Item 5 Enclosure
CAC
March 22, 2017

Alemany Interchange Improvement Study

Final Report

March 2017

This project is funded in part through the San Francisco County Transportation Authority's Neighborhood Transportation Improvement Program (NTIP). The NTIP was established to fund community-based efforts in San Francisco neighborhoods, especially in underserved neighborhoods and areas with vulnerable populations (e.g.seniors, children, and/or people with disabilities).

The NTIP is made possible with Proposition K local transportation sales tax funds. The San Francisco County Transportation Authority (SFCTA) would like to thank Commissioner Avalos Campos for recommending the Alemany Interchange Improvement Study for NTIP funding. The SFCTA would also like to acknowledge our project partners, including the San Francisco Municipal Transportation Agency (SFMTA), Department of Public Works (DPW) and California Department of Transportation (Caltrans) District 4. The final report was approved by the Transportation Authority Board on [date]

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1 EXECUTIVE SUMMARY

The Alemany Interchange Improvement Study was recommended by Commissioner Campos for Proposition K (Prop K) local transportation sales tax funds from the San Francisco County Transportation Authority's Neighborhood Transportation Improvement Program (NTIP). The NTIP is intended to strengthen project pipelines and advance the delivery of community-supported neighborhood-scale projects, especially in Communities of Concern and other underserved neighborhoods and areas with at-risk populations (e.g., seniors, children, and/or people with disabilities).

This community driven project addresses safety and accessibility across and along Alemany Boulevard between Putnam Street and Bayshore Boulevard. This portion of Alemany Boulevard, where U.S. 101, I-280, San Bruno Avenue, and Bayshore Boulevard intersect, presents major challenges to pedestrian and bicyclist safety and accessibility. The freeways and vehicle-oriented street design present barriers between the surrounding neighborhoods and limit crossing opportunities, requiring pedestrians, bicyclists, and transit riders to navigate a circuitous maze of high-speed streets and ramps. There are three wide vehicle lanes in each direction, allowing for high speed driving. Narrow sidewalks, limited pedestrian crossing opportunities, and shared lanes for bicycle access leave pedestrians and people on bikes exposed to these highway-like conditions.

The project was initiated with the help of neighboring communities, led by the Portola Neighborhood Association (PNA), and was requested by San Francisco Transportation Authority (SFCTA) Commissioner and Supervisorial District 9 Supervisor David Campos's office, with the purpose of improving safety, accessibility, and completing the bicycle network on Alemany Boulevard. The planning effort is led by the SFCTA and coordinated closely with California Department of Transportation (Caltrans) District 4, San Francisco Municipal Transportation Agency (SFMTA) and Department of Public Works (DPW).

The team performed an initial feasibility assessment, developed traffic analysis, and conducted community outreach through presenting at community and stakeholder meetings and other events such as the Alemany Market and neighborhood services organizations in the Portola neighborhood. The analysis and outreach informed the development of conceptual designs, preliminary cost estimates, and a funding and implementation strategy.

The Alemany Interchange Improvement Study (the project) has identified two phases for improvements through this corridor:

- Phase 1
  - Extend existing Alemany Boulevard bicycle lanes to fill the gap between Putnam Street and Bayshore Boulevard with buffered bicycle lanes and intersection improvements

  - Reduce Alemany Boulevard vehicle lanes from three to two in each direction from Putnam Street to Bayshore Boulevard
  - Restripe for multimodal improvements and traffic calming at intersections, including high visibility crosswalks and painted curb extensions to realign and reduce vehicle speed at the intersections
- Phase 2
  - Install a new multiuse path connecting from San Bruno Avenue to the Alemany Market
  - Install new traffic signals and marked crosswalks to facilitate pedestrian crossing of westbound Alemany Boulevard
  - Install high visibility pedestrian crosswalk on eastbound of Alemany Boulevard

The project team completed planning level cost estimates for Phase 1 and Phase 2 concept plans, including review by SFMTA and DPW. The estimated total cost for Phase 1 striping for pedestrian and bicycle improvements includes SFMTA staff time, coordination with Caltrans, and full implementation, and is approximately $277,000. The estimated total cost for Phase 2 includes the final design and construction of a multimodal path and a new signal for the pedestrian crossing, and is approximately $2.2 million. The Phase 2 cost estimate is a planning-level estimate and is subject to change as design progresses.

Phase 1 will be funded through Prop K NTIP Capital Funds and first steps of Phase 2 will be funded through General Funds. SFMTA will be the implementing agency for Phase 1 improvements, SFCTA will transfer project related materials and detailed striping plans to SFMTA to complete Phase 1. The SFMTA will also coordinate directly with Caltrans to meet permitting requirements. Phase 1 is expected to be completed and ready for use within two years.

DPW will be the implementing agency for Phase 2, and will coordinate with SFMTA and Caltrans to complete the funding and design plans for Phase 2, which will also require permitting and review from Caltrans.

2 INTRODUCTION

The Alemany Interchange Improvement Study (the project) is a Neighborhood Transportation Plan (NTP) led by SFCTA, in partnership with the office of Supervisor David Campos and community organizations in the Portola and Bernal Heights neighborhoods. This study was recommended by Commissioner Campos for Prop K local transportation sales tax funds from the Transportation Authority's Neighborhood Transportation Improvement Program (NTIP). The NTIP is intended to strengthen project pipelines and advance the delivery of community-supported neighborhood-scale projects, especially in Communities of Concern and other underserved neighborhoods and areas with at-risk populations (e.g., seniors, children, and/or people with disabilities). Along with NTIP, this study is also funded by District 9 General Fund.

PROJECT PURPOSE AND GOALS

This NTIP project developed and evaluated a limited set of specific improvements for multimodal connectivity and safety by providing pedestrian and bicycle connections along and across Alemany Boulevard, between Putnam Street and Bayshore Boulevard. Neighboring communities, led by the PNA, developed two specific proposals: a north-south pedestrian and bicycle pathway, connecting San Bruno Avenue to the Alemany Market; and dedicated bicycle lanes along Alemany Boulevard, connecting the existing bicycle lanes that end west of Putnam Street and on Bayshore Boulevard.

The community proposal calls for pedestrian and bicycle safety improvements, such as decreased crossing distances; reduced conflict points between pedestrians, bicyclists, and vehicle drivers; and new formal crossing opportunities. At the same time, the project team recognizes the important regional links provided by the surface streets, and on the connecting highways and ramps, and calls for improvements that will maintain acceptable operations and do not adversely impact safety of vehicles on I-280 and U.S. 101.

Project concepts and feasibility evaluation are guided by three primary goals:

- Strengthen connections – reconnect neighborhoods that are divided by vehicle dominated streets, highway ramps, and overpasses; and enable the long-term, community-driven greenway vision.
- Improve safety – implement safety countermeasures for pedestrians, bicyclists, and motorists while enhancing multimodal access and visibility for all ages and abilities.
- Keep costs low – identify low-cost treatments and quick implementation solutions to ensure near-term goals can be funded and constructed, while understanding that higher-cost options may also be available for medium-term implementation.

PROCESS

The project team, led by the SFCTA, worked directly with a Technical Advisory Committee (TAC) to seek guidance on design, analysis, and feasibility considerations throughout the course of the project. The TAC includes representatives from Caltrans' Community Planning, SFMTA planning and engineering staff, and DPW. The project team began work, with an introductory TAC meeting, in December 2015.

The project process was also built around community outreach and opportunities for direct connections with community organizations to ensure that project recommendations responded directly to community priorities and concerns.

The following topics were addressed:

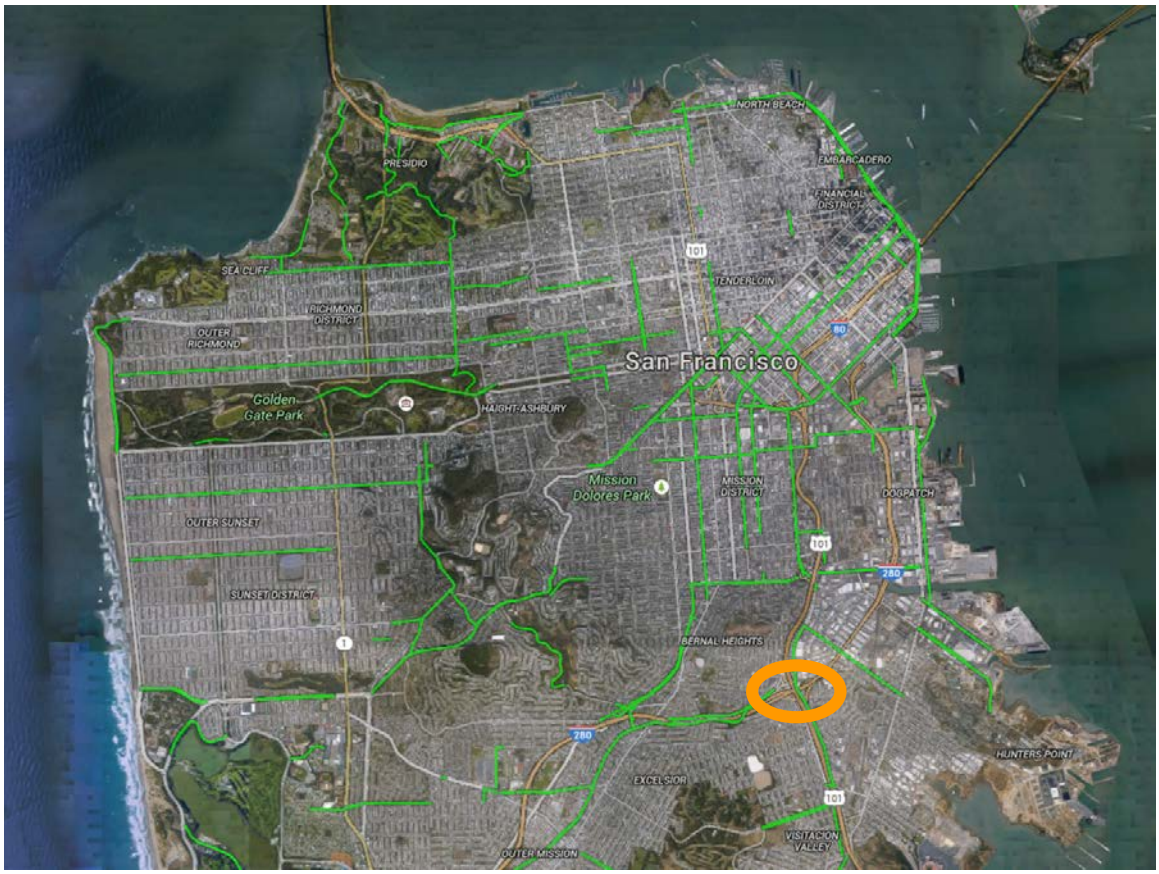
- Ongoing stakeholder coordination and community outreach
- Existing conditions and needs assessment
- Traffic analysis
- Preliminary and final design recommendations
- Cost estimates
- Funding and implementation plans and strategies

The project team has completed final design recommendations and cost estimates for Phase 1; concept plans and cost estimates for Phase 2; and is coordinating directly with SFMTA to transfer project details to SFMTA for Phase 1 implementation.

3 EXISTING CONDITIONS

The Alemany Interchange is located where U.S. 101, I-280, Alemany Boulevard, Bayshore Boulevard, and San Bruno Avenue intersect (see area circled with orange in Figure 1). The interchange has the potential to provide critical connections between the adjacent communities of Bernal Heights, the Portola, Silver Terrace, and the Bayview, as well as destinations beyond. However, pedestrians, bicyclists, and transit riders seeking to reach these communities must navigate a circuitous maze of high-speed streets and ramps. The posted speed limits are 40 mph on westbound Alemany Boulevard and 45 mph on eastbound Alemany Boulevard.

Figure 1 Project Location

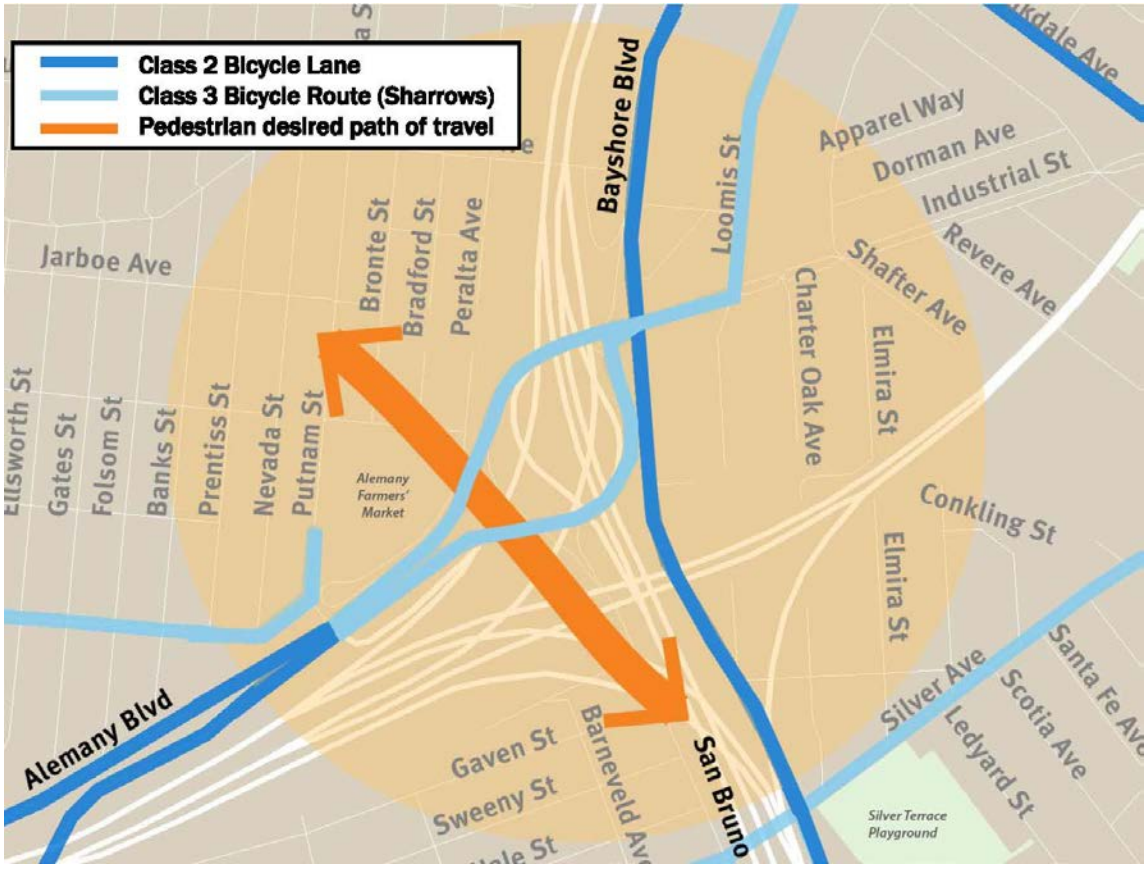


LAND USE CONTEXT

The project site is a central connecting point between land uses that surround the site. On the north side of Alemany Boulevard, there is a mix of residential and light industrial development, located west of Putnam Street, while the popular Alemany Market site is located immediately east of Putnam Street and US 101 freeway running parallel to southbound Bayshore Boulevard. On the south side of Alemany Boulevard, I-280 freeway runs parallel to eastbound Alemany and highway ramps intersect with Alemany Boulevard at several points between Putnam Street and Bayshore Boulevard. The neighborhood immediately east of Bayshore Boulevard is a mix of commercial and industrial development.

