



South of Market Ramp Intersection Safety Study

PHASE II



San Francisco
County Transportation
Authority

Draft Report

Acknowledgments

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EXECUTIVE SUMMARY



There are many intersections in San Francisco's South of Market (SoMa) neighborhood where freeway on-ramps or off-ramps intersect city streets. Many are located close to public schools, single room occupancy hotels, and senior centers, which are frequented by populations at high risk of injury from traffic collisions. Additionally, the SoMa has disproportionately large concentrations of low-income residents and traffic injuries and fatalities – making the neighborhood a priority for safety improvements.

This final report encapsulates Phase 2 of the SoMa Ramp Intersection Safety Study, which studied and identified recommended safety improvements at 10 freeway ramp intersections in the SoMa neighborhood. The Study goal is to improve safety at these intersections for all travelers, especially the most vulnerable populations, to support progress towards the City's Vision Zero goal to eliminate traffic fatalities by 2024. In April 2018, the Transportation Authority Board adopted the final report for Phase 1 of the Study (titled the Vision Zero Ramp Intersection Study), which recommended safety improvements at an additional five SoMa ramp intersections. The Transportation Authority led Phase 2 of the Study in partnership with SFMTA and a Technical Advisory Committee (TAC) that also included Caltrans, San Francisco Planning Department, and San Francisco Public Works Department. Preparation of this report was made possible in part by the San Francisco County Transportation Authority through a grant of Proposition K Local Transportation Sales Tax funds. The study was also funded by a Caltrans Sustainable Transportation Planning Grant.

The Study intersections were selected based on collision analyses, other planned safety improvement projects in the neighborhood, and a proactive approach to identify intersections where additional improvements could be made. The Study team analyzed collision patterns at each study intersection and recommended best-practice safety treatments to address them while also improving access for all travel modes. Recommended improvements include bulb-outs, signal improvements, crosswalk upgrades, and improvements to signs pavement markings. In some locations, the recommendations include reducing the number of vehicle lanes to shorten pedestrian and bicycle crossings and calm traffic. The Study team engaged with the community to gather input on safety needs at each intersection and proposed improvements. Multilingual outreach included a survey with over 800 responses, an open house held in July 2018, tabling at study intersections and Sunday Streets, meetings with community groups, and social media engagement.

The proposed improvements include near-term upgrades and capital improvements. The near-term plans include improvements such as striping, signal timing changes, and signage upgrades that are low-cost and could be implemented in the next two years. The proposed cost estimate for the near-term upgrades is \$246,800. The capital improvement proposals will require curb or signal work and include upgrades such as new curb bulb-outs, significant traffic lane re-configurations, new traffic signals, and new crosswalks and pedestrian signals. Many of the capital improvements could be implemented within five years, depending on funding availability and required approvals. The proposed cost for capital improvements is \$10,493,500.

The San Francisco Municipal Transportation Authority (SFMTA) will lead the design and construction of the recommended improvements in coordination with San Francisco Public Works and Caltrans, which will need to approve many of the recommended treatments. SFMTA has committed to implementing the recommended near-term improvements within two years, with the exception of improvements that require a longer Caltrans approval process, and is seeking Prop K Neighborhood Transportation Improvement Program (NTIP) District 6 funds for near-term improvements at the first several intersections. This report identifies a range of potential strategies to fund and implement the remaining improvements, including incorporating them into other planned projects, using developer-contributed funds, and seeking other local, state, or federal funding sources.

The Study team analyzed collision patterns at each study intersection and recommended best-practice safety treatments to address them while also improving access for all travel modes.

INTRODUCTION

The South of Market (SoMa) Ramp Intersection Safety Study (Study) was led by the San Francisco County Transportation Authority (Transportation Authority) in partnership with the San Francisco Municipal Transportation Agency (SFMTA). Preparation of this report was made possible in part by the San Francisco County Transportation Authority through a grant of Proposition K Local Transportation Sales Tax funds. The study was also funded by a Caltrans Sustainable Transportation Planning Grant. The overall purpose of this study is to recommend street safety improvements at 10 freeway on-ramp and off-ramp intersections in the SoMa neighborhood.

The first phase of the study – initiated in May 2016 and completed in early 2018 – evaluated five ramp intersections in the SoMa neighborhood and recommended near-term safety improvements. The recommendations included curb bulb-outs and sidewalk extensions, new crosswalks, increasing pedestrian leading interval signal times, and other traffic safety upgrades. SFMTA included the Phase 1 recommendations in its 2019-2023 Capital Improvement Program (CIP) to be built within that five-year period.

During Phase 2, the Study team analyzed 10 additional freeway ramp intersections in the SoMa and recommended improvements to increase safety and accessibility for all road users – especially for those who walk and bike. The Study proposes improvements that can be implemented in the near term over the next two years, as well as capital improvements that could be implemented over the next five years depending on funding availability and the timeline for required approvals.

Study Purpose

The purpose of this study is to increase safety for all road users at 10 freeway ramp intersections in the SoMa. In 2014, the City of San Francisco adopted its Vision Zero policy with the goal to end all traffic-related fatalities by 2024. To achieve this goal, City agencies are working closely with community advocates to identify and prioritize needs for street safety improvements and propose design solutions. These improvements are focused on the city's High Injury Network (HIN), which consists of the streets with the highest concentrations of severe and fatal collisions. In addition to infrastructure redesigns, the Vision Zero initiative includes education and enforcement campaigns to improve street safety. Nearly all SoMa ramp intersections are on the HIN; therefore, improving safety at these intersections is critical to meeting the City's Vision Zero goal.

Specific goals and objectives for this Study were based on existing City goals, policies, and guidelines and were meant to guide the development and evaluation of potential improvements. The Study team prioritized the primary goals, which focus on improving safety and accessibility at the intersections. The secondary goals encompass other important issues considered while developing improvements to meet the primary goals.

Table 1: Study Goals and Objectives

| PRIMARY GOALS | PRIMARY OBJECTIVES |
|---|---|
| Improve safety for all road users | Increase intersection safety for all modes by proposing improvements that address collision patterns and implement best practice safety treatments at each intersection |
| Improve access for vulnerable road users (those who walk, bike, and people with disabilities) | Ensure adequate facilities and access for pedestrians |
| | Increase bicycle facilities |
| | Ensure access for people with disabilities |
| SECONDARY GOALS | SECONDARY OBJECTIVES |
| Provide for efficient circulation of all transportation modes | Prioritize travel modes that efficiently use street space while accommodating all transportation modes |
| Accommodate planned neighborhood growth and ensure compatibility with other planned projects | Accommodate growth and increase in travel demand. Develop proposals compatible with other plans and projects |
| Develop proposals that are feasible to implement | Recommend treatments that would improve safety in a timely manner given funding constraints |

Study Intersection Selection

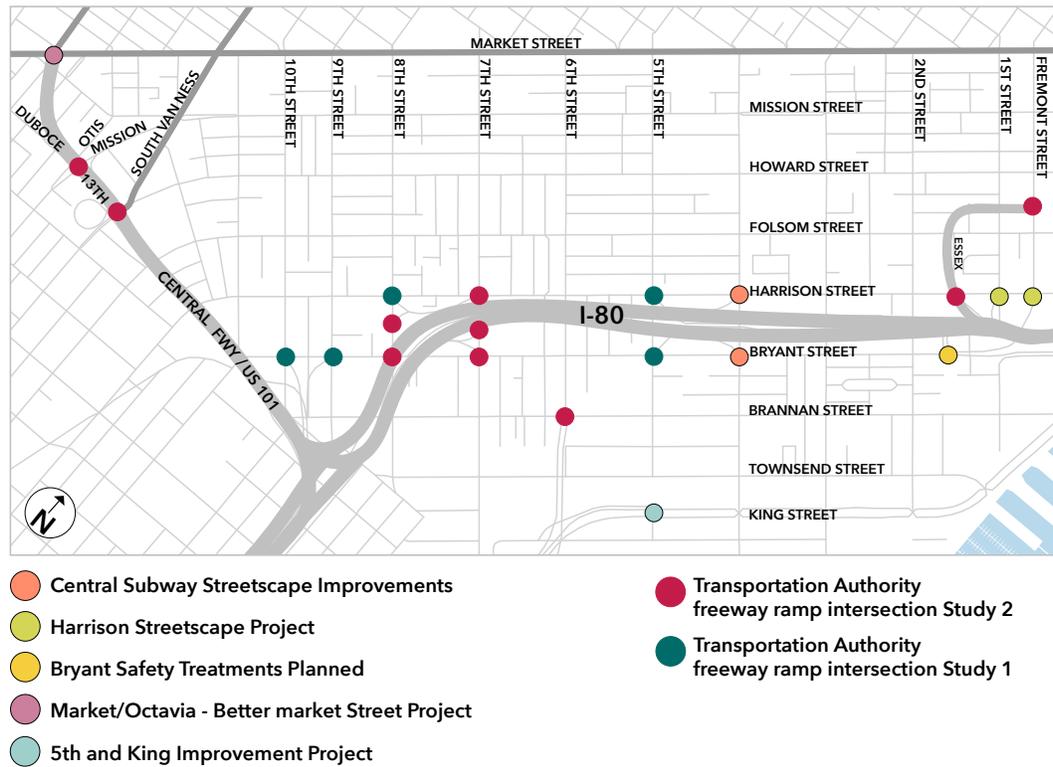
The project team selected 10 freeway ramp intersections in SoMa to be studied, based on three factors:

1. Traffic collisions: The number of traffic collisions at SoMa ramp intersections from 2012-2016, including those with and without fatalities and injuries.
2. Planned and future projects: Based on an inventory of all the ongoing and planned safety projects around all SoMa ramp intersections, the Study team identified intersections that were not already part of other safety projects or studies.
3. Proactive approach: The Study team took a proactive approach to assess each ramp intersection to determine if safety at the intersection could be improved.

Based on these criteria, the Study team selected the following 10 Study intersections:

1. Mission, Otis, Duboce, and 13th streets
(U.S. 101 northbound off-ramp)
2. South Van Ness Avenue and 13th Street
(U.S. 101 southbound on-ramp)
3. 8th Street midblock between Bryant and Harrison streets
(I-80 westbound off-ramp)
4. 8th Street and Bryant Street (I-80 westbound off-ramp)
5. 7th Street and Harrison Street (I-80 westbound on-ramp)
6. 7th Street midblock between Bryant and Harrison streets
(I-80 eastbound off-ramp)
7. 7th Street and Bryant Street (I-80 eastbound off-ramp)
8. 6th Street and Brannan Street
(I-280 northbound off-ramp, I-280 southbound on-ramp)
9. Fremont Street midblock between Howard and Folsom streets
(I-80 westbound off-ramp)
10. Essex Street and Harrison Street (I-80 eastbound on-ramp)

Figure 1: Study Ramp Intersections



The map in Figure 1 shows the locations of these 10 Study intersections in orange. It also shows the projects and studies, including the SoMa Freeway Ramp Intersection Safety Study Phase 1, that are addressing safety at the remaining ramp intersections in SoMa.

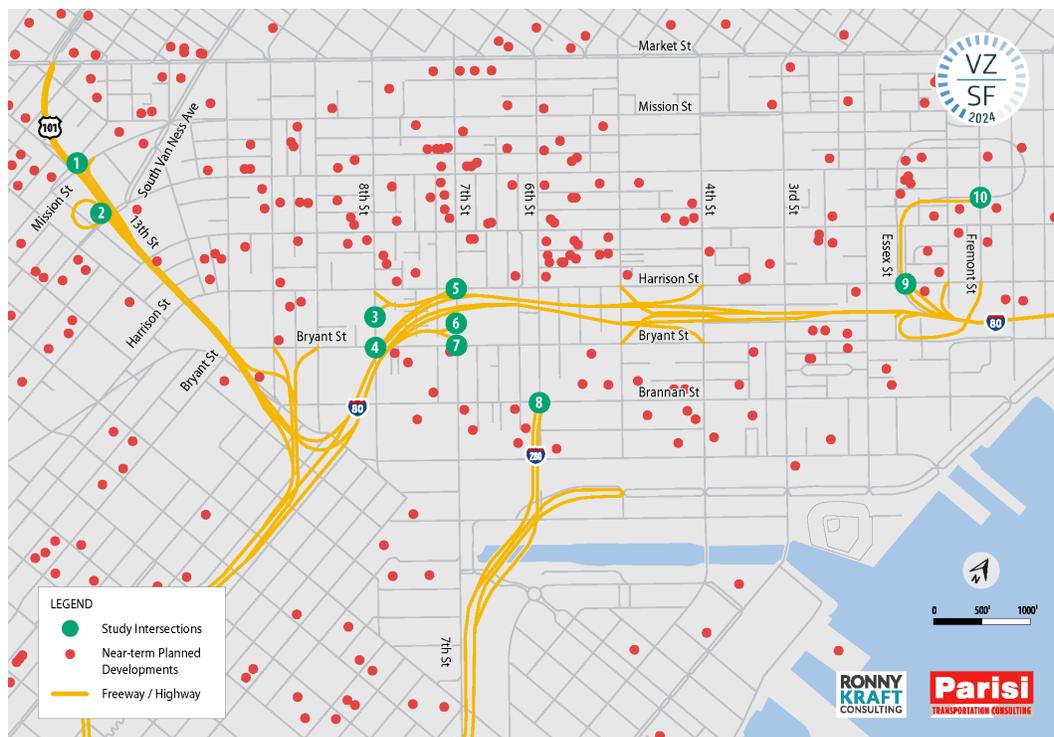
A memo included as Appendix A of this report provides more detail on the Study intersection selection process.

EXISTING CONDITIONS

Land Use Context

The SoMa neighborhood is one of San Francisco’s fastest growing neighborhoods. According to a September 2014 report by the San Francisco Planning Department, the SoMa is slated to receive upwards of 20,000 new residents and 50,000 new jobs by 2040 – more than any other Priority Development Area (PDA) in the city and representing 20% of all growth in San Francisco by 2040. Furthermore, the San Francisco Transportation Plan 2040 projects the city will see automobile trips rise roughly 30and SoMa will see some of the greatest impacts from the increased congestion Figure 2 illustrates the location of near-term planned land use developments in relation to Study intersections.

Figure 2: Planned Development in SoMa



Existing Transportation Network

The SoMa roadway network includes elevated sections of I-80, I-280, and U.S. 101 above a grid of arterial streets with 25 mph speed limits. Some arterials are one-way, and many are wide multi-lane streets that accommodate large flows of vehicular traffic. Most of the Study intersections have more than four legs, which serve both the grid of city streets and additional freeway on-ramps and off-ramps. Additionally, some of the approach legs of the Study intersections have multiple lanes serving one or more turn lanes, resulting in more complex traffic patterns.

COUNTS

The Study team used multimodal counts to estimate existing vehicle, pedestrian, and bicycle usage at all the intersections. The counts were also used to estimate possible traffic impacts from different design alternatives and the preliminary design plans. There were existing counts from other studies at five of the Study intersections and the Study team collected counts for the rest of the five intersections including:

1. Mission, Otis, Duboce, and 13th streets
(U.S. 101 northbound off-ramp)
2. South Van Ness Avenue and 13th Street
(U.S. 101 southbound on-ramp)
3. 7th Street and Harrison Street (I-80 westbound on-ramp)
4. 7th Street and Bryant Street (I-80 eastbound off-ramp)
5. 7th Street between Bryant and Harrison streets
(I-80 eastbound off-ramp)

Based on all the multimodal counts, here are the highlights:

- Traffic volumes are high at all intersections – there was a minimum of 1,529 vehicles during the p.m. peak hour on 7th Street, between Harrison and Bryant streets. The highest traffic volume is at 6th and Brannan streets (5,263 at p.m. peak hour) and highest total traffic volume is at Mission, Otis, Duboce, and 13th streets (9,093 combined a.m. and p.m. peak hours).
- The pedestrian and bicycle volumes are the highest at Mission, Otis, Duboce, and 13th streets (2,704 combined a.m. and p.m. peak hours).

See Appendix G for full traffic counts.

PEDESTRIAN INFRASTRUCTURE

The existing SoMa street network accommodates a diverse group of users, but the allocation of scarce roadway space currently prioritizes private vehicles over other travel modes. The existing pedestrian network in the SoMa includes sidewalks and crosswalks at most intersections. However, some SoMa freeway ramp intersections have gaps in the sidewalk network and closed or non-existent crosswalks, creating a difficult and unwelcoming walking environment. People walking may also follow the most direct route even when there is not an existing sidewalk or crosswalk, which is a safety concern.

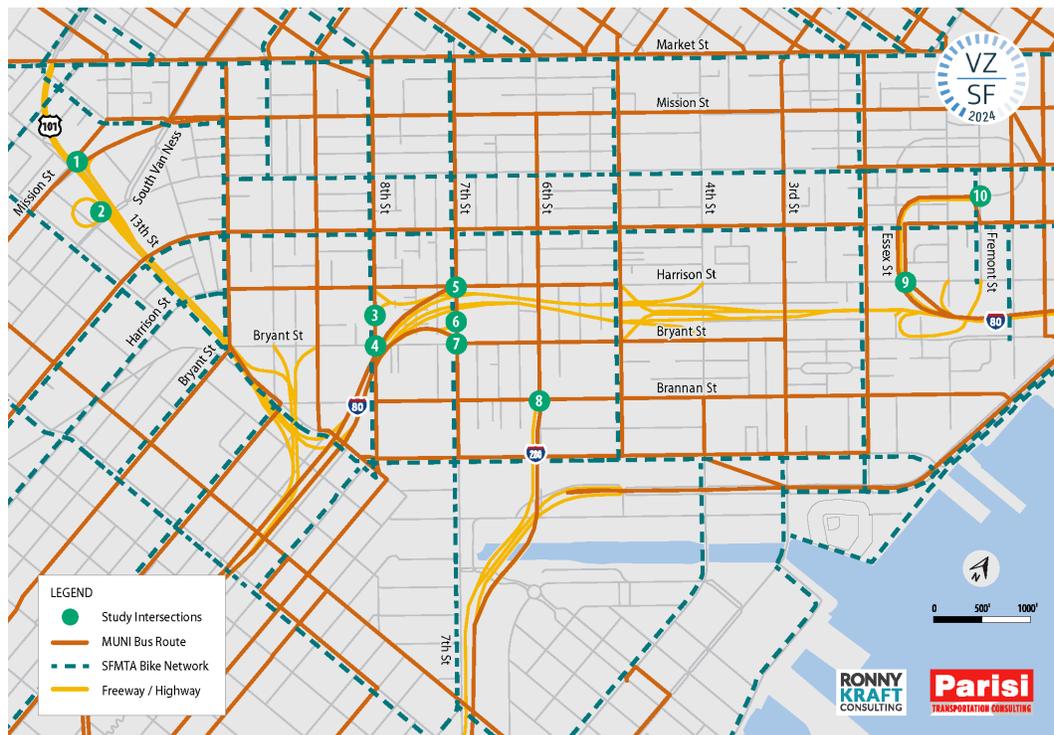
The Study team identified challenges for people walking including:

- Wide streets with long pedestrian crossing distances
- Closed crosswalks and missing sidewalks at some locations
- Narrow sidewalks and median refuges
- Lack of signal and signage visibility
- Lack of streetlights at some corners and lighting impacted by overhead freeway structures
- High vehicle volumes
- Conflicts between pedestrians and turning vehicles
- Freeway ramp vehicle queues frequently blocking crosswalks

BICYCLE INFRASTRUCTURE

Many SoMa streets are part of the city's bicycle route network. At the Study intersections, bike routes exist along the entirety of 7th and 8th streets. As shown in green in Figure 3, there are existing bike lanes along the entirety of 7th and 8th streets. Bicycle lanes exist on 13th Street to the east of the Study intersections, but they end at Folsom Street. New bike lanes will be constructed along Brannan Street in 2019 and are planned along 13th Street/Duboce Avenue from Folsom Street to Valencia Street. There are currently no bike lanes along other SoMa streets at the Study intersections.

Figure 3: Existing sfMTA Bicycle Routes, Muni Bus Route and Study Intersections



The Study team identified the following issues that people bicycling may experience:

- Lack of a bicycle lane, protection from traffic, and/or bicycle signals;
- High-speed turning movements and high vehicle volumes;
- Multiple lanes directing traffic in several directions, including onto freeway ramps, can make navigation difficult;
- Sight distance limited by obstructions such as parked vehicles; and
- Lack of streetlights at some corners and lighting impacted by overhead freeway structures.

TRANSIT INFRASTRUCTURE

The SoMa neighborhood has generally good transit service coverage, although some routes are relatively infrequent, and most do not have designated bus-only lanes to minimize the effects of traffic congestion on reliability. Transit routes exist along most Study intersection streets as shown in Figure 3 in dashed black.

The Study team identified the following issues for transit riders:

- Delays due to automobile congestion;
- Narrow sidewalks at or near bus stops;
- Lack of transit bulbs and limited lighting at some stops;
- High-speed turning movements and high vehicle volumes make accessing stops difficult for riders; and
- Closed or non-existent crosswalks making intersections longer and more difficult to cross, adding to stop access challenges.

TRAFFIC CONGESTION

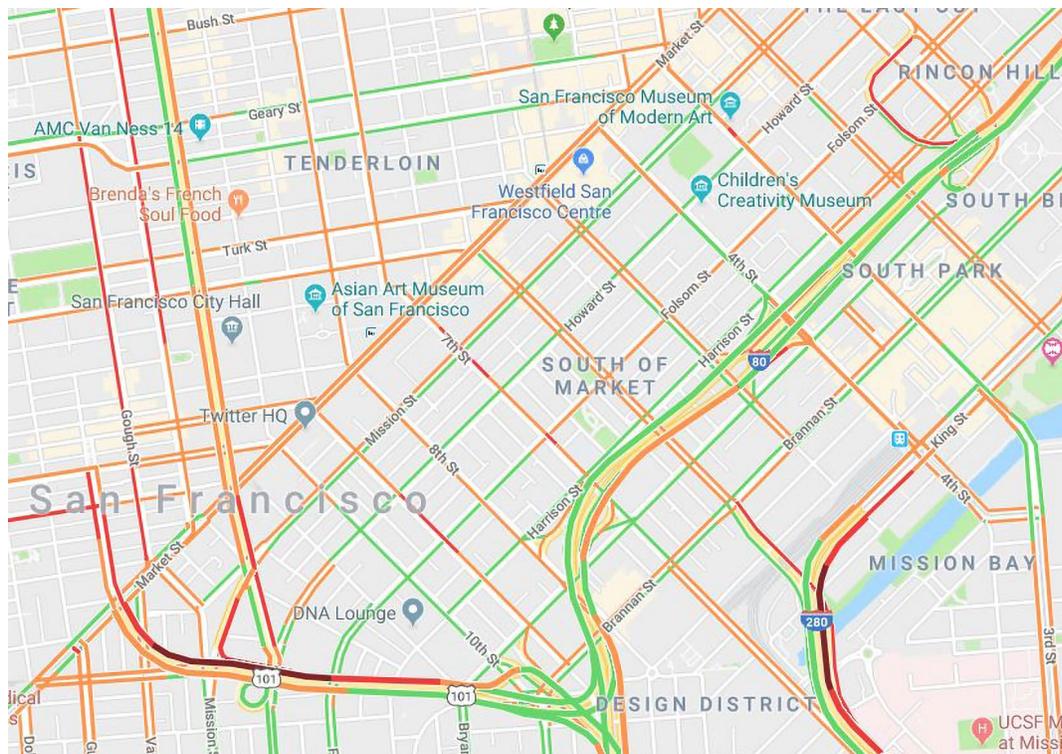
To obtain a general picture of traffic congestion levels, the Study intersections were analyzed using the *typical traffic* feature on Google Maps. This feature collects speed and location data from cell phones to create an index for vehicle speeds. Traffic conditions are illustrated in Figure 6 and Figure 7. Green symbolizes uncongested conditions and dark red symbolizes congested conditions. The analysis was done for the weekday a.m. peak (7 – 9 a.m.) and p.m. peak (4 – 6 p.m.).

A.M. Peak

On freeways, traffic is relatively free-flowing on I-80, I-280 south, and U.S. 101 south during the morning peak commute. Medium levels of freeway congestion are experienced on I-80 eastbound between 5th and 7th streets, while significant queues develop on U.S. 101 northbound around approaching Market Street and on I-280 northbound approaching 6th Street.

On surface streets, beginning around 8:15 a.m., eastbound Mission Street and northbound South Van Ness Avenue near 13th Street experience heavy congestion. 7th Street also experiences congestion starting around 8 a.m. Many of the other streets experience low or no congestion.

Figure 4: Typical a.m. Peak Hour Traffic Congestion



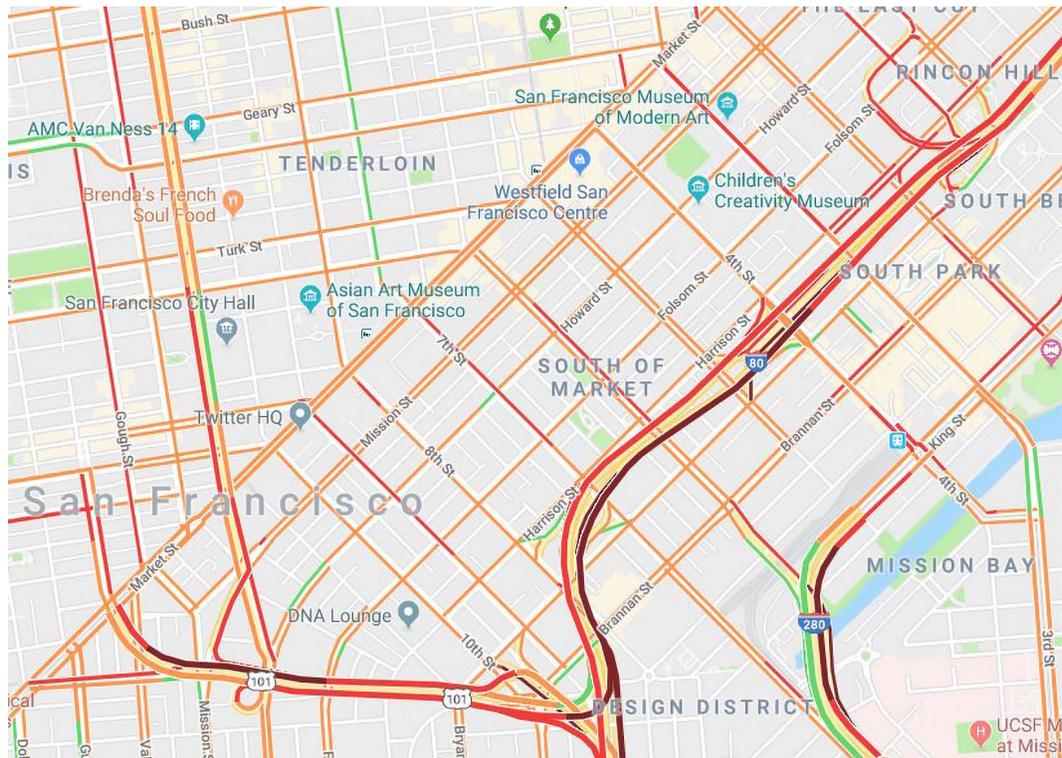
Source: Google Maps, Typical Traffic Conditions, accessed April 2018.

P.M. Peak

Traffic in the p.m. peak is significantly more severe than in the morning on all freeways and arterial streets. The heaviest congestion occurs on I-80 eastbound, though all of the SoMa. Congestion begins on both I-80 eastbound and U.S. 101 in both directions as early as 12:15 p.m.

Arterial streets within the SoMa experience high levels of congestion, especially approaching freeway on-ramps.

Figure 5: Typical p.m. Peak Hour Traffic Congestion



Source: Google Maps, Typical Traffic Conditions, accessed April 2018.

Ramp Congestion

Congestion also adversely impacts ramp access at Study intersections, as illustrated in Figure 6. During the day, the I-280 northbound off-ramp onto 6th and Brannan streets, the U.S. 101 northbound off-ramp to 13th and Mission streets, the I-80 westbound off-ramp to Fremont Street between Howard and Folsom, and the I-80 eastbound on-ramp from 8th and Bryant streets experience the most severe traffic congestion. The I-80 eastbound off-ramp to 7th and Bryant streets experiences essentially no traffic congestion, but sees moderate congestion upstream caused by the off-ramp at the mid-block of 7th Street. Other ramp intersections experience moderate traffic congestion throughout the day.

Figure 6: Typical Traffic Conditions on Study Intersection Ramps

| TRAFFIC CONDITIONS ON STUDY RAMPS | AM PEAK (7 - 9AM) | OFF-PEAK (12 - 2PM) | PM PEAK (4 - 6PM) |
|--|-------------------|---------------------|-------------------|
| US 101 NB Off-Ramp to 13th/Mission | | | |
| US 101 SB On-Ramp from 13th/S Van Ness | | | |
| I-80 WB Off-Ramp to 8th (Midblock) | | | |
| I-80 EB On-Ramp from 8th/Bryant | | | |
| I-80 WB On-Ramp to 7th/Harrison | | | |
| I-80 EB Off-Ramp to 7th (Midblock) | | | |
| I-80 EB Off-Ramp to 7th Bryant | | | |
| I-280 EB Off-Ramp to 6th/Brannan | | | |
| I-280 WB On-Ramp from 6th/Brannan | | | |
| I-80 EB On-Ramp to Harrison/Essex | | | |
| I-80 WB Off-Ramp to Fremont | | | |

FAST SLOW

Source: Google maps, "Typical Traffic Conditions." 2018

Related Planned Projects

Currently, several safety-focused planning studies and projects are underway that overlap with the Study intersections:

- 1. SFMTA's 7th and 8th Streets Safety Project:** The goal of the 7th and 8th Streets Safety Project is to improve safety and comfort for all modes of travel along 7th Street between Market Street and Folsom Street, and 8th Street between Market Street and Townsend Street. This project is implementing paint treatments to increase the visibility of people walking and biking, as well as concrete elements to provide smoother transit boarding and increased separation between people biking and driving. The project elements include a lane removal, protected bikeways, bus boarding islands, parking removal adjacent to crosswalks to increase visibility of people walking and biking, and signal hardware upgrades.
- 2. 6th Street Pedestrian Safety Project:** The 6th Street corridor has one of the highest concentrations of pedestrian collisions, injuries, and fatalities in San Francisco. In support of the City's Vision Zero policy, the 6th Street Pedestrian Safety Project aims to create a safe and inviting place for people to walk and bike by transforming 6th Street by adding wider sidewalks, new traffic signals, and streetscape improvements.
- 3. Brannan Street Safety Project:** In conjunction with utility and pavement upgrades, SFMTA will install safety upgrades along Brannan Street between Division Street and the Embarcadero, including at the intersection of 6th Street and Brannan Street. Improvements include new bike lanes, traffic signal timing changes, intersection upgrades, and a reduction in the number of travel lanes to calm traffic.
- 4. Market Octavia Plan Amendment (Hub) Public Realm Plan:** The San Francisco Planning Department has proposed improvements as part of the Market Octavia Plan Amendment along 13th Street and Duboce Avenue, including at two Study intersections – 13th and Mission streets and 13th Street and South Van Ness Avenue. The project plans propose a reconfiguration of the intersection at 13th Street and Mission Street to accommodate the addition of two-way travel on Otis Street, new protected bicycle lanes, new curb bulb-outs, improved sidewalks, and other new or upgraded pedestrian amenities.

-
5. **Caltrans Signal Upgrade:** Caltrans is planning improvements at the intersection of 7th Street and Harrison Street that will upgrade traffic signals and improve safety by signaling a crosswalk across a freeway ramp entrance.
 6. **Other Improvements from Existing Developer Obligations:** Repaving, curb ramps, and general repairs required per existing development agreements at Essex and Harrison streets and 6th and Brannan streets intersections.

The recommendations proposed in this Study were designed to integrate with the existing planned improvements listed above.

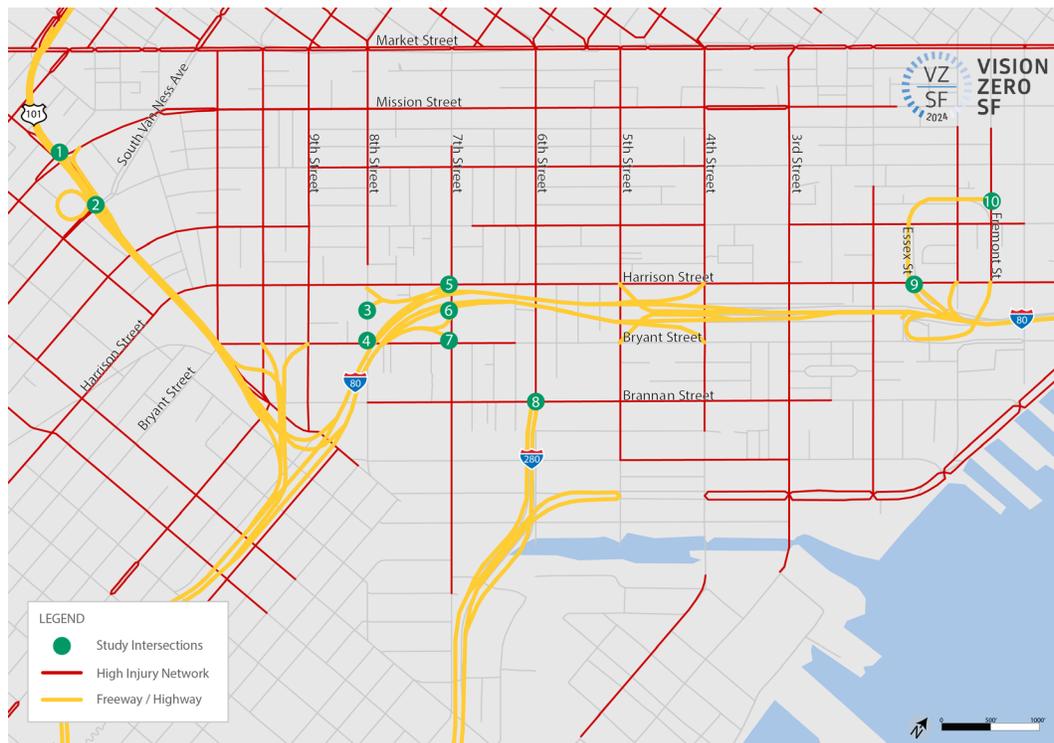
For more details on related planning projects, refer to Appendix B.

COLLISION ANALYSIS

High-Injury Network

All Study intersections are included in the City's 2017 update to the Vision Zero High Injury Network (HIN) developed by the San Francisco Department of Public Health. HIN streets represent those with the highest concentrations of severe and fatal collisions. The HIN includes traffic collision data reported to San Francisco Police Department combined with records of traffic injuries treated at San Francisco General Hospital.

Figure 7: 2017 High Injury Network Map



Collision Overview

The Study team analyzed historical collision data at each of the 10 Study intersections from 2012 - 2016 to identify any patterns that intersection safety improvements could address. The dataset includes collisions recorded by the San Francisco Police Department and the San Francisco Department of Public Health. According to the dataset, a total of 133 injury collisions occurred at eight of the intersections over this period. Of these collisions, eight were severe injury collisions and none were fatal. Only the 8th Street between Bryant and Harrison streets intersection had no recorded collisions. Additionally, no data was available for the newly constructed intersection

at Fremont Street between Howard and Folsom streets. Collision data key takeaways include the following:

- 53% of all collisions were vehicle to vehicle collisions. The rest of the collisions included vulnerable road users: pedestrians, bicyclists, and motorcyclists.
- 63% of the collisions were classified as broad-side and rear-end collisions.
- The dataset contains no correlation between collision rates and peak compared to non-peak periods, weekdays to weekends, day of week, time of day, or weather conditions.

Study intersections included in the collision analysis and the number and severity of collisions are as follows:

Table 2: Study Intersection by Number Total Collisions (2012 - 2016)

| STUDY INTERSECTION | TOTAL COLLISIONS | SEVERE INJURY |
|--|------------------|---------------|
| 6th Street and Brannan Street | 11 | |
| 7th Street and Bryant Street | 8 | 1 |
| 7th Street and Harrison Street | 13 | |
| 7th Street between Bryant and Harrison | 5 | |
| 8th Street and Bryant Street | 19 | |
| Harrison Street and Essex Street | 10 | |
| Mission Street and 13th Street | 35 | 6 |
| South Van Ness Avenue and 13th Street | 32 | 1 |
| Total | 133 | 8 |

There were four collisions for which only a collision date is known¹: one at 7th and Harrison streets, one at 8th and Bryant streets, and two at 13th and Mission streets.

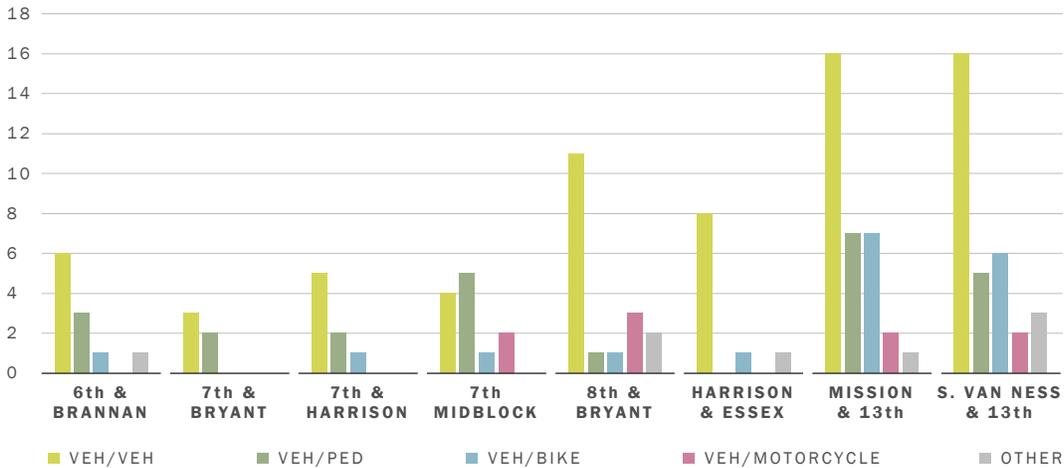
¹ These collisions are omitted from the proceeding collision characteristics and diagrams/ but are included in the count for total collisions. Appendix B contains further details of collisions at these eight intersections.

Collision Characteristics

MODE

Figure 8 shows an overview of collisions by transportation mode and Figure 9 shows the breakdown of collision occurrences by mode, organized by intersection. Notably, most collisions occurred between vehicles except at the 7th Street mid-block intersection where there were a higher number of vehicle on pedestrian collisions. The Harrison Street and Essex Street and the 7th Street and Bryant Street intersections also had no vehicle on pedestrian collisions or vehicle on bicycle collisions, respectively.

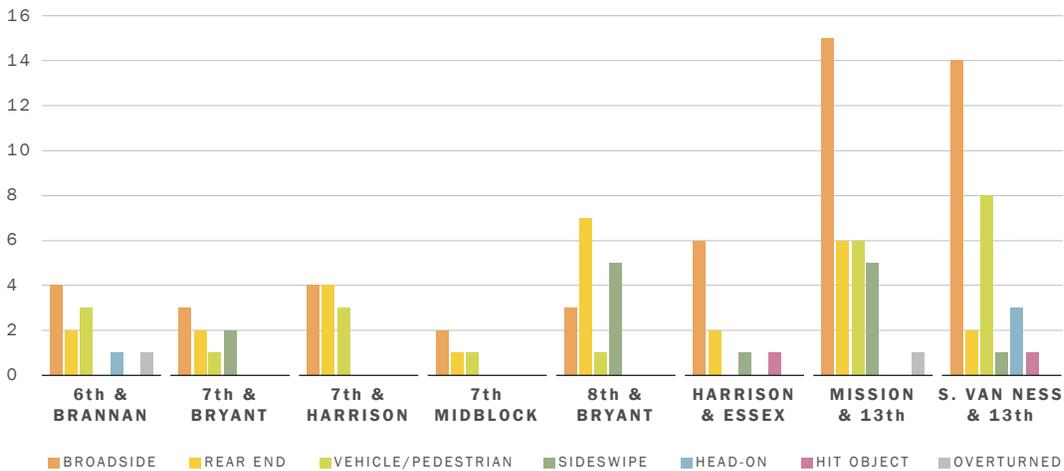
Figure 8: Parties Involved by Intersection



COLLISION TYPE

Broadsides were the most common collision type at each study intersection, except at the 8th Street and Bryant Street intersection.

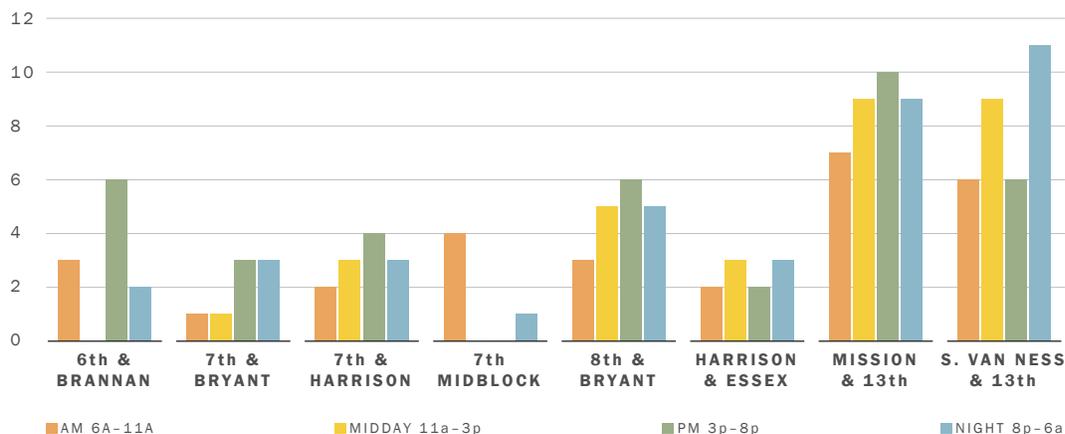
Figure 9: Collision Type by Intersection



TIME OF DAY

Figure 10 shows collisions by time of the day. Collisions tended to happen more often in the 3 – 8 p.m. period, except at the 7th Street midblock intersection, where most collisions occurred from 6 – 11 a.m. and at the South Van Ness Avenue and 13th Street intersection, where most collisions occurred during the late-night period from 8 p.m. – 6 a.m.

Figure 10: Collision by Time of Day



Collision Analysis by Intersection

The Study team analyzed each collision for which a police report was available. There were 11 collision reports that did not contain enough information to be diagrammed.

Refer to Appendix B for more intersection-specific collision details.

13th Street and Mission Street, Duboce Street and Otis Street

This intersection had 35 collisions – the highest number among all Study intersections – with most collisions occurring on the eastern side. Additionally, this intersection had the highest number of severe injury collisions. There were six bicycle collisions where the cyclists were found at fault, half of which were due to red light violations. Four collisions occurred from vehicles making illegal left turns from northbound Mission Street onto westbound 13th Street westbound and five collisions involving pedestrians occurred in the southeast corner, three of which involved vehicles making right turn maneuvers. Many collisions occurred at night.

13th Street and South Van Ness Avenue

This intersection had 32 collisions, the second-highest number among the Study intersections. Most collisions occurred in the central area of the intersection, which included instances of red light violations, unsafe lane changes, and unsafe turning maneuvers. Most vehicles found at fault were heading southbound on South Van Ness Avenue or eastbound on 13th Street. Four cyclists were found at fault for collisions on or near sidewalks. At this intersection, many collisions occurred during night time which could be related to street lighting where drivers are not able to see the red lights, or pedestrians and bicyclists.

8th Street mid-block between Harrison and Bryant Streets

There were no collisions recorded at this location from 2012 – 2016.

8th Street and Bryant Street

This intersection had a total of 19 collisions, including many collisions between vehicles as a result of unsafe speed. Several collisions occurred with at-fault vehicles heading southbound on 8th Street. Three collisions occurred because a vehicle tried to avoid the freeway on-ramp at the last second and collided with a vehicle in the adjacent travel lane.

7th Street and Harrison Street

This intersection had a total of 13 collisions with a relatively high number of pedestrian collisions (4). Many collisions were due to red light violations or unsafe speeds. There were six collisions involving vehicles traveling westbound on Harrison Street. This intersection also has a closed crosswalk on the south leg of the intersection where a pedestrian and vehicle collision occurred.

7th Street mid-block between Harrison and Bryant Streets

The 7th Street mid-block intersection between Harrison and Bryant Streets had five collisions, all clustered in the same area around the off-ramp where vehicles exit I-80 and yield to cross traffic. In two instances, pedestrians were struck in the crosswalk where visibility is less than ideal due to the curvature of the off-ramp.

7th Street and Bryant Street

This intersection also had eight collisions. There were two vehicle-on-pedestrian collisions in the same area at the east corner. In both cases, the vehicle was making a right turn from 7th Street onto Bryant Street.

6th Street and Brannan Street

There were 11 total collisions at this intersection, including three vehicle-on-pedestrian collisions in the east corner of this intersection. In all three instances, the vehicle, which was exiting the I-280 off-ramp and making a right turn onto Brannan, was found at fault.

Harrison Street and Essex Street

The 10 collisions at Harrison and Essex streets were mostly clustered in the western portion of the intersection. Many were broadside collisions resulting from red light violations or excessive speed. All incidents involved vehicles except for one collision between a pedestrian and a bicyclist.

Fremont Street off-ramp between Howard and Folsom

This new intersection which was signalized in 2015 did not have collision data available for the study period.

INTERAGENCY COORDINATION AND COMMUNITY ENGAGEMENT

Interagency Coordination

This Study was led by the Transportation Authority in close partnership with SFMTA on the Study team that met on a bi-weekly basis throughout the study to discuss project updates and next steps, review deliverables, and share technical input. The Study team formed a Technical Advisory Committee (TAC) that included the San Francisco Planning Department (SF Planning), the San Francisco Department of Public Works (SFPW), SFMTA, and Caltrans, and sought input at the key points of the Study process and on all major deliverables. The Study team also provided information and updates during major outreach rounds to additional agencies and, based on interest, met with representatives from the Mayor's Office of Disability, San Francisco Fire Department, San Francisco Police Department, and California Highway Patrol (CHP).

Public Outreach Process

The Study team also conducted three rounds of outreach to the public to solicit feedback from community stakeholders on the challenges they experience at the Study intersections and to inform intersection design recommendations. During the outreach process, the Study team maintained an updated website and mailing list of interested stakeholders to keep them informed about the project.

Round 1 Outreach

The goal for the first round of our outreach efforts was to identify the challenges stakeholders experience traveling through the Study intersections. The Study team developed a survey which asked respondents about the issues they experience and about any improvement ideas they had to increase safety of the intersections.

The Study team conducted the survey both online and in person at stakeholder meetings and a tabling event. It was advertised through multiple channels, including:

- Mailers translated into Spanish, Chinese, and Filipino languages directing recipients to take the survey;
- Online promotions including an educational video, e-newsletter, and multilingual social media posts promoting the Study and survey;
- Outreach to community-based organizations (CBOs), partner agencies, and other targeted groups with an interest in the project;
- In-person meetings with CBOs, partner agencies, and other organizations by Transportation Authority staff; and
- Intercept outreach in the Study area in collaboration with SFMTA's Vision Zero SF team.

Round 2 Outreach

The goal of the second round of outreach was to gather feedback on the draft safety improvement plans created for the Study intersections. This round of outreach was centered around an open house event, where the team presented the draft improvement designs to community stakeholders. During the open house, the Study team conducted an interactive activity to gather feedback on what aspects of the draft designs the attendees supported or did not support. The attendees stuck sticker dots next to different design features such as crosswalks, signs, and sidewalk extensions. As the attendees placed the dots, they commented on the different design features and provided feedback to the Study team. Additionally, the Study team conducted an intercept survey, met with interested community organizations, and manned information tables at Sunday Streets.

The second round of outreach included:

- Public Open House on July 31st, 2018 at Bayanihan Center from 5:30 p.m. to 7:30 p.m.;
- Information tables at the SoMa Sunday Streets on August 18th, 2018;
- Poster placement in the SoMa neighborhood;
- Online and social media promotions;
- Phone and email outreach to CBOs, partner agencies, and other stakeholder interest groups and individuals; and
- Intercept outreach in the Study area in collaboration with Vision Zero SF team.

Round 3 Outreach

During the third round of the outreach, the Study team notified all interested stakeholders that the draft final report was available for review, shared public meeting dates, and met with interested stakeholders to share final design drawings, cost estimates, and the funding and implementation plan.

Stakeholder Involvement

The SoMa is a vibrant neighborhood with diverse residents, several key business districts, and many schools and community centers. During each outreach round, the Study team reached out to the extensive list of SoMa and citywide community groups and stakeholders listed in Appendix E. Although most groups did not express interest in meeting directly, many did participate through the survey, by attending the open house, or via other communications with the project team.

Based on interest among the contacted stakeholder groups, the project team held in-person meetings or gave presentations to the following groups:

- Walk SF
- San Francisco Bicycle Coalition
- Western SoMa Community Benefits District (CBD)
- The Crafty Fox; Brick and Mortar
- Market-Octavia Citizens Advisory Committee
- Pedestrian Safety Advisory Committee
- San Francisco Transit Riders
- Independent Living Resource Center
- SoMa Hotel Council
- Transbay Joint Powers Authority Citizens Advisory Committee Chair

Feedback Summary

During the outreach process, the Transportation Authority received a range of stakeholder feedback that informed the proposed improvements. The feedback identified specific issues with the intersections at present and provided design ideas for improvements. Table 3 summarizes issues that were identified through the community feedback process and provides corresponding design recommendations for each safety issue identified. In some cases, the issues identified were broader than design treatments at individual intersections alone could address. In these cases, the study recommendations may help address the issue, but ,ultimately, a larger solution may be needed such as a corridor street redesign or additional safety education and enforcement programs.

Table 3: Summary of Public Feedback by Design Criteria

| CRITERIA | ISSUES TO ADDRESS | DESIGN RECOMMENDATION ELEMENTS |
|-------------------------------|---|---|
| PEDESTRIAN CROSSINGS | Concerns regarding pedestrian crossing lengths with the two-way Otis Street design | Included a one-way Otis Street option, with street configuration to be finalized by Market Octavia Plan Amendment |
| | Replace or augment yield signs on un-signalized off-ramps | Pedestrian ahead signage, flashing beacons, and/or protected signal phases |
| | Pedestrian visibility concerns and need for shorter and wider crosswalks | More corner curb extensions and high-visibility crosswalk markings |
| | | Protected signal phases, signals with leading pedestrian intervals, and longer pedestrian walking times |
| BICYCLE INFRASTRUCTURE | Lack of protected bike lanes and bike signals | Add more protected bike lanes |
| | | Add more bike-specific signals |
| | Need bicycle delineation through the intersection and avoid unprotected merge areas between bike and cars | Add more bike lanes fully delineated through the entire intersection Refine designs to eliminate merges between bikes and turning cars |
| TRANSIT | Bus stop improvements | Bus bulbs added |
| | Need transit priority lanes | More dedicated bus-only lanes where feasible within intersection-focused scope |

| CRITERIA | ISSUES TO ADDRESS | DESIGN RECOMMENDATION ELEMENTS |
|----------------------|---|---|
| ACCESSIBILITY | Improve accessibility to bus stop islands with more curb ramps or raised crosswalks | Ensure curb ramps available to access bus stop islands |
| | Need Accessible Pedestrian Signals (APS) at all signalized intersections | Install Accessible Pedestrian Signals (APS) at all signalized intersections |
| | Maintain curb access where needed when installing bike lanes | Detailed design phase for protected bike lanes to ensure curb access where needed |
| AUTO | Create sharper turns to slow down vehicles, especially coming from freeway ramps | Curb extensions, protected signal phases, and "No Right on Red" signs to slow down traffic and protect vulnerable users |
| | Maintain vehicle access to businesses | Driveway access would remain. Some intersection turning movements eliminated but alternate routes are available. |
| | Reduce auto lanes | Reallocate road space where feasible within intersection-focused scope |
| | Need traffic enforcement | Some design treatments, such as improved signage, signal visibility, and crosswalk markings may help. |
| GENERAL/OTHER | Improve intersection lighting, especially below overpasses | Install additional street lighting, especially under freeway overpasses |
| | Need more street greenery and placemaking elements | Install street trees and/or landscaping treatments where feasible and practical |
| | Additional space from pedestrian improvements could become occupied by encampments. | Consider including landscape, hardscape, or other vertical elements (e.g. bicycle racks) in added space. |
| | Construction of concrete elements could temporarily disrupt adjacent businesses. | Minimize construction durations and conduct outreach to adjacent businesses to minimize disruption. |

RECOMMENDED DESIGN IMPROVEMENTS

The Study team developed recommended improvement designs for the selected ramp intersections. They include proposed near-term upgrades as well as medium-term capital improvements at each intersection. The near-term plans include improvements such as striping, signal timing changes, and signage upgrades that are low-cost and could be implemented in the next two years. The capital improvement proposals will require curb or signal work and include upgrades such as new curb bulb-outs, significant traffic lane re-configurations, new traffic signals, and new crosswalks and pedestrian signals. Many of the capital improvements could be implemented within five years, depending on funding availability and required approvals. The design recommendations shown below were refined based on the results of stakeholder outreach and technical analysis. Appendix C provides more detailed technical design drawings and identifies which improvements could be constructed in the near term and which require capital upgrades.

In addition to the specific improvements at each intersection, recommended intersection upgrades include the following:

- Install high-visibility crosswalks.
 - Add advance stop bars to reduce the number of vehicles blocking crosswalks.
 - Add leading pedestrian intervals to reduce conflicts between turning vehicles and pedestrians.
 - Install Accessible Pedestrian Signals (APS) at all crossings.
 - Consider upgraded lighting to improve visibility.
-

Mission, Otis, Duboce, and 13th Streets (U.S. 101 northbound off-ramp)

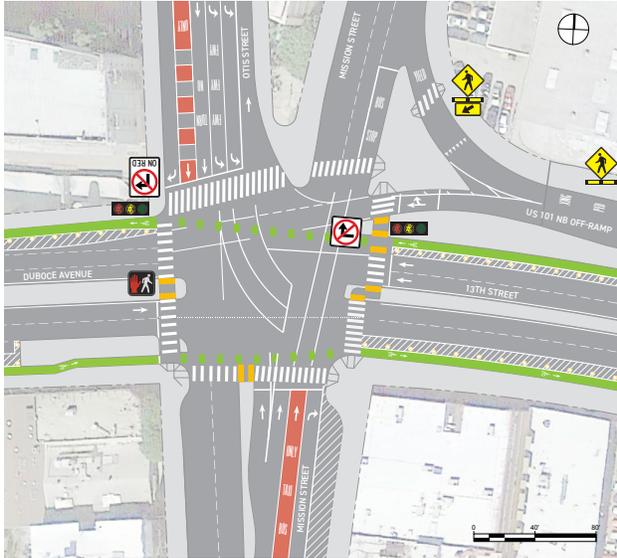


Figure 12: Mission, Otis, Duboce, 13th Street Improvement Plan (Option 1)

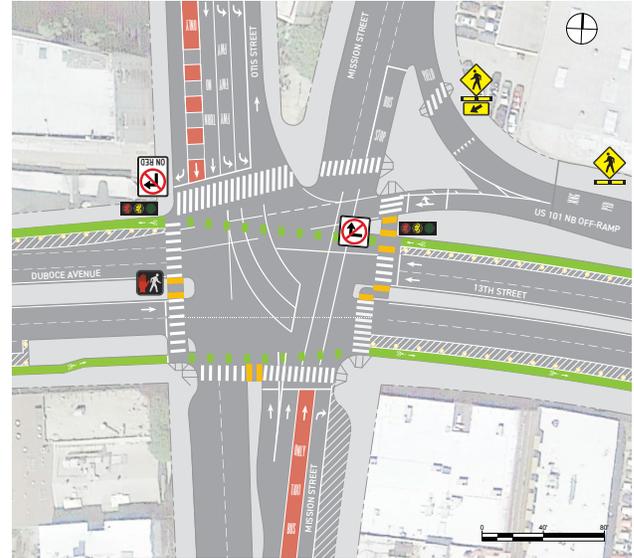


Figure 11: Mission, Otis, Duboce, 13th Street Improvement Plan (Option 2)

The intersection in Figure 12 is within the Market Octavia Plan Area. The recommendations from the Market Octavia Plan Amendment Public Realm Plan include protected bike lanes on 13th Street and Duboce Avenue and a two-way Otis Street re-design with traffic signal updates. The two-way Otis Street proposal would replace a sharp double left turn movement and improve pedestrian conditions at the nearby intersection of Mission Street, Otis Street, and South Van Ness Avenue. At this Study intersection, the two-way Otis street re-configuration would require lengthening the crosswalk across Otis Street and narrowing the adjacent median refuge area; narrowing the median refuge in Mission Street on the south side of the intersection; and eliminating the U-turn from Otis Street to Mission Street. It would also add to the complexity of the intersection and increase traffic queues on the freeway off-ramp.

