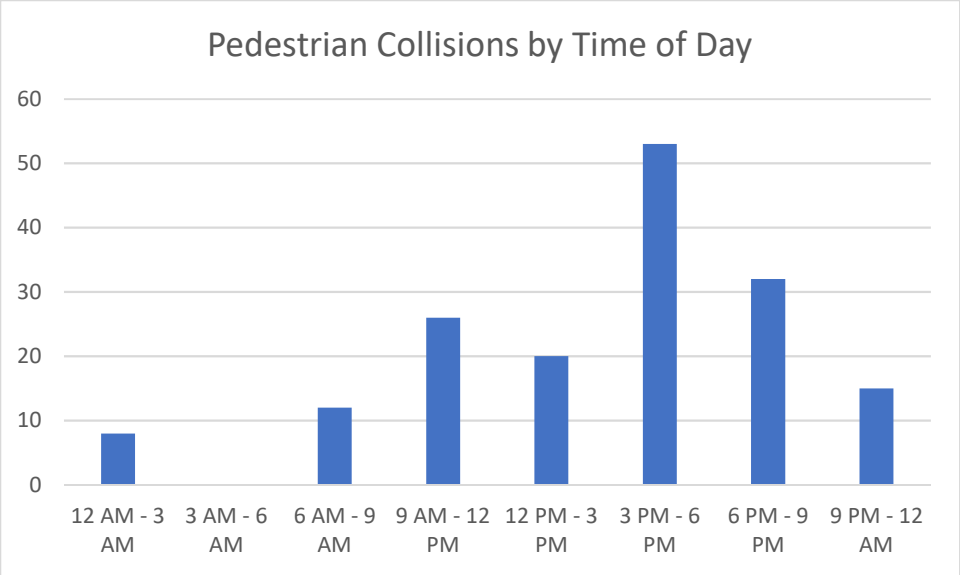
	Ped-Involved Crashes (includes Bikes)				Ped-Bike Crashes Only			
INTERSECTION	**I/S**	**Isl.**	**MB**	**Total**	**I/S**	**Isl.**	**MB**	**Total**
Steuart St.	0	--	0	0	0	--	0	0
Spear St.	1	--	0	1	0	--	0	0
Drumm St. / Main St.	4	--	3	7	1	--	0	1
Davis St. / Pine St. / Beale St.	2	--	2	4	0	--	0	0
Front St. / Fremont St.	1	--	1	2	1	--	0	1
Bush St. / Battery St. / 1st St.	5	4	0	9	0	0	0	0
Sutter St. / Sansome St.	2	--	1	3	0	--	0	0
2nd St.	5	0	0	5	0	0	0	0
Montgomery St. / New Montgomery St. / Post St.	9	4	0	13	0	1	0	1
Geary St. / Kearny St. / 3rd St.	7	3	2	12	3	0	1	4
Grant St. / O'Farrell St.	0	--	0	0	0	--	0	0
Stockton St. / Ellis St. / 4th St.	4	10	1	15	3	2	0	5
Powell St.	1	--	0	1	1	--	0	1
Cyril Magnin St. / 5th St.	18	8	1	27	4	2	0	6
Turk St. / Mason St.	2	--	1	3	0	--	0	0
Taylor St. / Golden Gate Ave. / 6th St.	8	3	0	11	2	0	0	2
Jones St. / McAllister St.	1	--	2	3	0	--	0	0
Charles J. Brenham Pl. / 7th St.	9	9	1	19	2	1	1	4
Hyde St. / Grove St. / 8th St.	6	2	3	11	1	0	1	2
Larkin St. / Hayes St. / 9th St.	2	1	0	3	0	0	0	0
Polk St. / Fell St. / 10th St.	1	--	0	1	0	--	0	0
11th St.	0	--	0	0	0	--	0	0
Van Ness Ave. / S Van Ness Ave.	3	3	0	6	0	0	0	0
12th St.	0	--	0	0	0	--	0	0
Franklin St. / Page St.	0	--	0	0	0	--	0	0
Rose St. / Brady St.	1	--	0	1	0	--	0	0
Gough St. / Haight St.	3	2	0	5	0	1	0	1
Valencia St.	1	0	0	1	1	0	0	1
Octavia Bl. / Octavia St.	3	--	0	3	0	--	0	0
TOTAL	**99**	**49**	**18**	**166**	**19**	**7**	**3**	**29**

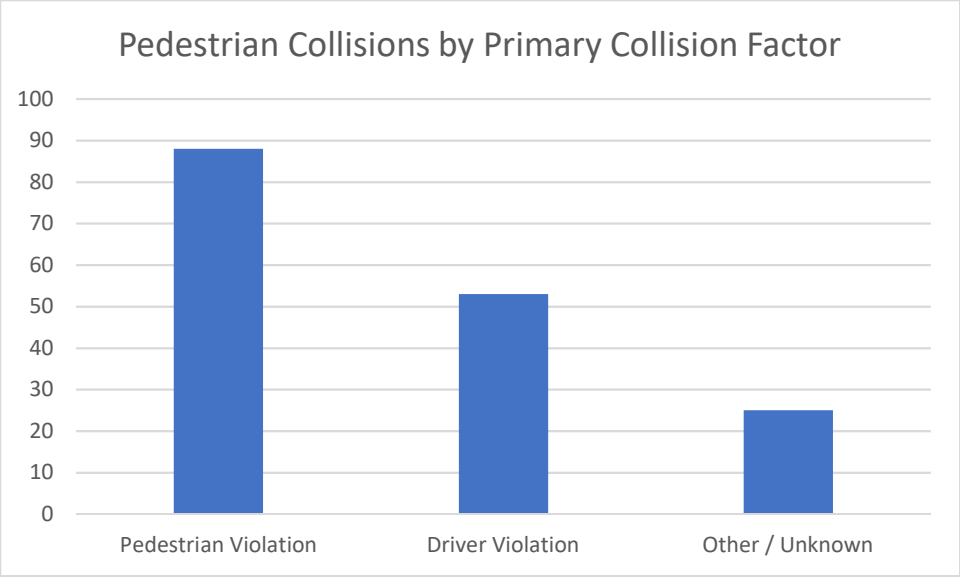
Source: City of San Francisco *Crossroads Collision Database* 2012-2016

Abbreviations: I/S – intersection, Isl. – Transit Island, MB - Midblock


Pedestrian Collisions by Nearest Intersection
30
25
20
15
10
5
0
Octavia Bl. / Octavia St.
Valencia St.
Gough St. / Haight St.
Rose St. / Brady St.
Franklin St. / Page St.
12th St.
Van Ness Ave. / S Van Ness Ave.
11th St.
Polk St. / Fell St. / 10th St.
Larkin St. / Hayes St. / 9th St.
Hyde St. / Grove St. / 8th St.
Charles J. Brenham Pl. / 7th St.
Jones St. / McAllister St.
Taylor St. / Golden Gate Ave. / 6th St.
Turk St. / Mason St.
Cyril Magnin St. / 5th St.
Powell St.
Stockton St. / Ellis St. / 4th St.
Grant St. / O'Farrell St.
Geary St. / Kearny St. / 3rd St.
Montgomery St. / New Montgomery St. /...
2nd St.
Sutter St. / Sansome St.
Bush St. / Battery St. / 1st St.
Front St. / Fremont St.
Davis St. / Pine St. / Beale St.
Drumm St. / Main St.
Spear St.
Steuart St.


Pedestrian Collisions by Severity
80
70
60
50
40
30
20
10
0
Fatal
Severe Injury
Other Visible Injury
Complaint of Pain
Property Damage Only
Other / Unknown


Pedestrian Collisions by Time of Day
60
50
40
30
20
10
0
12 AM - 3 AM
3 AM - 6 AM
6 AM - 9 AM
9 AM - 12 PM
12 PM - 3 PM
3 PM - 6 PM
6 PM - 9 PM
9 PM - 12 AM


Pedestrian Collisions by Primary Collision Factor
100
90
80
70
60
50
40
30
20
10
0
Pedestrian Violation
Driver Violation
Other / Unknown

Pedestrian Sidewalk LOS (Pinch Points) – 2020 Baseline & Baseline plus Project PM Peak Hour Conditions

Side of Street & Segment	Pedest-rians (Hourly)	2020 Baseline			2020 Baseline plus Project		
		Effective Sidewalk Width (ft)[1]	Density Ped/Min/Ft[2]	LOS	Effective Sidewalk Width (ft)[1]	Density Ped/Min/Ft[2]	LOS
North Side							
Drumm to Steuart	3,836	32	2.0	B	16	4.0	C
Montgomery to Sutter	4,008	13	5.1	C	7.5	8.9	D
5th to Ellis	3,242	11.5	4.7	C	8.5	6.4	D
Larkin to Grove	1,474	18.5	1.3	B	15	1.6	B
South Side							
Fremont to Beale	4,518	12	6.3	D	12	6.3	D
New Montgomery to 2nd	4,028	19	3.5	C	17	3.9	C
5th to 4th	5,112	11.5	7.4	D	11.5	7.4	D
8th to 7th	1,928	11	2.9	B	6.5	4.9	C
Valencia to Gough	776	9	1.4	B	5	2.6	B
Valencia to Gough (project variant)	776	--	--	--	5	2.6	B

1. "Effective width" equals sidewalk pinch point width minus four feet of walkable area due to street furniture and a two-foot shy distance from buildings.
2. Pedestrians per minute per foot of sidewalk width

Pedestrian Sidewalk LOS (Pinch Points) – 2040 Cumulative, Cumulative plus Project PM Peak Hour Conditions

Side of Street & Segment	Pedestrians (Hourly)	2040 Cumulative			2040 Cumulative plus Project		
		Effective Sidewalk Width (ft)[1]	Density Ped/Min/Ft[2]	LOS	Effective Sidewalk Width (ft)[1]	Density Ped/Min/Ft[2]	LOS
North Side							
Drumm to Steuart	4,660	32	2.4	B	16	4.9	C
Montgomery to Sutter	4,869	13	6.2	D	7.5	10.8	D
5th to Ellis	3,938	11.5	5.7	C	8.5	7.7	D
Larkin to Grove	1,791	18.5	1.6	B	15	2.0	B
South Side							
Fremont to Beale	5,489	12	7.6	D	12	7.6	D
New Montgomery to 2nd	4,893	19	4.3	C	17	4.8	C
5th to 4th	6,210	11.5	9.0	D	11.5	9.0	D
8th to 7th	2,342	11	3.5	C	6.5	6.0	D
Valencia to Gough	943	9	1.7	B	5	3.1	C
Valencia to Gough (project variant)	943	--	--	--	5	3.1	C

1. "Effective width" equals pinch point sidewalk width minus four feet of walkable area due to street furniture and a two-foot shy distance from buildings.
2. Pedestrians per minute per foot of sidewalk width

Attachment 9: Bicycle Analysis

Bicycle Facility Inventory, Roadway Segments

From	To	Length (feet)	Existing Bicycle Facility	Proposed Project Bicycle Facility
Market Street – Inbound (Eastbound)				
Octavia Blvd. / US 101	Gough Street	610	Shared lane	Separated bikeway
Gough Street	8th Street	2,940	Enhanced bike lane	Bike lane from 12th to South Van Ness; Separated bikeway all other segments Project variant: Separated bikeway all segments.
8th Street	Steuart Street	8,150	Shared lane	Separated bikeway
Market Street – Outbound (Westbound)				
Steuart Street	8th Street	8,150	Shared lane	Separated bikeway
8th Street	Van Ness Avenue	1,850	Enhanced bike lane	Bike lane from 11th to South Van Ness; Separated bikeway all other segments
Van Ness Avenue	Valencia Street	1,390	Bike lane (simple)	Bike lane from Rose to Gough; Separated bikeway all other segments Project variant: Bike lane from Rose to Gough; separated bikeway all other segments
Valencia Street	Octavia Boulevard / US 101	310	Enhanced bike lane	Separated bikeway

Source: Parisi Transportation Consulting, 2018.

Bicycle Facility Inventory, Intersections

Intersection	Existing Bicycle Crossing Treatment	Proposed Project Bicycle Crossing Treatment
Octavia Boulevard	Outbound and inbound crossing markings and barriers	Leading bicycle interval (LBI)
Valencia Street	Outbound left turn pocket and markings	Crossing markings; raised bicycle channel (NB Valencia turning right onto Market).
Gough Street	Outbound bike box, inbound shared lane markings	Crossing markings. Dedicated bicycle signal phase.
12th Street/Page Street/Franklin Street	Outbound crossing markings.	Crossing markings
Van Ness Avenue	Outbound and inbound bike boxes	Crossing markings. Leading bicycle interval (LBI)
11th Street	Inbound crossing markings.	Outbound left turn channel onto 11th. Crossing markings for bicycles to/from 11th crossing Market Street. Project variant: Crossing channel for westbound bicycles east of Van Ness Avenue to southbound 11th Street. Northbound 11th Street bicycles not permitted to turn onto westbound Market Street.
10th Street	Painted two-stage left turn bike box inbound Market onto NB Polk, inbound crossing markings.	Raised two-stage left turn bike box onto NB Polk, crossing markings
9th Street/Hayes Street/Larkin Street	Outbound and inbound Market bike boxes	Crossing markings. Leading bicycle interval (LBI)
8th Street/Grove Street/Hyde Street	Painted two-stage left turn bike box: outbound Market onto SB 8th, SB Grove onto inbound Market.	Painted two-stage left turn bike box: outbound onto SB 8th, SB Grove onto inbound Market, inbound Market onto NB Grove. Left turn channel, NB Hyde onto NB Grove. Leading bicycle interval (LBI)
7th Street	Painted two-stage left turn bike box: NB 7th onto outbound Market.	Painted two-stage left turn bike box: inbound Market to NB Charles J. Brenham.
Jones Street/ McAllister Street	Outbound and inbound crossing markings	Channel and crossing markings, SB Jones / McAllister to inbound Market. Dedicated bicycle signal phase.
Golden Gate Ave/Taylor Street/6th Street	Inbound crossing markings, painted two-stage left turn bike box: SB Golden Gate onto inbound Market.	Crossing markings, painted two-stage left turn bike box: SB Golden Gate onto inbound Market, NB 6th onto outbound Market. Leading bicycle interval (LBI)
Turk Street /Mason Street	No treatments	Crossing markings, outbound Market. Leading bicycle interval (LBI)

Intersection	Existing Bicycle Crossing Treatment	Proposed Project Bicycle Crossing Treatment
Cyril Magnin Street/5th Street	No treatments	Painted two-stage left turn bike box: NB 5th onto outbound Market, outbound Market onto SB 5th. Crossing markings. Leading bicycle interval (LBI).
Powell Street	No treatments	No treatments
Stockton Street/Ellis Street/4th Street	No treatments	Crossing markings. Inbound Market channel. Leading bicycle interval (LBI).
O'Farrell Street/Grant Avenue	Inbound crossing markings.	Outbound crossing markings.
Geary Street/Kearny Street/3rd Street	No treatments	Crossing markings.
Montgomery Street/New Montgomery Street	No treatments	Crossing markings. Outbound Market channel. Leading bicycle interval (LBI).
2nd Street	NB 2nd Street bike box.	Crossing markings. Raised two-stage left turn bike box, outbound Market to SB 2nd. Leading bicycle interval (LBI).
Sutter Street / Sansome Street	No treatment.	Outbound crossing markings. Raised two-stage left turn bike box, inbound Market to NB Sansome. Leading bicycle interval (LBI).
Bush Street/Battery Street/1st Street	No treatment.	Crossing markings. Dedicated bicycle signal phase.
Front Street/Fremont Street	No treatment.	Crossing markings. Leading bicycle interval (LBI).
Pine Street/Davis Street/Beale Street	No treatment.	Crossing markings. Painted two-stage left turn bike box, inbound Market to NB Pine. Dedicated bicycle signal phase.
Drumm Street / Main Street	No treatment.	Crossing markings. Leading bike interval
Spear Street	No treatment.	Dedicated bicycle signal phase and crossing markings.
Steuart Street	No treatment.	Dedicated bicycle signal phase and crossing markings.

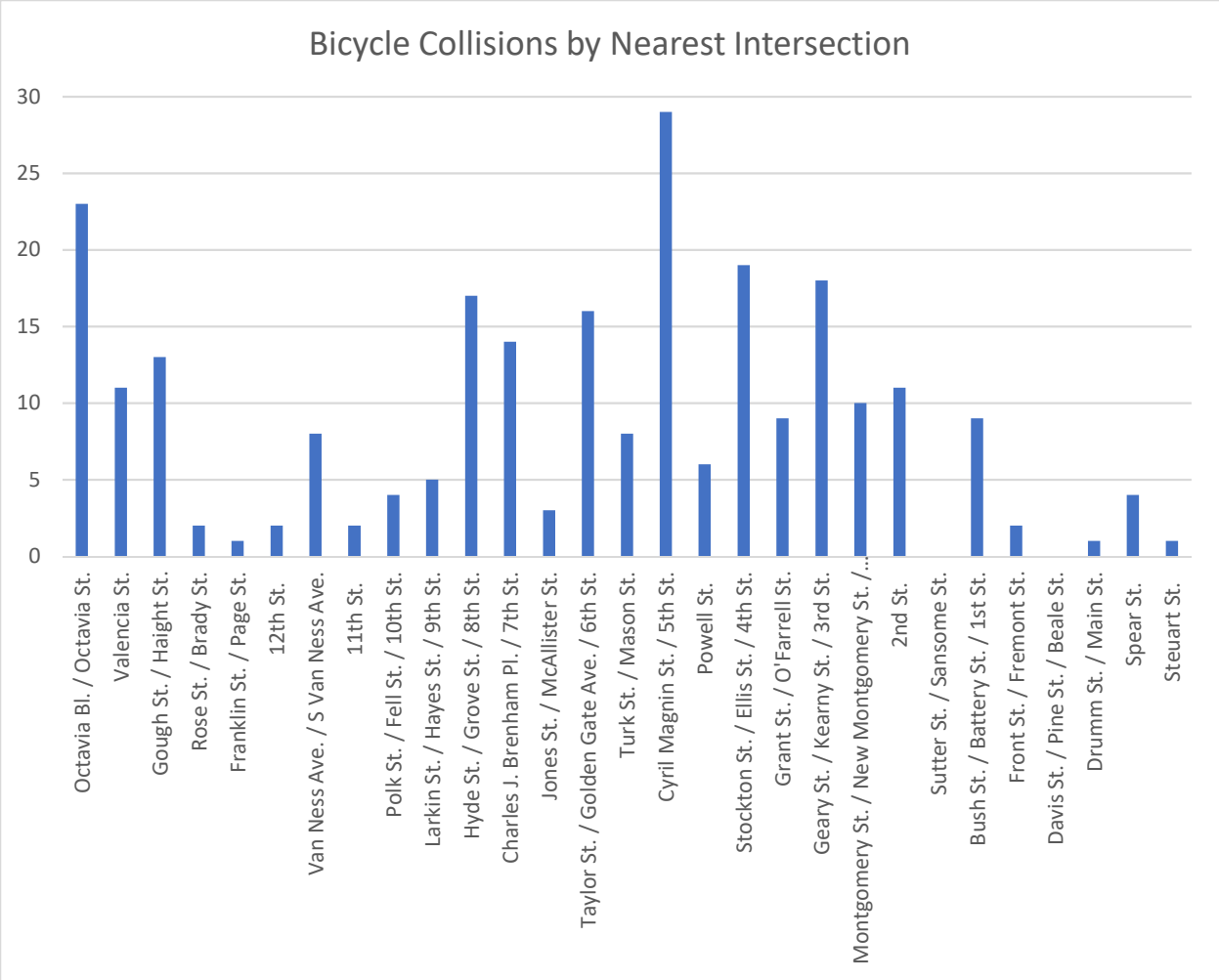
Source: Parisi Transportation Consulting, 2018.

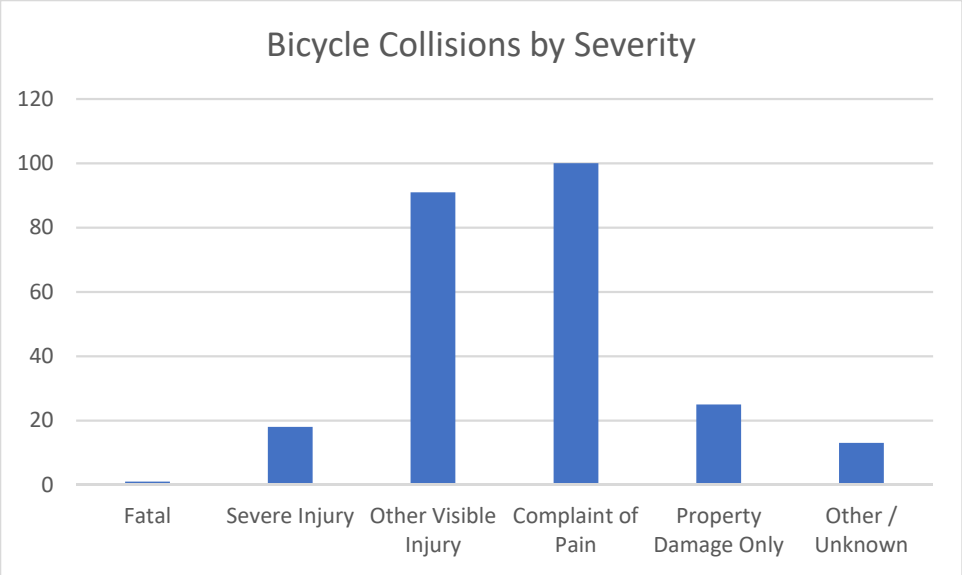
Market Street Bicycle-Involved Collisions, January 2012-December 2016

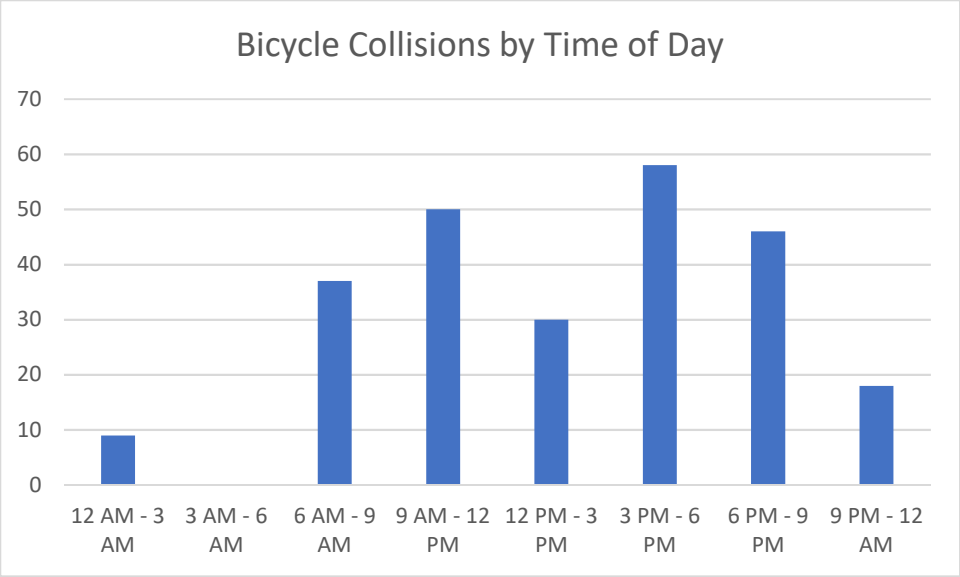
	Bike-Involved Crashes (includes Peds)				Ped-Bike Crashes Only			
INTERSECTION	**I/S**	**Isl.**	**MB**	**Total**	**I/S**	**Isl.**	**MB**	**Total**
Steuart St.	0	--	1	1	0	--	0	0
Spear St.	2	--	2	4	0	--	0	0
Drumm St. / Main St.	1	--	0	1	1	--	0	1
Davis St. / Pine St. / Beale St.	0	--	0	0	0	--	0	0
Front St. / Fremont St.	2	--	0	2	1	--	0	1
Bush St. / Battery St. / 1st St.	1	4	4	9	0	0	0	0
Sutter St. / Sansome St.	0	--	0	0	0	--	0	0
2nd St.	7	4	0	11	0	0	0	0
Montgomery St. / New Montgomery St. / Post St.	2	6	2	10	0	1	0	1
Geary St. / Kearny St. / 3rd St.	6	4	8	18	3	0	1	4
Grant St. / O'Farrell St.	5	--	4	9	0	--	0	0
Stockton St. / Ellis St. / 4th St.	10	7	2	19	3	2	0	5
Powell St.	4	--	2	6	1	--	0	1
Cyril Magnin St. / 5th St.	17	7	5	29	4	2	0	6
Turk St. / Mason St.	7	--	1	8	0	--	0	0
Taylor St. / Golden Gate Ave. / 6th St.	9	5	2	16	2	0	0	2
Jones St. / McAllister St.	3	--	0	3	0	--	0	0
Charles J. Brenham Pl. / 7th St.	6	3	5	14	2	1	1	4
Hyde St. / Grove St. / 8th St.	7	3	7	17	1	0	1	2
Larkin St. / Hayes St. / 9th St.	4	1	0	5	0	0	0	0
Polk St. / Fell St. / 10th St.	2	--	2	4	0	--	0	0
11th St.	1	--	1	2	0	--	0	0
Van Ness Ave. / S Van Ness Ave.	7	0	1	8	0	0	0	0
12th St.	2	--	0	2	0	--	0	0
Franklin St. / Page St.	1	--	0	1	0	--	0	0
Rose St. / Brady St.	0	--	2	2	0	--	0	0
Gough St. / Haight St.	9	4	0	13	0	1	0	1
Valencia St.	10	1	0	11	1	0	0	1
Octavia Bl. / Octavia St.	19	--	4	23	0	--	0	0
TOTAL	**144**	**49**	**55**	**248**	**19**	**7**	**3**	**29**

Source: City of San Francisco *Crossroads Collision Database* 2012-2016

Abbreviations: I/S – intersection, Isl. – Transit Island, MB - Midblock


Bicycle Collisions by Nearest Intersection
30
25
20
15
10
5
0
Octavia Bl. / Octavia St.
Valencia St.
Gough St. / Haight St.
Rose St. / Brady St.
Franklin St. / Page St.
12th St.
Van Ness Ave. / S Van Ness Ave.
11th St.
Polk St. / Fell St. / 10th St.
Larkin St. / Hayes St. / 9th St.
Hyde St. / Grove St. / 8th St.
Charles J. Brenham Pl. / 7th St.
Jones St. / McAllister St.
Taylor St. / Golden Gate Ave. / 6th St.
Turk St. / Mason St.
Cyril Magnin St. / 5th St.
Powell St.
Stockton St. / Ellis St. / 4th St.
Grant St. / O'Farrell St.
Geary St. / Kearny St. / 3rd St.
Montgomery St. / New Montgomery St. /...
2nd St.
Sutter St. / Sansome St.
Bush St. / Battery St. / 1st St.
Front St. / Fremont St.
Davis St. / Pine St. / Beale St.
Drumm St. / Main St.
Spear St.
Steuart St.


Bicycle Collisions by Severity
120
100
80
60
40
20
0
Fatal
Severe Injury
Other Visible Injury
Complaint of Pain
Property Damage Only
Other / Unknown


Bicycle Collisions by Time of Day
70
60
50
40
30
20
10
0
12 AM - 3 AM
3 AM - 6 AM
6 AM - 9 AM
9 AM - 12 PM
12 PM - 3 PM
3 PM - 6 PM
6 PM - 9 PM
9 PM - 12 AM

Bicycle Rack Inventory

Market Street - South Side			Market Street – North Side		
From	**To**	**Racks**	**From**	**To**	**Racks**
Octavia Boulevard / US 101	Valencia Street	2	Octavia Boulevard / US 101	Gough / Haight Street	7
Valencia Street	Gough Street	2	Gough / Haight Street	Rose Street	4
Gough Street	12th Street	3	Rose Street	Page / Franklin Street	4
12th Street	S. Van Ness Avenue	3	Page / Franklin Street	Van Ness Avenue	3
S. Van Ness Avenue	11th Street	1	Van Ness Avenue	Polk / Fell Street	5
11th Street	10th Street	3	Polk / Fell Street	Larkin / Hayes Street	5
10th Street	9th Street	4	Larkin / Hayes Street	Hyde Street	14
9th Street	8th Street	1	Hyde Street	Charles J. Brenham Street	11
8th Street	7th Street	11	Charles J. Brenham Street	Jones Street	1
7th Street	6th Street	11	Jones Street	Golden Gate / Taylor Street	5
6th Street	5th Street	6	Golden Gate / Taylor Street	Mason / Turk Street	9
5th Street	4th Street	9	Mason / Turk Street	Cyril Magnin Street	2
4th Street	3rd Street	10	Cyril Magnin Street	Stockton Street	2
3rd Street	New Montgomery Street	4	Stockton Street	O'Farrell Street	2
New Montgomery Street	2nd Street	2	O'Farrell Street	Kearny Street	3
2nd Street	Sutter Street	11	Kearny Street	Montgomery Street	3
Sutter Street	1st Street	3	Montgomery Street	Sutter Street	5
1st Street	Fremont Street	0	Sutter Street	Battery Street	1
Fremont Street	Beale Street	1	Battery Street	Front Street	0
Beale Street	Main Street	0	Front Street	Davis Street	1
Main Street	Spear Street	0	Davis Street	Drumm Street	0
Spear Street	Steuart Street	5	Drumm Street	Steuart Street	0
	Total	**116**		**Total**	**75**

Source: Parisi Transportation Consulting, 2017.

*One rack equals two bicycle parking spaces

Bay Area Bike Share Inventory

Location	Bike Share Positions (Docking Spaces)
Market Street north, between Rose and Page Streets	34
Market Street south, between S Van Ness Ave and Eleventh Street	27
Market Street south, between Tenth and Ninth Streets	26
Market Street south, between Seventh and Sixth Streets	22
Market Street north, between Turk and Fifth Streets	19
Market Street south, between Fourth and Third Streets	35
Market Street south, between Second and First Streets	36
Market Street north, between Bush and Fremont Streets	23
Market Street south, between Beale and Main Streets	27
Steuart at Market Street	22
Total	**271**

Source: Parisi Transportation Consulting, 2017.

APPENDIX 8: NOISE AND VIBRATION MODELING MATERIALS

APPENDICES

Noise

Appendix 1: Noise Monitoring Results

Appendix 2: Noise Modeling Assumptions

Appendix 3: Traffic Noise Modeling Results

Appendix 4: Construction Equipment

Vibration

Appendix 5: MTA Market Street Streetcar Vibration

Appendix 6: Buffer Differences for Building Damage from Vibration

Appendix 1: Noise Monitoring Results

Field Noise Survey

The project corridor is in a densely developed urban area consisting almost entirely of mid- to high-rise structures. The present noise environment is largely controlled by surface transportation noise consisting of bus, auto and truck traffic, as well as fixed-guideway electric streetcar operations.

A noise measurement survey was performed for the dual purpose of characterizing the existing noise environment along Market Street and providing data to validate the transportation noise modeling. This survey consisted of:

1. Attended and unattended noise level monitoring of the prevailing ambient noise along the project corridor, and
2. Measurements of passby[1] noise from individual historic rail cars operating along the SFMTA F-line on Market Street.

Noise Monitoring Results

Noise monitoring was performed between April 30 and May 1, 2018, at four long-term and nine short-term measurement locations. Table 1 provides locations and descriptions of the sites. Locations were selected following a walking soundscape survey of Market Street and were chosen to provide both uniform spatial coverage and to capture the range of noise exposure along the project corridor.

TABLE 1: NOISE MONITORING LOCATIONS

Site ID	Site Location	Latitude	Longitude	Primary Noise Source(s)
Long-term Measurements (24 hours)				
LT-1	Between Brady and 12th Streets, south side	37.7740	-122.4206	Streetcars and traffic
LT-2	Between 7th and 8th Streets, on UN Plaza	37.7801	-122.4142	Traffic on side streets
LT-3	Between Montgomery and Kearny Streets, north side	37.7885	-122.4026	Streetcars and traffic
LT-4	Between Spear and Steuart Streets, south side	37.7942	-122.3951	Streetcars and traffic
Short-term Measurements (20–30 minutes)				
ST-1	Market Street at 11th Street, north side	37.7757	-122.4188	Streetcars and traffic
ST-2	S/W corner, 10th and Market Streets	37.7764	-122.4175	Streetcars and traffic
ST-3	N/W corner of McAllister and Jones Streets	37.7812	-122.4122	Streetcars and traffic
ST-4	East side of Hallidie Plaza	37.7845	-122.4079	Streetcars and traffic
ST-5	S/W corner of Market Street and Yerba Buena	37.7862	-122.4050	Streetcars and traffic
ST-6	Yerba Buena, 300 feet from Market Street	37.7856	-122.4042	Traffic on side streets
ST-7	Yerba Buena, south side of Mission Street	37.7850	-122.4035	Traffic on side streets
ST-8	North side of Market Street, 100 feet east of 2nd Street	37.7896	-122.4012	Streetcars and traffic
ST-9	Between Fremont and 1st Streets, south side	37.7914	-122.3985	Streetcars and traffic

[1] *Passby* is the noise or vibration from a single vehicle in motion (approaching, passing by, or receding) that is observed to be audible above ambient levels. Noise or vibration levels from passbys are often expressed in terms of sound exposure level and L_{max}.

Site ID	Site Location	Latitude	Longitude	Primary Noise Source(s)
Streetcar Passby Noise Measurements				
TR-1A	Southeast corner of Castro and Market Streets	37.7626	-122.4349	Streetcar curve squeal
TR-1B	S/E corner of Market and Noe Streets	37.7642	-122.4330	Streetcar curve squeal
TR-1C	Corner of Market and Steuart Streets	37.7946	-122.3948	Streetcar curve squeal
TR-2	S/W corner of Market and 12th Streets	37.7741	-122.4204	Streetcars, tangent track over asphalt
TR-3A	N/E corner of Market Street and Van Ness Avenue	37.7755	-122.4190	Streetcars, tangent track over asphalt
TR-3B	Market between Van Ness Avenue and 10th Street, north side	37.7759	-122.4186	Streetcars, tangent track over asphalt
TR-4	Market between 9th and 10th Streets, north side	37.7771	-122.4171	Streetcars, tangent track over asphalt
TR-5A	N/W corner of Market Street and Charles J. Brenham Place	37.7803	-122.4130	Streetcars, tangent track over BART grates
TR-5B	Market Street at Powell Street, south side	37.7847	-122.4071	Streetcars, tangent track over BART grates
TR-5C	N/W corner of Market and Montgomery Street	37.7886	-122.4025	Streetcars, tangent track over BART grates

The unattended noise monitors ("long-term" in the table) were mounted on existing utility poles, at an approximate height of 10 feet. The attended ("short-term") measurements were made using portable sound level meters, mounted on tripods and set at ear height.

The short-term measurements provided supporting detail about the existing noise environment and served as "infill" measurements to complement the long-term monitoring results. The long-term measurements each covered a 24-hour period, and short-term measurements were either 20 or 30 minutes in duration. The daily noise levels are summarized in Table 2. Two sets of daily metrics are reported:

1. Calculated using hourly L_{eq} values. These give the conventional, overall daily average levels.
2. Calculated using hourly L_{50} values. These exclude the influence of transient noise events were used a proxy for the traffic noise contribution to the overall level.

Measured noise levels along Market Street were fairly uniform, with L_{dn} values at the four long-term monitoring sites ranging from 73 to 77 dBA. L_{dn} values at the short-term locations[2] ranged from 69 dBA to 77 dBA. The hour-by-hour variation in level covered a range of 9-14 dB depending on the location. Figure 1 shows measured hourly average noise level values at each of the long-term sites. At three of the four sites, the hourly average noise levels remained above 70 dBA for the majority of the day. (Site 2 was the expected exception to this, being located 230 feet from the Market Street centerline *vs*. about 45 feet for the other monitoring locations).

[2] Daily metrics at the short-term positions were inferred by adjusting the nearest long-term level by the difference between the short-term level and the corresponding HNL at that long-term site.