Together with hilly topography, the freeways act as barriers between the surrounding neighborhoods, with few locations where they can be crossed, preventing the adjacent residential neighborhoods from access to other areas in this vicinity (see Figure 2). Bernal Heights is located immediately north of the project site, connected via Putnam Street. Portola is located immediately south of the project site, connected via San Bruno Avenue. Silver Terrace is located southeast of the project site, with connections via Bayshore Boulevard and San Bruno Avenue. The Bayview is southeast of Silver Terrace.

Figure 2 Neighborhood Context



PEDESTRIAN AND BICYCLE NETWORK CONTEXT

Currently, no pedestrian or bicycle infrastructure directly connects the Alemany Market, a major destination located on the northwest side of the interchange, to San Bruno Avenue nor neighborhoods to the south. The existing pedestrian route requires a lengthy detour to the west and several separate street crossings due to a closed crosswalk at San Bruno Avenue. Instead, many pedestrians follow an informal path along a dirt trail through the interchange that requires crossing multiple uncontrolled lanes of fast-moving traffic. Because of the curving roadway alignment, the pedestrian and vehicle visibility is very poor at the informal crossing to the Alemany Market (see Figure 3). The low visibility is of particular concern, given the posted speed limits of 40 mph on westbound Alemany Boulevard and 45 mph on eastbound Alemany Boulevard. At these speeds, a pedestrian is 80%[1] more likely to experience a fatal injury from a collision with a vehicle.

Figure 3 Informal Crossing on Alemany Boulevard at Farmer's Market

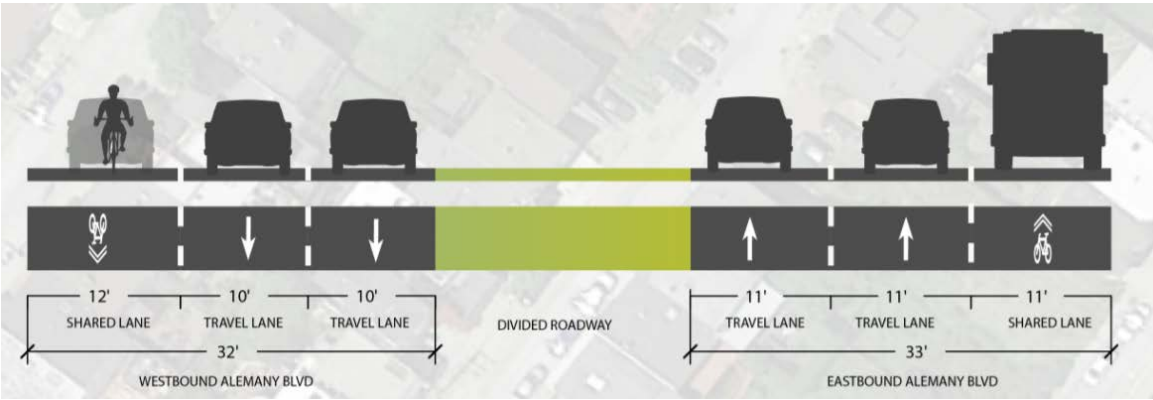
Sidewalks are present on either side of Alemany Boulevard, but north/south crosswalks are limited. One leg of the Alemany Boulevard/Putnam Street crosswalk is closed and there is no

[1] "Street Score 2016: Annual Report on the State of Walking in San Francisco," Walk San Francisco, December 2016.

north/south crosswalk at San Bruno Avenue. The Putnam Street and Bayshore Boulevard crossings are over a third of a mile apart and the east/west crosswalks, present at each intersection and ramp crossing in the study area, are long and traverse uncontrolled right turn slip lanes.

Bicycle network connectivity is also lacking. Alemany Boulevard is a designated east-west bicycle route, connecting to the Bayshore Boulevard north-south bicycle route, just east of the interchange. Alemany Boulevard west of the interchange has double-striped buffered bike lanes, which end abruptly at the Alemany Boulevard and Putnam Street/I-280 off-ramp intersection. "Sharrows" on Alemany Boulevard, between Putnam Street and Bayshore Boulevard, offer some wayfinding guidance to bicyclists through the interchange, but provide no separation from vehicles in the three-lane arterial. Bicyclists are either exposed to high-speed traffic, freeway-bound vehicles, and a circuitous maze of merging lanes and highway ramps; or choose to ride on sidewalks. See Figure 4 for the typical street geometry and vehicle lane widths.

Figure 4 Alemany Interchange – Existing Typical Cross Section



The project corridor is served by very limited transit. The Muni 9R travels along Bayshore Boulevard with a stop at Waterloo, one block north of the Alemany Boulevard intersection. The Muni 14X travels through the corridor along Alemany Boulevard, but does not stop nearby. The Muni 23 serves the adjacent Bernal Heights neighborhood with service along Crescent Street. Glen Park Station is the nearest BART station approximately 1.5 miles southwest of the project corridor.

SAFETY

Safety is a significant issue in the interchange area, with several collisions having occurred on the streets in and near the interchange, in recent years. The Alemany Boulevard, San Bruno Avenue, and Bayshore Boulevard corridors, which converge at the Alemany Interchange, have all been designated by the City's Vision Zero initiative as Pedestrian High Injury Corridors, where a disproportionate share of pedestrian injuries and deaths occur. High vehicle speeds and a lack of sufficient pedestrian and bicycle infrastructure are likely contributing factors to the high numbers of injuries in and around the Alemany Interchange. Addressing these issues is key to achieving the Vision Zero policy objective of zero traffic deaths by 2024.

Figure 5 Study Area Traffic Collisions Summary

Intersection	Total No. of Collisions	Pedestrian/Bicyclist Involved
Alemany Blvd & Bayshore Blvd	11	2 bicyclists, 1 pedestrian
Alemany Blvd & San Bruno Ave	2	1 bicyclist
Alemany Blvd & Crescent/Putnam St	1	1 bicyclist

Source: SWITRS 2010-2014

Of the collisions listed in Figure 5, there was one severe injury to a pedestrian, and most injuries were caused by unsafe speed, dangerous lane changes, and violation of the traffic signal.

This project is also closely related to other safety initiatives, including the SFCTA's broader Vision Zero Ramp Analysis, which will examine how to improve safety citywide, where the freeway system connects with local streets in coordination with the Freeway Corridor Management Study. Another related effort is the SFMTA's Muni Forward San Bruno Corridor Study that will design improvements with the goals of improving multimodal safety and improving the reliability of Muni in the corridor, just south of the Alemany Interchange.

4 PUBLIC AND STAKEHOLDER ENGAGEMENT

The project is community driven, and local neighborhood organizations and stakeholders have defined the safety and access improvement priorities from the inception of the project development. The project site is also located within a multi-jurisdictional right of way, with a range of city and state property owners and agencies responsible for maintenance. Therefore, effective community outreach and technical stakeholder engagement is integral to successful implementation of plans.

PUBLIC AND COMMUNITY OUTREACH

Outreach efforts began when the project team presented the project kickoff to the PNA steering committee, and continued throughout the course of the project to solicit feedback and keep the community informed. The community outreach efforts expanded over the course of the project to define priorities and challenges, and to seek input about presented solutions. The ongoing community engagement provided the project team with opportunities to refine project analysis and recommendations, and to build a coalition of support within the community.

The project team used several mediums to notify the community about the project status and public meetings. The project website was updated frequently to provide information about project status, upcoming presentations, and meeting details. The team also emailed project information to the SFCTA's contact list recipients and to the project update subscribers. In addition, the meeting details were posted to SFCTA's social media platforms, Facebook and Twitter, and a private social network for the neighborhoods, Nextdoor.

After completing preliminary analysis, the project team conducted a series of outreach meetings in spring of 2016 at various community meetings (including PNA, Portola Family Connection, San Francisco Community Empowerment Center, and Alemany Farmer's Market), with presentations about the existing conditions, traffic analysis, and initial design concepts.

Another round of community outreach was held in fall of 2016, including presentations of final traffic analysis, detailed striping drawing for Phase 1, conceptual drawing for Phase 2, project timeline, preliminary cost estimate, and funding strategies. In addition to the community groups and Alemany Farmer's Market, the project team provided project updates to both SFCTA's Citizen Advisory Committee (CAC) and Finance Committee.

Information was presented using multiple visuals, verbal communication, and written materials to address the needs of diverse groups of the project area's population. The project team presented the detailed drawing plans with large display posters to illustrate existing design challenges and proposed solutions. Project factsheets were translated into multiple languages,

including Chinese, Spanish, and Tagalog. The project team also coordinated with Cantonese and Spanish translators during the language-specific focus group outreach at Portola Family Connection and San Francisco Empowerment Center.

The project team made the following presentations to the public:

- Alemany Farmer's Market – March and November 2016
- Portola Family Connections – March and November 2016
- Portola Neighborhood Association Open Houses – June and October 2016
- Portola Neighborhood Association Steering Committee Meetings – March and September 2016
- San Francisco Community Empowerment Center – May 2016

In addition to presenting the project to neighborhood groups, the following advocacy and community entities/organizations have been involved:

- San Francisco Bicycle Coalition
- Walk SF
- The Greenhouse Project
- A Living Library
- San Francisco Supervisor of District 9 David Campos, and staff Hillary Ronen
- California Assembly member, David Chiu

See Figure 6 for a summary of highlights from community feedback, and additional details are included in Appendix A.

Figure 6 Community Feedback Summary

Topic	Community Feedback and Response
Connectivity to the Portola Neighborhood	Many residents of the Portola neighborhood expressed a desire for a buffered bicycle lane on Alemany Boulevard between Putnam Street and Bayshore Avenue and a new multi-use path to connect the Alemany Market to San Bruno Avenue. The project team received a letter from PNA at the outset of the study, and continued to coordinate with PNA throughout the project, sharing conceptual designs and including them in discussions about final design recommendations.
Potential Queuing	The road diet raised questions about possible vehicle queuing on Alemany Boulevard. In response, project team presented the final traffic study, which shows that road diet will not cause any significant impact due to existing low traffic volume and excess vehicle capacity on Alemany Boulevard. The results of this traffic study are detailed in Chapter 6.
New Signal Traffic	Phase 2 will include a new traffic signal on Alemany Boulevard to facilitate pedestrian crossing at the multimodal path connecting San Bruno Boulevard and Alemany Market. The new signal will be activated when a pedestrian or bicyclist is present, and will be coordinated with the Bayshore Avenue traffic signal to maintain a smooth flow for all modes of transportation.
Bicycle Safety	In order to address community-raised concern about the safety of bicyclists across intersections and along Alemany Boulevard, the project team recommended improvements to increase visibility and separation from vehicles including paint-based curb extensions and “No Right Turn on Red” signage. Soft-hit posts will be implemented along the corridor to further separate bicyclists from vehicle traffic.
Alemany Market Circulation	Traffic circulation at the market was not a main component of this project. However, the project team outlined potential/pilot recommendations in Chapter 7.
Storm water Runoff and Flooding	The project team responded to concerns from the public regarding flooding in and around the study area by coordinating with other city agencies to investigate the causes and perform initial hydrological analysis of the sites. San Francisco Public Works will conduct a survey of the landscaped median area where the Phase 2 path is recommended to address and identify drainage requirements
Landscape Improvement	Local interest in landscaping improvement at the interchange and surrounding area has been documented by the project team. Although enhancing the landscape is outside the scope of this project, future landscape improvement is feasible.

STAKEHOLDER AND AGENCY COORDINATION

A TAC was created for this project where multiple agencies including, SFMTA, San Francisco DPW, and California Department of Transportation (Caltrans) District 4 coordinated efforts with the project team on various aspects of the project. The various TAC agencies worked together, throughout the course of the project, to share analysis findings, discuss project implementation strategies, and define agency roles and responsibilities for future stages of implementation.

5 PRELIMINARY DESIGN

As defined previously, the project is intended to address specific multimodal safety and access deficiencies along Alemany Boulevard, between Putnam Street and Bayshore Boulevard. This chapter outlines the preliminary design priorities and conceptual design development.

DESIGN PRIORITIES

Preliminary design was guided by the following requirements:

- Improve pedestrian and bicyclist safety and accessibility along and across Alemany Boulevard through the study area.
- Improve pedestrian and bicyclist comfort and safety by decreasing crossing distances where possible, and reducing conflict points between pedestrians, bicyclists, and motorists.
- Create new opportunities for pedestrian and bicycle crossing.
- Maintain acceptable vehicle operations and do not adversely impact safety of vehicles on I-280 and US 101.

In addition to the project purpose, a number of design priorities were identified through the initial analysis and outreach process. Based on site visit observations, preliminary analysis, and stakeholder and community input, the following priorities emerged:

- Improve accessibility and safety for pedestrians and bicyclists
- Complete the bicycle network on Alemany Boulevard to fill the gap between Putnam Street and Bayshore Boulevard
- Address high speed vehicle turning movements, especially at right turn locations where motorists drive at highway speeds across pedestrian crosswalks
- Improve pedestrian and bicyclist visibility, especially at intersections
- Identify low-cost, low-barrier solutions to develop a concept that could be funded and implemented in the very near term
- Consider a road diet on Alemany Boulevard to redistribute the right of way and dedicate more space to bicyclists and pedestrians
- Keep flooding constraints in mind, as the surface streets in the project area frequently flood during heavy rainfall, especially the north side of Alemany and the US 101 connector detour
- Keep market circulation in mind, and minimize impact on westbound right turns at Putnam Street -- though market circulation and parking lot design is out of the scope of this project, this concern is raised more frequently than operations on Alemany Boulevard

- Maintain acceptable vehicle operations and evaluate potential design impacts on highway ramps
- Present opportunities for landscaping and community-led greening, and preserve the possibility of reclaiming the unpaved median between Putnam Street and the San Bruno Avenue access ramp for a neighborhood garden and/or stormwater mitigation -- though landscape enhancement is out of the scope of the street improvements called for in this project, there is strong support for community-led improvements, and Portola Urban Greening has been active in pursuing this topic (see Appendix B for PUG letter of support)

IMPROVEMENT STRATEGIES

The project design team focused on improvement strategies that could be implemented without any curb work or construction for Phase 1. These include a variety of traffic calming and street geometry design strategies.