During public outreach, the study team presented the two-way Otis Street option and heard concerns that additional traffic movements would add to the complexity of the intersection and lengthen pedestrian crossing distances. To address these concerns, the Study team developed safety improvements that could be implemented at the intersection in either of two scenarios:

- Two-way Otis Street with modified median and signal timing updates (shown in Figure 12, left); and
- One-way Otis Street with designs to reduce conflict points (shown in Figure 11, right).

The planning and environmental review process for the Market Octavia Plan Amendment will determine the final configuration for Otis Street.

As discussed in the collision analysis, many of the collisions occurred at the eastern side of the intersection. The Study team recommended improvements to reduce vehicle and pedestrian conflict points, signal timing changes and signal head upgrades, and the installation of pedestrian bulb-outs and median refuges.

Recommendations for this intersection include:

Improved pedestrian and bicycle facilities:

- Install new protected cycle tracks on Duboce Avenue and 13th Street. For the 2-way Otis Street scenario, a new signal phase would separate westbound 13th Street traffic and the accompanying westbound bicycle movement from the signal phase for westbound off-ramp traffic. Include a protected intersection treatment at the southwest corner to separate eastbound cyclists from traffic.
- Enlarge and improve median refuges.
- Add new corner sidewalk extensions to shorten crossing distances and increase pedestrian visibility for right turning vehicles.

Improved visibility and reduced conflict points:

- Improve lighting under the freeway to increase pedestrian visibility.
- Add flashing pedestrian crossing signs at the U.S. 101 off-ramp to increase pedestrian visibility and awareness for drivers.
- Add "No Right Turn on Red" signs to reduce vehicle conflict points with pedestrians and bicyclists.

Simplified the intersection configuration where possible and prioritizing transit:

- Add a bus only lane on Mission Street to improve Muni's on-time reliability and reduce conflict points between Muni busses and other road users.
- Reduce the number of traffic lanes on the northbound Mission Street approach to make room for a bus-only lane and more sidewalk space.
- Remove the U-turn option from Otis Street to Mission Street to simplify turning movements and reduce conflict points.

South Van Ness Avenue and 13th Street (U.S. 101 southbound on-ramp)

The intersection in Figure 13 is also within the Market Octavia Plan Area. The Market Octavia Plan Amendment Public Realm Plan proposed improvements include protected bike lanes on 13th Street.

The collision pattern at this intersection indicated that better traffic signal visibility and phasing may help address many collisions, especially involving left turning vehicles from South Van Ness Avenue to 13th Street. Wayfinding signage may help drivers avoid last minute maneuvering near the on-ramp.

Recommendations for this intersection include:

Improved and added pedestrian and bicycle facilities:

- Add new protected bike lanes on 13th Street to separate vehicles and bicyclists.
- Add a new sidewalk on the west side of South Van Ness Avenue with a new signalized crosswalk at the freeway on-ramp entrance to improve pedestrian accessibility and safety.
- Add new and larger pedestrian median refuge areas.

Simplified lane configurations

- Remove one westbound left turn lane and one eastbound through lane to fit the protected bike lanes.
- Convert a southbound through lane to a left turn lane with a protected signal phase from southbound South Van Ness Avenue to eastbound 13th Street to reduce conflicts between left turning vehicles and pedestrians.
- Reconfigure the entrance of the freeway on-ramp to provide two exclusive right turn lanes feeding onto the U.S. 101 on-ramp and one through lane heading southbound on South Van Ness Avenue. The dedicated right lanes with a signal and signage will provide lane designation clarity. The reconfiguration and signal will also improve safety for pedestrians as they cross the entrance to the on-ramp.

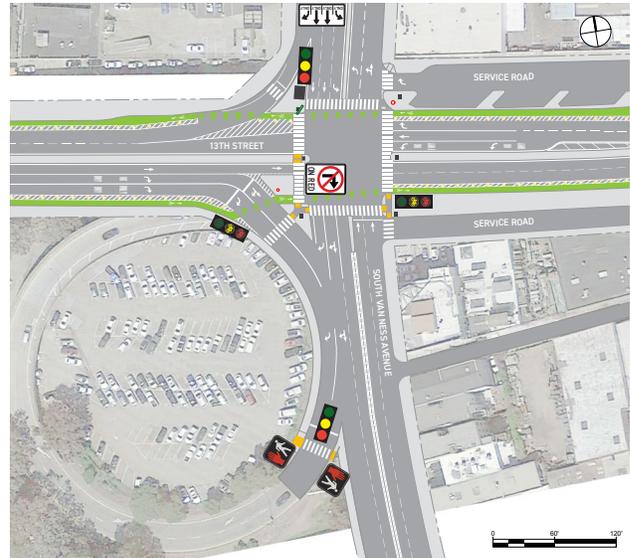


Figure 13: South Van Ness Avenue and 13th Street Improvement Plan

Improved visibility:

- Add new “No Turn on Red” signs on eastbound 13th Street right turn approach to South Van Ness. This sign will increase visibility of pedestrians and bicyclists and slow down right turning traffic on South Van Ness Avenue.
- Better pedestrian-scale lighting under freeway underpasses.

Improved wayfinding:

- Add overhead signage on the north leg of the intersection to give drivers lane designation information in advance of the intersection.

8th Street between Bryant and Harrison streets (I-80 westbound off-ramp)

This intersection is part of the SFMTA’s 8th Street Safety Project, which is planning a parking protected bike lane and transit boarding island with crosswalk.

This is a yield-controlled intersection and there were no reported traffic collisions during the data analysis period from 2012 - 2016. The recommendations are based on multiple site visits, technical advisory committee member comments, and public outreach.

Recommendations include:

Install rapid flashing beacons in advance of the crosswalk and update crosswalk striping to increase driver awareness and visibility of pedestrians.

Add new curb extensions and curb ramps to shorten pedestrian crossing distances, reduce turning vehicle speed, and increase visibility of pedestrians.

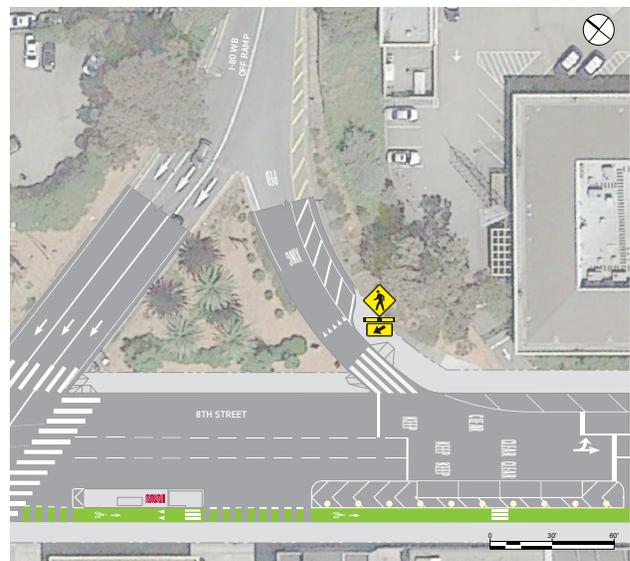


Figure 14: 8th Street between Bryant and Harrison streets Improvement Plan

8th Street and Bryant Street (I-80 westbound off-ramp)

At this intersection, wayfinding signage may help address collisions caused by last-minute merging. There is also a lack of high-quality pedestrian and bicycle facilities at the intersection. This intersection is part of the SFMTA's 8th Street Safety Project, which is planning a parking protected bike lane and transit boarding island in the median.

Recommendations for this intersection include:

Improve pedestrian and bicycle facilities:

- Add a new crosswalk across the east leg of Bryant Street and an exclusive left turn signal phase from southbound 8th Street to eastbound Bryant Street to increase pedestrian accessibility and reduce conflicts with turning traffic.
- Add a new sidewalk along the north side of Bryant Street with a signalized crosswalk across the on-ramp to increase pedestrian safety and accessibility.
- Add a median refuge on the south side of 8th Street connected to the new transit boarding island.

Improve visibility:

- Add new sidewalk extensions to shorten pedestrian crossing distances and increase visibility of crossing pedestrians. This includes a bus bulb on Bryant Street at the southwest corner.
- Update crosswalk striping at the intersection to increase visibility.

Improve wayfinding:

- Add new lane designation overhead signs in advance of the intersection for approaching vehicles on both 8th Street and Bryant Street to reduce lane designation confusion among drivers.
- Change the designation of the #2 lanes (second from left) on both 8th Street and Bryant Street from shared through/left turn to exclusive left turn lanes to simplify wayfinding and reduce last-minute merging to avoid queues.



Figure 15: 8th and Bryant streets Improvement Plan

7th Street and Harrison Street (I-80 westbound on-ramp)

The intersection in Figure ?? has improvements planned as part of a Caltrans signal upgrade project and SFMTA's 7th Street Bikeway Project. The Caltrans improvements include conversion of one of the northbound through/left turn lanes to an exclusive left turn lane, a new signalized crosswalk at the freeway on-ramp entrance, and signal upgrades on 7th Street. The SFMTA's bicycle lane project includes a parking protected bike lane on 7th Street and a transit boarding island on 7th Street and a transit boarding island.

The recorded collisions at this intersection indicate that there were a high number of pedestrian collisions, as well as a number of collisions due to red light violations or excessive speed.

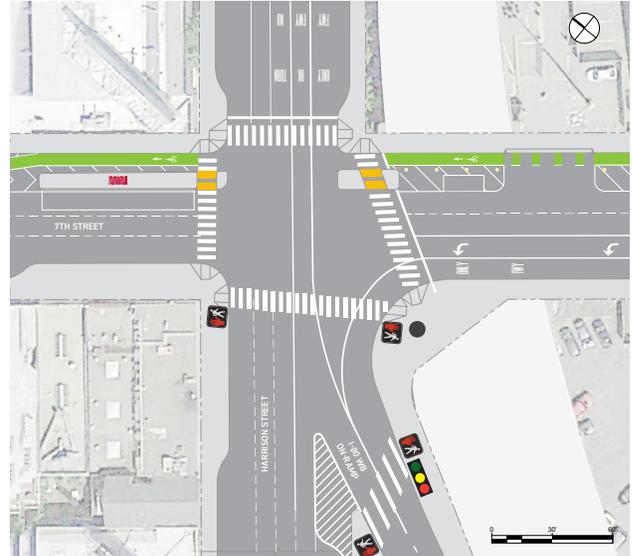


Figure 16: 7th and Harrison streets Improvement Plan

Recommendations for this intersection include:

Improved pedestrian facilities:

- Add a new crosswalk across with a protected signal phase on the west leg of Harrison Street to increase pedestrian accessibility.

Improved visibility:

- Add a pedestrian refuge area on 7th Street to increase safety of pedestrians and riders accessing the bus stop.
- Install sidewalk extensions on all corners of the intersection to shorten pedestrian crossing distances and increase pedestrian visibility. This would include a bus bulb on Harrison Street at the northwest corner.
- Install near-side traffic signals for better visibility.

7th Street between Bryant and Harrison streets (I-80 eastbound off-ramp)

The intersection in Figure 17 is part of SFMTA's 7th Street Near-Term Safety Project. The SFMTA's project recommendations include a parking protected bike lane and transit boarding island on 7th Street.

The collisions at this intersection involved vehicles exiting the on-ramp striking pedestrians in the crosswalk, vehicles on 7th Street, or another vehicle on the off-ramp.

Recommendations for this intersection include:

Installed flashing beacons to increase drivers' awareness and visibility of crossing pedestrians.

Close the left-most off-ramp lane to reduce the number of conflict points with pedestrians and increase visibility (potentially reconsider if the 8-Bayshore is rerouted to this ramp).

Added curb extensions and curb ramps to shorten pedestrian crossing distances, reduce turning vehicle speed, and increase visibility of pedestrians.

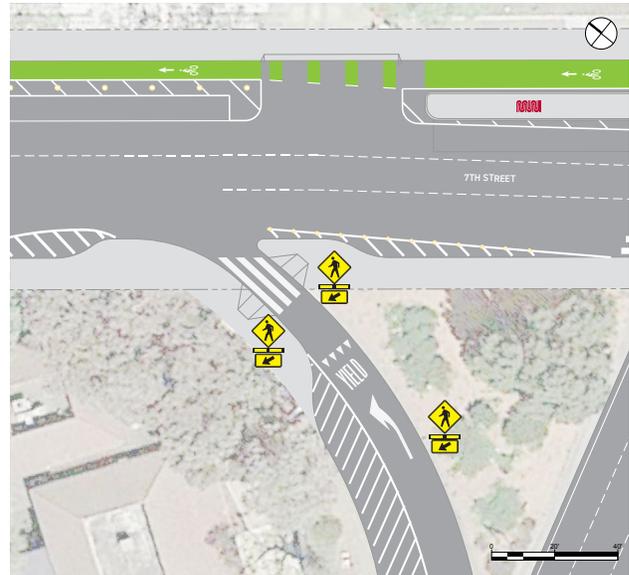


Figure 17: 7th Street between Bryant and Harrison streets Improvement Plan

7th Street and Bryant Street (I-80 eastbound off-ramp)

The intersection in Figure 18 is part of SFMTA's 7th Street Near-Term Safety Project. The project recommendations include the addition of a protected bike lane and bicycle signal phase.

At this intersection, most of the collisions occurred in the southeast corner of the intersection due to right turn vehicle movements from 7th Street onto Bryant Street.

Recommendations for this intersection include:

Removed far left freeway off-ramp lane to shorten pedestrian crossing distances.

Installed bulb-outs at all corners of the intersections to increase pedestrian visibility.

Installed new mast arms at the freeway off-ramp and at the southeast corner facing Bryant Street to increase traffic signal visibility for motorists.

Installed additional traffic signals at the southwest corner of the intersection.

Added pedestrian refuge associated with the bus boarding island to increase pedestrian and transit rider safety.



Figure 18: 7th and Bryant streets Improvement Plan

6th Street and Brannan Street (I-280 northbound off-ramp, I-280 southbound on-ramp)

The intersection in Figure 19 is part of SFMTA's Brannan Street Safety Project, which includes new bicycle lanes on Brannan Street.

At this intersection, the collisions are scattered throughout the intersection; several involved right-turning drivers from the off-ramp hitting pedestrians in the crosswalk on the east leg of Brannan Street.

Recommendations for this intersection include:

Improved pedestrian and bicycle facilities:

- Upgrade the bicycle lanes on Brannan Street, including converting the eastbound approach to a buffered bicycle lane by eliminating one of two right turn lanes.
- Add a new crosswalk with a median refuge across the freeway ramp leg of the intersection for better pedestrian accessibility.

Improved visibility:

- Add a protected right turn signal phase from the off-ramp onto Brannan Street to reduce conflicts between turning traffic and pedestrians.
- Extend the sidewalks at the northeast, southwest, and southeast corners to reduce pedestrian crossing distances and increase visibility.
- Install nearside traffic signal at the southwest corner of Brannan and 6th Street to improve signal visibility.
- Convert the southbound tow-away lane on 6th Street to a right turn only lane to keep fast-moving through traffic farther from the sidewalk and reduce merging in the intersection.



Figure 19: 6th and Brannan streets Improvement Plan

Essex Street and Harrison Street (I-80 eastbound on-ramp)

The intersection in Figure 20 is slated for developer-provided improvements, which include curb extensions at the northeast and southeast corners of the intersection.

At this intersection, most of the collisions occurred on the west side of the intersection due to red light violations or excessive speed.

Preliminary recommendations for this intersection include:

Improved visibility:

- Upgrade traffic signals to provide better signal visibility.
- Increase sidewalk widths at corners to increase pedestrian visibility and awareness of turning vehicles.

Improved pedestrian facilities:

- Add new signalized crosswalk across the freeway entrance and a protected right turn signal from Harrison Street onto the on-ramp to prevent conflicts with pedestrian crossings. Convert the eastbound through/right turn lane to a right turn only lane to improve clarity.
- Add a new signalized crosswalk across the west leg of Harrison Street.
- Add a new sidewalk along the south side of Harrison Street.

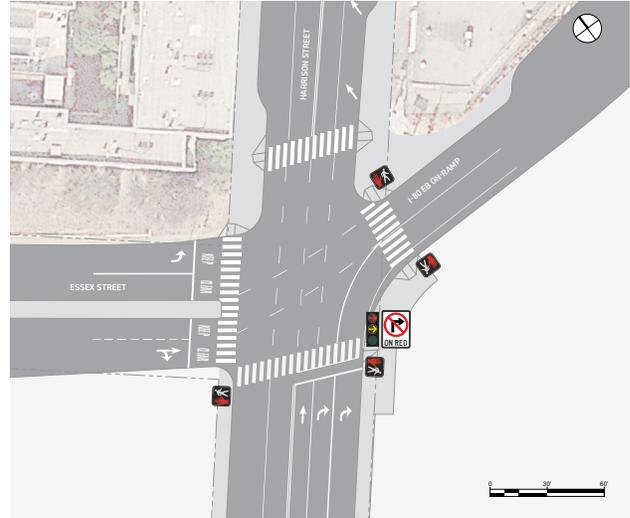


Figure 20: Essex and Harrison streets Improvement Plan

Fremont Street between Howard and Folsom streets (I-80 westbound off-ramp)

The intersection in Figure 21 had no collision data available at the time of this Study. The Study team recommends proactive improvements including:

- The addition of a signalized crosswalk on east leg of Fremont Street.
- Construct a raised splitter median island to direct drivers to the appropriate receiving lane.
- Add “No Right Turn on Red” signs on both sides of the freeway ramp to reduce conflicts with pedestrians.



Figure 21: Fremont between Howard and Folsom streets Improvement Plan

DESIGN EVALUATION

Traffic Analysis

The Study team conducted traffic analysis on five of the ramp intersections to determine the effects of proposed safety treatments that would potentially affect traffic capacity. The analysis included intersections at which the proposed improvements included lane capacity reductions or changes to signal phasing that could reduce traffic capacity (e.g., opening a new crosswalk). The other five intersections were not part of the traffic analysis as their impacts to traffic were expected to be minimal. For each analyzed intersection, the Study team first determined the existing traffic conditions, then tested the proposed design changes to understand the associated traffic effects. The analysis focused on:

- Whether any increase in traffic delay would potentially result in queues spilling back to upstream intersections or towards an on-ramp onto a freeway mainline; and
- Whether there would be significant increases in traffic delay that would affect transit performance.

The Study team used Synchro 10 and Simtraffic software to simulate existing and scenario signal phases and timing: volume to capacity ratios, traffic delay, queue lengths, and upstream blockages due to queuing during peak commute hours. The summary list below describes the traffic analysis conclusions. In some cases, the Study team refined proposed intersection designs to reduce queuing based on the analysis.

For more detailed information see Appendix C.

Mission, Otis, Duboce, and 13th streets (U.S. 101 northbound off-ramp)

One-Way Otis Scenario: This scenario does not require adding an additional signal phase because the two-stage bicycle lane movement allows westbound 13th Street traffic, off-ramp traffic, and westbound bicycles that have completed the two-stage maneuver to proceed across the intersection concurrently. As a result, queue increases would be relatively minimal and would only rarely back up to the next intersection. The Otis Street southbound left turn would see a slight increase in delay in the a.m. and back up into the previous intersection, but this is manageable given the benefit of the additional bicycle facility on 13th Street. During the p.m. peak, traffic queues are expected to remain similar to existing conditions.

Two-Way Otis Scenario: In order to accommodate a westbound bike lane and two-way Otis Street, an additional signal phase is required to separate westbound vehicle and bike traffic on 13th Street from traffic coming off the off-ramp. This additional phase reduces queues on the eastbound approach, but would increase delay and queues on all other intersection approaches.

- Due to the northbound through lane reduction, northbound through lane queue lengths would increase substantially. As a result, queued traffic would block buses from entering the northbound bus lane about 41% of the time in the a.m. peak hour and 14% of the time during the p.m. peak hour, increasing transit delay.
- The off-ramp queue would extend onto the freeway mainline approximately 73% of the time in both the a.m. and p.m. peak periods, compared to 30 - 37% in the a.m. and 12% in the p.m. under existing conditions. This would be a significant issue when seeking Caltrans approval for the proposed safety improvements.
- Southbound queues would typically extend through the intersection of Otis Street, McCoppin Street, and Gough Street, which occurs much less frequently today.
- Westbound queues would block the intersection of 13th Street and South Van Ness Avenue more frequently than they do today.

The Study team included both scenarios in the final recommendations pending a final Otis Street proposal as part of the Market Octavia Plan Amendment. The study team also looked at other scenarios such as changing the east crosswalk so that pedestrians would need to wait in order to cross that crosswalk in two stages. While this had the benefit of reducing the delay caused by the proposed two-way Otis Street, it would make the pedestrian crossing much more difficult. Therefore, the scenario was not recommended.

South Van Ness Avenue and 13th Street (U.S. 101 southbound on-ramp)

Reductions in the number of lanes for several movements (eastbound through, southbound through, westbound left turn) at this intersection combined with signal timing changes to accommodate a protected southbound left turn would increase queues on some approaches.

- Elimination of an eastbound through lane would increase the queue on that approach, but it would likely not extend to the adjacent signal at 13th/Duboce/Mission/Otis.
- The proposed protected southbound left turn would lengthen queues substantially in both the a.m. and p.m. peak hours. As a result, queues would extend back and block the upstream intersection at 12th Street about 90% of the time during the peak hours.
- The reduction in westbound left turn lanes from two to one combined with the proposed protected southbound left turn would result in longer queues on the westbound approach. They would extend back to the upstream intersection at Folsom Street up to 44% of the time in the p.m. peak hour.

Based on these findings, the Study recommends conducting a pilot as part of the near-term improvements, prohibiting southbound left turn movements for all time periods (they are currently prohibited only during the p.m. peak hour). The pilot evaluation would determine if 1) the change addresses existing conflicts involving southbound left turns at this intersection and 2) if it shifts higher volumes of turning traffic to other intersections (e.g. South Van Ness Avenue and 14th Street), creating potential issues there. If the pilot is successful in reducing overall conflicts in the network, then it could remain in place in lieu of adding a protected southbound left turn. Left turn signal modifications at 14th Street and South Van Ness Avenue could help to accommodate the increase in turning vehicles diverted from 13th Street/South Van Ness Avenue. With the possible elimination of the southbound left turn, which has relatively low traffic volumes, green time can be re-allocated to the other higher-volume movements. As a result, prohibiting the southbound left turn would reduce queues and delay at the intersection to manageable levels even with the proposed lane changes to accommodate eastbound and westbound bike lanes.

7th Street between Bryant and Harrison streets (I-80 eastbound off-ramp)

The recommended reduction of the freeway off-ramp from two lanes to one would increase queue lengths during both the a.m. and p.m. peak hours. The queue length would still be within the ramp storage area and would typically not back up onto the freeway mainline.

SFMTA is considering re-routing the inbound 8-Bayshore from Bryant Street to this midblock off-ramp, 7th Street, and Folsom Street before rejoining its current route on 3rd Street. If SFMTA implements this change, a second lane may need to be retained on this off-ramp to accommodate and avoid delays to Muni buses.

7th Street and Bryant Street (I-80 eastbound off-ramp)

The analysis found no significant effects on traffic from the proposed improvements at this intersection.

- Reducing the freeway off-ramp from three lanes to two would not have a significant effect on queues on the off-ramp, and that they would not extend back to the mainline during typical peak hour conditions.
- The recommended conversion of one northbound through lane into a second northbound right turn lane would not significantly affect queues on 7th Street.

6th Street and Brannan Street (I-280 northbound off-ramp, I-280 southbound on-ramp)

The new protected northbound right turn phase from the off-ramp together with the new crosswalk across the freeway ramps and associated signal timing changes would increase queuing at some approaches while decreasing it at others.

- Northbound I-280 splits about 3,000 feet south of the intersection into two legs that each end at surface street traffic signals (at the Study intersection on 6th Street and at an intersection on 5th Street), causing lengthy queues in the existing condition on both freeway legs. The entire freeway essentially functions as off-ramp queue storage.
- The I-280 off-ramp northbound right turn will see a large decrease in capacity due to the proposed signalization of this movement to separate pedestrians and right turning vehicles. Queues in the a.m. peak would be noticeably higher than current conditions. Delays and queuing could potentially be reduced by requiring pedestrians to push a button to cross Brannan Street in the east crosswalk.
- Queue lengths would vary on surface street approaches. In the p.m. peak, southbound 6th Street and northbound freeway off-ramp queues would decrease and may decrease even further due to the upcoming lane reduction on southbound 6th Street between Market and Howard. However, queues on eastbound Brannan Street would increase and back up to the next intersection. A re-evaluation of the traffic volumes is warranted in the future to determine how the Brannan Street Safety Project traffic calming measures affect future traffic volumes. Moreover, a future protected bicycle lane on Brannan Street may decrease the pedestrian crossing distances across Brannan, allowing the signal timing to be slightly more efficient
- Establishing both a new crosswalk across the off-ramp and a protected northbound off-ramp right turn phase together would significantly increase eastbound Brannan Street queues in the p.m. peak and off-ramp northbound right turn queues during the a.m. peak.

Cost Estimates

The Study team developed planning-level cost estimates for the Study intersections, shown Table 4, projecting that the recommended improvements to all 10 intersections would cost approximately \$10.7 million. Of this, approximately \$250,000 represents the cost of the identified near-term improvements, which can be implemented in the next two years. The remaining costs are for the capital improvements, which will take several years to implement. The cost estimates are based on typical City costs for the proposed types of improvements. Estimates include further planning, design, construction, and contingency costs. They assume concurrent implementation of similar improvements (e.g., implementing signal upgrades at multiple intersections at once).

For full cost estimate details, see Appendix F.

Table 4: Intersection Total Cost Summary

| INTERSECTIONS | NEAR-TERM IMPROVEMENTS | CAPITAL IMPROVEMENTS | TOTAL COST |
|--|------------------------|----------------------|---------------------|
| Mission, Otis, Duboce, and 13th streets (U.S. 101 northbound off-ramp) | \$54,900 | \$1,063,300 | \$1,118,200 |
| South Van Ness Avenue and 13th Street (U.S. 101 southbound on-ramp) | \$20,900 | \$1,076,000 | \$1,096,900 |
| 8th Street between Bryant and Harrison streets (I-80 westbound off-ramp) | \$10,000 | \$328,000 | \$338,000 |
| 8th Street and Bryant Street (I-80 westbound off-ramp) | \$37,000 | \$2,024,000 | \$2,061,000 |
| 7th Street and Harrison Street (I-80 westbound on-ramp) | \$10,000 | \$1,266,000 | \$1,276,000 |
| 7th Street between Bryant and Harrison streets (I-80 eastbound off-ramp) | \$11,500 | \$441,000 | \$452,500 |
| 7th Street and Bryant Street (I-80 eastbound off-ramp) | \$38,600 | \$1,093,000 | \$1,131,600 |
| 6th Street and Brannan Street (I-280 northbound off-ramp, I-280 southbound on-ramp) | \$49,300 | \$1,115,600 | \$1,164,900 |
| Fremont Street between Howard and Folsom streets (I-80 westbound off-ramp) | \$5,600 | \$469,000 | \$474,600 |
| Essex Street and Harrison Street (I-80 eastbound on-ramp) | \$9,000 | \$1,617,600 | \$1,626,600 |
| Total Cost | \$246,800 | \$10,493,500 | \$10,740,300 |

FUNDING AND IMPLEMENTATION PLAN

The next steps toward implementation of the recommended safety improvements include design, project approvals, funding, and construction. The Study team developed a funding and implementation plan in coordination with SFMTA and Caltrans.

SFMTA will lead design and implementation of the recommendations in coordination with San Francisco Public Works and Caltrans. Since the Study intersections involve both city streets and Caltrans freeway ramps, the proposed improvements will require Caltrans approvals in addition to the typical SFMTA legislation process for street design changes. Some of the proposed improvements may require additional traffic analysis during the Caltrans approval process regarding how the recommendations would affect off-ramp queues. The Transportation Authority could potentially provide assistance with Caltrans coordination for improvements that would require a more substantial approval process.

SFMTA has committed to implementing most near-term improvements within two years, with the exception of those that require a longer Caltrans approval process. Recommended near-term improvements at 7th Street and 8th Street are funded by D6 NTIP Capital funds. The goal for capital improvements is to implement them within five years, if possible, given funding availability and approval process.

Project funding and implementation are closely related, as a number of the improvements will be implemented by developers or with developer funds or together with other corridor projects. Table 4, shows the implementation plan for a couple of the intersections. Table 6 shows potential federal, state, and local funding sources that can be applicable to fund the proposed improvement plans. The Transportation Authority and SFMTA will continue to monitor and seek opportunities to use the identified funding sources to advance the Study recommendations.

Table 5: Implementation Plan by Intersection

| INTERSECTION | FUNDING PLAN FOR CAPITAL IMPROVEMENTS | IMPLEMENTATION PLAN FOR CAPITAL IMPROVEMENTS |
|--|--|---|
| Mission, Otis, Duboce, and 13th streets | Improvements could be funded with revenue from Market Octavia area plan fees. | |
| South Van Ness Avenue and 13th Street | Improvements will be prioritized as part of a future SFMTA new signal or signal modification project. SFMTA and the Transportation Authority will seek funding from sources listed in Table 6. | If not implemented by Caltrans, SFMTA to implement the improvements Construction in 2022 or 2023 |
| | Pending coordination with Caltrans, improvements could potentially be incorporated into an upcoming Caltrans U.S. 101 repaving project. | |
| 8th Street midblock between Bryant and Harrison streets | Improvements will be prioritized as part of a future SFMTA new signal or signal modification project. SFMTA and the Transportation Authority will seek funding from sources listed in Table 6. | If not implemented by Caltrans, SFMTA will prioritize the improvements as part of an upcoming new signal or signal upgrade project. |
| | Pending coordination with Caltrans, improvements could potentially be incorporated into an upcoming Caltrans U.S. 101 repaving project. | |
| 8th Street and Bryant Street | The project can be considered for the upcoming SFMTA CIP where it would also need to compete with other projects and funding sources. Additional funding is needed for capital improvements. SFMTA and the Transportation Authority will seek funding from sources listed in Table 6. | TBD pending future funding, additional coordination with Caltrans, and other priorities on the Vision Zero High Injury Network. |
| 7th Street and Harrison Street | | SFMTA will incorporate improvements as part of 7th Street project. Project will start, pending other priorities on the Vision Zero High-Injury Network. |
| 7th Street midblock between Bryant and Harrison streets | Recommended improvements will be funded through SFMTA's 7th Streetscape project. SFMTA to seek additional funds when project starts and scope is finalized. | 7th Street project will also need to coordinate with possible SFPUC water main work in the area to either combine work into one contract or to ensure the contracts do not impact each other. |
| 7th Street and Bryant Street | | |

All proposals that do not require Caltrans approval can be done by SFMTA in-house resources within 2 years of the publication of this report.

Near-term improvements along 7th and 8th Streets will be funded by Prop K Neighborhood Transportation Improvement Program (NTIP)

Near-term improvements for all other locations to be funded by SFMTA sources.

| INTERSECTION | FUNDING PLAN FOR CAPITAL IMPROVEMENTS | IMPLEMENTATION PLAN FOR CAPITAL IMPROVEMENTS | |
|--|---|---|--|
| <p>6th Street and Brannan Street</p> | <p>Pending coordination with Caltrans, improvements could potentially be incorporated into an upcoming Caltrans I-280 repaving project.</p> <p>The project can be considered for the upcoming SFMTA CIP where it would also need to compete with other projects and funding sources.</p> <p>The improvements can also be considered for 101/280 managed lanes project.</p> <p>If not implemented by Caltrans, additional funding is needed for capital improvements. SFMTA and the Transportation Authority will seek funding from sources listed in Table 6.</p> | <p>If not implemented by Caltrans, SFMTA will implement the recommended improvements pending funding sources confirmation.</p> | <p>All proposals that do not require Caltrans approval can be done by SFMTA in-house resources within 2 years of the publication of this report.</p> <p>Near-term improvements along 7th and 8th Streets will be funded by Prop K Neighborhood Transportation Improvement Program (NTIP)</p> |
| <p>Fremont Street between Howard and Folsom streets</p> | <p>SFMTA to prioritize IPIC funds from Transbay District to fund the capital improvements.</p> | <p>SFMTA to implement recommendations when IPIC funds become available.</p> <p>Earliest potential funding available will be in fiscal year 2021.</p> | <p>Near-term improvements for all other locations to be funded by SFMTA sources.</p> |
| <p>Essex Street and Harrison Street</p> | <p>New mast arm will be funded through EP-33 Prop K funds.</p> <p>Remaining improvements could be funded and possibly implemented by the developer of a proposed project on an adjacent property. Another potential funding source is Rincon Hill IPIC funds.</p> | <p>SFMTA will prioritize the new mast arm as part of an upcoming signal modification project.</p> <p>SFMTA to implement remaining recommendations pending funding source confirmation</p> <p>SFCTA and SFMTA staff to meet in 2022 to evaluate status of developer's required commitments to intersection improvements. If proposed development does not proceed, alternative funding plan to be developed.</p> | |

Table 6: Potential Funding Sources**FUNDING SOURCE****Prop K Sales Tax****POTENTIAL FUNDING AVAILABLE**

Project scope could be eligible for the Prop K Pedestrian Safety category and potentially Traffic Calming, New Signs and Signals, and Signals and Signs Maintenance and Renovation categories. FY 2019/20 – 2023/24 funds are all programmed to individual projects and placeholders but could be reprogrammed to these projects with agreement of project sponsors and SFCTA Board.

TIMELINE

Near-term improvements: Project sponsor could seek Neighborhood Transportation Improvement Program funds with support of District 6 SFCTA Commissioner. Project sponsor could seek allocation of currently programmed placeholders (e.g. Vision Zero Improvements or Advancing Equity through Safer Streets placeholders)

Capital improvements: Future projects may be programmed for FY 2024/25 via 2024 Prop K update.

FUNDING SOURCE**Prop AA Vehicle Registration Fee****POTENTIAL FUNDING AVAILABLE**

Project scope could be eligible for the Prop AA Pedestrian Safety category. All funds are currently programmed, but projects may finish under budget resulting in additional available funds.

TIMELINE

Near-term: Funds for an interim call for projects may become available if current projects are cancelled or completed under budget.

Capital improvements: Future projects may be programmed for FY 2022/23 via 2022 Prop AA Strategic Plan adoption.

FUNDING SOURCE**One Bay Area Grant (OBAG)****POTENTIAL FUNDING AVAILABLE**

OBAG enables counties to invest federal funds particularly in areas that local governments have identified and approved for future growth. Projects include local street and road maintenance, streetscape enhancements, bicycle and pedestrian improvements, transportation planning, Safe Routes to School projects, and more.

TIMELINE

The next cycle of OBAG funds is expected to have funds available for projects starting in FY 2022/23

FUNDING SOURCE**Prop B General Fund set-aside**

Potential inclusion in future SFMTA Capital Improvement Program (development to begin spring 2020)

FUNDING SOURCE**Prop A General Obligation bond**

Potential inclusion in future SFMTA Capital Improvement Program (development to begin spring 2020)

FUNDING SOURCE**General Fund Population Baseline****POTENTIAL FUNDING AVAILABLE**

The City is required to increase General Fund contributions to the SFMTA by a percentage equal to the City's annual population increase. 25% of this increase goes to capital street safety improvements.

TIMELINE

Potential inclusion in future SFMTA Capital Improvement Program (development to begin spring 2020).

FUNDING SOURCE**Interagency Plan Implementation Committee (IPIC)****POTENTIAL FUNDING AVAILABLE**

Total unprogrammed anticipated revenues for transportation in Transit Center area in FY20/21 – FY23/24: \$7,197,000. IPIC funds may be identified in future SFMTA CIP process.

TIMELINE

Funds programmed annually in summer-fall for following fiscal year.

FUNDING SOURCE**Highway Safety Improvement Program (HSIP)****POTENTIAL FUNDING AVAILABLE**

TBD, previous cycle \$182 million awarded to 221 projects in California.

TIMELINE

It is expected that the next HSIP Call for Projects (Cycle 10) be announced around April/May, 2020.

FUNDING SOURCE**Active Transportation Program (ATP)****POTENTIAL FUNDING AVAILABLE**

Funds available in both a state competitive process and a regional competitive process. Anticipated \$220M statewide plus approximately \$37M at MTC regional level available over four-year period. Average of past grants about \$1.8M.

TIMELINE

Funding will be available for FY 2021/22, 2022/23, 2023/24, 2024/25 in the ATP Cycle 5 call for projects in spring 2020. Additional ATP funds from other sources, including cancelled projects, may result in additional and earlier funding availability.

FUNDING SOURCE**Potential Future Transportation Network Company (TNC) Tax****POTENTIAL FUNDING AVAILABLE**

Could generate approximately \$30 to \$35M per year. As currently proposed, half of the tax revenue, approximately \$15M would be allocated to Vision Zero-related improvements such as the proposed improvements of this study.

TIMELINE

If this tax is approved by voters in November 2019, the policy is expected to go into effect in January 2020.

FUNDING SOURCE**Caltrans – State Highway Operation and Protection Program (SHOPP)****POTENTIAL FUNDING AVAILABLE**

Proposed improvements on 6th Street and Brannan Street, Mission and 13th Street, and South Van Ness Ave and 13th Street could be included in Caltrans repaving projects using this funding source.

TIMELINE

To be determined

APPENDICES

Appendix A Intersection Selection Memo

Appendix B Existing Conditions Report

Appendix C Technical Drawings

Appendix D Traffic Analysis Reports

Appendix E Outreach Report (Round 1 and Round 2)

Appendix F Full Cost Estimates

Appendix G Intersection Traffic Counts

APPENDIX A

Intersection Selection Memo



San Francisco
County Transportation
Authority



Memorandum

Date: May 17, 2018
To: Jeff Hobson
From: Colin Dentel-Post and Priyoti Ahmed, SFCTA
Subject: Study Intersection Selection Memo

SUMMARY

Over last decade, South of Market area (SoMa) neighborhood experienced tremendous housing and employment growth and will continue to growth in next 20 years. Improving the safety of all road users is essential for ensuring equitable mobility and quality of life for those who live or travel through the SoMa as the region changes. The Transportation Authority and the SFMTA are continuing a collaborative study effort to improve safety at freeway ramp intersections to support progress towards Vision Zero. This memorandum outlines the selection process and criteria for ten study intersections in the SoMa neighborhood for Phase 2 of the Vision Zero Intersection Ramps Study.

BACKGROUND

Phase 1 of the Vision Zero Ramp Intersection Study developed recommendations for improving safety at five SoMa freeway ramp intersections based on detailed crash analyses and other ongoing projects at the ramp intersections. Recommendations for Phase 1 focused on short-term improvements at five locations including signal timing, striping changes, signage improvements, lighting, wayfinding signage, shortening and opening crosswalks. Phase 1 was funded through Prop K D6 NTIP funds, and recommended improvements are expected to be implements as part of SFMTA project and SFMTA's Capital Investment Plan.

Phase 2 of the study will evaluate 10 new freeway ramp intersections in SoMa and recommend short and long terms improvements at those intersections.

Both phases of this study aim to increase safety where high-speed freeway traffic enters neighborhood streets, and the SoMa neighborhood has over 20 ramp intersections. Although Phase 1 of this study focused on high-injury collision locations, Phase 2 of this study aims to proactively improve 10 out of 22 total SoMa freeway ramp intersections that do not have safety improvements planned or recently improved through other infrastructure safety projects.

SELECTION PROCESS

To select the study intersections, the project team analyzed all SoMa freeway ramp intersections' traffic collisions, researched other infrastructure projects in the SoMa that are

already addressing safety issues at freeway ramp intersections, as well as took a proactive approach by looking at design characteristics of existing freeway ramp intersections and ways they could be improved to enhance road user safety.

Traffic Collision Analysis:

The project team evaluated all SoMa freeway ramp intersections based on total number of traffic collisions from 2011 to 2015. The total number of collisions include number of fatalities, severe injuries, visible injuries and any other complaints from traffic collisions. Table 1 shows all SoMa ramp intersections and their total collisions.

Planned and Future Projects:

The project team developed an inventory of all the projects that are proposing safety improvements at SoMa ramp intersections. Some of the planned and ongoing project at SoMa ramp locations are Central Subway Streetscape Project, Harrison Streetscape Project, and Vision Zero Ramps Phase 1 Study. These projects recommendations improve safety and circulation at various SoMa ramp intersection. To avoid any duplicate efforts and to increase safety improvements at all SoMa ramp intersections, the project team only selected intersections that are not already part of another safety projects or studies. Table 1 shows ongoing projects at each ramp intersections in SoMa.

Proactive Approach:

Along with conducting collision analysis and developing inventory of ongoing projects, the project team also assessed each ramp intersection to determine if the intersection can be further improved for all users of transportation. Following this approach, the project team selected intersections that do not have any traffic collisions and are not part of any ongoing projects but can be further improved for safety and traffic circulation. Table 1 shows those ramp intersections that have zero collision and are not part of other projects.

Table 1: SoMa Freeway Ramp Intersections

| Intersection | Freeway Ramp Intersection | Project Implementing Safety Improvements | Total Collisions (2011 – 2015) |
|---------------------|---|---|---------------------------------------|
| 1 | Mission, Otis, Duboce, & 13th streets (U.S. 101 NB off-ramp) | - | 32 |
| 2 | South Van Ness Avenue & 13th Street (U.S. 101 SB on-ramp) | - | 25 |
| 3 | 8th Street between Bryant & Harrison streets (I-80 WB off-ramp) | - | 0 |
| 4 | 8th Street & Bryant Street (I-80 WB off-ramp) | - | 4 |
| 5 | 7th Street & Harrison Street (I-80 WB on-ramp) | - | 12 |
| 6 | 7th Street between Bryant & Harrison streets (I-80 EB off-ramp) | - | 3 |
| 7 | 7th Street & Bryant Street (I-80 EB off-ramp) | - | 6 |

| | | | |
|----|---|--|----|
| 8 | 6th Street & Brannan Street (I-280 NB off-ramp, I-280 SB on-ramp) | Brannan Street Safety Project (not addressing ramp itself) | 12 |
| 9 | Fremont Street between Howard & Folsom streets (I-80 WB off-ramp) | - | 0 |
| 10 | Essex Street & Harrison Street (I-80 EB on-ramp) | - | 10 |
| 11 | 5th Street & King Street (I-280 NB off-ramp, I-280 SB on-ramp) | SFMTA Project | 8 |
| 12 | 5th Street & Harrison Street (I-80 WB off-ramp) | Vision Zero Freeway Ramps Phase 1 | 20 |
| 13 | 5th Street & Bryant Street (I-80 EB on-ramp) | Vision Zero Freeway Ramps Phase 1 | 16 |
| 14 | 8th Street & Harrison Street (I-80 WB off-ramp) | Vision Zero Freeway Ramps Phase 1 | 9 |
| 15 | 9th Street & Bryant Street (U.S. 101 NB off-ramp) | Vision Zero Freeway Ramps Phase 1 | 10 |
| 16 | 10th Street & Bryant Street (U.S. 101 SB on-ramp) | Vision Zero Freeway Ramps Phase 1 | 17 |
| 17 | 4th Street & Harrison Street (I-80 WB on-ramp) | Central Subway Streetscape Improvements | 16 |
| 18 | 4th Street & Bryant Street (I-80 EB off-ramp) | Central Subway Streetscape Improvements | 6 |
| 19 | Fremont Street & Harrison Street (I-80 WB off-ramp) | Harrison Street Repaving/Streetscape | 13 |
| 20 | 1st Street & Harrison Street (I-80 EB on-ramp) | Harrison Street Repaving/Streetscape | 10 |
| 21 | Bryant Street between 2nd Street and Rincon Street (I-80 EB on-ramp) | Safety Treatments Recently Implemented | 3 |
| 22 | Market Street and Octavia Boulevard (U.S. 101 NB off-ramp, U.S. 101 SB on-ramp) | Better Market Street Project | 25 |

SELECTED STUDY INTERSECTIONS FOR PHASE 2:

Based on the selection criteria, the selected intersections for this project are:

1. Mission, Otis, Duboce, & 13th streets (U.S. 101 NB off-ramp)
2. South Van Ness Avenue & 13th Street (U.S. 101 SB on-ramp)
3. 8th Street between Bryant & Harrison streets (I-80 WB off-ramp)
4. 8th Street & Bryant Street (I-80 WB off-ramp)
5. 7th Street & Harrison Street (I-80 WB on-ramp)

6. 7th Street between Bryant & Harrison streets (I-80 EB off-ramp)
7. 7th Street & Bryant Street (I-80 EB off-ramp)
8. 6th Street & Brannan Street (I-280 NB off-ramp, I-280 SB on-ramp)
9. Fremont Street between Howard & Folsom streets (I-80 WB off-ramp)
10. Essex Street and Harrison Street (I-80 EB on-ramp)



APPENDIX B

Existing Conditions Report



San Francisco
County Transportation
Authority

SoMa Ramp Intersection Safety Study

Existing Conditions Report

April 2018

Prepared for:



Prepared by:



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1 Introduction

The SoMa Ramp Intersection Safety Study (Study) seeks to improve safety for all road users in the South of Market (SoMa) neighborhood in the City of San Francisco. The study focuses on intersections where freeway ramps intersect with City streets and consists of two phases. Vision Zero Ramp Phase 1 focused on developing short-term safety improvements at five intersections and was completed in May 2018. This Study analyzes traffic collisions at an additional ten intersections and develops long-term and short-term improvements intersections.

Figure 1 illustrates the study area and intersections, most of which are along 7th, 8th, and 13th Streets. The 10 study intersections shown are:

1. Mission Street / 13th Street / US 101 NB Off-Ramp
2. South Van Ness Avenue / 13th Street / US 101 On-Ramp
3. 8th Street (Midblock) / I-80 WB Off-Ramp
4. Bryant Street / 8th Street / I-80 EB On-Ramp
5. Harrison Street / 7th Street / I-80 WB On-Ramp
6. 7th Street (Midblock) / I-80 EB Off-Ramp
7. Bryant Street / 7th Street / I-80 EB Off-Ramp
8. Brannan Street / 6th Street / I-280 On/Off-Ramp
9. Harrison Street / Essex Street / I-80 EB On-Ramp
10. Fremont Street / I-80 WB Off-Ramp

1.1 MULTIMODAL NETWORK

Figure 2 shows the MUNI transit routes (dashed black) and SFMTA bicycle network (green).

There are existing bike routes along the entirety of 7th and 8th Streets. Bicycle lanes exist on 13th Street to the east of the study intersections, but they end at Folsom St. There are currently no bicycle facilities along Brannan, Bryant, and Harrison Streets east of 11th Street in SoMa. There are also no bike lanes on 6th, Mission, or South Van Ness. There are existing transit routes along all study corridor streets, except South Van Ness Avenue and Fremont Street at the study intersections.

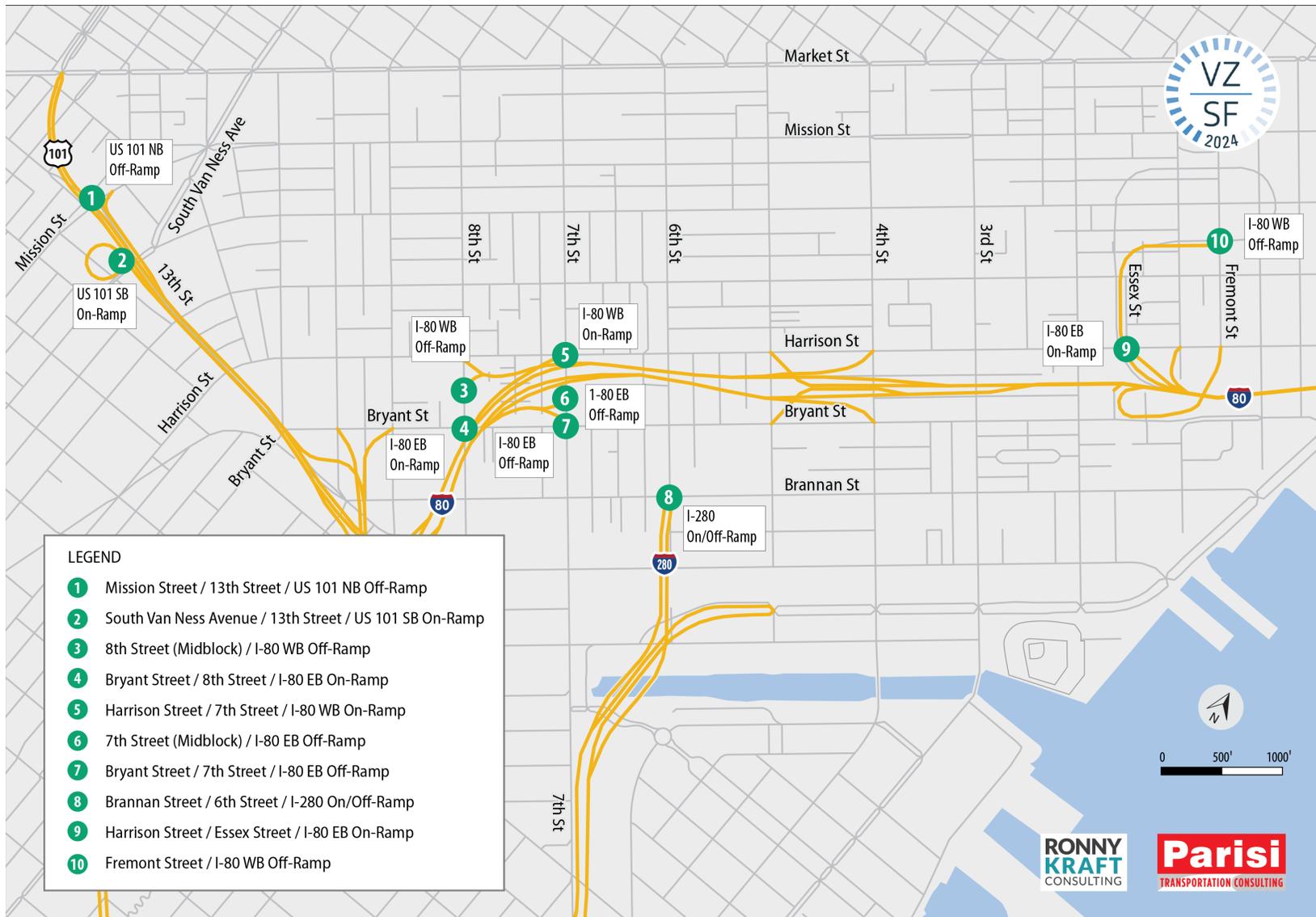


Figure 1: Study Area and Study Intersections

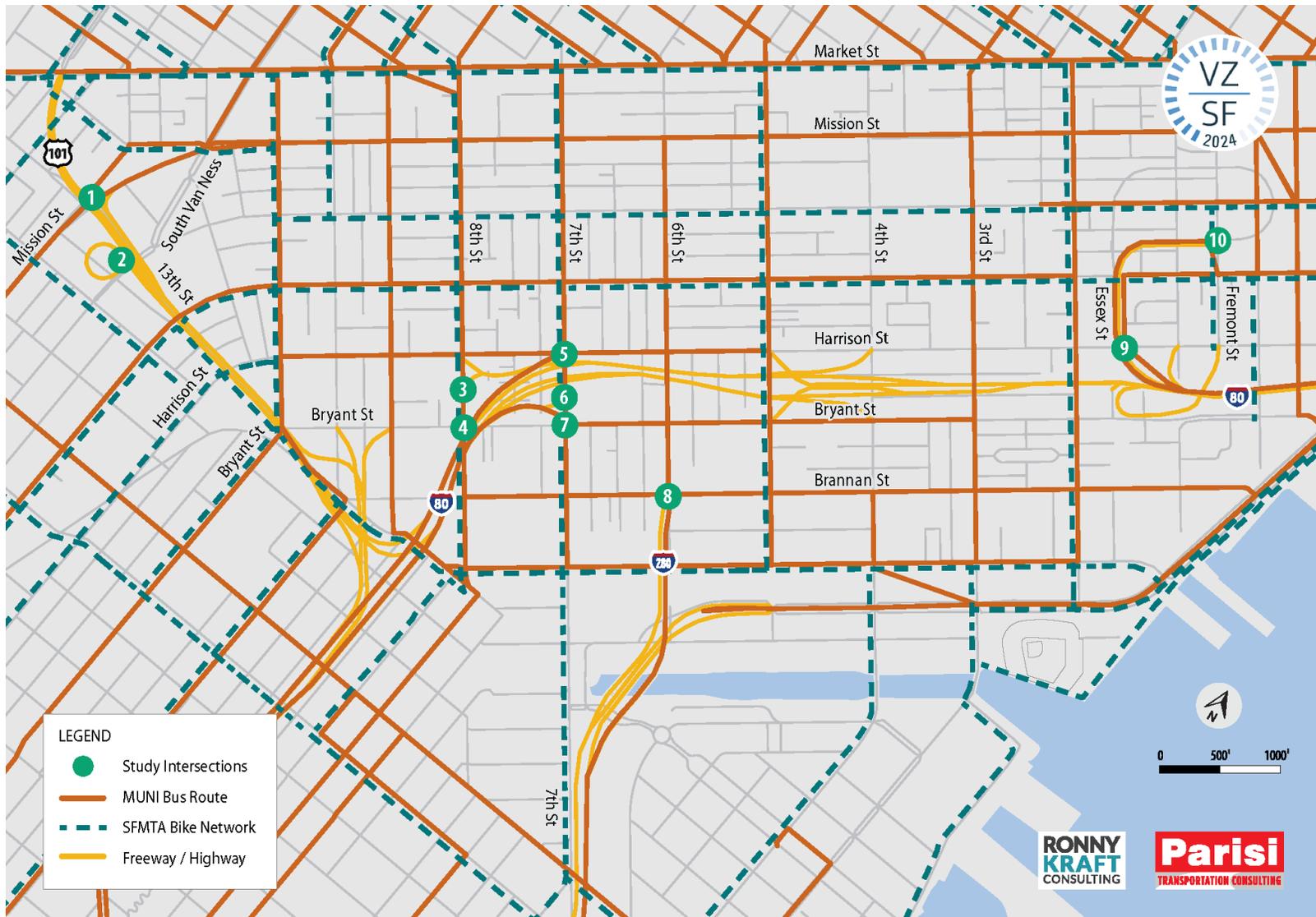


Figure 2: SoMa Multimodal Street Network

1.2 PLANNED PROJECTS

Currently, three planning projects are underway to improve mobility and safety for all road users in the SoMa:

1. **SFMTA's 7th and 8th Streets Safety Project:** The goal of the 7th and 8th Streets Safety Project is to improve safety and comfort for all modes of travel along 7th Street between Market Street and Folsom Street, and 8th Street between Market Street and Townsend Street. This project will implement paint treatments to increase the visibility of people walking and biking as well as concrete elements to provide smoother transit boarding and increased separation between people biking and driving. The project elements include a lane removal, protected bikeways, bus boarding islands, parking removal adjacent to crosswalks to increase visibility of people walking and biking, and signal hardware upgrades.
2. **6th Street Pedestrian Safety Project:** The 6th Street corridor has one of the highest concentrations of pedestrian collisions, injuries, and fatalities in San Francisco. In support of the City's Vision Zero policy, the 6th Street Pedestrian Safety Project aims to create a safe and inviting place for people to walk and bike by transforming 6th Street by adding wider sidewalks, new traffic signals, and streetscape improvements.
3. **Market Street Hub Public Realm Plan:** The San Francisco Planning Department has proposed improvements along 13th Street as part of the Market Street Hub Project that includes two Study intersections—13th and Mission streets and 13th Street and South Van Ness Avenue. The project plans include a reconfiguration of the intersection at 13th and Mission streets, new protected bicycle lane, new curb bulb-outs, improved sidewalks and raised crosswalks, and other new or upgraded pedestrian amenities.
4. **Caltrans Signal Upgrade:** Caltrans is proposing improvements along the 7th and Harrison streets Study intersection to improve efficiency and safety of the traffic signals at this intersection.
5. **Other Improvements from Existing Developer Obligations:** Repaving, curb ramps, and general repairs required per existing development agreements at Essex and Harrison Street and 6th and Brannan Street intersections.