TABLE 2: SUMMARY OF LONG- AND SHORT-TERM NOISE MONITORING

Site ID	Calculated Using Hourly L_{eq} Levels				Calculated Using Hourly L_{50} Levels			
	$L_{eq}(24)$	Peak Hr	L_{dn}	CNEL	$L_{eq}(24)$	Peak Hr	L_{dn}	CNEL
Long-Term (24 hr) Levels (Measured)								
LT-1	70.8	78.3	75.1	75.6	66.9	70.2	71.5	71.9
LT-2	67.0	74.3	72.9	73.1	64.1	68.9	71.0	71.1
LT-3	71.9	75.2	77.0	77.5	68.7	71.4	73.0	73.4
LT-4	70.2	73.1	74.7	75.0	68.3	71.2	72.3	72.7
Short-term Levels (Inferred)								
ST-1	67.8	75.2	72.0	72.5	64.2	67.5	68.8	69.2
ST-2	69.5	77.0	73.7	74.3	66.4	69.7	71.0	71.4
ST-3	65.0	72.5	69.3	69.8	68.9	72.2	73.5	73.9
ST-4	70.6	73.9	75.7	76.2	65.8	68.5	70.1	70.5
ST-5	70.6	73.9	75.7	76.2	68.3	71.0	72.6	73.0
ST-6	65.3	68.6	70.4	70.9	63.2	65.9	67.5	67.9
ST-7	63.7	66.9	68.8	69.3	60.2	62.9	64.5	64.9
ST-8	70.4	73.7	75.5	76.0	66.5	69.2	70.8	71.2
ST-9	72.5	75.4	77.0	77.3	65.8	68.7	69.8	70.2

FIGURE 1: HOURLY NOISE LEVELS AT LONG-TERM SITES

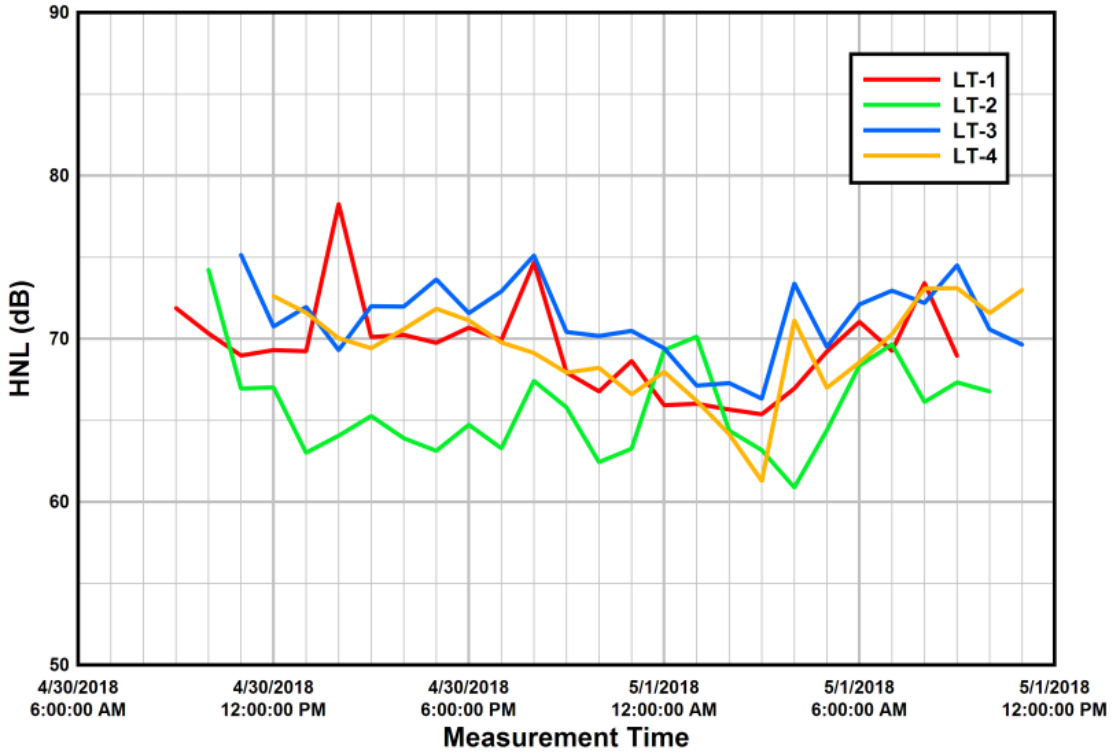


Figure 2 and Figure 3 show the L_{eq} and L_{50} noise levels respectively for just the Market Street locations (i.e., excluding LT-2, ST-6, and ST-7). The diurnal variation in L_{eq} is discernable but not particularly pronounced: hourly noise levels almost never fell below 65 dBA. Examining the L_{50} levels[3] (Figure 3), the results are more uniform. Even here, the levels fall below 65 dBA for just six to eight hours during the late evening/early morning hours.

FIGURE 2: MARKET STREET L_{EQ} LEVELS AT LONG- AND SHORT-TERM MEASUREMENT SITES

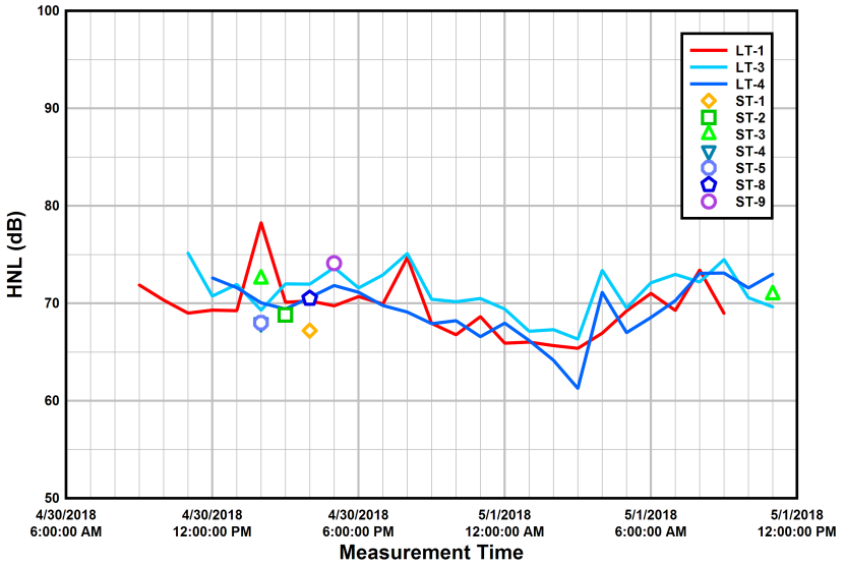
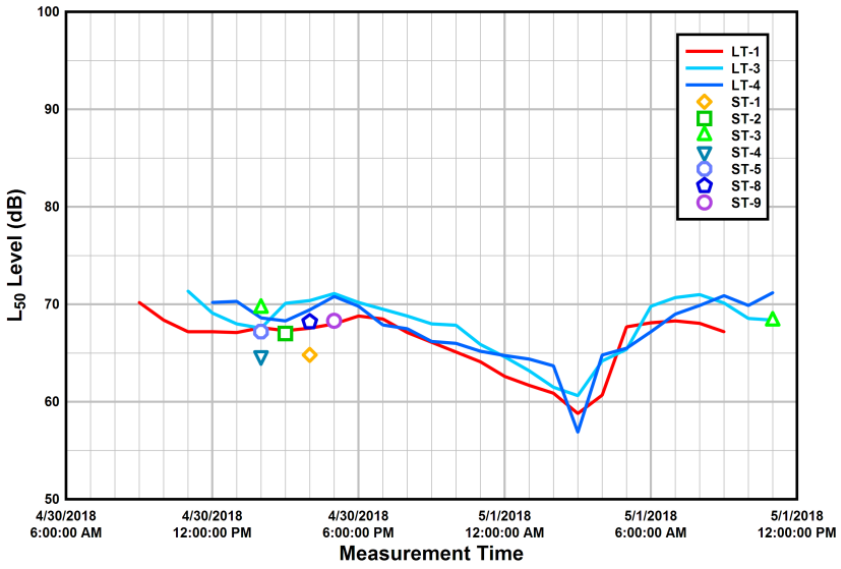


FIGURE 3: MARKET STREET L_{50} LEVELS AT LONG- AND SHORT-TERM MEASUREMENT SITES



[3] The L_{50} levels reflect the influence of relatively continuous and/or spatially distributed contributors such as traffic noise and exclude more transient elements such as horns and sirens. For this reason, L_{50} levels were used in validating the baseline Market Street noise model

Streetcar Passby Noise Measurements

Streetcar passby measurements were performed on April 19, 2018, using the in-service historic F-line cars. By prior arrangement, these included a sampling of "Milan" streetcars, considered by SFMTA staff to be among the noisier vehicles in their inventory. A total of 43 passby measurements were obtained at 10 locations identified in Table 1 and the 11 different streetcars identified in Table 3. The measurements were made at a nominal distance of 30 feet from the rail centerline. The 10 passby measurement locations were selected to characterize track sections along Market Street that might be expected to differ acoustically. The analysis showed no significant differences among some of these sites, so for modeling purposes the measurements were pooled into three categories:

1. Straight (tangent) track sections.
2. Short-radius curves (with a turn radius of 100 feet or less).
3. Tangent track over BART grates.

TABLE 3: HISTORIC STREETCARS MEASURED

No.	Livery	Car No.	Passbys
Non-Milan Streetcars (Presidents' Conference Committee [PCC] Streetcars)			
1	San Francisco	1040	7
2	San Francisco	1051	3
3	Philadelphia	1055	5
4	Kansas City	1056	2
5	Boston	1059	4
6	Mexico City	1072	4
7	San Diego	1078	3
8	Detroit	1079	2
9	Los Angeles	1080	5
Milan Streetcars			
10	Milan	1814	4
11	Milan	1856	6

To supplement Figure 4.C-4, which shows maximum passby noise levels of streetcars, Figure 4 summarizes passby single-event levels (SEL) from the 43 streetcar measurements, with the "Milan" cars shown separately from the remainder of the fleet. The SEL levels form the basis of source levels used in the noise modeling of streetcars. The observations of note here are:

1. When running at speed, the Milan cars consistently exhibited passby levels 10 dB higher than any of the non-Milan (the Presidents' Conference Committee [PCC]) streetcars,
2. For the non-Milan fleet (nine cars), passby levels varied considerably, with an overall range of 7 to 8 dB,
3. On short-radius curves the difference between Milan and PCC streetcar types was smaller, 5 dB on average, and a range of about 5 dB within type.

The differences between the Milan and other streetcars in service on April 19 are quite evident in the one-third octave band noise level data (spectra) collected during passby noise measurements. Figure 5 compares spectra at the passby maximum for streetcar 1856 (Milan) and 1040 (PCC).

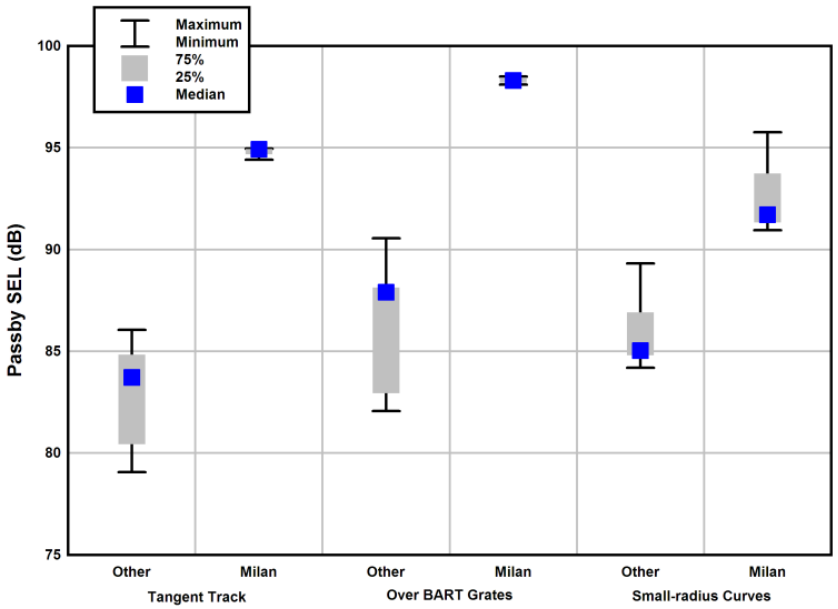


FIGURE 4: SUMMARY OF STREETCAR PASSBY SINGLE-EVENT LEVELS (SELS)

One-third octave band levels for the Milan car were 5 to 15 dB higher between 50 Hz and 8 kHz. Spectrograms comparing the two passbys are shown in Figure 6. The A-weighted levels at the passby maximum were 88.6 vs. 74.9 dB.

FIGURE 5: MAXIMUM PASSBY ONE-THIRD OCTAVE BAND LEVELS FOR MILAN AND PCC STREETCAR EXEMPLARS

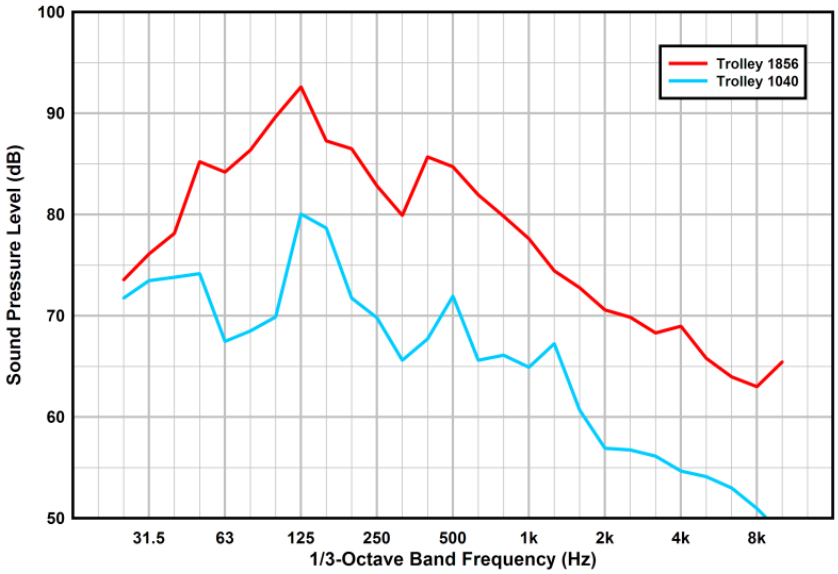
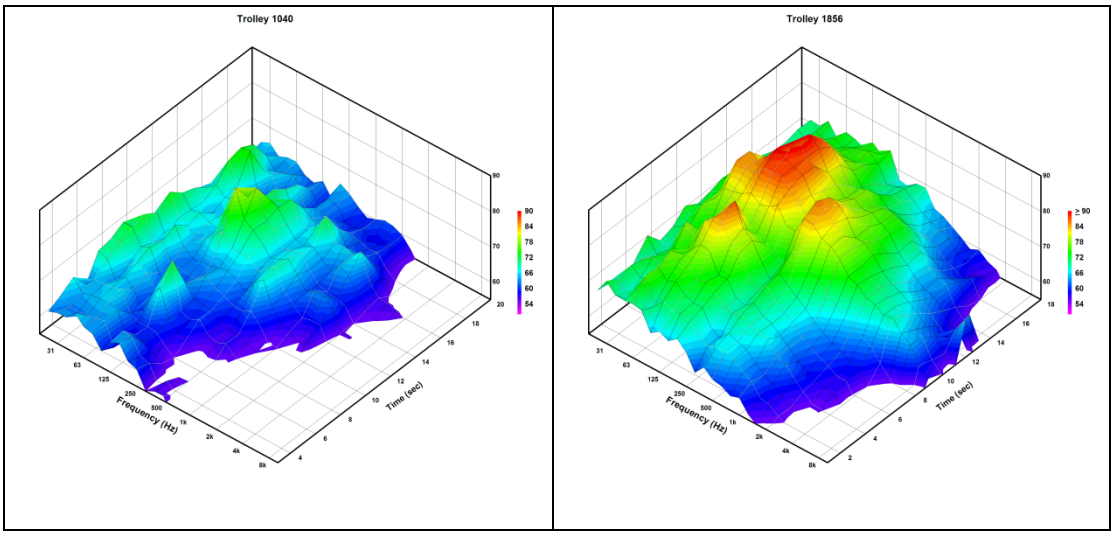


FIGURE 6: PASSBY SPECTRA FOR MUNI AND MILAN STREETCARS

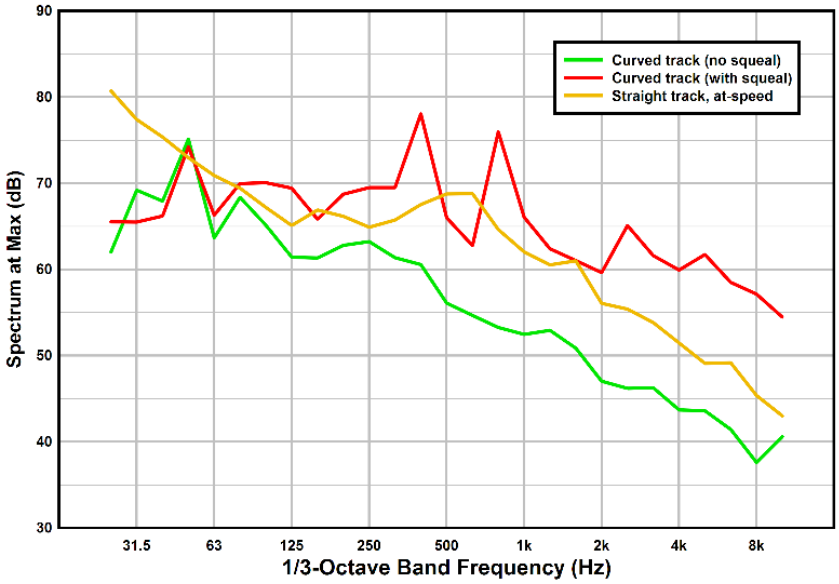


For the occasional cases where multiple passbys of individual streetcars were measured, the levels were repeatable within 3 dB.

Wheel Squeal Noise

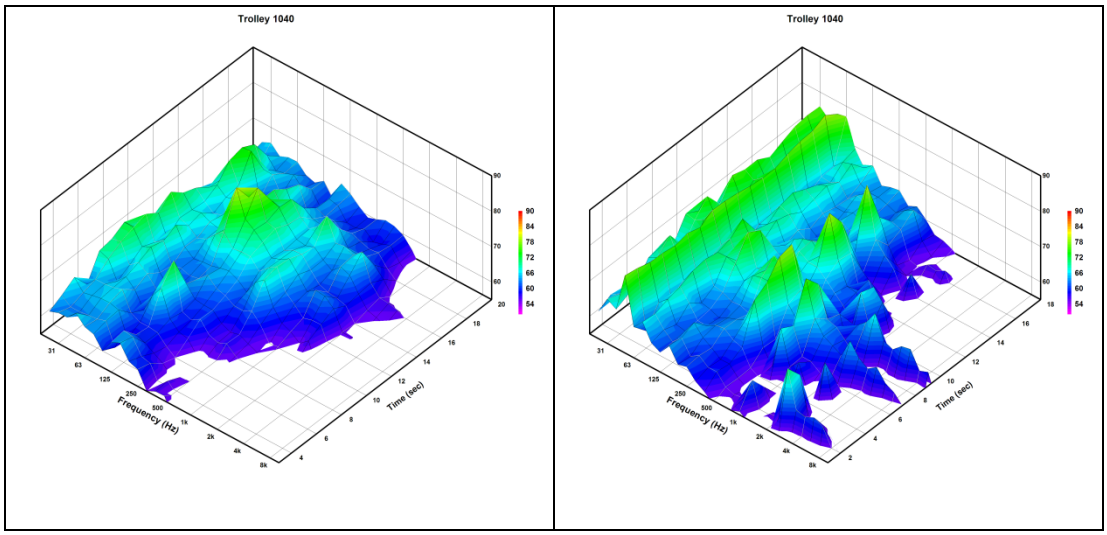
A number of passby measurements were made to characterize the flanging/wheel squeal noise produced by the streetcars when negotiating short radius turns. This noise is caused when the streetcar wheel flanges rub against the rail or in the case of squeal, by the transverse slip-stick forces that excite wheel vibration modes. Measurements to capture this effect were made at Steuart Street and at the Castro Street loop and are assumed to be representative of the conditions at the planned turn-around at McAllister Street. On these curves streetcar speeds were substantially reduced and - absent squeal - overall noise levels were lower compared to running on tangent track (by 5-10 dBA). However, when present, wheel squeal would typically increase levels by 10-15 dBA, equaling or often exceeding the at-speed running levels. Figure 7 shows passby spectra for car 1040 with and without wheel squeal present, as well as the max passby spectrum for the tangent track condition.

FIGURE 7: SPECTRA SHOWING FLANGING/WHEEL SQUEAL NOISE



Wheel squeal levels were rather variable and typically intermittent, and the limited number of samples did not allow clear pattern of behavior to be identified. However, all streetcars were observed to produce some degree of flanging and/or wheel squeal noise on short radius turns. Figure 8 illustrates this typically intermittent nature of the squeal.

FIGURE 8: EXAMPLE PASSBY SPECTRA WITH AND WITHOUT WHEEL SQUEAL PRESENT



Appendix 2: Noise Modeling Assumptions

Noise Modeling Approach

Fixed-guideway streetcar operations were modeled as acoustic line noise sources using SoundPLAN, a standards-based environmental noise program for calculating community noise exposure from a wide range of noise sources. Reference noise levels for F-Line streetcar operations were derived from the calibrated passby noise levels from noise measurements described in the previous section.

All roads, curbs, and building footprints were imported into SoundPLAN from GIS shapefiles provided by the City. Other City-provided GIS data such as the Land Use layer were used for supporting information and analysis but were not used by the noise model directly. The project corridor contains a number of high-rise structures: the noise calculations took into account sound reflections from, and the acoustic shielding and scattering caused by these buildings.

Modeling Assumptions

For modeling purposes, the project corridor was assumed to be flat (i.e., no topographic effects). Elevation changes along Market Street project corridor are gradual and amount to less than 100 feet along the 2.2-mile corridor.

Reference Streetcar Noise Levels

Streetcar noise was modeled as an acoustic line source. SELs for individual streetcars were calculated directly from the passby noise data, then averaged to provide reference source noise levels and spectra for the PCC and Milan-type streetcars. Reference streetcar passby levels were calculated for the two vehicle types and for three track conditions: straight (tangent) track over asphalt, tangent track over BART ventilation grates, and curved track sections at Steuart Street. Using the reference source levels, frequency of service per hour for each streetcar type was applied to obtain hourly noise levels over a daily distribution of streetcar trips, based on the F-Line schedule (as of October 2018). The model assumes operating hours along the F-Line would be the same as existing F-Line service. The model assumes streetcars would operate on the F-loop and F-Short between 7:00 a.m. and 7:00 p.m. The F-Short line would add up to 6 streetcars per hour in 2020. The combined headways on the F-Short would be 5 minutes in both directions (including 10-minute headways in each direction on the F-Line and 10-minute headways on the F-Short in each direction), east of the F-loop.

Streetcar Noise on the F-loop

Straight sections of track on the F-loop were modeled similar to tangent track passbys on Market Street. The straight sections on the F-loop account for approximately 370 feet of track along McAllister Street and 140 feet along Charles J. Brenham Place, with an assumed travel speed of 15 mph.

There would be 6 curved sections of track on the F-loop, each about 100 to 150 feet long. Passby source levels on curves were modeled similar to measurements on existing curves, as described in the previous section, as the operating noise was assumed to be similar to the measurements. Curve squeal noise was based on measured octave-band frequency spectra of PCC and Milan streetcars traveling across existing curves at Steuart Street and the Castro Street loop. The model assumes that streetcar noise on F-loop curves would be the same as noise levels measured from streetcar passbys on similar

existing curves (estimated 5 miles per hour), and as such, curve passby levels were not adjusted for speed.

Streetcar Noise on Crossovers

The SoundPLAN model uses the Federal Transit Administration source level for a standard crossover. Noise levels from crossovers assumed a travel speed of 5 mph for diverging movements entering or exiting the F-loop and 25 mph for non-diverging movements on the F-Line. A total of 8 new crossovers were modeled to allow for diverging movements between the F-Line and the F-loop.

Traffic Model Inputs

Traffic noise levels along side-streets were calculated using peak-hour traffic volume data provided by the Fehr & Peers (2018), and traffic noise emissions from data tables developed from the Federal Highway Administration TNM.

Traffic data along Market Street and adjacent side streets along the corridor were taken from the Better Market Street vehicle volumes spreadsheet provided by Fehr & Peers. These represented traffic volumes for the peak (p.m.) traffic hour. A factor of 10 was used to convert peak hour values to assumed ADT values. The model assumed hard ground attenuation and no noise barriers.

Appendix 3: Traffic Noise Modeling Results

Five model conditions were developed to predict traffic noise levels on side streets adjacent to Market Street, according to the following conditions:

1. 2018 (Present Traffic)
2. 2020 (Opening Year) No Project
3. 2020 Plus Project
4. 2040 (Design Year) No Project
5. 2040 Plus Project

Table 4 shows the predicted traffic noise levels for 2018 baseline, 2020, and 2040 traffic conditions. Negative values indicate that plus-project levels are predicted to be lower than the no-project condition. Based on the data in Table 4, opening-year plus-project conditions would have a maximum increase of 2.2 dB (in terms of L_{dn}) compared to no-project conditions. Design-year plus-project conditions would have a maximum increase of 2.4 dB compared to no-project conditions.

TABLE 4: TRAFFIC NOISE LEVELS ON SIDE STREETS OFF MARKET STREET

Intersection Number	Street	Segment location	Traffic Volume, Calculated Segment ADT					Traffic Noise Level, L_{dn}				L_{dn}		
			Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Year 2040 No Project	Year 2040 Plus Project	Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Difference, 2020 Plus Project and 2020 No Project	Year 2040 No Project	Year 2040 Plus Project	Difference, 2040 Plus Project and 2040 No Project
1	Steuart Street	south of Market Street	2,740	3,200	1,700	3,600	2,100	55.2	55.9	53.3	- 2.6	56.3	54.2	- 2.1
2	Spear Street	south of Market Street	3,230	2,200	1,200	2,400	1,400	55.9	54.3	52.0	- 2.3	54.7	52.6	- 2.1
3	Drumm Street	north of Market Street	6,990	7,100	7,500	7,800	8,700	59.1	59.2	59.4	+ 0.2	59.6	60.0	+ 0.4
3	Main Street	south of Market Street	6,440	7,400	4,400	8,000	5,000	58.8	59.3	57.2	- 2.1	59.7	57.7	- 2.0
4	Davis Street	north of Market Street	16,040	17,100	16,100	18,500	17,500	62.6	62.9	62.7	- 0.2	63.3	63.0	- 0.3
4	Beale Street	south of Market Street	14,050	14,800	15,000	16,100	16,200	62.1	62.3	62.4	+ 0.1	62.7	62.7	0.0
5	Front Street	north of Market Street	13,190	10,500	13,700	11,300	14,500	61.8	60.8	62.0	+ 1.2	61.1	62.2	+ 1.1
5	Fremont Street	south of Market Street	13,900	11,200	13,700	12,100	14,600	62.0	61.1	62.0	+ 0.9	61.4	62.2	+ 0.8
6	Battery Street	north of Market Street	9,760	11,500	9,500	12,600	10,400	60.5	61.2	60.4	- 0.8	61.6	60.8	- 0.8
6	1st Street	south of Market Street	11,680	14,200	11,500	15,600	12,800	61.3	62.1	61.2	- 0.9	62.5	61.7	- 0.8
7	Sansome Street	north of Market Street	2,200	2,000	1,100	2,100	1,200	54.3	54.0	51.7	- 2.3	54.2	52.0	- 2.2
8	2nd Street	south of Market Street	5,160	5,000	100	5,500	100	57.8	57.7	45.3	- 12.4	58.1	45.3	- 12.8
9	New Montgomery	north of Market Street	8,100	15,000	13,000	15,800	13,800	59.7	62.4	61.7	- 0.7	62.6	62.0	- 0.6
9	New Montgomery	south of Market Street	9,080	15,700	15,700	16,900	16,900	60.2	62.6	62.6	0.0	62.9	62.9	0.0
10	Kearney Street	northeast of Market Street	13,150	12,300	12,700	13,400	13,800	61.8	61.5	61.6	+ 0.1	61.9	62.0	+ 0.1
10	Geary Street	northwest of Market Street	5,280	4,200	3,600	4,800	4,100	57.9	57.0	56.3	- 0.7	57.5	56.9	- 0.6
10	3rd Street	south of Market Street	17,010	15,500	16,000	17,100	17,600	62.9	62.5	62.6	+ 0.1	62.9	63.0	+ 0.1
11	O'Farrell Street	north of Market Street	3,250	2,100	2,000	2,400	2,300	55.9	54.2	54.0	- 0.2	54.7	54.5	- 0.2
12	Stockton Street	north of Market Street	14,920	15,900	10,400	17,200	11,300	62.3	62.6	60.8	- 1.8	62.9	61.1	- 1.8
12	4th Street	south of Market Street	12,760	9,500	9,500	10,300	10,300	61.7	60.4	60.4	0.0	60.8	60.8	0.0
14	Cyril Magnin Street	north of Market Street	12,630	15,600	16,800	17,100	18,300	61.6	62.5	62.8	+ 0.3	62.9	63.2	+ 0.3
14	5th Street	south of Market Street	13,000	15,700	17,100	17,300	18,600	61.7	62.6	62.9	+ 0.3	63.0	63.3	+ 0.3
15	Mason Street	northeast of Market Street	4,370	1,600	2,300	1,800	2,700	57.1	53.1	54.5	+ 1.4	53.5	55.2	+ 1.7
15	Turk Street	northwest of Market Street	3,050	3,100	1,800	3,600	2,300	55.7	55.7	53.5	- 2.2	56.3	54.5	- 1.8
16	Golden Gate	north of Market Street	19,250	22,500	22,700	24,400	24,600	63.4	64.1	64.1	0.0	64.5	64.5	0.0
16	6th Street	south of Market Street	20,170	24,200	22,300	26,000	24,100	63.6	64.4	64.1	- 0.3	64.7	64.4	- 0.3
17	Jones Street	northeast of Market Street	2,360	2,000	1,700	2,200	2,000	54.6	54.0	53.3	- 0.7	54.3	54.0	- 0.3
17	McAllister Street	northwest of Market Street	4,670	3,000	1,800	3,600	2,200	57.4	55.6	53.5	- 2.1	56.3	54.3	- 2.0
18	7th Street	south of Market Street	15,390	16,000	16,800	17,500	18,300	62.5	62.6	62.8	+ 0.2	63.0	63.2	+ 0.2
20	8th Street	south of Market Street	14,470	14,500	17,500	16,000	19,000	62.2	62.2	63.0	+ 0.8	62.6	63.4	+ 0.8
20	Grove Street	northwest of Market Street	14,050	14,200	16,600	15,300	17,800	62.1	62.1	62.8	+ 0.7	62.4	63.1	+ 0.7
20	Hyde Street	northeast of Market Street	2,030	2,100	1,700	2,400	2,000	54.0	54.2	53.3	- 0.9	54.7	54.0	- 0.7
21	9th Street	south of Market Street	32,550	39,500	36,900	44,100	41,500	65.7	66.5	66.2	- 0.3	67.0	66.7	- 0.3
21	Hayes Street	northwest of Market Street	15,350	17,700	17,700	19,500	19,800	62.5	63.1	63.1	0.0	63.5	63.6	+ 0.1
21	Larkin Street	northeast of Market Street	15,360	17,700	19,200	19,900	21,700	62.5	63.1	63.4	+ 0.3	63.6	63.9	+ 0.3
22	10th Street	south of Market Street	20,050	20,600	20,800	23,000	23,100	63.6	63.7	63.8	+ 0.1	64.2	64.2	0.0
22	Fell Street	northwest of Market Street	9,030	10,000	9,000	11,300	10,300	60.2	60.6	60.2	- 0.4	61.1	60.8	- 0.3
22	Polk Street	northeast of Market Street	8,610	8,600	8,600	9,300	9,300	60.0	60.0	60.0	0.0	60.3	60.3	0.0
23	11th Street	south of Market Street	1,400	1,300	500	1,500	500	52.6	52.3	49.0	- 3.3	52.8	49.0	- 3.8
24	Van Ness Avenue	north of Market Street	31,690	33,900	32,100	36,400	34,600	65.6	65.9	65.6	- 0.3	66.2	66.0	- 0.2
24	Van Ness Avenue	south of Market Street	30,540	32,700	28,500	35,000	30,800	65.4	65.7	65.1	- 0.6	66.0	65.5	- 0.5
25 or 26	12th Street	south of Market Street	1,350	1,200	800	1,300	900	52.4	52.0	50.5	- 1.5	52.3	50.9	- 1.4
25 or 26	Page Street	northwest of Market Street	1,620	1,800	1,200	2,000	1,400	53.1	53.5	52.0	- 1.5	54.0	52.6	- 1.4
25 or 26	Franklin Street	northeast of Market Street	9,470	10,600	10,500	11,600	11,500	60.4	60.9	60.8	- 0.1	61.3	61.2	- 0.1