- Dedicated bicycle lane:
  - Maintain two 10- to 11-foot-wide vehicle travel lanes
  - Repurpose the 11- to 15-foot-wide curbside lane as a buffered bike lane
  - Utilize additional right of way to provide a wide buffer zone to separate bicycles from higher speed vehicles, and locate the bicycle travel lane beyond the curbside flood zone where possible
- Pedestrian and bicycle accessibility and safety:
  - Extend pedestrian zone beyond sidewalks at intersections to narrow vehicle right of way and reduce the pedestrian crossing distance
  - Reduce turning radii at intersections to slow vehicle movements across pedestrian and bicycle conflict zones by painting curb extensions to realign vehicle lanes and expand the pedestrian zone beyond the existing curb
  - Align crossings at 90 degrees where possible to mitigate crossing distance
  - Simplify vehicle movements at Bayshore Boulevard
  - Define, directionally, specific bicycle lanes and left turn bike box at Bayshore Boulevard
- Low cost improvements:
  - Define curb extensions, pedestrian crossings, and bicycle lanes through intersections with paint
  - Utilize other low-cost/ no-construction design elements, such as safe hit posts, to further separate vehicle lanes and bicycle lanes

While Phase 1 concepts utilize these low-cost design strategies, additional concepts requiring construction or larger investments were identified as part of a "Preferred Alternative," which became the basis for Phase 2 recommendations. These include maintaining or reinforcing the strategies outlined above with additional paint or curb work to formalize boundaries between vehicle and multimodal zones, and additional infrastructure, such as:

- Build a multimodal path connecting between San Bruno Avenue and the Alemany Market

- Support pedestrian and bicycle crossings and path access, with improvements at the existing eastbound Alemany Boulevard/San Bruno Avenue crossing, and a new coordinated traffic signal at the westbound Alemany Boulevard/Market crossing

DESIGN ALTERNATIVES

The following figures illustrate preliminary design concept sketches for improving multimodal safety and access along Alemany Boulevard.

Figure 7 Preliminary Design Sketch – Alemany Boulevard and Putnam Street

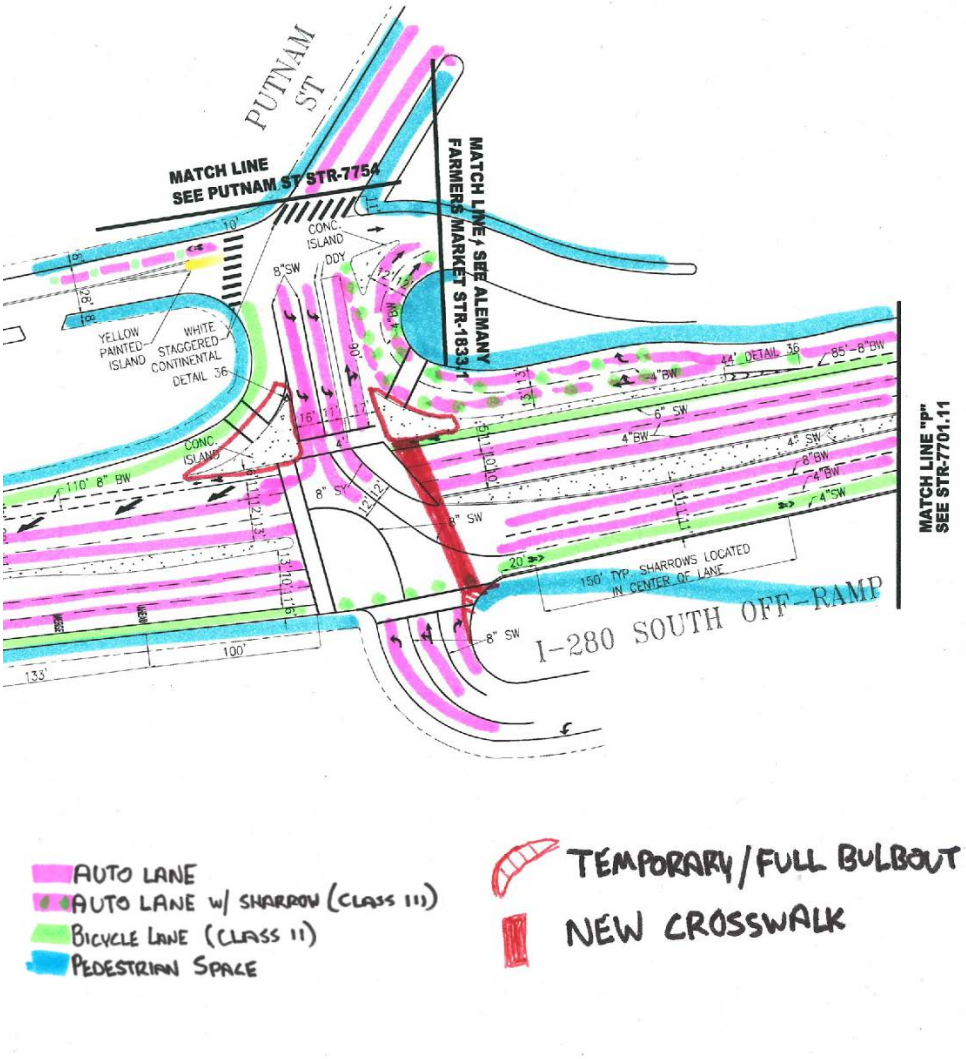
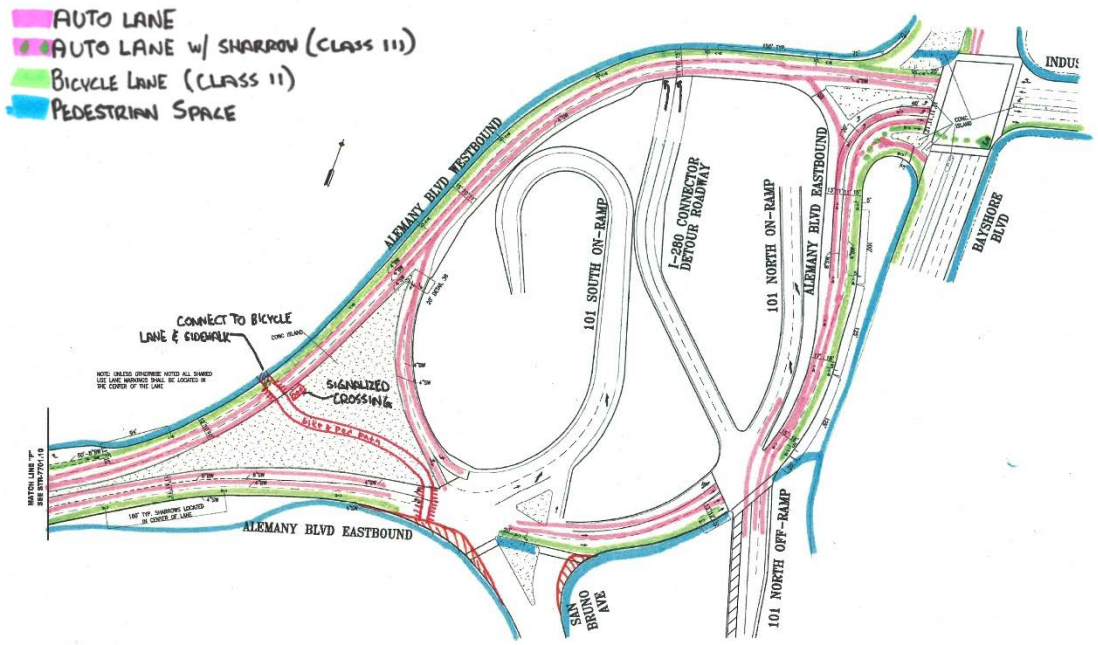


Figure 8 Preliminary Design Sketch – Alemany Boulevard and San Bruno Ave-Bayshore Boulevard



The following key design details are illustrated in the preliminary design sketches:

- Reduce vehicle lanes on Alemany Boulevard from three to two in each direction
- Add buffered bicycle lane on Alemany Boulevard in each direction
- Define bicycle lanes up to and through intersections
- Upgrade all striped crosswalks to high-visibility continental crosswalks
- Add new crosswalk at east leg of Alemany Boulevard/Putnam Street intersection
- Add bicycle lane markings to right turn slip lane onto Putnam Street at westbound Alemany Boulevard
- Extend pedestrian zones at curbs (bulbouts) and right turn slip lane pedestrian islands at Putnam Street
- Extend pedestrian zones at curbs (bulbouts) and right turn slip lane pedestrian islands at San Bruno Avenue
- Reduce pedestrian crossing distances at Putnam Street and San Bruno Avenue intersections
- Define bicycle right of way across Bayshore Boulevard and install a bike box to facilitate two-stage left turn at Bayshore Boulevard
- Consider squaring up vehicle lanes at intersections with turn lanes, where operations and large vehicle access will allow (depending on feasibility at southbound Putnam Street and southbound Bayshore Boulevard)
- Build multimodal path, connecting between San Bruno Avenue and the Alemany Market; install new pedestrian crossings across both directions of Alemany Boulevard and a coordinated signal for pedestrian crossing phase at westbound Alemany Boulevard crossing

Most street geometry, crosswalk improvements, and curb extensions were identified as paint-based improvements for Phase 1 implementation. Revisions from preliminary design sketches to the final striping plan include:

- The westbound right-turn slip lane at the Alemany Boulevard/Putnam Street intersection was revised to maintain vehicle access. A buffer between the vehicle lane and bicycle lane is maintained, where possible.
- The east leg of the crosswalk will remain closed to avoid conflict between northbound right-turning vehicles, southbound left turning vehicles, and crossing pedestrians
- The possibility of reducing speed limits for this segment of Alemany was discussed as a preliminary improvement, and was later removed from consideration and recommended for speed surveys after the installation of Phase 1 if undesired speeds are suspected along the project corridor.

The path and signal construction to Alemany Market was identified as a higher cost preferred alternative for Phase 2 implementation. All of these design details were included in the traffic analysis and other feasibility evaluations.

Phase 1 design details and Phase 2 concept designs were evaluated based on traffic analysis, consistency with SFMTA street design standards, additional input from stakeholders and community members, and ease of implementation. The following chapters outline technical analysis, final design recommendations, and implementation strategies.

6 EVALUATION AND TRAFFIC ANALYSIS

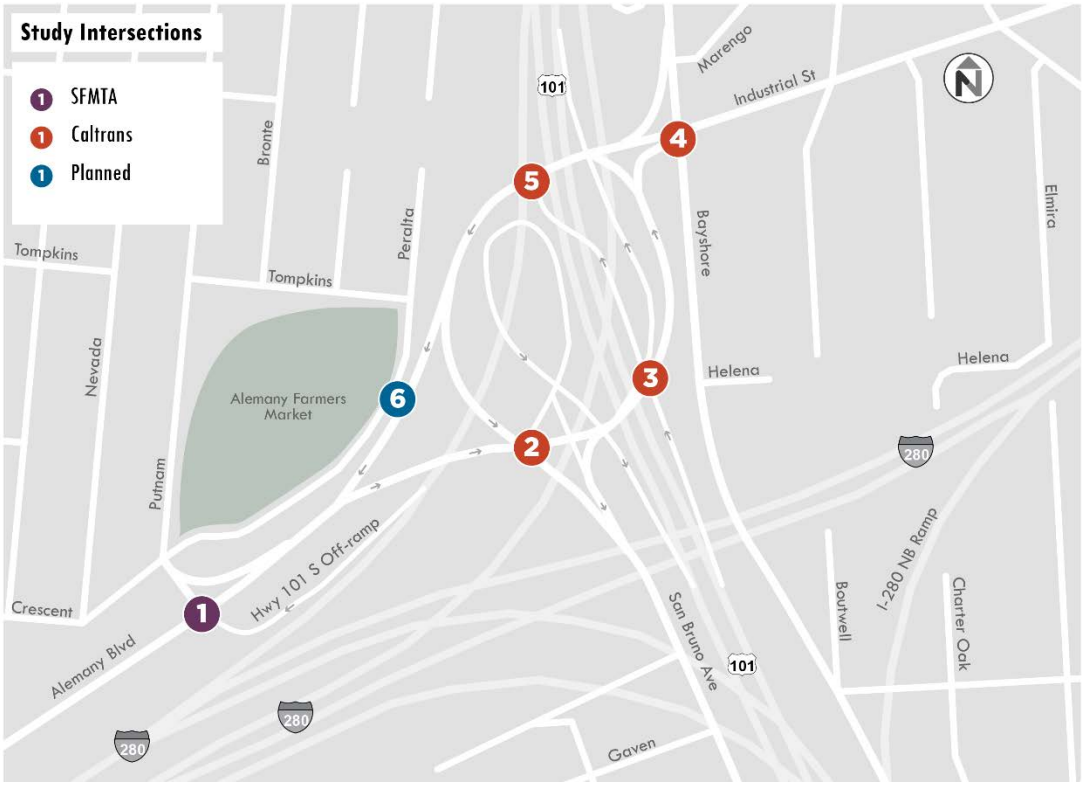
As part of the feasibility study for the Alemany Interchange Improvement Study, a traffic analysis was completed for the study area intersections. The traffic analysis included existing data collection through manual turning movement counts and video counts at some locations, where vehicle queuing is an important consideration. The results of the traffic analysis inform our understanding of how the transportation system, in the vicinity of the project area, may safely and efficiently support the proposed design options, with respect to automobile and transit operations.

DATA COLLECTION

Traffic counts were conducted during weekday and Saturday peak period hours, to coincide with Alemany Market activity. Figure 9 shows the location of the six study intersections, including:

1. Alemany Boulevard at US 101 SB off-ramp/Putnam Street
2. Alemany Boulevard EB at San Bruno Avenue/US 101 SB on-ramp
3. Alemany Boulevard EB at 101 NB off-ramp/US 101 NB on-ramp/ US 101 Detour
4. Bayshore Boulevard at Alemany Boulevard/Industrial Street
5. Alemany Boulevard WB at US 101 Detour
6. Alemany Boulevard WB at Path Crossing *(new signal)*

Figure 9 Study Area Intersection Locations



ANALYSIS

In accordance with the City of San Francisco's standard practice for traffic analysis, automobile delay, and level of service (LOS) analyses were reviewed for both the existing and plus project scenarios. The analyses were conducted using the signalized intersection methodology, outlined in the Highway Capacity Manual (HCM) 2000 for all study intersections. HCM 2000 was preferred over HCM 2010, due to HCM 2010's limitations in analyzing specific signal phasing schemes that exist in the study intersections for this project.