1.3 LAND USE CONTEXT

The SoMa neighborhood is one of San Francisco's fastest-growing. According to a September 2014 report by the San Francisco Planning Department, SoMa is programmed to receive almost 20,000 new residents and 50,000 new jobs by 2040 – more than any other San Francisco Priority Development Area (PDA) and representing 20 percent of all growth in San Francisco by 2040. Without appropriate street safety upgrades, this growth could increase the number of traffic collisions occurring in SoMa, particularly at ramp intersections. Figure 3 illustrates the location of near-term planned developments and their relationship to the study intersections.

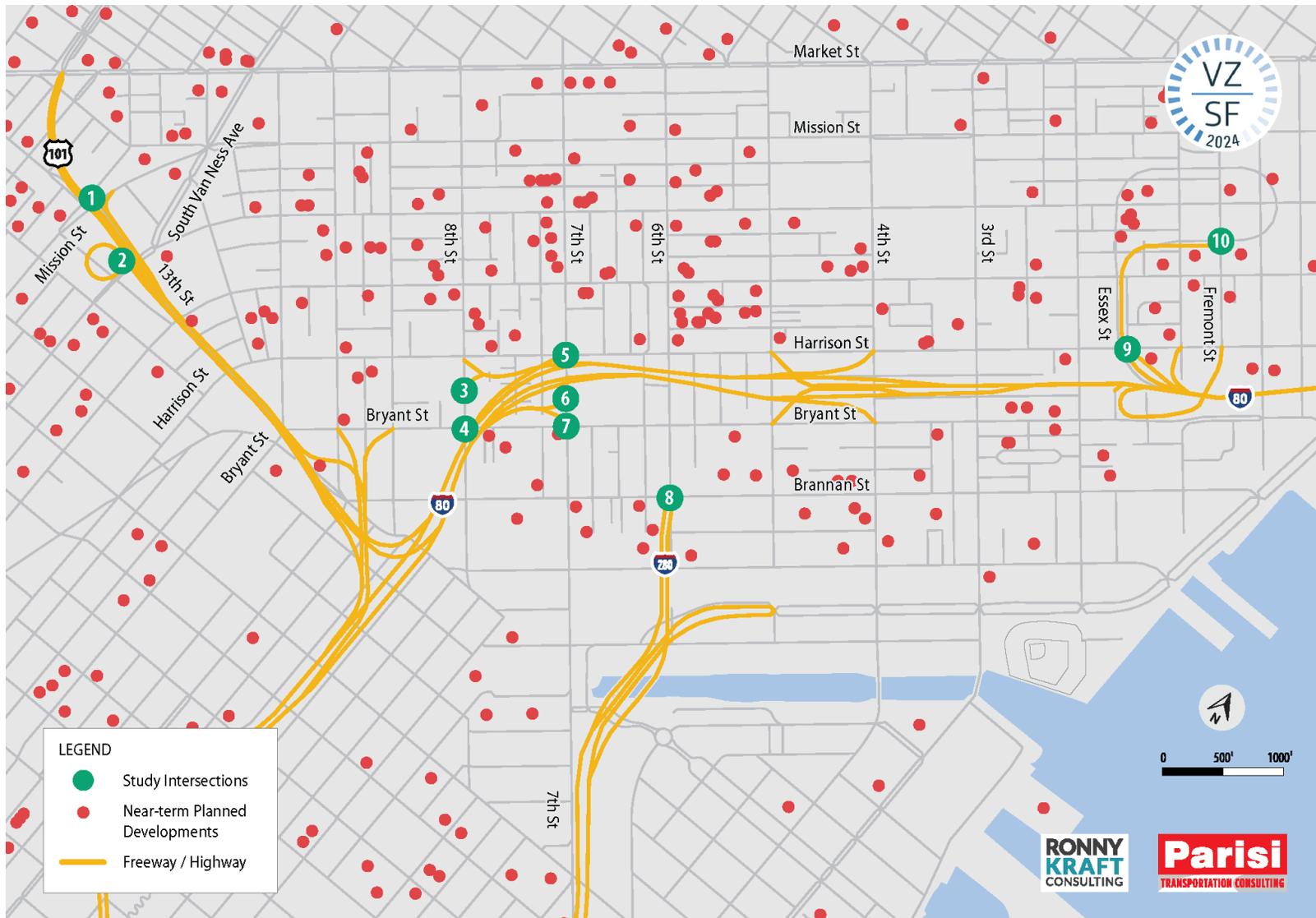


Figure 3: San Francisco Development Pipeline, 2017

2 Roadway Design and Traffic Conditions

This chapter provides an overview of the physical and operational characteristics of the SoMa roadway network, including the number of lanes on each street, whether they operate with one-way or two-way traffic, typical congestion, and typical speed.

2.1 ROADWAY AND RAMP DESIGN

SoMa's roadway network includes the I-80, I-280, and US-101 highways and a grid of 25 mph arterial streets and local streets. Most streets comprising the SoMa roadway grid average four to five lanes. Half of the study corridor streets operate with one-way traffic.

Table 1 summarizes the characteristics of the streets that comprise the study locations.

Table 1: Characteristics of Intersection Study Streets

| Street Name | Lanes | | Configuration |
|-----------------------------------|--|--|--|
| | Midblock | At Intersection | |
| 6 th Street | 5 | 5 | Two-Way |
| 7 th Street (Bryant) | 4 | 4 | One-Way |
| 7 th Street (Midblock) | - | 4 | |
| 7 th Street (Harrison) | 4 | 5 | |
| 8 th Street | 4 | 4 | One-Way |
| 13 th Street | 5 (West of SVN) 6 (East of SVN) | 6 | Two-Way |
| Mission Street | - | 6 (South of 13 th) 8 (North of 13 th , including Otis) | Two-Way |
| South Van Ness Avenue | 4 (South of 13 th) 5 (North of 13 th) | 6 | Two-Way |
| Bryant Street | 4 | 5 | One-Way |
| Brannan St | 4 (West of 6 th) 5 (East of 6 th) | 5 (West of 6 th) 6 (East of 6 th) | Two-Way |
| Harrison Street | 5 | 5 | One-way (Two-Way at Essex St) |
| Essex Street | 4 | 4 | One-Way |
| Fremont Street | - | 3 (South of intersection) 5 (North of intersection) | Two-Way south of intersection One-Way north of intersection |

2.2 CONGESTION

To obtain a general picture of traffic congestion levels, the SoMa streets at the 10 ramp intersections were studied using Google Maps' Typical Traffic feature, which collects speed and location data from users' mobile phones to create an index for vehicle speeds on any given road. Traffic conditions were symbolized using green for uncongested conditions, and dark red for slow/congested conditions. The analysis was done for the weekday AM peak (7am – 9am), off-peak (12pm – 2pm) and PM peak (4pm – 6pm).

AM Peak

Figure 4 illustrates traffic conditions during the AM periods for SoMa. On freeways, traffic is relatively free-flowing on I-80, I-280 S, and US-101 S during the morning commute (7am – 9am) as indicated by Typical Traffic's green rating.

The following freeway segments experience medium to high levels of congestion:

- U.S. 101 N around Mission Street
- I-80 E, which experiences moderate congestion between 5th and 7th Street
- I-280 E around 6th Street

Beginning around 8:15am, eastbound Mission Street and northbound South Van Ness Avenue near 13th Street both experience heavy amounts of congestion. 7th Street also experiences congestion starting around 8:00am. Most of the other streets experience low congestion, if at all.

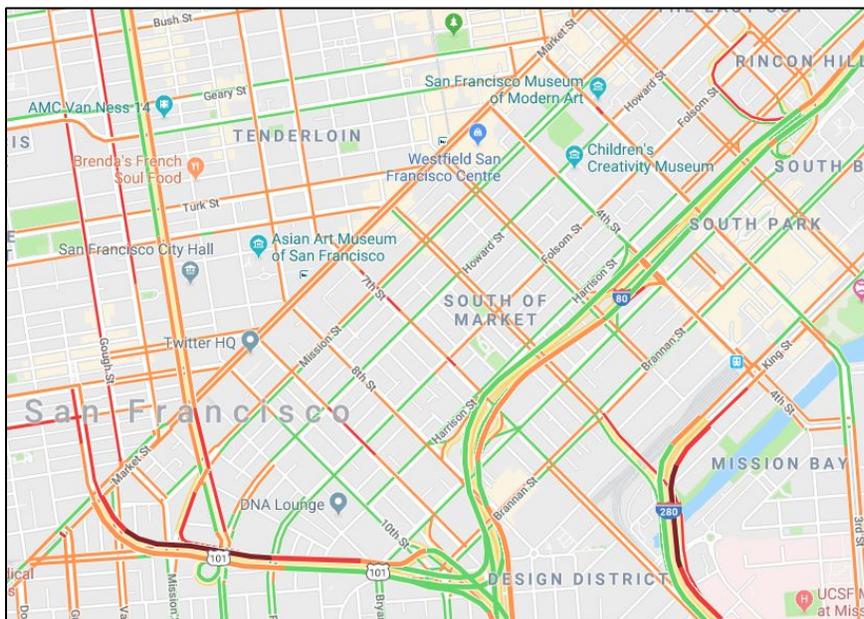


Figure 4: Typical Traffic in SoMa, AM Peak

Source: Google Maps, Typical Traffic Conditions, accessed April 2018.

PM Peak

Figure 5 illustrates traffic conditions during the PM periods for SoMa. Traffic congestion in the PM peak period is significantly worse and widespread than in the morning on all freeways and arterials. The heaviest congested conditions are apparent on I-80 East throughout SoMa. Congestion begins on both I-80 E and US-101 N as early as 12:15pm.

During the PM period, arterial streets within SoMa experience high levels of congestion, especially in the northbound direction towards Market Street and on streets approaching on-ramps.

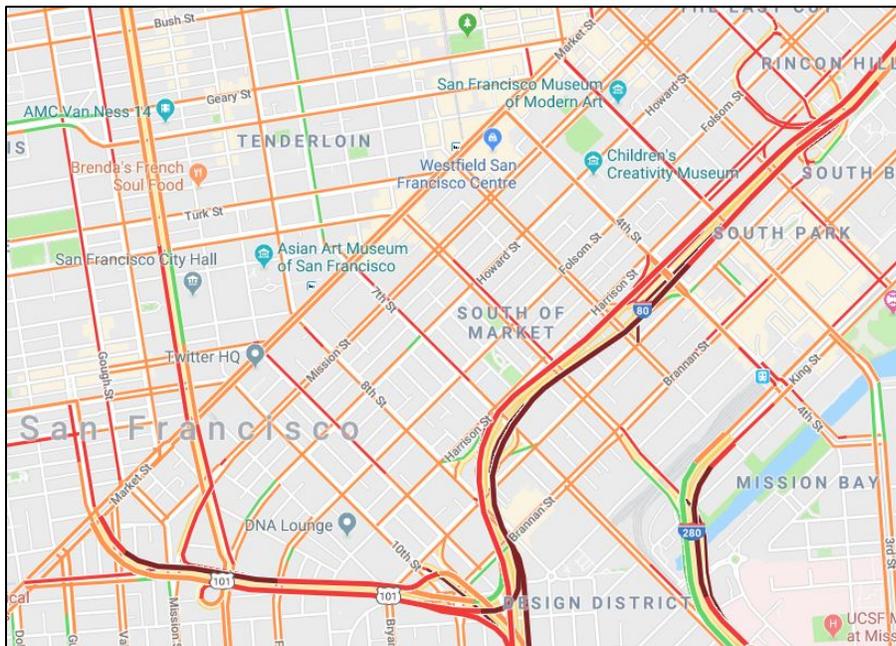
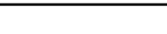
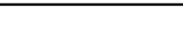
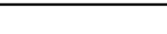


Figure 5: Typical Traffic in SoMa, PM Peak

Source: Google Maps, Typical Traffic Conditions, accessed April 2018.

Ramp Summary

Figure 6 illustrates how congestion affects ramps at the study intersections. The I-280 EB off-ramp onto 6th/Brannan Streets, US 101 NB off-ramp to 13th Street / Mission Street, I-80 WB off-ramp to Fremont Street, and I-80 EB on-ramp from 8th Street /Bryant Street experience the most severe traffic congestion during the day. The I-80 EB off-ramp to 7th Street / Bryant Street is shown as having no congestion, however there is moderate congestion upstream caused by the off-ramp at the midblock of 7th Street. Other ramp intersections experience moderate traffic congestion throughout the day.

| Traffic Conditions on Study Ramps | AM Peak (7-9am) | Off-Peak (12-2pm) | PM Peak (4-6pm) |
|--|---|--|---|
| US 101 NB Off-Ramp to 13th/Mission |  |  |  |
| US 101 SB On-Ramp from 13th/S Van Ness |  |  |  |
| I-80 WB Off-Ramp to 8th (Midblock) |  |  |  |
| I-80 EB On-Ramp from 8th/Bryant |  |  |  |
| I-80 WB On-Ramp to 7th/Harrison |  |  |  |
| I-80 EB Off-Ramp to 7th (Midblock) |  |  |  |
| I-80 EB Off-Ramp to 7th/Bryant |  |  |  |
| I-280 EB Off-Ramp to 6th/Brannan |  |  |  |
| I-280 WB On-Ramp from 6th/Brannan |  |  |  |
| I-80 EB On-Ramp to Harrison/Essex |  |  |  |
| I-80 WB Off-Ramp to Fremont |  |  |  |

Fast     Slow

Source: Google maps, "Typical Traffic Conditions," 2018

Figure 6: Typical Traffic Conditions on Study Intersection Ramps

3 Safety Analysis of Study Intersections and Corridors

This section analyzes the traffic collision history at the study intersections between 2012-2016 for injury collisions. The dataset includes collisions recorded by the San Francisco Police Department.

At least 133 injury collisions occurred at eight of the study intersections over this period. There were eight severe injury collisions and no fatal collisions during this time period within the study areas. Of the 10 study intersections, only the I-80 WB Off-Ramp / 8th Street midblock intersection did not have any recorded collisions during the study period. Data is not yet available for the newly constructed intersection at the I-80 WB Off-Ramp / Fremont Street intersection.

3.1 NETWORK COLLISION ANALYSIS

Figure 7 shows the different parties involved in the collisions. Slightly more than half (53 percent) of injury collisions involved only vehicles, 19 percent involved a vehicle and a pedestrian, 14 percent involved a vehicle and a cyclist, and seven percent involved a vehicle and a motorcycle/scooter. The “Other” category includes Bicycle / Pedestrian, Vehicle / Motorcycle / Bicycle, solo Vehicle, solo Motorcycle, and solo Bicycle collisions.

There were four collisions for which there was no associated police report.

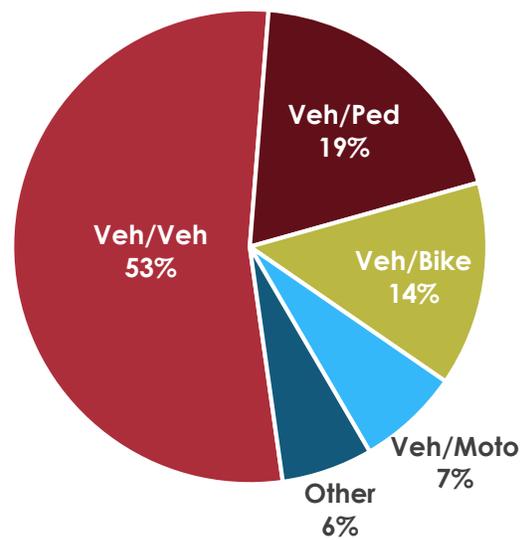


Figure 7: Collisions by Parties Involved

Figure 8 breaks down the different parties involved on an intersection level. Most incidents occur between vehicles, except

- The 7th Street (Midblock) / I-80 EB Off-Ramp intersection had a higher occurrence of vehicle-pedestrian collisions than vehicle-only collisions
- The Harrison Street / Essex Street / I-80 On/Off-Ramp intersection had no vehicle and pedestrian collisions
- The Bryant Street / 7th Street / I-80 EB Off-Ramp had no vehicle-bicycle collisions.

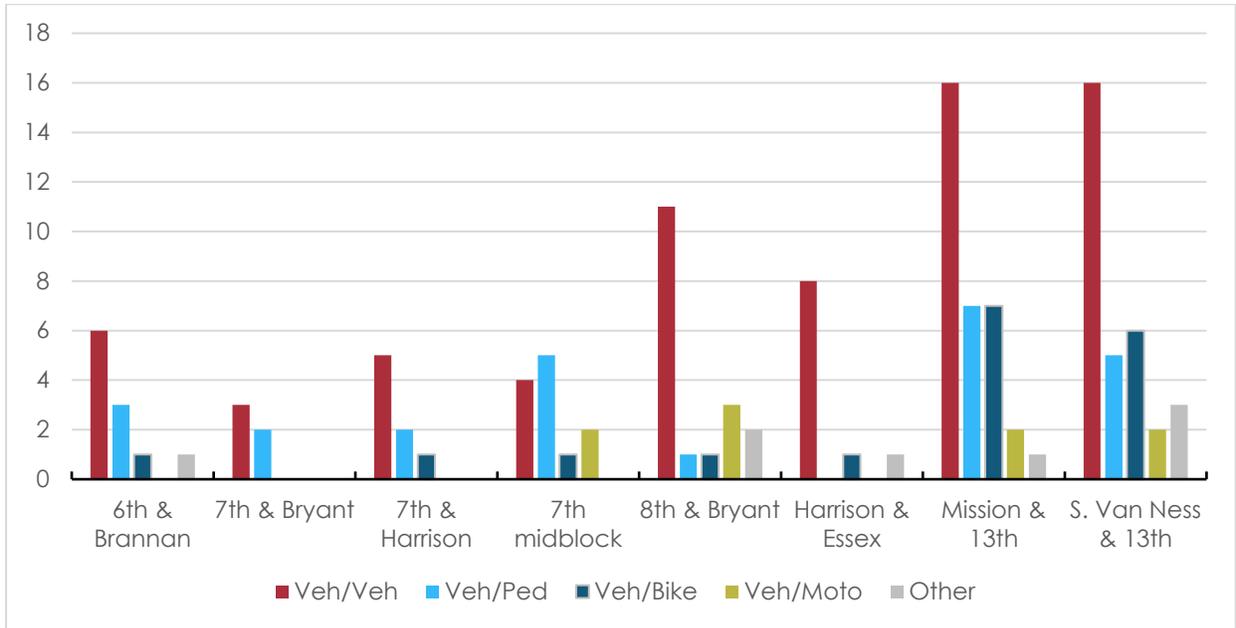


Figure 8: Collisions by Parties Involved by Intersection

Figure 9 and Figure 10 show the breakdown of collisions by type and by intersection. Broadside and rear-ends accounted for 63 percent of collisions. These two collision types could be indications of driver inattention, high vehicular speeds, low visibility of or not obeying signals, or poor sight distance. Broadside collisions were the greatest type of collision for all intersections other than 8th and Bryant Streets. At this intersection, there were twice as many rear-ends as there were broadside collisions. Sideswipe collisions are also a cause for concern as they account for 11 percent of the total collisions and could be caused by driver inattention, lane straddling, unsafe or last-second merging, or general confusion about lane configurations.

There were no direct trends or correlations found for collision rates between peak vs non-peak periods, weekdays vs weekends, by day of week, time of day, or weather conditions.

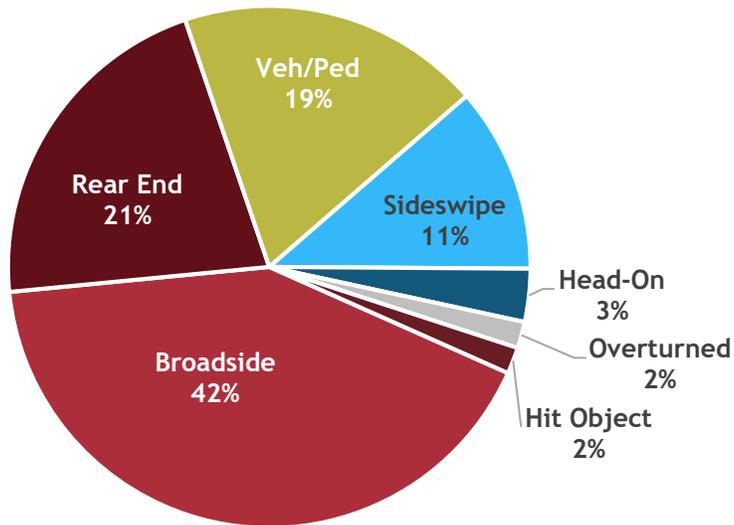


Figure 9: Collision Type for All Intersections

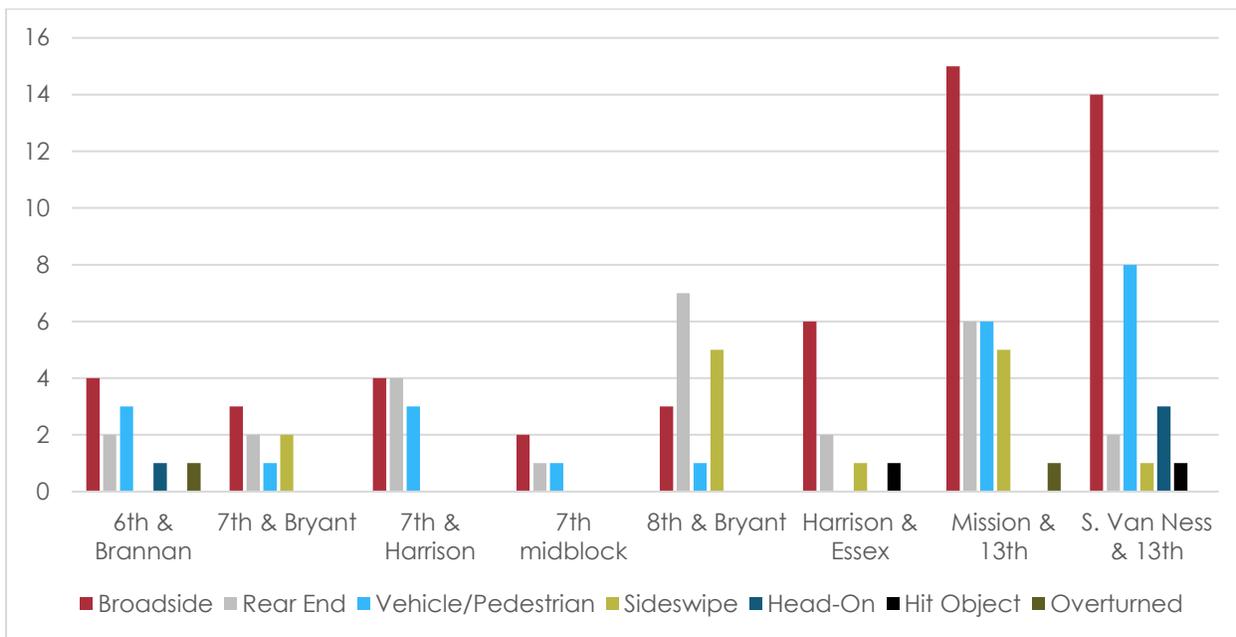


Figure 10: Collision Type by Intersection

3.2 INTERSECTION ANALYSIS

This section gives an existing conditions analysis of each of the study intersections, and includes the collision diagrams and collision summary. The party at fault is shown in red in the diagrams, and the date of each collision is also shown. There were 11 collision reports that did not contain enough information to be diagramed. These are shown in the tables of collisions in italics. "No report" is noted in the ID column for an additional four collisions.

3.2.1 MISSION STREET / 13TH STREET / US 101 NB OFF-RAMP

The following were the observed existing conditions at the intersection of Mission Street / 13th Street / US 101 NB Off-Ramp:

- No high-visibility crosswalks. Pedestrian crossings are wide and may require multiple signal phases to clear the intersection.
- No existing bicycle facilities along any approach
- The intersection is complex because it has more than four approaches, wide medians, staged pedestrian crossings, and turn prohibitions.
- Driver visibility of pedestrians at the off-ramp approaches is hindered by limited sight distance due to approach angle, bridge piers, and low lighting beneath the bridge.

Collision Analysis

The Mission Street / 13th Street / US 101 NB Off-Ramp intersection had the highest number of collisions (35) among the study intersections, with the majority occurring on the eastern half. The intersection also had the highest number of severe injury collisions. There were six collisions with cyclists where the cyclists were found at fault, half of which were due to red light violations. Four collisions occurred from vehicles making illegal left turns from northbound Mission onto westbound Duboce Avenue. Five collisions involving pedestrians occurred in the southeast corner, three involving vehicles making right turns.

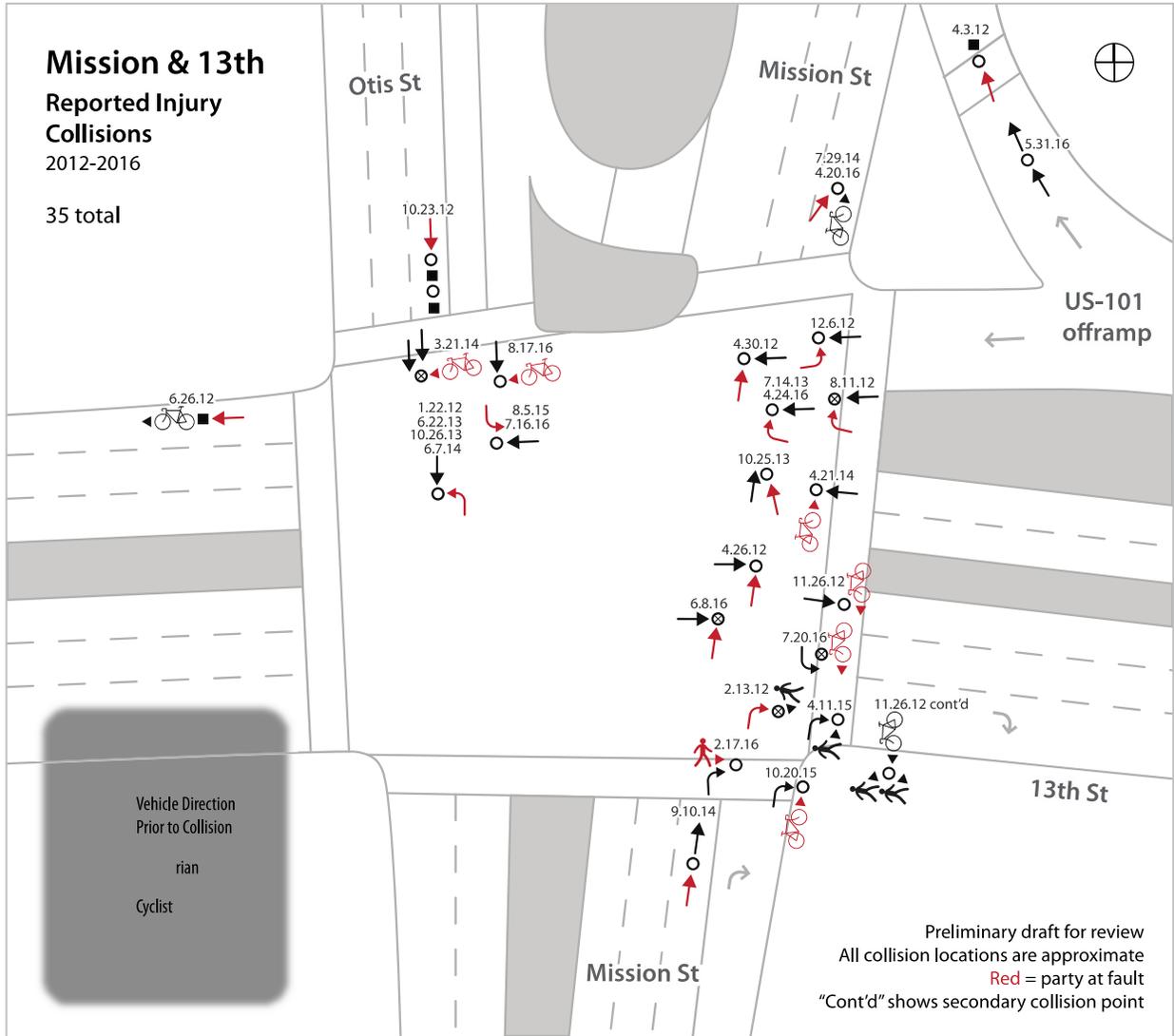


Figure 11: Collision Diagram for Mission Street / 13th Street / US 101 NB Off-Ramp

Table 2: Mission Street / 13th Street / US 101 NB Off-Ramp

| Date | Time | Parties Involved | Description | ID |
|----------|----------|----------------------------|--|-----------|
| 1/10/12 | 8:30 AM | Veh/Ped | Crossing between controlled intersections | 120029035 |
| 1/22/12 | 2:42 PM | Veh/Veh | Ambulance made an illegal left turn | 120059612 |
| 2/13/12 | 5:48 PM | Veh/Ped | Driver to yield right-of-way at crosswalks | 120124334 |
| 4/3/12 | 2:00 PM | Veh/Veh | Unsafe speed for prevailing conditions | 120265405 |
| 4/26/12 | 2:51 AM | Veh/Veh | Under the influence of alcohol or drug | 120329459 |
| 4/30/12 | 9:46 PM | Veh/Veh | SFPD vehicle w/ emergency lights on | 120344134 |
| 6/26/12 | 11:50 AM | Veh/Bicycle | Driver struck a bicycle from behind | 120502495 |
| 8/11/12 | 1:18 PM | Veh/Motorcycle | Driver made an illegal right turn | 120636323 |
| 10/5/12 | 8:45 PM | Veh/Ped | Red signal - pedestrian responsibilities | 120800493 |
| 10/23/12 | 12:57 PM | Veh/Veh/Veh | Unsafe speed for prevailing conditions | 120854064 |
| 11/21/12 | 9:50 AM | | | No report |
| 11/26/12 | 10:50 AM | Veh/Bicycle | Red signal - bicycle responsibilities | 120955496 |
| 12/6/12 | 8:54 PM | Veh/Veh | Violating special traffic control markers | 120985697 |
| 6/22/13 | 1:38 PM | Veh/Veh | Red signal - driver responsibilities | 130513040 |
| 7/14/13 | 8:46 AM | Veh/Veh | Violating special traffic control markers | 130578163 |
| 10/25/13 | 4:39 PM | Veh/Veh | Failure to use specified lanes | 130906542 |
| 10/26/13 | 4:23 PM | Veh/Veh | Violating special traffic control markers | 130909295 |
| 3/21/14 | 5:21 PM | Veh/Motorcycle/ Bicycle | Red signal - bicyclist responsibilities | 140240233 |
| 4/21/14 | 7:58 AM | Veh/Bicycle | Red signal - bicyclist responsibilities | 140329768 |
| 6/7/14 | 6:40 PM | Veh/Veh | Violating special traffic control markers | 140475082 |
| 7/29/14 | 9:34 AM | Veh/Bicycle | Unsafe turn or lane change prohibited | 140628833 |
| 9/10/14 | 2:10 AM | Veh/Veh | Unsafe speed for prevailing conditions | 140763984 |
| 4/11/15 | 7:33 PM | Veh/Ped | Unknown | 150314345 |
| 8/5/15 | 6:39 PM | Veh/Motorcycle | Red signal - driver responsibilities | 150681683 |

| Date | Time | Parties Involved | Description | ID |
|----------|----------|------------------|--|-----------|
| 10/20/15 | 4:57 PM | Veh/Ped | Bicycle entering into vehicle path | 150917927 |
| 2/17/16 | 8:15 PM | Veh/Ped | Pedestrian suddenly entering into vehicle path close enough to create an immediate hazard | 160143338 |
| 4/20/16 | 7:09 PM | Veh/Bicycle | Unsafe passing on right shoulder | 160325285 |
| 4/24/16 | 10:15 PM | Veh/Veh | Violating special traffic control markers | 160337484 |
| 5/31/16 | 10:45 AM | Veh/Veh | Unsafe speed for prevailing conditions | 160444108 |
| 6/8/16 | 7:24 PM | Veh/Veh | Under the influence of alcohol or drug | 160468073 |
| 6/22/16 | 9:25 PM | Veh/Ped | <i>Pedestrian suddenly entering into vehicle path close enough to create an immediate hazard</i> | 160507621 |
| 7/16/16 | 11:45 PM | Veh/Veh | Red signal - driver responsibilities | 160572840 |
| 7/20/16 | 1:10 PM | Veh/Bicycle | Red Signal - bicyclist responsibilities | 160585382 |
| 8/17/16 | 12:44 PM | Veh/Bicycle | Red signal - bicyclist responsibilities | 160664378 |
| 11/30/16 | 12:42 PM | | | No Report |

3.2.2 SOUTH VAN NESS AVENUE / 13TH STREET / US 101 SB ON-RAMP

The following were the observed existing conditions at the intersection of South Van Ness Avenue / 13th Street / US 101 SB On-Ramp:

- Crosswalks are not the high-visibility type.
- The sidewalk on the south side of EB 13th Street requires pedestrians to cross to the east side of South Van Ness.
- The intersection is wide, which increases exposure to oncoming traffic for pedestrians, bicyclists, and vehicles.
- Due to the intersection width, traffic signals are far away and difficult to see clearly. There are few nearside traffic signals to supplement the primary signal heads.
- No existing bicycle facilities along any approach
- Vehicles on SB South Van Ness Avenue were recorded disregarding the “No Left Turn 4-6PM” restriction.
- The pork-chop island at the southwest corner does not have detectable warning surfaces.
- Bridge piers located within the pedestrian refuges tend to obstruct the pedestrian path.

Collision Analysis

The South Van Ness Avenue / 13th Street / US 101 SB On-Ramp intersection had a very high number of collisions (32). Most occurred in the central area of the intersection, with several due to red light violations and unsafe lane changing or turning. Most vehicles found at fault were heading southbound on South Van Ness or eastbound on 13th Street. Four cyclists were found at fault for collisions within or near crosswalks.

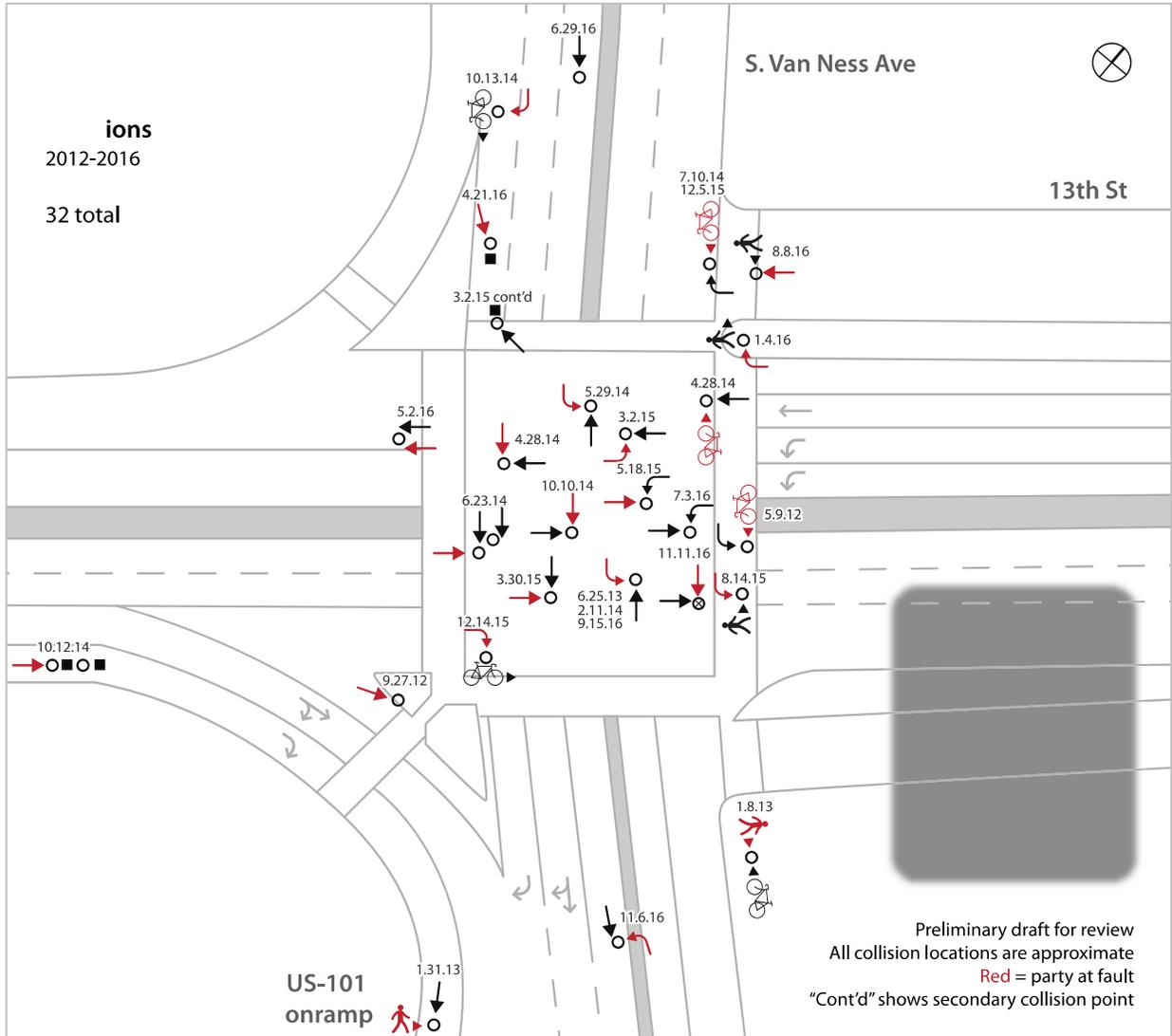


Figure 12: Collision Diagram for South Van Ness Avenue / 13th Street / US 101 SB On-Ramp

Table 3: South Van Ness Avenue / 13th Street / US 101 SB On-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|----------|----------|------------------|---|-----------|
| 5/9/12 | 10:27 AM | Veh/Bicycle | Bicyclist to yield right-of-way at crosswalks | 120368316 |
| 9/27/12 | 12:13 AM | Motorcycle | Unknown | 120773919 |
| 1/8/13 | 4:32 PM | Bicycle/Ped | Bicycle to travel in same direction as vehicles | 130021413 |
| 1/11/13 | 8:43 PM | Veh/Veh | Unsafe speed for prevailing conditions | 130038985 |
| 1/31/13 | 8:59 PM | Veh/Ped | Crossing between controlled intersections | 130089530 |
| 6/25/13 | 2:24 AM | Veh/Veh | Red signal - driver responsibilities | 130522336 |
| 2/11/14 | 9:05 AM | Veh/Motorcycle | Violation of right-of-way - left turn | 140122891 |
| 4/28/14 | 5:54 AM | Veh/Veh | Red signal - driver responsibilities | 140350644 |
| 4/28/14 | 2:13 AM | Veh/Bicycle | Red signal - bicyclist responsibilities | 140353240 |
| 5/29/14 | 8:19 PM | Veh/Veh | Unsafe turn prohibited | 140449792 |
| 6/23/14 | 2:05 AM | Veh/Veh/Veh | Red signal - driver responsibilities | 140519179 |
| 7/10/14 | 6:30 PM | Veh/Bicycle | Operating bicycle on sidewalk prohibited | 140573852 |
| 10/10/14 | 11:22 AM | Veh/Veh | Red signal - driver responsibilities | 140855901 |
| 10/12/14 | 11:26 AM | Veh/Veh/Veh | Unsafe speed for prevailing conditions | 140863277 |
| 10/13/14 | 2:15 PM | Veh/Bicycle | Turn at intersection from wrong position | 140865693 |
| 3/2/15 | 2:28 PM | Veh/Veh/Veh | Violation of right-of-way - left turn | 150189869 |
| 3/30/15 | 2:30 PM | Veh/Veh | Red signal - driver responsibilities | 150279658 |
| 5/18/15 | 9:40 AM | Veh/Veh | Red signal - driver responsibilities | 150431977 |
| 8/14/15 | 5:54 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 150708306 |
| 12/3/15 | 2:23 PM | Veh/Bicycle | Bicycle to travel in same direction as vehicles | 151048240 |
| 12/14/15 | 7:55 AM | Veh/Bicycle | Unsafe turn or lane change prohibited | 151078269 |
| 1/4/16 | 8:30 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 160012880 |
| 4/21/16 | 11:20 PM | Veh/Veh | Unsafe turn or lane change prohibited | 160329215 |
| 5/2/16 | 3:20 PM | Veh/Veh | Violating special traffic control markers | 160362356 |
| 6/29/16 | 7:44 PM | Moto | Unknown | 160528401 |

| Date | Time | Parties Involved | Description | ID |
|-----------------|----------|------------------|---|-----------|
| 7/3/16 | 7:03 PM | Veh/Veh | Red signal - driver responsibilities | 160539408 |
| 8/8/16 | 6:09 PM | Veh/Ped | Driver to yield right-of-way at crosswalks | 160639713 |
| 9/15/16 | 11:24 AM | Veh/Veh | Violation of right-of-way - left turn | 160749823 |
| 10/24/16 | 11:00 AM | Veh/Veh/Veh | Unsafe speed for prevailing conditions | 160865792 |
| 11/6/16 | 11:19 AM | Veh/Moto | Unsafe turn or lane change prohibited | 160904265 |
| 11/7/16 | 7:45 AM | Veh/Ped | Pedestrian suddenly entering into vehicle path close enough to create an immediate hazard | 160907162 |
| 11/11/16 | 11:45 PM | Veh/Veh | Red signal - driver responsibilities | 160912365 |

3.2.3 8TH STREET (MIDBLOCK) / I-80 WB OFF-RAMP

The following were the observed existing conditions at the intersection of 8th Street (Midblock) / I-80 EB Off-Ramp:

- Intersection is yield controlled
- Shrubbery and the approach angle obstruct the visibility of pedestrians in the southeast corner from drivers approaching from the off-ramp.

Collision Analysis

There were no collisions recorded at this location during the study period.

3.2.4 BRYANT STREET / 8TH STREET / I-80 EB ON-RAMP

The following were the observed existing conditions at the intersection of Bryant Street / 8th Street / I-80 EB On-Ramp:

- The bike lane on NB 8th Street, upstream of Bryant, discontinues at the bus stop; there are no queuing areas marked for bicyclists at the intersection
- Vehicles were observed entering the tow-away lane at high speed to cut ahead of queued traffic.
- There is a pedestrian crossing closed across the north leg of Bryant Street
- Due to the intersection width, traffic signals are far away and difficult to see clearly. There are few nearside traffic signals to supplement the primary signal heads.
- There is no sidewalk on the north side of Bryant Street east of 8th Street and no crosswalk across the on-ramp.
- The pedestrian passageway at the southeast corner is obstructed by the bridge columns and, at times, a homeless encampment.
- There appears to be excess vehicle capacity for through traffic on 8th Street.
- During heavy congestion, vehicles try to merge onto the freeway from the non-“freeway-only” lanes

Collision Analysis

The Bryant Street / 8th Street / I-80 EB On-Ramp intersection saw a total of 19 collisions including many collisions between vehicles as a result of unsafe speed. Several collisions occurred from vehicles at fault that were heading SB on 8th. In three collisions, at fault vehicles attempted to avoid the forced freeway onramp and collided with other vehicles.

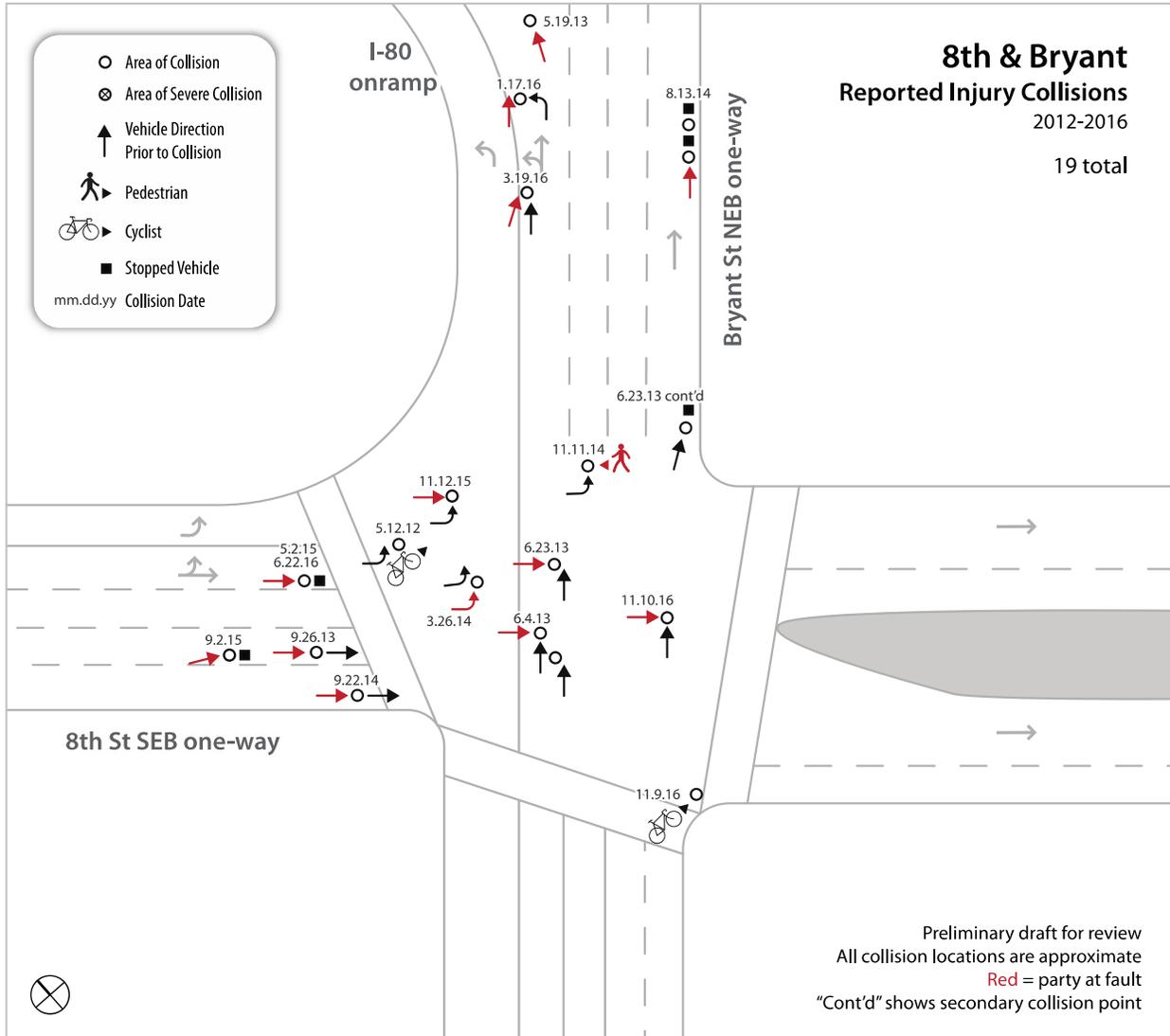


Figure 13: Collision Diagram for Bryant Street / 8th Street / I-80 EB On-Ramp

Table 4: Bryant Street / 8th Street / I-80 EB On-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|-------------|-------------|-------------------------|---|-----------|
| 5/12/12 | 11:40 AM | Veh/Bicycle | Failure to use specified lanes | 120377408 |
| 5/19/13 | 1:35 PM | Veh | Drunk driver collided with pillar | 130411789 |
| 6/4/13 | 1:54 PM | Veh/Veh/Veh | Red signal - driver responsibility | 130460504 |
| 6/23/13 | 12:14 AM | Veh/Veh/Veh | Red signal - driver responsibility | 130514543 |
| 9/26/13 | 2:25 AM | Veh/Veh | Unsafe speed for prevailing conditions | 130813414 |
| 3/26/14 | 10:00 AM | Veh/Motorcycle | Violating special traffic control markers | 140253496 |
| 5/1/14 | 2:22 AM | Veh/Veh | Following too closely prohibited | 140361588 |
| 8/13/14 | 3:41 PM | Veh/Veh/Veh | Unsafe speed for prevailing conditions | 140676525 |
| 9/22/14 | 12:36 PM | Veh/Veh | Unsafe speed for prevailing conditions | 140799644 |
| 11/11/14 | 9:50 PM | Veh/Ped | Crossing between controlled intersections | 140957507 |
| 5/2/15 | 2:00 AM | Veh/Veh | Unsafe speed for prevailing conditions | 150380879 |
| 9/2/15 | 4:00 PM | Veh/Motorcycle | Unsafe speed for prevailing conditions | 150770606 |
| 11/12/15 | 8:20 AM | Veh/Motorcycle | Violating special traffic control markers | 150985407 |
| 1/17/16 | 12:00 PM | Veh/Veh | Failure to use specified lanes | 160046920 |
| 2/17/16 | 10:40 AM | | | No report |
| 3/19/16 | 5:04 PM | Veh/Veh | Unsafe turn or lane change prohibited | 160231165 |
| 6/22/16 | 3:30 PM | Veh/Veh | Following too closely prohibited | 160506811 |
| 11/8/16 | 4:46 PM | Bicycle | Solo bicycle accident | 160911000 |
| 11/10/16 | 6:24 PM | Veh/Veh | Red signal - driver responsibility | 160916953 |

3.2.5 HARRISON STREET / 7TH STREET / I-80 WB ON-RAMP

The following were the observed existing conditions at the intersection of Harrison Street / 7th Street / I-80 WB On-Ramp:

- There is a closed pedestrian crossing across the west leg of Harrison Street.
- Large corner curb radii at the southwest corner.
- A lack of nearside traffic signals.

Collision Analysis

The Harrison Street / 7th Street / I-80 WB On-Ramp intersection experienced thirteen total collisions and a relatively high number of collisions involving pedestrians (four). Many collisions were due to red light violations or unsafe speed.

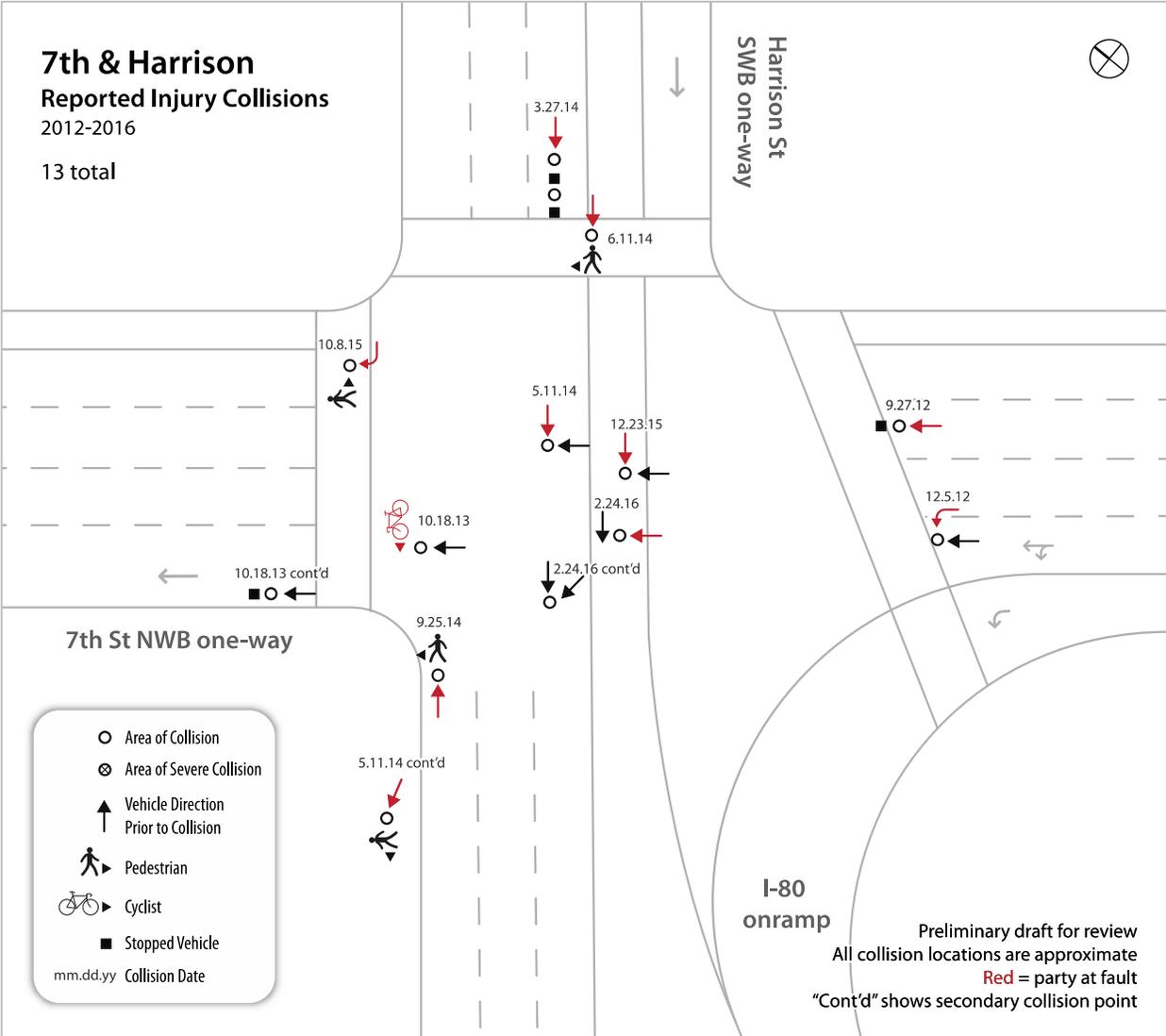


Figure 14: Collision Diagram for Harrison Street / 7th Street / I-80 WB On-Ramp

Table 5: Harrison Street / 7th Street / I-80 WB On-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|----------|----------|--------------------|--|-----------|
| 9/27/12 | 4:40 PM | Veh/Veh | Following too closely prohibited | 120775909 |
| 12/5/12 | 2:45 PM | Veh/Veh | Unsafe turn or lane change prohibited | 120980409 |
| 10/18/13 | 9:05 AM | Veh/Veh/Bicycle | Red signal - bicyclist responsibility | 130882146 |
| 12/29/13 | 1:50 AM | Veh/Veh | Under the influence of alcohol or drug | 131091548 |
| 3/27/14 | 3:49 PM | Veh/Veh/Motorcycle | Unsafe speed for prevailing conditions | 140257501 |
| 5/11/14 | 4:20 PM | Veh/Veh/Ped | Red signal - driver responsibility | 140395509 |
| 6/11/14 | 1:28 PM | Veh/Ped | Unsafe speed for prevailing conditions | 140485348 |
| 9/25/14 | 10:45 AM | Veh/Ped | Unsafe starting or backing on highway | 140808483 |
| 10/8/15 | 2:17 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 150882079 |
| 12/22/15 | | | Unsafe speed for prevailing conditions | No report |
| 12/23/15 | 1:03 AM | Veh/Motorcycle | Red signal - driver responsibilities | 151104290 |
| 1/4/16 | 7:00 PM | Veh/Ped | Unknown - Later Report | 160018703 |
| 2/23/16 | 11:25 AM | Veh/Veh/Veh | Red signal - driver responsibilities | 160158967 |

3.2.6 7TH STREET (MIDBLOCK) / I-80 EB OFF-RAMP

The following were the observed existing conditions at the intersection of 7th Street (Midblock) / I-80 EB Off-Ramp:

- Intersection is yield controlled with two off-ramp approach lanes, creating a multiple-threat crossing for pedestrians.
- Pedestrians at the northwest corner have limited sight distance from approaching vehicles in the leftmost lane of the off-ramp.
- The off-ramp intersects 7th Street at a low-approach angle, which encourages higher speeds and reduces sight lines of the driver.