Intersection Number	Street	Segment location	Traffic Volume, Calculated Segment ADT					Traffic Noise Level, L_{dn}				L_{dn}		
			Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Year 2040 No Project	Year 2040 Plus Project	Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Difference, 2020 Plus Project and 2020 No Project	Year 2040 No Project	Year 2040 Plus Project	Difference, 2040 Plus Project and 2040 No Project
27	Gough Street	north of Market Street	8,650	9,800	10,600	10,900	11,700	60.0	60.5	60.9	+ 0.4	61.0	61.3	+ 0.3
27	Gough Street	south of Market Street	15,130	16,500	19,300	18,100	20,900	62.4	62.8	63.4	+ 0.6	63.2	63.8	+ 0.6
28	Valencia Street	south of Market Street	6,550	10,500	10,500	11,200	11,200	58.8	60.8	60.8	0.0	61.1	61.1	0.0
29	Octavia Blvd	north of Market Street	34,780	41,500	42,300	46,000	46,800	66.0	66.7	66.8	+ 0.1	67.2	67.3	+ 0.1
29	Octavia Blvd	south of Market Street	34,350	40,600	40,600	44,800	44,800	65.9	66.6	66.6	0.0	67.1	67.1	0.0
30	The Embarcadero	north of Mission Street	45,170	51,700	52,600	57,600	58,500	67.1	67.7	67.8	+ 0.1	68.2	68.2	0.0
30	The Embarcadero	south of Mission Street	44,330	49,700	49,900	55,600	55,800	67.0	67.5	67.5	0.0	68.0	68.0	0.0
30	Mission Street	west of The Embarcadero	4,740	6,000	6,900	6,400	7,300	57.5	58.5	59.1	+ 0.6	58.7	59.3	+ 0.6
31	Steuart Street	north of Mission Street	2,740	3,200	1,700	3,600	2,100	55.2	55.9	53.3	- 2.6	56.3	54.2	- 2.1
31	Steuart Street	south of Mission Street	1,630	1,800	1,700	2,000	1,900	53.2	53.5	53.3	- 0.2	54.0	53.8	- 0.2
31	Mission Street	west of Steuart Street	4,440	4,800	5,600	5,200	6,000	57.2	57.5	58.2	+ 0.7	57.9	58.5	+ 0.6
32	Spear Street	north of Mission Street	3,530	2,300	1,400	2,500	1,600	56.3	54.5	52.6	- 1.9	54.9	53.1	- 1.8
32	Spear Street	south of Mission Street	4,680	3,400	2,800	3,800	3,200	57.4	56.1	55.3	- 0.8	56.6	55.9	- 0.7
32	Mission Street	west of Spear Street	5,850	6,300	7,500	6,900	8,100	58.4	58.7	59.4	+ 0.7	59.1	59.7	+ 0.6
33	Main Street	north of Mission Street	5,620	6,600	3,600	7,100	4,100	58.2	58.9	56.3	- 2.6	59.2	56.9	- 2.3
33	Main Street	south of Mission Street	7,030	8,600	6,500	9,400	7,300	59.1	60.0	58.8	- 1.2	60.4	59.3	- 1.1
33	Mission Street	west of Main Street	7,040	7,600	7,900	8,300	8,600	59.1	59.5	59.6	+ 0.1	59.8	60.0	+ 0.2
34	Beale Street	north of Mission Street	14,290	15,000	15,200	16,300	16,400	62.2	62.4	62.4	0.0	62.7	62.7	0.0
34	Beale Street	south of Mission Street	14,510	14,800	15,100	16,100	16,300	62.2	62.3	62.4	+ 0.1	62.7	62.7	0.0
34	Mission Street	west of Beale Street	9,260	9,800	10,200	10,700	11,100	60.3	60.5	60.7	+ 0.2	60.9	61.1	+ 0.2
35	Fremont Street	north of Mission Street	12,280	9,100	11,600	9,700	12,200	61.5	60.2	61.3	+ 1.1	60.5	61.5	+ 1.0
35	Fremont Street	south of Mission Street	13,430	9,600	11,600	10,200	12,200	61.9	60.5	61.3	+ 0.8	60.7	61.5	+ 0.8
35	Mission Street	west of Fremont Street	9,170	9,500	9,600	10,200	10,300	60.3	60.4	60.5	+ 0.1	60.7	60.8	+ 0.1
36	1st Street	north of Mission Street	12,490	15,000	12,300	16,400	13,600	61.6	62.4	61.5	- 0.9	62.7	61.9	- 0.8
36	1st Street	south of Mission Street	12,960	16,200	14,100	17,700	15,700	61.7	62.7	62.1	- 0.6	63.1	62.6	- 0.5
36	Mission Street	west of First Street	13,220	14,500	14,800	15,700	16,200	61.8	62.2	62.3	+ 0.1	62.6	62.7	+ 0.1
37	2nd Street	north of Mission Street	6,450	5,200	1,700	5,900	2,200	58.8	57.9	53.3	- 4.6	58.4	54.3	- 4.1
37	2nd Street	south of Mission Street	8,970	4,300	3,700	4,900	4,100	60.2	57.1	56.4	- 0.7	57.6	56.9	- 0.7
37	Mission Street	west of 2nd Street	14,270	13,000	13,000	14,000	14,000	62.1	61.7	61.7	0.0	62.1	62.1	0.0
38	New Montgomery	north of Mission Street	10,120	17,400	18,300	18,700	19,600	60.7	63.0	63.2	+ 0.2	63.3	63.5	+ 0.2
38	New Montgomery	south of Mission Street	10,690	19,100	19,800	20,800	21,500	60.9	63.4	63.6	+ 0.2	63.8	63.9	+ 0.1
38	Mission Street	west of New Montgomery	16,400	16,700	16,300	18,500	18,100	62.7	62.8	62.7	- 0.1	63.3	63.2	- 0.1
39	3rd Street	north of Mission Street	18,900	15,900	16,400	17,700	18,200	63.4	62.6	62.7	+ 0.1	63.1	63.2	+ 0.1
39	3rd Street	south of Mission Street	18,910	19,900	20,300	22,200	22,600	63.4	63.6	63.7	+ 0.1	64.0	64.1	+ 0.1
39	Mission Street	west of 3rd Street	13,410	15,700	15,800	17,300	17,400	61.9	62.6	62.6	0.0	63.0	63.0	0.0
40	4th Street	north of Mission Street	13,240	13,400	10,200	14,400	10,900	61.8	61.9	60.7	- 1.2	62.2	61.0	- 1.2
40	4th Street	south of Mission Street	12,800	11,800	9,400	12,600	9,900	61.7	61.3	60.4	- 0.9	61.6	60.6	- 1.0
40	Mission Street	west of 4th Street	15,560	17,500	17,400	19,000	18,900	62.5	63.0	63.0	0.0	63.4	63.4	0.0
41	5th Street	north of Mission Street	12,820	15,600	17,000	17,200	18,500	61.7	62.5	62.9	+ 0.4	62.9	63.3	+ 0.4
41	5th Street	south of Mission Street	12,230	14,200	14,800	15,800	16,300	61.5	62.1	62.3	+ 0.2	62.6	62.7	+ 0.1
41	Mission Street	west of 5th Street	15,470	16,800	17,900	18,600	19,700	62.5	62.8	63.1	+ 0.3	63.3	63.5	+ 0.2
42	6th Street	north of Mission Street	21,310	25,500	23,600	27,400	25,500	63.9	64.6	64.3	- 0.3	65.0	64.6	- 0.4
42	6th Street	south of Mission Street	21,460	24,900	23,000	26,700	24,800	63.9	64.5	64.2	- 0.3	64.8	64.5	- 0.3
42	Mission Street	west of 6th Street	15,710	16,000	16,900	17,800	18,700	62.6	62.6	62.9	+ 0.3	63.1	63.3	+ 0.2
43	7th Street	north of Mission Street	15,490	16,100	16,900	17,600	18,400	62.5	62.7	62.9	+ 0.2	63.0	63.2	+ 0.2
43	7th Street	south of Mission Street	16,120	17,800	18,500	19,600	20,300	62.7	63.1	63.3	+ 0.2	63.5	63.7	+ 0.2
43	Mission Street	west of 7th Street	13,920	14,600	15,400	16,200	17,000	62.0	62.2	62.5	+ 0.3	62.7	62.9	+ 0.2

Intersection Number	Street	Segment location	Traffic Volume, Calculated Segment ADT					Traffic Noise Level, L_{dn}				L_{dn}		
			Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Year 2040 No Project	Year 2040 Plus Project	Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Difference, 2020 Plus Project and 2020 No Project	Year 2040 No Project	Year 2040 Plus Project	Difference, 2040 Plus Project and 2040 No Project
44	8th Street	north of Mission Street	17,570	18,000	19,400	19,900	21,100	63.0	63.1	63.5	+ 0.4	63.6	63.8	+ 0.2
44	8th Street	south of Mission Street	15,180	15,500	17,900	17,300	19,500	62.4	62.5	63.1	+ 0.6	63.0	63.5	+ 0.5
44	Mission Street	west of 8th Street	14,870	15,400	16,800	17,000	18,400	62.3	62.5	62.8	+ 0.3	62.9	63.2	+ 0.3
45	9th Street	north of Mission Street	31,240	37,800	35,200	42,100	39,500	65.5	66.3	66.0	- 0.3	66.8	66.5	- 0.3
45	9th Street	south of Mission Street	29,790	36,000	34,100	40,200	38,300	65.3	66.1	65.9	- 0.2	66.6	66.4	- 0.2
45	Mission Street	west of 9th Street	11,860	11,800	12,700	13,200	14,100	61.4	61.3	61.6	+ 0.3	61.8	62.1	+ 0.3
46	10th Street	north of Mission Street	21,510	22,100	22,300	24,700	24,800	63.9	64.0	64.1	+ 0.1	64.5	64.5	0.0
46	10th Street	south of Mission Street	17,610	18,800	18,800	20,900	20,800	63.0	63.3	63.3	0.0	63.8	63.8	0.0
46	Mission Street	west of 10th Street	10,450	11,100	12,000	12,400	13,300	60.8	61.1	61.4	+ 0.3	61.5	61.8	+ 0.3
47	11th Street	north of Mission Street	4,660	5,200	4,600	5,900	5,100	57.4	57.9	57.4	- 0.5	58.4	57.8	- 0.6
47	11th Street	south of Mission Street	5,020	5,700	5,400	6,600	6,100	57.7	58.2	58.0	- 0.2	58.9	58.5	- 0.4
47	Mission Street	west of 11th Street	10,870	13,400	14,200	14,900	15,700	61.0	61.9	62.1	+ 0.2	62.3	62.6	+ 0.3
48	Van Ness Avenue	north of Mission Street	31,240	33,400	29,200	35,800	31,600	65.5	65.8	65.2	- 0.6	66.1	65.6	- 0.5
48	Van Ness Avenue	south of Mission Street	23,580	25,300	22,100	26,600	23,400	64.3	64.6	64.0	- 0.6	64.8	64.3	- 0.5
48	Mission Street	west of Van Ness Avenue	17,110	20,100	19,900	22,700	22,500	62.9	63.6	63.6	0.0	64.1	64.1	0.0
49	13th Street	west of Mission Street	12,770	14,200	14,100	15,600	15,500	61.7	62.1	62.1	0.0	62.5	62.5	0.0
49	13th Street	east of Mission Street	20,160	22,100	21,900	24,500	24,300	63.6	64.0	64.0	0.0	64.5	64.4	- 0.1
49	Mission Street	south of 13th Street	15,540	17,000	17,300	19,000	19,300	62.5	62.9	63.0	+ 0.1	63.4	63.4	0.0
50	Gough Street	north of Mission Street	8,280	9,500	10,300	10,500	11,300	59.8	60.4	60.8	+ 0.4	60.8	61.1	+ 0.3
50	Otis Street	south of Mission Street	13,260	15,000	15,700	16,800	17,500	61.8	62.4	62.6	+ 0.2	62.8	63.0	+ 0.2
50	McCoppin Street	west of Gough Street	1,700	3,000	2,900	3,300	3,200	53.3	55.6	55.5	- 0.1	56.0	55.9	- 0.1
50	Mission Street	east of Gough Street	6,360	8,700	8,500	9,800	9,600	58.7	60.0	59.9	- 0.1	60.5	60.5	0.0
51	Cyril Magnin Street	north of Ellis Street	3,100	3,500	4,500	3,900	5,000	55.7	56.2	57.3	+ 1.1	56.7	57.7	+ 1.0
51	Cyril Magnin Street	south of Ellis Street	7,560	8,400	7,100	9,100	7,700	59.4	59.9	59.2	- 0.7	60.2	59.5	- 0.7
51	Ellis Street	west of Cyril Magnin Street	6,180	6,700	6,900	7,300	7,500	58.6	58.9	59.1	+ 0.2	59.3	59.4	+ 0.1
51	Ellis Street	east of Cyril Magnin Street	3,140	3,600	1,500	3,900	1,600	55.8	56.3	52.8	- 3.5	56.7	53.1	- 3.6
52	Grant Avenue	north of Geary Street	2,720	3,200	3,500	3,600	3,900	55.2	55.9	56.2	+ 0.3	56.3	56.7	+ 0.4
52	Grant Avenue	south of Geary Street	2,130	2,100	2,100	2,400	2,400	54.2	54.2	54.2	0.0	54.7	54.7	0.0
52	Geary Street	west of Grant Avenue	5,810	6,300	7,200	7,200	8,000	58.3	58.7	59.2	+ 0.5	59.2	59.7	+ 0.5
52	Geary Street	east of Grant Avenue	3,520	4,000	5,200	4,600	5,700	56.2	56.8	57.9	+ 1.1	57.4	58.2	+ 0.8
53	Grant Avenue	north of Post Street	3,270	3,500	4,300	3,900	4,700	55.9	56.2	57.1	+ 0.9	56.7	57.4	+ 0.7
53	Grant Avenue	south of Post Street	3,430	3,200	3,500	3,600	3,900	56.1	55.9	56.2	+ 0.3	56.3	56.7	+ 0.4
53	Post Street	west of Grant Avenue	7,260	6,500	6,300	6,900	6,700	59.3	58.8	58.7	- 0.1	59.1	58.9	- 0.2
53	Post Street	east of Grant Avenue	7,200	4,800	4,100	5,200	4,500	59.2	57.5	56.9	- 0.6	57.9	57.3	- 0.6
54	Kearney Street	north of Post Street	15,830	14,000	14,000	15,100	15,100	62.6	62.1	62.1	0.0	62.4	62.4	0.0
54	Kearney Street	south of Post Street	14,200	12,500	12,600	13,600	13,700	62.1	61.6	61.6	0.0	61.9	62.0	+ 0.1
54	Post Street	west of Kearney Avenue	6,060	4,800	4,100	5,200	4,500	58.5	57.5	56.9	- 0.6	57.9	57.3	- 0.6
54	Post Street	east of Kearney Avenue	4,430	3,300	2,700	3,700	3,100	57.2	56.0	55.2	- 0.8	56.4	55.7	- 0.7
55	Stockton Street	north of O'Farrell Street	8,250	7,200	8,600	7,700	9,100	59.8	59.2	60.0	+ 0.8	59.5	60.2	+ 0.7
55	Stockton Street	south of O'Farrell Street	10,190	9,200	10,500	9,700	11,000	60.7	60.3	60.8	+ 0.5	60.5	61.0	+ 0.5
55	O'Farrell Street	west of Stockton Street	6,560	4,000	5,400	4,300	5,700	58.8	56.8	58.0	+ 1.2	57.1	58.2	+ 1.1
55	O'Farrell Street	east of Stockton Street	4,620	2,000	3,500	2,300	3,800	57.4	54.0	56.2	+ 2.2	54.5	56.6	+ 2.1
56	Mason Street	north of Eddy Street	4,530	4,300	4,300	4,800	4,900	57.3	57.1	57.1	0.0	57.5	57.6	+ 0.1
56	Mason Street	south of Eddy Street	2,660	1,300	2,300	1,500	2,700	55.1	52.3	54.5	+ 2.2	52.8	55.2	+ 2.4
56	Eddy Street	west of Mason Street	4,340	4,200	5,000	4,700	5,500	57.1	57.0	57.7	+ 0.7	57.4	58.1	+ 0.7
56	Eddy Street	east of Mason Street	6,210	7,200	9,000	8,000	9,900	58.6	59.2	60.2	+ 1.0	59.7	60.6	+ 0.9
57	Jones Street	north of Golden Gate Street	6,250	5,400	4,900	5,800	5,300	58.6	58.0	57.6	- 0.4	58.3	57.9	- 0.4

Intersection Number	Street	Segment location	Traffic Volume, Calculated Segment ADT					Traffic Noise Level, L_{dn}				L_{dn}		
			Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Year 2040 No Project	Year 2040 Plus Project	Existing Year 2018	Year 2020 No Project	Year 2020 Plus Project	Difference, 2020 Plus Project and 2020 No Project	Year 2040 No Project	Year 2040 Plus Project	Difference, 2040 Plus Project and 2040 No Project
57	Jones Street	south of Golden Gate Street	2,520	1,500	1,700	1,700	1,900	54.9	52.8	53.3	+ 0.5	53.3	53.8	+ 0.5
57	Golden Gate Street	west of Jones Street	6,620	6,400	5,600	7,100	6,300	58.9	58.7	58.2	- 0.5	59.2	58.7	- 0.5
57	Golden Gate Street	east of Jones Street	10,350	10,300	9,200	11,200	10,100	60.8	60.8	60.3	- 0.5	61.1	60.7	- 0.4
58	Franklin Street	north of Oak Street	23,320	24,200	24,400	26,200	26,200	64.3	64.4	64.5	+ 0.1	64.8	64.8	0.0
58	Franklin Street	south of Oak Street	12,200	10,800	11,000	11,500	11,500	61.5	61.0	61.0	0.0	61.2	61.2	0.0
58	Oak Street	west of Franklin Street	10,710	12,900	12,900	14,200	14,200	60.9	61.7	61.7	0.0	62.1	62.1	0.0
58	Oak Street	east of Franklin Street	410	500	500	500	500	48.4	49.0	49.0	0.0	49.0	49.0	0.0
59	Franklin Street	north of Fell Street	14,020	16,000	16,200	17,300	17,300	62.1	62.6	62.7	+ 0.1	63.0	63.0	0.0
59	Franklin Street	south of Fell Street	21,190	24,200	24,400	26,200	26,200	63.8	64.4	64.5	+ 0.1	64.8	64.8	0.0
59	Fell Street	west of Franklin Street	5,070	7,200	7,400	8,300	8,500	57.8	59.2	59.3	+ 0.1	59.8	59.9	+ 0.1
59	Fell Street	east of Franklin Street	8,000	10,600	10,800	11,800	12,000	59.7	60.9	61.0	+ 0.1	61.3	61.4	+ 0.1
60	Gough Street	north of Oak Street	14,350	15,500	17,800	17,200	19,500	62.2	62.5	63.1	+ 0.6	62.9	63.5	+ 0.6
60	Gough Street	south of Oak Street	15,560	16,900	19,800	18,600	21,500	62.5	62.9	63.6	+ 0.7	63.3	63.9	+ 0.6
60	Oak Street	west of Gough Street	13,000	14,300	14,900	15,600	16,200	61.7	62.2	62.3	+ 0.1	62.5	62.7	+ 0.2
60	Oak Street	east of Gough Street	11,790	12,900	12,900	14,200	14,200	61.3	61.7	61.7	0.0	62.1	62.1	0.0
61	Van Ness Avenue	north of Fell Street	32,910	34,300	31,800	36,800	34,200	65.7	65.9	65.6	- 0.3	66.2	65.9	- 0.3
61	Van Ness Avenue	south of Fell Street	30,910	33,900	31,700	36,500	34,200	65.5	65.9	65.6	- 0.3	66.2	65.9	- 0.3
61	Fell Street	west of Van Ness Avenue	8,900	10,600	10,800	11,800	12,000	60.1	60.9	61.0	+ 0.1	61.3	61.4	+ 0.1
61	Fell Street	east of Van Ness Avenue	8,740	9,000	8,700	10,100	9,800	60.1	60.2	60.0	- 0.2	60.7	60.5	- 0.2
62	1st Street	north of Howard Street	12,890	16,200	14,500	17,600	15,900	61.7	62.7	62.2	- 0.5	63.0	62.6	- 0.4
62	1st Street	south of Howard Street	12,800	14,800	13,500	16,200	14,900	61.7	62.3	61.9	- 0.4	62.7	62.3	- 0.4
62	Howard Street	west of 1st Street	17,000	19,700	19,400	21,500	21,200	62.9	63.5	63.5	0.0	63.9	63.8	- 0.1
62	Howard Street	east of 1st Street	16,910	18,300	18,400	20,100	20,200	62.9	63.2	63.2	0.0	63.6	63.6	0.0
63	3rd Street	north of Howard Street	19,050	18,200	18,700	20,300	20,800	63.4	63.2	63.3	+ 0.1	63.7	63.8	+ 0.1
63	3rd Street	south of Howard Street	19,470	18,700	18,500	20,900	20,700	63.5	63.3	63.3	0.0	63.8	63.7	- 0.1
63	Howard Street	west of 3rd Street	20,960	21,900	21,300	24,100	23,500	63.8	64.0	63.9	- 0.1	64.4	64.3	- 0.1
63	Howard Street	east of 3rd Street	20,540	21,400	21,500	23,500	23,600	63.7	63.9	63.9	0.0	64.3	64.3	0.0
64	5th Street	north of Howard Street	16,500	14,200	15,300	15,600	16,200	62.8	62.1	62.4	+ 0.3	62.5	62.7	+ 0.2
64	5th Street	south of Howard Street	14,670	13,800	14,600	15,200	15,500	62.3	62.0	62.2	+ 0.2	62.4	62.5	+ 0.1
64	Howard Street	west of 5th Street	15,980	16,400	16,600	18,100	18,300	62.6	62.7	62.8	+ 0.1	63.2	63.2	0.0
64	Howard Street	east of 5th Street	14,670	16,600	17,300	18,300	19,000	62.3	62.8	63.0	+ 0.2	63.2	63.4	+ 0.2
65	7th Street	north of Howard Street	11,970	13,300	13,700	14,600	15,000	61.4	61.8	62.0	+ 0.2	62.2	62.4	+ 0.2
65	7th Street	south of Howard Street	12,360	13,600	13,800	14,900	15,100	61.5	61.9	62.0	+ 0.1	62.3	62.4	+ 0.1
65	Howard Street	west of 7th Street	16,120	17,800	18,300	19,600	20,100	62.7	63.1	63.2	+ 0.1	63.5	63.6	+ 0.1
65	Howard Street	east of 7th Street	15,730	17,500	18,200	19,300	20,000	62.6	63.0	63.2	+ 0.2	63.4	63.6	+ 0.2
66	9th Street	north of Howard Street	8,860	9,900	10,100	10,900	11,100	60.1	60.6	60.7	+ 0.1	61.0	61.1	+ 0.1
66	9th Street	south of Howard Street	12,570	14,800	15,100	16,200	16,500	61.6	62.3	62.4	+ 0.1	62.7	62.8	+ 0.1
66	Howard Street	west of 9th Street	28,600	36,000	33,500	40,200	37,700	65.1	66.1	65.8	- 0.3	66.6	66.3	- 0.3
66	Howard Street	east of 9th Street	24,890	31,100	28,500	34,900	32,300	64.5	65.5	65.1	- 0.4	66.0	65.7	- 0.3
67	2nd Street	north of Folsom Street	13,910	15,100	15,100	16,600	16,600	62.0	62.4	62.4	0.0	62.8	62.8	0.0
67	2nd Street	south of Folsom Street	13,660	13,600	13,600	15,000	15,000	62.0	61.9	61.9	0.0	62.4	62.4	0.0
67	Folsom Street	west of 2nd Street	10,830	9,500	8,700	10,400	9,600	61.0	60.4	60.0	- 0.4	60.8	60.5	- 0.3
67	Folsom Street	east of 2nd Street	10,840	10,800	10,000	11,800	11,000	61.0	61.0	60.6	- 0.4	61.3	61.0	- 0.3
68	4th Street	north of Folsom Street	19,140	21,200	21,200	23,300	23,300	63.4	63.8	63.8	0.0	64.3	64.3	0.0
68	4th Street	south of Folsom Street	18,270	20,000	20,200	22,000	22,200	63.2	63.6	63.6	0.0	64.0	64.0	0.0
68	Folsom Street	west of 4th Street	15,840	15,500	15,700	17,100	17,300	62.6	62.5	62.6	+ 0.1	62.9	63.0	+ 0.1
68	Folsom Street	east of 4th Street	16,710	16,700	16,700	18,400	18,400	62.8	62.8	62.8	0.0	63.2	63.2	0.0

Intersection Number	Street	Segment location	Traffic Volume, Calculated Segment ADT					Traffic Noise Level, L_{dn}				L_{dn}		
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69	6th Street	north of Folsom Street	18,240	19,800	19,800	21,800	21,800	63.2	63.6	63.6	0.0	64.0	64.0	0.0
69	6th Street	south of Folsom Street	20,670	22,200	22,000	24,500	24,300	63.7	64.0	64.0	0.0	64.5	64.4	- 0.1
69	Folsom Street	west of 6th Street	19,840	20,900	23,200	23,100	25,400	63.6	63.8	64.2	+ 0.4	64.2	64.6	+ 0.4
69	Folsom Street	east of 6th Street	22,870	24,300	26,800	26,800	29,300	64.2	64.4	64.9	+ 0.5	64.9	65.2	+ 0.3
70	8th Street	north of Folsom Street	16,780	17,600	17,600	19,400	19,400	62.8	63.0	63.0	0.0	63.5	63.5	0.0
70	8th Street	south of Folsom Street	18,420	19,100	18,700	21,000	20,600	63.2	63.4	63.3	- 0.1	63.8	63.7	- 0.1
70	Folsom Street	west of 8th Street	14,250	15,300	17,400	16,800	18,900	62.1	62.4	63.0	+ 0.6	62.8	63.4	+ 0.6
70	Folsom Street	east of 8th Street	12,610	13,800	16,300	15,200	17,700	61.6	62.0	62.7	+ 0.7	62.4	63.1	+ 0.7
71	10th Street	north of Folsom Street	12,860	13,600	13,600	15,000	15,000	61.7	61.9	61.9	0.0	62.4	62.4	0.0
71	10th Street	south of Folsom Street	16,880	17,700	17,500	19,500	19,300	62.9	63.1	63.0	- 0.1	63.5	63.4	- 0.1
71	Folsom Street	west of 10th Street	23,420	24,400	23,900	26,800	26,300	64.3	64.5	64.4	- 0.1	64.9	64.8	- 0.1
71	Folsom Street	east of 10th Street	19,400	20,300	20,000	22,300	22,000	63.5	63.7	63.6	- 0.1	64.1	64.0	- 0.1

Source: ICF 2018; Fehr & Peers 2018, Better Market Street Vehicle Volumes.

Appendix 4: Construction Equipment

A list of the off-road construction equipment for each phase and sub-phase of the project is shown in Table 5.

TABLE 5. CONSTRUCTION PHASES AND OFF-ROAD EQUIPMENT

Phase	Sub-phase	Off-Road Equipment Type	Quantity	Hours/Day	Horsepower
Center Lanes and Rail Track Replacement	Grubbing/Land Clearing (Demolition)	Excavator	2	8	300
	Grading/Excavation (Earthwork and Grading)	Loader	2	8	100
	Drainage/Utilities/Sub-Grade (Utility Infrastructure: Track and Sewer)	Excavator	1	8	300
		Backhoe	1	8	90
		Skid-Steer Loader	1	8	50
		Loader	2	8	100
		Backhoe	1	8	90
	Paving (Roadbed and Curb Construction and Paving and Painting)	Tractors/Loaders/Backhoes	3	8	98
Outside/Curbside Lanes	Grubbing/Land Clearing (Demolition)	Excavator	2	8	300
	Grading/Excavation (Earthwork and Grading)	Loader	2	8	100
	Drainage/Utilities/Sub-Grade (Utility Infrastructure)	Excavator	1	8	300
		Backhoe	1	8	90
		Skid-Steer Loader	1	8	50
	Paving (Roadbed and Curb Construction and Paving and Painting/Coating)	Asphalt Paver	1	8	175
		Roller	2	8	125
		Sweeper	1	8	200
Sidewalks	Grubbing/Land Clearing (Demolition)	Backhoe	1	8	90
		Skid-Steer Loader	1	8	50
	Grading/Excavation (Earthwork and Grading)	Backhoe	1	8	90
		Skid-Steer Loader	1	8	50
	Drainage/Utilities/Sub-Grade (Utility Infrastructure)	Backhoe	2	8	90
		Boom Truck	1	8	250
		Bucket Truck	1	8	200
	Paving (Roadbed and Curb Construction and Paving and Painting/Coating)	Tractors/Loaders/Backhoes	3	8	98

Phase	Sub-phase	Off-Road Equipment Type	Quantity	Hours/Day	Horsepower
Intersections	Grubbing/Land Clearing (Demolition)	Crawler Tractors	1	8	208
		Excavators	2	8	163
		Signal Boards	1	8	6
	Grading/Excavation (Earthwork and Grading)	Crawler Tractors	1	8	208
		Excavators	3	8	163
		Graders	2	8	175
		Rollers	2	8	81
		Rubber-Tired Loaders	1	8	200
		Scrapers	2	8	362
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	4	8	98
	Drainage/Utilities/Sub-Grade (Utility Infrastructure)	Air Compressors	1	8	78
		Generator Sets	1	8	84
		Graders	1	8	175
		Plate Compactors	1	8	8
		Pumps	1	8	84
		Rough-Terrain Forklifts	1	8	100
		Scrapers	1	8	362
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	3	8	98
	Paving (Roadbed and Curb Construction and Paving and Painting/Coating)	Pavers	1	8	126
		Paving Equipment	1	8	131
		Rollers	2	8	81
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	3	8	98

Phase	Sub-phase	Off-Road Equipment Type	Quantity	Hours/Day	Horsepower
Traction Power	Grubbing/Land Clearing (Demolition)	Crawler Tractors	1	8	208
		Excavators	2	8	163
		Signal Boards	1	8	6
	Grading/Excavation (Earthwork and Grading)	Crawler Tractors	1	8	208
		Excavators	3	8	163
		Graders	2	8	175
		Rollers	2	8	81
		Rubber-Tired Loaders	1	8	200
		Scrapers	2	8	362
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	4	8	98
	Drainage/Utilities/Sub-Grade (Utility Infrastructure)	Air Compressors	1	8	78
		Generator Sets	1	8	84
		Graders	1	8	175
		Plate Compactors	1	8	8
		Pumps	1	8	84
		Rough-Terrain Forklifts	1	8	100
		Scrapers	1	8	362
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	3	8	98
	Paving (Roadbed and Curb Construction and Paving and Painting/Coating)	Pavers	1	8	126
		Paving Equipment	1	8	131
		Rollers	2	8	81
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	3	8	98

Phase	Sub-phase	Off-Road Equipment Type	Quantity	Hours/Day	Horsepower
Special Track Construction	Grubbing/Land Clearing (Demolition)	Excavator	2	8	300
	Grading/Excavation (Earthwork and Grading)	Loader	1	8	100
		Roller	1	8	100
		Bulldozer	1	8	100
	Drainage/Utilities/Sub-Grade (Utility Infrastructure)	Loader	1	8	100
		Excavator	1	8	300
		Boom Truck	1	8	125
	Paving (Roadbed and Curb Construction and Paving and Painting/Coating)	Asphalt Paver	1	8	175
		Roller	1	8	125
		Sweeper	1	8	200
2nd Street Connection	Grubbing/Land Clearing (Demolition)	Crawler Tractors	1	8	208
		Excavators	2	8	163
		Signal Boards	1	8	6
	Grading/Excavation (Earthwork and Grading)	Crawler Tractors	1	8	208
		Excavators	3	8	163
		Graders	2	8	175
		Rollers	2	8	81
		Rubber-Tired Loaders	1	8	200
		Scrapers	2	8	362
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	4	8	98
	Drainage/Utilities/Sub-Grade (Utility Infrastructure)	Air Compressors	1	8	78
		Generator Sets	1	8	84
		Graders	1	8	175
		Plate Compactors	1	8	8
		Pumps	1	8	84
		Rough-Terrain Forklifts	1	8	100
		Scrapers	1	8	362
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	3	8	98

Phase	Sub-phase	Off-Road Equipment Type	Quantity	Hours/Day	Horsepower
	Paving (Roadbed and Curb Construction and Paving and Painting/Coating)	Pavers	1	8	126
		Paving Equipment	1	8	131
		Rollers	2	8	81
		Signal Boards	1	8	6
		Tractors/Loaders/Backhoes	3	8	98

Appendix 5: MTA Market Street Streetcar Vibration

Streetcar Vibration Measurements

To model the potential future vibration generated by operation of the Better Market Street proposed project, first the existing vibration from streetcar operations was measured and compared to the generalized curve developed by the Federal Transit Administration for streetcar operations. Measurements were conducted at one or two distances per location, one at the façade and/or one at the curb or similar intermediate distance between the building to obtain a range of data. This data is shown in Figure 4.C-5 in Section 4.C, *Noise*. At each location, the actual speed varied, not always achieving 25 mph. Also, there was a range of vibration that is likely related to wheel and suspension design, with the Milan cars generating vibration in the higher end of the range; some PCC streetcars also fell at the upper end of the range. Lastly, while crossovers were identified, there seemed to be several places where joints or wheel flats caused vibration to occur higher than anticipated. Thus, the envelope identified for SFMTA streetcars moving through crossovers (solid blue) is closer than usual to the non-crossover curve (dotted blue). In general, with standard direct-fixation track fasteners there is no difference expected compared to ballasted track. In particular much of the existing F-Line has been constructed with embedded ballasted track which is even stiffer. Therefore, the future condition with direct fixation track is expected to be similar to the existing condition.

Appendix 6: Buffer Differences for Building Damage from Vibration

Buffer Distances for Vibration Impact

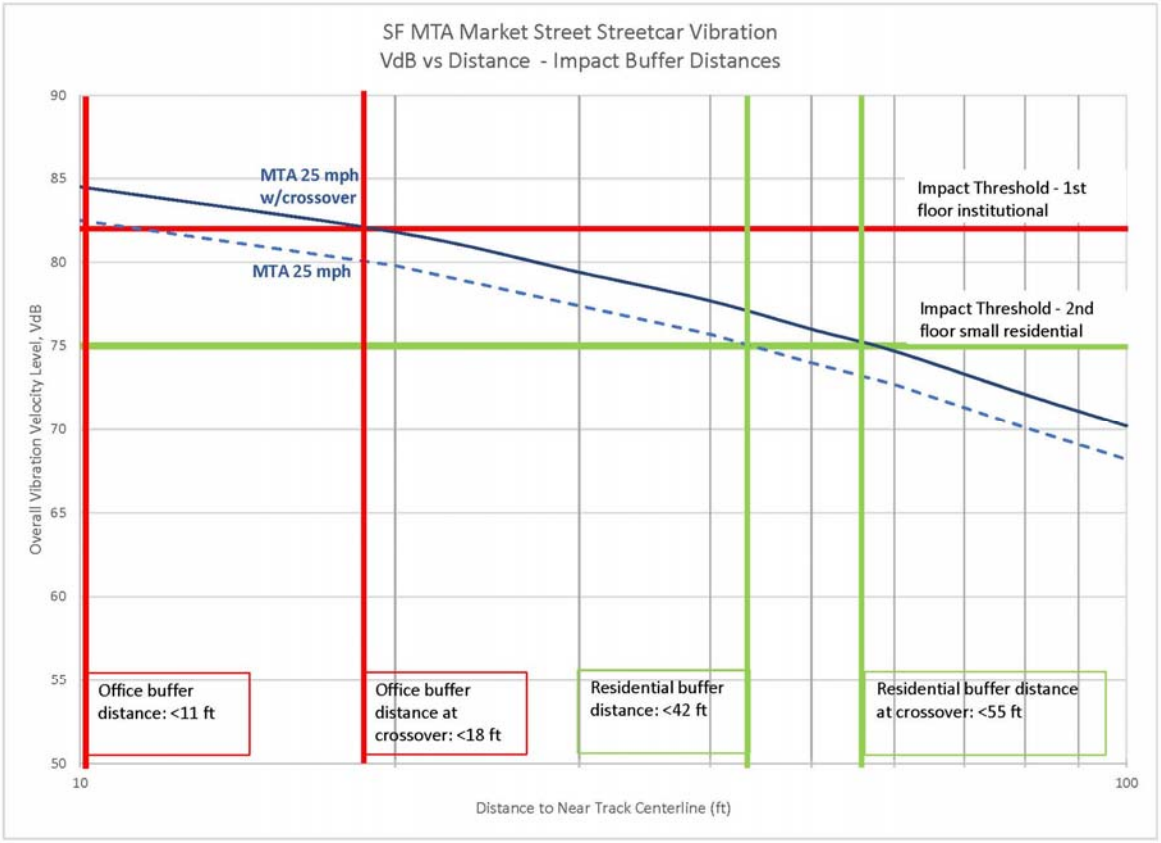
The blue curves shown in Figure 4.C-5 were used to establish impact buffer distances and evaluate the potential annoyance of occupants at residential buildings under existing and project conditions. Impact buffer distances are the same for existing and future conditions. Although there can be site-specific differences in the way vibration propagates through the soil or subsurface strata, at close distances (i.e., less than 100 feet), those differences are small. The "vibration vs. distance" curve shown in Figure 9 was developed from the SFMTA streetcar data, and takes into account the worst-case vibration sources (i.e., Milan and several other streetcars). These impact buffer distances for the proposed project are based on Federal Transit Administration thresholds and SFMTA streetcar data.

The method for determining the vibration impact at any specific building is as follows:

1. Identify the distance from the building façade to the near-track centerline.
2. Apply that distance to Figure 9 to determine the expected ground vibration (exterior).
3. Apply speed correction at the proposed F-loop area (5 mph): -14 dB at curves and special trackwork, -4 dB at tangent track
4. Apply analysis adjustments, based on the Federal Transit Administration methodology:
    a. Building coupling loss: -7 dB for one- to two-story masonry buildings; -10 dB, and even more, for larger buildings
    b. Floor resonance: +6 dB
    c. Floor-to-floor loss: -2 dB per floor up to 5 floors, -1 dB per floor up to 10th floor
    d. The net adjustment for estimating interior vibration on the second floor of a small residential building is 3 dB below the vibration expected on the ground level outside the building. For larger buildings, the net adjustment is 6 dB below ground-level vibration.
    e. If applicable, calculate the ground-borne noise level in dBA by adding -35 dB to the vibration level.