As indicated by the traffic model, all intersections currently operate at LOS D or better, except for Alemany Boulevard and San Bruno Avenue, which operate at LOS E for the morning peak hour. The results of the traffic model are summarized in

Figure 10 and Figure 11 AM Peak Hour Traffic Operations

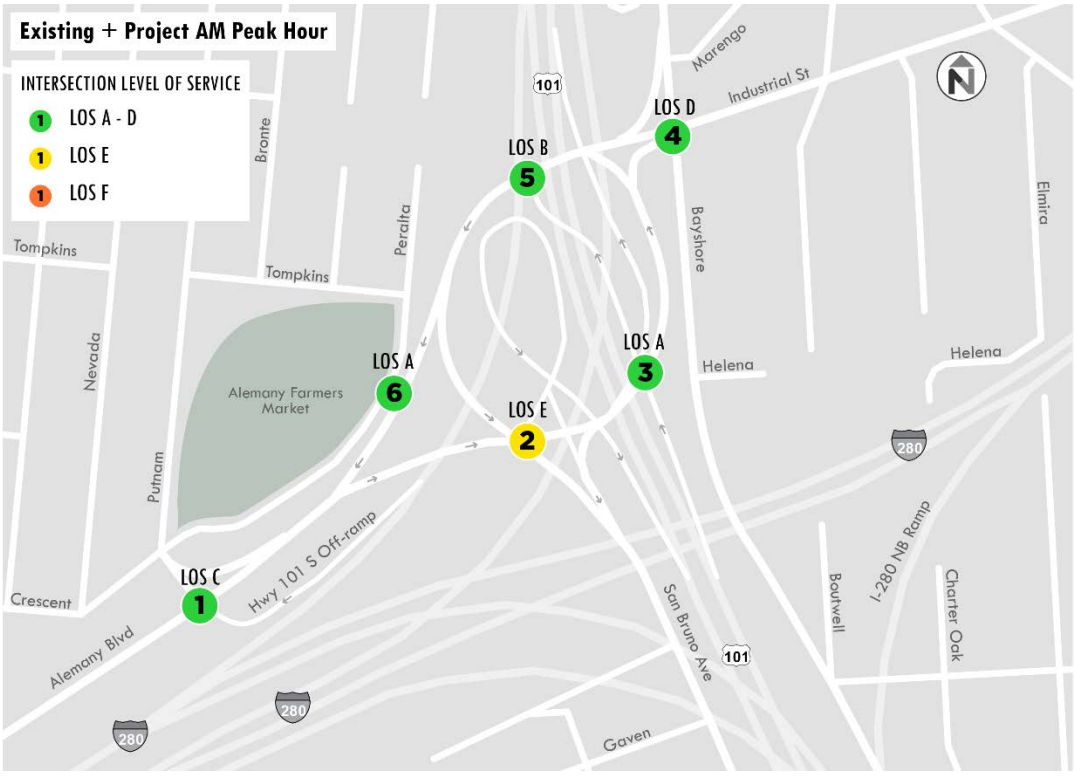


Figure 12, and the complete traffic analysis is available in Appendix C to this report.

While the proposed design is expected to increase delay at some study intersections, all intersections would maintain acceptable levels of service for peak hour conditions. The primary results of the analysis indicate:

- All intersections operate at LOS E or better for peak hour conditions, with the proposed design
- The proposed project design and signal optimization increases the average intersection delay by seven seconds or less for the study area, with the exception of Alemany Boulevard and Putnam Street
- With the proposed project, Caltrans off-ramps will continue to operate similar to the existing conditions and no significant queue buildup is expected on ramps
- Signal timing changes at the intersection of Alemany Boulevard and Putnam Street, in coordination with an ongoing SFMTA signal upgrade project, can be used as a mitigation and optimization strategy to better serve the vehicle demand at this intersection

Figure 10 Summary of Project Conditions LOS at Study Area Intersections

Intersection	Peak Hour	Existing Conditions		Existing with Project		Existing with Project (signal optimization)	
		LOS	Average Intersection Delay (sec)	LOS	Average Intersection Delay (sec)	LOS	Average Intersection Delay (sec)
Alemany Blvd & 101 SB Off-Ramp/Putnam St	AM PM	C D	25 38	C/D* E/E*	30/42* 56/62*	C/D* E/E*	28/42* 56/62*
Alemany Blvd EB & San Bruno Ave/ 101 SB On-Ramp	AM PM	E B	62 15	E B	69 16	E B	69 16
Alemany Blvd EB & 101 NB Off-Ramp/101 NB On-ramp/ 101 Detour	AM PM	A B	6 12	A B	8 14	A B	6 14
Bayshore Blvd & Alemany Blvd/Industrial St	AM PM	D C**	38 35	D D**	42 35	D D**	41 35
Alemany Blvd WB & 101 Detour	AM PM	A B	8 12	B D	10 44	B B	10 17
Alemany Blvd WB & Path Crossing (New Signal)	AM PM	- -	- -	A A	3 5	A A	3 5

*Results show both with/without the southbound Putnam St channelized right turn, respectively.

**Intersection crosses the 35.0s delay threshold between LOS C and LOS D through each of the scenarios. Delay is reported as rounded to the nearest whole number and LOS is reported as the output denoted in Synchro

Figure 11 AM Peak Hour Traffic Operations

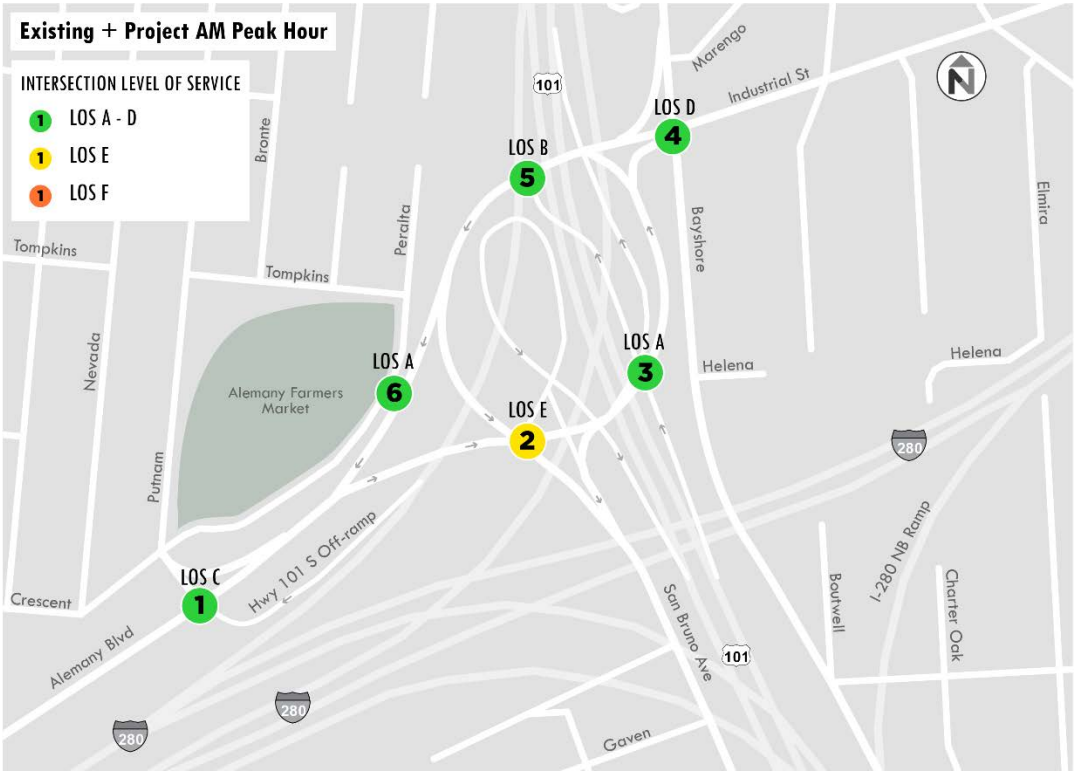
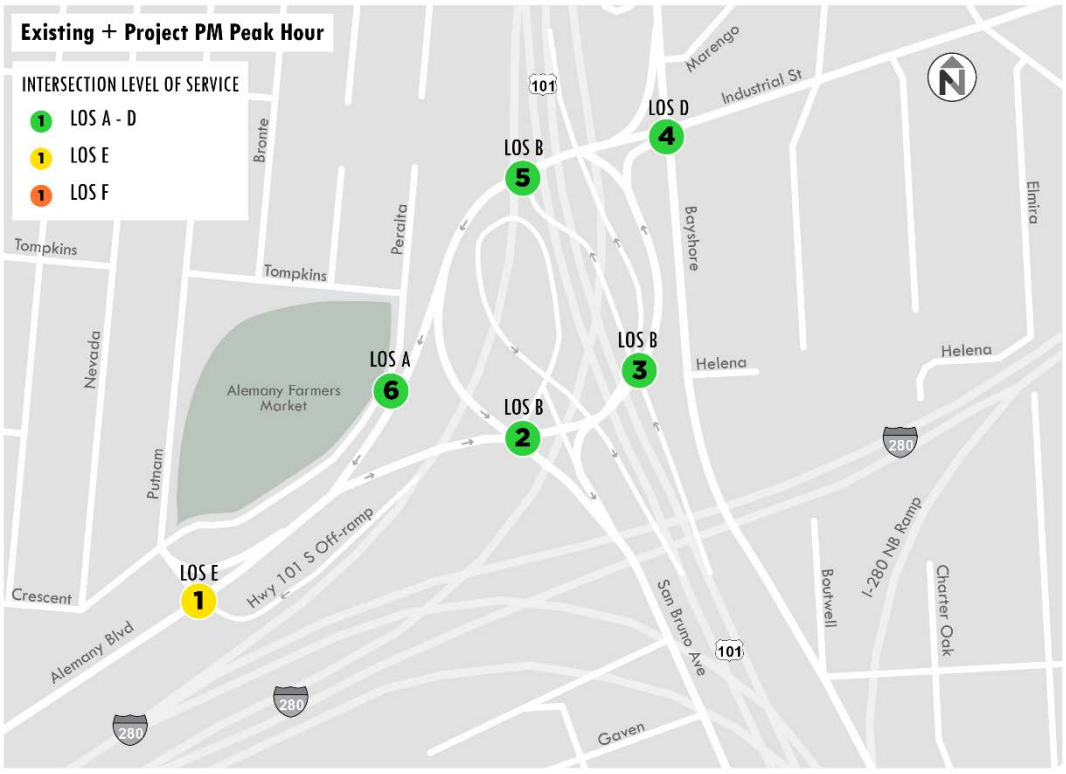


Figure 12 PM Peak Hour Traffic Operations



7 FINAL DESIGN RECOMMENDATIONS AND IMPLEMENTATION

The final design is informed by a combination of technical analyses, project priorities, design and implementation constraints, and community and stakeholder feedback. This chapter describes the final phased design details, cost estimates and considerations, and project implementation and funding strategies.

FINAL PHASED DESIGN DETAILS

The final project design recommendations are separated into two phases and have been refined to address feasibility constraints that were identified in the technical analysis.

Phase 1

Phase 1 improvements call for the following:

- Extend existing Alemany Boulevard bicycle lanes to fill the gap between Putnam Street and Bayshore Boulevard, with buffered bicycle lanes and intersection improvements
- Reduce Alemany Boulevard vehicle lanes from three to two in each direction from Putnam Street to Bayshore Boulevard
- Restripe for multimodal improvements and traffic calming at intersections, including high visibility crosswalks and painted curb extensions to realign and reduce vehicle speed at the intersections

To simplify Phase 1 recommendations and reduce impact on vehicle operations, slip lanes for right turning vehicles are maintained at southbound Putnam Street and southbound Bayshore Boulevard. Both of these locations are wide enough to include new dedicated bicycle lanes through the slip lanes, which merge with the Alemany Boulevard bicycle lanes. The other adjustment to preliminary design concepts is the Putnam Street intersection, where the east leg of the crosswalk will remain closed to avoid conflict between northbound right turning vehicles and crossing pedestrians.

Figure 13 illustrates existing and proposed Phase 1 design details and Figure 14 illustrates the existing and proposed Phase 1 cross sections for Alemany Boulevard design details and lane geometry.