Collision Analysis

7th midblock between Harrison and Bryant saw five collisions. All were clustered in the same area, where the vehicles exit the offramp and must yield to cross traffic. In two collisions, pedestrians were struck in an area of the intersection where visibility is limited for vehicles exiting the offramp.

The 7th Street Midblock off-ramp and 8th Street Midblock off-ramp are very similar in design. The 8th Street Midblock off-ramp, however, has no collisions recorded during the study period compared to the five collisions for 7th Street. One possible reason for this difference is because the 8th Street ramp is a single-lane approach, while the 7th Street ramp is a two-lane approach.

7th Midblock

Reported Injury Collisions

2012-2016

5 total

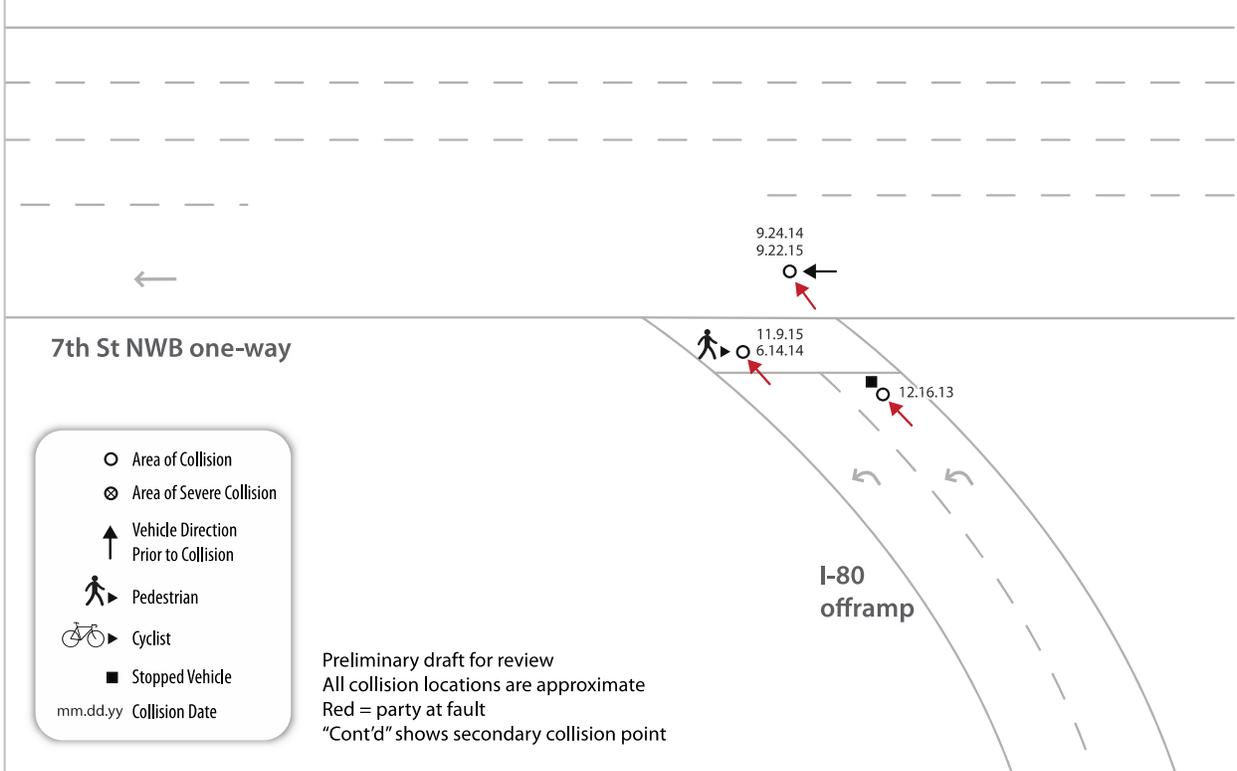


Figure 15: Collision Diagram for 7th Street (Midblock) / I-80 EB Off-Ramp

Table 6: 7th Street (Midblock) / I-80 EB Off-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|----------|----------|------------------|--|-----------|
| 12/16/13 | 9:40 PM | Veh/Veh | Unsafe speed for prevailing conditions | 131057697 |
| 6/14/14 | 8:22 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 140493006 |
| 9/24/14 | 9:13 AM | Veh/Veh | Driver to yield to cross-traffic | 140805558 |
| 9/22/15 | 10:16 AM | Veh/Veh | Driver to yield to cross-traffic | 150831333 |
| 11/9/15 | 10:58 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 150976973 |

3.2.7 BRYANT STREET / 7TH STREET / I-80 EB OFF-RAMP

The following conditions were observed at the intersection of Bryant Street / 7th Street / I-80 EB Off-Ramp:

- The intersection is wide, which increases exposure to oncoming traffic for pedestrians, bicyclists, and vehicles
- The bike lane on NB 7th Street does not have protection and there can be conflicts between right-turning traffic and bicyclists at the intersection
- Crosswalks are not the high-visibility type
- The east crossing is especially long and crosses two different EB approaches (from Bryant & I-80 off-ramp)
- Due to the intersection width, traffic signals are far away and difficult to see clearly. There are few nearside traffic signals to supplement the primary signal heads.
- The curb ramp at the northwest corner of the intersection does not meet current ADA standards (no truncated domes)

Collision Analysis

The Bryant Street / 7th Street / I-80 EB Off-Ramp intersection had eight collisions. There were two vehicle vs pedestrian collisions in the same area at the southeast corner. In both cases the at fault vehicle was making a right turn from 7th onto Bryant. There was one bicyclist-involved incident.

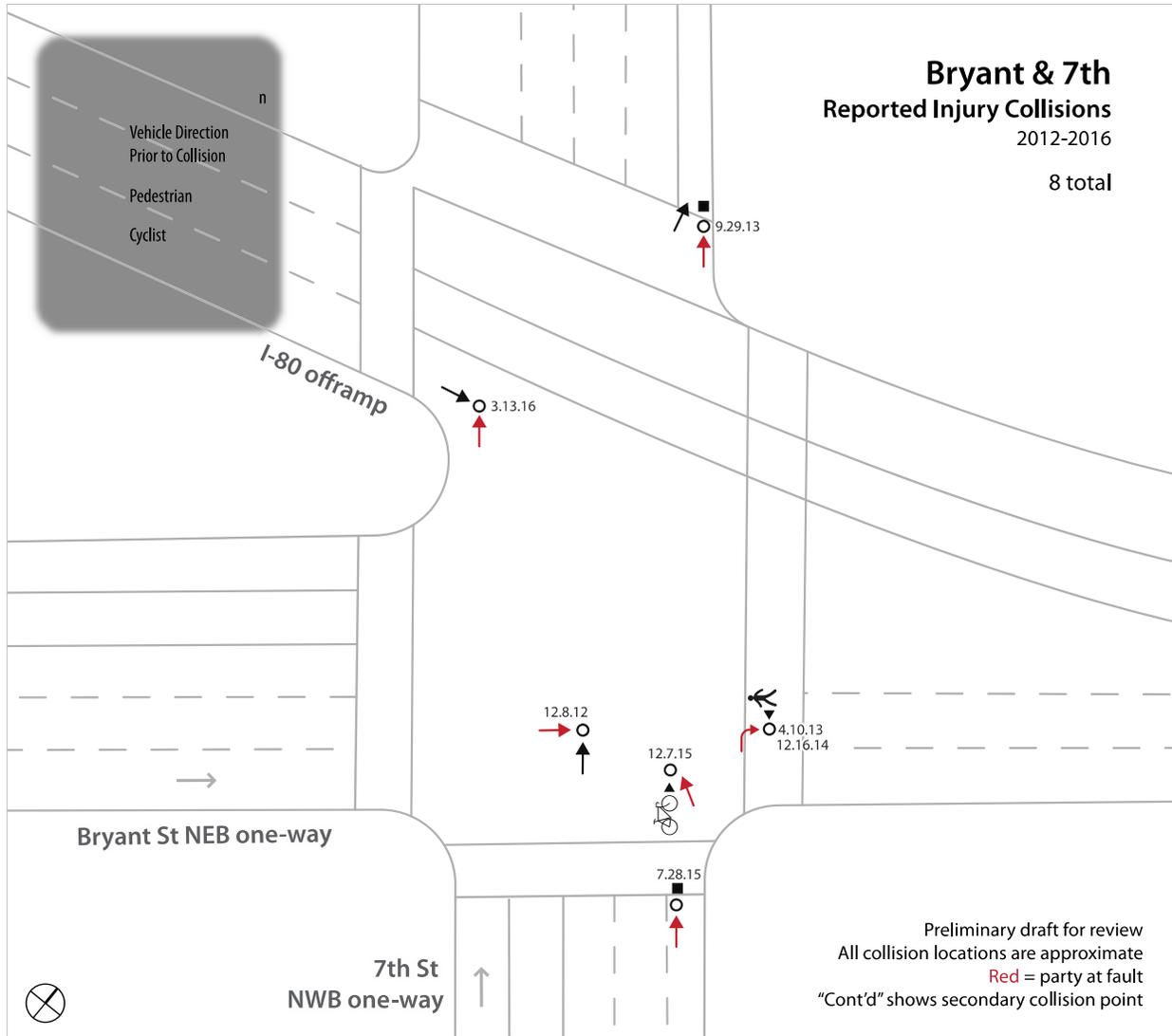


Figure 16: Collision Diagram for Bryant Street / 7th Street / I-80 EB Off-Ramp

Table 7: Bryant Street / 7th Street / I-80 EB Off-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|----------|---------|------------------|--|-----------|
| 12/8/12 | 4:32 AM | Veh/Veh | Red signal - driver responsibility | 120989354 |
| 4/10/13 | 2:49 PM | Veh/Ped | Driver to yield right-of-way at crosswalks | 130293208 |
| 9/29/13 | 4:36 AM | Veh/Veh/Veh | Unsafe speed for prevailing conditions | 130820776 |
| 12/16/14 | 1:20 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 141036170 |
| 7/28/15 | 3:59 PM | Veh/Veh | Unknown | 150656965 |
| 12/7/15 | 7:39 AM | Veh/Bicycle | Unsafe turn or lane change prohibited | 151057962 |
| 3/13/16 | 5:09 PM | Veh/Veh | Red signal - driver responsibilities | 160212767 |
| 4/27/16 | 4:40 PM | Veh/Veh | Unknown - Later Report | 160347405 |

3.2.8 BRANNAN STREET / 6TH STREET / I-280 ON/OFF-RAMP

The following were the observed existing conditions at the intersection of Brannan Street / 6th Street / I-280 On/Off-Ramp:

- There are no existing bicycle facilities along any approach.
- Crosswalks are not the high-visibility type and are faded. The pedestrian crossing at the south (I-280) approach is closed.
- The approaches along Brannan & 6th Street have no nearside traffic signals.
- The corner curb radii at the I-280 approach are very large.
- Existing curb ramps do not meet current ADA standards.
- The sight distance at the SE corner of pedestrians crossing the east side of the intersection is very limited for approaching off-ramp vehicles.

Collision Analysis

The Brannan Street / 6th Street / I-280 On/Off-Ramp intersection saw eleven total collisions, including three vehicle vs pedestrian collisions in the southeast corner of the intersection. In all three collisions, the vehicle exiting the I-280 offramp and making a right turn onto Brannan was found at fault. The large corner curb radii, shrubbery, and the large changeable message sign pole obstructs the visibility of pedestrians to approaching vehicles at this corner.

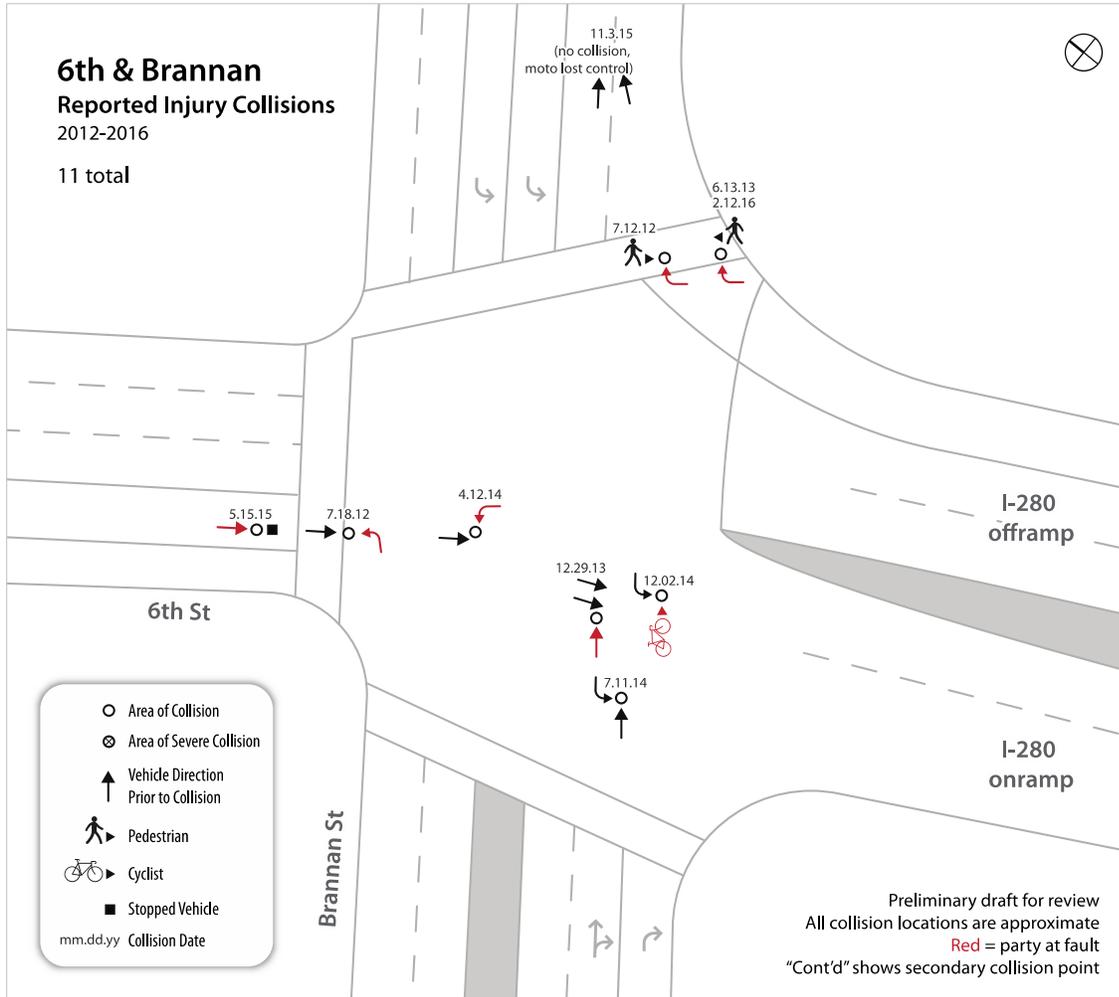


Figure 17: Collision Diagram for Brannan Street / 6th Street / I-280 On/Off-Ramp

Table 8: Brannan Street / 6th Street / I-280 On/Off-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|----------|---------|------------------|--|-----------|
| 3/14/12 | 4:41 PM | Veh/Veh | Unsafe speed for prevailing conditions | 120211088 |
| 7/12/12 | 4:35 PM | Veh/Ped | Driver to yield right-of-way at crosswalks | 120549873 |
| 7/18/12 | 9:02 PM | Veh/Veh | Violating special traffic control markers | 120568306 |
| 6/13/13 | 8:33 AM | Veh/Ped | Unknown | 130486102 |
| 12/29/13 | 4:34 PM | Veh/Veh/Veh | Red signal - driver responsibility | 131092881 |
| 4/12/14 | 2:22 AM | Veh/Veh | Violating special traffic control markers | 140304936 |
| 7/11/14 | 3:55 PM | Veh/Veh | Unknown | 140576184 |
| 12/2/14 | 7:18 PM | Veh/Bicycle | Red signal - bicyclist responsibility | 141018338 |
| 5/15/15 | 3:56 PM | Veh/Veh | Unsafe speed for prevailing conditions | 150423316 |
| 11/3/15 | 8:29 AM | Motorcycle | Solo motorcycle accident | 150959634 |
| 2/12/16 | 8:00 AM | Veh/Ped | Driver to yield right-of-way at crosswalks | 160126726 |

3.2.9 HARRISON STREET / ESSEX STREET / I-80 EB ON-RAMP

The following were the observed existing conditions at the intersection of Harrison Street / Essex Street / I-80 EB On-Ramp:

- Large intersection geometry.
- Crosswalks are not the high-visibility type.
- There are closed pedestrian crossings at the south and west approaches.
- Due to the intersection width, traffic signals are far away and difficult to see clearly. There are few nearside traffic signals to supplement the primary signal heads.
- The existing bridge piers obstruct SB Essex vehicles from seeing WB Harrison Street traffic, and vice-versa.
- There are no existing bicycle facilities along any approach.
- Vehicles on EB Harrison were observed entering the Bus-Only Lane to bypass queues on the I-80 on-ramp

Collision Analysis

The ten collisions at Harrison Street / Essex Street / I-80 EB On-Ramp were relatively clustered in the western portion of the intersection. Many were broadside collisions resulting from a red-light violation or unsafe speed. All but one collision involved only vehicles.

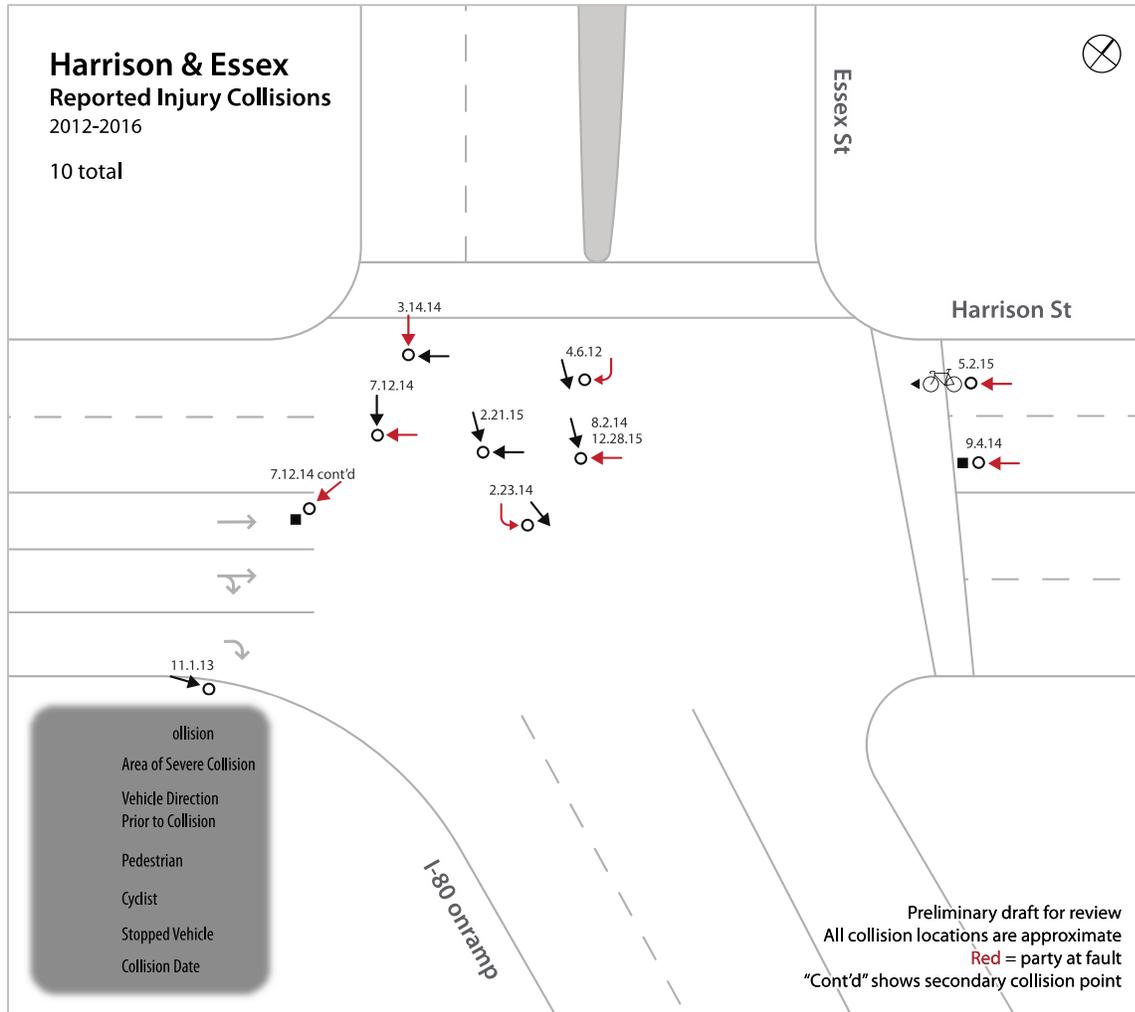


Figure 18: Collision Diagram for Harrison Street / Essex Street / I-80 EB On-Ramp

Table 9: Harrison Street / Essex Street / I-80 EB On-Ramp Collision Summary

| Date | Time | Parties Involved | Description | ID |
|-----------------|-------------|-------------------------|---------------------------------------|-----------|
| 4/6/12 | 8:49 AM | Veh/Veh | Unsafe turn or lane change prohibited | 120273505 |
| 11/1/13 | 12:20 AM | Veh | Improper Turning | 130926506 |
| 2/23/14 | 8:11 PM | Veh/Veh | Unsafe turn or lane change prohibited | 140160562 |
| 3/14/14 | 7:50 PM | Veh/Veh | Red signal - driver responsibilities | 140219012 |
| 7/12/14 | 11:55 AM | Veh/Veh/Veh | Red signal - driver responsibilities | 140578517 |
| 8/2/14 | 4:34 PM | Veh/Veh | Unsafe Speed | 140642479 |
| 9/4/14 | 9:14 AM | Veh/Veh | Unsafe Speed | 140744047 |
| 2/21/15 | 8:25 PM | Veh/Veh | Unknown - Red Light | 150161481 |
| 5/2/15 | 2:15 PM | Veh/Bicycle | Unsafe Speed | 150381924 |
| 12/28/15 | 1:45 PM | Veh/Veh | Unsafe Speed | 151116825 |

3.2.10 FREMONT STREET / I-80 WB OFF-RAMP

The following were the observed existing conditions at the intersection of Fremont Street / I-80 WB Off-Ramp:

- Crosswalks are not the high-visibility type.
- There are no pedestrian crossings marked across Fremont Street, despite public walkways through new developments on either side of the intersection that create a pedestrian desire line across Fremont Street.
- There are no existing bicycle facilities along Fremont Street
- “No Turn on Red” signs are placed on the far side of the intersection and hard to see.

Collision Analysis

There was no collision data for this location during the study period because the intersection is relatively newly constructed.

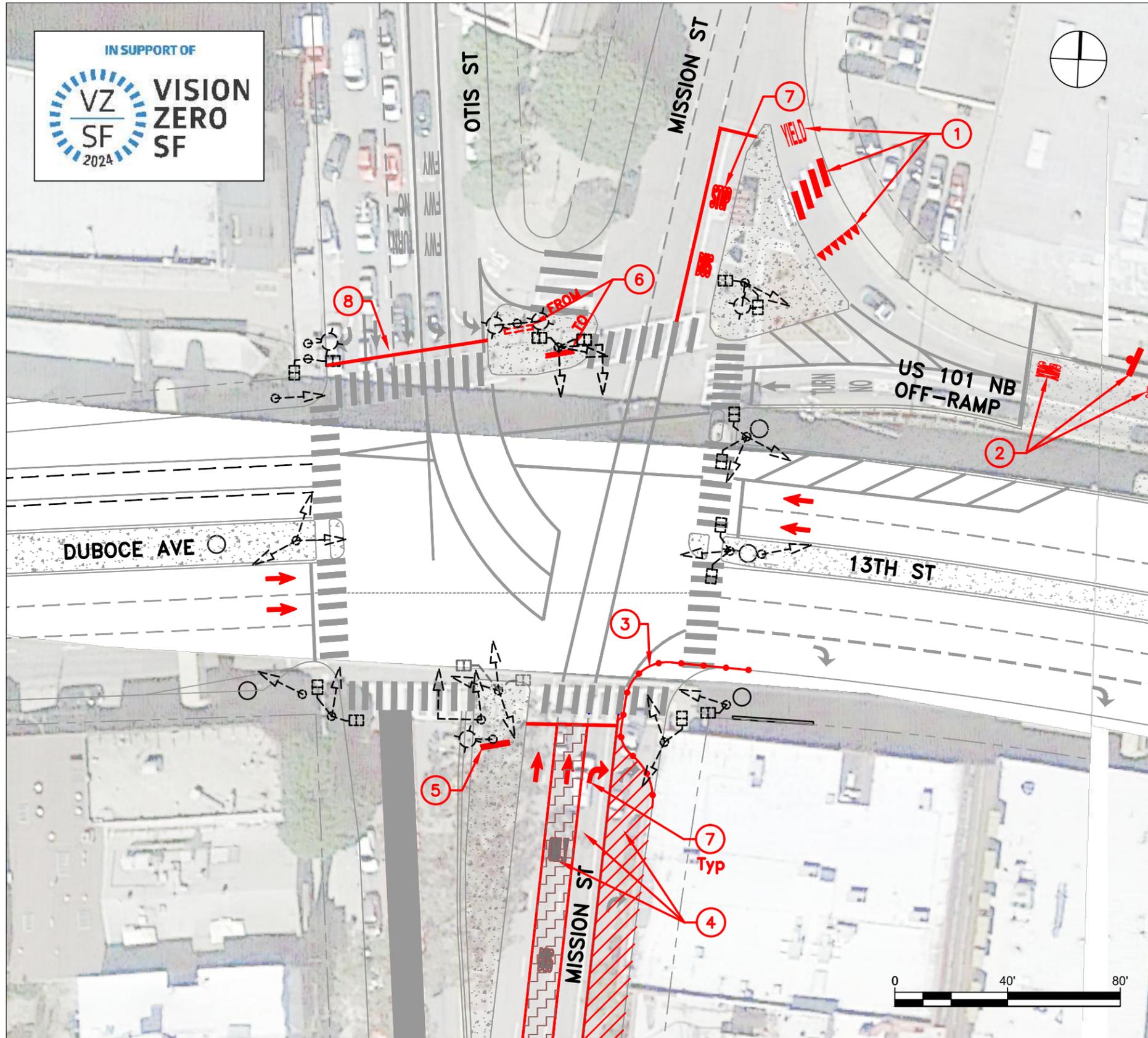
APPENDIX C

Technical Drawings



San Francisco
County Transportation
Authority





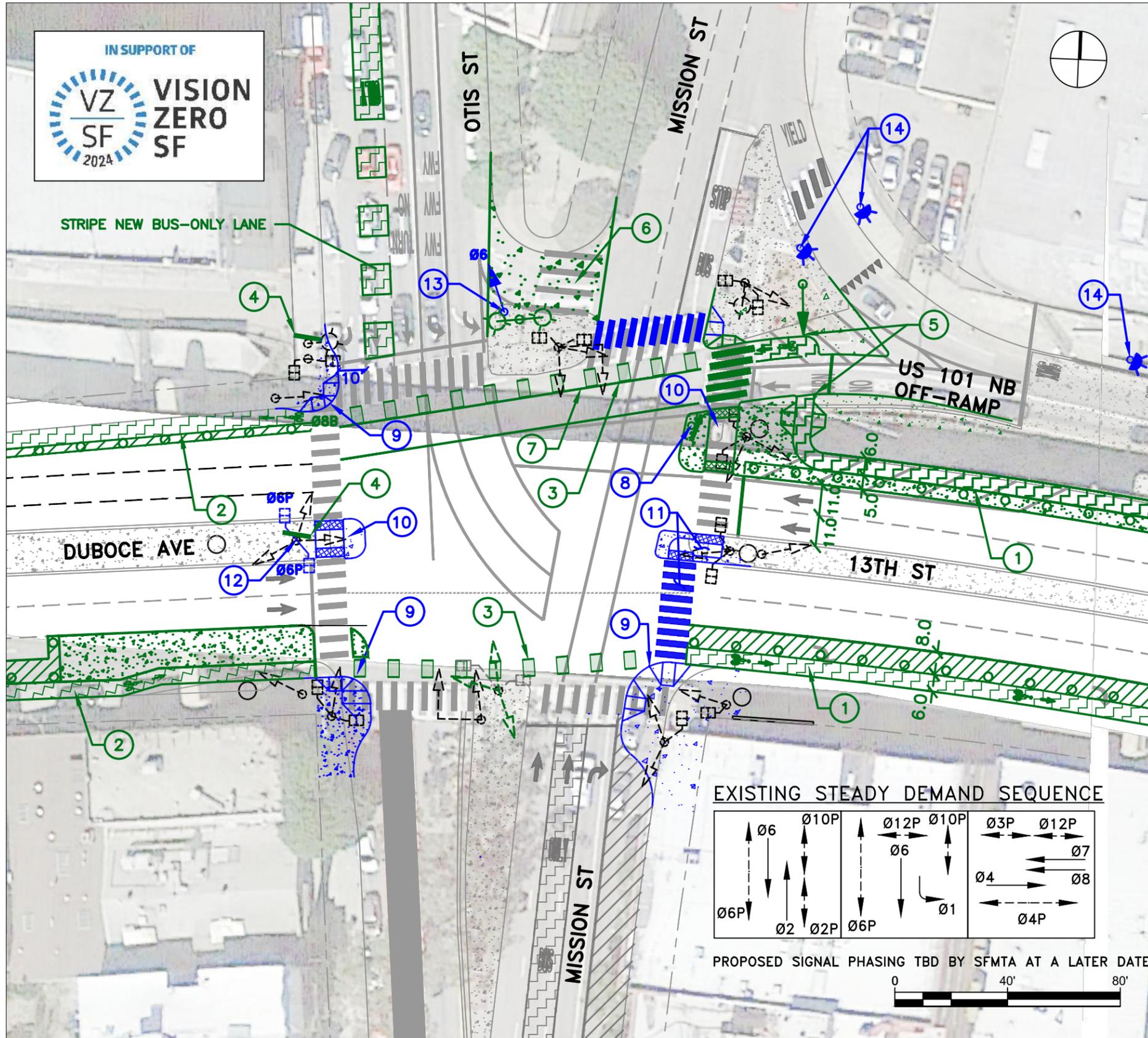
RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① YIELD LINE, YIELD STENCIL, AND CONTINENTAL CROSSWALK (IMPLEMENTED BY CALTRANS IN 2018)
- ② STRIPE "PED XING" PAVEMENT MARKINGS IN ADVANCE OF CROSSING. INSTALL "PEDESTRIAN CROSSING AHEAD" WARNING SIGN AND PLAQUE. REQUIRES CALTRANS APPROVAL
- ③ INSTALL BULB-OUT USING TEMPORARY MATERIALS (E.G. DELINEATORS AND PAINT) FOR NEAR-TERM IMPLEMENTATION
- ④ CONVERT #2 LANE TO BUS-ONLY LANE. CONVERT #3 LANE TO RIGHT-TURN-ONLY LANE AND REMOVE #4 LANE. LANE RECONFIGURATIONS MAY REQUIRE SHIFTING OF OVERHEAD MUNI LINES. NEW BUS LANE REQUIRES FURTHER STUDY
- ⑤ INSTALL ADDITIONAL NEAR-SIDE "NO LEFT TURN" SIGN
- ⑥ RELOCATE FARSIDE "NO LEFT TURN" SIGN TO SIGNAL POLE
- ⑦ STRIPE PAVEMENT MARKING ARROWS TO REINFORCE LANE ASSIGNMENT
- ⑧ STRIPE ADVANCE STOP BAR

MISSION STREET/13TH STREET/US 101 NB OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



MARKET STREET HUB PROJECT**

EXPECTED COMPLETION 2023

- ① CONSTRUCT PROTECTED CYCLE TRACK ON 13TH STREET. PROTECT WITH DELINEATORS AND CONSIDER FUTURE PLANTER BOXES. REQUIRES REMOVING PORTION OF DUBOCE AVENUE MEDIAN OF MISSION
- ② CONSTRUCT PROTECTED CYCLE TRACK ON DUBOCE AVENUE.
- ③ STRIPE GREEN BIKE CROSSING
- ④ INSTALL "NO RIGHT TURN ON RED" SIGN
- ⑤ CONSTRUCT WB CYCLE TRACK CHANNEL AND INSTALL BICYCLE SIGNAL TO CONTROL THE CROSSING AT THE US 101 OFF-RAMP. REALIGN THE US 101 NB OFF-RAMP APPROACH
- ⑥ CONSTRUCT SIDEWALK
- ⑦ STRIPE OFF-RAMP LANE LINE EXTENSIONS THROUGH THE INTERSECTION

RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ⑧ INSTALL "NO RIGHT TURN" SIGN
- ⑨ CONSTRUCT BULB-OUT AND CURB RAMPS
- ⑩ CONSTRUCT NEW PEDESTRIAN REFUGE
- ⑪ CONSTRUCT STAGGERED PEDESTRIAN CROSSING AND NEW REFUGE. REALIGN PEDESTRIAN SIGNAL HEADS TO FACILITATE STAGGERED CROSSING
- ⑫ INSTALL PEDESTRIAN SIGNALS AT PEDESTRIAN REFUGE
- ⑬ INSTALL NEARSIDE LEFT TURN SIGNAL HEAD
- ⑭ INSTALL RECTANGULAR RAPID FLASHING BEACON ASSEMBLY

GENERAL: INSTALL APS FOR ALL CROSSINGS

GENERAL: STUDY DAY/NIGHT LIGHTING CONDITIONS UNDER THE FREEWAY STRUCTURE

*NO TURN ON RED

**INCLUDES VISION ZERO RECOMMENDATIONS FOR MARKET STREET HUB PROJECT

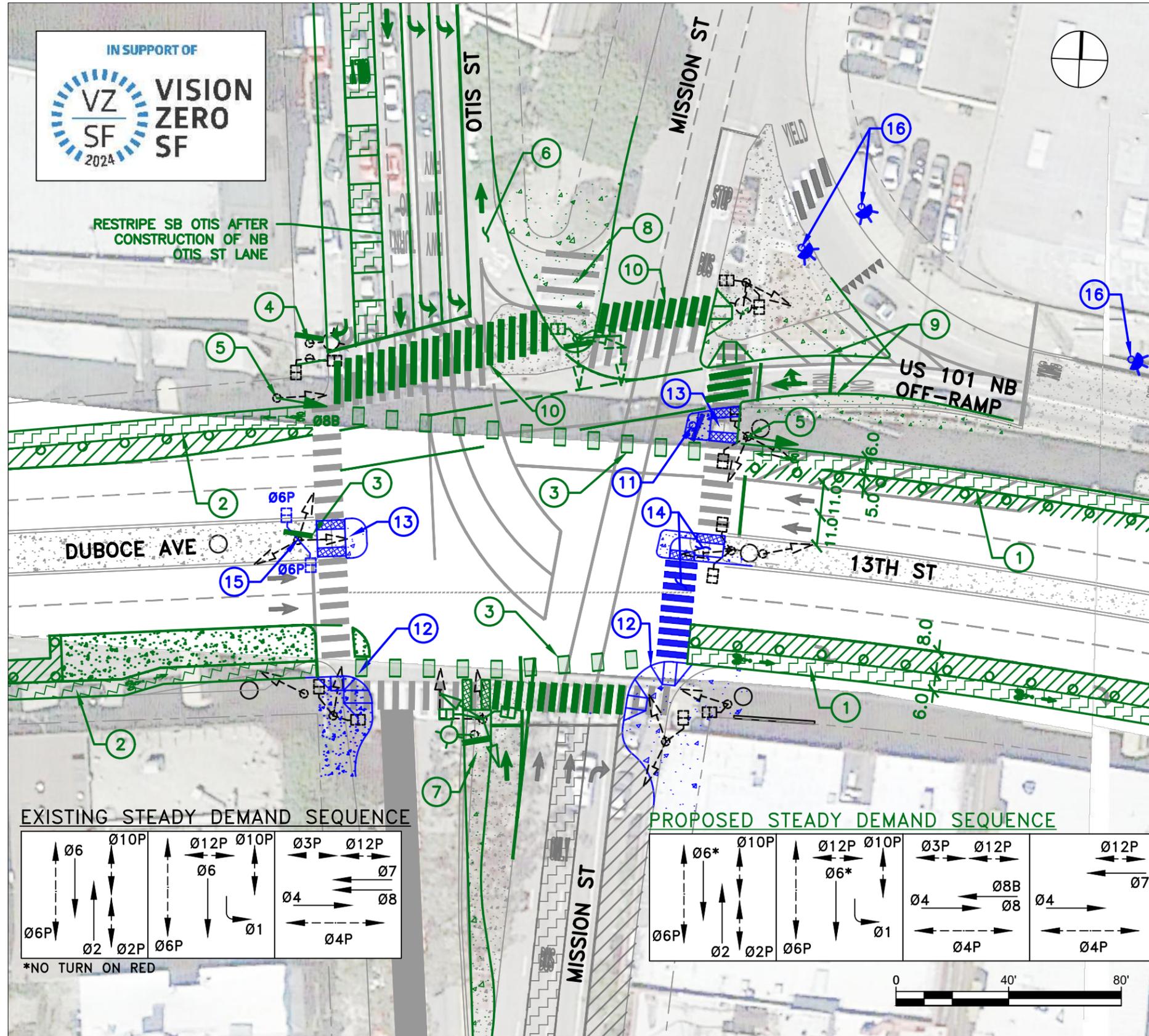
***NOTE: ADDITIONAL HUB PROJECT RECOMMENDATIONS MAY BE INCORPORATED INTO FUTURE VERSIONS OF THIS PLAN

MISSION STREET/13TH STREET/US 101 NB OFF-RAMP***

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019

MARKET STREET HUB PROJECT (NB OTIS ST ALTERNATIVE)**
EXPECTED COMPLETION 2023



- ① CONSTRUCT PROTECTED CYCLE TRACK ON 13TH STREET. PROTECT WITH DELINEATORS AND CONSIDER FUTURE PLANTER BOXES
- ② CONSTRUCT PROTECTED CYCLE TRACK ON DUBOCE AVENUE
- ③ STRIPE GREEN BIKE CROSSING
- ④ INSTALL "NO RIGHT TURN ON RED" SIGN
- ⑤ INSTALL BIKE SIGNAL. ASSIGN WB BIKE SIGNAL TO Ø8 AND SEPARATE WB Ø8 APPROACH AND US 101 NB OFF-RAMP Ø7 PHASES. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑥ CONSTRUCT NB OTIS ST LANE THROUGH PARKING REMOVAL AND SHIFTING OF SB OTIS ST LANES
- ⑦ CONSTRUCT NB OTIS ST LANE BY MODIFYING THE EXISTING MEDIAN. RELOCATE ALL EXISTING CONFLICTING SIGNAL EQUIPMENT
- ⑧ RECONSTRUCT MEDIAN TO ALLOW SPACE FOR RIGHT TURNS ONTO NB OTIS FROM US 101 OFF-RAMP. RELOCATE ALL EXISTING CONFLICTING SIGNAL EQUIPMENT
- ⑨ REALIGN US 101 OFF-RAMP APPROACH AT INTERSECTION AFTER CONSTRUCTION OF WB CYCLE TRACK ON 13TH ST. STRIPE OFF-RAMP LANE LINE EXTENSIONS.
- ⑩ RESTRIPE AND REALIGN HIGH-VISIBILITY CROSSWALK AFTER MEDIAN MODIFICATIONS

RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ⑪ INSTALL "NO RIGHT TURN" SIGN
- ⑫ CONSTRUCT BULB-OUT AND CURB RAMPS
- ⑬ CONSTRUCT NEW PEDESTRIAN REFUGE
- ⑭ CONSTRUCT STAGGERED PEDESTRIAN CROSSING AND NEW REFUGE. REALIGN PEDESTRIAN SIGNAL HEADS TO FACILITATE STAGGERED CROSSING
- ⑮ INSTALL PEDESTRIAN SIGNALS AT PEDESTRIAN REFUGE
- ⑯ INSTALL RECTANGULAR RAPID FLASHING BEACON ASSEMBLY

GENERAL: INSTALL APS FOR ALL CROSSINGS

GENERAL: STUDY DAY/NIGHT LIGHTING CONDITIONS UNDER THE FREEWAY STRUCTURE

GENERAL: BUS ONLY LANE REQUIRES FURTHER STUDY

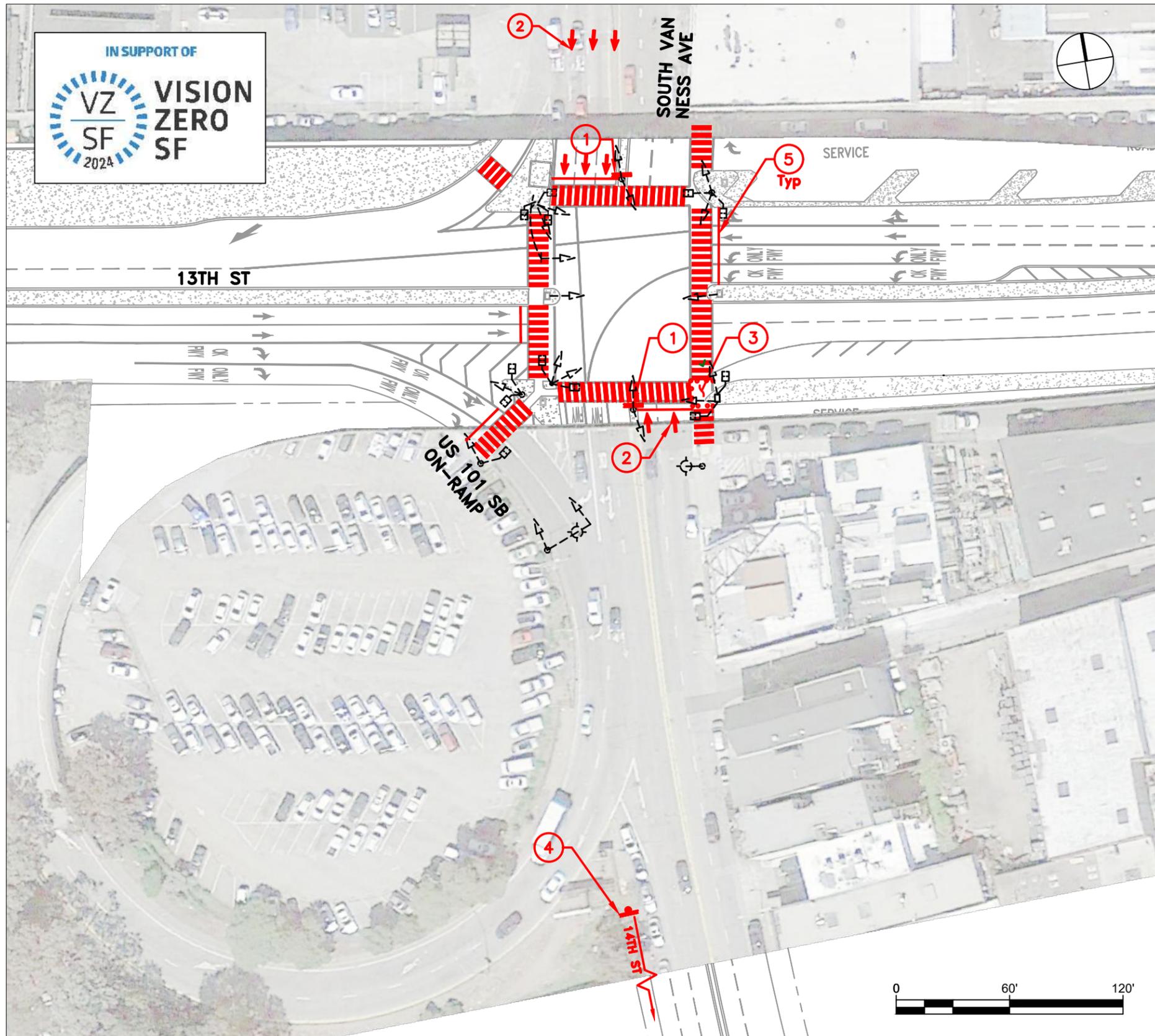
**INCLUDES VISION ZERO RECOMMENDATIONS FOR MARKET STREET HUB PROJECT

***NOTE: ADDITIONAL HUB PROJECT RECOMMENDATIONS MAY BE INCORPORATED INTO FUTURE VERSIONS OF THIS PLAN

MISSION STREET/13TH STREET/US 101 NB OFF-RAMP***

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① INSTALL "NO LEFT TURN" SIGN TO PROHIBIT SOUTHBOUND LEFT TURN MOVEMENTS AT ALL TIMES. CONSIDER LAGGING PROTECTED LEFT TURN AS AN ALTERNATIVE (CAPITAL IMPROVEMENT)
- ② STRIPE THROUGH ARROWS FOR NORTHBOUND AND SOUTHBOUND TO REINFORCE LEFT TURN PROHIBITIONS. NORTHBOUND LEFT TURNS ARE CURRENTLY PROHIBITED.
- ③ CREATE PEDESTRIAN REFUGE AREA USING TEMPORARY MATERIALS (E.G. DELINEATORS AND PAINT) FOR NEAR-TERM IMPLEMENTATION
- ④ INSTALL "SIDEWALK CLOSED AHEAD, CROSS HERE" SIGN AT THE NORTHWEST CORNER OF 14TH STREET AND SOUTH VAN NESS AVE
- ⑤ STRIPE ADVANCE STOP BAR

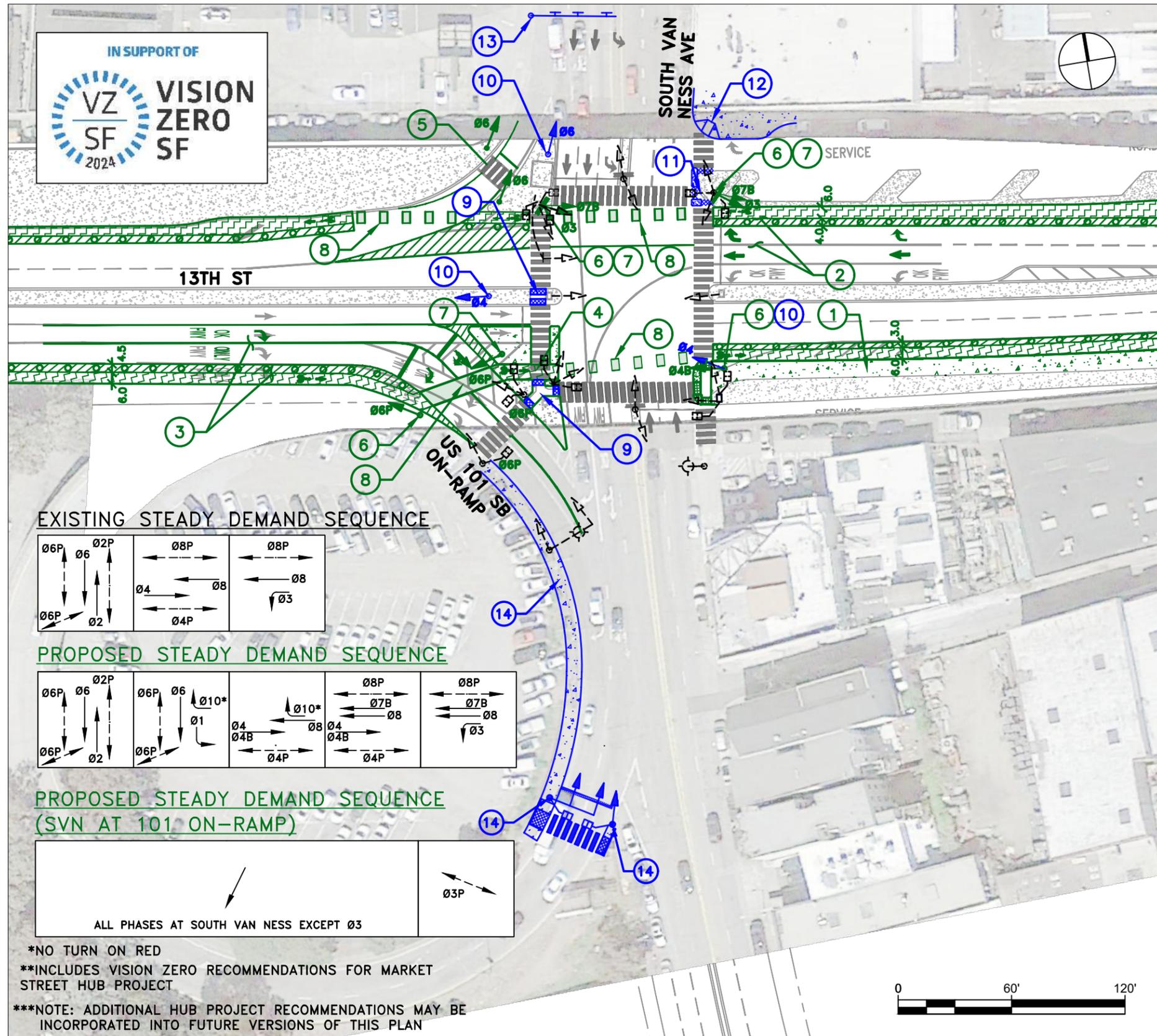
GENERAL: STRIPE HIGH-VISIBILITY CROSSWALK

GENERAL: INSTALL LEADING PEDESTRIAN INTERVAL FOR CROSSINGS

SOUTH VAN NESS AVE/13TH ST/US 101 SB ON-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



MARKET STREET HUB PROJECT**

EXPECTED COMPLETION 2023

- ① CONSTRUCT MEDIAN EXTENSION
- ② RECONFIGURE LANES BY CONVERTING #2 LANE TO "THROUGH ONLY" LANE, #3 LANE TO "RIGHT TURN ONLY" LANE, AND REMOVE EXISTING #4 LANE. DESIGNATE RIGHT TURN AS "NO TURN ON RED". CONSTRUCT WB PROTECTED CYCLE TRACK ON 13TH STREET. PROTECT WITH DELINEATORS AND CONSIDER FUTURE PLANTER BOXES. OPTION SHOWN STILL UNDER STUDY
- ③ REMOVE EXISTING #2 THROUGH LANE, SHIFT SLIP LANES, AND CHANGE LANE ASSIGNMENTS (AS SHOWN ON PLANS) AND CONSTRUCT EASTBOUND PROTECTED CYCLE TRACK. PROTECT WITH DELINEATORS AND CONSIDER FUTURE PLANTER BOXES
- ④ RECONSTRUCT PORKCHOP ISLAND TO PROVIDE BICYCLE REFUGE AND A WIDER PASSAGEWAY FOR PEDESTRIAN ACCESS
- ⑤ SIGNALIZE SLIP LANE AND ASSIGN SIGNALS TO Ø6. MODIFY EDGELINE STRIPING AND STRIPE STOP BAR
- ⑥ INSTALL BIKE SIGNAL. ASSIGN WESTBOUND BIKE SIGNAL TO Ø7 AND EASTBOUND BIKE SIGNAL TO Ø4
- ⑦ INSTALL RIGHT TURN SIGNAL AND "NO TURN ON RED" SIGN. ASSIGN SIGNAL TO Ø3 TO SEPARATE RIGHT TURN PHASE FROM BIKE PHASE
- ⑧ STRIPE GREEN BIKE CROSSING

RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

EXPECTED COMPLETION 2023

- ⑨ UPGRADE PEDESTRIAN PASSAGEWAY WITH DETECTIBLE WARNING SURFACES
- ⑩ INSTALL NEW TRAFFIC SIGNAL
- ⑪ CONSTRUCT PEDESTRIAN REFUGE
- ⑫ CONSTRUCT BULB-OUT AND CURB RAMP
- ⑬ INSTALL OVERHEAD LANE ASSIGNMENT SIGN
- ⑭ EXTEND SIDEWALK TOWARDS US 101 SB ON-RAMP AND INSTALL NEW SIGNAL. MAY REQUIRE RELOCATION OF EXISTING SIGNAL POLES.