The corresponding buffer distances for small residential buildings (e.g., one- or two-story masonry buildings) from track without and with crossovers are 42 feet and 55 feet, respectively at 25 mph operating speed. These are shown in Figure 9. This is a conservative approach, as the many larger buildings would provide even more coupling loss and possibly less floor resonance. An impact buffer distance of 55 feet was developed based on the potential impact for small residential structures with these building adjustment factors: -7 dB coupling loss, -2 dB to the second floor, +6 dB floor amplification. Combined with the interior vibration criterion of 72 VdB for residences, the exterior ground vibration would have to be 75 VdB or greater to generate vibration impact at the small residential structures, which corresponds to a 55-foot distance from the near track centerline from crossovers or special trackwork; 42 feet distance for tangent (straight) track. However, for larger residential buildings, that buffer distance reduces to 35 feet from special trackwork and 25 feet from tangent track, respectively. For office buildings, which are all substantial structures, the net negative adjustment is 10 dB to the interior vibration on the ground floor; so even with a crossover, the buffer distance for impacts is 18 feet at 25 mph.

FIGURE 9: VIBRATION IMPACT BUFFER DISTANCES



The construction vibration impact assessment was conducted in accordance with Caltrans guidance, which identifies the source vibration and scales the vibration amplitude with distance to the sensitive receptor, as discussed below. The construction equipment associated with the construction phasing and work zones developed by the project sponsor was reviewed in consideration of source vibration values for the different types of construction equipment in Table 4.C-13 in Section 4.C, *Noise*, which were then used to estimate construction vibration levels. Table 4.C-13 summarizes the source vibration values, which were adjusted for distance using the equation below. For this analysis, the hoe ram vibration value was also applied to the backhoe, excavator and tractor; the large bulldozer vibration value was also applied to the scraper and grader; and the jackhammer vibration value was also applied to the plate compactor. The following equation was applied to determine buffer distances from construction vibration for each applicable criteria value. The analysis assumes that the proposed project would comply with the requirements of Public Works' standard construction measures.

Buffer Distance (feet) = $(PPV_{ref}/PPV_{limit})^{1/n}$ x 25

PPV_{ref} = source reference vibration at 25 feet

PPV_{limit} = target criteria limit

n = soil attenuation rate (non-dimensional)

The Federal Transit Administration recommends the use of n=1.5 for "typical soils." Caltrans suggests the use of 1.3 for competent soils (e.g., most sands, sandy clays, silty clays), and this value was used in this analysis because it assumes a slower attenuation rate with distance and it is more conservative.

This information was used to develop buffer distances for building damage, as shown in Figure 10 for historic structures and Figure 11 for all structures.

FIGURE 10: BUFFER DISTANCES FOR BUILDING DAMAGE (HISTORIC STRUCTURES)

				Criteria Categories and Vibration Limits (PPV in/sec)			
				Criteria: Fragile Historic (PPV In/s)		Criteria: Historic (PPV in/s)	
				Transient	Continuous/Freq Intermittent	Transient	Continuous/Freq Intermittent
				0.2	0.1	0.5	0.25
Phase	Subphase	Maximum Vibration Sources	Character	Buffer distance	Buffer distance	Buffer distance	Buffer distance
Center Lanes/Rail Track	Demolition, Utilities	Backhoe, Excavtor	Transient	13		7	
Outside/Curb Lanes	Demolition, Utilities	Backhoe, Excavtor	Transient	13		7	
	Paving	Roller	Continuous/Freq. Intermittment		44		22
Sidewalks	Demolition, Gradiing, Utilities	Backhoe	Transient	13		7	
Intersections	Demolition, Gradiing, Utilities	Backhoe, Excavtor	Transient	13		7	
	Paving	Roller	Continuous/Freq. Intermittment		44		22
	Utilities	Plate Compactors	Continuous/Freq. Intermittment		11		6
Traction Power	Demolition, Gradiing, Utilities	Backhoe, Excavtor	Transient	13		7	
	Paving	Roller	Continuous/Freq. Intermittment		44		22
	Utilities	Plate Compactors	Continuous/Freq. Intermittment		11		6
Special Track Construction	Demolition, Gradiing, Utilities	Backhoe, Excavtor	Transient	13		7	
	Paving and Grading	Roller	Continuous/Freq. Intermittment		44		22
	Utilities	Plate Compactors	Continuous/Freq. Intermittment		11		6

FIGURE 11: BUFFER DISTANCES FOR BUILDING DAMAGE (ALL STRUCTURES)

				Criteria Categories and Vibration Limits (PPV in/sec)											
			1.3	Criteria: Extremely Fragile		Criteria: Fragile		Criteria: Historic		Criteria: Older residential		Criteria: New residential		Criteria: Modern Industrial	
				Transient	Continuous/Freq Intermittent	Transient	Continuous/Freq Intermittent	Transient	Continuous/Freq Intermittent	Transient	Continuous/Freq Intermittent	Transient	Continuous/Freq Intermittent	Transient	Continuous/Freq Intermittent
				0.12	0.08	0.2	0.1	0.5	0.25	0.5	0.3	1	0.5	2	0.5
Phase	Subphase	Maximum Vibration Sources	Character	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance	Buffer distance
Center Lanes/Rail Track	Demolition, Utilities	Backhoe, Excavator	Transient	20		13		7		7		4		2	
Outside/Curb Lanes	Demolition, Utilities	Backhoe, Excavator	Transient	20		13		7		7		4		2	
	Paving	Roller	Continuous/Freq. Intermittent		53		44		22		19		13		13
Sidewalks	Demolition, Grading, Utilities	Backhoe	Transient	20		13		7		7		4		2	
Intersections	Demolition, Grading, Utilities	Backhoe, Excavator	Transient	20		13		7		7		4		2	
	Paving	Roller	Continuous/Freq. Intermittent		53		44		22		19		13		13
	Utilities	Plate Compactors	Continuous/Freq. Intermittent		13		11		6		5		3		3
Traction Power	Demolition, Grading, Utilities	Backhoe, Excavator	Transient	20		13		7		7		4		2	
	Paving	Roller	Continuous/Freq. Intermittent		53		44		22		19		13		13
	Utilities	Plate Compactors	Continuous/Freq. Intermittent		13		11		6		5		3		3
Special Track Construction	Demolition, Grading, Utilities	Backhoe, Excavator	Transient	20		13		7		7		4		2	
	Paving and Grading	Roller	Continuous/Freq. Intermittent		53		44		22		19		13		13
	Utilities	Plate Compactors	Continuous/Freq. Intermittent		13		11		6		5		3		3

APPENDIX 9: AIR QUALITY MODELING MATERIALS

APPENDICES

Appendix 1: Detailed Construction Emissions Results
Appendix 2: Construction Modeling Assumptions
Appendix 3: Operational Modeling Assumptions

Appendix 1: Detailed Construction Emissions Results

Unmitigated Construction Emissions

		CRITERIA AIR POLLUTANTS Total Tons/Stage (unless otherwise noted)			
Construction Stage		**ROG**	**Nox**	**PM 10 Exhaust**	**PM 2.5 Exhaust**
1-Center Lanes and Rail Track Replacement[a]		0.05	1.26	0.04	0.03
2-Outside/Curbside Lanes		0.07	1.83	0.02	0.01
3-Sidewalks		0.03	0.80	0.01	0.01
4-Intersections		0.15	3.87	0.04	0.02
5-Traction Power Duct Bank Work (Market Street)[b]		0.13	3.26	0.02	0.02
lbs per tons X 2 segments[c]	4,000	1,707.11	44,064.41	504.38	366.37
6-Traction Power Duct Bank Work (2nd and Stevenson streets)[b]		0.13	3.27	0.02	0.02
lbs per ton x 1 segment[d]	2,000	261.63	6,541.53	39.28	33.03
Annual Total (lbs/year)		1,968.74	50,605.94	543.66	399.41
Average Daily/workday (lbs/day)	235	8.34	215.34	2.31	1.70
Threshold (lbs/day)		*54*	*54*	*82*	*54*

[a] Emissions presented in this stage includes those for special track construction.

[b] The utility infrastructure sub-stage includes Muni traction power duct bank work under Market Street and under 2nd and Stevenson streets. For the purpose of this analysis, Muni traction power duct bank work under Market Street and traction power duct bank work under 2nd and Stevenson streets were modeled separately and added to the construction emissions of the four primary stages.

[c] Activities during several stages would occur concurrently, and as such it was assumed that, during these periods of overlap, all equipment would operate concurrently. Additionally, construction of up to two segments could be constructed in any given year. Therefore, construction emissions were modeled for one construction segment and then conservatively doubled to account for concurrent construction of a second segment.

[d] The proposed project only requires one construction segment with traction power duct bank work under 2nd and Stevenson streets, so construction emissions for this segment in any given year were not doubled in the analysis.

Mitigated Construction Emissions

		CRITERIA AIR POLLUTANTS Total Tons/Stage (unless otherwise noted)			
Construction Stage		**ROG**	**Nox**	**PM 10 Exhaust**	**PM 2.5 Exhaust**
1-Center Lanes and Rail Track Replacement[a]		0.05	0.29	0.02	0.01
2-Outside/Curbside Lanes		0.07	0.51	0.02	0.01
3-Sidewalks		0.03	0.27	0.01	0.01
4-Intersections		0.13	1.15	0.04	0.02
5-Traction Power Duct Bank Work (Market Street)[b]		0.12	0.54	0.02	0.01
lbs per tons X 2 segments[c]	4,000	1,604.01	10,999.83	403.75	250.30
6-Traction Power Duct Bank Work (2nd and Stevenson streets)[b]		0.12	0.55	0.02	0.01
lbs per ton x 1 segment[d]	2,000	235.11	1,100.72	36.59	28.79
Annual Total (lbs/year)		1,839.12	12,100.55	440.34	279.09
Average Daily/workday (lbs/day)	235	7.83	51.49	1.87	1.19
Threshold (lbs/day)		*54*	*54*	*82*	*54*

[a] Emissions presented in this stage includes those for special track construction.

[b] The utility infrastructure sub-stage includes Muni traction power duct bank work under Market Street and under 2nd and Stevenson streets. For the purpose of this analysis, Muni traction power duct bank work under Market Street and traction power duct bank work under 2nd and Stevenson streets were modeled separately and added to the construction emissions of the four primary stages.

[c] Activities during several stages would occur concurrently, and as such it was assumed that, during these periods of overlap, all equipment would operate concurrently. Additionally, construction of up to two segments could be constructed in any given year. Therefore, construction emissions were modeled for one construction segment and then conservatively doubled to account for concurrent construction of a second segment.

[d] The proposed project only requires one construction segment with traction power duct bank work under 2nd and Stevenson streets, so construction emissions for this segment in any given year were not doubled in the analysis.

Appendix 2: Construction Modeling Assumptions

On-Road General Construction Assumptions (all values per day)

Stage and Sub-stage	Soil (cy)	Pavement (cy)	Trucks (trips)	Workers (trips)	Water Trucks	Acres Graded
Center Lanes and Rail Track Replacement (5 months)						
Grubbing/Land Clearing	0	1,200	10	16	1	0.05
Grading/Excavation	0	0	0	8	1	0.10
Drainage/Utilities/Sub-Grade	1,100	0	4	32	1	0.57
Paving	0	600	10	20	1	0.00
Center Lanes Rail Track - Special Track (2 months)						
Grubbing/Land Clearing	0	325	10	16	1	0.20
Grading/Excavation	75	0	3	12	1	0.20
Drainage/Utilities/Sub-Grade	175	0	4	20	1	0.20
Paving	0	125	6	104	1	0.00
Outside Curb Lanes (7 months)						
Grubbing/Land Clearing	0	550	10	10	1	0.59
Grading/Excavation	0	0	0	8	1	0.59
Drainage/Utilities/Sub-Grade	75	0	4	16	1	0.59
Paving	0	550	29	56	1	0.00
Sidewalks (10 months)						
Grubbing/Land Clearing	0	2,070	6	8	1	1.29
Grading/Excavation	500	0	4	6	1	0.05
Drainage/Utilities/Sub-Grade	150	0	2	10	1	0.03
Paving	0	2,070	4	12	1	0.00
Intersections (6 months)						
Grubbing/Land Clearing	0	0	0	10	1	0.15
Grading/Excavation	0	0	0	40	1	0.15
Drainage/Utilities/Sub-Grade	1,100	0	55	28	1	0.15
Paving	0	2,070	104	20	1	0.00
Traction Power Duct Bank Work (Market Street) (6 months)						
Grubbing/Land Clearing	57	0	3	10	1	2.34
Grading/Excavation	0	0	0	40	1	2.34
Drainage/Utilities/Sub-Grade	10	0	1	28	1	2.34
Paving	0	0	0	20	1	0.00
Traction Power Duct Bank Work (2nd and Stevenson streets) (6 months)						
Grubbing/Land Clearing	0	0	0	10	1	0.11
Grading/Excavation	0	0	0	40	1	0.11
Drainage/Utilities/Sub-Grade	24	0	2	28	1	0.11
Paving	0	87	5	20	1	0.00

Off-Road Construction Equipment Assumptions

Stage and Sub-stage	Equipment	Number per Day	HP	Hours per Day
Center Lanes and Rail Track Replacement				
Grubbing/Land Clearing	Excavators[a]	2	300	8
Grading/Excavation	Tractors/Loaders/Backhoes	2	100	8
Drainage/Utilities/Sub-Grade	Excavators	1	300	8
	Skid Steer Loaders	1	50	8
	Tractors/Loaders/Backhoes	2	90	8
	Tractors/Loaders/Backhoes	2	100	8
Paving	Pavers[b]	1	175	8
	Rollers[b]	2	125	8
	Sweepers/Scrubbers[b]	1	200	8
Center Lanes Rail Track - Special Track				
Grubbing/Land Clearing	Excavators[a]	2	300	8
Grading/Excavation	Tractors/Loaders/Backhoes	1	100	8
	Rollers	1	100	8
	Rubber Tired Dozers	1	100	8
Drainage/Utilities/Sub-Grade	Tractors/Loaders/Backhoes	1	100	8
	Excavators	1	300	8
	Off-Highway Truck	1	125	8
Paving	Pavers	1	175	8
	Rollers	1	125	8
	Sweepers/Scrubbers	1	200	8
Outside Curb Lanes				
Grubbing/Land Clearing	Excavators[a]	2	300	8
Grading/Excavation	Tractors/Loaders/Backhoes	2	100	8
Drainage/Utilities/Sub-Grade	Excavators	1	300	8
	Skid Steer Loaders	1	50	8
	Tractors/Loaders/Backhoes	2	90	8
	Tractors/Loaders/Backhoes	2	100	8
Paving	Pavers	1	175	8
	Rollers	2	125	8
	Sweepers/Scrubbers	1	200	8
Sidewalks				
Grubbing/Land Clearing	Tractors/Loaders/Backhoes	1	90	8
	Skid Steer Loaders	1	50	8
Grading/Excavation	Tractors/Loaders/Backhoes	1	90	8
	Skid Steer Loaders	1	50	8

Drainage/Utilities/Sub-Grade	Tractors/Loaders/Backhoes	2	90	8
	Off-Highway Trucks	1	250	8
	Off-Highway Trucks	1	200	8
Paving	Pavers[a]	1	175	8
	Rollers[a]	2	125	8
	Sweepers/Scrubbers[a]	1	200	8
Intersections				
Grubbing/Land Clearing	Crawler Tractors	1	208	8
	Excavators	2	163	8
	Tractors/Loaders/Backhoes[a]	3	98	8
Grading/Excavation	Crawler Tractors	1	208	8
	Excavators	3	163	8
	Graders	2	175	8
	Rollers	2	81	8
	Rubber Tired Loaders	1	200	8
	Scrapers	2	362	8
	Tractors/Loaders/Backhoes	4	98	8
Drainage/Utilities/Sub-Grade	Air Compressors	1	78	8
	Generator Sets	1	84	8
	Graders	1	175	8
	Plate Compactors	1	8	8
	Pumps	1	84	8
	Rough Terrain Forklifts	1	100	8
	Scrapers	1	362	8
Paving	Pavers	1	126	8
	Paving Equipment	1	131	8
	Rollers	2	81	8
	Tractor/Loaders/Backhoes	3	98	8
Traction Power Duct Bank Work (Market Street)				
Grubbing/Land Clearing	Crawler Tractors	1	208	8
	Excavators	2	163	8
	Tractors/Loaders/Backhoes[a]	3	98	8
Grading/Excavation	Crawler Tractors	1	208	8
	Excavators	3	163	8
	Graders	2	175	8
	Rollers	2	81	8
	Rubber Tired Loaders	1	200	8
	Scrapers	2	362	8
	Tractors/Loaders/Backhoes	4	98	8
	Air Compressors	1	78	8

Drainage/Utilities/Sub-Grade	Generator Sets	1	84	8
	Graders	1	175	8
	Plate Compactors	1	8	8
	Pumps	1	84	8
	Rough Terrain Forklifts	1	100	8
	Scrapers	1	362	8
Paving	Pavers	1	126	8
	Paving Equipment	1	131	8
	Rollers	2	81	8
	Tractor/Loaders/Backhoes	3	98	8
Traction Power Duct Bank Work (2nd and Stevenson streets)				
Grubbing/Land Clearing	Crawler Tractors	1	208	8
	Excavators	2	163	8
	Tractors/Loaders/Backhoes[a]	3	98	8
Grading/Excavation	Crawler Tractors	1	208	8
	Excavators	3	163	8
	Graders	2	175	8
	Rollers	2	81	8
	Rubber Tired Loaders	1	200	8
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Drainage/Utilities/Sub-Grade	Air Compressors	1	78	8
	Generator Sets	1	84	8
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	Plate Compactors	1	8	8
	Pumps	1	84	8
	Rough Terrain Forklifts	1	100	8
	Scrapers	1	362	8
Paving	Pavers	1	126	8
	Paving Equipment	1	131	8
	Rollers	2	81	8
	Tractor/Loaders/Backhoes	3	98	8

[a] The construction equipment assumption for the sub-stage accounts for the use of a hoe ram.

[b] The construction equipment assumptions associated with the pavings sub-stage in the Outside Curb Lanes stage accounted for paving activities in the Center Lanes and Rail Track Replacement stage and the Sidewalks stage for the full right-of-way. Due to schedule overlaps between the aforementioned stages and to avoid overestimating off-road construction emissions, CalEEMod only included the off-road construction equipment assumptions associated with the paving sub-stage in the Outside Curb Lanes stage.

Unmitigated Off-Road Equipment Emission Factors (g/hp-hr)

Equipment	ROG	NOx	PM10	PM2.5	CO2	CH4	N2O
Excavators	0.12	3.79	0.09	0.09	530.61	0.03	0.01
Tractors/Loaders/Backhoes	0.19	4.75	0.19	0.19	530.61	0.03	0.01
Skid Steer Loaders	0.23	4.75	0.19	0.19	530.61	0.03	0.01
Rollers	0.23	4.75	0.03	0.03	530.61	0.03	0.01
Rubber Tired Dozers	0.23	4.75	0.03	0.03	530.61	0.03	0.01
Pavers	0.19	4.17	0.02	0.02	530.61	0.03	0.01
Sweepers/Scrubbers	0.12	4.15	0.01	0.01	530.61	0.03	0.01
Off-Highway Trucks	0.19	4.17	0.02	0.02	530.61	0.03	0.01
Crawler Tractors	0.12	4.15	0.01	0.01	530.61	0.03	0.01
Graders	0.12	4.15	0.01	0.01	530.61	0.03	0.01
Rubber Tired Loaders	0.12	4.15	0.01	0.01	530.61	0.03	0.01
Scrapers	0.12	3.79	0.01	0.01	530.61	0.03	0.01
Air Compressors	0.23	4.75	0.03	0.03	530.61	0.03	0.01
Generator Sets	0.23	4.75	0.03	0.03	530.61	0.03	0.01
Plate Compactors	0.29	4.63	0.04	0.04	530.61	0.03	0.01
Pumps	0.23	4.75	0.03	0.03	530.61	0.03	0.01
Rough Terrain Forklifts	0.23	4.75	0.03	0.03	530.61	0.03	0.01
Paving Equipment	0.19	4.17	0.02	0.02	530.61	0.03	0.01

Mitigated Off-Road Equipment Emission Factors (g/hp-hr)

Low HP	High HP	ROG	NOx	PM10	PM2.5
50	75	0.19	3.33	0.02	0.02
75	100	0.15	0.30	0.02	0.01
100	175	0.15	0.30	0.02	0.01
175	300	0.15	0.30	0.02	0.01
300	600	0.15	0.30	0.02	0.01

Appendix 3: Operational Modeling Assumptions

Intersection/Segment/Vehicle	2020 No Project				2020 Project				2040 No Project				2040 Project			
	Volumes		Miles		Volumes		Miles		Volumes		Miles		Volumes		Miles	
	Peak Hr	Daily	Peak Hr	Daily	Peak Hr	Daily	Peak Hr	Daily	Peak Hr	Daily	Peak Hr	Daily	Peak Hr	Daily	Peak Hr	Daily
Third-Kearny and Market																
Segment 1 (NB dept)	1,660	16,600	72	725	1,620	16,200	71	707	1,830	18,300	80	799	1,780	17,800	78	777
Light/Med	*1,575*	*15,753*	*69*	*688*	*1,537*	*15,374*	*67*	*671*	*1,737*	*17,367*	*76*	*758*	*1,689*	*16,892*	*74*	*737*
Gasoline	1,521	15,210	66	664	1,484	14,844	65	648	1,602	16,022	70	699	1,558	15,585	68	680
Diesel	34	336	1	15	33	328	1	14	50	501	2	22	49	488	2	21
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	21	207	1	9	20	202	1	9	84	843	4	37	82	820	4	36
Heavy	*35*	*349*	*2*	*15*	*34*	*340*	*1*	*15*	*38*	*384*	*2*	*17*	*37*	*374*	*2*	*16*
Gasoline	3	33	0	1	3	32	0	1	2	24	0	1	2	23	0	1
Diesel	30	305	1	13	30	297	1	13	35	350	2	15	34	340	1	15
Natural Gas	1	11	0	0	1	11	0	0	1	10	0	0	1	10	0	0
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*50*	*498*	*2*	*22*	*49*	*486*	*2*	*21*	*55*	*549*	*2*	*24*	*53*	*534*	*2*	*23*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	15	149	1	7	15	146	1	6	16	165	1	7	16	160	1	7
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	35	349	2	15	34	340	1	15	38	384	2	17	37	374	2	16
Segment 2 (EB app + WB dept)	410	4,100	18	182	60	600	3	27	480	4,800	21	214	110	1,100	5	49
Light/Med	*389*	*3,891*	*17*	*173*	*57*	*569*	*3*	*25*	*456*	*4,555*	*20*	*203*	*104*	*1,044*	*5*	*46*
Gasoline	376	3,757	17	167	55	550	2	24	420	4,203	19	187	96	963	4	43
Diesel	8	83	0	4	1	12	0	1	13	131	1	6	3	30	0	1
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	5	51	0	2	1	7	0	0	22	221	1	10	5	51	0	2
Heavy	*9*	*86*	*0*	*4*	*1*	*13*	*0*	*1*	*10*	*101*	*0*	*4*	*2*	*23*	*0*	*1*
Gasoline	1	8	0	0	0	1	0	0	1	6	0	0	0	1	0	0
Diesel	8	75	0	3	1	11	0	0	9	92	0	4	2	21	0	1
Natural Gas	0	3	0	0	0	0	0	0	0	3	0	0	0	1	0	0
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*12*	*123*	*1*	*5*	*2*	*18*	*0*	*1*	*14*	*144*	*1*	*6*	*3*	*33*	*0*	*1*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	4	37	0	2	1	5	0	0	4	43	0	2	1	10	0	0
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	9	86	0	4	1	13	0	1	10	101	0	4	2	23	0	1
Segment 3 (NB app)	1,550	15,500	82	818	1,600	16,000	84	845	1,710	17,100	90	903	1,760	17,600	93	929
Light/Med	*1,471*	*14,710*	*78*	*777*	*1,518*	*15,184*	*80*	*802*	*1,623*	*16,228*	*86*	*857*	*1,670*	*16,702*	*88*	*882*
Gasoline	1,420	14,202	75	750	1,466	14,661	77	774	1,497	14,972	79	791	1,541	15,409	81	814
Diesel	31	314	2	17	32	324	2	17	47	468	2	25	48	482	3	25
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	19	193	1	10	20	200	1	11	79	788	4	42	81	811	4	43
Heavy	*33*	*326*	*2*	*17*	*34*	*336*	*2*	*18*	*36*	*359*	*2*	*19*	*37*	*370*	*2*	*20*
Gasoline	3	30	0	2	3	31	0	2	2	22	0	1	2	23	0	1
Diesel	28	284	2	15	29	294	2	15	33	327	2	17	34	337	2	18
Natural Gas	1	11	0	1	1	11	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*47*	*465*	*2*	*25*	*48*	*480*	*3*	*25*	*51*	*513*	*3*	*27*	*53*	*528*	*3*	*28*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	140	1	7	14	144	1	8	15	154	1	8	16	158	1	8
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	326	2	17	34	336	2	18	36	359	2	19	37	370	2	20
Segment 4 (WB app Market + EB dep)	420	4,200	22	221	50	500	3	26	490	4,900	26	258	100	1,000	5	53
Light/Med	*399*	*3,986*	*21*	*210*	*47*	*475*	*3*	*25*	*465*	*4,650*	*25*	*245*	*95*	*949*	*5*	*50*
Gasoline	385	3,848	20	203	46	458	2	24	429	4,290	23	226	88	876	5	46

Diesel	8	85	0	4	1	10	0	1	13	134	1	7	3	27	0	1
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	5	52	0	3	1	6	0	0	23	226	1	12	5	46	0	2
Heavy	*9*	*88*	*0*	*5*	*1*	*11*	*0*	*1*	*10*	*103*	*1*	*5*	*2*	*21*	*0*	*1*
Gasoline	1	8	0	0	0	1	0	0	1	6	0	0	0	1	0	0
Diesel	8	77	0	4	1	9	0	0	9	94	0	5	2	19	0	1
Natural Gas	0	3	0	0	0	0	0	0	0	3	0	0	0	1	0	0
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*13*	*126*	*1*	*7*	*2*	*15*	*0*	*1*	*15*	*147*	*1*	*8*	*3*	*30*	*0*	*2*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	4	38	0	2	0	5	0	0	4	44	0	2	1	9	0	0
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	9	88	0	5	1	11	0	1	10	103	1	5	2	21	0	1
Segment 5 (WB app Geary)	100	1,000	1	8	30	300	0	2	110	1,100	1	8	30	300	0	2
Light/Med	*95*	*949*	*1*	*7*	*28*	*285*	*0*	*2*	*104*	*1,044*	*1*	*8*	*28*	*285*	*0*	*2*
Gasoline	92	916	1	7	27	275	0	2	96	963	1	7	26	263	0	2
Diesel	2	20	0	0	1	6	0	0	3	30	0	0	1	8	0	0
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	1	12	0	0	0	4	0	0	5	51	0	0	1	14	0	0
Heavy	*2*	*21*	*0*	*0*	*1*	*6*	*0*	*0*	*2*	*23*	*0*	*0*	*1*	*6*	*0*	*0*
Gasoline	0	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Diesel	2	18	0	0	1	6	0	0	2	21	0	0	1	6	0	0
Natural Gas	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*3*	*30*	*0*	*0*	*1*	*9*	*0*	*0*	*3*	*33*	*0*	*0*	*1*	*9*	*0*	*0*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	1	9	0	0	0	3	0	0	1	10	0	0	0	3	0	0
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	2	21	0	0	1	6	0	0	2	23	0	0	1	6	0	0
Third and Mission																
Segment 1 (SB app + NB dept)	1,590	15,900	101	1,008	1,640	16,400	104	1,040	1,770	17,700	112	1,122	1,820	18,200	115	1,154
Light/Med	*1,509*	*15,089*	*96*	*957*	*1,556*	*15,564*	*99*	*987*	*1,680*	*16,797*	*107*	*1,065*	*1,727*	*17,272*	*110*	*1,095*
Gasoline	1,457	14,569	92	924	1,503	15,027	95	953	1,550	15,497	98	983	1,593	15,935	101	1,010
Diesel	32	322	2	20	33	332	2	21	48	485	3	31	50	498	3	32
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	198	1	13	20	205	1	13	82	815	5	52	84	838	5	53
Heavy	*33*	*334*	*2*	*21*	*34*	*344*	*2*	*22*	*37*	*372*	*2*	*24*	*38*	*382*	*2*	*24*
Gasoline	3	31	0	2	3	32	0	2	2	23	0	1	2	24	0	2
Diesel	29	292	2	18	30	301	2	19	34	339	2	21	35	348	2	22
Natural Gas	1	11	0	1	1	11	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*48*	*477*	*3*	*30*	*49*	*492*	*3*	*31*	*53*	*531*	*3*	*34*	*55*	*546*	*3*	*35*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	143	1	9	15	148	1	9	16	159	1	10	16	164	1	10
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	334	2	21	34	344	2	22	37	372	2	24	38	382	2	24
Segment 2 (EB app + WB dept)	1,570	15,700	136	1,359	1,580	15,800	137	1,368	1,730	17,300	150	1,497	1,740	17,400	151	1,506
Light/Med	*1,490*	*14,899*	*129*	*1,290*	*1,499*	*14,994*	*130*	*1,298*	*1,642*	*16,418*	*142*	*1,421*	*1,651*	*16,513*	*143*	*1,429*
Gasoline	1,439	14,386	125	1,245	1,448	14,477	125	1,253	1,515	15,147	131	1,311	1,523	15,234	132	1,319
Diesel	32	318	3	27	32	320	3	28	47	474	4	41	48	477	4	41
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	196	2	17	20	197	2	17	80	797	7	69	80	802	7	69
Heavy	*33*	*330*	*3*	*29*	*33*	*332*	*3*	*29*	*36*	*363*	*3*	*31*	*37*	*365*	*3*	*32*
Gasoline	3	31	0	3	3	31	0	3	2	23	0	2	2	23	0	2
Diesel	29	288	2	25	29	290	3	25	33	331	3	29	33	333	3	29