Figure 13 Alemany Interchange – Existing and Phase 1 Proposed Improvements

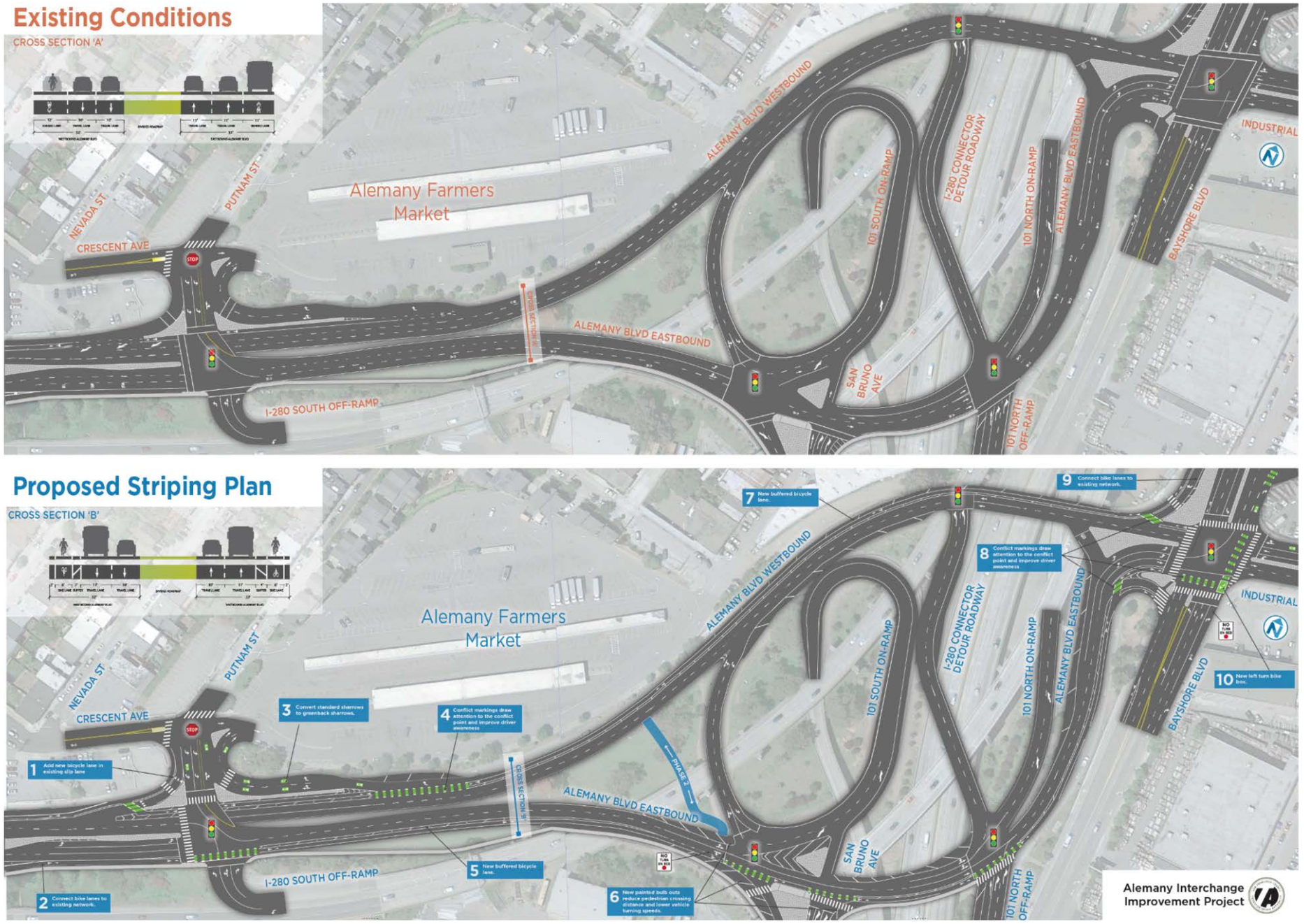
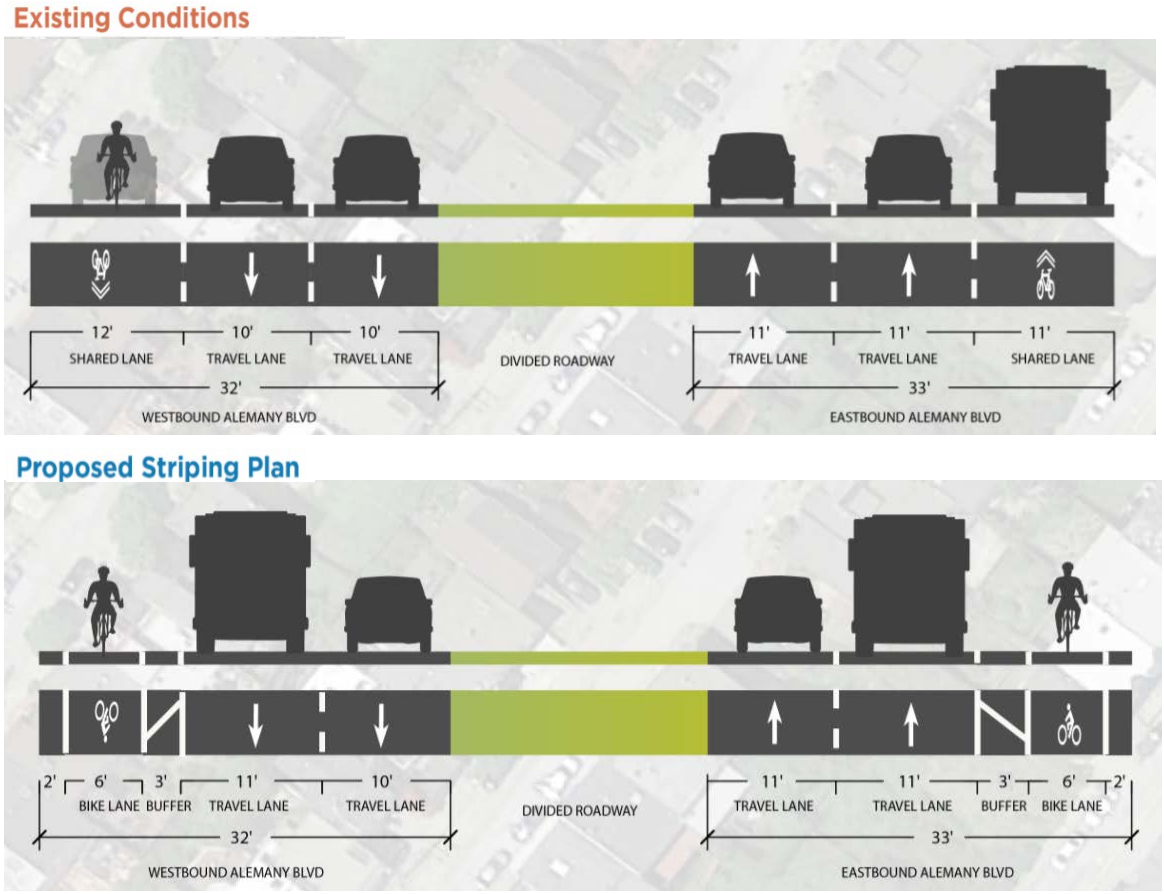


Figure 14 Alemany Interchange – Existing and Phase 1 Proposed Cross Section Details



The Figure 14 plan drawings are based on the detailed final striping drawings in SFMTA's preferred format, which are included in Appendix D.

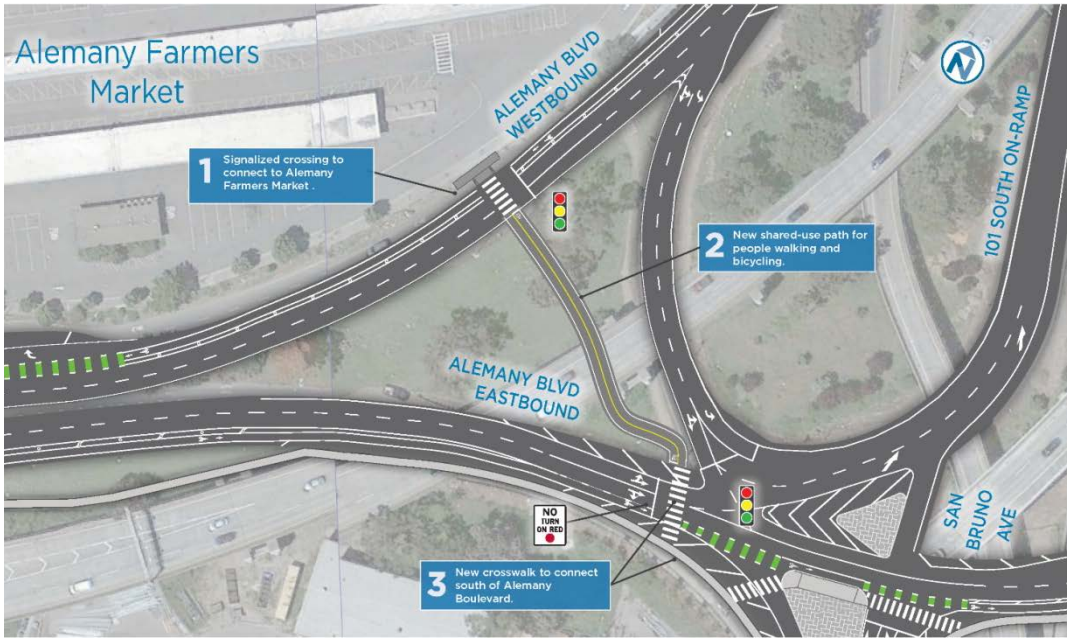
Phase 2

Phase 2 calls for the following additional improvements:

- Install a new multiuse path connecting from San Bruno Avenue to the Alemany Market
- Install new traffic signals and marked crosswalks to facilitate pedestrian crossing of westbound Alemany Boulevard
- Install high visibility pedestrian crosswalk on eastbound of Alemany Boulevard

All Phase 1 design recommendations are compatible with Phase 2 and will not require any adjustment for Phase 2 implementation. The Phase 2 concept is illustrated in Figure 15.

Figure 15 Alemany Interchange – Phase 2 Proposed Improvements



Phase 1 improvements are fully funded and will be implemented by SFMTA in coordination with Caltrans. Phase 2 improvements require additional funding and will be implemented by Public Works in coordination with SFMTA and Caltrans. Implementation and funding strategies are outlined below.

Additional Recommendations

In addition to the improvements included in the scope of this project, community members and neighborhood organization representatives commented that circulation and parking within the Alemany Market is a challenge and high priority for improving safety and access to the market. In particular, market customers expressed their concern about vehicle queuing on Putnam Street at the approach to the market entrance, confusing right of way organization at the market entrance, congestion within the market, and lack of bicycle parking. The following strategies are recommended to pilot near-term improvements:

1. Traffic flow management at entrance – station market management staff outside of the market property to direct traffic at the confusing Putnam Street/Crescent Avenue/Peralta Avenue intersection, and to clear queues forming on Putnam Street or on the Alemany Boulevard right turn slip lane
2. Parking management – use market management staff to direct vehicle traffic to available parking to limit the amount of traffic congestion near the market entrance, making use of underutilized parking spaces further in the back of the market
3. Provide bicycle parking – provide temporary bicycle parking access for bicyclists, who currently have to search the market perimeter for available sign posts
4. Consider westbound Alemany Boulevard right turn slip lane management – use traffic cones to maintain a single lane through the right turn slip lane to simplify vehicle

movement and reduce conflict at the Putnam Street/Crescent Avenue/Peralta Avenue mixing zone

5. Posted speed limit reduction– currently, the posted speed limit on Alemany Boulevard is 40 mph on westbound and 45 mph on eastbound. Preliminary design recommendation identified posted speed limit reduction on Alemany Boulevard as a traffic calming strategy. SFMTA indicated that the posted speed limit is determined through speed survey[2], which the City conducts every 7 years or after a major improvement project. The speed survey on Alemany Boulevard was completed in May 2016 and determined that the posted speed limit is still applicable on that section of Alemany Boulevard. It is recommended that SFMTA conducts another speed survey after the completion of Phase 1 to re-evaluate the posted speed limit. Phase 1 intends to increase safety through reducing number of traveling lanes, implementing buffered bicycle lanes and installing paint-based curb extensions on Alemany Boulevard. The speed survey after Phase 1 could determine if these safety countermeasures also lowered traveling speed.

Strategies 1 through 4 may be implemented by staff as pilot projects to evaluate impacts and effectiveness.

COST ESTIMATE

Cost estimates for Phase 1 improvements were developed based on the striping and paving measurements, defined in the detailed design drawings. Planning level cost estimates for Phase 2 were developed based on a combination of measurement estimates and recent line item costs for similar projects in San Francisco.

Phase 1 improvements will require implementation of the following:

- SFMTA staff planning, engineering, and design support
- Removal/grinding of existing pavement striping
- Installation of proposed pavement striping and required signage, including "no right turn on red" on northbound Bayshore Boulevard
- Installation of safe hit posts

With a ten percent markup added for contingency, the Phase 1 construction cost[3] estimate is approximately **$277,000**.

Phase 2 improvements will require implementation of the following:

- SFMTA staff planning, engineering, and design support
- DPW staff engineering and final design
- Building of asphalt/concrete path
- Installation of proposed pavement striping

[2] Speed survey determines posted speed limit for a particular section of roadway. The survey observes platoons of 100 cars for a specific day and its 85th percentile speed (85% of the vehicles traveling at or below speed) determines the posted speed limit for that section of the roadway.

[3] The construction cost estimate does not include maintenance cost. SFMTA indicated that the maintenance cost would be negligible since there is already buffered bicycle lane east and west of the project area, it would most likely get lump into those areas bicycle infrastructure maintenance schedule and cost.

- Installation of new pedestrian signal, and associated electric/construction
- Installation of path lighting

With a 20 percent markup added for contingency (higher than Phase 1 to account for more unknowns), the Phase 2 planning level cost estimate is approximately **$2.2 million**.

Cost estimate calculation details are provided in Appendix E.

PROJECT IMPLEMENTATION

The project improvements will be implemented in two Phases – Phase 1 will be led by SFMTA, in coordination with Caltrans, and Phase 2 will be led by Public Works, in coordination with SFMTA and Caltrans.

Phase 1

SFMTA will lead the final design effort, the construction management, and will also be the grant administrator. SFMTA will directly conduct the striping and construction work and the SFCTA will provide advice and stakeholder support, if needed.

SFMTA must complete the following tasks prior to starting construction:

- Confirm final design drawings with SFMTA engineering staff
- Finalize environmental clearance and approvals - by definition, multimodal street design elements improve conditions for non-vehicle trips and, therefore, would not trigger a significant impact.
- Complete permits and obtain approvals from Caltrans – this project will require an encroachment permit and a Permit Engineering Evaluation Report (PEER) from Caltrans (see Appendix F for Caltrans permit forms); Caltrans has indicated that an encroachment permit may be issued/approved approximately four to six weeks after the application is complete.

Because Phase 1 is fully funded through construction, construction can begin as early as the permits are obtained, possibly before end of calendar year 2017. Phase 1 will be funded through Prop K NTIP Capital funds.

Phase 2

Phase 2 requires construction of a multiuse path on City property and Caltrans' right of way, and installation of a new traffic signal, signal coordination, and striping updates on City streets. Therefore, Phase 2 will be led by DPW in close partnership with SFMTA and Caltrans. Both design details and funding will have to be finalized before implementing Phase 2 and there are still many unknowns, such as exact path location, drainage challenges, and specific impact of Caltrans highway construction. The first step of Phase 2 will be funded by General Funds.

The following considerations must be addressed prior to Phase 2 implementation:

- Completion of site survey to inform design details and identify drainage needs
- Finalization of design and construction plans – including all associated surveying and multi-agency coordination, and confirming compliance with requirements for Caltrans structure clearance
- Finalization of detailed construction cost estimate

- Finalization of environmental clearance and approvals
- Coordination with Caltrans to determine project development – the complexity of the project and the construction budget are the primary factors to determine the level of Caltrans involvement, and this project would likely call for either streamlined oversight (less than $1 million and simple) or oversight development (greater than $1 million and complex)
- Coordination with Caltrans to address impact of upcoming freeway ramp construction timing – Caltrans will have to provide additional information as the freeway project progresses (the Phase 2 path may be constructed after the Caltrans project[4] is complete)
- Coordination with the San Francisco Public Utilities Commission (SFPUC) and neighborhood organizations to identify funding and implementation strategies for landscaping, greening, and stormwater management/mitigation (see Appendix B). The SFPUC has determined that this area needs major upgrades to address flooding and the SFPUC Board has not determined a strategy for addressing the area's needs. A future SFPUC-led project could incorporate stormwater management best practices with greening and open space creation.

FUNDING STRATEGIES

The SFCTA has secured funding for Phase 1 through Prop K NTIP Capital funds and General Fund Add-Back for the first steps of Phase 2. The project team will continue to identify additional potential funding sources for Phase 2. The following section lists sources for both already secured Phase 1 funding and potential Phase 2 funds.

Secured funding for Phase 1 and early Phase 2

Prop K and add back funds have been confirmed for Phase 1 and early Phase 2 costs.

- **Prop K NTIP Capital Funding (Phase 1):** On December 13, 2016, the SFCTA Board approved $277,000 from District 9 Prop K NTIP Capital funds for Phase 1 of the Alemany Interchange Improvement Project. This project was championed by the PNA and supported by Supervisor Campos and other community groups. Of the $600,000 in NTIP capital funds available for District 9 through Fiscal Year 2018/19, $125,000 remains available for allocation to District 9 priorities which could include this project.
- **General Funds (Phase 2):** Supervisor Campos secured $100,000 from the General Fund for SFMTA for the first steps of Phase 2. SFMTA will transfer these funds to the DPW to complete a survey for the Phase 2 multi-use path location and determine next steps of the project. The survey result will provide further information on scope, schedule, and cost estimates of Phase 2 of the project.