GENERAL: UPGRADE ALL 8" SIGNAL HEADS TO 12"

GENERAL: INSTALL 12" SECTION BACKPLATES FOR ALL SIGNAL HEADS

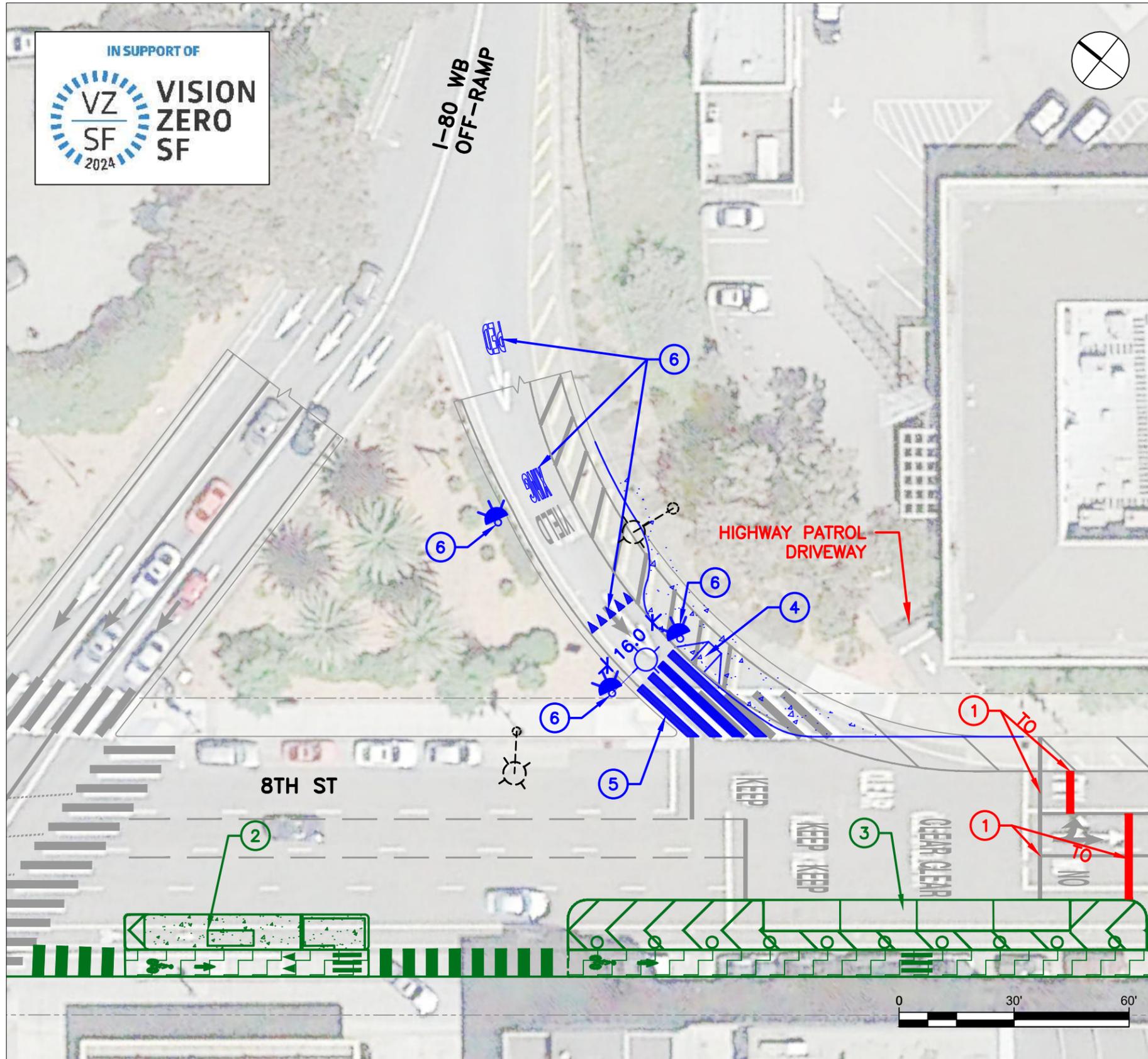
GENERAL: INSTALL APS

GENERAL: STUDY PROVIDING DAYTIME LIGHTING UNDER THE BRIDGE
 GENERAL: HUB STUDY WILL BE ADDING FRONTAGE ROAD ISLANDS ON SOUTH VAN NESS NORTH OF THIS INTERSECTION. (DOES NOT AFFECT DRAWING SHOWN)

SOUTH VAN NESS AVE/13TH ST/US 101 SB ON-RAMP***

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① EXTEND FAR SIDE BOUNDARY LINE OF EXISTING "KEEP CLEAR" ZONE TO PREVENT BLOCKAGE OF HIGHWAY PATROL ACCESS

SFMTA 8TH STREET SAFETY PROJECT

- ② TRANSIT BOARDING ISLAND WITH ADA CURB RAMP AND CROSSWALK IMPLEMENTED LATE 2018
- ③ PARKING-PROTECTED BIKE LANE AND STRIPING MODIFICATIONS IMPLEMENTED MID 2018

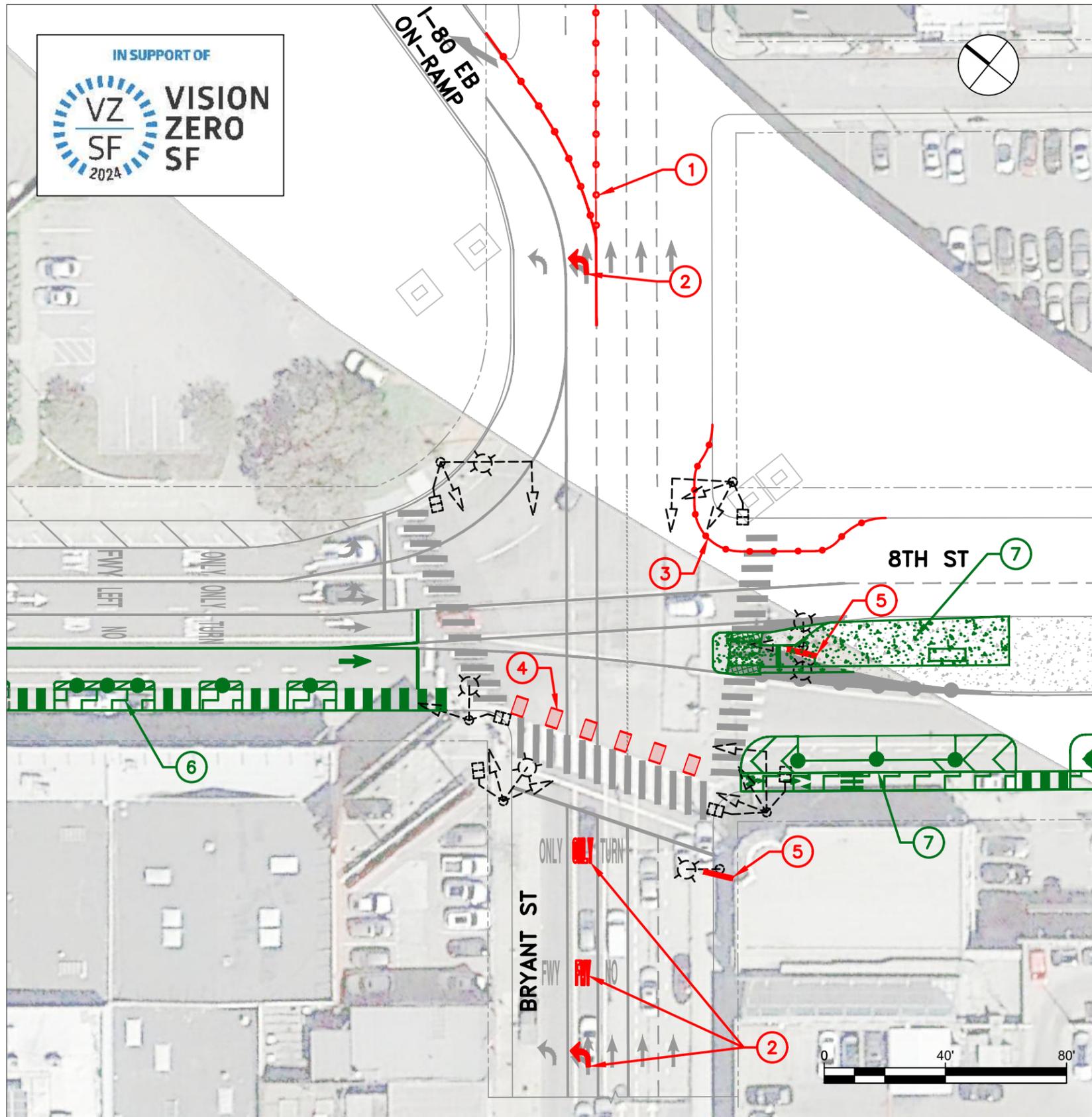
RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ④ CONSTRUCT BULB-OUT AND CURB RAMP
- ⑤ REMOVE EXISTING PAVEMENT MARKINGS, STRIPE YIELD LINE AND "PED XING" PAVEMENT MARKINGS, RE-ORIENT HIGH-VISIBILITY CROSSWALK
- ⑥ INSTALL RECTANGULAR RAPID FLASHING BEACON ASSEMBLY AND STUDY ADDITIONAL STREETLIGHTING

8TH STREET (MIDBLOCK)/I-80 WB OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① STRIPE AND INSTALL DELINEATORS TO CHANNELIZE ON-RAMP TRAFFIC
- ② CONVERT #2 LANE TO "FREEWAY ONLY" LANE
- ③ INSTALL BULB-OUT USING TEMPORARY MATERIALS (E.G. DELINEATORS AND PAINT) FOR NEAR-TERM IMPLEMENTATION
- ④ STRIPE GREEN BIKE CROSSING AFTER IMPLEMENTATION OF SFMTA 8TH STREET SAFETY PROJECT PHASE 2
- ⑤ INSTALL "NO TURN ON RED" SIGN

GENERAL: INSTALL LEADING PEDESTRIAN INTERVAL FOR CROSSING

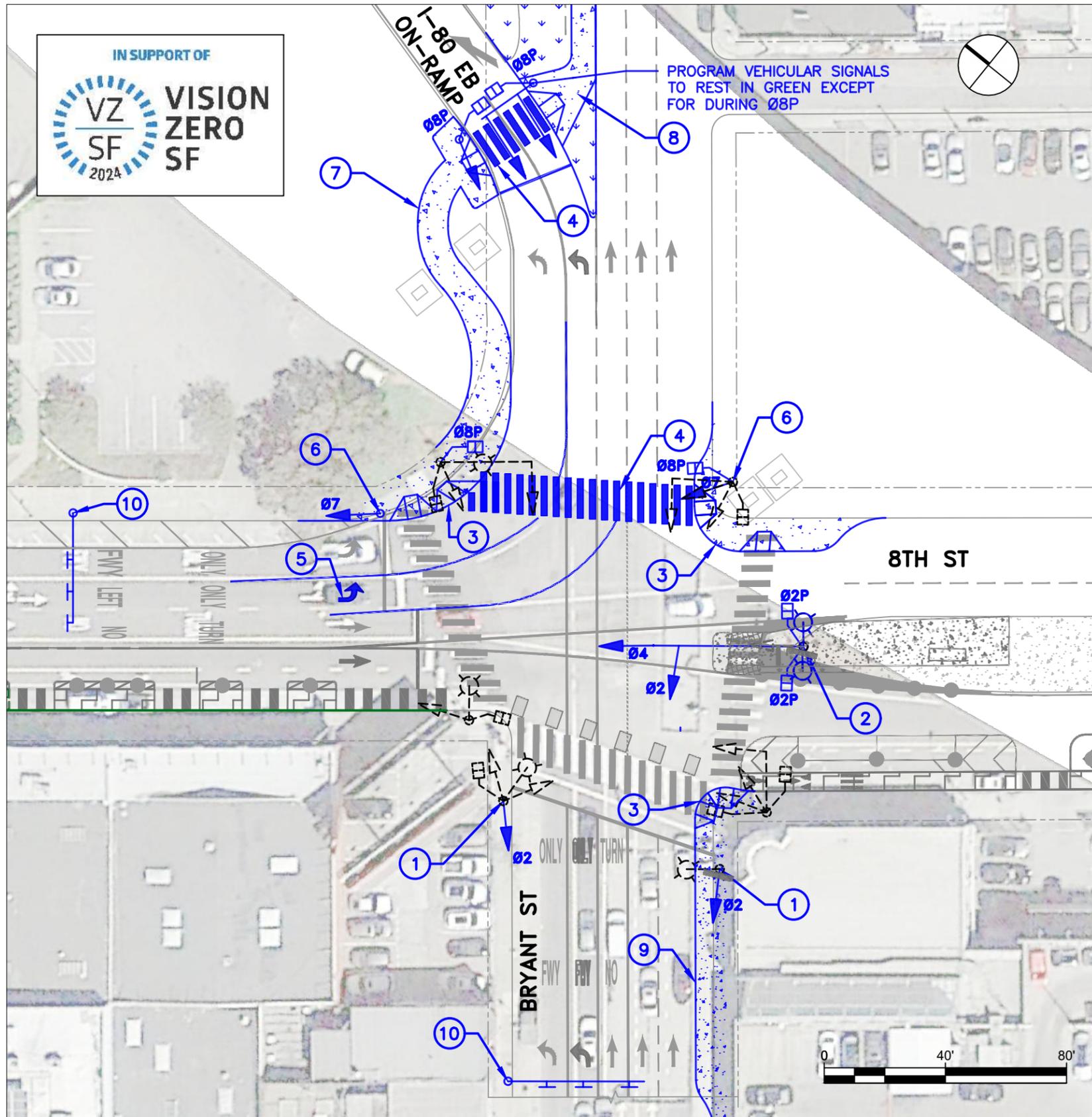
SFMTA PROJECT 8TH STREET SAFETY PROJECT

- ⑥ PROTECTED BIKE LANE AND STRIPING MODIFICATIONS IMPLEMENTED 2018
- ⑦ NEW TRANSIT BOARDING ISLAND AND CORRESPONDING EXPANDED EXTENT OF PROTECTED BIKE LANES TO BE IMPLEMENTED 2020

BRYANT STREET/8TH STREET/I-80 EB ON-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019

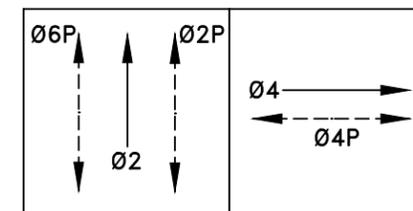


RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

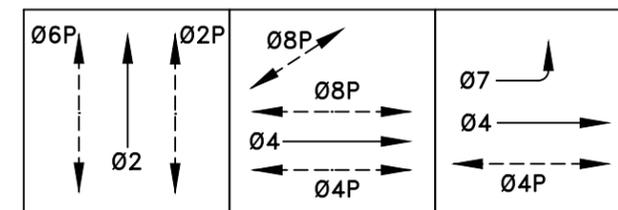
- ① INSTALL NEARSIDE TRAFFIC SIGNAL
- ② UPGRADE TO MAST ARM POLE AND INSTALL PEDESTRIAN SIGNALS.
- ③ CONSTRUCT BULB-OUT AND CURB RAMPS. STRIPE LEFT-TURN GUIDING LINES
- ④ STRIPE AND SIGNALIZE NEW PEDESTRIAN CROSSING AND ASSIGN TO Ø8P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑤ CONVERT #2 LANE TO "LEFT TURN ONLY" LANE
- ⑥ PROVIDE PROTECTED PHASING OF LEFT TURNS FROM 8TH STREET (Ø7) AND INSTALL LEFT TURN SIGNALS. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑦ EXTEND SIDEWALK TO I-80 ON-RAMP
- ⑧ CONSTRUCT CURB EXTENSION WITH SIDEWALK AND LANDSCAPING
- ⑨ CONSTRUCT BUS BULB
- ⑩ INSTALL OVERHEAD LANE ASSIGNMENT SIGNS

GENERAL: INSTALL APS FOR ALL CROSSINGS

EXISTING STEADY DEMAND SEQUENCE



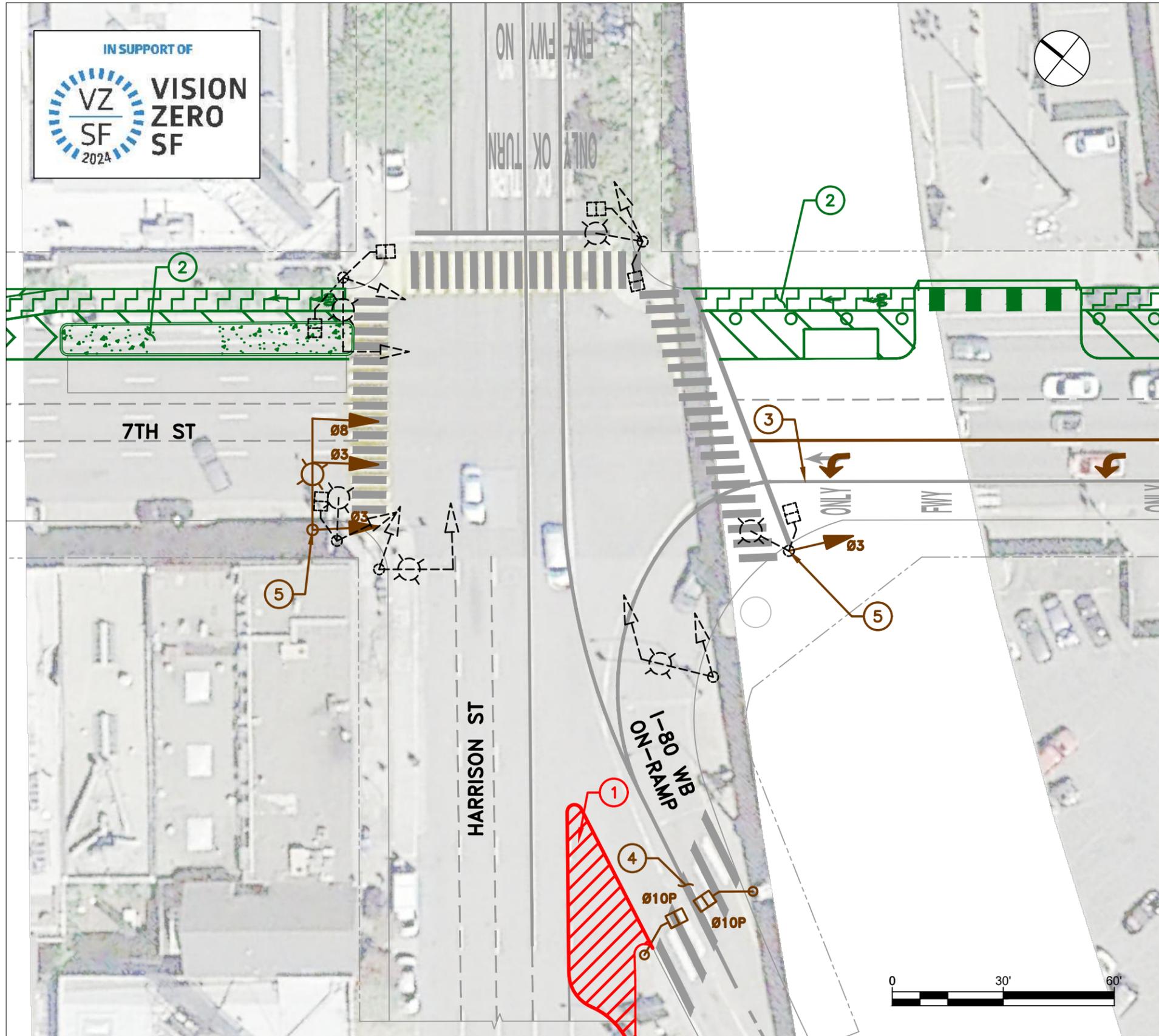
PROPOSED STEADY DEMAND SEQUENCE



BRYANT STREET/8TH STREET/I-80 EB ON-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① STRIPE CROSSHATCH PAVEMENT MARKINGS TO IMPROVE ON-RAMP CHANNELIZATION

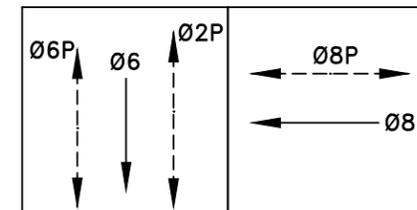
SFMTA 7TH STREET NEAR-TERM SAFETY PROJECT ITEMS UNDER STUDY FOR IMPLEMENTATION 2020

- ② PARKING-PROTECTED BIKE LANE AND TRANSIT BOARDING ISLAND

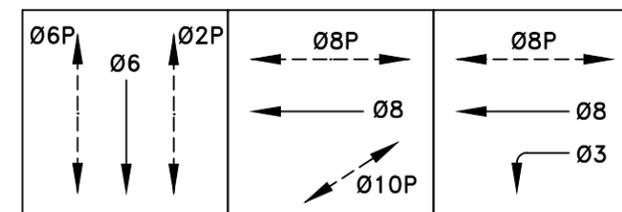
CALTRANS PROJECT WITH IMPLEMENTATION IN EARLY 2019

- ③ CONVERSION OF #1 AND #2 LANES INTO TWO PROTECTED LEFT-TURN LANES. ASSIGN TO Ø3. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ④ SIGNALIZATION OF ON-RAMP PEDESTRIAN CROSSING. ASSIGN TO Ø10P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑤ INSTALLATION OF NEW TRAFFIC SIGNAL EQUIPMENT. EXISTING SIGNALS TO BE REMOVED

EXISTING STEADY DEMAND SEQUENCE



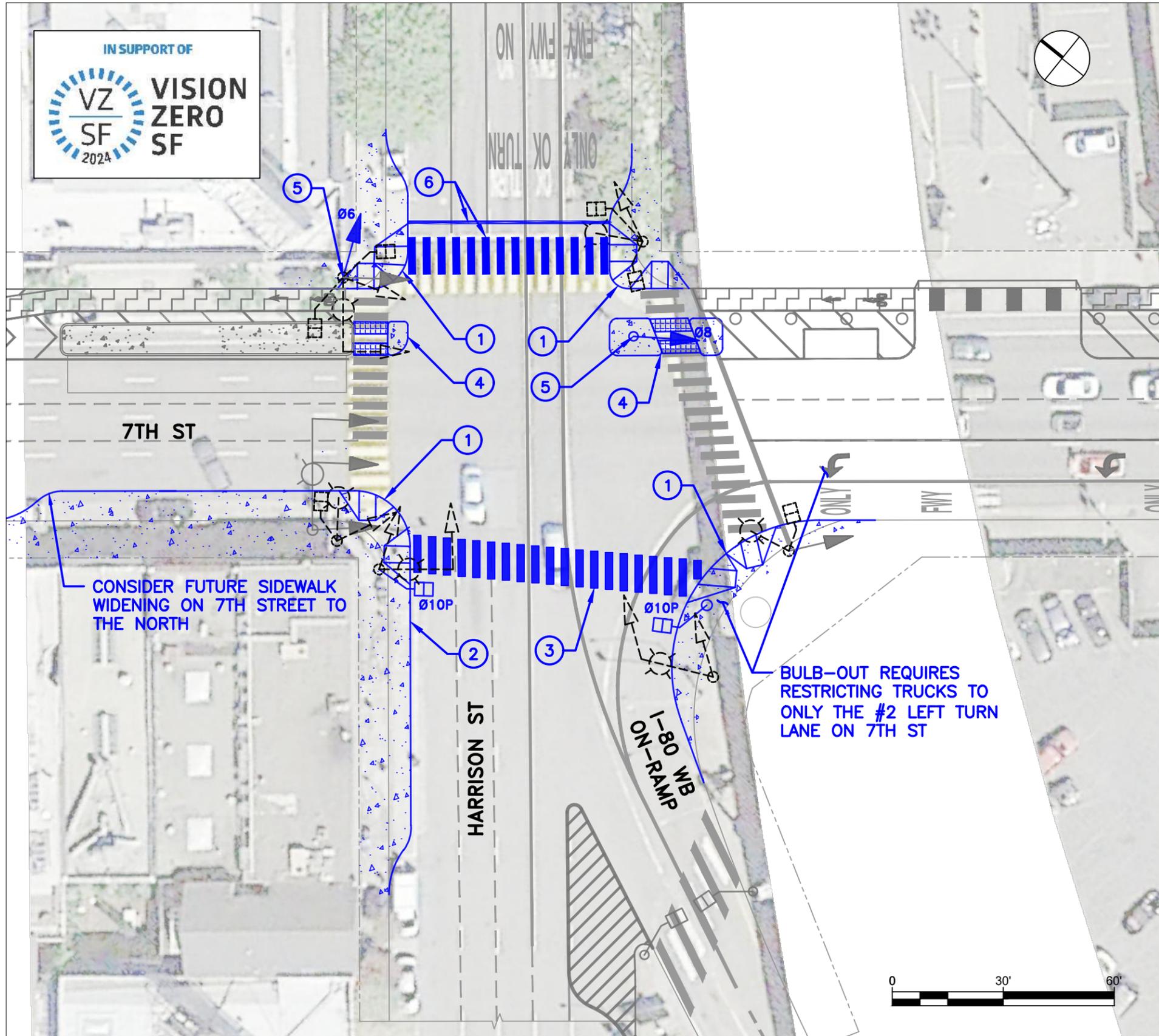
PROPOSED STEADY DEMAND SEQUENCE



HARRISON STREET/7TH STREET/I-80 WB ON-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

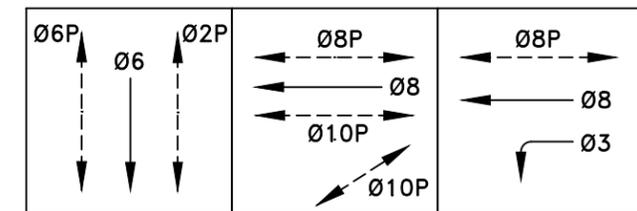
- ① CONSTRUCT BULB-OUT AND CURB RAMPS
- ② CONSTRUCT BUS-BULB CURB EXTENSION
- ③ STRIPE AND SIGNALIZE NEW PEDESTRIAN CROSSING AND ASSIGN TO Ø10P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ④ CONSTRUCT PEDESTRIAN REFUGE
- ⑤ INSTALL NEAR-SIDE TRAFFIC SIGNAL
- ⑥ REALIGN CROSSWALK AND STRIPE ADVANCE STOP BAR

GENERAL: INSTALL APS FOR ALL CROSSINGS

GENERAL NOTES

1140 HARRISON STREET PROJECT JUST WEST OF THE ON-RAMP (NEW DEVELOPMENT) WILL WIDEN HARRISON STREET'S NORTH SIDEWALK FROM BERWICK TO LANGTON FROM 8 TO 15 FEET. PARKING WILL BE RETAINED. SPACE IS COMING FROM A LANE REDUCTION. MAY BE ABLE TO CONTINUE THE SIDEWALK WIDENING FROM LANGTON TO 7TH PLUS THE BUS BULB.

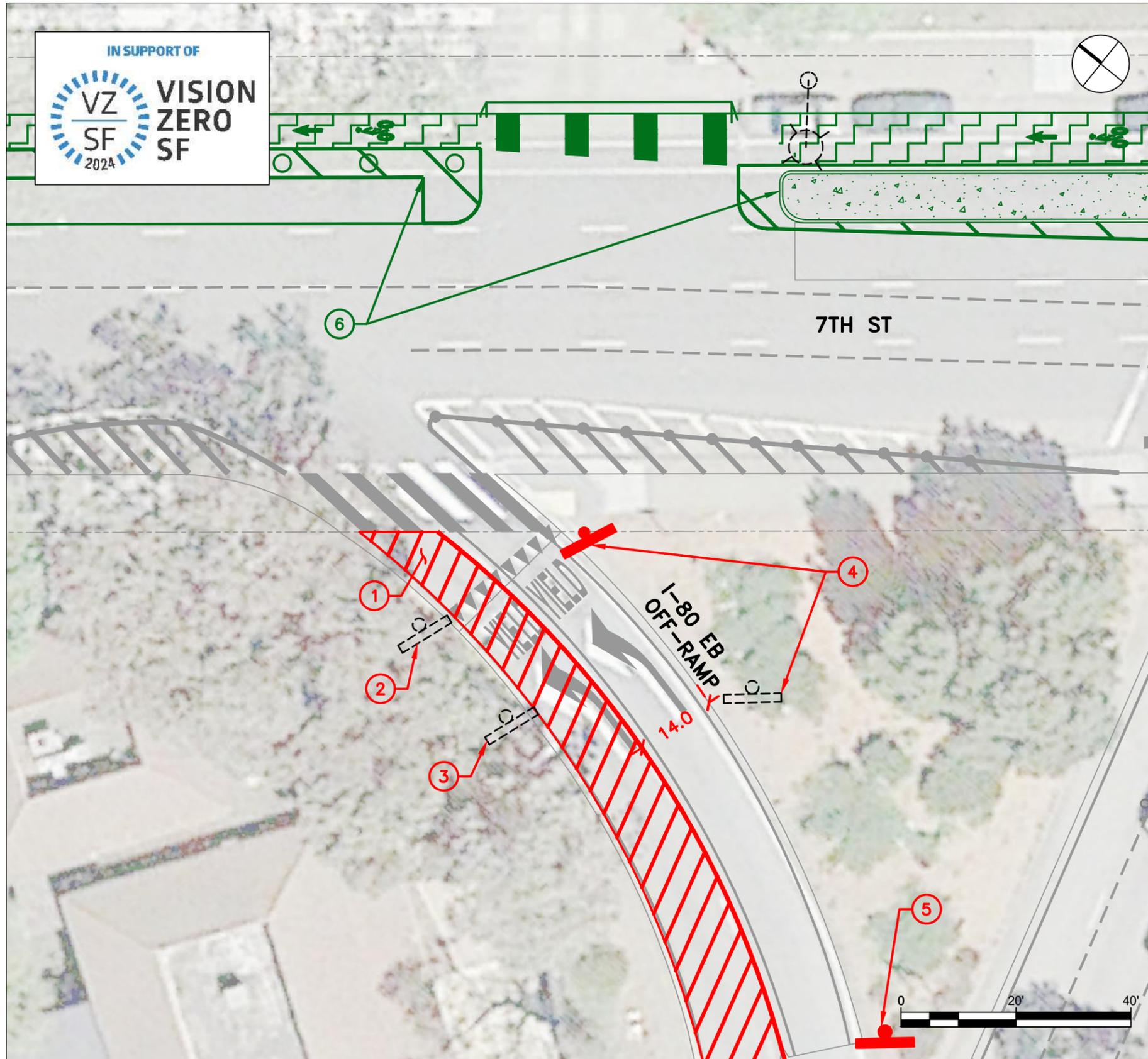
PROPOSED STEADY DEMAND SEQUENCE



HARRISON STREET/7TH STREET/I-80 WB ON-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (NEAR-TERM)*

- ① REMOVE #1 LANE AND EXISTING PAVEMENT MARKINGS AND STRIPE CROSSHATCH PAVEMENT MARKINGS
- ② REMOVE EXISTING "YIELD HERE TO PEDESTRIANS" SIGN
- ③ REMOVE EXISTING "YIELD" SIGN
- ④ RELOCATE EXISTING PEDESTRIAN CROSSING SIGN TO CORNER AND INSTALL LEFT DIAGONAL ARROW PLAQUE BELOW EXISTING SIGN
- ⑤ INSTALL "PEDESTRIAN CROSSING AHEAD" WARNING SIGN AND PLAQUE

SFMTA 7TH STREET NEAR-TERM SAFETY PROJECT-

ITEMS UNDER STUDY FOR IMPLEMENTATION IN 2020

- ⑥ PARKING-PROTECTED BIKE PATH AND TRANSIT BOARDING ISLAND

GENERAL NOTES

HALL OF JUSTICE OFF-RAMP REALIGNMENT PROJECT ON HOLD INDEFINITELY

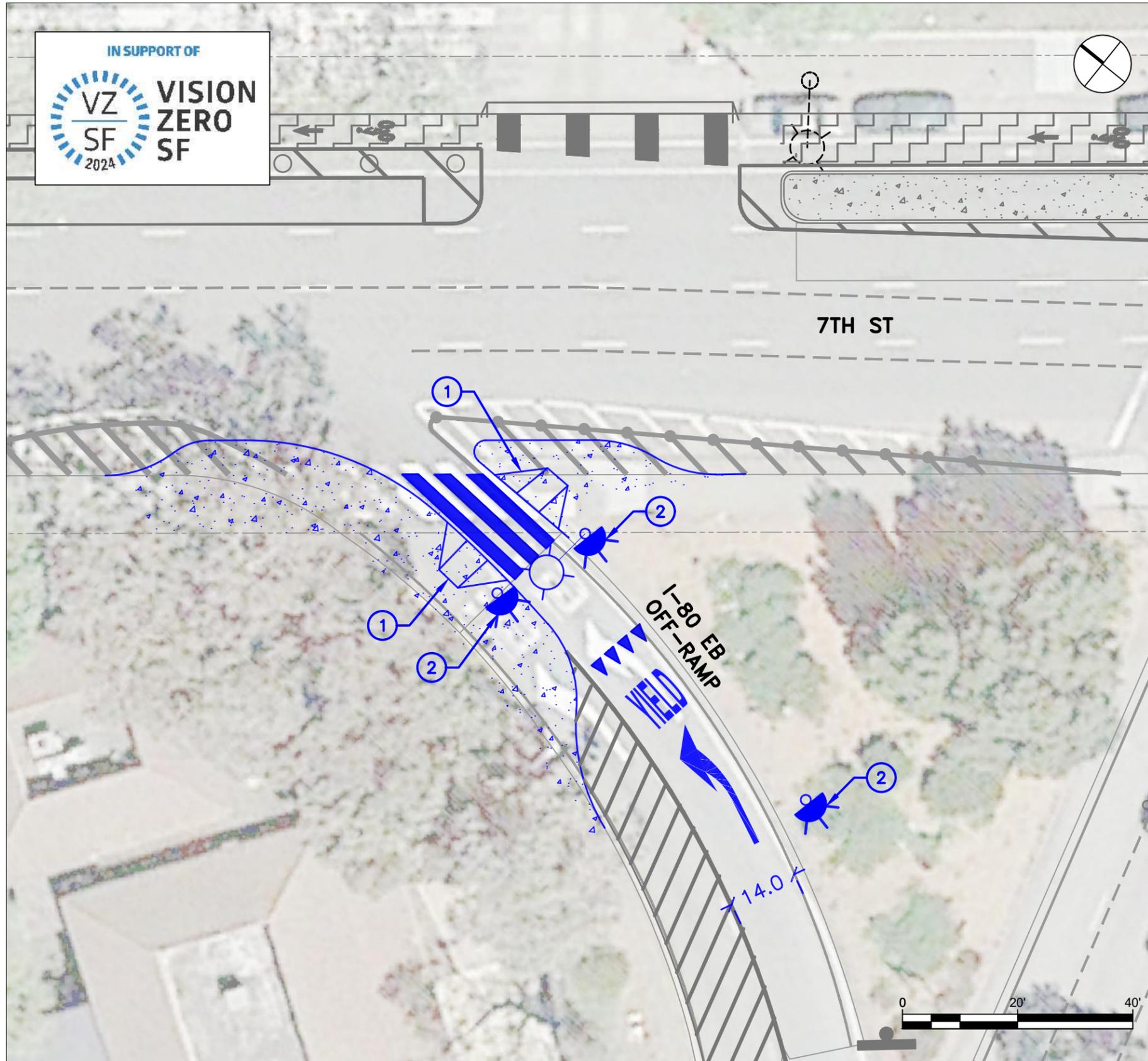
MUNI 8 BAYSHORE MAY BE RE-ROUTED ONTO THIS OFF-RAMP, WHICH WILL AFFECT THE RECOMMENDED DESIGN. MORE INFORMATION TO COME 2020

*ALL ITEMS REQUIRE CALTRANS APPROVAL PROCESS

7TH STREET (MIDBLOCK)/I-80 EB OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ① CONSTRUCT BULB-OUT AND CURB RAMPS
- ② INSTALL RECTANGULAR RAPID FLASHING BEACON ASSEMBLY AND STUDY ADDITIONAL LIGHTING

GENERAL: STRIPE CONTINENTAL CROSSWALKS

GENERAL: READJUST YIELD LINE, "YIELD", AND LEFT TURN ARROW PAVEMENT MARKINGS

GENERAL NOTES

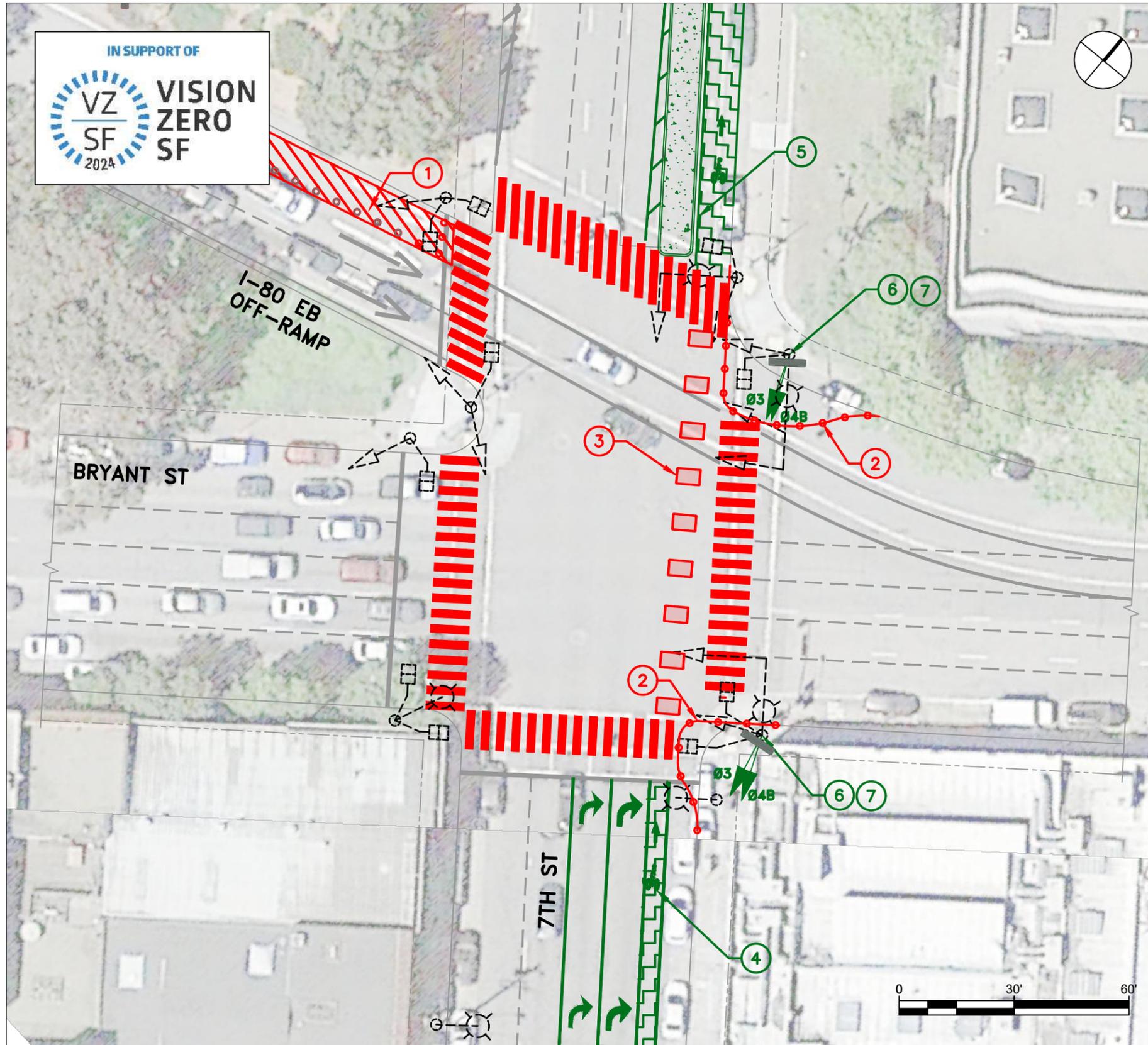
HALL OF JUSTICE OFF-RAMP REALIGNMENT PROJECT ON HOLD INDEFINITELY

MUNI 8 BAYSHORE MAY BE RE-ROUTED ONTO THIS OFF-RAMP, WHICH WILL AFFECT THE RECOMMENDED DESIGN. MORE INFORMATION TO COME 2020

7TH STREET (MIDBLOCK)/I-80 EB OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



BRYANT STREET/7TH STREET/I-80 EB OFF-RAMP
 VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS
 FEBRUARY 2019

RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① REMOVE #1 LANE AT OFF-RAMP. INSTALL DELINEATORS AND STRIPE CROSSHATCH PAVEMENT MARKINGS. REQUIRES LENGTHY CALTRANS APPROVAL PROCESS
 - ② INSTALL BULB-OUT USING TEMPORARY MATERIALS (E.G. DELINEATORS AND PAINT) FOR NEAR-TERM IMPLEMENTATION
 - ③ STRIPE GREEN BIKE CROSSING
- GENERAL: STRIPE HIGH-VISIBILITY CROSSWALK

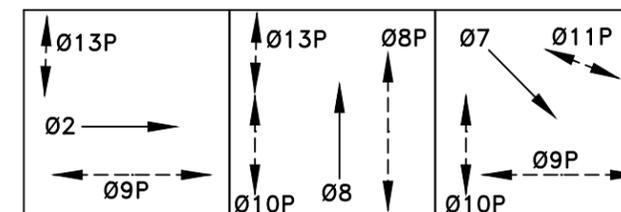
SFMTA 7TH STREET NEAR-TERM SAFETY PROJECT
 ITEMS UNDER STUDY, FOR IMPLEMENTATION IN 2020

- ④ BIKE LANE AND STRIPING. SIGNAL AND PHASING MODIFICATIONS REQUIRED TO STAGE BICYCLISTS TO THE RIGHT OF A "RIGHT TURN ONLY LANE". SIGNAL CHANGES ARE PENDING COORDINATION WITH UPCOMING WATER MAIN WORK ON 7TH STREET. SEE NOTES 5 AND 6 ON THIS SHEET AND THE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑤ MEDIAN-PROTECTED CYCLE TRACK
- ⑥ INSTALL BIKE SIGNAL AND "NO TURN ON RED" SIGN. ASSIGN TO Ø4B. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW*
- ⑦ INSTALL RIGHT TURN SIGNAL. ASSIGN TO Ø3 TO LEAD-LAG NB BICYCLE AND RIGHT TURN PHASE RESPECTIVELY. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW*

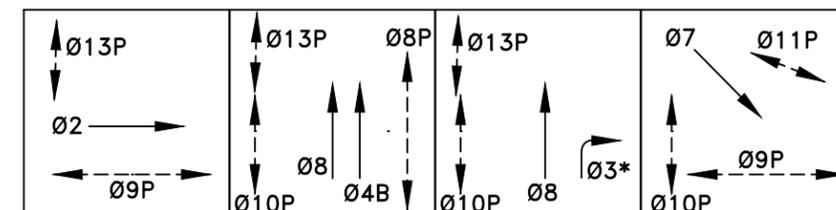
GENERAL NOTES

HALL OF JUSTICE OFF-RAMP REALIGNMENT PROJECT ON HOLD INDEFINITELY

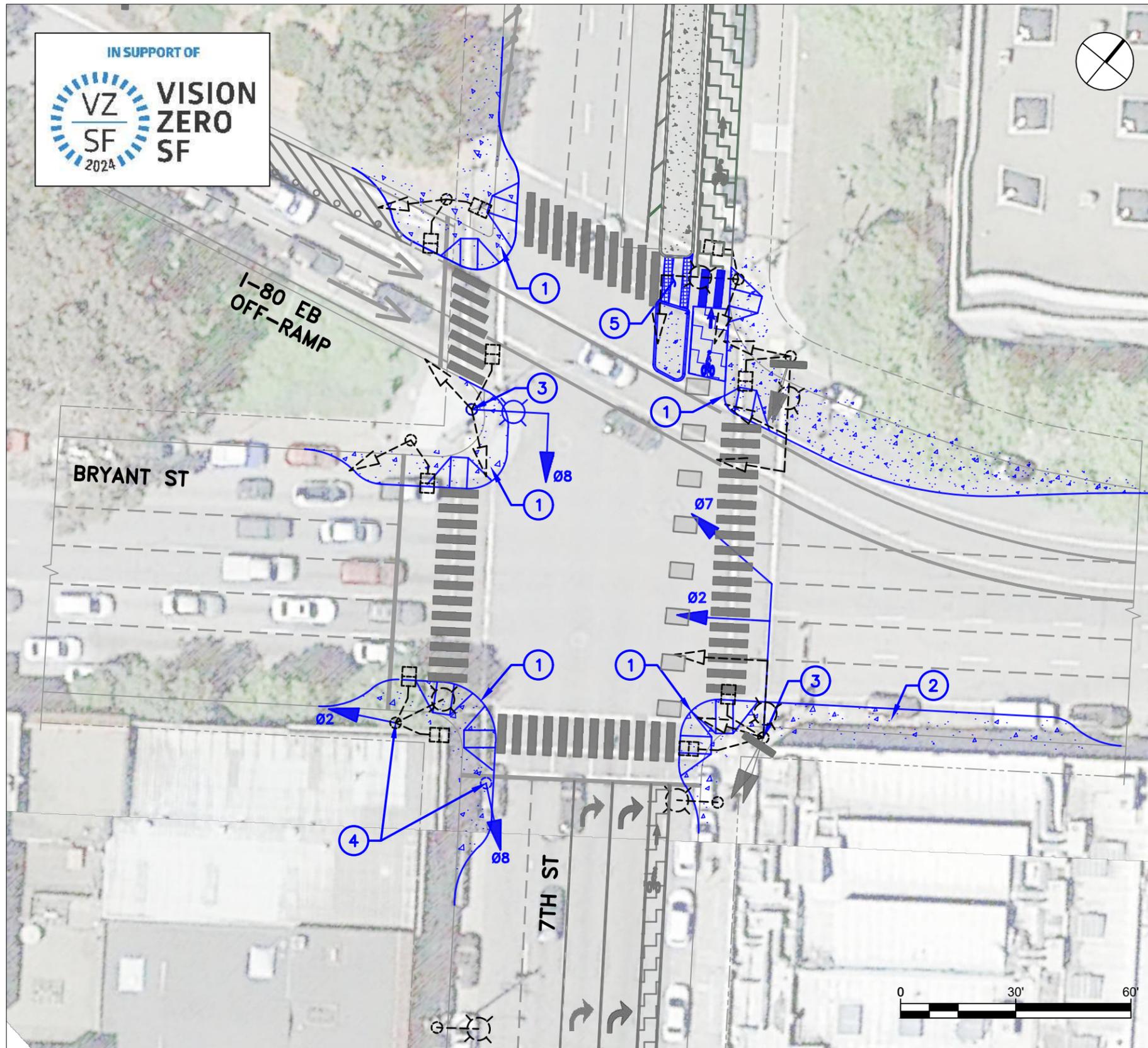
EXISTING STEADY DEMAND SEQUENCE



PROPOSED STEADY DEMAND SEQUENCE



*NO TURN ON RED



RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ① CONSTRUCT BULB-OUT AND CURB RAMPS
- ② CONSTRUCT BUS-BULB CURB EXTENSION
- ③ UPGRADE TO MAST ARM POLE
- ④ INSTALL NEARSIDE TRAFFIC SIGNAL
- ⑤ CONSTRUCT PEDESTRIAN REFUGE, STRIPE AND EXTEND MEDIAN-PROTECTED CYCLE TRACK

GENERAL: INSTALL APS FOR ALL CROSSINGS. STUDY STREETLIGHT CONDITIONS AT NORTHWEST CORNER

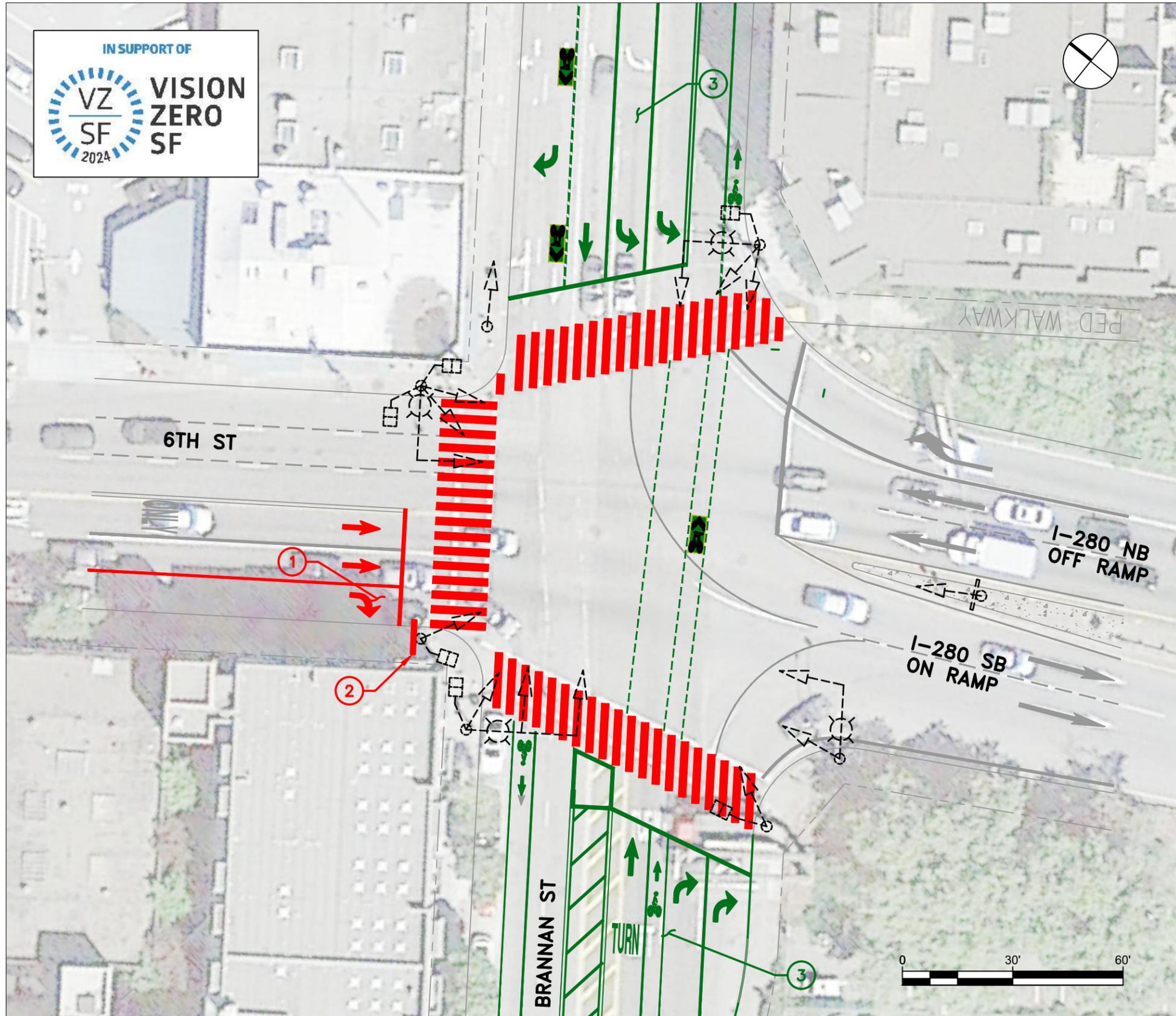
GENERAL NOTES

HALL OF JUSTICE OFF-RAMP REALIGNMENT PROJECT ON HOLD INDEFINITELY

BRYANT STREET/7TH STREET/I-80 EB OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① CONVERT TOW-AWAY LANE TO "RIGHT TURN ONLY" LANE. PROHIBIT TRUCK RIGHT TURNS NOTE: TRUCKS CAN DRIVE OVER PAINTED MEDIAN
 - ② INSTALL "RIGHT LANE MUST TURN RIGHT" SIGN
- GENERAL: STRIPE HIGH VISIBILITY CROSSWALK
- GENERAL: UPGRADE ALL 8" SIGNAL HEADS TO 12"
- GENERAL: INSTALL 12" SECTION BACKPLATES FOR ALL SIGNAL HEADS
- GENERAL: INSTALL LEADING PEDESTRIAN INTERVAL FOR Ø6P

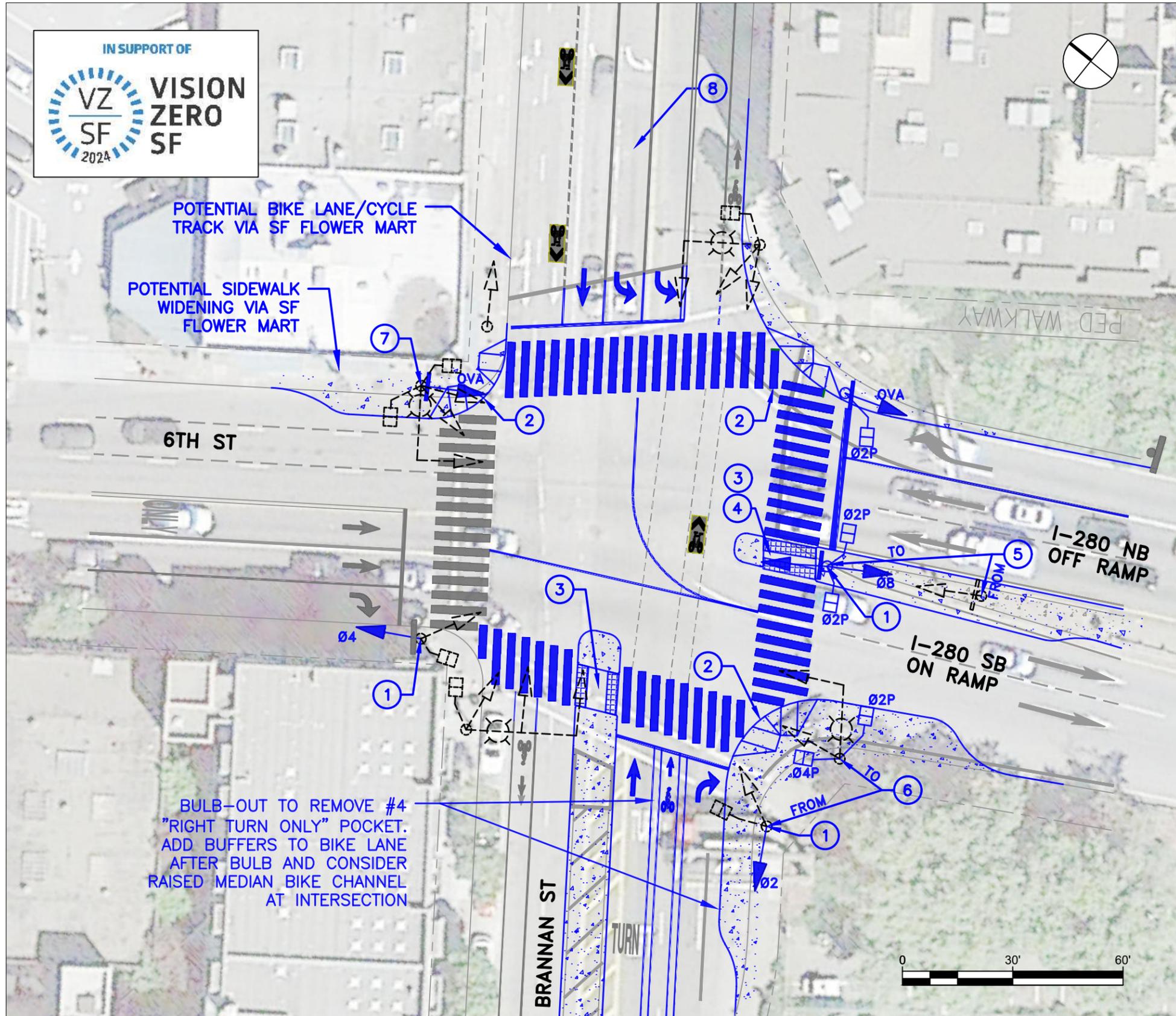
SFMTA PROJECT

- ③ STRIPING MODIFICATIONS TO BE COMPLETED MID-2019 VIA SFMTA 6TH & BRANNAN ROAD DIET PROJECT

BRANNAN STREET/6TH STREET/I-280 ON/OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