Natural Gas	1	11	0	1	1	11	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*47*	*471*	*4*	*41*	*47*	*474*	*4*	*41*	*52*	*519*	*4*	*45*	*52*	*522*	*5*	*45*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	141	1	12	14	142	1	12	16	156	1	13	16	157	1	14
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	330	3	29	33	332	3	29	36	363	3	31	37	365	3	32
Segment 3 (NB app + SB dept)	1,990	19,900	119	1,191	2,030	20,300	121	1,215	2,220	22,200	133	1,329	2,260	22,600	135	1,353
Light/Med	*1,889*	*18,885*	*113*	*1,130*	*1,926*	*19,265*	*115*	*1,153*	*2,107*	*21,068*	*126*	*1,261*	*2,145*	*21,447*	*128*	*1,284*
Gasoline	1,823	18,234	109	1,091	1,860	18,601	111	1,113	1,944	19,437	116	1,163	1,979	19,787	118	1,184
Diesel	40	403	2	24	41	411	2	25	61	608	4	36	62	619	4	37
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	25	248	1	15	25	253	2	15	102	1,023	6	61	104	1,041	6	62
Heavy	*42*	*418*	*3*	*25*	*43*	*426*	*3*	*26*	*47*	*466*	*3*	*28*	*47*	*475*	*3*	*28*
Gasoline	4	39	0	2	4	40	0	2	3	29	0	2	3	30	0	2
Diesel	37	365	2	22	37	372	2	22	42	425	3	25	43	432	3	26
Natural Gas	1	14	0	1	1	14	0	1	1	13	0	1	1	13	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*60*	*597*	*4*	*36*	*61*	*609*	*4*	*36*	*67*	*666*	*4*	*40*	*68*	*678*	*4*	*41*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	18	179	1	11	18	183	1	11	20	200	1	12	20	203	1	12
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	42	418	3	25	43	426	3	26	47	466	3	28	47	475	3	28
Segment 4 (WB app + EB dept)	1,610	16,100	95	946	1,570	15,700	92	923	1,780	17,800	105	1,046	1,740	17,400	102	1,023
Light/Med	*1,528*	*15,279*	*90*	*898*	*1,490*	*14,899*	*88*	*876*	*1,689*	*16,892*	*99*	*993*	*1,651*	*16,513*	*97*	*970*
Gasoline	1,475	14,752	87	867	1,439	14,386	85	845	1,558	15,585	92	916	1,523	15,234	90	895
Diesel	33	326	2	19	32	318	2	19	49	488	3	29	48	477	3	28
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	201	1	12	20	196	1	12	82	820	5	48	80	802	5	47
Heavy	*34*	*338*	*2*	*20*	*33*	*330*	*2*	*19*	*37*	*374*	*2*	*22*	*37*	*365*	*2*	*21*
Gasoline	3	32	0	2	3	31	0	2	2	23	0	1	2	23	0	1
Diesel	30	295	2	17	29	288	2	17	34	340	2	20	33	333	2	20
Natural Gas	1	11	0	1	1	11	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*48*	*483*	*3*	*28*	*47*	*471*	*3*	*28*	*53*	*534*	*3*	*31*	*52*	*522*	*3*	*31*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	145	1	9	14	141	1	8	16	160	1	9	16	157	1	9
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	34	338	2	20	33	330	2	19	37	374	2	22	37	365	2	21
Fourth and Mission																
Segment 1 (SB app + NB dept)	1,340	13,400	82	819	1,020	10,200	62	623	1,440	14,400	88	880	1,090	10,900	67	666
Light/Med	*1,272*	*12,717*	*78*	*777*	*968*	*9,680*	*59*	*592*	*1,367*	*13,666*	*84*	*835*	*1,034*	*10,344*	*63*	*632*
Gasoline	1,228	12,278	75	750	935	9,346	57	571	1,261	12,608	77	771	954	9,543	58	583
Diesel	27	271	2	17	21	206	1	13	39	394	2	24	30	299	2	18
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	17	167	1	10	13	127	1	8	66	663	4	41	50	502	3	31
Heavy	*28*	*281*	*2*	*17*	*21*	*214*	*1*	*13*	*30*	*302*	*2*	*18*	*23*	*229*	*1*	*14*
Gasoline	3	26	0	2	2	20	0	1	2	19	0	1	1	14	0	1
Diesel	25	246	2	15	19	187	1	11	28	275	2	17	21	208	1	13
Natural Gas	1	9	0	1	1	7	0	0	1	8	0	0	1	6	0	0
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*40*	*402*	*2*	*25*	*31*	*306*	*2*	*19*	*43*	*432*	*3*	*26*	*33*	*327*	*2*	*20*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	12	121	1	7	9	92	1	6	13	130	1	8	10	98	1	6
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Electric	28	281	2	17	21	214	1	13	30	302	2	18	23	229	1	14
Segment 2 (EB app + WB dept)	1,750	17,500	149	1,495	1,740	17,400	149	1,486	1,900	19,000	162	1,623	1,890	18,900	161	1,614
Light/Med	*1,661*	*16,608*	*142*	*1,419*	*1,651*	*16,513*	*141*	*1,410*	*1,803*	*18,031*	*154*	*1,540*	*1,794*	*17,936*	*153*	*1,532*
Gasoline	1,604	16,035	137	1,370	1,594	15,943	136	1,362	1,664	16,635	142	1,421	1,655	16,548	141	1,413
Diesel	35	354	3	30	35	352	3	30	52	520	4	44	52	518	4	44
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	22	218	2	19	22	217	2	19	88	875	7	75	87	871	7	74
Heavy	*37*	*368*	*3*	*31*	*37*	*365*	*3*	*31*	*40*	*399*	*3*	*34*	*40*	*397*	*3*	*34*
Gasoline	3	34	0	3	3	34	0	3	2	25	0	2	2	25	0	2
Diesel	32	321	3	27	32	319	3	27	36	363	3	31	36	362	3	31
Natural Gas	1	12	0	1	1	12	0	1	1	11	0	1	1	11	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*53*	*525*	*4*	*45*	*52*	*522*	*4*	*45*	*57*	*570*	*5*	*49*	*57*	*567*	*5*	*48*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	16	158	1	13	16	157	1	13	17	171	1	15	17	170	1	15
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	37	368	3	31	37	365	3	31	40	399	3	34	40	397	3	34
Segment 3 (NB app + SB dept)	1,180	11,800	71	706	940	9,400	56	563	1,260	12,600	75	754	990	9,900	59	593
Light/Med	*1,120*	*11,198*	*67*	*670*	*892*	*8,921*	*53*	*534*	*1,196*	*11,957*	*72*	*716*	*940*	*9,395*	*56*	*562*
Gasoline	1,081	10,812	65	647	861	8,613	52	515	1,103	11,032	66	660	867	8,668	52	519
Diesel	24	239	1	14	19	190	1	11	35	345	2	21	27	271	2	16
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	15	147	1	9	12	117	1	7	58	580	3	35	46	456	3	27
Heavy	*25*	*248*	*1*	*15*	*20*	*197*	*1*	*12*	*26*	*265*	*2*	*16*	*21*	*208*	*1*	*12*
Gasoline	2	23	0	1	2	18	0	1	2	16	0	1	1	13	0	1
Diesel	22	216	1	13	17	172	1	10	24	241	1	14	19	189	1	11
Natural Gas	1	8	0	0	1	6	0	0	1	7	0	0	1	6	0	0
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*35*	*354*	*2*	*21*	*28*	*282*	*2*	*17*	*38*	*378*	*2*	*23*	*30*	*297*	*2*	*18*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	11	106	1	6	8	85	1	5	11	113	1	7	9	89	1	5
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	25	248	1	15	20	197	1	12	26	265	2	16	21	208	1	12
Segment 4 (WB app + EB dept)	1,590	15,900	138	1,376	1,600	16,000	138	1,385	1,740	17,400	151	1,506	1,750	17,500	151	1,515
Light/Med	*1,509*	*15,089*	*131*	*1,306*	*1,518*	*15,184*	*131*	*1,314*	*1,651*	*16,513*	*143*	*1,429*	*1,661*	*16,608*	*144*	*1,437*
Gasoline	1,457	14,569	126	1,261	1,466	14,661	127	1,269	1,523	15,234	132	1,319	1,532	15,322	133	1,326
Diesel	32	322	3	28	32	324	3	28	48	477	4	41	48	479	4	41
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	198	2	17	20	200	2	17	80	802	7	69	81	806	7	70
Heavy	*33*	*334*	*3*	*29*	*34*	*336*	*3*	*29*	*37*	*365*	*3*	*32*	*37*	*368*	*3*	*32*
Gasoline	3	31	0	3	3	31	0	3	2	23	0	2	2	23	0	2
Diesel	29	292	3	25	29	294	3	25	33	333	3	29	33	335	3	29
Natural Gas	1	11	0	1	1	11	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*48*	*477*	*4*	*41*	*48*	*480*	*4*	*42*	*52*	*522*	*5*	*45*	*53*	*525*	*5*	*45*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	143	1	12	14	144	1	12	16	157	1	14	16	158	1	14
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	334	3	29	34	336	3	29	37	365	3	32	37	368	3	32
Fifth and Mission																
Segment 1 (SB app + NB dept)	1,560	15,600	96	958	1,700	17,000	104	1,044	1,720	17,200	106	1,056	1,850	18,500	114	1,136
Light/Med	*1,480*	*14,804*	*91*	*909*	*1,613*	*16,133*	*99*	*991*	*1,632*	*16,323*	*100*	*1,003*	*1,756*	*17,557*	*108*	*1,078*
Gasoline	1,429	14,294	88	878	1,558	15,577	96	957	1,506	15,059	92	925	1,620	16,197	99	995
Diesel	32	316	2	19	34	344	2	21	47	471	3	29	51	507	3	31
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Electric	19	195	1	12	21	212	1	13	79	792	5	49	85	852	5	52
Heavy	*33*	*328*	*2*	*20*	*36*	*357*	*2*	*22*	*36*	*361*	*2*	*22*	*39*	*389*	*2*	*24*
Gasoline	3	31	0	2	3	33	0	2	2	23	0	1	2	24	0	1
Diesel	29	286	2	18	31	312	2	19	33	329	2	20	35	354	2	22
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*47*	*468*	*3*	*29*	*51*	*510*	*3*	*31*	*52*	*516*	*3*	*32*	*56*	*555*	*3*	*34*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	140	1	9	15	153	1	9	15	155	1	10	17	167	1	10
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	328	2	20	36	357	2	22	36	361	2	22	39	389	2	24
Segment 2 (EB app + WB dept)	1,680	16,800	145	1,446	1,790	17,900	154	1,540	1,860	18,600	160	1,601	1,970	19,700	170	1,695
Light/Med	*1,594*	*15,943*	*137*	*1,372*	*1,699*	*16,987*	*146*	*1,462*	*1,765*	*17,651*	*152*	*1,519*	*1,870*	*18,695*	*161*	*1,609*
Gasoline	1,539	15,394	132	1,325	1,640	16,402	141	1,412	1,629	16,285	140	1,401	1,725	17,248	148	1,484
Diesel	34	340	3	29	36	362	3	31	51	509	4	44	54	540	5	46
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	21	210	2	18	22	223	2	19	86	857	7	74	91	908	8	78
Heavy	*35*	*353*	*3*	*30*	*38*	*376*	*3*	*32*	*39*	*391*	*3*	*34*	*41*	*414*	*4*	*36*
Gasoline	3	33	0	3	4	35	0	3	2	24	0	2	3	26	0	2
Diesel	31	308	3	27	33	328	3	28	36	356	3	31	38	377	3	32
Natural Gas	1	12	0	1	1	12	0	1	1	10	0	1	1	11	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*50*	*504*	*4*	*43*	*54*	*537*	*5*	*46*	*56*	*558*	*5*	*48*	*59*	*591*	*5*	*51*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	15	151	1	13	16	161	1	14	17	167	1	14	18	177	2	15
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	35	353	3	30	38	376	3	32	39	391	3	34	41	414	4	36
Segment 3 (NB app + SB dept)	1,420	14,200	85	851	1,480	14,800	89	887	1,580	15,800	95	947	1,630	16,300	98	977
Light/Med	*1,348*	*13,476*	*81*	*808*	*1,405*	*14,045*	*84*	*842*	*1,499*	*14,994*	*90*	*899*	*1,547*	*15,469*	*93*	*928*
Gasoline	1,301	13,011	78	780	1,356	13,561	81	813	1,383	13,834	83	829	1,427	14,271	86	856
Diesel	29	287	2	17	30	299	2	18	43	433	3	26	45	446	3	27
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	18	177	1	11	18	185	1	11	73	728	4	44	75	751	5	45
Heavy	*30*	*298*	*2*	*18*	*31*	*311*	*2*	*19*	*33*	*332*	*2*	*20*	*34*	*342*	*2*	*21*
Gasoline	3	28	0	2	3	29	0	2	2	21	0	1	2	21	0	1
Diesel	26	261	2	16	27	272	2	16	30	302	2	18	31	312	2	19
Natural Gas	1	10	0	1	1	10	0	1	1	9	0	1	1	9	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*43*	*426*	*3*	*26*	*44*	*444*	*3*	*27*	*47*	*474*	*3*	*28*	*49*	*489*	*3*	*29*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	13	128	1	8	13	133	1	8	14	142	1	9	15	147	1	9
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	30	298	2	18	31	311	2	19	33	332	2	20	34	342	2	21
Segment 4 (WB app + EB dept)	1,840	18,400	157	1,572	1,890	18,900	161	1,614	2,020	20,200	173	1,725	2,070	20,700	177	1,768
Light/Med	*1,746*	*17,462*	*149*	*1,492*	*1,794*	*17,936*	*153*	*1,532*	*1,917*	*19,170*	*164*	*1,637*	*1,964*	*19,644*	*168*	*1,678*
Gasoline	1,686	16,860	144	1,440	1,732	17,318	148	1,479	1,769	17,686	151	1,511	1,812	18,124	155	1,548
Diesel	37	372	3	32	38	382	3	33	55	553	5	47	57	567	5	48
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	23	230	2	20	24	236	2	20	93	931	8	79	95	954	8	81
Heavy	*39*	*386*	*3*	*33*	*40*	*397*	*3*	*34*	*42*	*424*	*4*	*36*	*43*	*435*	*4*	*37*
Gasoline	4	36	0	3	4	37	0	3	3	26	0	2	3	27	0	2
Diesel	34	338	3	29	35	347	3	30	39	386	3	33	40	396	3	34
Natural Gas	1	13	0	1	1	13	0	1	1	11	0	1	1	12	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*55*	*552*	*5*	*47*	*57*	*567*	*5*	*48*	*61*	*606*	*5*	*52*	*62*	*621*	*5*	*53*

Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	17	166	1	14	17	170	1	15	18	182	2	16	19	186	2	16
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	39	386	3	33	40	397	3	34	42	424	4	36	43	435	4	37
Sixth and Mission																
Segment 1 (SB app + NB dept)	2,550	25,500	156	1,565	2,360	23,600	145	1,448	2,740	27,400	168	1,681	2,550	25,500	156	1,565
Light/Med	*2,420*	*24,200*	*148*	*1,485*	*2,240*	*22,396*	*137*	*1,374*	*2,600*	*26,003*	*160*	*1,596*	*2,420*	*24,200*	*148*	*1,485*
Gasoline	2,337	23,365	143	1,434	2,162	21,624	133	1,327	2,399	23,990	147	1,472	2,233	22,326	137	1,370
Diesel	52	516	3	32	48	477	3	29	75	750	5	46	70	698	4	43
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	32	318	2	20	29	295	2	18	126	1,262	8	77	117	1,175	7	72
Heavy	*54*	*536*	*3*	*33*	*50*	*496*	*3*	*30*	*58*	*575*	*4*	*35*	*54*	*536*	*3*	*33*
Gasoline	5	50	0	3	5	46	0	3	4	36	0	2	3	33	0	2
Diesel	47	468	3	29	43	433	3	27	52	524	3	32	49	488	3	30
Natural Gas	2	18	0	1	2	16	0	1	2	15	0	1	1	14	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*77*	*765*	*5*	*47*	*71*	*708*	*4*	*43*	*82*	*822*	*5*	*50*	*77*	*765*	*5*	*47*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	23	230	1	14	21	212	1	13	25	247	2	15	23	230	1	14
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	54	536	3	33	50	496	3	30	58	575	4	35	54	536	3	33
Segment 2 (EB app + WB dept)	1,600	16,000	138	1,376	1,690	16,900	145	1,453	1,780	17,800	153	1,531	1,870	18,700	161	1,608
Light/Med	*1,518*	*15,184*	*131*	*1,306*	*1,604*	*16,038*	*138*	*1,379*	*1,689*	*16,892*	*145*	*1,452*	*1,775*	*17,746*	*153*	*1,526*
Gasoline	1,466	14,661	126	1,261	1,549	15,485	133	1,332	1,558	15,585	134	1,340	1,637	16,373	141	1,408
Diesel	32	324	3	28	34	342	3	29	49	488	4	42	51	512	4	44
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	200	2	17	21	211	2	18	82	820	7	71	86	862	7	74
Heavy	*34*	*336*	*3*	*29*	*35*	*355*	*3*	*31*	*37*	*374*	*3*	*32*	*39*	*393*	*3*	*34*
Gasoline	3	31	0	3	3	33	0	3	2	23	0	2	2	24	0	2
Diesel	29	294	3	25	31	310	3	27	34	340	3	29	36	358	3	31
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	11	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*48*	*480*	*4*	*41*	*51*	*507*	*4*	*44*	*53*	*534*	*5*	*46*	*56*	*561*	*5*	*48*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	144	1	12	15	152	1	13	16	160	1	14	17	168	1	14
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	34	336	3	29	35	355	3	31	37	374	3	32	39	393	3	34
Segment 3 (NB app + SB dept)	2,490	24,900	149	1,495	2,300	23,000	138	1,381	2,670	26,700	160	1,603	2,480	24,800	149	1,489
Light/Med	*2,363*	*23,630*	*142*	*1,419*	*2,183*	*21,827*	*131*	*1,310*	*2,534*	*25,338*	*152*	*1,521*	*2,354*	*23,535*	*141*	*1,413*
Gasoline	2,282	22,816	137	1,370	2,107	21,075	127	1,265	2,338	23,377	140	1,403	2,171	21,713	130	1,304
Diesel	50	504	3	30	47	465	3	28	73	731	4	44	68	679	4	41
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	31	311	2	19	29	287	2	17	123	1,230	7	74	114	1,143	7	69
Heavy	*52*	*523*	*3*	*31*	*48*	*483*	*3*	*29*	*56*	*561*	*3*	*34*	*52*	*521*	*3*	*31*
Gasoline	5	49	0	3	5	45	0	3	3	35	0	2	3	32	0	2
Diesel	46	457	3	27	42	422	3	25	51	511	3	31	47	474	3	28
Natural Gas	2	17	0	1	2	16	0	1	2	15	0	1	1	14	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*75*	*747*	*4*	*45*	*69*	*690*	*4*	*41*	*80*	*801*	*5*	*48*	*74*	*744*	*4*	*45*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	22	224	1	13	21	207	1	12	24	240	1	14	22	223	1	13
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	52	523	3	31	48	483	3	29	56	561	3	34	52	521	3	31
Segment 4 (WB app + EB dept)	1,580	15,800	135	1,350	1,690	16,900	144	1,444	1,750	17,500	149	1,495	1,860	18,600	159	1,589
Light/Med	*1,499*	*14,994*	*128*	*1,281*	*1,604*	*16,038*	*137*	*1,370*	*1,661*	*16,608*	*142*	*1,419*	*1,765*	*17,651*	*151*	*1,508*

Gasoline	1,448	14,477	124	1,237	1,549	15,485	132	1,323	1,532	15,322	131	1,309	1,629	16,285	139	1,391
Diesel	32	320	3	27	34	342	3	29	48	479	4	41	51	509	4	44
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	197	2	17	21	211	2	18	81	806	7	69	86	857	7	73
Heavy	*33*	*332*	*3*	*28*	*35*	*355*	*3*	*30*	*37*	*368*	*3*	*31*	*39*	*391*	*3*	*33*
Gasoline	3	31	0	3	3	33	0	3	2	23	0	2	2	24	0	2
Diesel	29	290	2	25	31	310	3	26	33	335	3	29	36	356	3	30
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*47*	*474*	*4*	*40*	*51*	*507*	*4*	*43*	*53*	*525*	*4*	*45*	*56*	*558*	*5*	*48*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	142	1	12	15	152	1	13	16	158	1	13	17	167	1	14
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	332	3	28	35	355	3	30	37	368	3	31	39	391	3	33
Seventh and Mission																
Segment 1 (SB app + NB dept)	1,610	16,100	99	988	1,690	16,900	104	1,037	1,760	17,600	108	1,080	1,840	18,400	113	1,129
Light/Med	*1,528*	*15,279*	*94*	*938*	*1,604*	*16,038*	*98*	*984*	*1,670*	*16,702*	*102*	*1,025*	*1,746*	*17,462*	*107*	*1,072*
Gasoline	1,475	14,752	91	905	1,549	15,485	95	950	1,541	15,409	95	946	1,611	16,110	99	989
Diesel	33	326	2	20	34	342	2	21	48	482	3	30	50	504	3	31
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	201	1	12	21	211	1	13	81	811	5	50	85	848	5	52
Heavy	*34*	*338*	*2*	*21*	*35*	*355*	*2*	*22*	*37*	*370*	*2*	*23*	*39*	*386*	*2*	*24*
Gasoline	3	32	0	2	3	33	0	2	2	23	0	1	2	24	0	1
Diesel	30	295	2	18	31	310	2	19	34	337	2	21	35	352	2	22
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*48*	*483*	*3*	*30*	*51*	*507*	*3*	*31*	*53*	*528*	*3*	*32*	*55*	*552*	*3*	*34*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	145	1	9	15	152	1	9	16	158	1	10	17	166	1	10
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	34	338	2	21	35	355	2	22	37	370	2	23	39	386	2	24
Segment 2 (EB app + WB dept)	1,460	14,600	125	1,253	1,540	15,400	132	1,321	1,620	16,200	139	1,390	1,700	17,000	146	1,459
Light/Med	*1,386*	*13,855*	*119*	*1,189*	*1,461*	*14,615*	*125*	*1,254*	*1,537*	*15,374*	*132*	*1,319*	*1,613*	*16,133*	*138*	*1,384*
Gasoline	1,338	13,378	115	1,148	1,411	14,111	121	1,211	1,418	14,184	122	1,217	1,488	14,884	128	1,277
Diesel	30	295	3	25	31	312	3	27	44	444	4	38	47	466	4	40
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	18	182	2	16	19	192	2	16	75	746	6	64	78	783	7	67
Heavy	*31*	*307*	*3*	*26*	*32*	*323*	*3*	*28*	*34*	*340*	*3*	*29*	*36*	*357*	*3*	*31*
Gasoline	3	29	0	2	3	30	0	3	2	21	0	2	2	22	0	2
Diesel	27	268	2	23	28	283	2	24	31	310	3	27	33	325	3	28
Natural Gas	1	10	0	1	1	11	0	1	1	9	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*44*	*438*	*4*	*38*	*46*	*462*	*4*	*40*	*49*	*486*	*4*	*42*	*51*	*510*	*4*	*44*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	13	131	1	11	14	139	1	12	15	146	1	13	15	153	1	13
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	31	307	3	26	32	323	3	28	34	340	3	29	36	357	3	31
Segment 3 (NB app + SB dept)	1,780	17,800	107	1,070	1,850	18,500	111	1,112	1,960	19,600	118	1,178	2,030	20,300	122	1,220
Light/Med	*1,689*	*16,892*	*102*	*1,015*	*1,756*	*17,557*	*106*	*1,055*	*1,860*	*18,600*	*112*	*1,118*	*1,926*	*19,265*	*116*	*1,158*
Gasoline	1,631	16,310	98	980	1,695	16,951	102	1,019	1,716	17,161	103	1,031	1,777	17,773	107	1,068
Diesel	36	360	2	22	37	374	2	22	54	537	3	32	56	556	3	33
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	22	222	1	13	23	231	1	14	90	903	5	54	94	935	6	56
Heavy	*37*	*374*	*2*	*22*	*39*	*389*	*2*	*23*	*41*	*412*	*2*	*25*	*43*	*426*	*3*	*26*
Gasoline	3	35	0	2	4	36	0	2	3	26	0	2	3	27	0	2

Diesel	33	327	2	20	34	339	2	20	37	375	2	23	39	388	2	23
Natural Gas	1	12	0	1	1	13	0	1	1	11	0	1	1	11	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*53*	*534*	*3*	*32*	*56*	*555*	*3*	*33*	*59*	*588*	*4*	*35*	*61*	*609*	*4*	*37*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	16	160	1	10	17	167	1	10	18	176	1	11	18	183	1	11
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	37	374	2	22	39	389	2	23	41	412	2	25	43	426	3	26
Segment 4 (WB app + EB dept)	1,630	16,300	140	1,403	1,720	17,200	148	1,480	1,820	18,200	157	1,566	1,910	19,100	164	1,644
Light/Med	*1,547*	*15,469*	*133*	*1,331*	*1,632*	*16,323*	*140*	*1,405*	*1,727*	*17,272*	*149*	*1,486*	*1,813*	*18,126*	*156*	*1,560*
Gasoline	1,494	14,936	129	1,285	1,576	15,760	136	1,356	1,593	15,935	137	1,371	1,672	16,723	144	1,439
Diesel	33	330	3	28	35	348	3	30	50	498	4	43	52	523	5	45
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	20	203	2	18	21	215	2	18	84	838	7	72	88	880	8	76
Heavy	*34*	*342*	*3*	*29*	*36*	*361*	*3*	*31*	*38*	*382*	*3*	*33*	*40*	*401*	*3*	*35*
Gasoline	3	32	0	3	3	34	0	3	2	24	0	2	2	25	0	2
Diesel	30	299	3	26	32	316	3	27	35	348	3	30	37	365	3	31
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	11	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*49*	*489*	*4*	*42*	*52*	*516*	*4*	*44*	*55*	*546*	*5*	*47*	*57*	*573*	*5*	*49*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	15	147	1	13	15	155	1	13	16	164	1	14	17	172	1	15
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	34	342	3	29	36	361	3	31	38	382	3	33	40	401	3	35
Eighth and Mission																
Segment 1 (SB app + NB dept)	1,800	18,000	111	1,105	1,940	19,400	119	1,191	1,990	19,900	122	1,222	2,110	21,100	130	1,295
Light/Med	*1,708*	*17,082*	*105*	*1,049*	*1,841*	*18,411*	*113*	*1,130*	*1,889*	*18,885*	*116*	*1,159*	*2,002*	*20,024*	*123*	*1,229*
Gasoline	1,649	16,493	101	1,013	1,778	17,776	109	1,091	1,742	17,423	107	1,070	1,847	18,474	113	1,134
Diesel	36	364	2	22	39	392	2	24	55	545	3	33	58	578	4	35
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	22	225	1	14	24	242	1	15	92	917	6	56	97	972	6	60
Heavy	*38*	*378*	*2*	*23*	*41*	*407*	*3*	*25*	*42*	*418*	*3*	*26*	*44*	*443*	*3*	*27*
Gasoline	4	35	0	2	4	38	0	2	3	26	0	2	3	28	0	2
Diesel	33	330	2	20	36	356	2	22	38	381	2	23	40	404	2	25
Natural Gas	1	12	0	1	1	13	0	1	1	11	0	1	1	12	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*54*	*540*	*3*	*33*	*58*	*582*	*4*	*36*	*60*	*597*	*4*	*37*	*63*	*633*	*4*	*39*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	16	162	1	10	17	175	1	11	18	179	1	11	19	190	1	12
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	38	378	2	23	41	407	3	25	42	418	3	26	44	443	3	27
Segment 2 (EB app + WB dept)	1,540	15,400	92	923	1,680	16,800	101	1,007	1,700	17,000	102	1,019	1,840	18,400	110	1,103
Light/Med	*1,461*	*14,615*	*88*	*876*	*1,594*	*15,943*	*96*	*956*	*1,613*	*16,133*	*97*	*967*	*1,746*	*17,462*	*105*	*1,047*
Gasoline	1,411	14,111	85	846	1,539	15,394	92	923	1,488	14,884	89	892	1,611	16,110	97	966
Diesel	31	312	2	19	34	340	2	20	47	466	3	28	50	504	3	30
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	19	192	1	12	21	210	1	13	78	783	5	47	85	848	5	51
Heavy	*32*	*323*	*2*	*19*	*35*	*353*	*2*	*21*	*36*	*357*	*2*	*21*	*39*	*386*	*2*	*23*
Gasoline	3	30	0	2	3	33	0	2	2	22	0	1	2	24	0	1
Diesel	28	283	2	17	31	308	2	18	33	325	2	19	35	352	2	21
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	10	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*46*	*462*	*3*	*28*	*50*	*504*	*3*	*30*	*51*	*510*	*3*	*31*	*55*	*552*	*3*	*33*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	139	1	8	15	151	1	9	15	153	1	9	17	166	1	10

Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	32	323	2	19	35	353	2	21	36	357	2	21	39	386	2	23
Segment 3 (NB app + SB dept)	1,550	15,500	93	932	1,790	17,900	108	1,077	1,730	17,300	104	1,041	1,950	19,500	117	1,173
Light/Med	*1,471*	*14,710*	*88*	*885*	*1,699*	*16,987*	*102*	*1,022*	*1,642*	*16,418*	*99*	*987*	*1,851*	*18,506*	*111*	*1,113*
Gasoline	1,420	14,202	85	854	1,640	16,402	99	987	1,515	15,147	91	911	1,707	17,073	103	1,027
Diesel	31	314	2	19	36	362	2	22	47	474	3	29	53	534	3	32
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	19	193	1	12	22	223	1	13	80	797	5	48	90	898	5	54
Heavy	*33*	*326*	*2*	*20*	*38*	*376*	*2*	*23*	*36*	*363*	*2*	*22*	*41*	*410*	*2*	*25*
Gasoline	3	30	0	2	4	35	0	2	2	23	0	1	3	26	0	2
Diesel	28	284	2	17	33	328	2	20	33	331	2	20	37	373	2	22
Natural Gas	1	11	0	1	1	12	0	1	1	10	0	1	1	11	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*47*	*465*	*3*	*28*	*54*	*537*	*3*	*32*	*52*	*519*	*3*	*31*	*59*	*585*	*4*	*35*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	14	140	1	8	16	161	1	10	16	156	1	9	18	176	1	11
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	33	326	2	20	38	376	2	23	36	363	2	22	41	410	2	25
Segment 4 (WB app + EB dept)	1,430	14,300	123	1,226	1,510	15,100	129	1,295	1,580	15,800	135	1,355	1,660	16,600	142	1,423
Light/Med	*1,357*	*13,571*	*116*	*1,163*	*1,433*	*14,330*	*123*	*1,229*	*1,499*	*14,994*	*129*	*1,285*	*1,575*	*15,753*	*135*	*1,351*
Gasoline	1,310	13,103	112	1,123	1,384	13,836	119	1,186	1,383	13,834	119	1,186	1,453	14,534	125	1,246
Diesel	29	289	2	25	31	305	3	26	43	433	4	37	45	455	4	39
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	18	178	2	15	19	188	2	16	73	728	6	62	76	765	7	66
Heavy	*30*	*300*	*3*	*26*	*32*	*317*	*3*	*27*	*33*	*332*	*3*	*28*	*35*	*349*	*3*	*30*
Gasoline	3	28	0	2	3	30	0	3	2	21	0	2	2	22	0	2
Diesel	26	262	2	22	28	277	2	24	30	302	3	26	32	318	3	27
Natural Gas	1	10	0	1	1	10	0	1	1	9	0	1	1	9	0	1
Electric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bus	*43*	*429*	*4*	*37*	*45*	*453*	*4*	*39*	*47*	*474*	*4*	*41*	*50*	*498*	*4*	*43*
Gasoline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	13	129	1	11	14	136	1	12	14	142	1	12	15	149	1	13
Natural Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric	30	300	3	26	32	317	3	27	33	332	3	28	35	349	3	30

Operational Emission Factors (grams per mile)

Vehicle/Fuel	2020			2040		
	ROG	TOG	PM2.5	ROG	TOG	PM2.5
Light/Med						
Gasoline	0.04	0.06	0.00	0.02	0.03	0.00
Diesel	0.08	0.09	0.01	0.08	0.09	0.01
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00
Electric	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Truck						
Gasoline	0.10	0.15	0.00	0.01	0.02	0.00
Diesel	0.20	0.23	0.08	0.01	0.01	0.01
Natural Gas	0.18	3.81	0.01	0.06	3.20	0.00
Electric	0.00	0.00	0.00	0.00	0.00	0.00
Bus						
Gasoline	0.00	0.00	0.00	0.00	0.00	0.00
Diesel	0.00	0.13	0.01	0.00	0.08	0.01
Natural Gas	0.10	6.83	0.00	0.09	6.65	0.00
Electric	0.00	0.00	0.00	0.00	0.00	0.00

Operational Fleet Mix

Vehicle Type	% of Fleet
Light/Med	94.9%
Heavy Truck	2.1%
Bus	3.0%

Gasoline TOG Speciation

Pollutant	**Percent**
Acetaldehyde	0.28%
Acrolein	0.13%
Benzene	2.47%
1,3-Butadiene	0.55%
Ethylbenzene	0.55%
Formaldehyde	1.58%
Hexane	1.60%
Methanol	0.12%
Methyl Ethyl Ketone	0.02%
Naphthalene	0.05%
Propylene	3.06%
Styrene	0.12%
Toluene	5.76%
Xylenes	4.80%

LNG VOC Speciation

Pollutant	**Percent**
Acetaldehyde	13.800%
Acrolein	0.000%
Benzene	0.253%
1,3-Butadiene	0.000%
Ethylbenzene	0.131%
Formaldehyde	16.200%
Hexane	0.0%
Methanol	0.0%
Methyl Ethyl Ketone	0.0%
Naphthalene	0.0%
Propylene	0.0%
Styrene	0.0%
Toluene	0.786%
Xylenes	0.634%

APPENDIX 10: SCREENING-LEVEL WIND ASSESSMENT

BETTER MARKET STREET

SAN FRANCISCO, CA

SCREENING-LEVEL WIND ASSESSMENT - FINAL
RWDI # 1700387
June 18, 2018

SUBMITTED TO

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1 INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by ICF to assess the pedestrian wind conditions along Market Street in San Francisco, CA (Image 1) after the implementation of the Better Market Street Project (proposed project). The proposed project consists of transportation and streetscape improvements along Market Street that would include changes to the roadway configuration and private vehicle access; traffic signals; surface transit, including transit-only lanes, stop spacing and service, stop locations, stop characteristics, and infrastructure; bicycle facilities; pedestrian facilities; streetscapes; commercial and passenger loading; vehicular parking; utilities; and street trees. The wind assessment focuses on the wind hazard conditions as they may be affected by the proposed project, including the removal of all existing street trees on Market Street, the replacement or relocation of some street trees, and the addition of street furniture and public art. The proposed transportation improvements are not expected to alter the wind conditions for the proposed project and are therefore not discussed in this assessment.

Also, discussed in this assessment is the potential wind impact of the proposed project variant. The project variant is a variation of the proposed project within the project limits. The differences between the project variant and the proposed project include changes in regards to roadway configuration, private vehicle access, surface transit, and pedestrian and bicycle facilities in the western segment of the project corridor. The differences between the project variant and the proposed project are not expected to have an impact on wind conditions.

This screening-level assessment is qualitative in nature and based on the following:

- local wind conditions in the San Francisco area;
- the extensive wind studies conducted by RWDI for various developments along Market Street;
- design drawings and information for the proposed project and the project variant received by RWDI on April 20, 2018; and
- RWDI's engineering judgment, experience and expert knowledge of wind flows around buildings and trees[1][2][3].

As discussed in Section 3, *Meteorological Data*, no wind tunnel tests were conducted solely for the purpose of this assessment; this assessment relies on wind studies conducted by RWDI for other projects along Market Street, as well as our experience and engineering judgment.

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[1] C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", 10th International Conference on Wind Engineering, Copenhagen, Denmark.

[2] H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", Journal of Wind Engineering and Industrial Aerodynamics, vol.104-106, pp.397-407.

[3] H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", ASCE Structure Congress 2004, Nashville, Tennessee.

Image 1: Aerial view of the project corridor and surroundings (not to scale)
(Google™ Earth is the source for this and many other photos in the report.)

2 PROPOSED PROJECT AND PROJECT CORRIDOR INFORMATION

2.1 Proposed Project

The proposed project would redesign and provide various transportation and streetscape improvements to a 2.2-mile-long corridor, generally encompassing Market Street between Steuart Street and Octavia Boulevard, including Charles J. Brenham Place, and Valencia Street between Market and McCoppin streets, (the project corridor) (Image 2). The proposed improvements that could affect the existing wind conditions along the project corridor would include the removal of all existing street trees on Market Street. Trees would be replaced or relocated in areas where sidewalks would be reconfigured to accommodate wider center transit boarding islands and the new sidewalk-level bikeway. Street furniture and public art would be added in certain locations.

The main features of the proposed project that would have the potential to affect the wind conditions are the proposed removal of all existing street trees along Market Street and the proposed replacement and relocation of some of the street trees along Market Street. In the right conditions, with the appropriate species and size, trees

have been proven to be effective in the reduction of wind speeds at the pedestrian level. In an open area exposed to the predominant winds (such as a park or large courtyard space), moving or reducing the number of trees could have a substantial effect on wind conditions at grade level. In a built-up area, such as Market Street, where the main factors affecting the wind conditions are the buildings in the immediate surroundings, the effects of the removal and replacement of trees would be less substantial.

As part of the proposed project, the majority of the sidewalks along Market Street between Van Ness Avenue and Steuart Street would include 10-foot-wide zones with furnishings, referred to as "Streetlife Zones" (Image 3). Streetlife Zones would be defined by street trees and streetlight poles and would be located between the pedestrian through-zone and the sidewalk-level bikeway. The Streetlife Zones would allow for the installation of features such as street furniture, benches, moveable tables and chairs, sidewalk planting areas, small retail stands (e.g., flower sellers, food carts), public restrooms, advertising kiosks, news racks, bicycle share facilities, and bicycle racks on the sidewalk. The placement of the larger proposed features, such as the kiosks and retail stands, may reduce some wind speeds to the immediate east of the features. The smaller proposed features (i.e., the features that would be less than six feet tall) would not be expected to affect the wind conditions. At this time, the dimensions of the proposed street furniture and public art have not been determined.

The conclusions in Section 5, *Pedestrian Wind Conditions*, of this assessment take all the above factors into account when assessing the impact on the conditions for each segment of the project corridor.

2.2 Project Variant

The project variant would redesign and provide various transportation and streetscape improvements within the approximately 0.6-mile portion of Market Street between Octavia Boulevard and approximately 300 feet east of the Hayes and Market Street intersection. As with the proposed project, the project variant would include the removal of all existing street trees on Market Street. Similar to the proposed project, trees would be replaced or relocated in areas where sidewalks would be reconfigured and street furniture and public art would be added in certain Streetlife Zones. Thus, the features of the proposed project that could affect the wind conditions are also proposed under the project variant and the project variant is not expected to have any additional impact on the wind conditions in the project corridor.

2.3 Project Corridor

Pedestrian areas within the project corridor include sidewalks, crosswalks, transit stops and platforms, bicycle facilities, and outdoor seating areas. For most of the project corridor, a single row of street trees are included within the existing sidewalks on either side of the street.