Potential Phase 2 Funding Sources

The Prop K NTIP Capital funds and the General Fund are also potential sources. The following additional sources have been identified for Phase 2 costs.

[4] Caltrans is conducting the design phase of US 101 Bridge Deck Replacement at Alemany Circle Undercrossing project, which is located above the proposed multi-use path location. This project will not affect any intersections in the project area, but may call for roadway closures and other impacts during the construction phase.

- **Transportation Fund for Clean Air, County Program:** This SFCTA-administered funding source can fund eligible project types that achieve cost-effective emission reductions by diverting motor vehicle trips to other modes, including transit and non-motorized modes. The Phase 2 multi-use path is eligible for this funding source because this project closes a pedestrian and bicycle gap in the network and provides a direct access to the Alemany Market from nearby neighborhoods. Phase 2 of the project could qualify for up to $150,000, based on average daily traffic, trip length, and estimated eliminated vehicle GHG emission, per Bay Area Air Quality Management District assumption.
- **Active Transportation Program (ATP):** The ATP is consolidated funding from federal and state transportation programs into a single program which focuses on active transportation projects. The ATP is administered by the Caltrans Division of Local Assistance, Office of Active Transportation and Special Programs. Projects may compete for a statewide funding pot, with final selections made by the California Transportation Commission (CTC) and a regional funding pot, with selections made by the Metropolitan Transportation Commission (MTC). The Phase 2- multi-use path of the project addresses pedestrian and bicycle safety issues, closes a bicycle/pedestrian network gap, improves bicycle and pedestrian facilities, and promotes non-motorized modes. The ATP awards points to projects that benefit Disadvantaged Communities (DACs); this project is eligible, since it provides access to healthy food for neighborhoods defined by MTC as Communities of Concern. The most recent round of ATP included $120 million in the statewide pot and $20 million in the regional pot over two years, so funding under ATP could cover the full cost of Phase 2. However, the ATP is highly competitive and funding may not be available until approximately three years after the call for projects.
- **One Bay Area Grant (OBAG):** OBAG is the Metropolitan Transportation Commission's (MTC's) funding framework for distribution of the Bay Area's federal Surface Transportation Program and Congestion Mitigation and Air Quality (STP/CMAQ) funds to better integrate the region's transportation and land use. SFCTA administers the OBAG County Program to select projects that are consistent with MTC's guidelines, including eligible project types and the requirement that at least 70% of the funds be directed to Priority Development Areas (PDAs). The project may qualify for funding, due to Phase 2 proposed bicycle and pedestrian improvements and proximate access to the Bayview/Hunters Point Shipyard/Candlestick Point PDA.
- **Proposition AA (Prop AA):** Administered by SFCTA, Prop AA uses revenues collected from an additional $10 motor vehicle registration fee in San Francisco to fund projects for local road repairs, pedestrian safety improvements, transit reliability, and mobility improvements throughout the city. The Phase 2 of this project addresses road repairs, but would likely fit best in the pedestrian safety category of Prop AA. The pedestrian safety improvements include installation of traffic signals, high-visibility crosswalks, curb extensions, and a dedicated path for pedestrians and bicyclists. The 2017 Prop AA Strategic Plan includes an estimated $5 million for the Pedestrian Safety category over fiscal years 2017/18 - 2021/22. This project could be eligible for Prop AA funds that become available over this five-year period, or the project team could compete for funds in the next Strategic Plan update.
- **Proposition K (Prop K):** This half-cent sales tax program, managed by the SFCTA, includes expenditure plan categories that this project could draw from for eligible scope

components, including Pedestrian Safety and Circulation, Bike Safety and Circulation, and Traffic Calming.

Figure 16 Summary of Potential Funding Sources:

Funding Opportunities	Maximum Award	Next Call for Projects Issued	Funded Phase
Prop K NTIP Capital Funding	Up to $125,000 through Fiscal Year 2018/19	Currently available	Design and Construction
Transportation Fund Clean Air	$150,000	Call for projects to be issued in March 2017, due by late April 2017 Implementation of the project would need to start within a year and half of the awarded funding (December 2018)	Construction
Active Transportation Program	No maximum	FY 21/22	Design and Construction
One Bay Area Grant (OBAG)	Approx. $44 million available over 5 years; (previously funded projects' award ranged from $520,000 to $11 million)	Next call for projects is anticipated in March 2017. An awarded project will likely be able to access the funds in Fiscal Years 2018/19 - 2022/23	Design and Construction
Prop AA	$23 million over 5 years (all categories), $5 million (Ped Safety category)	Next Strategic Plan update anticipated 2022. Could apply for funds if available over the next five years	Design and construction
Prop K	TBD	Anticipated 2018	Environmental, Design and Construction
General Fund	TBD	Through the annual budget process or as soon as June 2017	Planning, Environmental, Design and Construction

NEXT STEPS

The SFCTA and the project team will provide support in the transition of this project to SFMTA and DPW, including sharing all supporting materials and electronic files for next stages of design details, analysis, environmental clearance review, and ongoing stakeholder contact.

The current timeline for Phase 1 calls for final design and environmental clearance by early to mid-2017, followed by permit application review and construction by late 2017, or early 2018.

Phase 2 requires more steps before final design and environmental clearance, which makes the timeline harder to predict. DPW and SFMTA could likely make progress on the remaining planning and engineering elements in the next couple of years, even if funding for full construction and Caltrans permits are not yet secured. DPW has identified funding to initiate a preliminary topographical and engineering survey of the area where the future path will be located, which will allow a better understanding of the costs associated with construction.

Appendix A Outreach Details

Appendix B PUG Neighborhood Greening Letter of Support

Appendix C Traffic Analysis

Appendix D Detailed Final Striping Drawings in SFMTA Preferred Format

Appendix E Cost Estimate Details

Appendix F Caltrans Permit Forms

Appendix A

Outreach Details

Alemany Interchange Improvement Study- Community Outreach Detail

1. Introduction

This appendix summarizes the key outreach activities that the project team undertook to ensure that the community was notified about the study and a diverse group of people participated in engagement efforts. Public comments that we received from project outreach efforts were reviewed by the project team and the solicit community feedback are incorporated into the final recommendations of the study.

The outreach efforts began in the winter of 2015 where the project team met with several stakeholders in the community and participated in the Portola Neighborhood Association(PNA) meetings to introduce the project to the residents. During the second round of outreach in spring of 2016, the project team presented existing conditions, traffic analysis and initial design concepts to the various community meetings including PNA, Portola Family Connection and Alemany Farmer's Market. The project team conducted the third round of outreach in fall of 2016 where they presented final traffic analysis, detailed striping drawing for phase 1 and conceptual drawing for phase 2, project timeline, preliminary cost estimate and possible funding opportunities to the communities. List below shows number of stakeholders and public meetings that the project team attended to communicate about the project

2. Community Workshop and Meeting

2.1. Format

Locations and Times Summary Table:

		LOCATION	DATE/TIME	LANGUAGES	TYPE
First Round	Portola Neighborhood Association Steering Committee	Portola Branch Library, 380 Bacon St, San Francisco	Thursday, October 22, 6-8pm	English	Community Meeting
	Portola Neighborhood Association Steering Committee	Portola Branch Library, 380 Bacon St, San Francisco	Tuesday, March 22, 6-8pm	English	Community Meeting
	Alemany Farmer's Market	100 Alemany Blvd, San Francisco	Saturday, March 26, 8:30-11:30am	English	Table with booth and post boards
	Family	Family	Tuesday,	English,	Focus

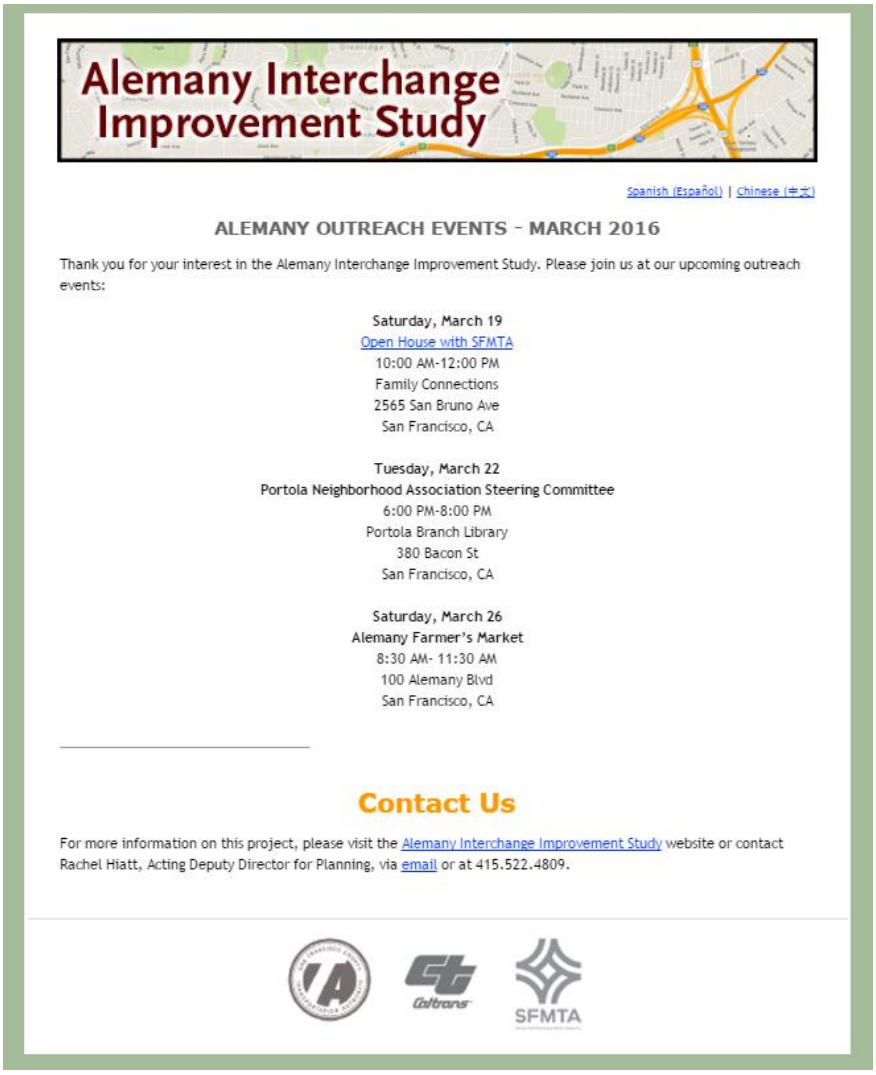
	Connections	Connections, 2565 San Bruno Ave, San Francisco	April 19, 6-8pm	Cantonese	Group
	San francisco Community Empowerment Center	2798 San Bruno Ave, San Francisco	Friday, May 13, 6-8pm	English, Cantonese, Spanish	Community Meeting
	Portola Neighborhood Association Community Meeting	Palega Rec Center, 500 Felton Street, San Francisco	Thursday, June 23, 6:30-8pm	English	Community Meeting
Third Round	Portola Neighborhood Association Steering Committee	Portola Branch Library, 380 Bacon St, San Francisco	Tuesday, September 27, 6-8pm	English	Community Meeting
	Portola Neighborhood Association Community Meeting	Palega Rec Center, 500 Felton Street, San Francisco	Thursday, October 27, 6:30-8pm	English	Community Meeting
	Alemany Farmer's Market	100 Alemany Blvd, San Francisco	Saturday, November 5, 8-11am	English	Booth / table
	Family Connections	Family Connections, 2565 San Bruno Ave, San Francisco	Tuesday, November 18, 6-7pm	English, Cantonese	Focus Group

2.2. Workshop and Meeting Notification

- WORKSHOP NOTICES ON THE PROJECT WEBSITE: The project website was updated constantly to reflect the most recent workshop and meeting details.
- EMAIL TO PROJECT'S CONTACTS DATABASE: Announcement about the community workshops and meetings were sent through the SFCTA's mail database. This database includes City partners, stakeholder groups, community organizations, members of the project Technical Advisory Committee, and individuals who have opted into the mailing list either online or in person at community meetings and outreach.
- MEDIA COVERAGE: The Streetblog SF blog had posted information about the project in June 2015.

- SOCIAL MEDIA: Meeting details were posted to the SFCTA's Facebook and Twitter accounts to encourage SFCTA followers to attend and pass word along to neighbors. The study team also posted the meeting information on Nextdoor, the private social network for the neighborhoods.

MailChamp



Alemany Interchange Improvement Study

Spanish (Español) | Chinese (中文)

ALEMANY OUTREACH EVENTS - MARCH 2016

Thank you for your interest in the Alemany Interchange Improvement Study. Please join us at our upcoming outreach events:

Saturday, March 19
Open House with SFMTA
10:00 AM-12:00 PM
Family Connections
2565 San Bruno Ave
San Francisco, CA

Tuesday, March 22
Portola Neighborhood Association Steering Committee
6:00 PM-8:00 PM
Portola Branch Library
380 Bacon St
San Francisco, CA

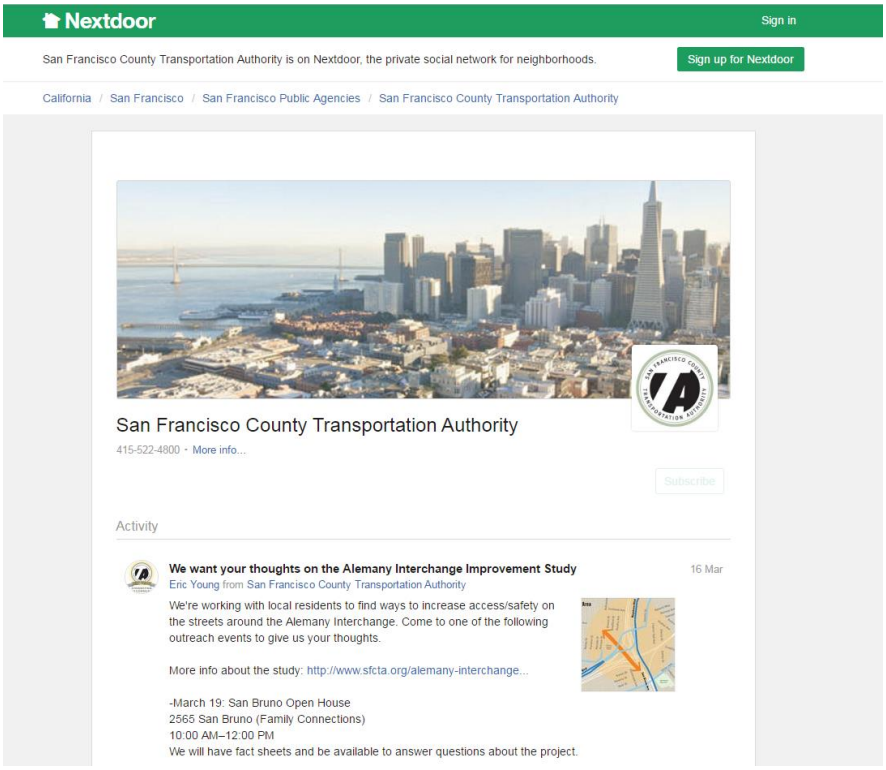
Saturday, March 26
Alemany Farmer's Market
8:30 AM- 11:30 AM
100 Alemany Blvd
San Francisco, CA