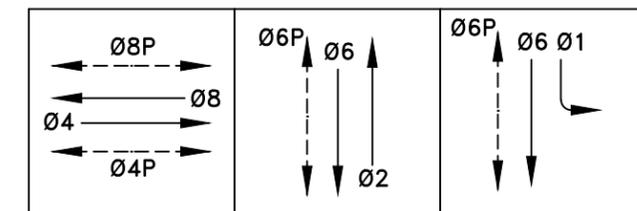
RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ① INSTALL NEAR-SIDE TRAFFIC SIGNAL HEAD
- ② CONSTRUCT BULB-OUT AND CURB RAMPS
- ③ CONSTRUCT RAISED MEDIAN AND PEDESTRIAN REFUGE
- ④ SIGNALIZE NEW PEDESTRIAN CROSSING. ASSIGN PEDESTRIAN SIGNALS TO Ø2P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW.
- ⑤ RELOCATE EXISTING TRAFFIC SIGNAL ASSEMBLY CLOSER TO THE MIDDLE OF THE INTERSECTION
- ⑥ RELOCATE EB PEDESTRIAN SIGNAL TO MAST ARM SIGNAL POLE TO ALIGN SIGNAL WITH NEW CROSSING
- ⑦ INSTALL RIGHT TURN SIGNAL AND INSTALL "NO TURN ON RED" SIGN. ASSIGN RIGHT TURN SIGNAL PHASE TO OVERLAP PHASE (OVA). SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑧ RESTRICT TRUCK TURNS TO #2 "LEFT TURN ONLY LANE" WITH SIGNAGE

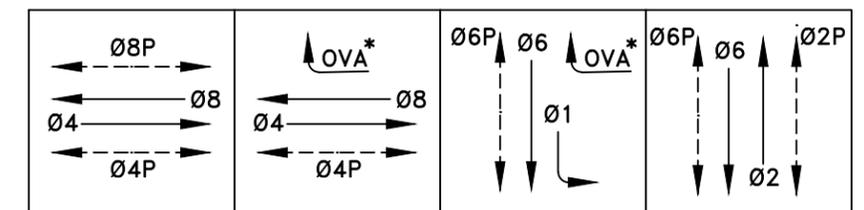
GENERAL: INSTALL APS FOR ALL CROSSINGS

GENERAL: REALIGN AND RESTRIPE HIGH-VISIBILITY CROSSWALK AND STRIPING AFTER BULB-OUT AND PEDESTRIAN REFUGE CONSTRUCTION

EXISTING STEADY DEMAND SEQUENCE



PROPOSED STEADY DEMAND SEQUENCE

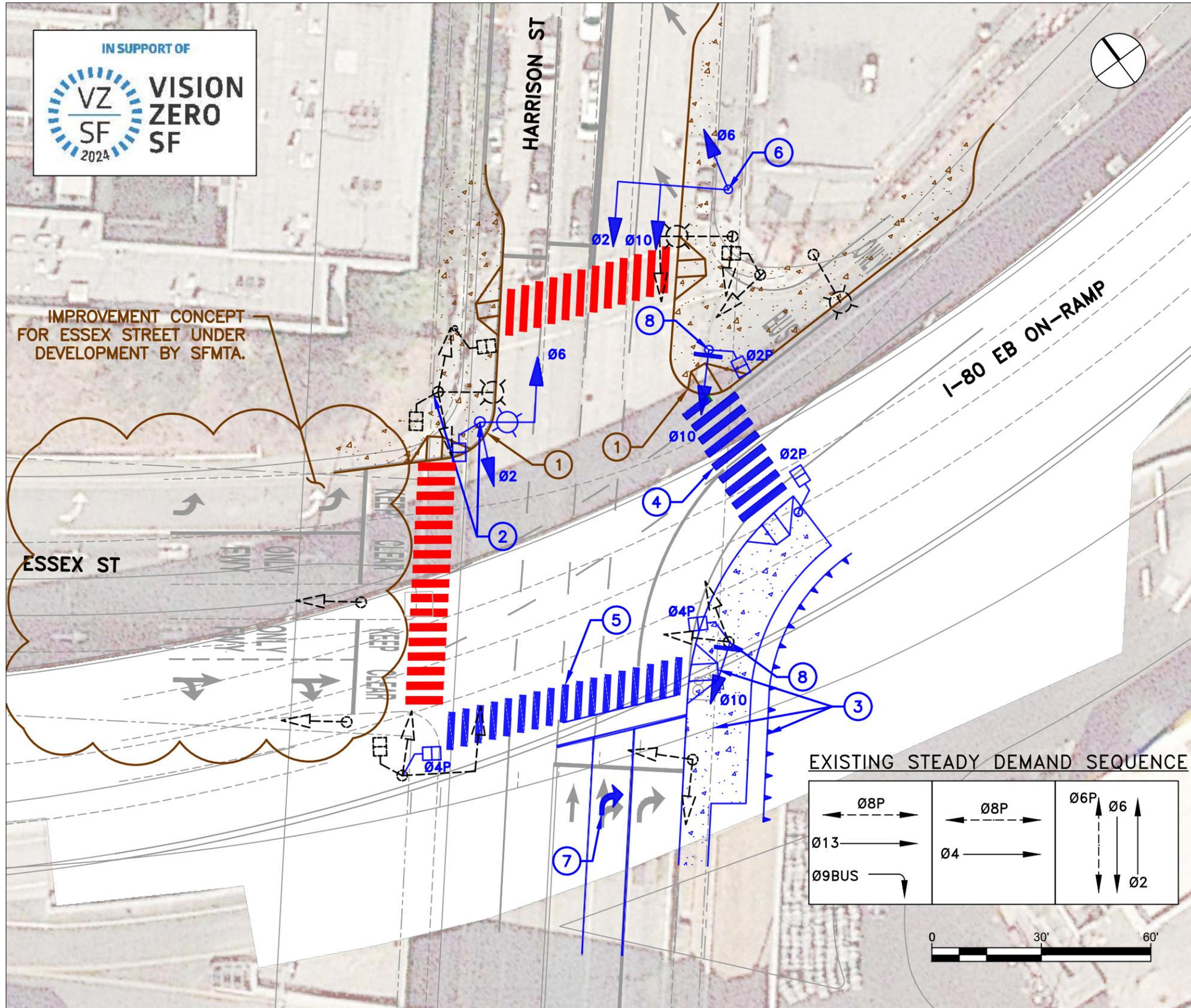


*NO RIGHT TURN ON RED

BRANNAN STREET/6TH STREET/I-280 ON/OFF-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019



FUTURE IMPROVEMENTS (BY OTHERS)

- ① FRONTING OWNER TO CONSTRUCT BULBOUT

RECOMMENDED IMPROVEMENTS (NEAR-TERM PROJECT)

GENERAL: INSTALL LEADING PEDESTRIAN INTERVAL FOR ALL CROSSINGS

GENERAL: STRIPE HIGH-VISIBILITY CROSSWALK

RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

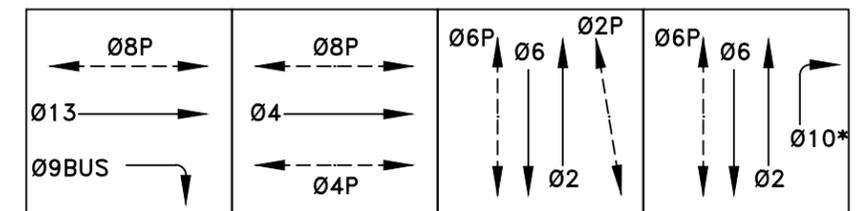
- ② REMOVE EXISTING SIGNAL POLE AT NORTHWEST CORNER AND INSTALL NEW MAST ARM POLE WITH OVERHEAD TRAFFIC SIGNAL
- ③ CONSTRUCT RETAINING WALL, EXTEND ADJACENT SIDEWALK, AND CONSTRUCT CURB RAMPS
- ④ STRIPE AND SIGNALIZE NEW PEDESTRIAN CROSSING. ASSIGN TO Ø2P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑤ STRIPE AND SIGNALIZE NEW PEDESTRIAN CROSSING. ASSIGN TO Ø4P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW
- ⑥ INSTALL SIGNALS ON NEW MAST ARM POLE
- ⑦ CONVERT #2 LANE TO "RIGHT TURN ONLY" LANE
- ⑧ INSTALL RIGHT TURN SIGNAL. ASSIGN SIGNAL TO Ø10 TO SEPARATE RIGHT TURNING VEHICLES AND NEW PEDESTRIAN CROSSING ACROSS ON-RAMP. INSTALL "NO TURN ON RED SIGN"

GENERAL: INSTALL APS FOR ALL CROSSINGS

GENERAL NOTES

NORTH SIDE OF ESSEX IS ONE POSSIBLE LOCATION FOR BAY BRIDGE BIKE PATH TOUCHDOWN

PROPOSED STEADY DEMAND SEQUENCE



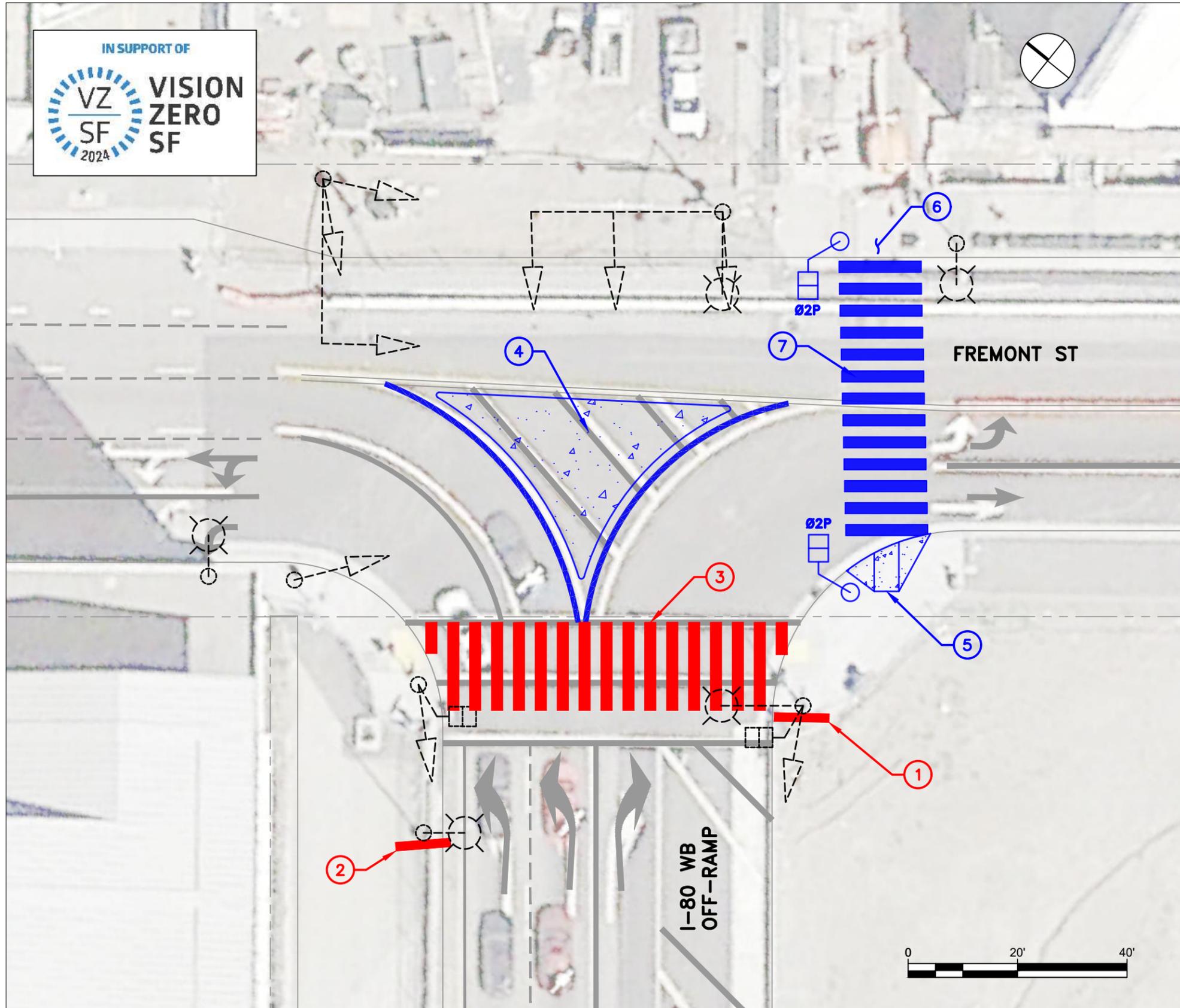
*NO RIGHT TURN ON RED

HARRISON STREET/ESSEX STREET/I-80 EB ON-RAMP

VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS

FEBRUARY 2019





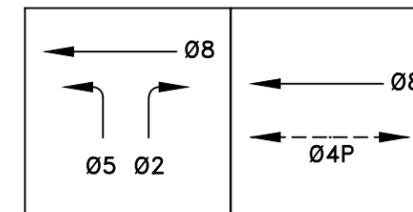
RECOMMENDED IMPROVEMENTS (NEAR-TERM)

- ① INSTALL NEARSIDE "NO RIGHT TURN ON RED" SIGN
- ② INSTALL NEARSIDE "NO LEFT TURN ON RED" SIGN
- ③ STRIPE HIGH VISIBILITY CROSSWALK

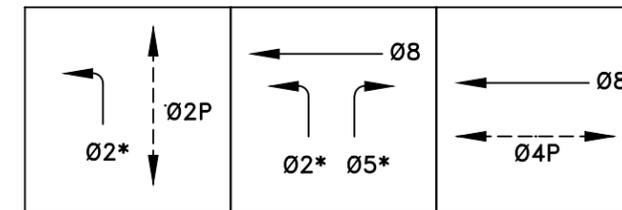
RECOMMENDED IMPROVEMENTS (CAPITAL PROJECT)

- ④ CONSTRUCT RAISED SPLITTER ISLAND
- ⑤ CONSTRUCT CURB RAMP
- ⑥ MODIFY PLAZA RAMP FOR PEDESTRIAN USE
- ⑦ STRIPE AND SIGNALIZE NEW PEDESTRIAN CROSSING AND ASSIGN TO Ø2P. SEE PROPOSED STEADY DEMAND SEQUENCE BELOW

EXISTING STEADY DEMAND SEQUENCE



PROPOSED STEADY DEMAND SEQUENCE



*"LEFT TURN ONLY" AND "RIGHT TURN ONLY" PHASES ARE RE-ASSIGNED FROM EXISTING

FREMONT STREET/I-80 WB OFF-RAMP
 VISION ZERO PHASE 2 RAMP INTERSECTION IMPROVEMENTS
 FEBRUARY 2019

APPENDIX D

Traffic Analysis Reports

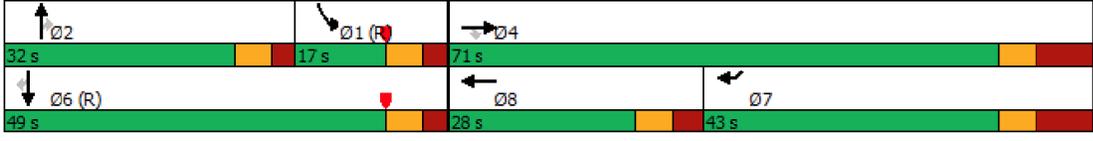
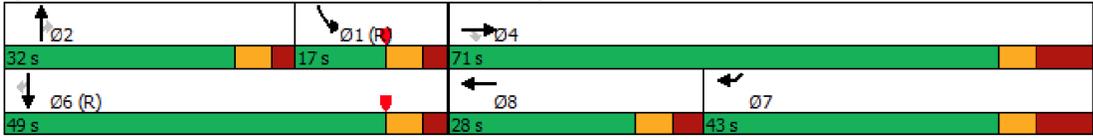


San Francisco
County Transportation
Authority

Intersection: 13th St and Mission St: Existing

| | | |
|---|---|---|
| Cycle Time | 90s | |
| Splits and Phases | AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp | |
| | PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp | |
| V/C Ratio (>0.85) | AM | N/A |
| | PM | N/A |
| LOS E/F Movements | AM | N/A |
| | PM | N/A |
| 95th Percentile Queues (ft) | AM | EBT – 517, EBR – 396; WBT – 459; NBT – 238; SBL – 401, SBT – 157, SWR – 2972 |
| | PM | EBT – 514, EBR – 400; WBT – 654; NBT – 129; SBL – 636, SBT – 650, SWR – 2032 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 59%; WB blocked at Van Ness – 7%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 0-1%, SBT lanes 0%; SWR (101 Off-Ramp) blocked at mainline 101 – 30-37% |
| | PM | EB blocked at Valencia – 27%; WB blocked at Van Ness – 27-36%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 21-52%, SBT lanes 22%; SWR (101 Off-Ramp) blocked at mainline 101 – 12% |

Intersection: 13th St and Mission St: No 2-Way Otis, With Bus Lane
(Split phase between WB and WB Ramp)

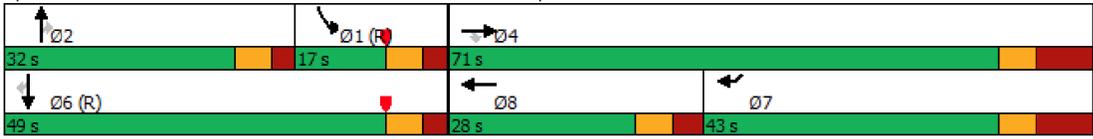
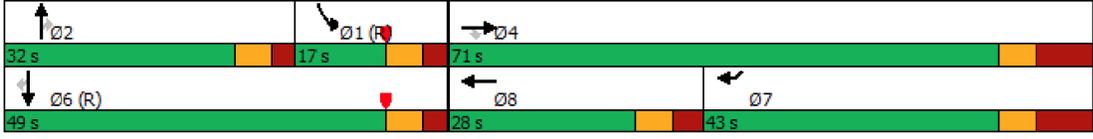
| | | |
|--|---|---|
| Cycle Time | 120s | |
| Splits and Phases | <p>AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp</p>  <p>PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp</p>  | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph7 SWRT | |
| V/C Ratio (>0.85) | AM | WBT (0.89), NBT (0.88), SBL (1.75) |
| | PM | WBT (1.18), SBL (1.85) |
| LOS E/F Movements | AM | NBT(E), WBT(E), SBL(F) |
| | PM | WBT (F), SBL(F) |
| 95th Percentile Queues (ft) | AM | EBT – 577, EBR – 93; WBT – 674; NBT – 675; SBL – 540, SBT – 500, SWR – 2437 |
| | PM | EBT – 231, EBR – 88; WBT – 621; NBT – 563; SBL – 633, SBT – 631, SWR – 793 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 4%; WB blocked at Van Ness – 44-74%; NB blocked at 14 th – 73%; SB blocked at Otis/McCoppin/Gough – SBL lanes 54-95%; SWR (101 Off-Ramp) blocked at mainline 101 – 2% |
| | PM | EB blocked at Valencia – 0%; WB blocked at Van Ness – 56-92%; NB blocked at 14 th – 1%; SB blocked at Otis/McCoppin/Gough – SBL lanes 95-96%; SWR (101 Off-Ramp) blocked at mainline 101 – 0% |
| NBT Bus Only Lane Block Time during the Peak Hour | AM | Blocked – 69% |
| | PM | Blocked – 16% |

NBT Bus Only lane assumed from Erie Street to 13th Street – results in a single-lane section on Mission Street from Erie Street to ~135 feet south of 13th Street

Intersection: 13th St and Mission St: No 2-Way Otis, No Bus Lane (Concurrent WB Ramp and WB 13th)

| | | |
|---|-------------------------------------|--|
| Cycle Time | 110s | |
| Splits and Phases | <p>AM:</p> <p>PM:</p> | |
| New Crosswalk | N/A | |
| New Traffic Phases | N/A | |
| V/C Ratio (>0.85) | AM | SBL (0.91) |
| | PM | SBL (0.98), WBT (0.94) |
| LOS E/F Movements | AM | SBL(E) |
| | PM | SBL(E) |
| 95th Percentile Queues (ft) | AM | EBT – 372; WBT – 245; NBT – 213; SBL – 639, SBT – 394, SWR – 186 |
| | PM | EBT – 251; WBT – 741; NBT – 193; SBL – 567, SBT – 295, SWR – 103 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 12-48%; WB blocked at Van Ness – 0%; NB blocked at 14 th 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 38-67%; SWR (101 Off-Ramp) blocked at mainline 101 – 0% |
| | PM | EB blocked at Valencia – 0%; WB blocked at Van Ness – 28-39%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 1-4%; SWR (101 Off-Ramp) blocked at mainline 101 – 0% |

Intersection: 13th St and Mission St: With 2-Way Otis, With Bus Lane

| | | |
|--|---|--|
| Cycle Time | 120s | |
| Splits and Phases | AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp  | |
| | PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp  | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph7 SWRT | |
| V/C Ratio (>0.85) | AM | WBT (0.89), SBL (1.75), SWR (1.05) |
| | PM | WBT (1.18), SBL (1.85), SWR (0.99) |
| LOS E/F Movements | AM | SBL (F), SWR (F) |
| | PM | WBT (F), SBL (F), SWR (E) |
| 95th Percentile Queues (ft) | AM | EBT – 539 ; EBR – 78, WBT – 655; NBT – 763, SBL – 159, SBT – 163, SWR – 167 |
| | PM | EBT – 135; EBR – 82, WBT – 628; NBT – 499, SBL – 105, SBT – 117, SWR – 178 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 2%; WB blocked at Van Ness – 18-35%; NB blocked at 14 th – 17%; SB blocked at Otis/McCoppin/Gough – SBL lanes 72-94%; SWR (101 Off-Ramp) blocked at mainline 101 – 73% |
| | PM | EB blocked at Valencia – 0%; WB blocked at Van Ness – 54-98%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 84-89%; SWR (101 Off-Ramp) blocked at mainline 101 – 73% |
| NBT Bus Only Lane Block Time during the Peak Hour | AM | Blocked – 41% |
| | PM | Blocked – 14% |

NBT Bus Only lane assumed from Erie Street to 13th Street – results in a single-lane section on Mission Street from Erie Street to ~135 feet south of 13th Street

Intersection: 13th St and Mission St: With 2-Way Otis, No Bus Lane

| | | |
|---|---|--|
| Cycle Time | 120s | |
| Splits and Phases | <p>AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp</p> <p>PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp</p> | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph7 SWRT | |
| V/C Ratio (>0.85) | AM | WBT (0.89), SBL (1.75), SWR (1.05) |
| | PM | WBT (1.18), SBL (1.85), SWR (0.99) |
| LOS E/F Movements | AM | SBL (F), SWR (F) |
| | PM | WBT (F), SBL (F), SWR (E) |
| 95th Percentile Queues (ft) | AM | EBT – 581, EBR – 73; WBT – 668; NBT – 17; SBL – 166, SBT – 122, SWR – 85 |
| | PM | EBT – 228, EBR – 100; WBT – 604; NBT – 166; SBL – 102, SBT – 105, SWR – 97 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 5%; WB blocked at Van Ness – 20-27%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 81-96%, SBT lanes 6-7%, SBR lanes 0%; SWR (101 Off-Ramp) blocked at mainline 101 – 73% |
| | PM | EB blocked at Valencia – 10% ; WB blocked at Van Ness – 11-16%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 63-95%, SBT lanes 13%, SBR lanes 0%; SWR (101 Off-Ramp) blocked at mainline 101 – 73% |

Critical ped Xing Ø8 WBT, ped Xing distance =70'. Assume W5s, FDW+Y+R=23s. Walk speed 3ft/s.

Intersection: 13th St and Mission St: With 2-Way Otis, Bus Lane, Half Crossing East Xwalk

| | | |
|--|---|---|
| Cycle Time | 120s | |
| Splits and Phases | AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp | |
| | PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph7 SWRT | |
| V/C Ratio (>0.85) | AM | WBT (0.86), NBT (0.93), SBL (0.99), SWR (0.97) |
| | PM | WBT (1.03), SBL (1.04), SWR (0.99) |
| LOS E/F Movements | AM | NBT (F), NBR (F), SBL (F), SBR (E) |
| | PM | WBT (E), NBT (E), SBL (F), SWR (E) |
| 95th Percentile Queues (ft) | AM | EBT – 474; EBR – 73, WBT – 657; NBT – 459; SBL – 163, SBT –170, SWR – 110 |
| | PM | EBT – 205; EBR – 93, WBT – 621; NBT – 659; SBL – 69, SBT – 61, SWR – 116 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 2% WB blocked at Van Ness – 17-30%; NB blocked at 14 th – 89%; SB blocked at Otis/McCoppin/Gough – SBL lanes 58-86%; SWR (101 Off-Ramp) blocked at mainline 71% |
| | PM | EB blocked at Valencia – 0%; WB blocked at Van Ness – 37-53%; NB blocked at 14 th – 9%; SB blocked at Otis/McCoppin/Gough – SBL lanes 80-81%; SWR (101 Off-Ramp) blocked at mainline 73% |
| NBT Bus Only Lane Block Time during the Peak Hour | AM | Blocked – 82% |
| | PM | Blocked –37% |

NBT Bus Only lane assumed from Erie Street to 13th Street – results in a single-lane section on Mission Street from Erie Street to ~135 feet south of 13th Street

Critical ped Xing Ø2 NBT, ped Xing distance =33'. Assume W5s, FDW+Y+R=11s. Walk speed 3ft/s. Min ph time is 16s.

Intersection: 13th St and Mission St: With 2-Way Otis, No Bus Lane, Half Crossing East Xwalk

| | | |
|---|---|---|
| Cycle Time | 120s | |
| Splits and Phases | AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp | |
| | PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph7 SWRT | |
| V/C Ratio (>0.85) | AM | WBT (0.86), SBL (0.99), SWR (0.97) |
| | PM | WBT (1.03), SBL (1.04), SWR (0.99) |
| LOS E/F Movements | AM | NBT (E), NBR (F), SBL (F), SBR (E) |
| | PM | WBT (E), SBL (F), SBR (E) |
| 95th Percentile Queues (ft) | AM | EBT – 494, EBR – 49; WBT – 606; NBT – 649; SBL – 164, SBT – 160, SWR – 87 |
| | PM | EBT – 194, EBR – 59; WBT – 599; NBT – 202; SBL – 103, SBT – 103, SWR – 85 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 3%; WB blocked at Van Ness – 20-38%; NB blocked at 14 th – 37-83%; SB blocked at Otis/McCoppin/Gough – SBL lanes 61-87%, SBT lanes 17-27%, SBR lanes 0%; SWR (101 Off-Ramp) blocked at mainline 101 – 73% |
| | PM | EB blocked at Valencia – 0%; WB blocked at Van Ness – 36-87%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 80-82%, SBT lanes 36-66%, SBR lanes 7%; SWR (101 Off-Ramp) blocked at mainline 101 – 73% |

Intersection: 13th St and Mission St: No 2-Way Otis, No Bus Lane

| | | |
|---|---|--|
| Cycle Time | 120s | |
| Splits and Phases | <p>AM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp</p> <p>PM: Splits and Phases: 1: Mission St & 13th St & US 101 NB Off-Ramp</p> | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph7 SWRT | |
| V/C Ratio (>0.85) | AM | WBT (0.89), SBL (1.75), |
| | PM | WBT (1.18), SBL (1.85) |
| LOS E/F Movements | AM | WBT (E), SBL (F) |
| | PM | WBT (F), SBL (F) |
| 95th Percentile Queues (ft) | AM | EBT – 546, EBR – 13; WBT – 723; NBT – 534; SBL – 616, SBT – 604, SWR – 1108 |
| | PM | EBT – 223, EBR – 52; WBT – 605; NBT – 380; SBL – 537, SBT – 588, SWR – 468 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Valencia – 1-11%; WB blocked at Van Ness – 40-69%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 84-91%, SBT lanes 0-23%, SBR lanes 0%; SWR (101 Off-Ramp) blocked at mainline 101 – 0% |
| | PM | EB blocked at Valencia – 0%; WB blocked at Van Ness – 53-93%; NB blocked at 14 th – 0%; SB blocked at Otis/McCoppin/Gough – SBL lanes 76-86%, SBT lanes 42%, SBR lanes 3%; SWR (101 Off-Ramp) blocked at mainline 101 – 0% |

Intersection: South Van Ness and 13th St: Existing

| | | |
|---|--|--|
| Cycle Time | 90s | |
| Splits and Phases | AM: Splits and Phases: 2: South Van Ness Ave & 13th St | |
| | PM: Splits and Phases: 2: South Van Ness Ave & 13th St | |
| V/C Ratio (>0.85) | AM | EBR (1.27) |
| | PM | N/A |
| LOS E/F Movements | AM | EBR (F) |
| | PM | N/A |
| 95th Percentile Queues (ft) | AM | EBT –301, EBR – 529; WBT – 248; NBT – 203; SBL –407, SBT – 443 |
| | PM | EBT – 433, EBR – 421; WBT – 609; NBT – 187; SBL – 599, SBT – 599 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Otis/Mission –2%; WB blocked at Folsom St – 0%; NB blocked at 14 th – 3%-9%; SB blocked at 12 th – 3-4% |
| | PM | EB blocked at Otis/Mission – 1-12%; WB blocked at Folsom St – 6-10%; NB blocked at 14 th – 2%; SB blocked at 12 th – 19-24% |

Intersection: South Van Ness and 13th St: South Van Ness with No Left Turn

| | | |
|---|--|--|
| Cycle Time | 120s | |
| Splits and Phases | AM: Splits and Phases: 2: South Van Ness Ave & 13th St | |
| | PM: Splits and Phases: 2: South Van Ness Ave & 13th St | |
| New Crosswalk | N/A | |
| New Traffic Phases | Dedicated WB Bike/Ped Crossing Phase (Φ9), protected WB RT (Φ10) | |
| V/C Ratio (>0.85) | AM | EBR (1.08) |
| | PM | EBT (0.91), SBT (0.90) |
| LOS E/F Movements | AM | EBR (E) |
| | PM | N/A |
| 95th Percentile Queues (ft) | AM | EBT – 373; EBR – 321; WBT – 783; NBT – 182; SBT – 640 |
| | PM | EBT – 370; EBR – 279; WBT – 653; NBT – 207; SBT – 668 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Otis/Mission – 0%; WB blocked at Folsom St – 10-26%; NB blocked at 14 th – 10-26%; SB blocked at 12 th – 31-35% |
| | PM | EB blocked at Otis/Mission – 0%; WB blocked at Folsom St – 18-55%; NB blocked at 14 th – 3-11%; SB blocked at 12 th – 53-69% |

Intersection: South Van Ness and 13th St: South Van Ness With Left Turn

| | | |
|---|--|--|
| Cycle Time | 120s | |
| Splits and Phases | AM: Splits and Phases: 2: South Van Ness Ave & 13th St | |
| | PM: Splits and Phases: 2: South Van Ness Ave & 13th St | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph1 SBL, Ph10 WBL | |
| V/C Ratio (>0.85) | AM | EBT (0.94), EBR (1.24), NBT (0.91) |
| | PM | EBT (0.99), SBT (0.93) |
| LOS E/F Movements | AM | EBT (E), EBR (F), WBL (E), NBT (F), SBL (E) |
| | PM | WBL (E), WBR (E), SBL (E) |
| 95th Percentile Queues (ft) | AM | EBT – 437, EBR – 456; WBT – 586; NBT – 186; SBL – 772, SBT – 561 |
| | PM | EBT – 600, EBR – 428; WBT – 653; NBT – 197; SBL – 746, SBT – 571 |
| Queuing Upstream Block Time during the Peak Hour | AM | EB blocked at Otis/Mission –1%; WB blocked at Folsom St – 2%; NB blocked at 14 th – 55-58%; SB blocked at 12 th – SBL lanes 22%, SBT lanes 88-95% |
| | PM | EB blocked at Otis/Mission – 9%; WB blocked at Folsom St – 15-44%; NB blocked at 14 th – 4-19%; SB blocked at 12 th – SBL lanes 21%, SBT lanes 69-89% |

Intersection: 7TH Midblock: Existing

| Cycle Time | Yield controlled | |
|---|-------------------------|--|
| 95th Queue (ft) | AM | 141-150 ft |
| | PM | 65-67 ft |
| Queuing Penalty (veh) | AM | 1 veh at the off-ramp (midblock and Bryant split) |
| | PM | 0 veh at the off-ramp (midblock and Bryant split) |
| 95th Percentile Queues (ft) | AM | NBT – 45, NEL – 90 |
| | PM | NBT – 11, NEL – 67 |
| Queuing Upstream Block Time during the Peak Hour | AM | Blocked at the off-ramp (midblock and Bryant split) – 0% |
| | PM | Blocked at the off-ramp (midblock and Bryant split) – 0% |

I-80 Off Ramp queuing capacity

- 250' from midblock intersection to Off-Ramp Split (midblock and Bryant)
- 600' from 7th (either approach) to I-80 off-ramp junction at mainline

Intersection: 7TH Midblock: With Project 1 Yield Lane

| Cycle Time | Yield controlled | |
|---|-------------------------|---|
| 95th Queue | AM | 262 ft |
| | PM | 136 ft |
| Queuing Penalty | AM | 22 veh at the off-ramp (midblock and Bryant split) |
| | PM | 0 veh at the off-ramp (midblock and Bryant split) |
| 95th Percentile Queues (ft) | AM | NBT – 36, NEL – 262 |
| | PM | NBT – 185, NEL – 136 |
| Queuing Upstream Block Time during the Peak Hour | AM | Blocked at the off-ramp (midblock and Bryant) split) – 3% |
| | PM | Blocked at the off-ramp (midblock and Bryant split) – 0% |

I-80 Off Ramp queuing capacity

- 250' from midblock intersection to Off-Ramp Split (midblock and Bryant)
- 600' from 7th (either approach) to I-80 off-ramp junction at mainline

Intersection: 7TH Midblock: With Project 2 Yield Lanes

| Cycle Time | Yield controlled | |
|---|-------------------------|--|
| 95th Queue | AM | 117-213ft |
| | PM | 127-168ft |
| Queuing Penalty | AM | 2 veh |
| | PM | 8 veh |
| 95th Percentile Queues (ft) | AM | NBT – 31, NEL – 213 |
| | PM | NBT – 205, NEL – 168 |
| Queuing Upstream Block Time during the Peak Hour | AM | Blocked at the off-ramp (midblock and Bryant split) – 1% |
| | PM | Blocked at the off-ramp (midblock and Bryant split) – 7% |

I-80 Off Ramp queuing capacity

- 250' from midblock intersection to off-ramp split (midblock and Bryant)
- 600' from 7th (either approach) to I-80 off-ramp junction at mainline

Intersection: 7TH St and Bryant St: Existing

| | | |
|---|---|---|
| Cycle Time | 90s | |
| Splits and Phases | AM: Splits and Phases: 1: Bryant St & 7th St & I-80 EB Off-Ramp | |
| | PM: Splits and Phases: 1: Bryant St & 7th St & I-80 EB Off-Ramp | |
| V/C Ratio (>0.85) | AM | N/A |
| | PM | N/A |
| LOS E/F Movements | AM | N/A |
| | PM | N/A |
| 95th Percentile Queues (ft) | AM | EBL – 252; NWT – 293, NET – 341, NBT – 45 |
| | PM | EBL – 107; NWT – 415, NET – 490, NBT – 11 |
| Queuing Upstream Block Time during the Peak Hour | AM | I-80 EB Off Ramp (midblock and Bryant split) – 9% |
| | PM | NEB blocked at 8th St – 6% |

I-80 Off Ramp queuing capacity

- 250' from midblock intersection to off-ramp split (midblock and Bryant)
- 600' from 7th (either approach) to I-80 off-ramp junction at mainline

Intersection: 7TH St and Bryant St: **with Project**

| | | |
|---|----------------|--|
| Cycle Time | 90s | |
| Splits and Phases | AM: | |
| | PM: | |
| New Crosswalk | N/A | |
| New Traffic Phases | Ph11P, Ph3 NWL | |
| V/C Ratio (>0.85) | AM | EBL (0.94), NWR (0.86) |
| | PM | NWT (0.95), NET (0.93) |
| LOS E/F Movements | AM | NWR (E), EBL (E) |
| | PM | N/A |
| 95th Percentile Queues (ft) | AM | EBL – 309; NWT – 272, NET – 385 |
| | PM | EBL – 169; NWT – 555, NET – 536 |
| Queuing Upstream Block Time during the Peak Hour | AM | I-80 EB Off Ramp (midblock and Bryant split) – 0-6% |
| | PM | I-80 EB Off Ramp (midblock and Bryant split) – 0% NWT blocked at Brannan – 2% NET blocked at 8 th – 2 - 11% |

I-80 Off Ramp queuing capacity

- 250' from midblock intersection to off-ramp split (midblock and Bryant)
- 600' from 7th (either approach) to I-80 off-ramp junction at mainline

Intersection: 6TH and Brannan: Existing

| | | |
|---|---|--|
| Cycle Time | 60s | |
| Splits and Phases | AM: Splits and Phases: 1: Brannan St & I-280 On/Off-Ramp/6th St | |
| | PM: Splits and Phases: 1: Brannan St & I-280 On/Off-Ramp/6th St | |
| V/C Ratio (>0.85) | AM | SET (0.89), NWT (1.14), NWR (0.90) |
| | PM | SET (1.13), NWT (1.09), NET (1.46), SWL (0.88) |
| LOS E/F Movements | AM | NWT (F) |
| | PM | NET (F), NWT (F), SET(F) |
| 95th Percentile Queues (ft) | AM | SET – 312, SER – 59; NWT – 498, NET–159; SWL –174, SWT –100 |
| | PM | SET – 591, SER –700; NWT – 876, NWR-672, NET–7180; SWL –409, SWT –123, SWL-378 |
| Queuing Upstream Block Time during the Peak Hour | AM | SEB blocked at Bryant – 0%; NWB blocked at Freeway Main Line – 0%; NEB blocked at 7 th St – 0%; SWB blocked at 5 th – SBL lanes 0%, SBT lanes 0% |
| | PM | SEB blocked at Bryant – SET 74-90%, SER 74%; NWB blocked at Freeway Main Line– 22-27%; NEB blocked at 7 th St – NET 61%, NETR 79%; SWB blocked at 5 th – 0% |

Queue storage from Brannan to I-280 mainline = 3000'

Intersection: 6TH and Brannan: with Project (Open Xwalk Across Ramp and Ramp NBRT signal)

| | | |
|---|---|--|
| Cycle Time | 120s | |
| Splits and Phases | AM: Splits and Phases: 1: Brannan St & I-280 On/Off-Ramp/6th St | |
| | PM: Splits and Phases: 1: Brannan St & I-280 On/Off-Ramp/6th St | |
| New Crosswalk | South Crosswalk on I-280 On/Off Ramp (Ph2) | |
| New Traffic Phases | Ph12P (NWB East Xwalk Xing Brannan) and protected Ph9 NWR | |
| V/C Ratio (>0.85) | AM | NWR (1.27), SWL (0.87) |
| | PM | SET (1.10), NWT (0.94), NWR (0.91), NER (1.10), SWL (1.09) |
| LOS E/F Movements | AM | NWR (F), SWL (E) |
| | PM | SET(F), NER(F), SWL(F) |
| 95th Percentile Queues (ft) | AM | SET – 363, SER – 66; NWT – 2920, NET–200, NER-138; SWL –246, SWT –179 |
| | PM | SET – 510, SER – 179; NWT – 1032, NET–698; SWL –271, SWT –697 |
| Queuing Upstream Block Time during the Peak Hour | AM | SEB blocked at Bryant – 0%; NWB blocked at Freeway Main Line – 25-56%; NEB blocked at 7 th St – 0%; SWB blocked at 5 th – 0% |
| | PM | SEB blocked at Bryant – SET lanes 8-15% NWB blocked at Freeway Main Line– 0%; NEB blocked at 7 th St– 65%; SWB blocked at 5 th –SWT lanes 29% |

Queue storage from Brannan to I-280 mainline = 3000'

Intersection: 6TH and Brannan: with Project (Ramp NBRT signal only)

| | | |
|---|---|---|
| Cycle Time | 120s AM, 90s PM | |
| Splits and Phases | AM: | |
| | PM: | |
| New Crosswalk | None | |
| New Traffic Phases | Ph12P (NWB East Xwalk Xing Brannan) and protected Ph9 NWR | |
| V/C Ratio (>0.85) | AM | NBR (1.04), SWL (0.87), NET (0.93), NER (0.87) |
| | PM | SET (1.11), NWT (0.94), NWR (0.94), NET(0.86), SWL (0.90) |
| LOS E/F Movements | AM | NWR (E), NET(F), NER(E), SWL (E) |
| | PM | NET(E), SET (F) |
| 95th Percentile Queues (ft) | AM | SET – 232, SER – 32; NWT – 1240, NET–258, NER-153; SWL –205, SWT –221 |
| | PM | SET – 521, SER – 210; NWT – 607, NET–376; SWL –280, SWT –527 |
| Queuing Upstream Block Time during the Peak Hour | AM | SEB blocked at Bryant – 0%; NWB blocked at Freeway Main Line – 0%; NEB blocked at 7 th St – 0%; SWB blocked at 5 th – 0% |
| | PM | SEB blocked at Bryant – SET lanes 8% NWB blocked at Freeway Main Line– 0%; NEB blocked at 7 th St– 0%; SWB blocked at 5 th –SWT lanes 2% |

Queue storage from Brannan to I-280 mainline = 3000'

APPENDIX E

Outreach Report Round 1



San Francisco
County Transportation
Authority

MEMO

To: SFCTA SoMa Ramps Project Team

From: Civic Edge Consulting

Date: May 17, 2018

Subject: Round One SoMa Ramp Intersections Project Outreach Summary Report

As the San Francisco County Transportation Authority (SFCTA) undertakes its second phase of the South of Market neighborhood ramp intersections safety study, community and stakeholder participation has been a priority of the project team. The following Outreach Summary Report outlines the engagement strategies for Round One of the Study, taking place between February and May 2018.

The goal for Outreach Round 1 of the SoMa Ramp Intersections Safety Study (Vision Zero Ramp Study 2) was to solicit input from community stakeholders to help develop recommended safety improvements to 10 pre-selected ramp intersections in the neighborhood.

Feedback collected during Outreach Round 1 of this study will help to identify issues and needs of the community stakeholders and to develop the improvement recommendations.

The first round of outreach included the following tools:

- A broadly fielded survey translated into Spanish, Chinese, and Filipino;
- A mailer to promote the survey, translated into Spanish, Chinese, and Filipino;
- Online promotions including an educational video, eNewsletter, and English social media posts promoting the study and survey;
- Additional in-language social media ads targeting Spanish, Chinese, and Filipino speakers;
- Outreach to community-based organizations (CBOs), partner agencies, and other targeted groups with an interest in the project;
- In-person presentations to CBOs, partner agencies, and other organizations by SFCTA staff; and
- Intercept outreach in the study area, in collaboration with Vision Zero SF.

SoMa Ramp Intersections Survey

A survey was developed by the project team to learn more about people's experiences at the 10 intersections within the study area and gather feedback on potential safety improvements. The survey took approximately six minutes to complete and was translated into Spanish, Chinese, and Filipino. All participants were invited to sign up to receive email updates on this study.

Prior to answering questions, survey participants were provided the following background information about the study:

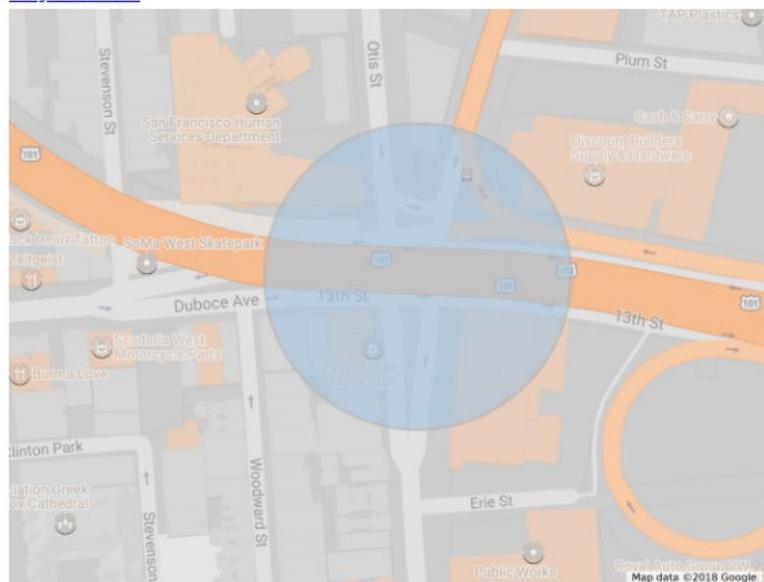
There are many intersections in San Francisco's South of Market neighborhood where freeway on- or off-ramps intersect city streets. Many of these ramps are close to schools, single room occupancy hotels, and senior centers, which attract populations at high risk of injury from traffic collisions.

The Transportation Authority and the SFMTA are exploring ways to improve safety for all travelers as we work toward San Francisco's Vision Zero goal to eliminate traffic deaths by 2024. This study will focus on a selected of freeway ramp intersections in SoMa (the remaining intersections are being addressed through other planning efforts).

As part of this study, we are seeking to learn more about people who travel in SoMa and better understand your travel experiences around freeway on- and off-ramp intersections.



Freeway Ramp Intersection #1: Mission, Otis, Duboce, & 13th streets (U.S. 101 NB off-ramp)
[Google Street View](#)



Please select any safety concerns you have when using this intersection:

- Unsafe traffic speeds
- Poor street lighting at night
- Poor traffic signal visibility
- Streets are difficult to cross for people walking
- Streets are difficult to cross for people biking
- No issues

Do you have other safety concerns or suggestions about how to improve this intersection?

Detail from online survey

Participants had the option to answer specific questions related to the 10 intersections being studied and answer general questions about traveling in SoMa or only answer general questions about traveling in SoMa.

Specific intersection questions included identifying any safety concerns about each intersection, including:

- Unsafe traffic speeds
- Poor street lighting at night
- Poor traffic signal visibility
- Streets are difficult to cross for people walking
- Streets are difficult to cross for people biking
- No issues

They could also offer open-ended feedback to the question: Do you have other safety concerns or suggestions about how to improve this intersection?

All respondents were asked to “Please describe your overall experience traveling in the SoMa neighborhood. Please share any overarching concerns or let us know how your travel experience in SoMa could be improved.”

Additionally, data was collected about when, where, and why participants travelled through SoMa and demographic information about home and work zip codes, age, income, gender, and ethnicity. We received the following responses from the survey:

- English – 807 responses
- Chinese – 14 responses
- Spanish – 5 responses
- Filipino – 1 responses

It is important to note that the language of the survey used does not indicate the ethnicity of the respondent pool, as many individuals tend to take surveys in English even if it is offered in a language they may be more familiar with. The self-identified ethnicities of the respondents are listed below.

Five common themes were apparent during this portion of the outreach and analysis, raised primarily in the general comments section:

- **Pedestrian Safety:** Focuses on the comments related to the experience of traveling through SoMa on-foot and/or with a mobility or assistive aid device. These comments do not directly acknowledge the root causes of such challenges, but rather the experience of traveling as a pedestrian itself.
- **Bicycle Safety and Infrastructure:** Refers to the general comments that focus on traveling through SoMa from the point of view of a cyclist while considering the bicycle infrastructure available to-date.
- **Motorist Behavior:** Refers to comments from motorists that are traveling through SoMa. The comments include confusion of motorists when they approach an intersection without warning of crosswalk or clear navigation direction.
- **Street and Site Design:** Focuses on the experience of traveling through SoMa either as a pedestrian, cyclist, motorist, or transit/TNC rider. Unlike the previous two categories, this theme applies to respondents whose reported challenges in navigating SoMa are the direct result of the configuration of the road, highway, sidewalk, or cycling networks. This cause and effect commentary is either directly acknowledged by the respondent or implied based on the information provided in the comments.
- **Encampments:** Refers to comments where the respondent’s primary challenge is in navigating around or through areas with homeless encampments.
- **Other:** A theme used in cases where none of the above apply, typically in situations where a general or unrelated opinion about SoMa is provided.

The survey revealed that **Street and Site Design** is the top theme related to navigating SoMa.

Within the general comments section, several respondents acknowledged that the configuration of the streets and freeway ramps play a role in the causes and effects of traveling as a pedestrian, cyclist, motorist, or transit/TNC rider. This includes challenges related to: wayfinding as a motorist, visibility as a pedestrian, navigating shared streets with curbside cycling infrastructure as both a pedestrian and cyclist, confusion or delays in merging from highways to local roads and vice versa for all modes, etc.

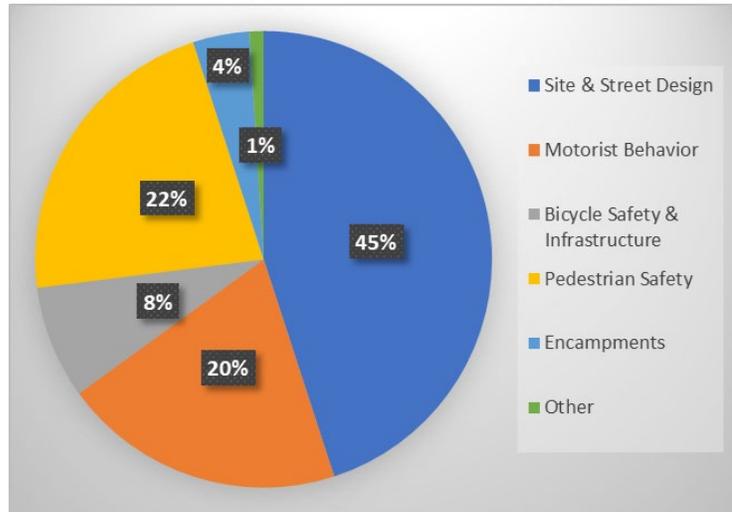


Figure 1: Themes of Survey Respondents Comments

The table below shows the summary of the survey respondents' experience using the study intersection ramps. Majority of the respondents identified "Difficult to Cross for People Walking" as their primary street safety concern for all the study intersections except for Essex and Harrison Street. The respondents also specified "Unsafe Traffic Speeds" as another area of street safety issue for most of the study intersections. For more information, see attached appendix A.

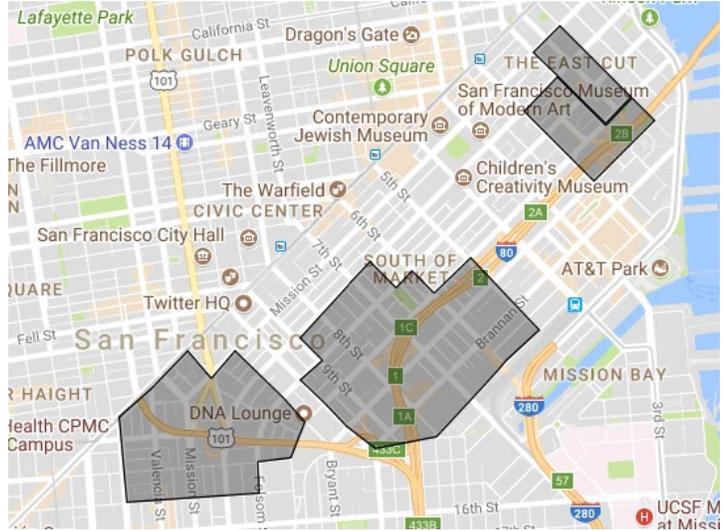
| Intersection | Unsafe Traffic Speeds | Poor Street Lighting | Poor Traffic Signals | Difficult to Cross for People Walking | Difficult to Cross for People Biking | No Issues |
|---|-----------------------|----------------------|----------------------|---------------------------------------|--------------------------------------|------------|
| 1. Mission, Otis, Duboce, & 13th streets | 40% | 31% | 22% | 62% | 43% | 20% |
| 2. South Van Ness Avenue & 13th Street | 37% | 26% | 22% | 61% | 39% | 27% |
| 3. 8th Street between Bryant & Harrison streets | 35% | 14% | 16% | 49% | 26% | 38% |
| 4. 8th Street & Bryant Street | 34% | 19% | 21% | 57% | 33% | 31% |
| 5. 7th Street & Harrison Street | 34% | 19% | 19% | 52% | 30% | 37% |
| 6. 7th Street between Bryant & Harrison streets | 37% | 21% | 21% | 47% | 26% | 37% |
| 7. 7th Street & Bryant Street | 36% | 18% | 18% | 53% | 29% | 36% |
| 8. 6th Street & Brannan Street | 43% | 20% | 21% | 60% | 38% | 29% |
| 9. Fremont Street between Howard & Folsom streets | 33% | 13% | 18% | 46% | 27% | 44% |
| 10. Essex Street and Harrison Street | 30% | 23% | 17% | 44% | 26% | 46% |

Table 1: Summary of Survey Results

Mailer

A postcard was sent to approximately 15,000 addresses in SoMa within a few blocks of the ramp intersections. A map of the mailing area can be seen in the image to the right.

The postcard provided information about the project itself and instructions on how to subscribe to informational emails. Links to participate in the survey were included in English, Spanish, Chinese, and Filipino. The mailer was delivered the week of April 16, 2018.



Map of SoMa Ramp Study Mail Distribution

Online Promotions

To spread the word about the SoMa Ramp Intersections Study and increase engagement, SFMTA mounted an online campaign that included an educational video, eNewsletter, and social media posts and ads.

In-Language Social Media Ads

Knowing that one in four SoMa residents self-identify as speaking English “less than very well,” connecting with a multilingual audience was a priority for the project team.

To encourage participation in the survey by residents more comfortable communicating in Spanish, Chinese and Filipino, targeted, in-language Facebook advertisements were created. The ads ran between April 13 and 27, 2018. A total budget of \$150 was used for ads in Spanish, Chinese and Filipino targeting residents who speak those languages with the following zip codes: 94107, 94105, and 94103.



Surveys were also shared in the newsletter of District 6 Supervisor Jane Kim, the San Francisco Bicycle Coalition, Walk San Francisco, and the Yerba Buena CBD.

Sample Facebook ad



Images used in the in-language Facebook ads

The ads reached thousands of SoMa residents over their two-week run with the following results:

Spanish

- Clicks: 90
- Reach: 3,562
- Impressions: 6,422

Filipino

- Clicks: 100
- Reach: 2,015
- Impressions: 4,685

Chinese

- Clicks: 81
- Reach: 1,837
- Impressions: 4,446

In total, the ads reached nearly 7,414 SoMa residents over the course of two weeks. The average cost-per-click across ads was about \$.55, which is standard for in-language survey ads. Overall, the ads were an effective way to expand the reach of the outreach effort to multilingual SoMa residents. On the organic side of social media, SFCTA posted the survey link and accompanying video on Facebook and Twitter. Agencies and groups like Vision Zero SF and SF Transit Riders reposted the survey link, expanding the reach of the survey to their networks.

Outreach to Community Organizations and Stakeholders

Members of the SFCTA project team and Civic Edge Consulting conducted outreach to nearly 70 organizations with connections to the project to solicit their feedback on how SoMa streets could be made safer for all that use them. These organizations, which include public agencies, community groups, local businesses and employers, and neighborhood and citywide advocacy groups were invited to share their experiences in SoMa through the survey and were given language promoting the survey to include in newsletters to their members.