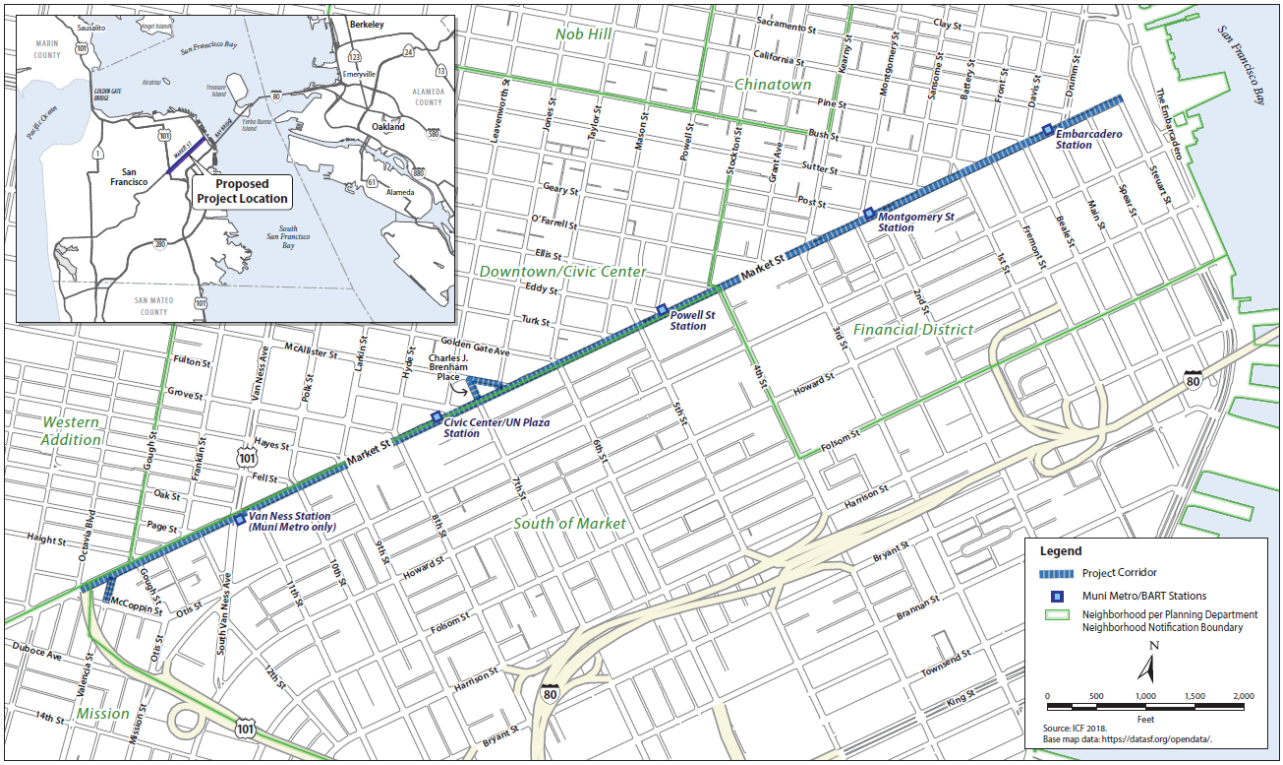


Image 2: Proposed project corridor

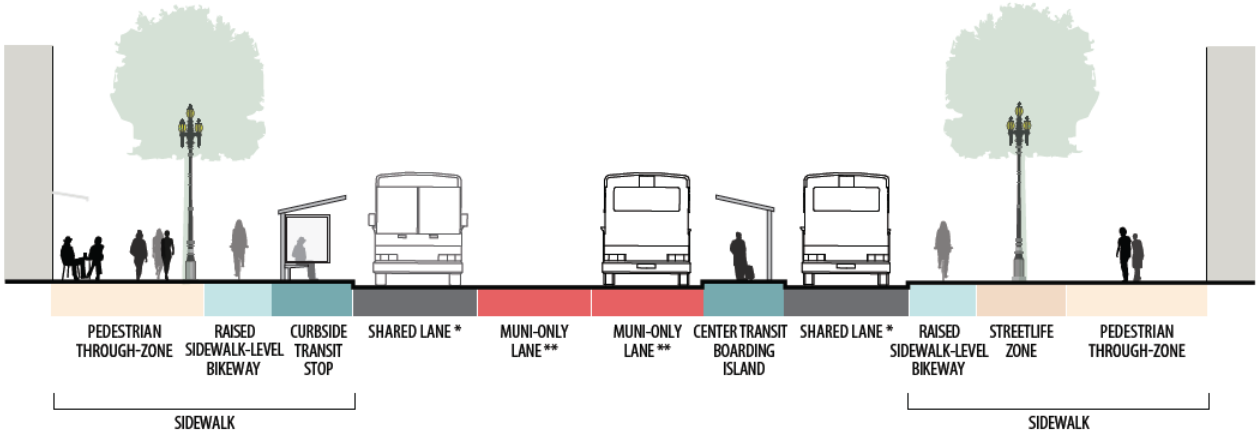


Image 3: Typical mid-block cross section

3 METEOROLOGICAL DATA

Long-term wind data recorded at a height of 33 feet at San Francisco International Airport between 1948 and 2017 are used as a reference for this wind assessment. They are presented as an annual wind rose in Image 4a. Of the primary wind directions, four have the greatest frequencies of occurrence and make up the majority of the strong

winds that occur as shown in Image 4a. These wind directions are west-northwest, west, northwest and west-southwest.

Another set of wind data is often used in San Francisco for projects that are subject to the San Francisco planning code requirements. It was gathered at the old San Francisco Federal Building at 50 United Nations Plaza (Weather Service Office) at a height of 132 feet above grade during the period of 1945 to 1950. Image 4b shows a similar distribution of wind speeds and directions as those in Image 4a.

This qualitative assessment primarily considers the above wind data for winds from the dominant directions (west, west-northwest and west-southwest) as they interact with the project corridor. However, winds from other directions are also considered in this assessment. Although wind direction is not directly referenced at every location, information derived from our knowledge of how winds behave, the directionalities, and previous wind studies conducted by RWDI in the area, that support the conclusions provided in Section 5, *Pedestrian Wind Conditions*.

As this assessment focuses on the effect of the removal of all existing street trees on Market Street, the replacement or relocation of some street trees, and the addition of street furniture and public art, some of the previous wind tunnel studies carried out within the project corridor were used to inform the wind conditions expected with no landscaping or street furniture in place. This is a conservative assessment of conditions within the project corridor because landscaping and other porous elements along the street are considered positive wind control measures and are often used to reduce wind speeds in areas that are less comfortable than required. With this knowledge, and the comparison to other projects in the corridor that were tested with and without landscaping in place, RWDI assessed how much the proposed project would change existing wind conditions.

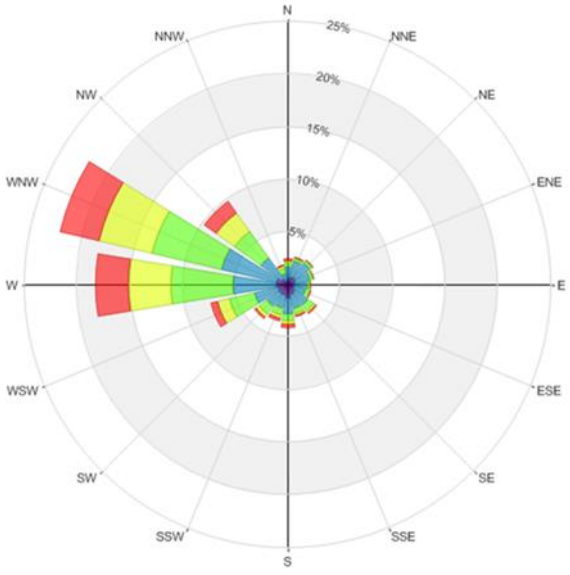


Image 4a: Annual distribution of winds approaching San Francisco International Airport (1948 to 2017)

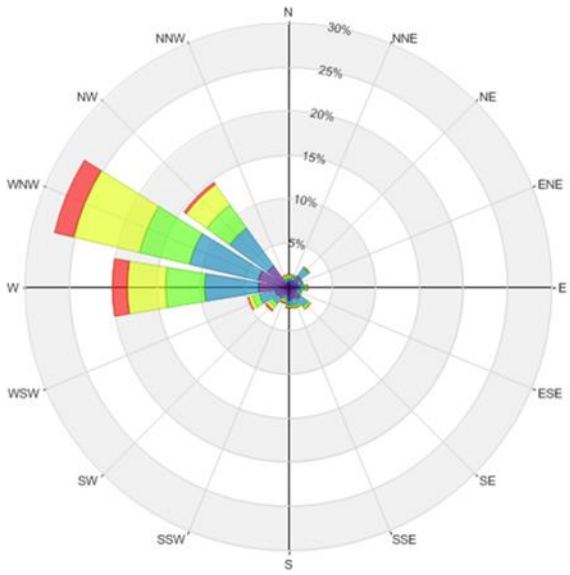


Image 4b: Annual distribution of winds approaching San Francisco Downtown Station (6:00 to 20:00, 1945 to 1950)

Wind Speed (mph)
Calm
1-5
6-10
11-15
16-20
>20

4 PLANNING CODE REQUIREMENTS

Wind comfort and hazard criteria are specified in San Francisco Planning Code section 148: Reduction of Ground-level Wind Currents in Downtown Commercial (C-3) Districts. Section 148 requires that buildings and additions to existing buildings shall be shaped, or other wind-baffling measures shall be adopted, so that the developments will not cause ground-level wind currents to exceed, more than 10 percent of the time year-round, between 7:00 a.m. and 6:00 p.m., the comfort level of 11 m.p.h. equivalent wind speed in areas of substantial pedestrian use and seven m.p.h. equivalent wind speed in public seating areas. The Planning Code comfort criteria are defined in terms of equivalent wind speed, which is an average wind speed (mean velocity), adjusted to include the level of gustiness and turbulence. Under procedures developed to implement section 148, equivalent wind speed is defined as the mean wind velocity, multiplied by the quantity (one plus three times the turbulence intensity) divided by 1.45. This calculation magnifies the reported wind speed when turbulence intensity is greater than 15 percent. The text in this assessment simply refers to the data as wind speeds.

The modifications proposed for the streets and sidewalks within the project corridor would occur within the existing operational public right-of-way, would not involve the construction of or alterations to buildings along Market Street, and would therefore not be subject to Planning Code section 148. Nonetheless, the project corridor runs

through a C-3 District and these criteria can be and have been applied to the project corridor as a guideline for environmental review of the wind hazard criterion.

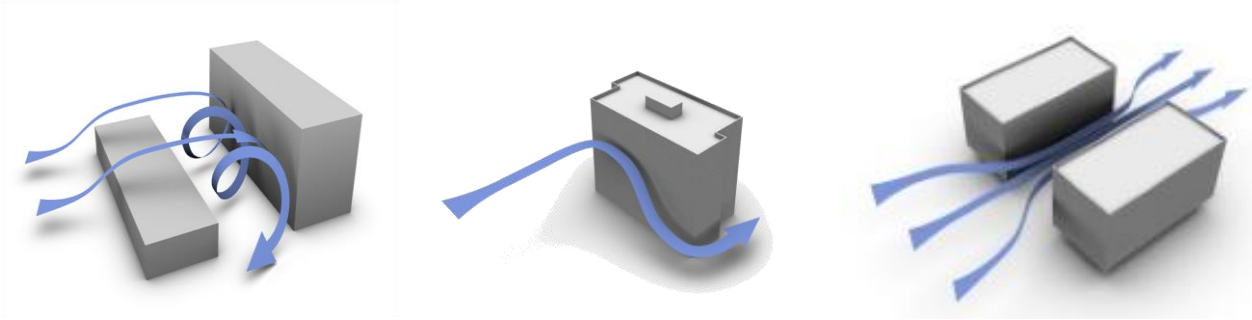
5 PEDESTRIAN WIND CONDITIONS

5.1 Background

Predicting wind speeds and frequencies of occurrence involves the assessment of building geometry, orientation, position and height of surrounding buildings, upwind terrain and the local wind climate as well as landscaping. RWDI has conducted thousands of wind tunnel model studies on pedestrian wind conditions around buildings, yielding a broad knowledge base. This knowledge has been incorporated into RWDI's proprietary software that allows, in many situations, for a screening-level qualitative estimation of pedestrian wind conditions without wind tunnel testing.

In the following discussion of anticipated wind conditions, reference is made to the following generalized wind flows. Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level (Image 5a). Such a downwashing flow is often the main cause for wind accelerations around tall buildings at the pedestrian level. These winds can be relatively strong and turbulent, especially around the exposed building corners (Image 5b). These downwashed winds may subsequently channel along street canyons between buildings and make these areas windy (Image 5c).

If these building/wind combinations occur for prevailing directions, there is a greater potential for increased wind activity and uncomfortable or even hazardous conditions.

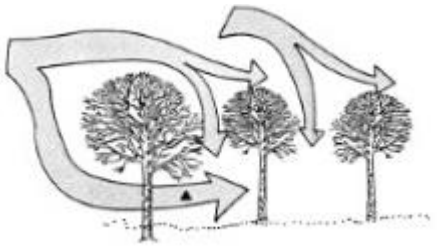


(a) Downwashing Flow (b) Corner Acceleration (c) Channeling Effect

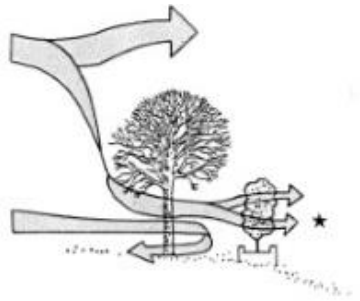
Images 5a-c: General wind flow phenomena around buildings

5.2 Streetscape Features and Wind Control

As discussed below, there are various types of streetscape features used for wind control (e.g., trees, landscaping, hardscaping, and street art). Tree leaves and branches form three-dimensional obstacles that reduce downwashing winds off nearby buildings (Image 6a). Horizontal wind flows above the pedestrian level can also be reduced by canopy-type trees; however, local wind acceleration may occur under tree canopies, as shown in Image 6a. For trees to be effective in controlling winds at the pedestrian level, under-planting or the placement of other features is typically required. These may include low bushes and shrubs (Image 6b) and benches with high backs (Image 6c). In addition, trees should be dense (or mature) and able to keep their foliage reasonably well through the winter months (Image 6d) to be effective in controlling winds at the pedestrian level. Trees are considered effective as wind control measures due to the porosity of the foliage. Similarly, porous windscreens and street art are considered effective as wind control measures. When wind travels through a porous object (e.g., trees, porous windscreens, and porous street art), the wind speed is reduced as the energy of the wind is separated from one strong stream to several weaker streams of wind.

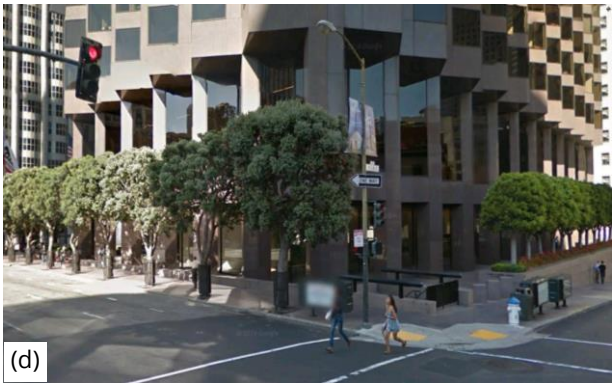


(a)



(b)

(c)



(d)

Images 6a-d: Wind control by trees and other streetscape features

5.3 Existing Wind Conditions

RWDI has conducted various wind studies in the City of San Francisco, including many along Market Street. Wind tunnel studies that have been carried out by RWDI and have been referenced to inform the conclusions made in this assessment are listed below and are marked by yellow pins in Image 7:

- The Hub Plan (2018)
- 22 Franklin Street (2015)
- 1554 Market Street (2014)
- Market and Van Ness/ One Oak (2013)
- 30 Van Ness (2018)
- 1500 Mission (2015)
- 10th and Market (2003)
- 1125 Market Street (2015)
- 1075 Market Street (2015)
- 1028 Market Street (2015)
- 1066 Market Street (2015)
- 57 Taylor Street (2015)
- 950-954 Market Street (2015)
- Mason & Turk Street (2013)
- 120 Stockton Street (2018)
- 706 Mission Street (2012)
- The Place Condo (2008)
- First and Mission (2011)
- 350 Mission Street (2010)

Photos of wind tunnel models of select projects along Market Street are shown in Image 8 to provide context of the area and buildings around the proposed project. These wind tunnel models informed the description of existing conditions provided in this assessment.

Wind conditions along Market Street generally do not exceed the wind hazard criterion for the most of the west (Octavia Boulevard to Franklin Street) and mid portions (9th to 4th streets) between relatively low buildings, and for the entire east portion (2nd Street to The Embarcadero) due to dense surroundings in the downtown. However, higher wind activity that may exceed the wind hazard criterion were previously detected at three areas along Market Street (marked by red circles in Image 7):

- between Van Ness Avenue and Polk Street/10th Street due to the existing and future tall buildings;
- at the north end of Yerba Buena Lane on the west side of an existing hotel tower; and
- around the intersection with 3rd Street/Kearny Street, which is an “entrance” for the prevailing west and west-northwest winds into the downtown core of dense tall buildings.

Detailed discussions for these areas are provided in the next section. In addition, see recommendations to lower existing wind speeds in Section 6, *Summary and Recommendations*.

Image 7: Wind studies conducted by RWDI along Market Street (yellow pins), including three segments of higher wind activity (red circles)

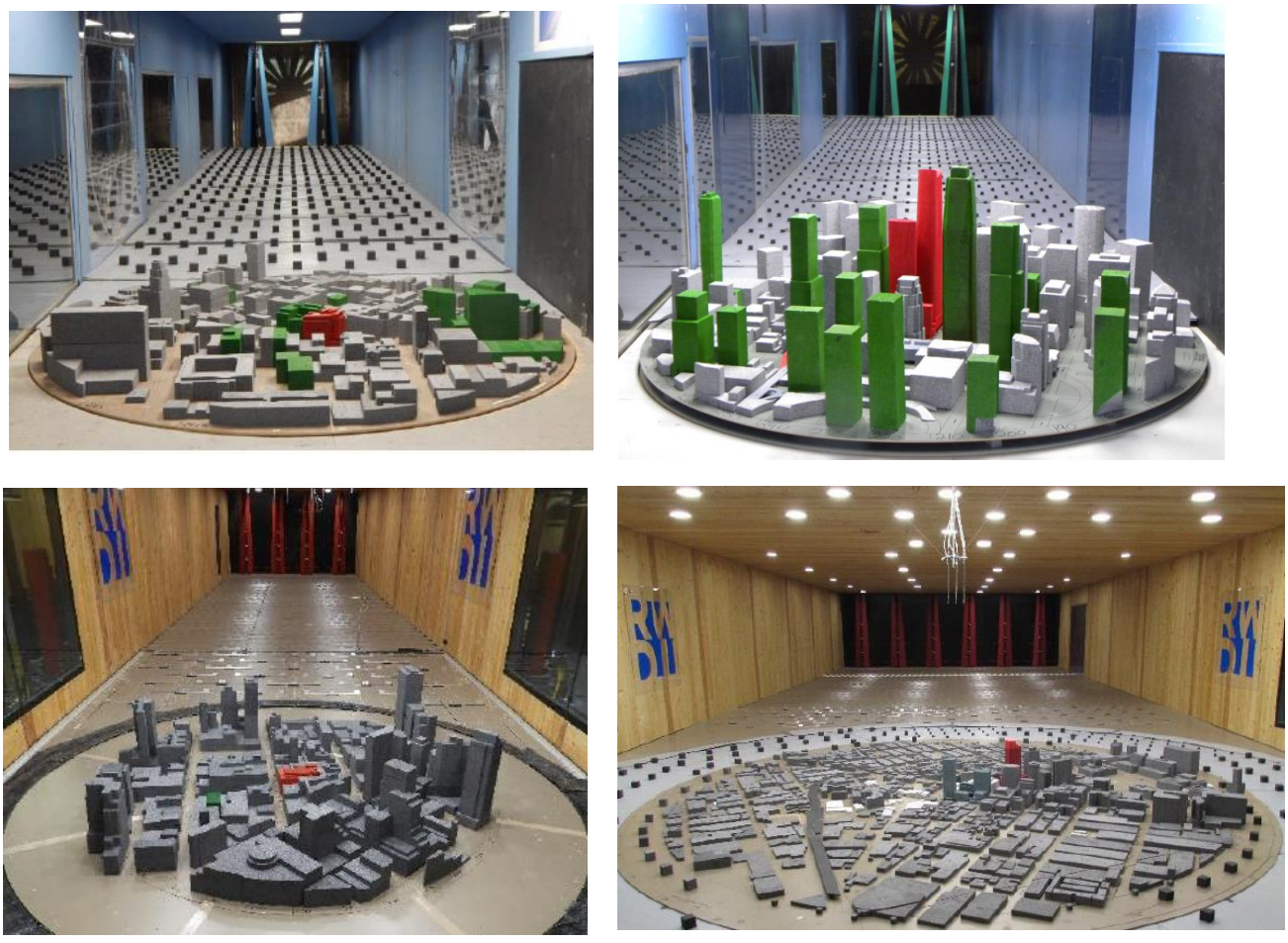


Image 8: Photos of wind tunnel models of select projects along Market Street (1028 Market Street – top left, First and Mission – top right, 120 Stockton Street – bottom left & 30 Van Ness – bottom right)

5.4 Potential Wind Impact: Octavia Boulevard to Fell Street

The west end of the project corridor from Octavia Boulevard to 12th Street includes low buildings on both sides of Market Street (Area A in Image 9a), where wind speeds are typically expected to not exceed the hazard criterion under existing conditions based on previous wind tunnel results.[4] Wind conditions that would be similar to the existing conditions and would not exceed the hazard criterion are predicted for this segment of Market Street after implementation of the proposed project and the streetscape improvements. This is due to the impact of the surrounding buildings on existing wind conditions compared to the impact of grade-level landscaping, as explained in Section 2, *Proposed Project and Project Corridor Information*.

However, the intersections of Market Street with Fell Street/Polk Street/10th Street (Area B1) and Van Ness/ Oak Street/ 11th Street intersection (Area B2) are currently windy around the existing towers such as 1390 Market Street, 1 Polk Street, 8 10th Street, and 30 Van Ness, with some locations expected to exceed the wind hazard criterion. The wind conditions at these two intersections are caused by downwashing due to the exposure of the taller towers to the northwesterly winds and relatively low buildings to the west. The existing landscaping along this stretch of Market Street is extensive with a single row of trees on either side of the street. The improvements associated with the proposed project, including removal and replacement of trees, are not anticipated to increase wind speeds or exposure to wind hazards in this area as the quantity and size of the trees is expected to be similar to the existing landscaping. The dimensions of the proposed street furniture and public art have not yet been determined. As discussed above, if they are six feet tall or higher then improved wind conditions would result. However, winds exceeding the hazard criterion are still not anticipated to occur if these features are shorter than six feet.

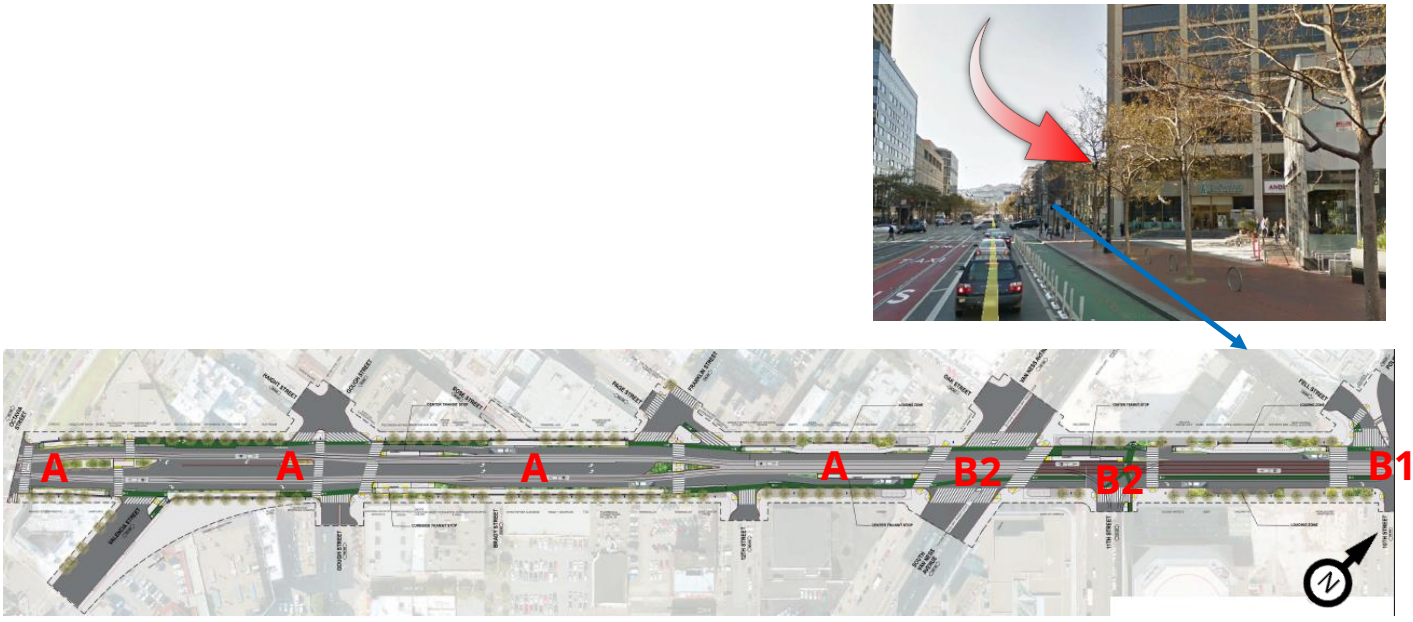


Image 9a: Proposed Improvements: Octavia Boulevard to Fell Street

[4] Based on previous wind studies prepared for The Hub Plan and projects at 22 Franklin Street and 1554 Market Street.

5.5 Potential Wind Impact: Polk to McAllister streets

Moving east along Market Street between Polk and McAllister streets, wind speeds are expected to not exceed the hazard criterion based on previous wind tunnel results[5] (Area C in Image 9b). This is due to the relatively dense, medium-rise buildings on the north side of the street and similar buildings on the south. As part of the proposed project, the existing double rows of trees in this area would be completely removed and partially replaced by a single row of trees. Previous wind tunnel studies of the existing conditions were tested without any landscaping. Therefore, changes to the streetscape associated with the proposed project, including removing/replacing trees and re-arrangements of bike paths/cross walks and intersections, would not result in any exceedances of the hazard criterion, or have a substantial effect on existing wind conditions in this segment of Market Street.

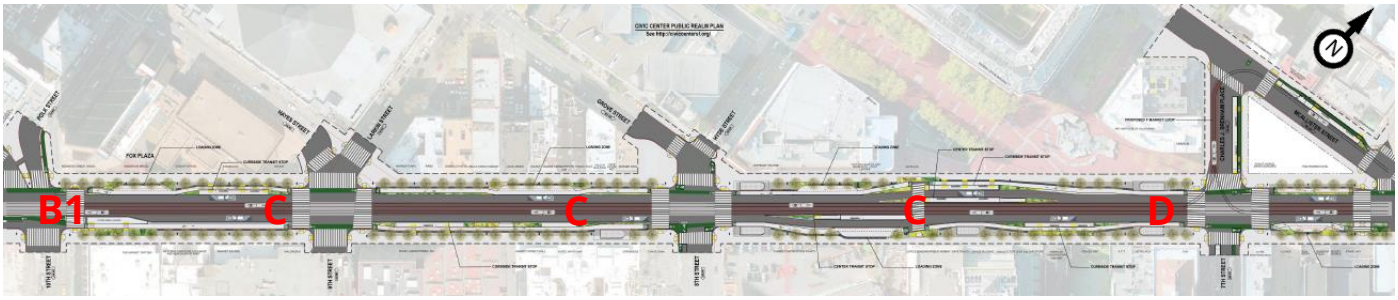


Image 9b: Proposed Improvements: Polk to McAllister streets

5.6 Potential Wind Impact: Jones to Ellis streets

The section of Market Street between Jones and Ellis streets is surrounded by dense buildings on both sides and has no high-rise buildings as shown by the 3-D image (Image 9c). As a result, relatively low wind activity that does not exceed the hazard criterion is expected along this street section (Area E in Image 9c). As part of the proposed project, the existing double rows of trees in this area would be removed and replaced by a single row of trees. Once again, the previous wind tunnel studies carried out along this stretch of Market Street[6] were without landscaping and showed comfortable wind conditions, therefore wind conditions are not expected to result in any locations where the hazard criterion is exceeded with the proposed changes.

For reasons stated above, it is unlikely that removing and/or replacing trees along sidewalks would result in wind hazard exceedances. However, the comfort conditions in the vicinity of the several outdoor seating areas, such as those close to the Taylor Street intersection (Area F1 in Image 9c), would benefit from street trees of denser foliage and other wind control measures, such as windscreens or street art (Image 6) to the west of the areas.

The sunken station plazas (Area F2 in Image 9c) are currently sheltered from horizontal winds by the walls that surround them. As the proposal for the sidewalks and landscaping in this area are downwind of these plazas, the proposed project is not expected to affect the wind conditions in these areas.

[5] Based on previous wind studies prepared for projects at 1125 Market Street and 1075 Market Street.
[6] Based on previous wind studies prepared for projects at 1028 Market Street and 57 Taylor Street.

Image 9c: Proposed Improvements: Jones to Ellis streets

5.7 Potential Wind Impact: Stockton to Sutter streets

The section of Market Street between Stockton and Sutter streets contains two known windy areas: one along Yerba Buena Lane on the west side of an existing hotel tower (Area H1 in Image 9d) and the other at the intersection of Market Street with Kearny Street/3rd Street (Area H2 in Image 9d) [7]. Winds along Yerba Buena Lane (Area H1 in Image 9d) are caused by the prevailing winds being deflected down by the existing Four Seasons tower, which is significantly taller than its surroundings to the west. The existing tall buildings on the east side of Kearny Street form a tall wall to deflect the prevailing winds into the open intersection area (Area H2 in Image 9d). Existing wind activity in this area exceeds the wind hazard criterion.

One notable change proposed for this segment of Market Street (Area G in Image 9d) under the proposed project is the complete removal of the existing double rows of trees on both sides of the street, and partial replacement with a single row of trees. Since the existing conditions are a result of downwashing off the tall tower and buildings noted above, and the proposed single line of trees are spaced close together, this change and the other improvements associated with the proposed project are not expected to significantly alter the existing wind conditions along Market Street or create any wind hazard exceedances. In addition, the proposed arrangement of trees under the proposed project is expected to eventually provide a canopy for pedestrians along the sidewalk.

[7] The Palace Condo and First and Mission

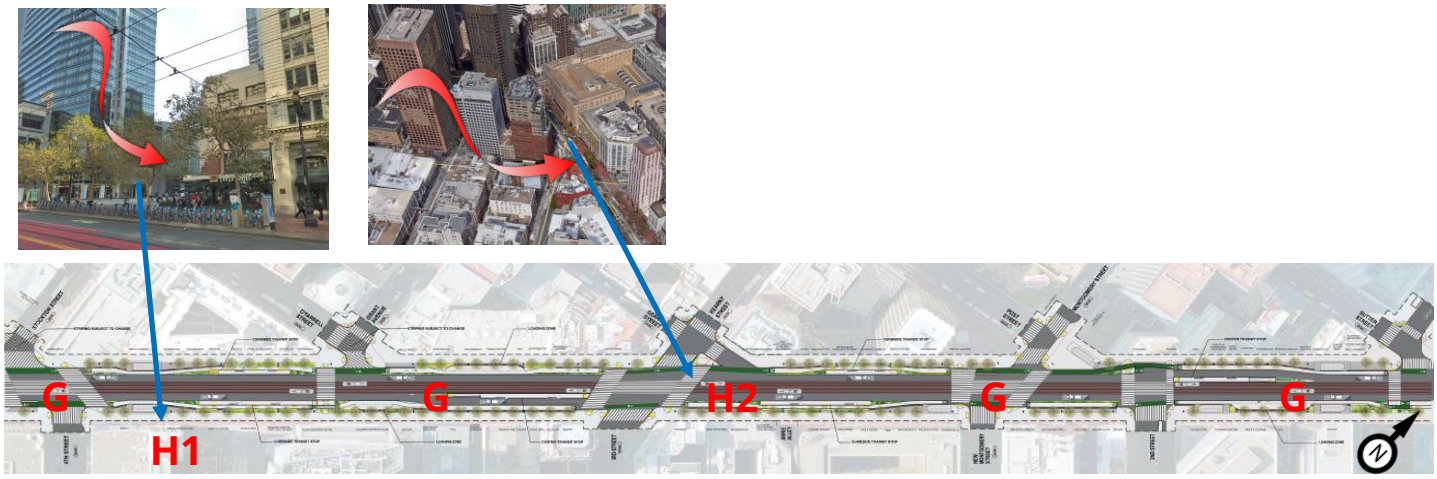


Image 9d: Proposed Improvements: Stockton to Sutter streets

5.8 Potential Wind Impact: Sansome to Steuart streets

The last segment of Market Street east of Sansome Street is heavily sheltered by tall buildings in the downtown core, and existing wind activity in this area does not exceed the wind hazard criterion[8]. Relatively calmer winds are created by the many taller buildings that are sheltering pedestrians at street level. The proposed changes and updates to the grade level landscaping or furniture would have an unsubstantial effect on the existing wind conditions. For this reason, the proposed changes to the street landscaping would not result in winds that exceed the wind hazard criterion.

Image 9e: Proposed Improvements: Sansome to Steuart streets

5.9 Potential Wind Impact: Project Variant

As previously discussed, the features of the proposed project that could affect the wind conditions are also proposed under the project variant and the project variant is not expected to have any additional impact on the wind conditions in the project corridor. Thus, it is anticipated that the potential wind impacts of the project variant would be the same as the impacts discussed above for the proposed project. The project variant is not expected to result in an increase in wind speeds and would not result in an increase in exposure to existing wind hazards.

[8] Based on previous wind studies prepared for a project at 350 Mission Street.

6 SUMMARY AND RECOMMENDATIONS

6.1 Summary

This screening-level wind assessment was conducted based on the local wind climate, existing and proposed streetscape improvements along Market Street, and previous wind studies conducted by RWDI along the project corridor. The streetscape improvements included under the proposed project, including changes to street trees, pedestrian and bicycle facilities, crosswalks, transit platforms and stops, would not substantially alter the existing wind conditions, nor induce new wind hazard exceedances. Based on previous wind studies, the following three areas experience existing wind speeds that exceed the hazard criterion:

- between Van Ness Avenue and Polk Street/10th Street due to the existing and future tall buildings;
- at the north end of Yerba Buena Lane on the west side of an existing hotel tower; and
- around the intersection with 3rd Street/Kearny Street, which is an "entrance" for the prevailing west and west-northwest winds into the downtown core of dense tall buildings.

The proposed project would not increase wind speeds in these areas, and would not increase the potential for exposure to existing wind hazards. The streetscape improvements proposed under the project variant would be similar to the proposed project, and therefore the project variant would not increase wind speeds and would not result in a potential increase in exposure to existing wind hazards.

6.2 Recommendations

Although additional exceedance of the wind hazard criterion is not expected with implementation of the proposed project or the project variant, RWDI recommends incorporation of the following measures to lower existing wind speeds at the areas identified above that experience existing wind speeds that exceed the hazard criterion:

- street trees to be combined with hardscaping, street art or porous tall furniture such as those shown in Image 6 for the protection of the trees from windy conditions at the intersection of Market Street and Van Ness Avenue;
- street trees be combined with hardscaping, street art and other elements for wind control at the intersection of Market Street with Fell, Polk and 10th streets;
- trees with denser foliage, (Image 6d) be planted at 7th Street;
- enhancements such as those mentioned in Images 6a, 6b and 6d should be made to the existing landscaping in the United Nations Plaza to protect this area from northwest exposure; and
- the street trees should be combined with hardscaping such as windscreens, street art or other elements used for wind control, at the north end of Yerba Buena Lane and the intersection of 3rd and Kearney streets.

APPENDIX 11: BETTER MARKET STREET FINAL REPORT (2013)

The Better Market Street Project

Final Report

Acknowledgements

The Better Market Street project is a collaboration between the City and County of San Francisco multi-agency project team and a multi-disciplinary consultant team. We would like to recognize the contributions of the following people.

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The Better Market Street Project

Final Report

1. Purpose of this Report

Built in the late 1800s, Market Street was designed to be San Francisco's grand boulevard. Its diagonal design made it a unique and central city connector for moving people and goods. Today, more than a quarter of a million people travel along Market Street to and from their destinations during the course of an average weekday. While still San Francisco's iconic street, the 1970s design for Market Street has become dated and no longer meets the placemaking or transportation needs of the City.

The planned re-paving of Market Street from Van Ness Avenue to Steuart Street in 2016 presents a special opportunity to envision a new Market Street that responds to its evolving civic, transportation and economic role in the City. The Better Market Street project engages both City agencies and a broad spectrum of the community to reach a better understanding of what improvements contribute to the success of the street.

The Better Market Street project is expected to result in a major revitalization effort based on a number of placemaking and sustainable transportation investments. These will support increased promenading opportunities and an enlivened sidewalk life; safer pedestrian crossing; reliable, fast and comfortable transit service; and a safe, comfortable and appealing bicycle facility along its entire length. Finally, the economic and community development efforts along the corridor would be further strengthened by the public realm and transportation improvements.

Constraints within the Market Street right of way to create a world class boulevard for all users and feedback from public workshops guided the Better Market Street project to consider Mission Street as a complementary corridor to Market Street. The Better Market Street project requirement of two lanes of traffic in both directions to improve transit performance and allow for operational flexibility in the context of fixed infrastructure such as BART portals and existing and predicted high-traffic pedestrian locations revealed constraints on design for a continuous separated bikeway for the length of Market Street. The Better Market Street project approaches Mission Street as a potential partner corridor for transportation and public life, allowing the Better Market Street project to consider three viable options that provide flexibility for the future and a range of costs.

The purpose of this report is to review the Better Market Street project's purpose and need; its goals, ambitions and design drivers; and the range of corridor-wide transportation elements suggested during the preliminary evaluation phase. This report documents the evaluation of the various transportation elements, and presents a set of options to potentially carry forward into detailed environmental review.