Contact Us

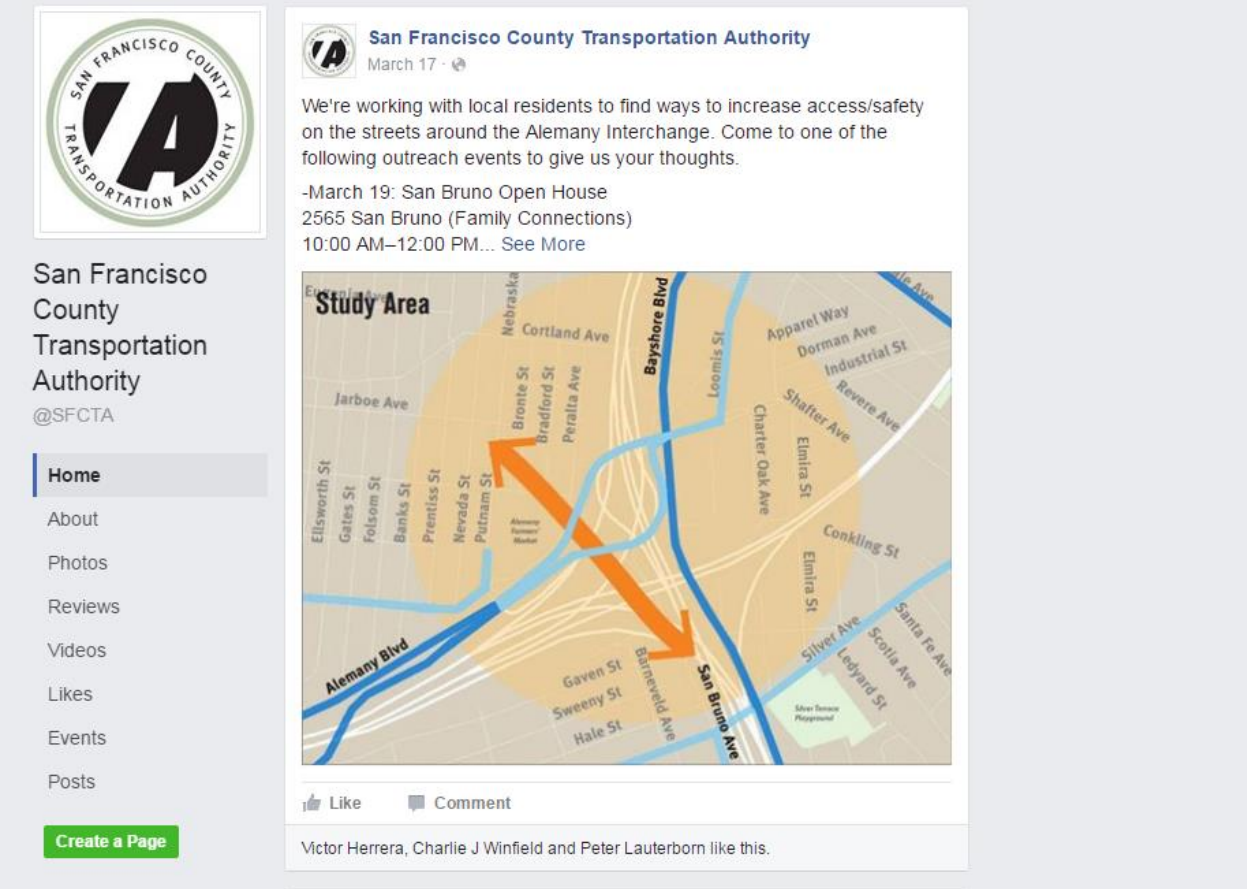
For more information on this project, please visit the Alemany Interchange Improvement Study website or contact Rachel Hiatt, Acting Deputy Director for Planning, via email or at 415.522.4809.

Twitter:

Nextdoor:



Facebook:



2.3. Informational Materials at Workshops and Meetings

Information was presented using multiple visual and verbal communication methods.

- EXHIBIT BOARDS: The project team developed large 24”x36” display posters to provide contextual maps of the study area and to convey the potential alternatives. Posters were also translated into Chinese for the community meetings and with the presence of Cantonese interpretation.
- POWERPOINT PRESENTATION: The project team delivered a brief introductory presentation at the beginning of the outreach meeting. The presentation identified the development forecasts for the study interchange area and identified the potential alternatives for each segment of the corridor. During the meeting at Family Connection, the presentation was made with on-site interpretation into Cantonese.
- PROJECT FACT SHEET: The project fact sheet, available at the welcome table, provided a written overview of the project, a summary of the project goals, and an explanation of the project’s schedule. This project factsheet was available in English, Spanish, Chinese, and Filipino.
- COMMENT CARDS: Comment cards were distributed at meetings and workshops to facilitate community feedback.

3. Technical and Coordination Meeting

3.1. Technical Advisory & Coordination Meeting

The study team had coordinated with the planners and engineers from San Francisco Municipal Transportation Agency(SFMTA) and California Department of Transportation District 4. The study team hosted the Technical Advisory and Coordination meeting in February 2015, December 2015, February 2016, July 2016, August 2016, and November 2016 to provide the ongoing project updates and seeking feedback from different public agencies.

3.2. Briefings

Briefings were scheduled with neighborhood, community, city-side stakeholders, and elected officials as a way of introducing the project and obtaining feedback.

Stakeholders included in these briefings included:

- San Francisco Bicycle Coalition
- Walk SF
- The Greenhouse Project
- A Living Library
- San Francisco Supervisor of District 9 David Campo & Hillary Ronen
- California Assembly member David Chui

3.3. Site Visit

There were two rounds of site visits in this outreach process. In February 2015, a study group consists of neighborhood, community, and city-wide stakeholders visited the study area and identified the potential connectivity and mobility problems. The study team revisited the site for analyzing the existing traffic condition and pedestrian and bicyclists crossing of different intersections in January 2016.

Site Visit Photos

Figure 1: Alemany Westbound and Putnam Street

Figure 2: Alemany Eastbound and Westbound

Figure 3: Alemany Boulevard and San Bruno Avenue

Figure 4: Alemany Westbound, Opening of Informal Path

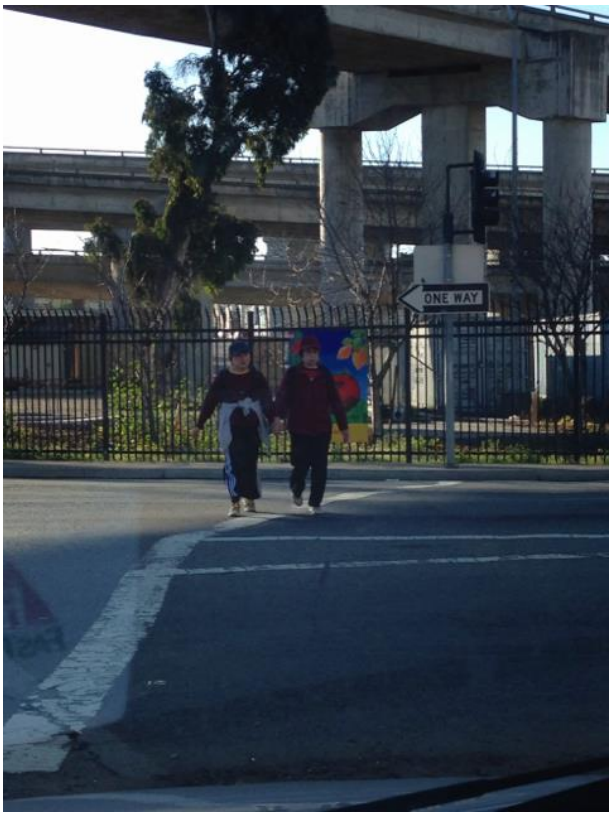


Figure 5: Informal Crossing on Alemany Westbound

Figure 6: Informal Crossing on Alemany Boulevard (Westbound)

4. Media Coverage

4.1. News

Before the launch of the project, Streetblog SF ran a story on June 26, 2015 introducing the project especially the multimodal improvement to the public.

STREETSBLOG SF

Pedestrian Safety | Bicycling | Muni | Parking | Peninsula | California

Friday, June 26, 2015 10 Comments

Safer Path Could Help Untangle the "Alemany Maze" Highway Interchange

by Aaron Bialick

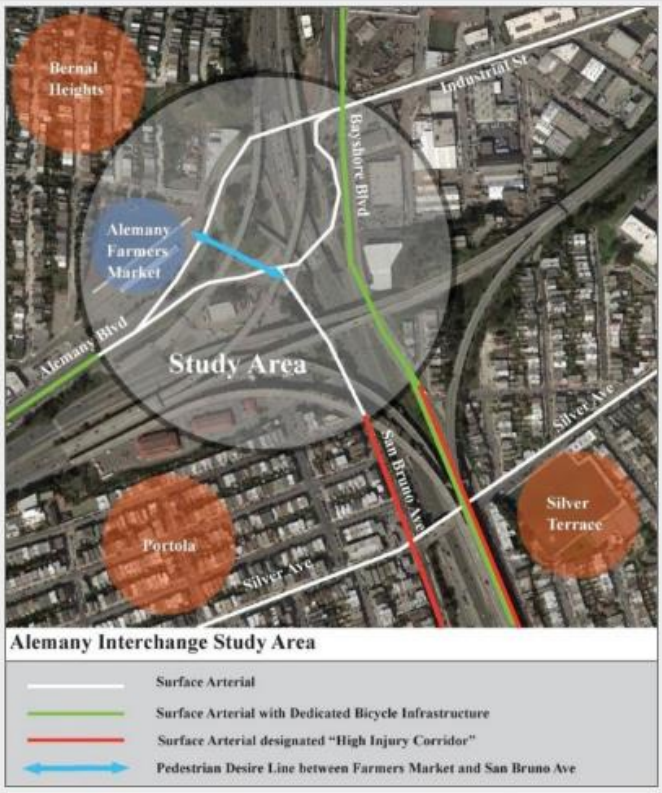


Image: SFCTA via D10 Watch

The "Alemany Maze," the deadly Highway 101 and 280 interchange in the southeast city, could get a safer crossing for walking and biking. Funding to study a walking path and bike lanes through the junction was approved this week by the SF County Transportation Authority Board of Directors, comprised of the Board of Supervisors.

The study, set to be completed by next June, will look at creating a "multi-modal pathway" where residents already cross the "nasty mess of ramps" to reach the Alemany Farmers Market, SFCTA

5. Public comment Received

Alemany Interchange Improvement study is championed by PNA who has brought it to the SFCTA attention and provided desired conceptual alternatives for the project. The PNA identified that this area is the missing bicycle link on Alemany corridor and would need to have safety measures for bicyclists and pedestrians and bicyclists do not have a direct access to the Farmer's Market. Thus, the community expressed their desire for a buffered bicycle lane on Alemany Boulevard between Putnam Street and Bayshore Avenue and multi-use path connect Alemany Farmer's Market to the San Bruno Avenue. The project team consulted with PNA about their conceptual design and included these designs in final design recommendations.

Figure 7: Project Team Discussing Future Plan

From the community outreach efforts, project team received informative and insightful feedback from the community member. Many community members raised questions about possible queuing on Alemany Boulevard due to proposed road-diet. In response, project team presented final traffic study which shows that road-diet will not cause any significant impact due to existing low traffic volume on Alemany Boulevard. The community also raised concern about the safety of bicyclists who are currently navigating through the opening of the on and off freeway ramps. The project team ensured that the buffered lane with soft hit posts and paint-based curb will create a calm traffic and safe environment for all users of transportation.

Lists below including the frequent asked questions and comments that the project team hear from the community from the outreach activities.

WHAT WE HEARD	**WHAT WE DID**
Why study the area?	We study this area in order to - balance accessibility for all modes of transportation along the Alemany Corridor. - enhance safety and comfort of transportation along the Alemany Corridor - provide connectivity to the Alemany Flea Market from nearby neighborhoods
What changes will you be making to further improve safety around the interchange?	The improvement includes: - the “road diet” that would reduce vehicle travel lanes along Alemany from six (three in each direction) to four (two in each direction), and repurpose roadway space to enhanced pedestrian and bicycle facilities. - a new multi-use path with signalized crossings from the Alemany Flea Market to the intersection of Alemany Boulevard and San Bruno Avenue. This can provide better, safer, and more convenient access to the Farmer’s market for pedestrians and bicyclists.
What will happen to the bike lane?	- The effort of road diet would allow continuous on-street bicycle lanes along Alemany Boulevard, eliminating a gap between Putnam Street and Bayshore Boulevard. - The new buffered bicycle lane along Alemany Boulevard, new left turn bike box at the intersection of Bayshore Blvd and Alemany Blvd, and conflict markings will help protect bicyclists’ safety and improve driver awareness near conflict points.
There are severe flooding issues around the interchange. How is the project address this issue?	The project team acknowledge the flooding issues around the interchange and already coordinated with San Francisco Public Utility Commission and Department of Public Work (DPW) to research the causes and solutions to the problem. DPW will conduct more thorough survey on the drainage and hydrological situation in order to better design the multi-use path.
How the traffic be affected after the change?	- Although the proposed road diet reduces corridor capacity, the study intersections are expected to perform within the acceptable standards with minimal additional vehicle delay.

	- The signal modification and shorter pedestrian crossing distances would not cause severe vehicle delay but to near current levels. Please refer to the traffic analysis report for more details.
Will this project affect the parking spaces and the access to the Alemany Farmer's Market?	The Alemany Interchange Improvement Study will not affect Farmers Market lot access and no changes are proposed for Tompkins or other nearby streets as part of this project. All recommendations are focused on Alemany Boulevard and intersections from Putnam Street to Bayshore Boulevard. We have been coordinating directly with related city departments, including the Department of Real Estate that manage the Farmers Market, and understand that Farmer's Market lot access is also a primary concern for many neighbors.
Do you plan to improve the landscape along the roadside?	The project team have also heard directly from Portola Urban Greening (PUG, http://www.portolaurbangreening.org/) in support of landscaping improvements to the Alemany Boulevard median. This is outside the scope of the Interchange Improvement Study project, but we will make note of the local interest in landscaping this area in our final report, and will ensure that plans will allow for future landscape improvements.
When will the project approved and constructed?	The project will be developed in 2 different phases. - Phase 1 will be the implementation of the "road diet" and street striping. SFMTA will lead the final design effort, the construction management, and will also be the grant administrator. SFMTA will directly conduct the striping and construction work. The project team is aiming at complete the phase 1 by March 2018. - Phase 2 will be the installment of the multi-use path. SFDPW will be the leading agency to conduct the on-site survey, detailed design effort, and the construction of the path. This phase of work is foreseen to be completed in a longer period of time.