The following is a list of organizations that were contacted about the SoMa Ramp Intersections Study either by email, phone, or both:

- 303 Second Street Plaza
- 33 Clementina St Home Owners Assn.
- Alliance for a Better District 6
- Bayanihan Community Center
- Bicycle Advisory Committee
- California Highway Patrol
- Canon Kip Senior Center
- Carmichael, Bessie (6-8 Campus)
- Carmichael, Bessie (Pre-K- 5 Campus)
- Central Market CBD
- Chinatown Community Development Center
- Coalition on Homelessness
- Community Awareness and Treatment Services, Inc - Women's Place drop-in clinic
- Courtyard by Marriott San Francisco Downtown

- Crafty Fox, Brick & Mortar*
- Department of Homelessness and Supportive Housing
- East Cut CBD
- Eastern Neighborhoods Citizen Advisory Committee
- Filipino American Development Foundation
- Filipino Cultural District
- Five Keys Charter School
- Flower Mart
- Gene Friend Rec Center
- Greek Orthodox Cathedral
- Hotel Council*
- Independent Living Resource Center
- Jasper San Francisco
- Livable City
- Lyon-Martin Health Services
- Market & Octavia CAC*
- Marshall Elementary School
- Mayor's Office on Disability (MOD)
- Natoma Neighborhood Group
- One Rincon Hill Association
- Police Officers Association
- Rincon Hill Residents Association
- Sailors' Union of the Pacific
- Salvation Army - Harbor Light
- San Francisco Bay Area and Planning and Urban Research Association (SPUR)
- San Francisco Bicycle Coalition*
- San Francisco Fire Department*
- San Francisco Police Department*
- San Francisco Sheriff's Dept
- San Francisco Tennis Club
- San Francisco Transit Riders
- Senior Disability Action
- SF Housing Authority/Mayor's Office of Housing and Community Development
- SFFD
- SFMTA Pedestrian Safety Advisory Committee (PSAC)
- SoMa Leadership Council
- SOMA Stabilization Fund
- SOMArts Cultural Center
- South Beach | Rincon | Mission Bay Neighborhood Association
- South Beach Merchants
- South of Market Business Association
- South of Market Community Action Network (SOMCAN)
- South of Market Youth Collaborative*
- Tenants and Owners Development Corporation (TODCO)
- Terra Gallery & Event Venue
- The Harrison
- The Stud Bar
- TMASF
- Transbay Joint Powers Authority (TJPA)
- Transbay Joint Powers Authority CAC*
- United Playaz
- Walk San Francisco*
- West Bay Filipino Multi Service Center
- West Bay Pilipino Multi Service Center
- Western SOMA Voice
- Western SoMa CBD
- Yerba Buena CBD

SFCTA made presentation to the organizations with asterisk (*)

The response from organizations was generally positive with a wide-ranging acknowledgment that the existing intersections are challenging to all street users, regardless if they are on foot or bicycle, taking transit, or driving. More specific feedback includes:

- Advanced traffic stop bar to increase distance between vehicles and pedestrians
- Rectangular Flashing Beacon signals (where applicable) to increase pedestrian awareness and visibility
- New crosswalks, bicycle lanes and sidewalks (where applicable) to reduce pedestrian and bicyclist crossing distance
- Pedestrian scale lighting under freeways to increase pedestrian and bicyclist visibility

- “No Turn on Red” signs to reduce vehicle turning speed and increase pedestrian visibility

Intercept Outreach in Collaboration with Vision Zero SF

To maximize participation by those who live and work in SoMa and those who travel through the area, the project team partnered with Vision Zero SF to conduct intercept outreach on May 2, 2018. Multilingual outreach ambassadors distributed the SoMa Ramps mailer along with VZSF informational materials. Ambassadors also engaged participants in an activity that asked them to rate their feeling of safety at the 10 ramp intersections.

A number of people shared stories of travelling in the area, including two who had been hit by a car at this intersection or similar intersections when biking or walking. While many individuals stated that they would take the online survey, there were a few recurring suggestions for improvements, including:

- Ensuring ADA compliant sidewalks (especially given the local populations of people with disabilities and experiencing homelessness);
- Improving drainage at these intersections so that they don't flood when it rains;
- Lengthening traffic signal pedestrian crossing times; and
- Improving the bus boarding island at Mission and 13th Street by addressing challenges like trash on the island and occasional tents which make it challenging to navigate.

Outreach Metrics:

- Number of interactions: 450
- Number of activity participants: 20
- SFCTA mailers distributed: 400
- Race (by observation): 30% White, 30% Asian and Pacific Islander, 30% Latino, 10% African American
- Age (by observation): 50% adults 25-50, 15% teens-early 20's, 5% under 12, 30% 50+
- Languages (by interactions): 70% English, 10% Spanish, 10% Chinese, 10% Filipino

Vision Zero SF also promoted SFCTA social media posts about the SoMa Ramp Intersections Study and survey.

APPENDIX E

Outreach Report Round 2



San Francisco
County Transportation
Authority

MEMO

To: SFCTA SoMa Ramps Project Team

From: Civic Edge Consulting, SFCTA Staff

Date: October 9, 2018

Subject: SoMa Ramp Intersections Safety Study – Round 2 Outreach Summary Report

The goal for the SoMa Ramp Intersections Safety Study's second round of outreach was to gather feedback on the draft safety improvement design proposals at ten freeway ramp intersections in the neighborhood. Outreach was centered around an open house but also included other methods such as stakeholder group meetings and tabling at Sunday Streets.

The second round of outreach included the following tools:

- Open house on July 31;
- Poster placement around the study's intersections (map);
- Intercept outreach in the study area, in collaboration with Vision Zero SF;
- Tabling at SoMa Sunday Streets on August 18; and
- Phone and email outreach to community-based organizations (CBOs), partner agencies, and other groups and individuals with an interest in the project.

Open House

The project team held an open house on Tuesday, July 31 from 5:30 to 7:30 p.m. at the Bayanihan Center at 1010 Mission Street. The event featured stations showing proposed designs at each of the ten study intersections, as well as information about the study background and potential next steps. Team members were available at each station to answer questions and a Filipino interpreter was on hand. Multilingual event notification materials invited participants to request any other needed translation or assistance services.

Open house attendees were asked to provide feedback through any of several mechanisms. Participants could use emoji stickers to identify design elements they did or did not like, add additional feedback on Post-It notes to be placed on the posters, and/or fill out comment cards with any more detailed input.

In total, 24 individuals signed in at the welcome station near the entrance to the Open House. A plurality of attendees cited an email from the SFCTA as the means by which they learned about the meeting. Another six individuals cited information from a community group.

Four individuals self-identified as "resident" or member of the "public," while another eight people listed no affiliation. All 12 of these individuals used personal emails, suggesting that they did not attend in any professional or organizational capacity. None of the participants needed translation services.



Two community non-profits were represented, with two individuals representing each South of Market Community Action Network (SOMCAN) and Senior Disability Action (SDA). Other individuals attended representing the Office of Supervisor Jane Kim, CalTrans, the San Francisco Bicycle Coalition, YIMBY Action, and SOMA West Community Benefit District.

Outreach to Community Organizations and Stakeholders

Members of the SFCTA project team and Civic Edge Consulting conducted outreach to nearly 70 organizations with connections to the project to solicit their feedback and invite them to the open house. These groups were the same as those contacted during the first round of outreach.

The following is a list of organizations that were contacted about the SoMa Ramp Intersections Study either by email, phone, or both (see next page). Based on stakeholder requests, project team members met with groups marked with an asterisk (*) during this round of outreach.

- 303 Second Street Plaza
- 33 Clementina St Home Owners Assn.
- Alliance for a Better District 6
- Bayanihan Community Center
- Bicycle Advisory Committee
- California Highway Patrol
- Canon Kip Senior Center
- Carmichael, Bessie (6-8 Campus)
- Carmichael, Bessie (Pre-K- 5 Campus)
- Central Market CBD
- Chinatown Community Development Center
- Coalition on Homelessness
- Community Awareness and Treatment Services, Inc - Women's Place drop-in clinic
- Courtyard by Marriott San Francisco Downtown
- Crafty Fox; Brick & Mortar
- Department of Homelessness and Supportive Housing
- East Cut CBD
- Eastern Neighborhoods Citizen Advisory Committee
- Filipino American Development Foundation
- Filipino Cultural District
- Five Keys Charter School
- Flower Mart
- Gene Friend Rec Center
- Greek Orthodox Cathedral
- Hotel Council
- Independent Living Resource Center
- Jasper San Francisco
- Livable City
- Lyon-Martin Health Services
- Market & Octavia CAC
- Marshall Elementary School
- Mayor's Office on Disability (MOD)*
- Natoma Neighborhood Group
- One Rincon Hill Association
- Police Officers Association
- Rincon Hill Residents Association
- Sailors' Union of the Pacific
- Salvation Army - Harbor Light
- San Francisco Bay Area and Planning and Urban Research Association (SPUR)
- San Francisco Bicycle Coalition*
- San Francisco Police Department
- San Francisco Sheriff's Dept
- San Francisco Tennis Club
- San Francisco Transit Riders
- Senior Disability Action
- SF Housing Authority/Mayor's Office of Housing and Community Development
- SFFD
- SFMTA Pedestrian Safety Advisory Committee (PSAC)
- SoMa Leadership Council
- SOMA Stabilization Fund
- SOMArts Cultural Center
- SoMaWest CBD
- South Beach | Rincon | Mission Bay Neighborhood Association
- South Beach Merchants
- South of Market Business Association
- South of Market Community Action Network (SOMCAN)
- Tenants and Owners Development Corporation (TODCO)
- Terra Gallery & Event Venue
- The Harrison
- The Stud Bar
- TMA SF
- Transbay Joint Powers Authority (TJPA)
- Transbay Joint Powers Authority CAC
- United Playaz
- Walk San Francisco*
- West Bay Filipino Multi Service Center
- West Bay Pilipino Multi Service Center
- West SoMa Community Benefits District*
- Western SOMA Voice
- Yerba Buena CBD

Intercept Outreach

In conjunction with Vision Zero SF, our team conducted intercept outreach on July 26 from 3 to 7 PM at 7th and Bryant outside of the Hall of Justice. Three Outreach Ambassadors, who between them spoke English, Spanish, Chinese, and Filipino, interacted with 250 individuals representing a diverse cross-section of people walking in the neighborhood.

The team focused on informing individuals about the upcoming SoMa Ramps Study Open House. The majority of people we talked to were happy to receive a flyer about the Open House. About 30 people were eager to stop and find out more information, including where the Open House would take place and what specific recommendations were going to be outlined by the project team. About ten people we spoke to told us that they had already heard of the Open House and three people indicated that they were going to attend.

People were generally very happy to hear that both the SoMa Ramps Study and Open House were taking place. Most people told us that the SoMa neighborhood feels very unsafe due to high traffic volumes, high speeds, and distracted driving. Tabling at the corner of 7th and Bryant was a powerful tool, as pedestrians were able to directly point out nearby freeway ramps and indicate the challenges happening “right here.” Individuals have seen collisions happen themselves in this neighborhood and welcome this focus on improving safety.

Sunday Streets Outreach

Sunday Streets is a public event held by SFMTA and Livable City to promote active urban lifestyles, centering on bicycle and pedestrian activities. In coordination with Vision Zero SF, the SFCTA team and a representative from SFMTA hosted interactive outreach boards and collected feedback on proposed improvements to the ten study intersections. The boards themselves covered the project overview and displayed illustrative renderings of the draft proposed improvements.

In total, the team interacted with approximately 160 individuals, many whom left feedback emoji stickers on the posters indicating whether they liked or did not like the proposed improvements. Overall, people were happy to see safety improvements being planned. In addition, nine individuals signed up for the email list and seven individuals left specific comments on feedback cards.

Posters and other Notifications

Several additional methods were used to distribute notifications announcing the availability of design recommendations and the time and location of the open house. Posters in English, Chinese, Spanish, and Filipino were placed throughout SoMa near the ten intersections included in this study. Posters were placed within one to two blocks of the study intersections and numbered nearly 90 in total. Posters were removed within two days of the Open House. Notification emails were sent to the nearly 450 people who had indicated interest in the study during the first round of outreach, including recipients of first-round radius mailer postcards and respondents to the survey conducted earlier in the year. Lastly, social media posts also advertised the upcoming outreach.

Feedback Overview

The project team compiled public feedback collected during this outreach round and used it to further refine and improve the proposals for the ten ramp intersections. In addition, some feedback was more general than can be addressed by focusing on the designs for these intersections alone, such as requests for more traffic enforcement or street and freeway network changes that extend beyond the study intersections. These ideas were shared with appropriate agencies and teams (e.g. SFMTA for traffic enforcement requests and the Connect SF planning process to study larger transportation network changes). Feedback received included the following summarized comments:

Pedestrian crossings:

- Shorter and wider crosswalks
- Concerns regarding pedestrian crossing lengths with the two-way Otis St. design
- Improve pedestrian signal visibility
- Replace or augment yield signs on unsignalized off-ramps with more signage, flashing lights, stop signs, and/or full signals
- More curb bulb-outs and improve visibility with paint
- More "No Right on Red" signs
- More leading pedestrian signals and longer pedestrian walking times
- Add painted stop lines in advance of crosswalks

Bicycle infrastructure:

- More protected bike lanes (consider using planters for protection in the long term)
- More bike-specific signals
- More bike lanes fully delineated through intersections
- Refine design of merge areas between bikes and turning cars
- At mid-block crossings, more signs warning bicyclists to slow down

Transit:

- Bus shelter shade improvements and arrival time indicators
- More dedicated Muni lanes

Accessibility:

- Improve accessibility to bus stop islands with more curb ramps or raised crosswalks
- Accessible Pedestrian Signals (APS) at all intersections
- Maintain blue parking zones when reducing parking spaces
- Maintain curb access where needed when installing bike lanes

Auto:

- Create sharper turns to slow down vehicles, especially coming from freeway ramps
- Maintain vehicle access to businesses (e.g. Discount Builder and Supply Store on Mission)
- More road diets to reduce auto lanes
- More traffic enforcement
- Long term elimination of freeways and on-off ramps

General/Other:

- Improve intersection lighting, especially below underpasses
- More street greenery, especially on medians, and placemaking elements
- More active TDM programs

APPENDIX F

Full Cost Estimates



San Francisco
County Transportation
Authority

| | | | | | |
|------------------|--|------------|-----------------------|------------------|---------------------|
| Location: | MISSION STREET/13TH STREET/US 101 NB OFF-RAMP | | | | |
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | Bus Only Lane Striping | 1200 | Per SQ FT of Red Lane | \$ 20 | \$ 24,000 |
| N2 | Pavement Markings (Intersection) | 2 | Each Intersection | \$ 10,000 | \$ 20,000 |
| N3 | Remove/Replace Signs | 3 | Per Sign | \$ 300 | \$ 900 |
| N4 | Temporary Bulb-out/Refuge (with delineators) | 1 | EA | \$ 10,000 | \$ 10,000 |
| | | | | Total | \$ 54,900 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | Accessible Pedestrian Signals | 2 | Per Intersection | \$ 200,000 | \$ 400,000 |
| C2 | Bulb-out | 3 | EA | \$ 113,000 | \$ 339,000 |
| C3 | Pavement Markings (Intersection) | 2 | Each Intersection | \$ 10,000 | \$ 20,000 |
| C4 | Raised Median | 3 | EA | \$ 23,000 | \$ 69,000 |
| C5 | Remove/Replace Signs | 1 | Per Sign | \$ 300 | \$ 300 |
| C6 | RRFB Assembly | 1 | LS | \$ 200,000 | \$ 200,000 |
| C7 | Traffic Signals (12" section) [Install/upgrade] | 2 | Each Signal Head | \$ 5,000 | \$ 10,000 |
| C8 | Traffic Signals (12" section) and a new Pole | 1 | EA | \$ 25,000 | \$ 25,000 |
| | | | | Total | \$ 1,063,300 |
| Location: | SOUTH VAN NESS AVE/13TH ST/US 101 SB ON-RAMP | | | | |
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 |
| N2 | Remove/Replace Signs | 3 | Per Sign | \$ 300 | \$ 900 |
| N3 | Temporary Bulb-out/Refuge (with delineators) | 1 | EA | \$ 10,000 | \$ 10,000 |
| | | | | Total | \$ 20,900 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | 12" Backplates | 1 | Per Intersection | \$ 5,000 | \$ 5,000 |
| C2 | Accessible Pedestrian Signals | 1 | Per Intersection | \$ 200,000 | \$ 200,000 |
| C3 | Bulb-out | 1 | EA | \$ 113,000 | \$ 113,000 |
| C4 | Overhead Sign | 1 | EA | \$ 52,000 | \$ 52,000 |
| C5 | Pedestrian Crossing With Signals | 1 | EA | \$ 400,000 | \$ 400,000 |
| C6 | Raised Median | 3 | EA | \$ 23,000 | \$ 69,000 |
| C7 | Sidewalk | 1 | LS | \$ 62,000 | \$ 62,000 |
| C8 | Traffic Signals (12" section) and a new Pole | 7 | EA | \$ 25,000 | \$ 175,000 |
| | | | | Total | \$ 1,076,000 |
| Location: | 8TH STREET (MIDBLOCK)/I-80 WB OFF-RAMP | | | | |
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 |
| | | | | Total | \$ 10,000 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | Bulb-out | 1 | EA | \$ 113,000 | \$ 113,000 |
| C2 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 |
| C3 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 |
| C4 | RRFB Assembly | 1 | LS | \$ 200,000 | \$ 200,000 |
| Total | | | | Total | \$ 328,000 |

| | | | | | | |
|------------------|--|------------|-------------------|------------------|---------------------|-----------|
| Location: | BRYANT STREET/8TH STREET/I-80 EB ON-RAMP | | | | | |
| NEAR-TERM | | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost | |
| N1 | Green Bike Crossing | 120 | SQFT | \$ 20 | \$ 2,400 | |
| N2 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 | |
| N3 | Remove/Replace Signs | 2 | Per Sign | \$ 300 | \$ 600 | |
| N4 | Temporary Bulb-out/Refuge (with delineators) | 2 | EA | \$ 10,000 | \$ 20,000 | |
| N5 | Install Leading Pedestrian Interval | 1 | LS | \$ 4,000 | \$ 4,000 | |
| Total | | | | Total | \$ 37,000 | |
| CAPITAL | | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost | |
| C1 | Accessible Pedestrian Signals | 2 | Per Intersection | \$ 200,000 | \$ 400,000 | |
| C2 | Bulb-out | 4 | EA | \$ 113,000 | \$ 452,000 | |
| C3 | Mast Arm Pole with signals | 1 | Each Pole | \$ 71,000 | \$ 71,000 | |
| C4 | Overhead Sign | 2 | EA | \$ 52,000 | \$ 104,000 | |
| C5 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 | |
| C6 | Pedestrian Crossing With Signals | 2 | EA | \$ 400,000 | \$ 800,000 | |
| C7 | Sidewalk | 1 | LS | \$ 62,000 | \$ 62,000 | |
| C8 | Traffic Signals (12" section) and a new Pole | 5 | EA | \$ 25,000 | \$ 125,000 | |
| | | | | Total | \$ 2,024,000 | |
| Location: | HARRISON STREET/7TH STREET/I-80 WB ON-RAMP | | | | | |
| NEAR-TERM | | | | | | \$ 10,000 |
| # | Description | QTY | Unit | Unit Cost | Total Cost | |
| N1 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 | |
| Total | | | | | \$ 10,000 | |
| CAPITAL | | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost | |
| C1 | Accessible Pedestrian Signals | 1 | Per Intersection | \$ 200,000 | \$ 200,000 | |
| C2 | Bulb-out | 5 | EA | \$ 113,000 | \$ 565,000 | |
| C3 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 | |
| C4 | Pedestrian Crossing With Signals | 1 | EA | \$ 400,000 | \$ 400,000 | |
| C5 | Raised Median | 2 | EA | \$ 23,000 | \$ 46,000 | |
| C6 | Traffic Signals (12" section) and a new Pole | 2 | EA | \$ 25,000 | \$ 50,000 | |
| Total | | | | | \$ 1,266,000 | |
| Location: | 7TH STREET (MIDBLOCK)/I-80 EB OFF-RAMP VISION | | | | | |
| NEAR-TERM | | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost | |
| N1 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 | |
| N2 | Remove/Replace Signs | 5 | Per Sign | \$ 300 | \$ 1,500 | |
| Total | | | | | \$ 11,500 | |
| CAPITAL | | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost | |
| C1 | Bulb-out | 2 | EA | \$ 113,000 | \$ 226,000 | |
| C2 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 | |
| C3 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 | |
| C4 | RRFB Assembly | 1 | LS | \$ 200,000 | \$ 200,000 | |
| Total | | | | | \$ 441,000 | |

| Location: | BRYANT STREET/7TH STREET/I-80 EB OFF-RAMP | | | | |
|------------------|---|-----|-------------------|------------|---------------------|
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 |
| N2 | Green Bike Crossing | 180 | SQFT | \$ 20 | \$ 3,600 |
| N3 | Temporary Bulb-out/Refuge (with delineators) | 3 | EA | \$ 10,000 | \$ 30,000 |
| Total | | | | | \$ 38,600 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | Accessible Pedestrian Signals | 1 | Per Intersection | \$ 200,000 | \$ 200,000 |
| C2 | Bulb-out | 6 | EA | \$ 113,000 | \$ 678,000 |
| C3 | Mast Arm Pole with signals | 2 | Each Pole | \$ 71,000 | \$ 142,000 |
| C4 | Raised Median | 1 | EA | \$ 23,000 | \$ 23,000 |
| C5 | Traffic Signals (12" section) and a new Pole | 2 | EA | \$ 25,000 | \$ 50,000 |
| Total | | | | | \$ 1,093,000 |
| Location: | BRANNAN STREET/6TH STREET/I-280 ON/OFF-RAMP | | | | |
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | 12" Backplates | 1 | Per Intersection | \$ 5,000 | \$ 5,000 |
| N2 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 |
| N3 | Install Leading Pedestrian Interval | 1 | LS | \$ 4,000 | \$ 4,000 |
| N4 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 |
| N6 | Remove/Replace Signs | 1 | Per Sign | \$ 300 | \$ 300 |
| N7 | Traffic Signals (12" section) [Install/upgrade] | 5 | Each Signal Head | \$ 5,000 | \$ 25,000 |
| Total | | | | | \$ 49,300 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | Accessible Pedestrian Signals | 1 | Per Intersection | \$ 200,000 | \$ 200,000 |
| C2 | Bulb-out | 3 | EA | \$ 113,000 | \$ 339,000 |
| C3 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 |
| C4 | Pedestrian Crossing With Signals | 1 | EA | \$ 400,000 | \$ 400,000 |
| C5 | Raised Median | 2 | EA | \$ 23,000 | \$ 46,000 |
| C6 | Remove/Replace Signs | 2 | Per Sign | \$ 300 | \$ 600 |
| C7 | Traffic Signals (12" section) and a new Pole | 5 | EA | \$ 25,000 | \$ 125,000 |
| Total | | | | | \$ 1,115,600 |
| Location: | HARRISON STREET/ESSEX STREET/I-80 EB ON-RAMP | | | | |
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 |
| N2 | Install Leading Pedestrian Interval | 1 | LS | \$ 4,000 | \$ 4,000 |
| Total | | | | | \$ 9,000 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | Accessible Pedestrian Signals | 1 | Per Intersection | \$ 200,000 | \$ 200,000 |
| C2 | Mast Arm Pole with signals | 2 | Each Pole | \$ 71,000 | \$ 142,000 |
| C3 | Pavement Markings (Intersection) | 1 | Each Intersection | \$ 10,000 | \$ 10,000 |
| C4 | Pedestrian Crossing With Signals | 2 | EA | \$ 400,000 | \$ 800,000 |
| C5 | Remove/Replace Signs | 2 | Per Sign | \$ 300 | \$ 600 |
| C6 | Retaining Wall | 1 | LS | \$ 353,000 | \$ 353,000 |
| C7 | Sidewalk | 1 | LS | \$ 62,000 | \$ 62,000 |
| C8 | Traffic Signals (12" section) and a new Pole | 2 | EA | \$ 25,000 | \$ 50,000 |
| Total | | | | | \$ 1,617,600 |

| | | | | | |
|------------------|--|------------|----------------------|------------------|-------------------|
| Location: | FREMONT STREET/I-80 WB OFF-RAMP VISION ZERO | | | | |
| NEAR-TERM | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| N1 | Crosswalk Striping (Continental) | 1 | EA Intersection | \$ 5,000 | \$ 5,000 |
| N2 | Remove/Replace Signs | 2 | Per Sign | \$ 300 | \$ 600 |
| Total | | | | | \$ 5,600 |
| CAPITAL | | | | | |
| # | Description | QTY | Unit | Unit Cost | Total Cost |
| C1 | Curb Ramp | 2 | Per Corner (2 ramps) | \$ 23,000 | \$ 46,000 |
| C2 | Pedestrian Crossing With Signals | 1 | EA | \$ 400,000 | \$ 400,000 |
| C3 | Raised Median | 1 | EA | \$ 23,000 | \$ 23,000 |
| Total | | | | | \$ 469,000 |

APPENDIX G

Traffic Counts



San Francisco
County Transportation
Authority

TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

Latitude: 37.77470
Longitude: -122.405403

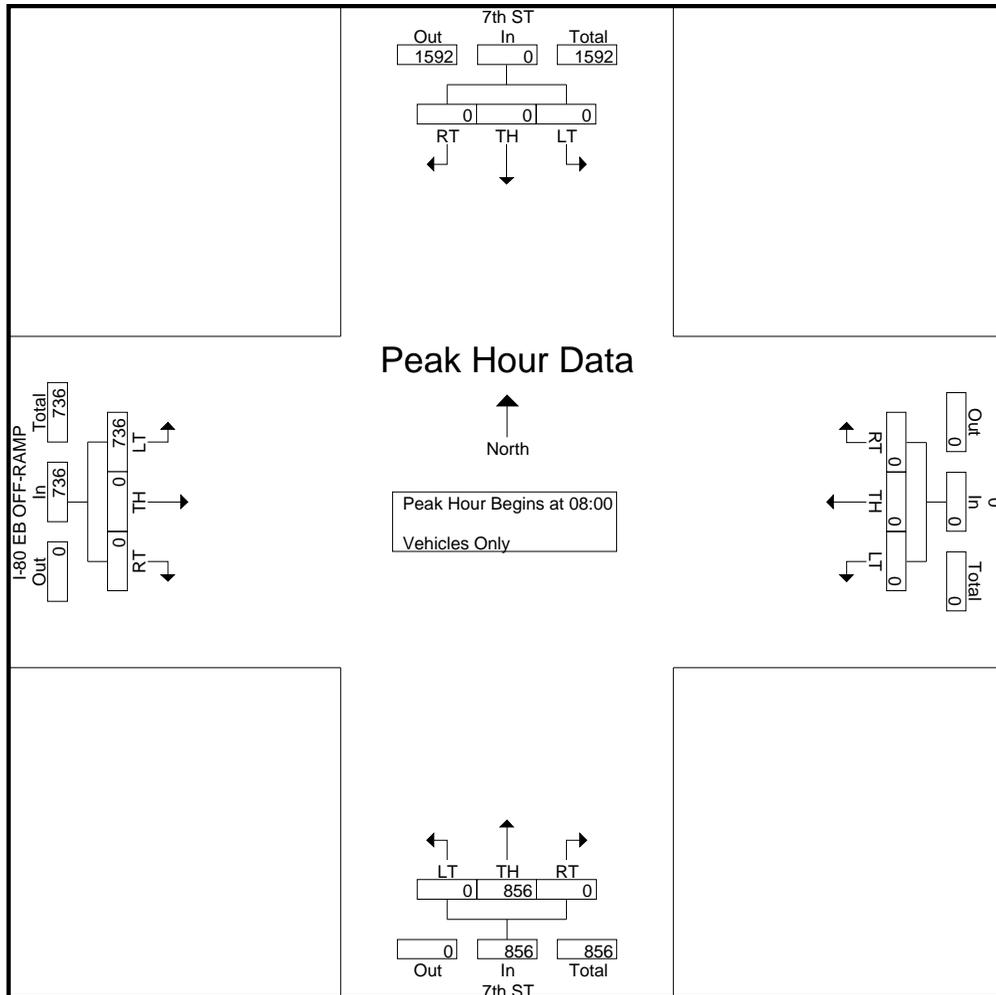
File Name : 7-80 eb off-ramp-a
Site Code : 2
Start Date : 8/28/2018
Page No : 1

Groups Printed- Vehicles Only

| Start Time | 7th ST Southbound | | | | 0 Westbound | | | | 7th ST Northbound | | | | I-80 EB OFF-RAMP Eastbound | | | | Int. Total |
|-------------|-------------------|----|----|------------|-------------|----|----|------------|-------------------|------|----|------------|----------------------------|----|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 128 | 0 | 0 | 149 | 149 | 277 |
| 07:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 0 | 130 | 0 | 0 | 161 | 161 | 291 |
| 07:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 0 | 160 | 0 | 0 | 159 | 159 | 319 |
| 07:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 203 | 0 | 203 | 0 | 0 | 175 | 175 | 378 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 621 | 0 | 621 | 0 | 0 | 644 | 644 | 1265 |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 190 | 0 | 190 | 0 | 0 | 166 | 166 | 356 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 224 | 0 | 224 | 0 | 0 | 189 | 189 | 413 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 228 | 0 | 228 | 0 | 0 | 184 | 184 | 412 |
| 08:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 214 | 0 | 214 | 0 | 0 | 197 | 197 | 411 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 856 | 0 | 856 | 0 | 0 | 736 | 736 | 1592 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1477 | 0 | 1477 | 0 | 0 | 1380 | 1380 | 2857 |
| Apprch % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | 100 | 100 | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51.7 | 0 | 51.7 | 0 | 0 | 48.3 | 48.3 | |

| Start Time | 7th ST Southbound | | | | 0 Westbound | | | | 7th ST Northbound | | | | I-80 EB OFF-RAMP Eastbound | | | | Int. Total |
|--------------|-------------------|------|------|------------|-------------|------|------|------------|-------------------|------|------|------------|----------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 190 | 0 | 190 | 0 | 0 | 166 | 166 | 356 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 224 | 0 | 224 | 0 | 0 | 189 | 189 | 413 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 228 | 0 | 228 | 0 | 0 | 184 | 184 | 412 |
| 08:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 214 | 0 | 214 | 0 | 0 | 197 | 197 | 411 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 856 | 0 | 856 | 0 | 0 | 736 | 736 | 1592 |
| % App. Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | 100 | 100 | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .939 | .000 | .939 | .000 | .000 | .934 | .934 | .964 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00



TRAFFIC COUNTS PLUS

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CITY OF SAN FRANCISCO

File Name : 7-80 EB off-ramp-p

Latitude: 37.77470

Site Code : 2

Longitude: -122.405403

Start Date : 8/28/2018

Page No : 1

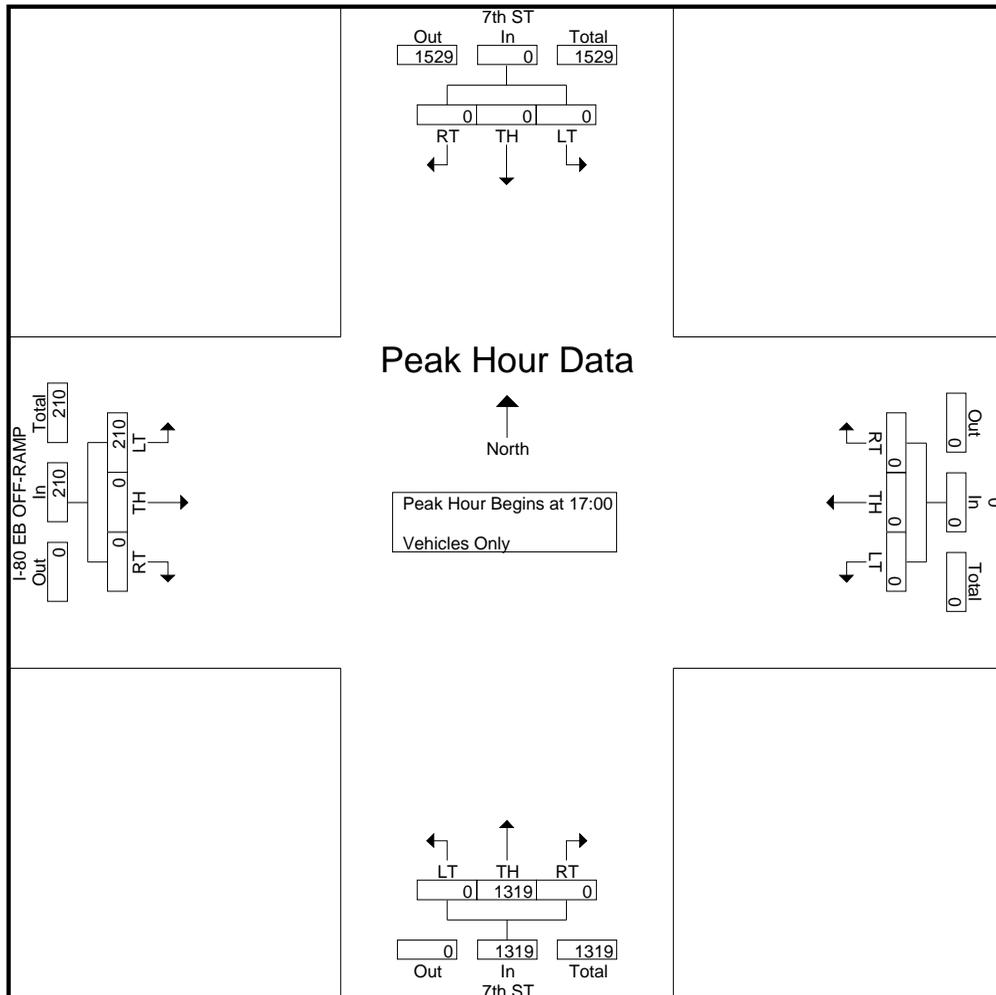
Groups Printed- Vehicles Only

| Start Time | 7th ST Southbound | | | | 0 Westbound | | | | 7th ST Northbound | | | | I-80 EB OFF-RAMP Eastbound | | | | Int. Total |
|-------------|-------------------|----|----|------------|-------------|----|----|------------|-------------------|------|----|------------|----------------------------|----|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 307 | 0 | 307 | 0 | 0 | 25 | 25 | 332 |
| 16:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 288 | 0 | 288 | 0 | 0 | 26 | 26 | 314 |
| 16:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 306 | 0 | 306 | 0 | 0 | 24 | 24 | 330 |
| 16:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 324 | 0 | 324 | 0 | 0 | 33 | 33 | 357 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1225 | 0 | 1225 | 0 | 0 | 108 | 108 | 1333 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 336 | 0 | 336 | 0 | 0 | 36 | 36 | 372 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 338 | 0 | 338 | 0 | 0 | 51 | 51 | 389 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 340 | 0 | 340 | 0 | 0 | 51 | 51 | 391 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305 | 0 | 305 | 0 | 0 | 72 | 72 | 377 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1319 | 0 | 1319 | 0 | 0 | 210 | 210 | 1529 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2544 | 0 | 2544 | 0 | 0 | 318 | 318 | 2862 |
| Apprch % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | 100 | 100 | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88.9 | 0 | 88.9 | 0 | 0 | 11.1 | 11.1 | |

| Start Time | 7th ST Southbound | | | | 0 Westbound | | | | 7th ST Northbound | | | | I-80 EB OFF-RAMP Eastbound | | | | Int. Total |
|--------------|-------------------|------|------|------------|-------------|------|------|------------|-------------------|------|------|------------|----------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 336 | 0 | 336 | 0 | 0 | 36 | 36 | 372 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 338 | 0 | 338 | 0 | 0 | 51 | 51 | 389 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 340 | 0 | 340 | 0 | 0 | 51 | 51 | 391 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305 | 0 | 305 | 0 | 0 | 72 | 72 | 377 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1319 | 0 | 1319 | 0 | 0 | 210 | 210 | 1529 |
| % App. Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | 100 | 100 | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .970 | .000 | .970 | .000 | .000 | .729 | .729 | .978 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 17:00



TRAFFIC COUNTS PLUS

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CITY OF SAN FRANCISCO

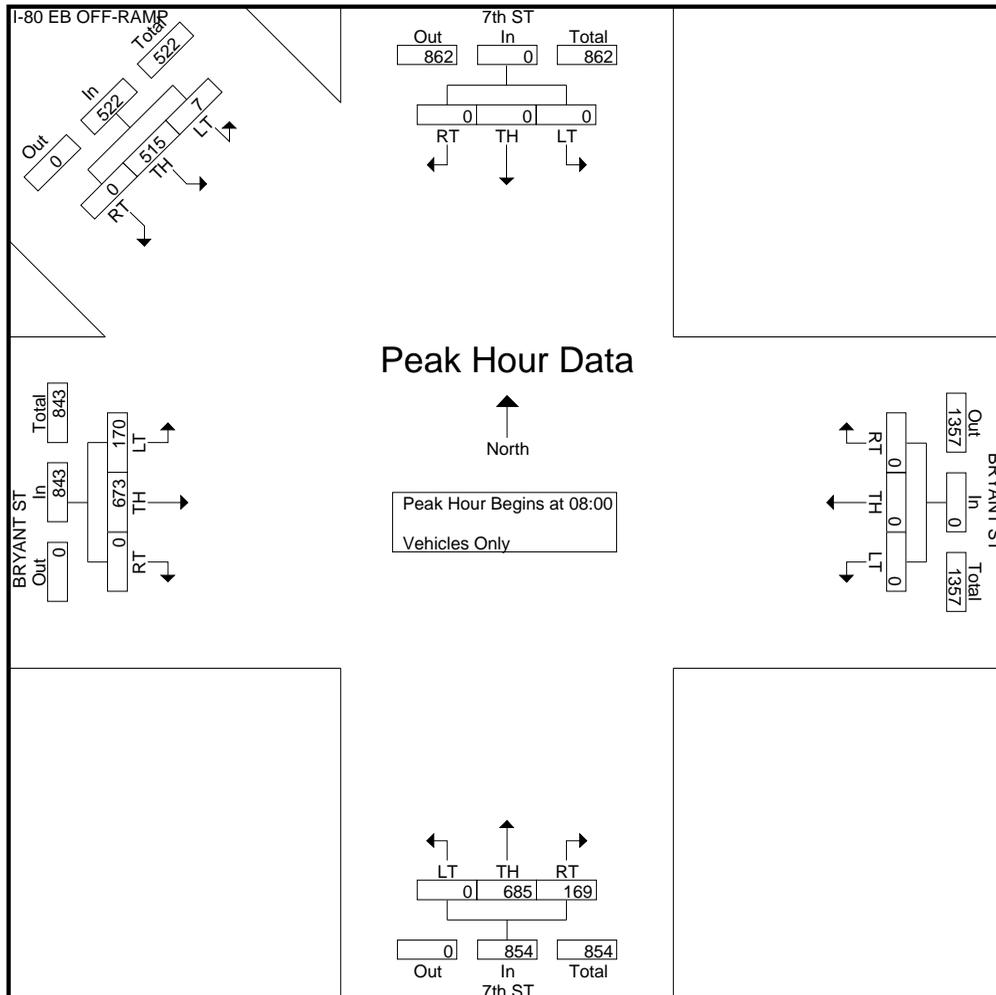
Latitude: 37.774300
Longitude: -122.404762

File Name : 7-bryant-a
Site Code : 1
Start Date : 8/28/2018
Page No : 1

Groups Printed- Vehicles Only

| Start Time | 7th ST Southbound | | | | BRYANT ST Westbound | | | | 7th ST Northbound | | | | BRYANT ST Eastbound | | | | I-80 EB OFF-RAMP Southeastbound | | | | Int. Total |
|-------------|-------------------|----|----|------------|---------------------|----|----|------------|-------------------|------|----|------------|---------------------|------|------|------------|---------------------------------|------|-----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 105 | 0 | 138 | 0 | 70 | 22 | 92 | 0 | 45 | 3 | 48 | 278 |
| 07:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 117 | 0 | 152 | 0 | 99 | 22 | 121 | 0 | 59 | 2 | 61 | 334 |
| 07:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 136 | 0 | 174 | 0 | 116 | 26 | 142 | 0 | 58 | 0 | 58 | 374 |
| 07:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 173 | 0 | 202 | 0 | 142 | 29 | 171 | 0 | 82 | 0 | 82 | 455 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 135 | 531 | 0 | 666 | 0 | 427 | 99 | 526 | 0 | 244 | 5 | 249 | 1441 |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 152 | 0 | 190 | 0 | 132 | 37 | 169 | 0 | 87 | 1 | 88 | 447 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 178 | 0 | 224 | 0 | 177 | 45 | 222 | 0 | 116 | 1 | 117 | 563 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 176 | 0 | 214 | 0 | 168 | 46 | 214 | 0 | 153 | 0 | 153 | 581 |
| 08:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 179 | 0 | 226 | 0 | 196 | 42 | 238 | 0 | 159 | 5 | 164 | 628 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 169 | 685 | 0 | 854 | 0 | 673 | 170 | 843 | 0 | 515 | 7 | 522 | 2219 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 304 | 1216 | 0 | 1520 | 0 | 1100 | 269 | 1369 | 0 | 759 | 12 | 771 | 3660 |
| Apprch % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 80 | 0 | 41.5 | 0 | 80.4 | 19.6 | 37.4 | 0 | 98.4 | 1.6 | 21.1 | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.3 | 33.2 | 0 | 41.5 | 0 | 30.1 | 7.3 | 37.4 | 0 | 20.7 | 0.3 | 21.1 | |

| Start Time | 7th ST Southbound | | | | BRYANT ST Westbound | | | | 7th ST Northbound | | | | BRYANT ST Eastbound | | | | I-80 EB OFF-RAMP Southeastbound | | | | Int. Total |
|--|-------------------|------|------|------------|---------------------|------|------|------------|-------------------|------|------|------------|---------------------|------|------|------------|---------------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 | | | | | | | | | | | | | | | | | | | | | |
| 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 152 | 0 | 190 | 0 | 132 | 37 | 169 | 0 | 87 | 1 | 88 | 447 |
| 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 178 | 0 | 224 | 0 | 177 | 45 | 222 | 0 | 116 | 1 | 117 | 563 |
| 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 176 | 0 | 214 | 0 | 168 | 46 | 214 | 0 | 153 | 0 | 153 | 581 |
| 08:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 179 | 0 | 226 | 0 | 196 | 42 | 238 | 0 | 159 | 5 | 164 | 628 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 169 | 685 | 0 | 854 | 0 | 673 | 170 | 843 | 0 | 515 | 7 | 522 | 2219 |
| % App. Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19.8 | 80.2 | 0 | 41.5 | 0 | 79.8 | 20.2 | 37.4 | 0 | 98.7 | 1.3 | 21.1 | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .899 | .957 | .000 | .945 | .000 | .858 | .924 | .886 | .000 | .810 | .350 | .796 | .883 |



TRAFFIC COUNTS PLUS

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CITY OF SAN FRANCISCO

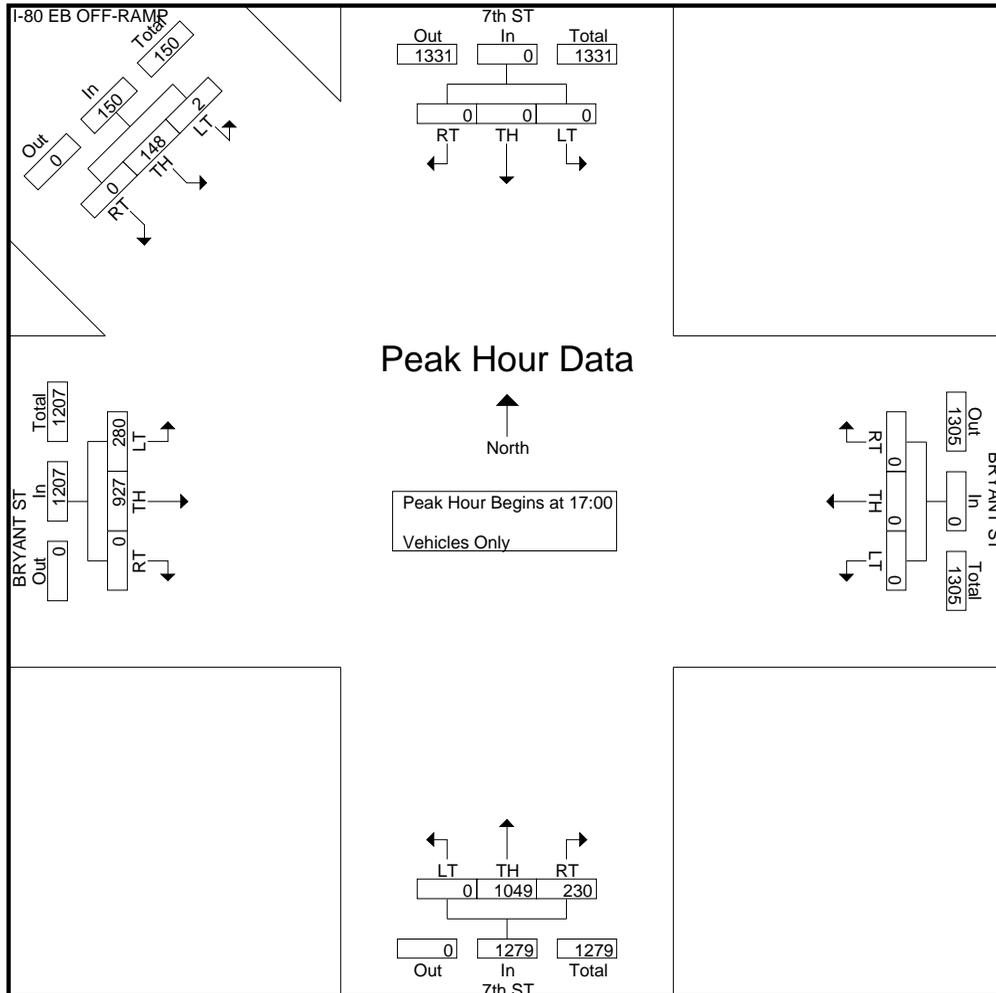
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Longitude: -122.404762

File Name : 7-bryant-p
Site Code : 1
Start Date : 8/28/2018
Page No : 1

Groups Printed- Vehicles Only

| Start Time | 7th ST Southbound | | | | BRYANT ST Westbound | | | | 7th ST Northbound | | | | BRYANT ST Eastbound | | | | I-80 EB OFF-RAMP Southeastbound | | | | Int. Total |
|--------------|-------------------|----|----|------------|---------------------|----|----|------------|-------------------|------|----|------------|---------------------|------|------|------------|---------------------------------|------|-----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 254 | 0 | 308 | 0 | 156 | 57 | 213 | 0 | 20 | 1 | 21 | 542 |
| 16:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 238 | 0 | 293 | 0 | 178 | 51 | 229 | 0 | 25 | 0 | 25 | 547 |
| 16:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 258 | 0 | 322 | 0 | 170 | 50 | 220 | 0 | 25 | 0 | 25 | 567 |
| 16:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 266 | 0 | 320 | 0 | 165 | 57 | 222 | 0 | 33 | 0 | 33 | 575 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 227 | 1016 | 0 | 1243 | 0 | 669 | 215 | 884 | 0 | 103 | 1 | 104 | 2231 |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 278 | 0 | 347 | 0 | 187 | 65 | 252 | 0 | 31 | 0 | 31 | 630 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 268 | 0 | 328 | 0 | 248 | 73 | 321 | 0 | 22 | 0 | 22 | 671 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 257 | 0 | 307 | 0 | 283 | 79 | 362 | 0 | 44 | 0 | 44 | 713 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 246 | 0 | 297 | 0 | 209 | 63 | 272 | 0 | 51 | 2 | 53 | 622 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 1049 | 0 | 1279 | 0 | 927 | 280 | 1207 | 0 | 148 | 2 | 150 | 2636 |
| Grand Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 457 | 2065 | 0 | 2522 | 0 | 1596 | 495 | 2091 | 0 | 251 | 3 | 254 | 4867 |
| Apprch % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.1 | 81.9 | 0 | 51.8 | 0 | 76.3 | 23.7 | 43 | 0 | 98.8 | 1.2 | 5.2 | |
| Total % | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.4 | 42.4 | 0 | 51.8 | 0 | 32.8 | 10.2 | 43 | 0 | 5.2 | 0.1 | 5.2 | |

| Start Time | 7th ST Southbound | | | | BRYANT ST Westbound | | | | 7th ST Northbound | | | | BRYANT ST Eastbound | | | | I-80 EB OFF-RAMP Southeastbound | | | | Int. Total |
|--|-------------------|------|------|------------|---------------------|------|------|------------|-------------------|------|------|------------|---------------------|------|------|------------|---------------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 17:00 | | | | | | | | | | | | | | | | | | | | | |
| 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 278 | 0 | 347 | 0 | 187 | 65 | 252 | 0 | 31 | 0 | 31 | 630 |
| 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 268 | 0 | 328 | 0 | 248 | 73 | 321 | 0 | 22 | 0 | 22 | 671 |
| 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 257 | 0 | 307 | 0 | 283 | 79 | 362 | 0 | 44 | 0 | 44 | 713 |
| 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 246 | 0 | 297 | 0 | 209 | 63 | 272 | 0 | 51 | 2 | 53 | 622 |
| Total Volume | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 1049 | 0 | 1279 | 0 | 927 | 280 | 1207 | 0 | 148 | 2 | 150 | 2636 |
| % App. Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 82 | 0 | 51.8 | 0 | 76.8 | 23.2 | 43 | 0 | 98.7 | 1.3 | 5.2 | |
| PHF | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .833 | .943 | .000 | .921 | .000 | .819 | .886 | .834 | .000 | .725 | .250 | .708 | .924 |



TRAFFIC COUNTS PLUS

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CITY OF SAN FRANCISCO

Latitude: 37.775525
Longitude: -122.406314

File Name : 7-harrison-a
Site Code : 3
Start Date : 8/28/2018
Page No : 1

Groups Printed- Vehicles Only

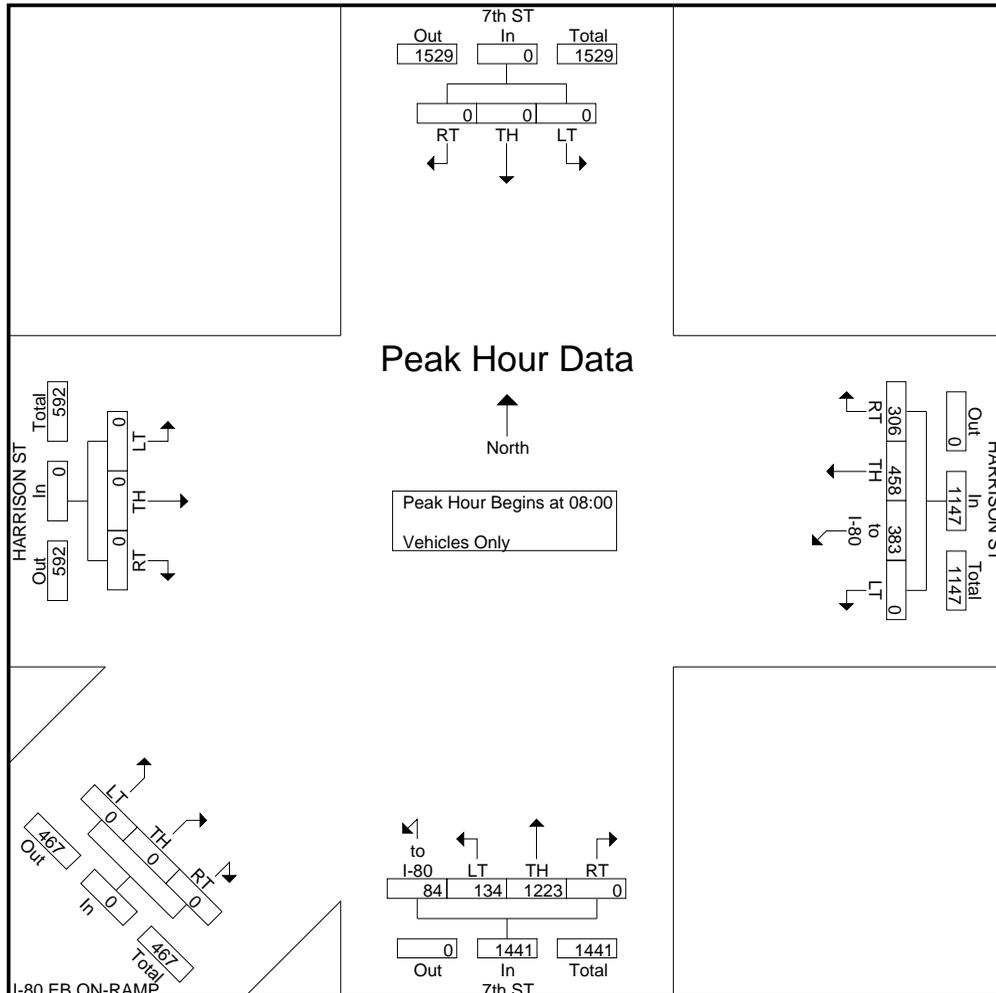
| Start Time | 7th ST Southbound | | | | HARRISON ST Westbound | | | | | 7th ST Northbound | | | | | HARRISON ST Eastbound | | | | I-80 EB ON-RAMP Northeastbound | | | | Int. Total | |
|-------------|-------------------|----|----|------------|-----------------------|------|---------|----|------------|-------------------|------|-----|---------|------------|-----------------------|----|----|------------|--------------------------------|----|----|------------|------------|------|
| | RT | TH | LT | App. Total | RT | TH | to I-80 | LT | App. Total | RT | TH | LT | to I-80 | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | | |
| 07:00 | 0 | 0 | 0 | 0 | 65 | 79 | 66 | 0 | 210 | 0 | 238 | 19 | 18 | 275 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 485 |
| 07:15 | 0 | 0 | 0 | 0 | 68 | 91 | 53 | 0 | 212 | 0 | 245 | 21 | 12 | 278 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 490 |
| 07:30 | 0 | 0 | 0 | 0 | 62 | 100 | 58 | 0 | 220 | 0 | 255 | 15 | 17 | 287 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 507 |
| 07:45 | 0 | 0 | 0 | 0 | 84 | 113 | 92 | 0 | 289 | 0 | 292 | 25 | 20 | 337 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 626 |
| Total | 0 | 0 | 0 | 0 | 279 | 383 | 269 | 0 | 931 | 0 | 1030 | 80 | 67 | 1177 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2108 |
| 08:00 | 0 | 0 | 0 | 0 | 84 | 98 | 71 | 0 | 253 | 0 | 293 | 20 | 11 | 324 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 577 |
| 08:15 | 0 | 0 | 0 | 0 | 79 | 110 | 90 | 0 | 279 | 0 | 313 | 34 | 28 | 375 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 654 |
| 08:30 | 0 | 0 | 0 | 0 | 68 | 129 | 104 | 0 | 301 | 0 | 305 | 32 | 25 | 362 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 663 |
| 08:45 | 0 | 0 | 0 | 0 | 75 | 121 | 118 | 0 | 314 | 0 | 312 | 48 | 20 | 380 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 694 |
| Total | 0 | 0 | 0 | 0 | 306 | 458 | 383 | 0 | 1147 | 0 | 1223 | 134 | 84 | 1441 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2588 |
| Grand Total | 0 | 0 | 0 | 0 | 585 | 841 | 652 | 0 | 2078 | 0 | 2253 | 214 | 151 | 2618 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4696 |
| Apprch % | 0 | 0 | 0 | 0 | 28.2 | 40.5 | 31.4 | 0 | | 0 | 86.1 | 8.2 | 5.8 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 0 | 0 | 0 | 12.5 | 17.9 | 13.9 | 0 | 44.3 | 0 | 48 | 4.6 | 3.2 | 55.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| Start Time | 7th ST Southbound | | | | HARRISON ST Westbound | | | | | 7th ST Northbound | | | | | HARRISON ST Eastbound | | | | I-80 EB ON-RAMP Northeastbound | | | | Int. Total |
|------------|-------------------|----|----|------------|-----------------------|----|---------|----|------------|-------------------|----|----|---------|------------|-----------------------|----|----|------------|--------------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | to I-80 | LT | App. Total | RT | TH | LT | to I-80 | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------|------|------|------|-----------|------------|------------|------|------------|------|------------|-----------|-----------|------------|------|------|------|------|------|------|------|------|------|------------|
| 08:00 | 0 | 0 | 0 | 0 | 84 | 98 | 71 | 0 | 253 | 0 | 293 | 20 | 11 | 324 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 577 |
| 08:15 | 0 | 0 | 0 | 0 | 79 | 110 | 90 | 0 | 279 | 0 | 313 | 34 | 28 | 375 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 654 |
| 08:30 | 0 | 0 | 0 | 0 | 68 | 129 | 104 | 0 | 301 | 0 | 305 | 32 | 25 | 362 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 663 |
| 08:45 | 0 | 0 | 0 | 0 | 75 | 121 | 118 | 0 | 314 | 0 | 312 | 48 | 20 | 380 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 694 |
| Total Volume | 0 | 0 | 0 | 0 | 306 | 458 | 383 | 0 | 1147 | 0 | 1223 | 134 | 84 | 1441 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2588 |
| % App. Total | 0 | 0 | 0 | 0 | 26.7 | 39.9 | 33.4 | 0 | | 0 | 84.9 | 9.3 | 5.8 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| PHF | .000 | .000 | .000 | .000 | .911 | .888 | .811 | .000 | .913 | .000 | .977 | .698 | .750 | .948 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .932 |