This report was prepared by the Better Market Street project team, which includes the Department of Public Works, the Planning Department, the San Francisco Municipal Transportation Agency, the Public Utilities Commission, the Office of Economic and Workforce Development, and the San Francisco County Transportation Authority. The project's transportation consulting team is led by Parisi Transportation

Consulting with support from Nelson/Nygaard, Fehr & Peers, Gehl Architects, Perkins + Will, CMG Landscape Architects, and Circlepoint.

Figure 1. Bird's-eye photo of Market Street

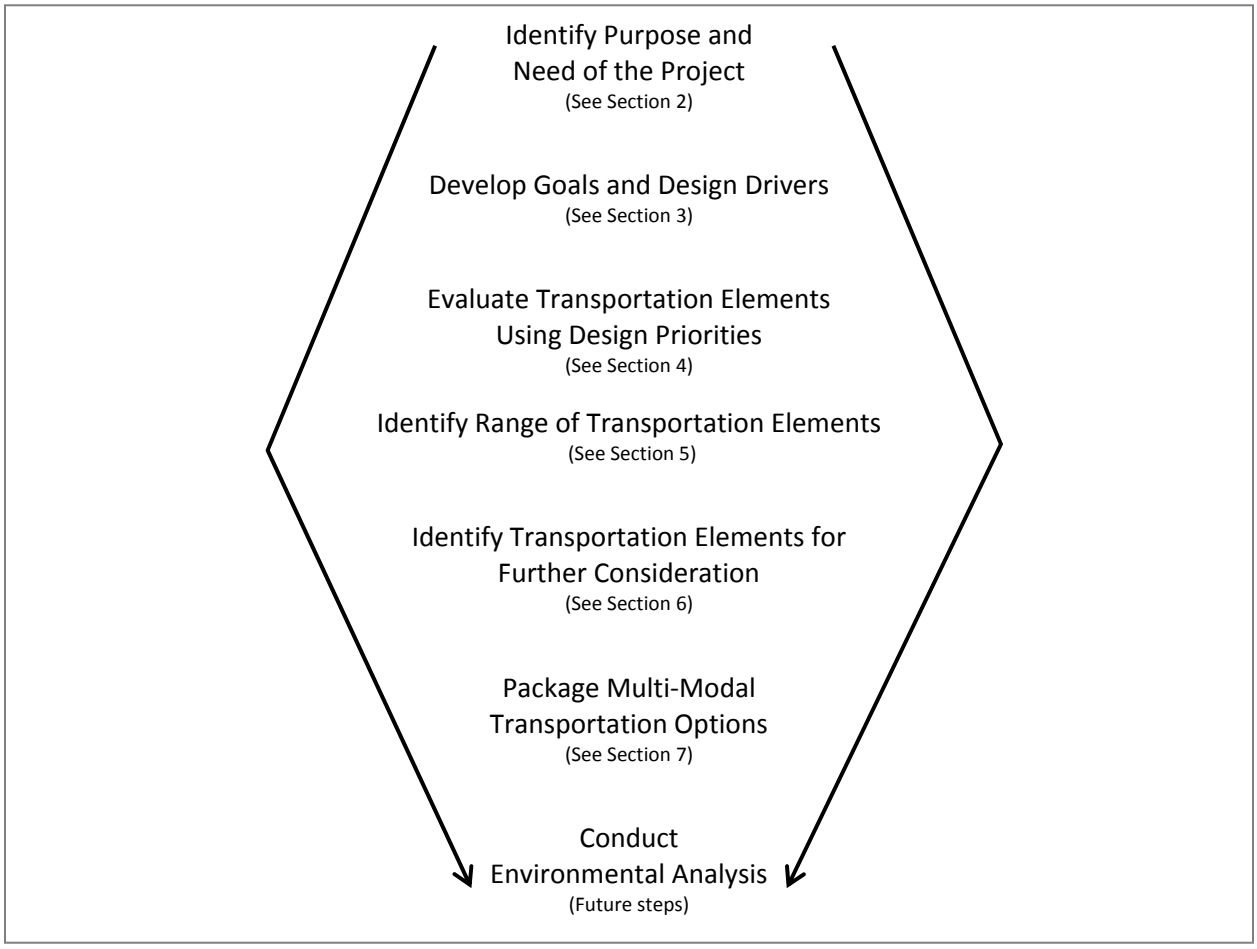


Figure 2. The project process diagram

2. Project Purpose and Need

The project's purpose is to:

- Improve mobility for pedestrians and people on bicycles and transit vehicles while also accommodating taxis, trucks and private vehicle circulation;
- Reduce conflicts and friction among street users to improve safety for all travel modes and to reduce transit vehicle delays;
- Enhance access to Market Street destinations with improved pedestrian routes, clear wayfinding, and loading areas;
- Provide public realm experiences that offer inviting settings and are comfortable and safe day and night; and
- Spotlight Market Street's identity by highlighting its distinctive features, unique districts, and impressive views.

The need for the project is indicated by the following:

- Market Street connects two different street grid systems, resulting in unfavorable intersection configurations that affect all travel modes;
- Pedestrian accessibility and mobility provisions are generally unfavorable; transit stop provisions are constrained and unwelcoming;
- Bicyclists are not afforded a continuous bicycle facility along Market Street; bicyclist volumes are increasing significantly;
- Transit vehicle travel speeds are slow and transit service is unreliable; transit demand along Market Street is expected to grow substantially;
- Taxi zones and areas for vehicle loading are limited along Market Street;
- Collisions of various combinations of pedestrians, bicyclists, transit vehicles and private vehicles are common; one-half of all collisions involve a pedestrian or bicyclist;
- Market Street does not offer a sense of place in many sections; the street is void of uses, designs and programs of activity that encourage people to extend their use of the street and to feel secure;
- The street's distinctive features, districts and views are not strong destination points; Market Street's civic purpose is underused; and
- Wayfinding along and across Market Street is confusing for all travel modes

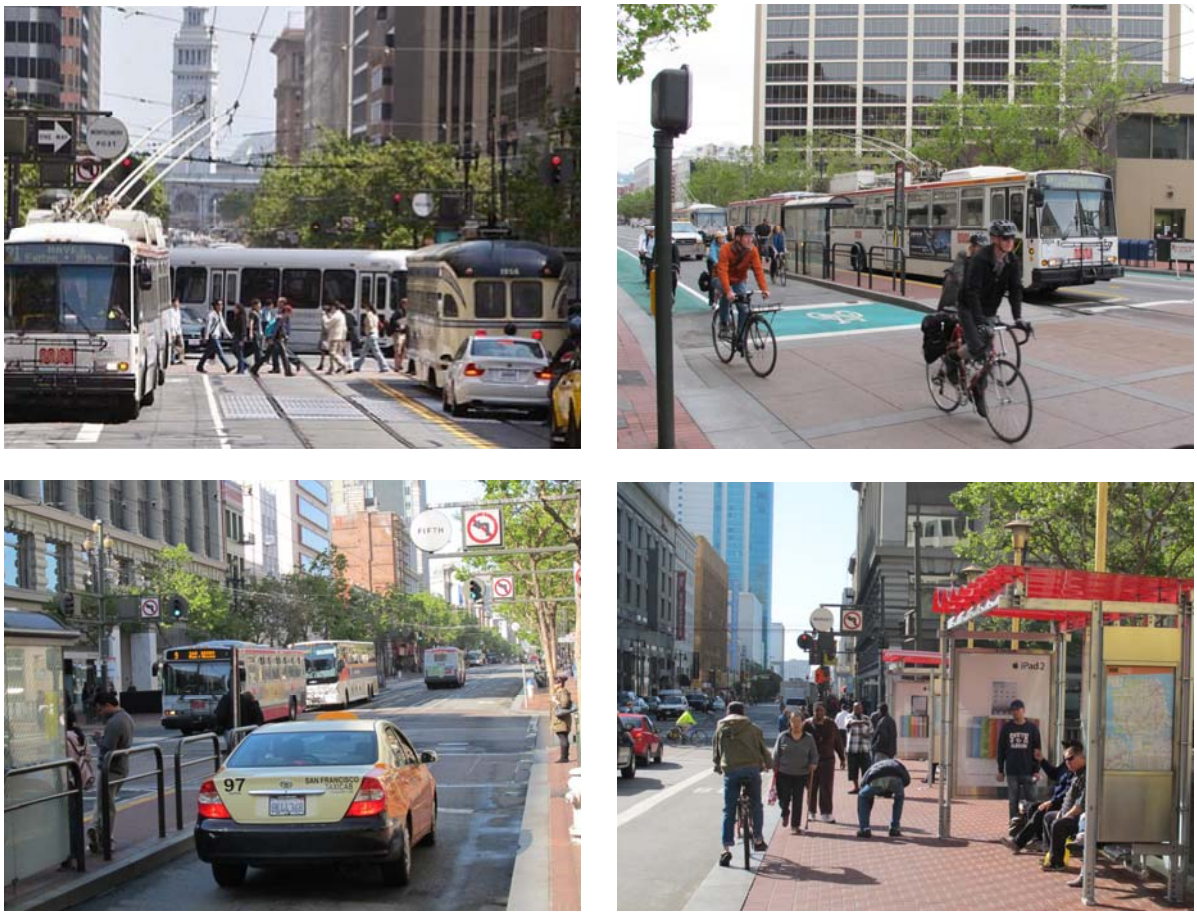


Figure 3. Market Street existing conditions

3. Goals and Design Drivers

The goal of the Better Market Street project is to revitalize Market Street from Octavia Boulevard to The Embarcadero and reestablish the street as the premier cultural, civic, transportation and economic center of San Francisco and the Bay Area. The design aims to achieve simplicity of place and movement through the following specific actions pertaining to placemaking and transportation:

- Placemaking:
  - Create one strong identity
  - Introduce a Streetlife Zone (see Appendix 1)
  - Introduce a public space hierarchy
  - Further develop the public space network
  - Revitalize the major public spaces
  - Enhance district characters
- Transportation:
  - Improve transit efficiency
  - Enhance the continuous bicycle facility
  - Reconfigure awkward intersections
  - Reduce conflicts between all users moving along and crossing the street

Figure 4. One Street, six districts, three major public spaces

Public space, modes of travel, civic identity, safety and pedestrian experience require coordinated action. Consequently, the most promising practices from elsewhere in San Francisco, the Bay Area, and the world have been considered for what might be unique solutions for Market Street. The project's five key 'design drivers', corresponding with each of the purpose areas shown on page 3 and guiding alternatives development and screening are as follows:

- Improve mobility
    - Improve transit speed, reliability and system capacity
    - Improve safety and comfort of bicycling facility to encourage use by people eight years old to 80
    - Improve pedestrian mobility and safety
    - Introduce clear and simple wayfinding and simplicity of place and movement
- Enhance public realm experience
    - Increase diversity of activities in the public realm
    - Enhance character of district identities
    - Improve key public plazas
    - Improve quality of green infrastructure
- Enhance access

    - Improve comfort and security of transit boarding areas
    - Balance private auto circulation with operational needs of other modes
    - Accommodate taxis and paratransit
    - Strengthen pedestrian connections to adjacent destinations
- Spotlight unique identity
    - Maintain a One Street identity, while strengthening identity of districts
    - Emphasize locations of special urban form
    - Introduce designs unique to Market Street, using existing success to focus future improvements
- Reduce conflict and friction
    - Increase diversity of groups and activities
    - Improve the comfort and security of pedestrians
    - Re-imagine the concept of boarding islands
    - Simplify and reconfigure street intersections
    - Provide a continuous bicycle facility

Initial public outreach for the project, engaged the public to envision a revitalized Market Street – a place of vibrant public life, fast and reliable public transit and thriving commerce – and then to realize a physical plan for those improvements. During this round of outreach, the public responded with their top priorities for a better Market Street. The list below represents the top vote-getting categories.

- Placemaking: receiving the highest number of votes, participants felt the character of Market Street and the quality of its spaces needed to be enhanced
- Walking: the safety and enjoyment of the pedestrian realm is a key priority and participants would prefer a more attractive and interesting pedestrian experience
- Bicycling: participants want a street where cycling is prioritized, safe and convenient
- Economic vitality: participants indicated preference for the project to support the economic vitality of businesses, particularly ground floor uses, along the Market Street corridor
- Public transit: reliable public transit is key to the success of Market Street. Outreach participants indicated that public transit offers many advantages, such as its convenience and the fact that it is faster than walking
- Civic: participants indicated that some great civic amenities like Civic Center are beautiful but lack diverse activity and are compromised by criminal activity
- Connecting neighborhoods: participants indicated that Market Street's role as a connector of many diverse neighborhoods and the fact that is passes through the heart of the City could be accentuated
- Service and taxi access: participants indicated difficulty finding a taxi on Market Street at any hour, via loading areas other than at hotels
- Vehicular circulation: participants raised several concerns about how vehicles dominate the Market Street environment, and indicated a need to reduce conflicts with other modes

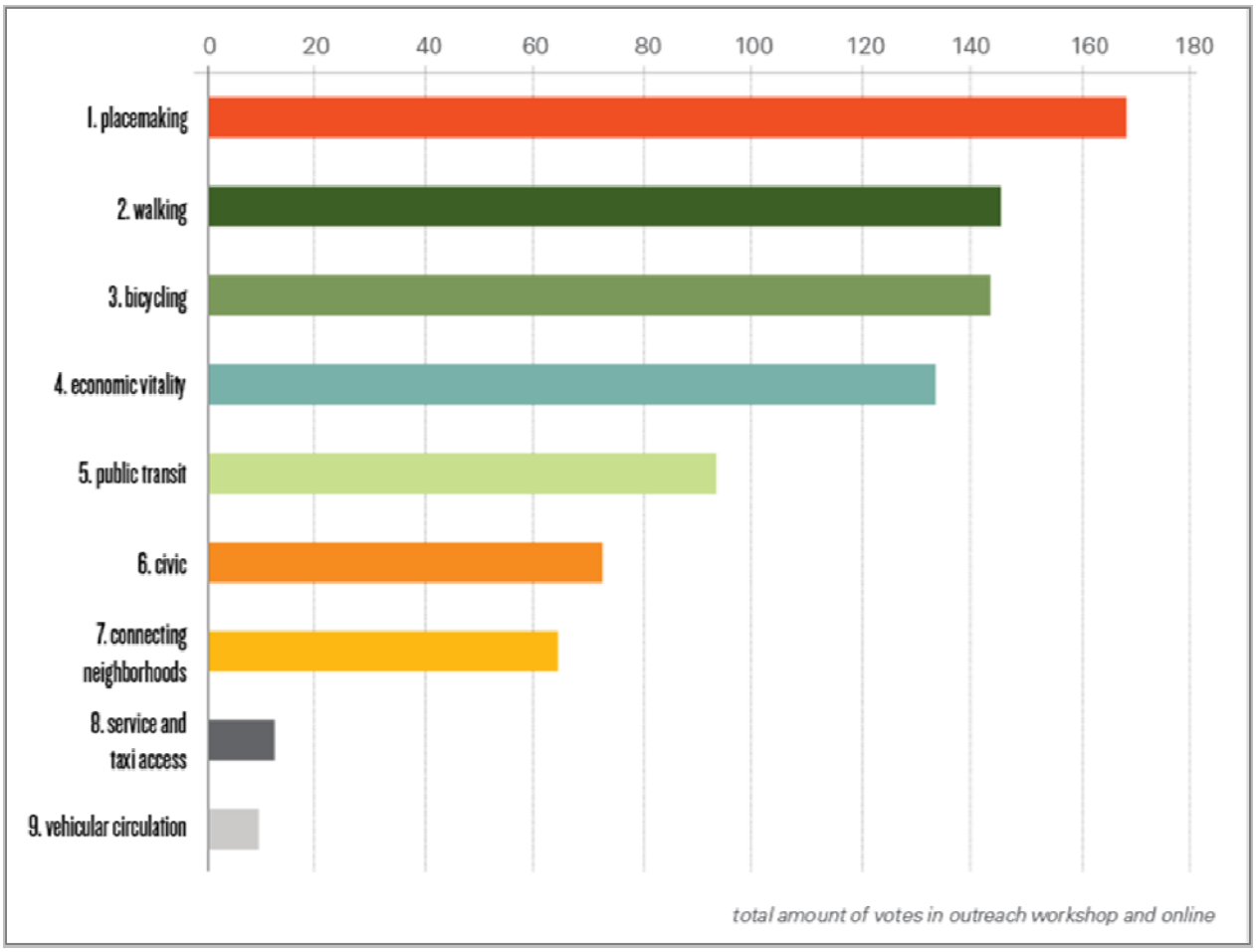


Figure 5. Public priorities for a better Market Street

Why Mission Street?

The Mission Street option arose out of two circumstances: one, intensifying constraints on creating a world class boulevard for all users on Market Street; and two, suggestions from BMS public workshops that we consider Mission Street within the BMS project. Working within given requirement of two lanes of traffic in both directions to improve transit performance and allow for operational flexibility, the remaining width of the street must accommodate cyclists, pedestrians, public space improvements and loading. During the design process for a Market Street cycletrack the BMS team discovered significant pinch points at BART portals and inadequate pedestrian space at high-traffic locations (e.g. Hallidie Plaza). Additionally, retaining the flexibility to accommodate future development on Market Street has become a key issue as the current development boon plays out. The Market Street option with a cycletrack would reduce the sidewalk width from its current maximum width of 35' to a proposed minimum of 21.5' The BMS team listened to public comments and considered Mission Street as a partner street allowing for three viable options that provide flexibility for the future and a range of costs.

4. Design Priorities and Evaluation

The project team, using Better Market Street project's purpose, need, "design drivers", and community input, developed design priorities to assist in evaluating the corridor-wide transportation elements described in the previous section. Eight design priorities related to transportation ("One Street Moving", 1 through 8), seven priorities related to urban design ("One Street Meeting", A through G), and three additional considerations were adopted by the project team. Each design priorities contain one or more "metric." During the evaluation of the corridor-wide transportation elements, the metrics were used to assess each element's viability.

"One Street Moving" Design Priorities and Metrics:

1. Improve pedestrian mobility and safety
    - Serious injuries and fatalities
    - Interrupted desire lines (see Appendix 7 for slip lane example of broken desire lines)
2. Improve comfort and safety of bicyclists along length of the street
    - Length of continuous, protected bike facility along Market Street, both approaching and through intersections
    - Width
    - Separation
    - Speed
3. Improve transit speed, reliability and system capacity
    - Travel speed by route and Market Street segment
    - Reliability
    - System capacity
4. Improve comfort and security of transit boarding islands (curb and island)
    - Amount of seating
    - Size of waiting area
    - Sun exposure and wind/rain protection
5. Reduce private vehicle conflicts
    - Number of collisions involving all modes
    - Transit delay (minutes/route)
    - Amount of double parking and parking on sidewalk
6. Accommodate people using taxis and paratransit
    - Conceptual design to include paratransit access at curb at any point even if results in blocking transit or bike lane
    - Enhance ability for people using these vehicles to safely board and alight along Market Street
7. Accommodate delivery vehicles
    - Identify potential alley/sidestreet options for loading, time of day procedures and/ or allocation of space to mitigate multi-modal conflicts
    - Maintain ability for these vehicles to traverse and access businesses along Market Street
8. Implement a wayfinding system that is clear and simple for everybody
    - Number of major destinations identified by a variety of on-street signage

- Distinct zones clearly delineated for each mode

"One Street Meeting" Design Priorities and Metrics:

A. Increase levels and diversity of pedestrian activity on the sidewalk
   - Number of lingering activities
   - Variability in uses

B. Integrate waiting and lingering activities
   - Percentage of non-standing lingering activity at transit stops

C. Public life at sidewalk grade
   - Increase density of activity per unit of area

D. Strengthen public space network
   - Number of interrupted pedestrian desire lines
   - Number of pedestrian obstacles from Market Street to nearby key destinations
   - Effective wayfinding to nearby key destinations

E. Connect cycling to public life
   - Number of bikes parked on or near Market Street

F. Increase diversity of groups and activities
   - Increase the diversity of users as measured by age, gender and socioeconomic status

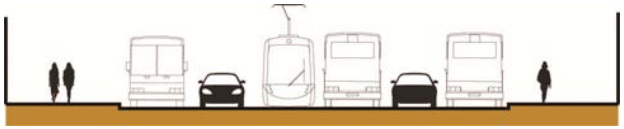
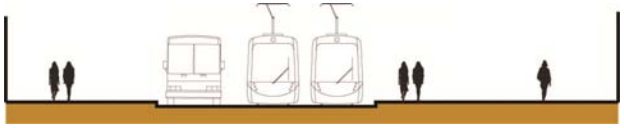
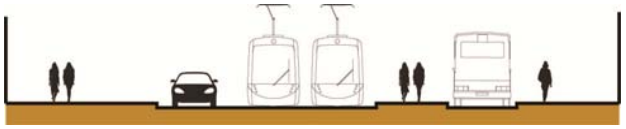
G. Improve the comfort and security of pedestrians
   - Lighting level and consistency
   - Light quality

Additional Considerations:

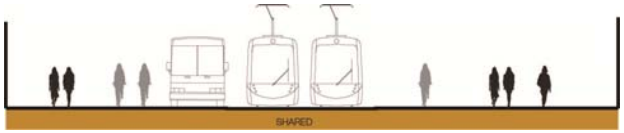
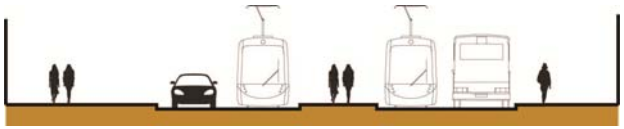
- Cost
  a. Cost of comparable streets projects in peer cities
- Constructability
  a. Need to move utilities, curbs, etc.; need to improve sidewalk; stormwater considerations; etc.
- Economic development
  a. Likelihood of positive economic impact on corridor and city

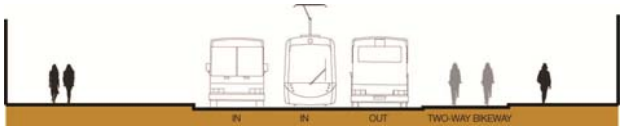
5. Range of Transportation Elements

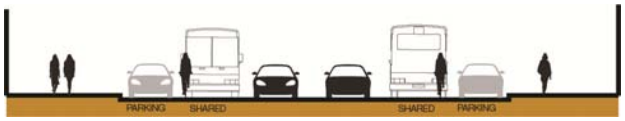
Based on the Better Market Street project's purpose, need, "design drivers", and community input, the project team identified 17 potential corridor-wide transportation elements for consideration, including four along the Mission Street corridor. The following provides a brief description of each transportation element and evaluation using a set of mentioned "design priorities". Elements selected to move forward into conceptual design are indicated by green highlight.

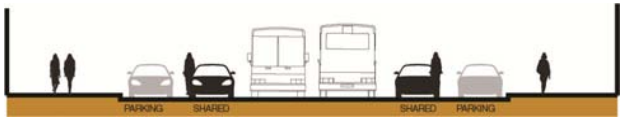
Corridor-wide Transportation Element	Alternatives Cross-Section	Pros/ Advantages *Addresses Design Priorities*	Cons / Disadvantages *Conflicts with Design Priorities*
I. Widen to Provide Total of Six Travel Lanes • Reduces sidewalk width to accommodate six travel lanes.		• *3, 6, 7* • Maximizes speed, capacity, reliability for transit, taxi, private autos and loading vehicles • Avoids impacting SOMA vehicular circulation	• *1, A, B, C, D, E, F, G, Econ. dev.* • Jeopardizes sense of place and importance of Market Street as an urban civic street • Dismisses ideals of a Complete Street (streets that are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities)
II. One Lane along Boarding Area, Two Lanes in Opposite Direction • Buses would share the center transit-only lane where there are boarding islands, otherwise there would be four lanes. • Would require a new, third signal phase, resulting in shorter phases overall. • Best suited for outbound stops where majority of boardings occur. • Could provide significant opportunities to activate and enliven public realm by merging waiting and public life.		• *1, 4, A, B, C, D, E, F, G* • Enhances comfort and experience of transit riders by connecting boarding islands to pedestrian amenities on sidewalk • Allows for seamless transition from public life to riding transit	• *3, 6, 7* • Jeopardizes speed, reliability and flexibility of transit from 8th Street to Main Street
III. Replace Historic F-line with Modern, High Speed, ADA-accessible Tram • Maintain current street alignment, but replace historic cars with modern tram cars.		• *3* • Improves transit speed, reliability, and accessibility – would eliminate need for ramps providing greater flexibility with design • Reduces ambient noise	• Cannot procure transit fleet on a timeline consistent with the Better Market Street Project

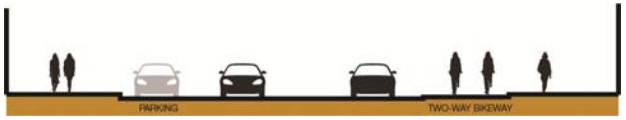
IV. Limited Transit Turnarounds During Peak Hours and All Transit Operates in Transit-only Center Lanes • Center lanes would be transit only. • During peak hours, limited number of bus lines would turn around at Market Street. • F-line service would be supplemented with modern low-floor streetcars during peak to alleviate transit-transit conflicts and improve speed, reliability and accessibility. • Transit service would resume to operate as normal during off-peak hours, but still in center lanes. • Bicyclists would share curb lane with private vehicles, taxis and loading.		• *3* • Transit-only in the center lanes • Curb lanes remain to allow for flexibility • Improves speed and reliability of transit • Accommodates high volumes of cyclists in curb lanes • Requires minimal infrastructure changes, saving costs	• *3, 5* • Short line and full line decreases service legibility • Creates a "transfer penalty" (65-95% of inbound passengers that reach Market Street travel beyond the Civic Center BART/Muni station, and 35-50% travel beyond Powell BART/Muni; both are potential points of transfer) • Mission Street transit is at maximum capacity and cannot accommodate more transit • In event that supplemental shuttle is no available, Muni Metro does not have capacity to accommodate transfers at Market Street for those who take a short line busCreating a Market Street shuttle service is resource consumptive, SFMTA staff required for operations and vehicles
V. Rail-only Service between 5th Street and The Embarcadero, with Pedestrians and Bicyclists • All transit lines would be rerouted such that riders would alight at Market Street at 5th Street and transfer to augmented Market Street rail service. • Creates possibility of new significant transit node, with associated economic development potential and public realm activation. • Could free up space along the curb to accommodate a bike lane and loading zones.		• *2, 3, 6, 7, 8, E* • Reduces transit-transit conflicts to improve speed, reliability, accessibility, and legibility • Allows more flexible use of curbside lane • Allows current curb alignment to be maintained, reducing project construction costs	• *3* • Jeopardizes comfort of a subset of transit riders as it forces them to transfer, which could hurt ridership, depending on the duration of transfer time • Requires significant operational adjustments to turn routes around near Market Street • Turnaround and layover space currently does not exist; would require a redesign of Hallidie Plaza west of Cyril Magnin

VI. Rail-only Transit Service between Van Ness Avenue and The Embarcadero, with Pedestrians and Bicyclists • Remove all transit except for F-line, supplemented by additional modern trams. • Would allow for flexibility in the streetscape design to accommodate pedestrians and bicyclists and capture Complete Street objectives.		• *1, 2, 4, 5, 6, 7, 8, A, B, C, D, E, F, G* • Improves pedestrian and bicycling experience by removing conflict with private autos and most transit • Maintains historic streetcar identity feature and supplements with modern trams	• 3, 4, 5, 6, 7 • Jeopardizes transit ridership as there would be a transfer penalty to all routes that terminate at Market Street • Requires riders to transfer to the expanded F-line service or to subsurface transit • Loss of ridership may negatively impact economic development along corridor
VII. Single Surface, Shared Space between 4th and 5th Streets • Curb-less shared space for all modes with paving treatments, street layout, and signage to encourage cooperative use of the space. • Would reflect prominence of this block in the City as the most visited street in San Francisco • Would offer potential to best capture public life potential of confluence with Powell Street, Hallidie Plaza, Westfield Mall, and Market Street.		• *1, 2, 4, 5, 6, 7, 8, A, B, C, D, E, F, G* • Improves pedestrian experience in an area with almost 90,000 pedestrians on a weekend day • Supports identity and economic development • Possible solution to conflict between portals, boarding islands and bike facility	• *3, Cost, Constructability* • There are design questions regarding how best to address safety issues with defining space for accessibility purposes • Jeopardizes transit speed and possibly reliability, although other streets have successfully integrated transit and Shared Space. Substantial best practice research would be necessary. • Rider comfort and overhead wire connectivity with vertical shift to single surface would need to be addressed through design
VIII. Create Ramblas (i.e., large center median allowing active uses), Realign Tracks with Center Boarding and Wide Center-Street Public Space • Shift F-line to provide 20-foot center space along length of corridor to act as shared waiting space for center-running transit (F-line and bus routes). • For stretches not including transit stops, space could be		• *1, 4, 6, 7, 8, B, C, D, F, G* • Improves waiting experience for transit riders • Creates identity and new opportunities for public life	• *Cost, Economic Development* • Very expensive to move track and utilities for F-line, realign overhead wires for buses, move grates for subsurface transit, and replace/upgrade fleet for left-side boarding • May shift pedestrian activity to center area and away from businesses on sidewalk

engaged with varied streetscape and recreational opportunities.			
IX. Boulevard Layout, Local Access and Center Through Lanes • Maintains four lanes of traffic. • Maximizes private vehicle access to buildings. • Potential to improve quality of waiting experience of transit riders, depending on design of local-access lane.		• *1, 3, 4, G* • Transit would be realigned to accommodate a center space along the length of corridor, but just wide enough for transit stop activity • In stretches along corridor not used for transit stops, streetscape treatments could capture Complete Street elements	• *Cost* • Requires new fleet for left-side boarding and while this may not negatively impact conditions for different modes, it does not significantly improve any either • Does not actively improve transit speed nor provide enough space in the center to generate a new public life space. Rather, it may take away some space that could be used for a bike facility or public, such as on the sidewalk.
X. Skip Stop • Transit concentrated into center lanes. • Curbside lane shared by taxis, paratransit, private vehicles and bicyclists.		• *4, E, Cost* • Maintains existing historic streetcar service, with ability to introduce modern streetcars in the future • Potential to reduce vehicle speed • No changes to transit service or lane assignment; all to center lane to improve legibility	• *3, 4, 5, Cost* • Transition for buses to move from boarding island back into transit lane requires significant curb cut • Movement for buses from boarding island back into transit lane slows transit and increases chances of disconnecting overhead wires • Requires moving the tracks and utilities/grates in places where F-line stops
XI. "3:1" Concept • Two inbound Market Street lanes, one outbound lane/couplet with Mission Street for a portion of Market Street's outbound transit. • Two-way cycletrack on Market Street.		• *2, E, Cost* • Provides separated bicycle facility • Eliminates need to cut curb for cycletrack, allowing for more public activation zones	• *2, 3, 5* • Decreases service legibility • Reduces transit service area • Would overload Mission Street • A single outbound lane on Market Street would impact SFMTA's ability to respond to vehicle breakdowns and creates problems for emergency access • A two-way cycletrack on Market Street prohibits paratransit

			access and would require significant engineering and enforcement to alleviate conflicts between autos, pedestrians, and bicyclists.
XII. Limited Auto Restriction and Shared Transit/Bicycle Lane • Transit only center lanes • Auto restrictions, with curb lane shared by transit, paratransit/taxis, private autos and bicycles.		• *B, Cost* • Improves opportunity to expand street life activation • Reduces need to make significant changes to curb alignment	• *2, 3* • Relies primarily on automobile restrictions to improve comfort and safety for people on bicycles sharing the curbside lane. • Does not provide dedicated right-of-way to separate people on bicycles from transit vehicles. Relies on transit stop placement and curbside lane widening to provide bicycle-transit passing opportunities and to reduce intermodal conflicts.
XIII. Curbside Cycletrack • Transit only center lanes • Auto restrictions, with curb lane shared by transit, paratransit/taxis, and private autos, but not bicycles. • Directional, separated bicycle facilities at mid-grade or sidewalk grade.		• *2, B,E* • Provides separated bicycle facility • Allows for spontaneous interaction – bicyclists can engage the public realm	• *2, 5, 6, 7, 8* • Cycletrack's location next to curb may conflict with standard paratransit loading and unloading operations where there is no dedicated loading zone. Curbside paratransit operations require eight feet of area perpendicular to and above curb to allow patrons safe access between vehicle and sidewalk. • Potential bicyclist conflicts with people crossing the bicycle facility would exist under the proposed design.
XIV. Mission Street TEP Moderate Concept with Side-running Bus Lanes • Miscellaneous features, e.g., extending right-turn lanes • Bus stops: extend existing bus zones, select stop		• *3, 5, 6, 7* • This concept is compatible with all Market Street proposals that do not divert Market Street buses onto Mission Street.	• Does not substantially address Market Street design priorities and metrics

consolidations, new boarding island at Transbay Transit Center (inbound) • 24-hour transit only lanes between Beale and 11th • No parking between 7 a.m. and 7 p.m.			
XV. Mission Street TEP Expanded Concept with Center-running Bus Lanes • Miscellaneous features, e.g., extending right-turn lanes, required right turns, queue jumps • Bus stops: extend existing bus zones, select stop consolidations, near-side boarding islands (inbound at 6th, 5th, 4th, 3rd, 2nd, Fremont; outbound at 2nd, 3rd, 4th) • 24-hour transit only lanes between Beale and 11th; center-running transit lane between Fremont and 6th • No parking 24 hours a day between Fremont and 6th		• *3, 4, 5, 6, 7* • This concept is compatible with all Market Street proposals that do not divert Market Street buses onto Mission Street.	• Does not substantially address Market Street design priorities and metrics
XVI. Mission Street Bikeway with One-way Cycletrack on Each Side • Two six- to eight-foot wide bikeways on each side of Mission Street, with two- to five-foot painted buffer • Floating parking on one side of the street • Introduce left-turns from Mission Street at select intersections • Move Muni 14-Mission line, Golden Gate Transit buses		• *2, 5* • Eliminates conflict with buses and rail vehicles, creates a straightforward path of travel • Has the potential to allow left turns on Mission Street, requires greatest degree of auto restrictions on Market Street • Enables cycletracks separated from traffic by wide buffer areas	• *2, 3* • Creates the primary bicycle facility one block away from Market Street on Mission Street • Consolidates Mission Street transit service onto Market Street. Requires Mission Street users to divert one block from the existing stop pattern. May introduce operational challenges for bus operations at peak demand along Market Street and at transit stops.

and SamTrans lines to Market Street • Time traffic signals to prioritize bicycle progression along Mission Street			
XVII. Mission Street Bikeway with Two-way Cycletrack on One Side • A 12- to 16-foot wide two-way bikeway on the north side of Mission Street • Curbside parking on the south side of Mission Street • Move Muni 14-Mission line, Golden Gate Transit buses and SamTrans lines to Market Street • Time traffic signals to prioritize bicycle progression along Mission Street		• *2, 5* • Eliminates conflict with buses and rail vehicles, creates a straightforward path of travel • Has the potential to allow left turns on Mission Street, requires greatest degree of auto restrictions on Market Street	• *2, 3, 6* • Creates the primary bicycle facility one block away from Market Street on Mission Street • Consolidates Mission Street transit service onto Market Street transit service. Requires Mission Street users to divert one block from the existing stop pattern. May introduce operational challenges for bus operations at peak demand along Market Street and at transit stops • Restricts curbside access on the cycletrack side of the street to a larger extent than a one-way bicycle facility

The project team and the technical advisory committee considered the project goals and design drivers to prioritize the pros and cons and determined Elements XII, XIII and XVI should move forward in the planning process with the following revisions:

- XII. Auto Restrictions and Shared Transit/Bicycle Lane: private auto restrictions should also be considered wherever there is not a dedicated cycletrack on or parallel to Market Street
- XIII. Curbside Cycletrack: the facility should consider a mid-level cycletrack between the vehicular travel lanes and abutting the adjacent sidewalk
- XVI. Mission Street Bikeway with One-way Cycletracks: the Market Street design will be consistent with XII.

Elements XIV and XV are compatible with Elements XII and XIII, and are moving forward with their own environmental study (Transit Effectiveness Project). Element XVI precludes Elements XIV and XV, and will be analyzed as part of this projects' environmental study. Because the cons of all other elements that substantially conflict with the project goals and design drivers and also outweighed any benefits, they were removed from further consideration.

6. Description of Transportation Elements to be Further Considered

Transit Operating Plan

The existing design of Market Street consists of a near-side transit stop at every intersection with a numbered street, except for at 2nd Street (stop at New Montgomery Street). Curbside stops were placed midblock to prevent both travel lanes from being blocked by transit vehicles at the intersection. The legacy signal timing for the Market Street corridor was designed to have every transit vehicle board and alight at the intersection's stop (red) phase, with buses ready to depart at the next green signal phase. However, this signal timing scheme no longer works due to changes in the traffic modal distribution (e.g., the addition of the historic F-Line streetcar and the dramatic increase in bicycle traffic), changes to the freeway network after the Loma Prieta earthquake, and the temporary traffic/transit rerouting due to Central Subway construction.

The goal of the two transit concepts summarized below is to create a more resilient scheme for improved transit operations. The basic premise for improving transit operations is through stop location and distance optimization. Rather than providing a transit island and curb stop every block (about every 900 feet, on average), the proposals attempt to provide stops every one and a one-half blocks (about every 1,400 to 1,500 feet, on average) or farther. The Enhanced Local Transit concept would preserve the existing route-based travel lane assignments, while the Rapid Transit concept would assign all limited service buses to the center lane and the local buses to the curb lane.

Another goal for the transit stop design is to move the island stops from near-side to far-side or midblock locations to reduce instances where near-side island stops prevent vehicles in the curbside lane from moving into the center lane to get around vehicle queues near the intersections. This is a common occurrence at high pedestrian traffic intersections where right-turning vehicles frequently queue at the crosswalk.

- Enhanced Local Transit operations: with minor stop optimization changes, Enhanced Local Transit operations would result in nine island stops and seven curb stops in the inbound direction and nine island stops and six curb stops in the outbound direction. Transit operations would continue to assign lines on a destination basis, i.e., inbound buses headed to the Ferry Building travel in the center lane and inbound buses en route to the Transbay Transit Center (TTC) travel in the curbside lane. Outbound buses headed to the Castro would stay in the center lane, while buses turning onto the North-of-Market grid would travel in the curbside lane. This lane assignment would allow passenger to board both limited and local bus service at the same stops, thereby preserving system legibility.
- Rapid Transit operations: with significant stop optimization changes, Rapid Transit operations would result in six island stops and nine curb stops in the inbound direction and six island stops and eight curb stops in the outbound direction. Limited-stop transit lines would be assigned the center lanes, while local lines would use the curbside lanes. The limited lines in the center lane should benefit greatly from the greater stop spacing (averaging about 2000 feet). However, route legibility for customers may be jeopardized for customers, as they would no longer be able to catch limited and local buses at the same stop. The Rapid Transit lane assignment scheme would also require inbound limited buses headed to the Transbay Transit Center to change lanes before turning right at 1st Street. Similarly, outbound limited buses headed to the NOMA grid would need to transition to the curbside lane before taking a right turn, which is a maneuver not currently needed with the existing lane assignments.
- In addition to transit stop spacing, all of the alternatives would include significant enhancements to transit such as: widened and raised platforms to meet ADA standards and enable level boarding, ticket vending machines and pre-payment, improved signal timing and transit signal priority where appropriate, etc. These improvements, all of which can contribute to increase transit travel speed and reliability, will be considered and refined as part of the environmental review and design phases for the project.

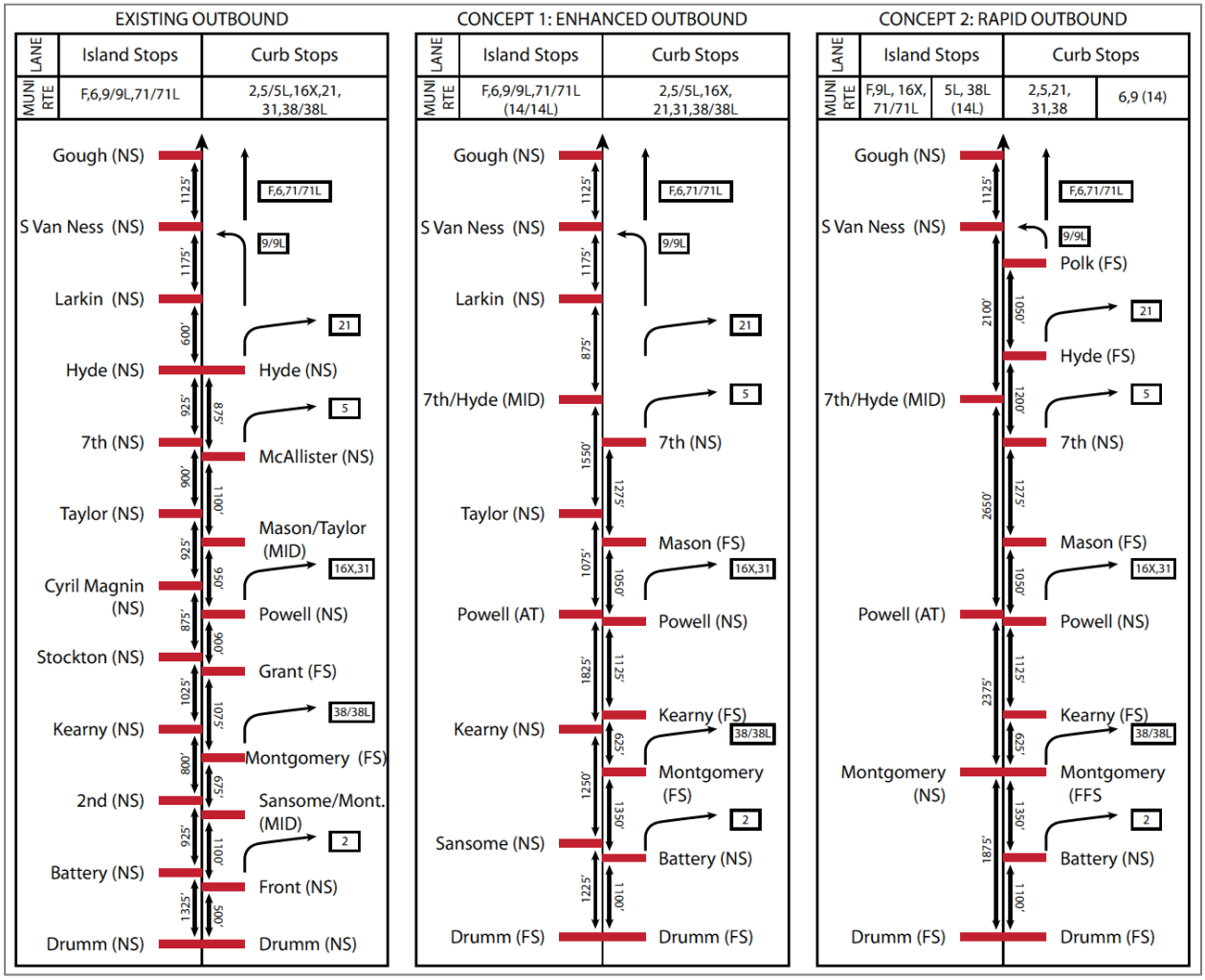


Figure 6. Transit stop comparison

Bicycle Circulation

Further study on each bicycle facility proposal's ability to provide a safer and more comfortable bicycle facility will be conducted. Key metrics will include the width, separation, design speed, and length of the bicycle facility.

- Shared lane operations on Market Street: similar to existing operations, this circulation option would realign portions of the curb line to widen the shared curbside lane, minimizing conflicts between cyclists and vehicles. Based on the current operating conditions on Market Street, people on bicycles traveling in a shared lane will be able to maintain an average speed of 10 mph. The planned widening of the curb lanes will alleviate conflicts between people on bicycles and transit/auto vehicles, particularly when the lane is channelized at a near-side boarding island.

- Cycletracks on Market Street: the sidewalk width would be reduced and the curbline redesigned for a significant portion of the corridor to provide a seven- to eight-foot wide vertically separated bicycle facility. High pedestrian volumes between 3rd and 5th Streets would necessitate maintaining the existing or widening the sidewalk. The cycletrack in this two-block

segment would transition into a shared lane facility. Based on the current operating conditions on Market Street, people on bicycles traveling in a dedicated cycletrack will be able to maintain an average speed of 12 mph. The dedicated bicycle right-of-way will alleviate conflicts between people on bicycles and transit/auto vehicles for the majority of Market Street.

- Cycletracks on Mission Street: moving Mission Street's transit lines to Market Street, this circulation option would convert the existing transit only lane on Mission Street to a separated bicycle facility. Bicyclists would not be prohibited from cycling along Market Street, but signage would direct cyclists to the Mission Street cycletracks. All Mission Street transit service would need to transition onto Market Street, including the Muni 14 Mission line, and select Golden Gate Transit and SamTrans lines currently using Mission Street. The dedicated cycletrack and opportunity to provide bicycle-preferential signal timing (green wave) could allow people on bicycles traveling to maintain an average speed of 14 mph. This concept includes improvements to roadways connecting to Mission Street, including to/from The Wiggle and Valencia Street via Otis and McCoppin Streets.

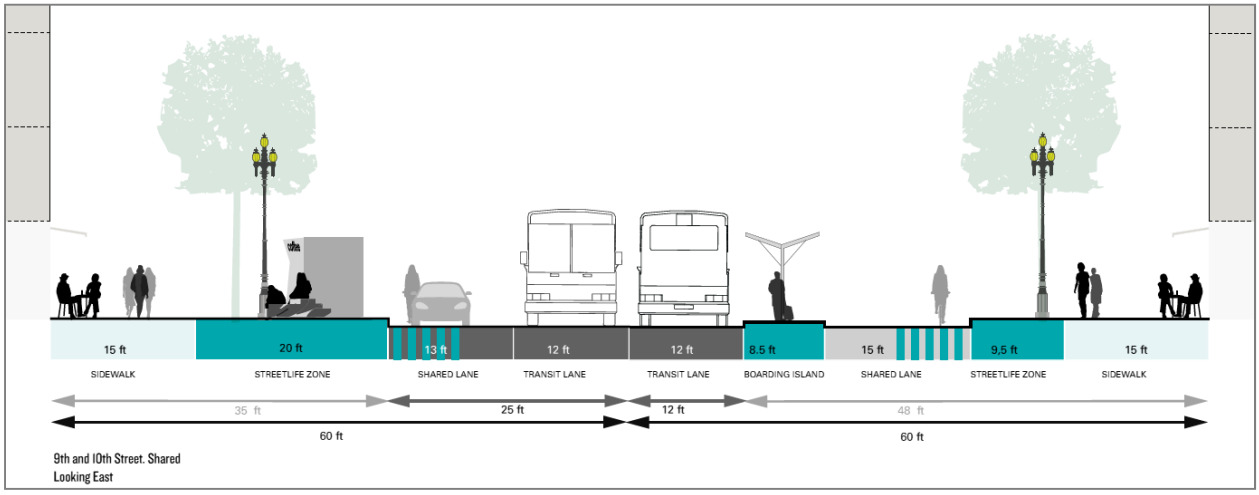


Figure 7. Market Street Shared Lane

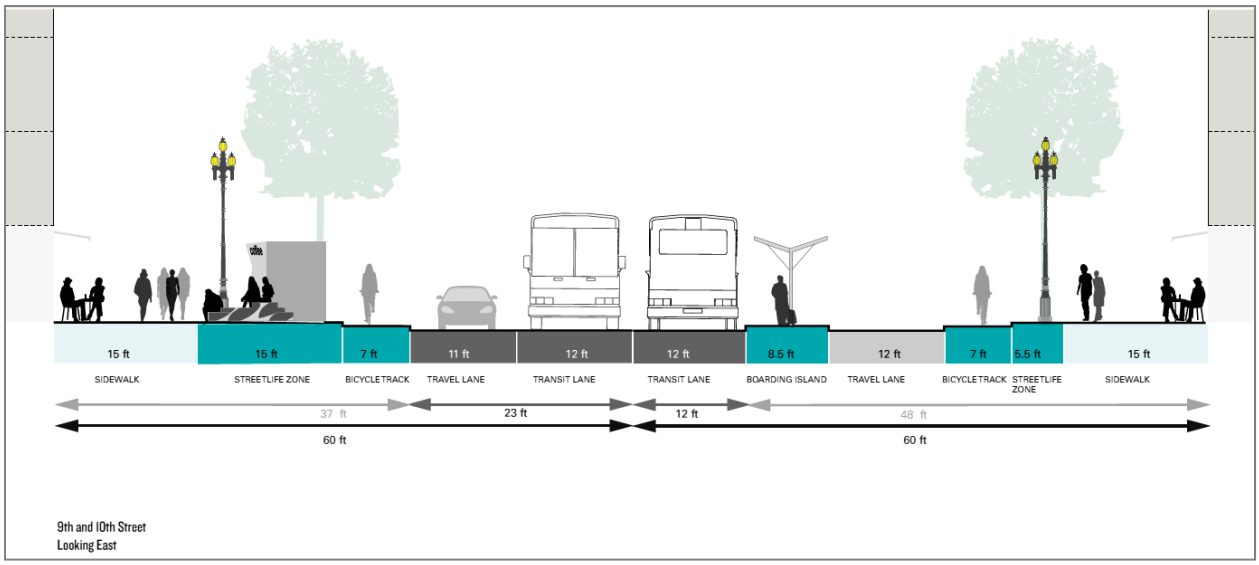


Figure 8. Market Street Cylcetrack

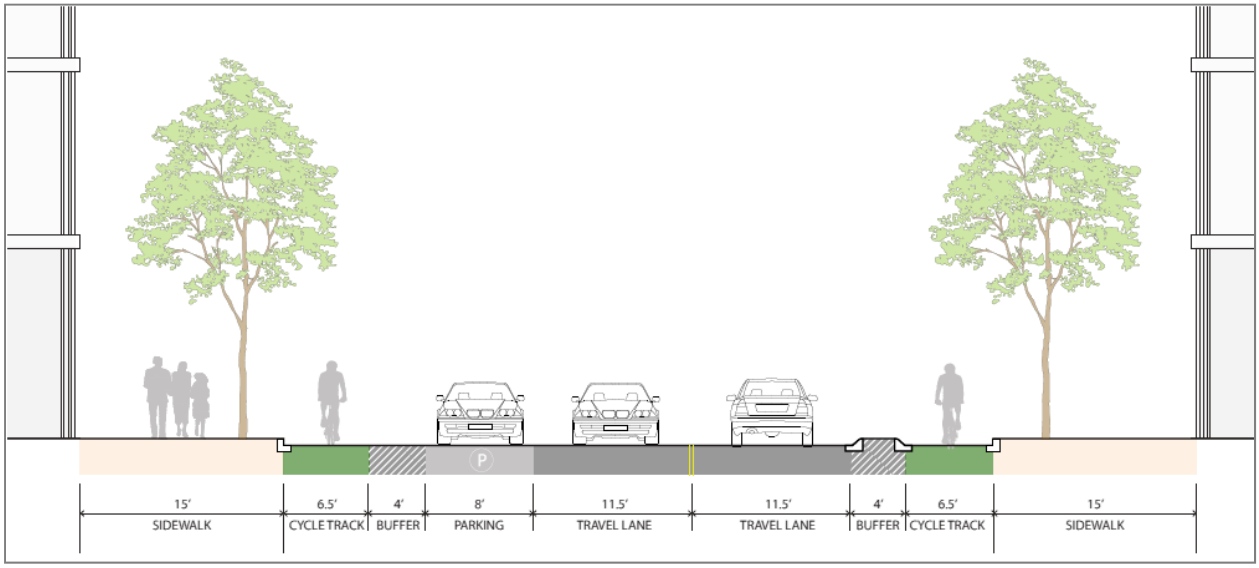


Figure 9. Mission Street Cycletrack

Private Auto Circulation

Under all private automobile proposals, further study on each proposal's effect of automobile restrictions on corridor automobile circulation would be conducted, as would their potential benefit to transit and bicycle traffic, and level of design and enforcement needed to enact the auto restriction.

- Level 1 – Car-free from 5th Street to Transbay Terminal: This proposal would make the segment of Market Street between Fremont and 5th Streets prohibited to private automobiles from about 7 a.m. to about 7 p.m. The proposal would add a third required right turn in the inbound direction at 5th Street, and two required right turns in the outbound direction at Sutter and Geary Streets. There would be turn prohibitions for northbound 5th Street ("No Right Turn"), southbound 4th/Stockton/Ellis Street ("No Turns"), inbound O'Farrell Street ("Left Turn Only" at Grant Street), northbound 3rd Street ("No Turns"), southbound Montgomery Street ("No Turns"), 2nd Street (no through access north of Mission Street), southbound Bush Street ("No Turns"), and northbound Fremont Street ("No Left Turns"). Auto restrictions also under consideration include a required left turn for autos at inbound O'Farrell Street onto Grant Street and closing Battery Street between Bush and Market Streets.
- Level 2 – Car-free from 8th Street to Fremont Street: This proposal would make the segment of Market Street from 5th Street to Fremont Street prohibited to private automobiles during daytime hours (e.g., 7 a.m. to 7 p.m.). This segment of Market Street has the highest transit and pedestrian volumes.
- Level 3 – Car-free from Van Ness Avenue to the Embarcadero: This proposal would make the entirety of the Market Street east of Van Ness Avenue car free during most of the day (e.g., 7 a.m. to 7 p.m.). All autos traveling on streets intersecting Market Street would be prohibited from making turns onto Market Street. Streets that "T" onto Market Street would either permit limited auto access or would be closed at the nearest upstream intersection.

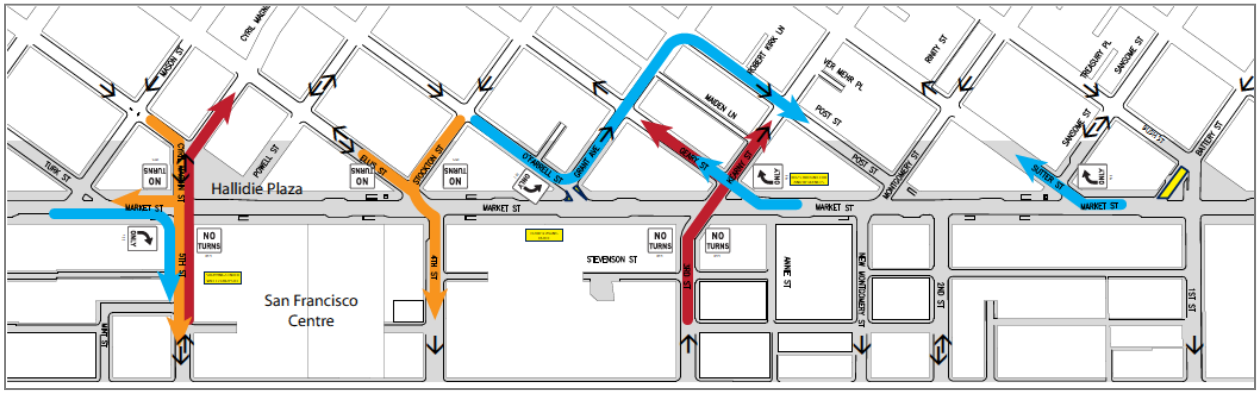


Figure 10. Car Free Market Circulation Diagram, Level 1

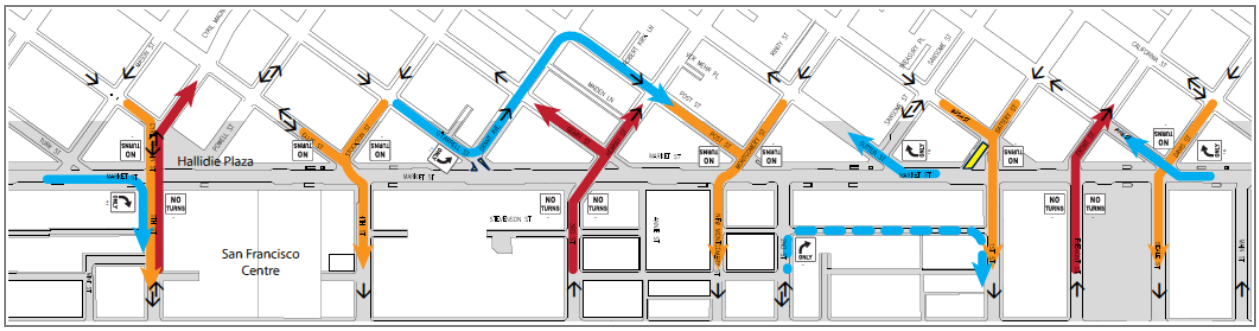


Figure 11. Car Free Market Circulation Diagram, Level 2

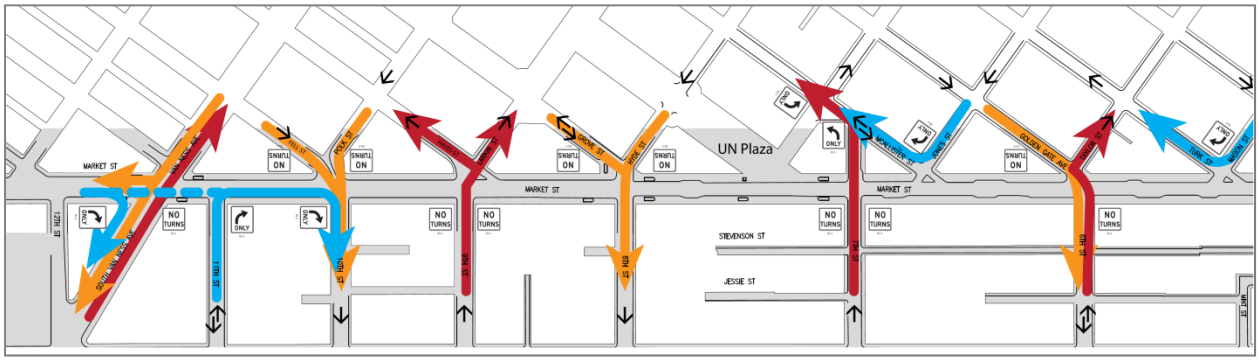


Figure 12. Car Free Market Circulation Diagram, Level 3 (Between 6th Street and Van Ness Avenue)

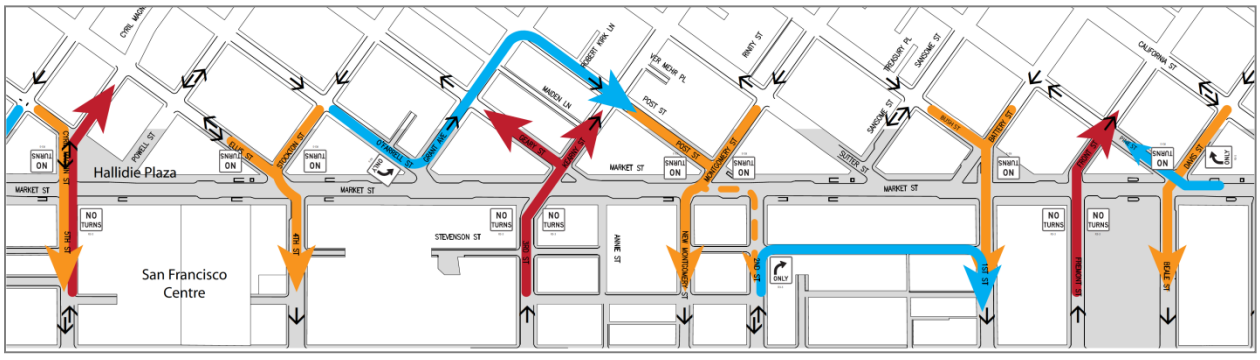


Figure 12. Car Free Market Circulation Diagram, Level 3 (Between Beale Street and 6th Street)

Public Spaces and Street Life

The pedestrian network provides the critical connections for all walking trips, but also for every automobile, transit and cycling trip. Strengthening a coherent network of high quality pedestrian routes will enhance the social and economic vitality of the downtown, with Market Street as the critical spine in the network.

Pedestrians, more so than any other mode, are sensitive to the quality of the immediate environment and make trip and route choice decisions based on whether the sidewalks, open spaces and adjacent buildings offer a sense of comfort, protection and delight to pedestrians. By providing a safe and comfortable space for pedestrians, they are less likely to make movements into spaces that would impede transit travel. All three options will provide appealing paths to and from transit boarding areas to enhance access and the waiting experience.

All the proposed designs for Market Street improve on the existing conditions in a number of ways:

- Sidewalks are scaled to provide a greater sense of intimacy and vitality;
- An adaptable Streetlife Zone is introduced to create local opportunities for activation, while providing space for streetlights, stormwater areas and pedestrian amenities;
- A new paving system will provide smoother conditions in the pedestrian through zone and more flexibility for alternative enhancements in the Streetlife Zone;
- Transit boarding areas will be visually tied to the sidewalk through paving to highlight to all users the elevated levels of pedestrian activity within the area;
- Improved soil and drainage conditions will allow for a healthier, more robust urban forest; and,
- Intersections will be redesigned to narrow and simplify pedestrian crossing, while creating new mini-plazas.

The variation between the three options developed revolves on the amount of space pedestrians have and the degree to which cyclists are invited to transition from cyclist to pedestrian and back again, depending on shopping opportunities, spotting friends, or compelling invitations to stop and enjoy the enhanced public realm. Specifically:

- A cycletrack, as compared to the shared bike lane, makes it easier for a cyclist to transition to a pedestrian, thereby increasing the amount of activity on the sidewalk; and,
- Pedestrian space is reduced, at times significantly, when cycletracks are included, thereby limiting the amount and range of pedestrian activation possible.

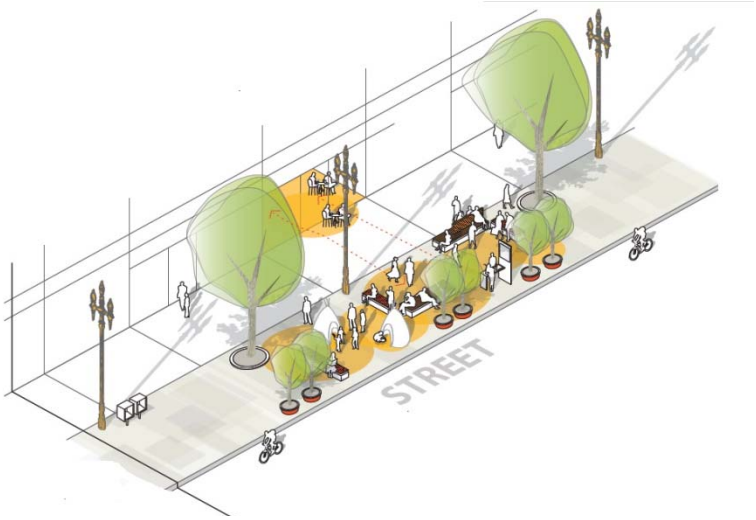


Figure 13. Illustration of proposed pedestrian throughway and Streetlife Zone.

Summary of Community Involvement

The Better Market Street project team has held two rounds of public workshops. The second round, including a webinar, occurred in July 2012 to showcase proposed improvements along Market Street and collect public feedback. A major concern was safety along Market Street for pedestrians and bicyclists, and an overall sense of security along the corridor. With respect to transportation, over 80 percent of respondents favored a separated cycletrack, with over 70 percent indicating the importance of a consistent design along the entire length of the corridor. Please refer to appendix 5 for detailed public outreach findings.

Almost 80 percent of respondents strongly supported reducing private auto access along Market Street, with others preferring a compromise between private vehicle usage and other modes. Eighty-five percent of respondents indicated they were willing to reduce the amount of bus and train stops to achieve faster, more reliable transit, even if it meant they had to walk farther.

Public comments on the Better Market Street project for the second round workshops were collected through a 28-question survey using questions that corresponded with the workshop exhibits. Exhibits were also available for review on the project website.

A third round of public outreach is scheduled for July 2013. Workshop and webinar participants will view and discuss designs for three options and provide input on the parameters that matter most to people in order to help the City make future decisions about the direction for revitalizing Market Street.

Figure 14. Better Market Street public workshops

7. Description of Options to Carry Forward

This section briefly introduces the project options encapsulating the range of transportation elements for further consideration in the environmental review stage of the project. However, there are also public realm and urban design considerations to be taken into account for all options. The project team performed an initial analysis of performance of these alternatives, particularly with respect to transit performance. This analysis can be found in Appendix 4 and will support the additional work that will occur during the environmental review phase.

No Project Option

Under the No Project option, no substantial transportation improvements would be made along Market Street or Mission Street, with the exception of already planned improvements.

Option 1: Market Street Shared Lane + Level 2 Auto Restrictions (private car-free from to 8th to Fremont/Transbay Terminal) + Rapid Transit

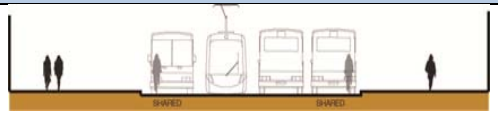
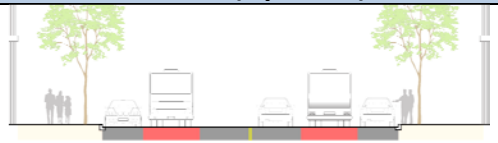
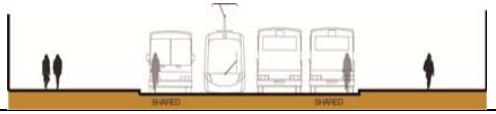
The shared lane alternative would not provide substantial improvement for some bicycle conditions and correspondingly would not resolve many transit-bicycle conflicts. As such, a greater degree of auto restrictions and transit priority would be anticipated for this concept to achieve the project goals.

Option 2: Market Street Cycletrack + Level 1 Auto Restrictions (private car-free from 5th to Fremont/Transbay Terminal) + Local Enhanced Transit

Cycletrack along Market Street would provide the greatest separation for bicycles from other modes and could therefore achieve the project goals with a lesser degree of auto restrictions and transit priority.

Option 3: Mission Street Bikeway with One-way Cycletrack + Level 3 Auto Restrictions (private car-free from Van Ness to The Embarcadero) + Local Enhanced Transit

The Mission Street bikeway concept would add a substantial amount of buses onto Market Street for a large extent of the project area. This concept would need the greatest level of automobile restriction to facilitate transit vehicle flow. The Local Enhanced transit concept would reduce the degree of travel lane changes for buses when approaching the terminals or leaving Market Street.

		Option 1. Market Street	Option 2. Market Street	Option 3. Mission Street + Market Street (Option 1)
Existing Cross-Section				
Cross-Section Moving Forward		***XII. Limited Auto Restriction and Shared Transit/Bicycle Lane*** 	***XIII. Curbside Cycletrack*** 	***XVI. Mission Street Bikeway with One-way Cycletrack on Each Side***
Impact	**Pedestrians**	• Retains most of the existing sidewalk space preserves the spacious pedestrian throughway. Narrowing sidewalk only where new islands are located • Retain plenty of opportunities for streetlife hubs, street furnishing, sidewalk greening , stormwater infiltration zones and cultural activities	• Requires significant narrowing of sidewalk, leaving less room for streetlife opportunities • The cycletrack buffers pedestrians from vehicular traffic • The redesign of north side crosswalks to align with desire lines and traffic signal improvements improve pedestrian comfort and safety	• Invites a vision for an integrated districts, connecting Market Street to SoMa and activating the network of streets and alleys in between • The cycletrack provides a buffer for pedestrians from vehicular traffic • Provides the opportunity to insert additional mid-block signalized crosswalks on Mission Street and widen the sidewalk in the active blocks of 1st to 2nd Street and 3rd to 4th Street
	Cyclists	• The existing cycletrack from Octavia to 8th Street remains with an improved supersharrow shared lane from 8th Street to Steuart Street • Intersection and traffic signal improvements help to make the cycle facility safer and more comfortable	• The cycletrack from Steuart Street to Grant Street and 5th Street to Octavia Boulevard provides a safe, comfortable cycling experience • Intersection and traffic-signal improvements help to make the cycle facility more legible • The cycletrack allows cyclists to engage in streetlife	• A cycletrack on Mission Street from South Van Ness to the Embarcadero, with greenwave signal timing (synchronized lights for bicycles) • The cycletrack allows cyclists to engage in streetlife
	Transit	• Retains four vehicular traffic lanes and transit only center lane • Boarding islands are upgraded to meet accessibility standards and improve the experience of waiting for transit	• The separated bicycle facility reduces bike-transit conflicts • Retains the vehicular travel lanes and transit only center lanes • Boarding islands are upgraded to meet accessibility standards and improve the experience of waiting for transit	• The 14/14L, Golden Gate and Sam Trans bus lines move to Market Street • Requires making Market Street the transit priority corridor • See Option 1 for impacts on Market Street
	Drivers	• Due to the shared bicycle/vehicular lane east of 8th Street, auto restrictions are recommended 7 am to 7 pm from Fremont Street to accommodate peak transit flow from the Transbay Terminal to 5th Street	• Due to the shared bicycle/ vehicular lane from Grant Street to 5th Street, auto restrictions are recommended 7 am to 7 pm from Fremont Street to 5th Street to accommodate peak transit flow on Market Street from the Transbay Terminal to 5th Street	• Due to the shared bicycle /vehicular lane east of 8th Street and the rerouting of buses from Mission Street, maximum auto restrictions are recommended 7 am to 7 pm from Fremont Street to Van Ness Avenue • New left turns in this option help facilitate traffic crossing market Street

Near-term Market Street Projects

In response to public desire for improvements on Market Street before implementation of the Better Market Street project, a multi-agency group comprised of representative from DPW, SFMTA, SF Planning Department and the Mayor's Office has developed a list of priority projects on Market Street (please see the appendix). The projects on this list have been identified in coordination with the Better Market Street team but are not a part of the project. Priority projects include the activation of Market Street through new legislation for a special permit area; urban design interventions such as a redesign of Mechanics Plaza; infrastructure upgrades including repaving the curbside lane, including the bikeway; and analyzing automobile restrictions between 3rd Street and 5th Street. At this time there are no funded plans to include pilot projects as a part of the BMS project. Please refer to appendix 6.

Environmental Review Process

Next Steps

For the environmental review process, the City team will submit a Preliminary Project Assessment to the Planning Department. This is the opportunity for the Planning Department to evaluate the Better Market Street project for planning issues and pertinent planning policies. At the same time, the City team will post a Request for Qualifications to begin the consultant selection process. The City team will review proposals from interested consultant teams and hire a qualified team to perform the environmental review.

The consultant team will be in charge of completing the Environmental Evaluation which relates to the California Environmental Quality Act CEQA process for this project. The initial submittal to City Planning will highlight basic project information and provide a general assessment on the level of technical information required for environmental review. The City will also engage the Federal Transportation Administration (FTA) and Caltrans on the National Environmental Protection Act (NEPA) requirements for a joint CEQA/NEPA document.

Future Community Involvement

As part of the environmental review process, the information from the environmental evaluation form will be compiled into a formal Notice of Preparation. The notice will include the description of the Better Market Street project, project limits, and salient environmental issues. The Planning Department will hold a Public Scoping meeting to hear oral comments and learn about public concerns. This is the first formal opportunity for members of the public to comment on the environmental aspects of the Better Market Street project; however, the public is welcome to write letters in response to the environmental aspects of the project at any time before the Public Scoping Meeting.

Additionally, members of the public are welcome and encouraged to attend and participate in the next round of community outreach scheduled for July 2013. These public workshops/community meetings will focus on the project design and discuss the three options that are being evaluated during the environmental review process.

Appendices

1. Options
2. Market Street Conceptual Designs
3. Mission Street Conceptual Designs
4. Better Market Street Transit Delay and Reliability Analysis
5. Public Participation Reports
6. Market Street Near-term Project List
7. Market street Desire Line Diagram