TRAFFIC COUNTS PLUS

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CITY OF SAN FRANCISCO

File Name : 7-harrison-p

Latitude: 37.775525

Site Code : 3

Longitude: -122.406314

Start Date : 8/28/2018

Page No : 1

Groups Printed- Vehicles Only

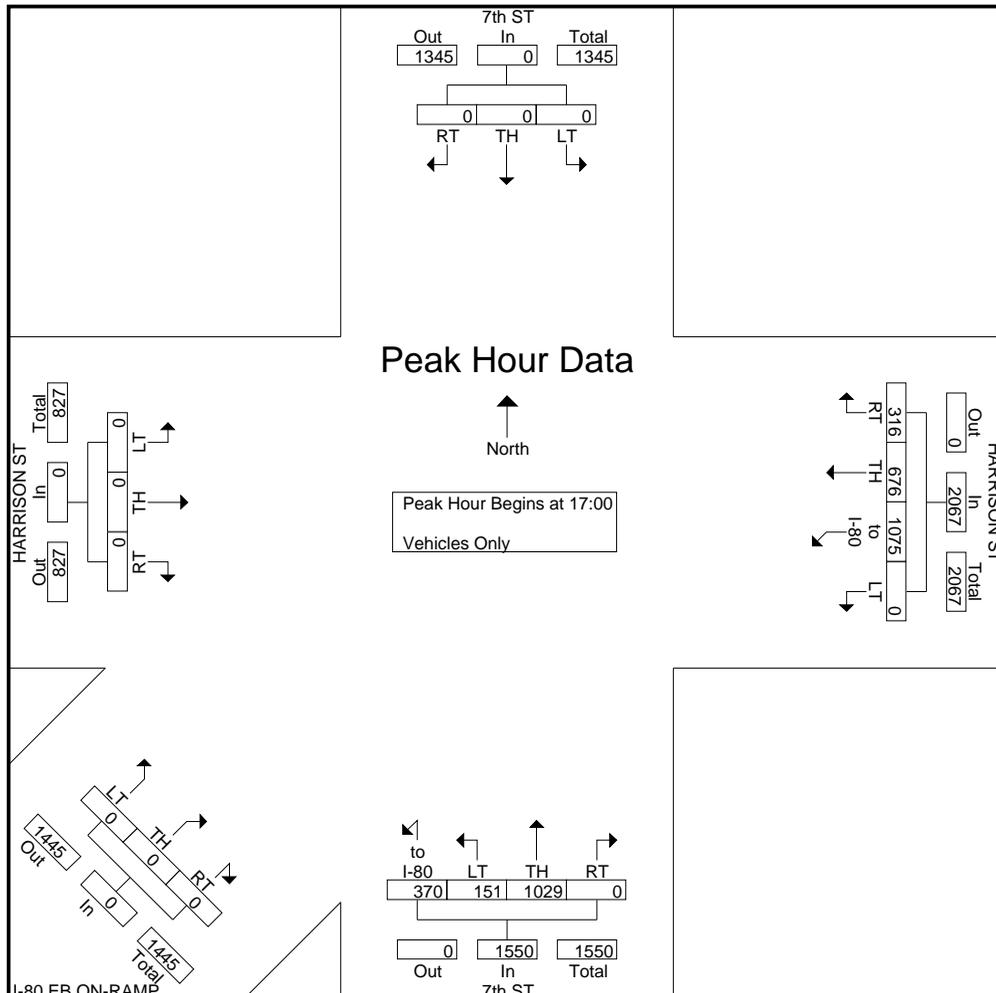
| Start Time | 7th ST Southbound | | | | HARRISON ST Westbound | | | | 7th ST Northbound | | | | HARRISON ST Eastbound | | | | I-80 EB ON-RAMP Northeastbound | | | | Int. Total | | | |
|-------------|-------------------|----|----|------------|-----------------------|------|---------|----|-------------------|----|------|------|-----------------------|------------|----|----|--------------------------------|------------|----|----|------------|----|------------|------|
| | RT | TH | LT | App. Total | RT | TH | to I-80 | LT | App. Total | RT | TH | LT | to I-80 | App. Total | RT | TH | LT | App. Total | RT | TH | | LT | App. Total | |
| 16:00 | 0 | 0 | 0 | 0 | 84 | 149 | 171 | 0 | 404 | 0 | 187 | 46 | 83 | 316 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 720 |
| 16:15 | 0 | 0 | 0 | 0 | 61 | 156 | 235 | 0 | 452 | 0 | 197 | 42 | 77 | 316 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 768 |
| 16:30 | 0 | 0 | 0 | 0 | 69 | 151 | 287 | 0 | 507 | 0 | 213 | 39 | 75 | 327 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 834 |
| 16:45 | 0 | 0 | 0 | 0 | 47 | 158 | 256 | 0 | 461 | 0 | 239 | 37 | 94 | 370 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 831 |
| Total | 0 | 0 | 0 | 0 | 261 | 614 | 949 | 0 | 1824 | 0 | 836 | 164 | 329 | 1329 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3153 |
| 17:00 | 0 | 0 | 0 | 0 | 75 | 151 | 287 | 0 | 513 | 0 | 248 | 28 | 106 | 382 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 895 |
| 17:15 | 0 | 0 | 0 | 0 | 69 | 182 | 285 | 0 | 536 | 0 | 243 | 34 | 95 | 372 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 908 |
| 17:30 | 0 | 0 | 0 | 0 | 85 | 172 | 277 | 0 | 534 | 0 | 255 | 51 | 106 | 412 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 946 |
| 17:45 | 0 | 0 | 0 | 0 | 87 | 171 | 226 | 0 | 484 | 0 | 283 | 38 | 63 | 384 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 868 |
| Total | 0 | 0 | 0 | 0 | 316 | 676 | 1075 | 0 | 2067 | 0 | 1029 | 151 | 370 | 1550 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3617 |
| Grand Total | 0 | 0 | 0 | 0 | 577 | 1290 | 2024 | 0 | 3891 | 0 | 1865 | 315 | 699 | 2879 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6770 |
| Apprch % | 0 | 0 | 0 | 0 | 14.8 | 33.2 | 52 | 0 | 0 | 0 | 64.8 | 10.9 | 24.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Total % | 0 | 0 | 0 | 0 | 8.5 | 19.1 | 29.9 | 0 | 57.5 | 0 | 27.5 | 4.7 | 10.3 | 42.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

| Start Time | 7th ST Southbound | | | | HARRISON ST Westbound | | | | 7th ST Northbound | | | | HARRISON ST Eastbound | | | | I-80 EB ON-RAMP Northeastbound | | | | Int. Total |
|------------|-------------------|----|----|------------|-----------------------|----|---------|----|-------------------|----|----|----|-----------------------|------------|----|----|--------------------------------|------------|----|----|------------|
| | RT | TH | LT | App. Total | RT | TH | to I-80 | LT | App. Total | RT | TH | LT | to I-80 | App. Total | RT | TH | LT | App. Total | RT | TH | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 17:00

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------|------|------|------|-----------|------------|------------|------|------------|------|------------|-----------|------------|------------|------|------|------|------|------|------|------|------|------|------------|
| 17:00 | 0 | 0 | 0 | 0 | 75 | 151 | 287 | 0 | 513 | 0 | 248 | 28 | 106 | 382 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 895 |
| 17:15 | 0 | 0 | 0 | 0 | 69 | 182 | 285 | 0 | 536 | 0 | 243 | 34 | 95 | 372 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 908 |
| 17:30 | 0 | 0 | 0 | 0 | 85 | 172 | 277 | 0 | 534 | 0 | 255 | 51 | 106 | 412 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 946 |
| 17:45 | 0 | 0 | 0 | 0 | 87 | 171 | 226 | 0 | 484 | 0 | 283 | 38 | 63 | 384 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 868 |
| Total Volume | 0 | 0 | 0 | 0 | 316 | 676 | 1075 | 0 | 2067 | 0 | 1029 | 151 | 370 | 1550 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3617 |
| % App. Total | 0 | 0 | 0 | 0 | 15.3 | 32.7 | 52 | 0 | 0 | 0 | 66.4 | 9.7 | 23.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .908 | .929 | .936 | .000 | .964 | .000 | .909 | .740 | .873 | .941 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .956 |



TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

Latitude: 37.770068
Longitude: -122.420080

File Name : mission-13-a
Site Code : 1
Start Date : 3/7/2018
Page No : 1

Groups Printed- Vehicles Only

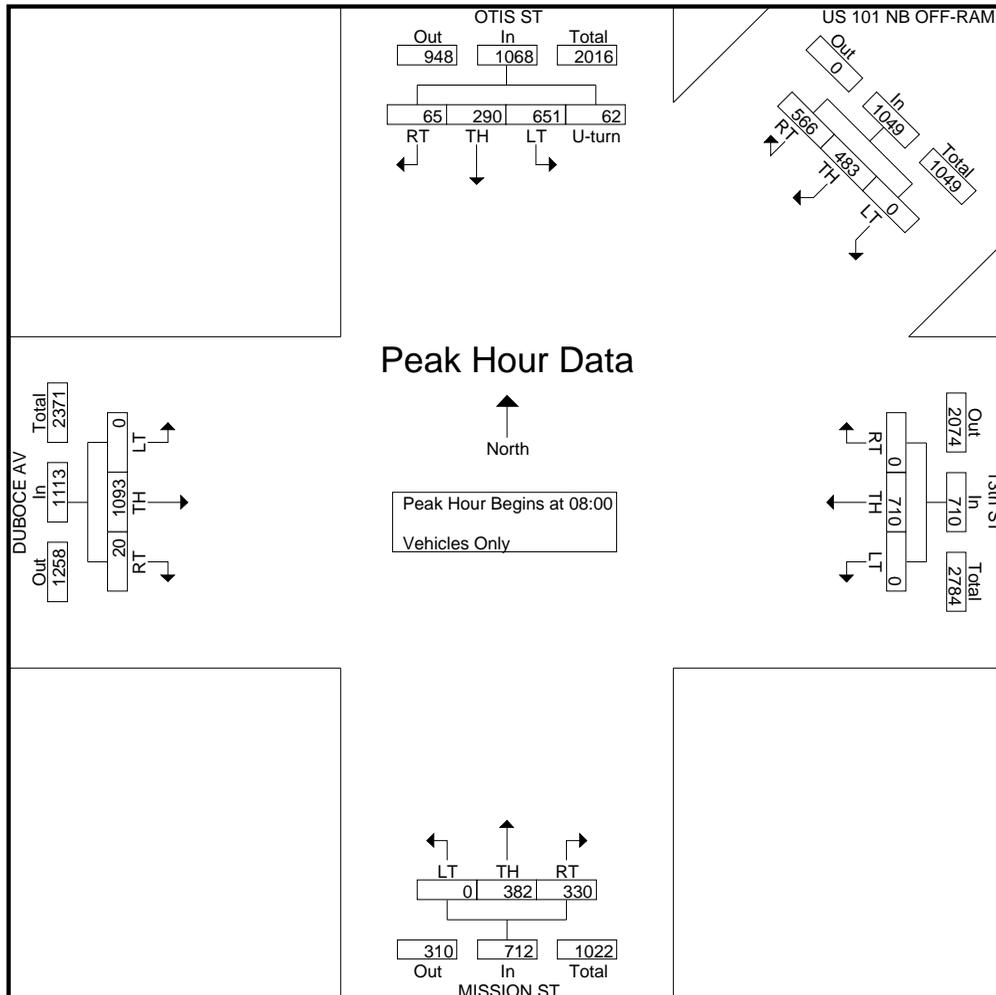
| Start Time | OTIS ST Southbound | | | | | 13th ST Westbound | | | | MISSION ST Northbound | | | | DUBOCE AV Eastbound | | | | US 101 NB OFF-RAMP Southwestbound | | | | Int. Total |
|-------------|--------------------|-----|------|--------|------------|-------------------|------|----|------------|-----------------------|------|----|------------|---------------------|------|----|------------|-----------------------------------|------|----|------------|------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 13 | 57 | 180 | 18 | 268 | 0 | 84 | 0 | 84 | 47 | 48 | 0 | 95 | 6 | 184 | 0 | 190 | 217 | 131 | 0 | 348 | 985 |
| 07:15 | 16 | 55 | 169 | 13 | 253 | 0 | 119 | 0 | 119 | 54 | 68 | 0 | 122 | 6 | 197 | 0 | 203 | 219 | 135 | 0 | 354 | 1051 |
| 07:30 | 14 | 61 | 148 | 14 | 237 | 0 | 170 | 0 | 170 | 62 | 65 | 0 | 127 | 4 | 231 | 0 | 235 | 198 | 134 | 0 | 332 | 1101 |
| 07:45 | 15 | 76 | 147 | 13 | 251 | 0 | 178 | 0 | 178 | 71 | 81 | 0 | 152 | 7 | 184 | 0 | 191 | 186 | 115 | 0 | 301 | 1073 |
| Total | 58 | 249 | 644 | 58 | 1009 | 0 | 551 | 0 | 551 | 234 | 262 | 0 | 496 | 23 | 796 | 0 | 819 | 820 | 515 | 0 | 1335 | 4210 |
| 08:00 | 13 | 81 | 156 | 21 | 271 | 0 | 195 | 0 | 195 | 84 | 86 | 0 | 170 | 4 | 249 | 0 | 253 | 161 | 123 | 0 | 284 | 1173 |
| 08:15 | 13 | 57 | 166 | 13 | 249 | 0 | 172 | 0 | 172 | 85 | 103 | 0 | 188 | 4 | 270 | 0 | 274 | 150 | 132 | 0 | 282 | 1165 |
| 08:30 | 20 | 72 | 150 | 17 | 259 | 0 | 161 | 0 | 161 | 90 | 97 | 0 | 187 | 4 | 280 | 0 | 284 | 108 | 111 | 0 | 219 | 1110 |
| 08:45 | 19 | 80 | 179 | 11 | 289 | 0 | 182 | 0 | 182 | 71 | 96 | 0 | 167 | 8 | 294 | 0 | 302 | 147 | 117 | 0 | 264 | 1204 |
| Total | 65 | 290 | 651 | 62 | 1068 | 0 | 710 | 0 | 710 | 330 | 382 | 0 | 712 | 20 | 1093 | 0 | 1113 | 566 | 483 | 0 | 1049 | 4652 |
| Grand Total | 123 | 539 | 1295 | 120 | 2077 | 0 | 1261 | 0 | 1261 | 564 | 644 | 0 | 1208 | 43 | 1889 | 0 | 1932 | 1386 | 998 | 0 | 2384 | 8862 |
| Apprch % | 5.9 | 26 | 62.3 | 5.8 | | 0 | 100 | 0 | | 46.7 | 53.3 | 0 | | 2.2 | 97.8 | 0 | | 58.1 | 41.9 | 0 | | |
| Total % | 1.4 | 6.1 | 14.6 | 1.4 | 23.4 | 0 | 14.2 | 0 | 14.2 | 6.4 | 7.3 | 0 | 13.6 | 0.5 | 21.3 | 0 | 21.8 | 15.6 | 11.3 | 0 | 26.9 | |

| Start Time | OTIS ST Southbound | | | | | 13th ST Westbound | | | | MISSION ST Northbound | | | | DUBOCE AV Eastbound | | | | US 101 NB OFF-RAMP Southwestbound | | | | Int. Total |
|------------|--------------------|----|----|--------|------------|-------------------|----|----|------------|-----------------------|----|----|------------|---------------------|----|----|------------|-----------------------------------|----|----|------------|------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00

| | | | | | | | | | | | | | | | | | | | | | | |
|--------------|-----------|-----------|------------|-----------|------------|------|------------|------|------------|-----------|------------|------|------------|----------|------------|------|------------|------------|------------|------|------------|-------------|
| 08:00 | 13 | 81 | 156 | 21 | 271 | 0 | 195 | 0 | 195 | 84 | 86 | 0 | 170 | 4 | 249 | 0 | 253 | 161 | 123 | 0 | 284 | 1173 |
| 08:15 | 13 | 57 | 166 | 13 | 249 | 0 | 172 | 0 | 172 | 85 | 103 | 0 | 188 | 4 | 270 | 0 | 274 | 150 | 132 | 0 | 282 | 1165 |
| 08:30 | 20 | 72 | 150 | 17 | 259 | 0 | 161 | 0 | 161 | 90 | 97 | 0 | 187 | 4 | 280 | 0 | 284 | 108 | 111 | 0 | 219 | 1110 |
| 08:45 | 19 | 80 | 179 | 11 | 289 | 0 | 182 | 0 | 182 | 71 | 96 | 0 | 167 | 8 | 294 | 0 | 302 | 147 | 117 | 0 | 264 | 1204 |
| Total Volume | 65 | 290 | 651 | 62 | 1068 | 0 | 710 | 0 | 710 | 330 | 382 | 0 | 712 | 20 | 1093 | 0 | 1113 | 566 | 483 | 0 | 1049 | 4652 |
| % App. Total | 6.1 | 27.2 | 61 | 5.8 | | 0 | 100 | 0 | | 46.3 | 53.7 | 0 | | 1.8 | 98.2 | 0 | | 54 | 46 | 0 | | |
| PHF | .813 | .895 | .909 | .738 | .924 | .000 | .910 | .000 | .910 | .917 | .927 | .000 | .947 | .625 | .929 | .000 | .921 | .879 | .915 | .000 | .923 | .966 |



TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

Latitude: 37.770068
Longitude: -122.420080

File Name : mission-13-p
Site Code : 1
Start Date : 3/7/2018
Page No : 1

Groups Printed- Vehicles Only

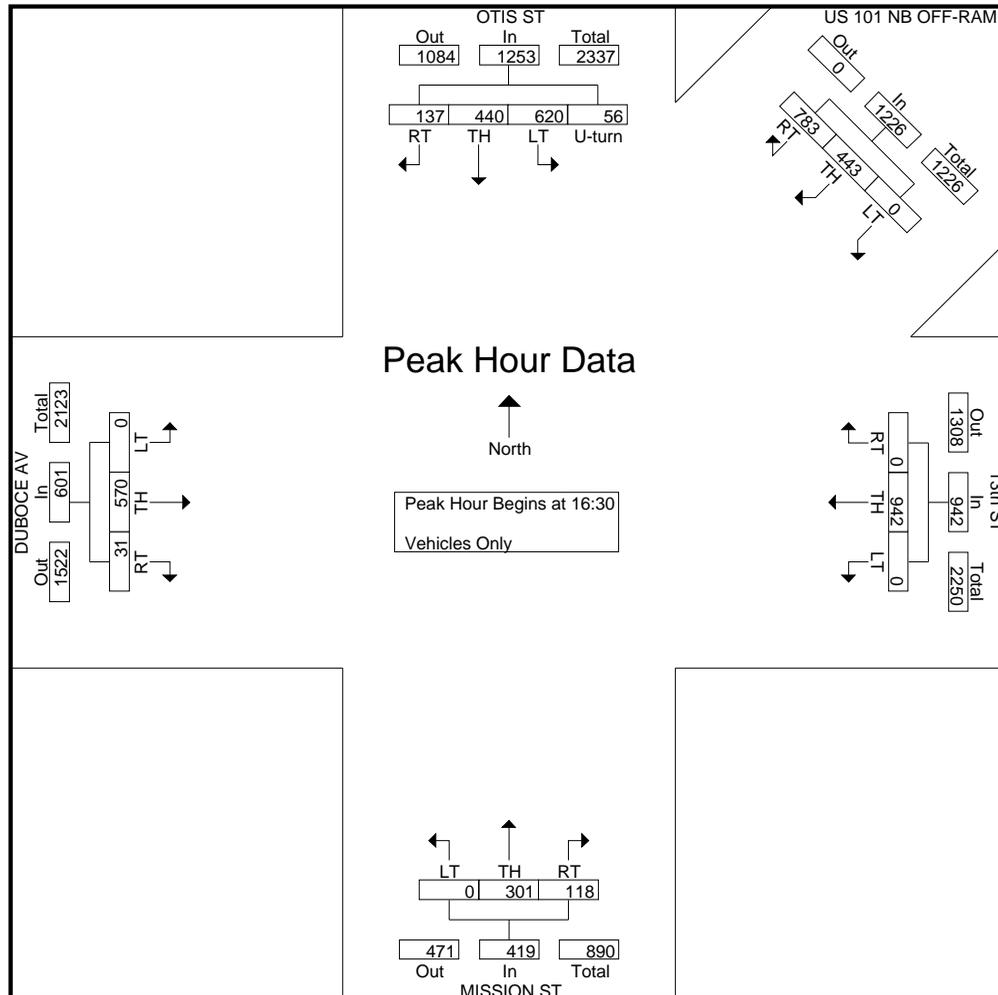
| Start Time | OTIS ST Southbound | | | | | 13th ST Westbound | | | | MISSION ST Northbound | | | | DUBOCE AV Eastbound | | | | US 101 NB OFF-RAMP Southwestbound | | | | Int. Total |
|-------------|--------------------|------|------|--------|------------|-------------------|------|----|------------|-----------------------|------|----|------------|---------------------|------|----|------------|-----------------------------------|------|----|------------|------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 21 | 88 | 151 | 16 | 276 | 0 | 199 | 0 | 199 | 29 | 54 | 0 | 83 | 5 | 146 | 0 | 151 | 64 | 125 | 0 | 189 | 898 |
| 16:15 | 26 | 89 | 147 | 19 | 281 | 0 | 204 | 0 | 204 | 31 | 75 | 0 | 106 | 5 | 130 | 0 | 135 | 164 | 120 | 0 | 284 | 1010 |
| 16:30 | 22 | 96 | 154 | 18 | 290 | 0 | 230 | 0 | 230 | 20 | 67 | 0 | 87 | 7 | 141 | 0 | 148 | 206 | 128 | 0 | 334 | 1089 |
| 16:45 | 43 | 120 | 159 | 14 | 336 | 0 | 249 | 0 | 249 | 27 | 81 | 0 | 108 | 3 | 128 | 0 | 131 | 187 | 106 | 0 | 293 | 1117 |
| Total | 112 | 393 | 611 | 67 | 1183 | 0 | 882 | 0 | 882 | 107 | 277 | 0 | 384 | 20 | 545 | 0 | 565 | 621 | 479 | 0 | 1100 | 4114 |
| 17:00 | 42 | 103 | 161 | 11 | 317 | 0 | 242 | 0 | 242 | 29 | 72 | 0 | 101 | 14 | 161 | 0 | 175 | 195 | 119 | 0 | 314 | 1149 |
| 17:15 | 30 | 121 | 146 | 13 | 310 | 0 | 221 | 0 | 221 | 42 | 81 | 0 | 123 | 7 | 140 | 0 | 147 | 195 | 90 | 0 | 285 | 1086 |
| 17:30 | 34 | 130 | 145 | 8 | 317 | 0 | 206 | 0 | 206 | 25 | 79 | 0 | 104 | 5 | 147 | 0 | 152 | 179 | 101 | 0 | 280 | 1059 |
| 17:45 | 32 | 141 | 166 | 5 | 344 | 0 | 210 | 0 | 210 | 24 | 71 | 0 | 95 | 8 | 141 | 0 | 149 | 139 | 106 | 0 | 245 | 1043 |
| Total | 138 | 495 | 618 | 37 | 1288 | 0 | 879 | 0 | 879 | 120 | 303 | 0 | 423 | 34 | 589 | 0 | 623 | 708 | 416 | 0 | 1124 | 4337 |
| Grand Total | 250 | 888 | 1229 | 104 | 2471 | 0 | 1761 | 0 | 1761 | 227 | 580 | 0 | 807 | 54 | 1134 | 0 | 1188 | 1329 | 895 | 0 | 2224 | 8451 |
| Apprch % | 10.1 | 35.9 | 49.7 | 4.2 | | 0 | 100 | 0 | | 28.1 | 71.9 | 0 | | 4.5 | 95.5 | 0 | | 59.8 | 40.2 | 0 | | |
| Total % | 3 | 10.5 | 14.5 | 1.2 | 29.2 | 0 | 20.8 | 0 | 20.8 | 2.7 | 6.9 | 0 | 9.5 | 0.6 | 13.4 | 0 | 14.1 | 15.7 | 10.6 | 0 | 26.3 | |

| Start Time | OTIS ST Southbound | | | | | 13th ST Westbound | | | | MISSION ST Northbound | | | | DUBOCE AV Eastbound | | | | US 101 NB OFF-RAMP Southwestbound | | | | Int. Total |
|------------|--------------------|----|----|--------|------------|-------------------|----|----|------------|-----------------------|----|----|------------|---------------------|----|----|------------|-----------------------------------|----|----|------------|------------|
| | RT | TH | LT | U-turn | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 16:30

| | | | | | | | | | | | | | | | | | | | | | | |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 16:30 | 22 | 96 | 154 | 18 | 290 | 0 | 230 | 0 | 230 | 20 | 67 | 0 | 87 | 7 | 141 | 0 | 148 | 206 | 128 | 0 | 334 | 1089 |
| 16:45 | 43 | 120 | 159 | 14 | 336 | 0 | 249 | 0 | 249 | 27 | 81 | 0 | 108 | 3 | 128 | 0 | 131 | 187 | 106 | 0 | 293 | 1117 |
| 17:00 | 42 | 103 | 161 | 11 | 317 | 0 | 242 | 0 | 242 | 29 | 72 | 0 | 101 | 14 | 161 | 0 | 175 | 195 | 119 | 0 | 314 | 1149 |
| 17:15 | 30 | 121 | 146 | 13 | 310 | 0 | 221 | 0 | 221 | 42 | 81 | 0 | 123 | 7 | 140 | 0 | 147 | 195 | 90 | 0 | 285 | 1086 |
| Total Volume | 137 | 440 | 620 | 56 | 1253 | 0 | 942 | 0 | 942 | 118 | 301 | 0 | 419 | 31 | 570 | 0 | 601 | 783 | 443 | 0 | 1226 | 4441 |
| % App. Total | 10.9 | 35.1 | 49.5 | 4.5 | | 0 | 100 | 0 | | 28.2 | 71.8 | 0 | | 5.2 | 94.8 | 0 | | 63.9 | 36.1 | 0 | | |
| PHF | .797 | .909 | .963 | .778 | .932 | .000 | .946 | .000 | .946 | .702 | .929 | .000 | .852 | .554 | .885 | .000 | .859 | .950 | .865 | .000 | .918 | .966 |



TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

File Name : van ness-13-a

Latitude: 37.769827

Site Code : 2

Longitude: -122.417807

Start Date : 3/7/2018

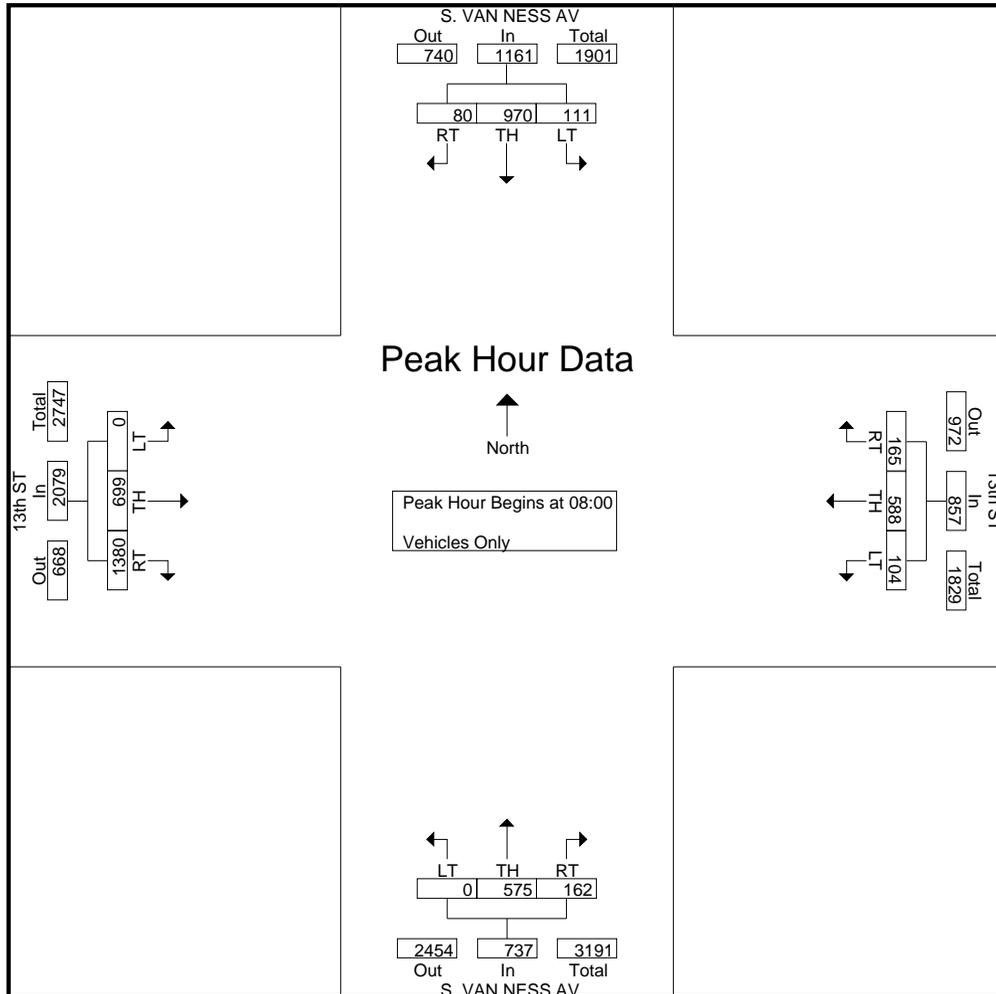
Page No : 1

Groups Printed- Vehicles Only

| Start Time | S. VAN NESS AV Southbound | | | | 13th ST Westbound | | | | S. VAN NESS AV Northbound | | | | 13th ST Eastbound | | | | Int. Total |
|-------------|---------------------------|------|-----|------------|-------------------|------|------|------------|---------------------------|------|----|------------|-------------------|------|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 13 | 265 | 31 | 309 | 29 | 70 | 22 | 121 | 16 | 63 | 0 | 79 | 308 | 109 | 0 | 417 | 926 |
| 07:15 | 23 | 253 | 27 | 303 | 34 | 95 | 15 | 144 | 18 | 99 | 0 | 117 | 302 | 112 | 0 | 414 | 978 |
| 07:30 | 15 | 241 | 38 | 294 | 41 | 150 | 17 | 208 | 22 | 109 | 0 | 131 | 312 | 135 | 0 | 447 | 1080 |
| 07:45 | 25 | 238 | 27 | 290 | 31 | 156 | 15 | 202 | 34 | 142 | 0 | 176 | 322 | 113 | 0 | 435 | 1103 |
| Total | 76 | 997 | 123 | 1196 | 135 | 471 | 69 | 675 | 90 | 413 | 0 | 503 | 1244 | 469 | 0 | 1713 | 4087 |
| 08:00 | 27 | 249 | 29 | 305 | 37 | 164 | 23 | 224 | 34 | 126 | 0 | 160 | 343 | 146 | 0 | 489 | 1178 |
| 08:15 | 18 | 236 | 19 | 273 | 35 | 150 | 24 | 209 | 47 | 143 | 0 | 190 | 339 | 171 | 0 | 510 | 1182 |
| 08:30 | 15 | 246 | 30 | 291 | 36 | 136 | 33 | 205 | 45 | 140 | 0 | 185 | 358 | 186 | 0 | 544 | 1225 |
| 08:45 | 20 | 239 | 33 | 292 | 57 | 138 | 24 | 219 | 36 | 166 | 0 | 202 | 340 | 196 | 0 | 536 | 1249 |
| Total | 80 | 970 | 111 | 1161 | 165 | 588 | 104 | 857 | 162 | 575 | 0 | 737 | 1380 | 699 | 0 | 2079 | 4834 |
| Grand Total | 156 | 1967 | 234 | 2357 | 300 | 1059 | 173 | 1532 | 252 | 988 | 0 | 1240 | 2624 | 1168 | 0 | 3792 | 8921 |
| Apprch % | 6.6 | 83.5 | 9.9 | | 19.6 | 69.1 | 11.3 | | 20.3 | 79.7 | 0 | | 69.2 | 30.8 | 0 | | |
| Total % | 1.7 | 22 | 2.6 | 26.4 | 3.4 | 11.9 | 1.9 | 17.2 | 2.8 | 11.1 | 0 | 13.9 | 29.4 | 13.1 | 0 | 42.5 | |

| Start Time | S. VAN NESS AV Southbound | | | | 13th ST Westbound | | | | S. VAN NESS AV Northbound | | | | 13th ST Eastbound | | | | Int. Total |
|--------------|---------------------------|------|------|------------|-------------------|------|------|------------|---------------------------|------|------|------------|-------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 08:00 | 27 | 249 | 29 | 305 | 37 | 164 | 23 | 224 | 34 | 126 | 0 | 160 | 343 | 146 | 0 | 489 | 1178 |
| 08:15 | 18 | 236 | 19 | 273 | 35 | 150 | 24 | 209 | 47 | 143 | 0 | 190 | 339 | 171 | 0 | 510 | 1182 |
| 08:30 | 15 | 246 | 30 | 291 | 36 | 136 | 33 | 205 | 45 | 140 | 0 | 185 | 358 | 186 | 0 | 544 | 1225 |
| 08:45 | 20 | 239 | 33 | 292 | 57 | 138 | 24 | 219 | 36 | 166 | 0 | 202 | 340 | 196 | 0 | 536 | 1249 |
| Total Volume | 80 | 970 | 111 | 1161 | 165 | 588 | 104 | 857 | 162 | 575 | 0 | 737 | 1380 | 699 | 0 | 2079 | 4834 |
| % App. Total | 6.9 | 83.5 | 9.6 | | 19.3 | 68.6 | 12.1 | | 22 | 78 | 0 | | 66.4 | 33.6 | 0 | | |
| PHF | .741 | .974 | .841 | .952 | .724 | .896 | .788 | .956 | .862 | .866 | .000 | .912 | .964 | .892 | .000 | .955 | .968 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00



TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

Latitude: 37.769827
Longitude: -122.417807

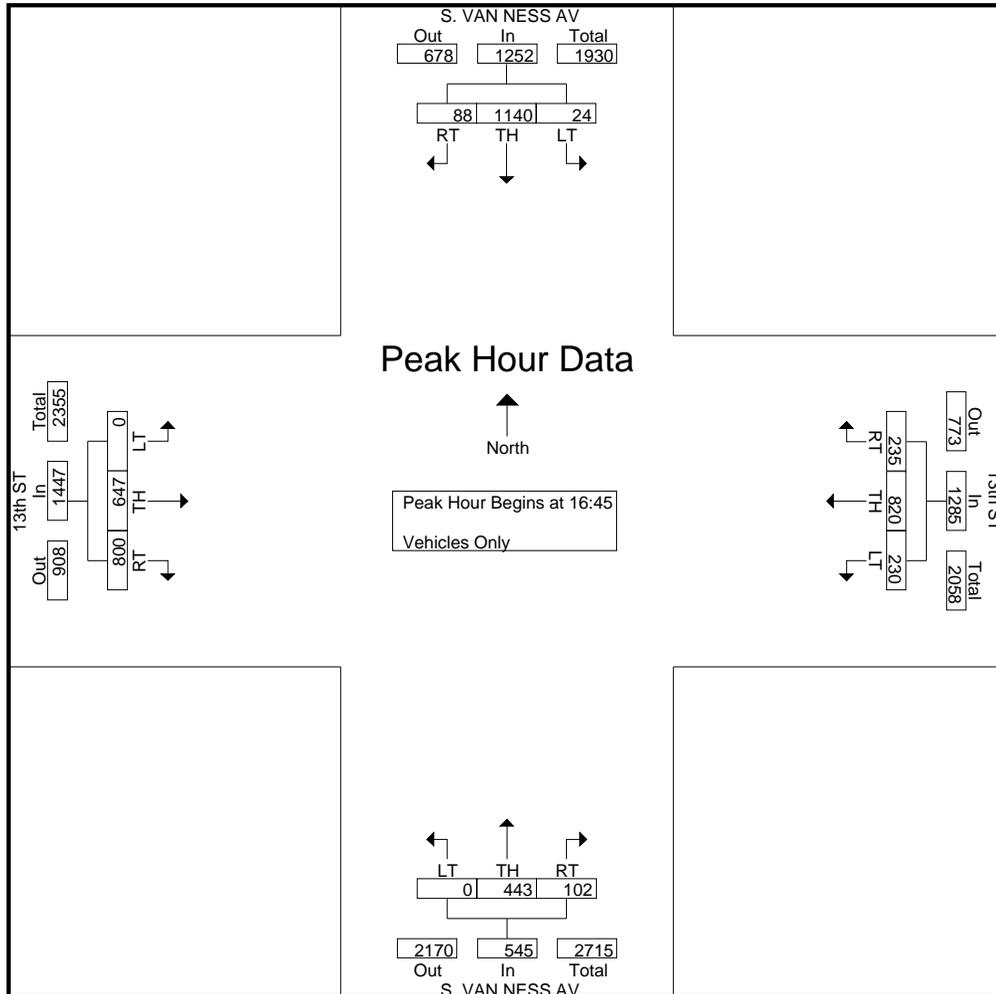
File Name : van ness-13-p
Site Code : 2
Start Date : 3/7/2018
Page No : 1

Groups Printed- Vehicles Only

| Start Time | S. VAN NESS AV Southbound | | | | 13th ST Westbound | | | | S. VAN NESS AV Northbound | | | | 13th ST Eastbound | | | | Int. Total |
|-------------|---------------------------|------|-----|------------|-------------------|------|------|------------|---------------------------|------|----|------------|-------------------|------|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 13 | 282 | 10 | 305 | 55 | 183 | 52 | 290 | 30 | 111 | 0 | 141 | 202 | 156 | 0 | 358 | 1094 |
| 16:15 | 15 | 280 | 4 | 299 | 42 | 192 | 40 | 274 | 28 | 119 | 0 | 147 | 191 | 125 | 0 | 316 | 1036 |
| 16:30 | 23 | 285 | 3 | 311 | 35 | 201 | 36 | 272 | 22 | 107 | 0 | 129 | 195 | 147 | 0 | 342 | 1054 |
| 16:45 | 29 | 284 | 7 | 320 | 47 | 213 | 37 | 297 | 24 | 89 | 0 | 113 | 184 | 158 | 0 | 342 | 1072 |
| Total | 80 | 1131 | 24 | 1235 | 179 | 789 | 165 | 1133 | 104 | 426 | 0 | 530 | 772 | 586 | 0 | 1358 | 4256 |
| 17:00 | 25 | 302 | 5 | 332 | 73 | 214 | 64 | 351 | 24 | 102 | 0 | 126 | 204 | 175 | 0 | 379 | 1188 |
| 17:15 | 19 | 292 | 2 | 313 | 59 | 206 | 65 | 330 | 31 | 129 | 0 | 160 | 232 | 145 | 0 | 377 | 1180 |
| 17:30 | 15 | 262 | 10 | 287 | 56 | 187 | 64 | 307 | 23 | 123 | 0 | 146 | 180 | 169 | 0 | 349 | 1089 |
| 17:45 | 13 | 280 | 7 | 300 | 41 | 186 | 55 | 282 | 40 | 77 | 0 | 117 | 174 | 161 | 0 | 335 | 1034 |
| Total | 72 | 1136 | 24 | 1232 | 229 | 793 | 248 | 1270 | 118 | 431 | 0 | 549 | 790 | 650 | 0 | 1440 | 4491 |
| Grand Total | 152 | 2267 | 48 | 2467 | 408 | 1582 | 413 | 2403 | 222 | 857 | 0 | 1079 | 1562 | 1236 | 0 | 2798 | 8747 |
| Apprch % | 6.2 | 91.9 | 1.9 | | 17 | 65.8 | 17.2 | | 20.6 | 79.4 | 0 | | 55.8 | 44.2 | 0 | | |
| Total % | 1.7 | 25.9 | 0.5 | 28.2 | 4.7 | 18.1 | 4.7 | 27.5 | 2.5 | 9.8 | 0 | 12.3 | 17.9 | 14.1 | 0 | 32 | |

| Start Time | S. VAN NESS AV Southbound | | | | 13th ST Westbound | | | | S. VAN NESS AV Northbound | | | | 13th ST Eastbound | | | | Int. Total |
|--------------|---------------------------|------|------|------------|-------------------|------|------|------------|---------------------------|------|------|------------|-------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:45 | 29 | 284 | 7 | 320 | 47 | 213 | 37 | 297 | 24 | 89 | 0 | 113 | 184 | 158 | 0 | 342 | 1072 |
| 17:00 | 25 | 302 | 5 | 332 | 73 | 214 | 64 | 351 | 24 | 102 | 0 | 126 | 204 | 175 | 0 | 379 | 1188 |
| 17:15 | 19 | 292 | 2 | 313 | 59 | 206 | 65 | 330 | 31 | 129 | 0 | 160 | 232 | 145 | 0 | 377 | 1180 |
| 17:30 | 15 | 262 | 10 | 287 | 56 | 187 | 64 | 307 | 23 | 123 | 0 | 146 | 180 | 169 | 0 | 349 | 1089 |
| Total Volume | 88 | 1140 | 24 | 1252 | 235 | 820 | 230 | 1285 | 102 | 443 | 0 | 545 | 800 | 647 | 0 | 1447 | 4529 |
| % App. Total | 7 | 91.1 | 1.9 | | 18.3 | 63.8 | 17.9 | | 18.7 | 81.3 | 0 | | 55.3 | 44.7 | 0 | | |
| PHF | .759 | .944 | .600 | .943 | .805 | .958 | .885 | .915 | .823 | .859 | .000 | .852 | .862 | .924 | .000 | .954 | .953 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:45



TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

Latitude: 37.769217
Longitude: -122.417834

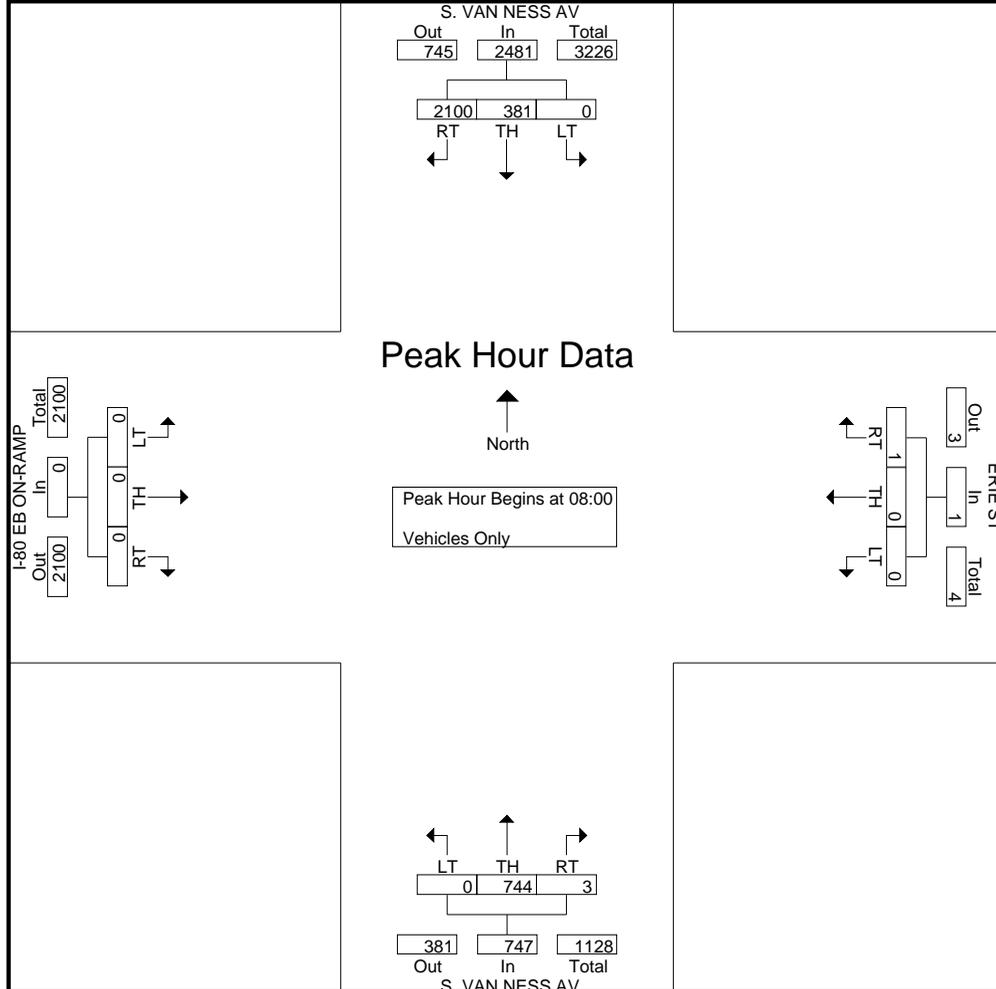
File Name : van ness-erie-a
Site Code : 3
Start Date : 3/7/2018
Page No : 1

Groups Printed- Vehicles Only

| Start Time | S. VAN NESS AV Southbound | | | | ERIE ST Westbound | | | | S. VAN NESS AV Northbound | | | | I-80 EB ON-RAMP Eastbound | | | | Int. Total |
|-------------|------------------------------|------|----|------------|----------------------|----|----|------------|------------------------------|------|----|------------|------------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 07:00 | 517 | 89 | 0 | 606 | 0 | 0 | 0 | 0 | 0 | 83 | 0 | 83 | 0 | 0 | 0 | 0 | 689 |
| 07:15 | 494 | 78 | 0 | 572 | 1 | 0 | 0 | 1 | 0 | 119 | 0 | 119 | 0 | 0 | 0 | 0 | 692 |
| 07:30 | 498 | 77 | 0 | 575 | 0 | 0 | 0 | 0 | 0 | 137 | 0 | 137 | 0 | 0 | 0 | 0 | 712 |
| 07:45 | 491 | 90 | 0 | 581 | 0 | 0 | 0 | 0 | 1 | 178 | 0 | 179 | 0 | 0 | 0 | 0 | 760 |
| Total | 2000 | 334 | 0 | 2334 | 1 | 0 | 0 | 1 | 1 | 517 | 0 | 518 | 0 | 0 | 0 | 0 | 2853 |
| 08:00 | 537 | 96 | 0 | 633 | 0 | 0 | 0 | 0 | 0 | 168 | 0 | 168 | 0 | 0 | 0 | 0 | 801 |
| 08:15 | 509 | 94 | 0 | 603 | 0 | 0 | 0 | 0 | 0 | 188 | 0 | 188 | 0 | 0 | 0 | 0 | 791 |
| 08:30 | 541 | 101 | 0 | 642 | 1 | 0 | 0 | 1 | 1 | 187 | 0 | 188 | 0 | 0 | 0 | 0 | 831 |
| 08:45 | 513 | 90 | 0 | 603 | 0 | 0 | 0 | 0 | 2 | 201 | 0 | 203 | 0 | 0 | 0 | 0 | 806 |
| Total | 2100 | 381 | 0 | 2481 | 1 | 0 | 0 | 1 | 3 | 744 | 0 | 747 | 0 | 0 | 0 | 0 | 3229 |
| Grand Total | 4100 | 715 | 0 | 4815 | 2 | 0 | 0 | 2 | 4 | 1261 | 0 | 1265 | 0 | 0 | 0 | 0 | 6082 |
| Apprch % | 85.2 | 14.8 | 0 | | 100 | 0 | 0 | | 0.3 | 99.7 | 0 | | 0 | 0 | 0 | | |
| Total % | 67.4 | 11.8 | 0 | 79.2 | 0 | 0 | 0 | 0 | 0.1 | 20.7 | 0 | 20.8 | 0 | 0 | 0 | 0 | |

| Start Time | S. VAN NESS AV Southbound | | | | ERIE ST Westbound | | | | S. VAN NESS AV Northbound | | | | I-80 EB ON-RAMP Eastbound | | | | Int. Total |
|--------------|------------------------------|------------|------|------------|----------------------|------|------|------------|------------------------------|------------|------|------------|------------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 08:00 | 537 | 96 | 0 | 633 | 0 | 0 | 0 | 0 | 0 | 168 | 0 | 168 | 0 | 0 | 0 | 0 | 801 |
| 08:15 | 509 | 94 | 0 | 603 | 0 | 0 | 0 | 0 | 0 | 188 | 0 | 188 | 0 | 0 | 0 | 0 | 791 |
| 08:30 | 541 | 101 | 0 | 642 | 1 | 0 | 0 | 1 | 1 | 187 | 0 | 188 | 0 | 0 | 0 | 0 | 831 |
| 08:45 | 513 | 90 | 0 | 603 | 0 | 0 | 0 | 0 | 2 | 201 | 0 | 203 | 0 | 0 | 0 | 0 | 806 |
| Total Volume | 2100 | 381 | 0 | 2481 | 1 | 0 | 0 | 1 | 3 | 744 | 0 | 747 | 0 | 0 | 0 | 0 | 3229 |
| % App. Total | 84.6 | 15.4 | 0 | | 100 | 0 | 0 | | 0.4 | 99.6 | 0 | | 0 | 0 | 0 | | |
| PHF | .970 | .943 | .000 | .966 | .250 | .000 | .000 | .250 | .375 | .925 | .000 | .920 | .000 | .000 | .000 | .000 | .971 |

Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00



TRAFFIC COUNTS PLUS

mietekm@comcast.net
925.305.4358

CITY OF SAN FRANCISCO

Latitude: 37.769217
Longitude: -122.417834

File Name : van ness-erie-p
Site Code : 3
Start Date : 3/7/2018
Page No : 1

Groups Printed- Vehicles Only

| Start Time | S. VAN NESS AV Southbound | | | | ERIE ST Westbound | | | | S. VAN NESS AV Northbound | | | | I-80 EB ON-RAMP Eastbound | | | | Int. Total |
|-------------|------------------------------|------|----|------------|----------------------|----|----|------------|------------------------------|------|----|------------|------------------------------|----|----|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 16:00 | 351 | 181 | 0 | 532 | 0 | 0 | 0 | 0 | 0 | 143 | 0 | 143 | 0 | 0 | 0 | 0 | 675 |
| 16:15 | 355 | 155 | 0 | 510 | 1 | 0 | 0 | 1 | 1 | 143 | 0 | 144 | 0 | 0 | 0 | 0 | 655 |
| 16:30 | 333 | 186 | 0 | 519 | 0 | 0 | 0 | 0 | 1 | 125 | 0 | 126 | 0 | 0 | 0 | 0 | 645 |
| 16:45 | 305 | 201 | 0 | 506 | 1 | 0 | 0 | 1 | 0 | 122 | 0 | 122 | 0 | 0 | 0 | 0 | 629 |
| Total | 1344 | 723 | 0 | 2067 | 2 | 0 | 0 | 2 | 2 | 533 | 0 | 535 | 0 | 0 | 0 | 0 | 2604 |
| 17:00 | 399 | 175 | 0 | 574 | 0 | 0 | 0 | 0 | 1 | 130 | 0 | 131 | 0 | 0 | 0 | 0 | 705 |
| 17:15 | 401 | 193 | 0 | 594 | 1 | 0 | 0 | 1 | 1 | 158 | 0 | 159 | 0 | 0 | 0 | 0 | 754 |
| 17:30 | 298 | 212 | 0 | 510 | 0 | 0 | 0 | 0 | 0 | 135 | 0 | 135 | 0 | 0 | 0 | 0 | 645 |
| 17:45 | 287 | 266 | 0 | 553 | 0 | 0 | 0 | 0 | 0 | 122 | 0 | 122 | 0 | 0 | 0 | 0 | 675 |
| Total | 1385 | 846 | 0 | 2231 | 1 | 0 | 0 | 1 | 2 | 545 | 0 | 547 | 0 | 0 | 0 | 0 | 2779 |
| Grand Total | 2729 | 1569 | 0 | 4298 | 3 | 0 | 0 | 3 | 4 | 1078 | 0 | 1082 | 0 | 0 | 0 | 0 | 5383 |
| Apprch % | 63.5 | 36.5 | 0 | | 100 | 0 | 0 | | 0.4 | 99.6 | 0 | | 0 | 0 | 0 | | |
| Total % | 50.7 | 29.1 | 0 | 79.8 | 0.1 | 0 | 0 | 0.1 | 0.1 | 20 | 0 | 20.1 | 0 | 0 | 0 | 0 | |

| Start Time | S. VAN NESS AV Southbound | | | | ERIE ST Westbound | | | | S. VAN NESS AV Northbound | | | | I-80 EB ON-RAMP Eastbound | | | | Int. Total |
|--------------|------------------------------|------|------|------------|----------------------|------|------|------------|------------------------------|------|------|------------|------------------------------|------|------|------------|------------|
| | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | RT | TH | LT | App. Total | |
| 17:00 | 399 | 175 | 0 | 574 | 0 | 0 | 0 | 0 | 1 | 130 | 0 | 131 | 0 | 0 | 0 | 0 | 705 |
| 17:15 | 401 | 193 | 0 | 594 | 1 | 0 | 0 | 1 | 1 | 158 | 0 | 159 | 0 | 0 | 0 | 0 | 754 |
| 17:30 | 298 | 212 | 0 | 510 | 0 | 0 | 0 | 0 | 0 | 135 | 0 | 135 | 0 | 0 | 0 | 0 | 645 |
| 17:45 | 287 | 266 | 0 | 553 | 0 | 0 | 0 | 0 | 0 | 122 | 0 | 122 | 0 | 0 | 0 | 0 | 675 |
| Total Volume | 1385 | 846 | 0 | 2231 | 1 | 0 | 0 | 1 | 2 | 545 | 0 | 547 | 0 | 0 | 0 | 0 | 2779 |
| % App. Total | 62.1 | 37.9 | 0 | | 100 | 0 | 0 | | 0.4 | 99.6 | 0 | | 0 | 0 | 0 | | |
| PHF | .863 | .795 | .000 | .939 | .250 | .000 | .000 | .250 | .500 | .862 | .000 | .860 | .000 | .000 | .000 | .000 | .921 |

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 17:00