Appendix B

Letter from Portola Urban Greening

THE GREENHOUSE PROJECT

Envisioning the Future of the Alemany Interchange

Priorities and Desires from the Portola and Bernal Heights

The Alemany Interchange's surrounding neighborhoods, the Portola and Bernal Heights, eagerly welcome and fully support the San Francisco County Transit Authority's work studying the Alemany Interchange and planning for safer pedestrian and cyclist routes through the high-speed thoroughfare. Local residents have long sought a safer connection between Bernal Heights and the Portola, especially during times of congested use that occur every weekend during the Alemany Farmers and Flea markets. Upon learning of the SFCTA's Alemany Maze Interchange Improvement Study, residents of both neighborhoods were excited to hear that the City was beginning to address this longstanding problem, and are looking forward to more efficient pedestrian pathways, and designated bike lanes, and traffic calming in the area. Furthermore, as representatives of our respective neighborhoods we request that the upcoming investments in the maze reflect local priorities, as well as lay the groundwork for investments beyond transit-oriented changes that respond to the needs of adjacent communities.

Neighborhood Priorities for the Alemany Interchange:

1) **Safety:**
   As noted in the Portola Green Plan, a safe connection between our currently disjointed communities is a priority for both neighborhoods. The unnatural barricade of Alemany Boulevard between Bernal and the Portola has led to several severe-injury or fatal collisions in recent years, leading to its designation as a Pedestrian High Injury Corridor. Our communities deserve safe, easy, and inviting pedestrian and bicycle pathways between important neighborhood assets including the Alemany Farmers Market, Bernal Heights Park, and McLaren Park. We look forward to the Alemany Interchange Improvement Study's recommendations and interventions that accomplish this goal.

2) **Sustainable Infrastructure:**
   The Portola district, with its long history of green-oriented community identity, sees the use of sustainable infrastructure as key for the long-term success of the Alemany Interchange. Greening has the potential to be used as a traffic-calming device in the project, increasing safety and creating a welcoming space for those on foot, in addition to reducing dangerous flooding in the area and addressing the City's objective to better manage its stormwater and reduce GHG emissions. The San Francisco Better Streets Plan provides extensive documentation of the beneficial effects of urban street greening on pedestrian comfort and safety, traffic calming, air quality, water management, wildlife habitat, carbon emissions, and psychological welfare. We see the Caesar Chavez streetscape project from the SF Planning Department as a successful precedent for such work, and advocate for investment in the Alemany Interchange to be similarly driven by urban greening design principles.

3) **Creative Community Use:**
   The Portola and Bernal neighborhoods also see a unique opportunity in the unused land beneath the multitude of on and off-ramps that intersect at the Alemany Interchange. This land has the potential to be repurposed for community use and public benefit. We see the SoMa West Skate Park and Dog Play Area led by Public Works as a thriving example of activating unused space near highway infrastructure, made possible through the creative repurposing of the land for community use.

2 BURROWS STREET, SAN FRANCISCO, CA 94134
e: contact@sfgreenhouses.org
t: 415.686.9133
w. sfgreenhouses.org

Appendix C

Traffic Analysis

NELSON
NYGAARD

MEMORANDUM

To: Rachel Hiatt, SFCTA

From: Meghan Weir and Michael Riebe, PE

Date: January 19, 2017

Subject: Alemany Interchange Traffic Analysis

INTRODUCTION

The following memorandum presents the traffic analysis results for the proposed Alemany Interchange Project, a multimodal improvement project along Alemany Boulevard between Crescent Avenue and Bayshore Boulevard. This memorandum addresses the impacts of the proposed project on the traffic and transportation conditions in the vicinity of the project site.

The purpose of this study is to determine whether the transportation system in the vicinity of the project area is capable of safely and efficiently supporting the proposed design options associated with the Alemany Interchange Project.

BACKGROUND

The Alemany Interchange Project is located in the southeast portion of the City and County of San Francisco. The Alemany Interchange is where US 101, Interstate 280, Alemany Boulevard, Bayshore Boulevard, San Bruno Avenue, and several other local streets intersect. The project area is adjacent to and underneath 2 Caltrans facilities, US 101 (post mile 2.00 to 2.20) and Interstate 280 (post mile 4.15 to 4.35). A junction of streets and ramps and a lack of dedicated pedestrian and bicycle facilities present barriers for people walking, biking, and accessing transit in the nearby neighborhoods of Bernal Heights, Portola, Silver Terrace, and the Bayview. The posted speed limit on Alemany Boulevard through the project area is 40 miles per hour.

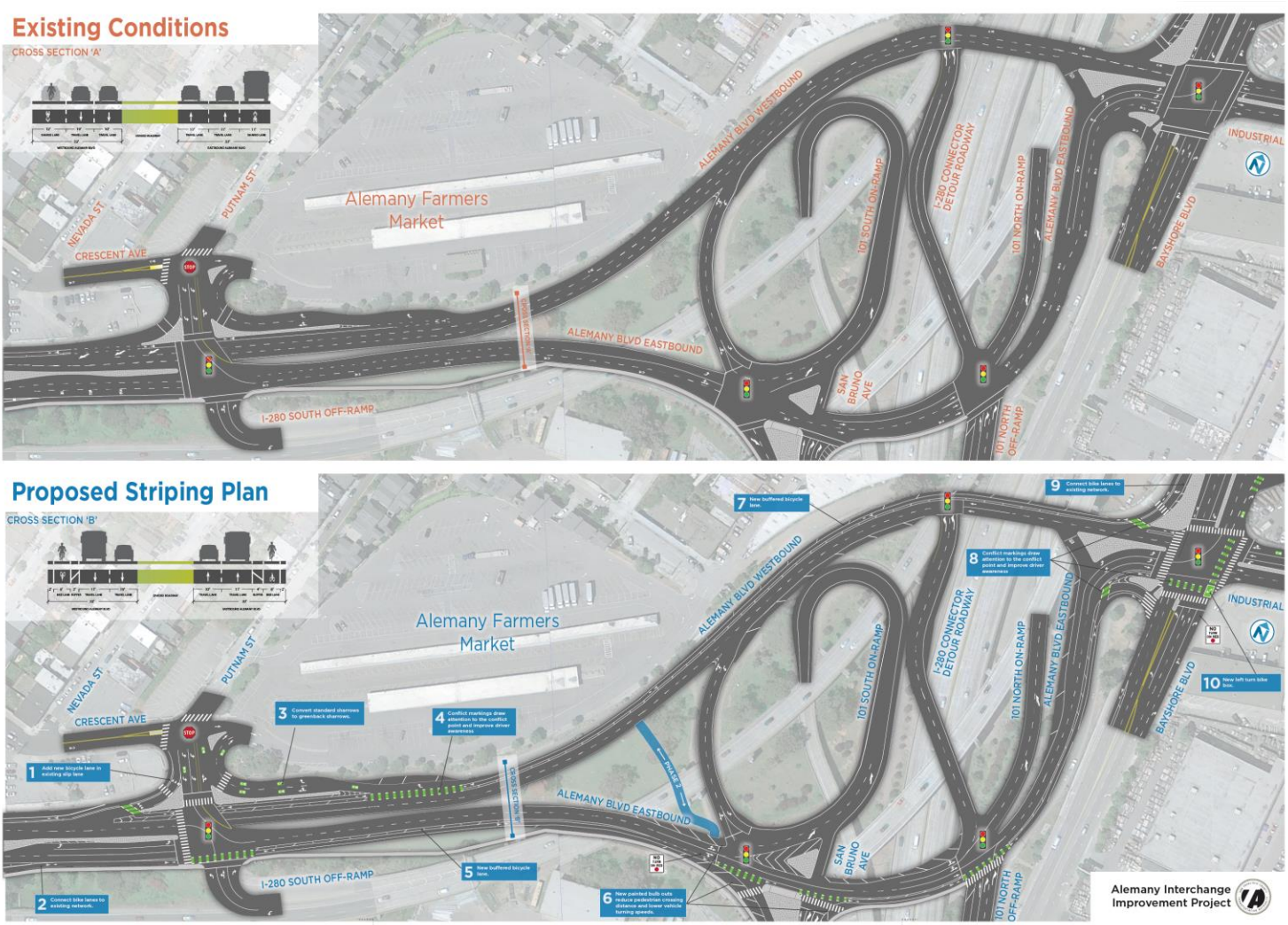
The Alemany Improvement Project has a range of design elements that are intended to:

- Balance accessibility for all modes of transportation along the Alemany Corridor
- Enhance safety and comfort for all modes, especially pedestrian and bicycles
- Provide connectivity to the Alemany Flea Market from nearby neighborhoods

The proposed improvements include a “road diet” that would reduce vehicle travel lanes along Alemany from six (three in each direction) to four (two in each direction), and repurpose roadway space to enhanced pedestrian and bicycle facilities. The road diet would allow continuous on-street (Class 2) bicycle lanes along Alemany Boulevard, eliminating a gap between Putnam Street and Bayshore Boulevard. The project includes curb extensions to slow vehicle turning movements at the interchanges and new crossings at select intersections. The Alemany Improvement Project also includes a new multi-use path with signalized crossings from the Alemany Flea Market to the intersection of Alemany Boulevard and San Bruno Avenue. Walking distance between the

beginning of the project area on San Bruno Avenue and the center of the Alemany Farmers Market will decrease from 2000' in the existing conditions to 650' in the full buildout conditions. Figure 1 shows the proposed improvements and traffic circulation in respect to the location of the project area.

Figure 1: Alemany Improvement Project Draft Concept Design



TRANSIT ROUTES

The Alemany Corridor serves seven Muni transit routes that utilize one or more of the five study intersections. The routes marked with an asterisk (*) indicate a service with headways of 10 minutes or less or an express route. These routes include:

- 8-Bayshore*
- 9-San Bruno*
- 9R-San Bruno Rapid*
- 14x-Mission Express*
- 23-Monterey
- 24-Castro*
- 67-Bernal Heights

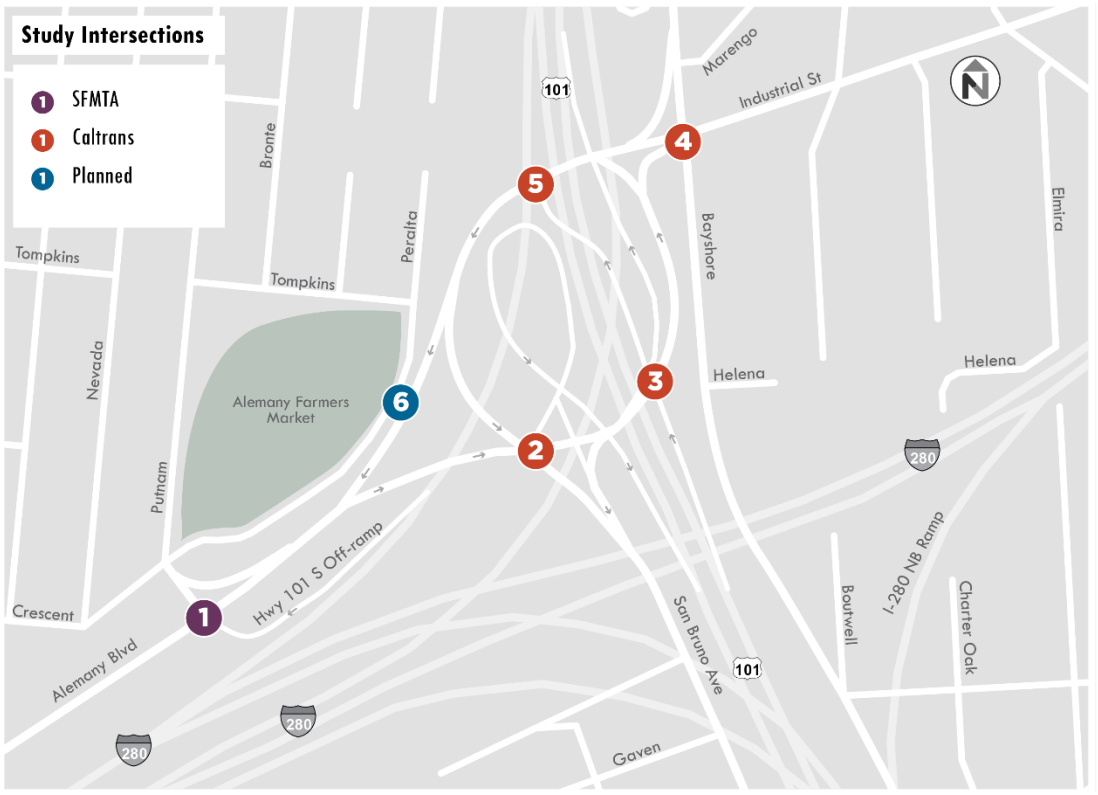
METHODOLOGY

To determine the intersection level of service (LOS), analysis was conducted at five intersections including:

1. Alemany Boulevard at US 101 SB Off-ramp /Putnam Street
2. Alemany Boulevard EB at San Bruno Avenue / US 101 SB on-ramp
3. Alemany Boulevard EB at 101 NB off-ramp / US 101 NB on-ramp/ US 101 Detour
4. Bayshore Boulevard at Alemany Boulevard/Industrial Street
5. Alemany Boulevard WB at 101 Detour

Figure 2 shows the location of the five study intersection. Traffic counts were conducted during weekday peak periods in February 2016 from, 7:00 AM to 9:00 A and 4:00 PM to 6:00 PM. Weekend traffic counts were conducted at the intersection of Alemany Boulevard and Putnam Street on Saturday from 8:00 AM to 11:00AM to coincide with Alemany Farmers Market activity. The purpose of the Saturday analysis was to determine if long queues existed in the westbound Alemany right turn lanes entering the Farmers Market. The traffic counts were complemented with a video analysis as well as a site visit by the project team.

Figure 2: Map of Study Intersections



The system peak hours were determined to be 7:30 AM to 8:30 AM and 5:00 PM to 6:00 PM for the morning and evening peak hour, respectively. In general, the evening peak hour volumes were higher than the morning peak hour. There was an observed directional peak on Alemany Boulevard in the eastbound direction during the AM peak and westbound direction during the PM peak. This is most likely attributed to Alemany Boulevard's location near freeway ramps and orientation towards downtown San Francisco. Pedestrian and vehicle volumes increased during

the Alemany Farmers Market weekend analysis period, as expected, but were still less than the traffic volumes seen in the AM and PM peak.

Intersection operations were evaluated for the following scenarios:

- **Existing:** 2016 traffic conditions
- **Existing plus Project:** 2016 traffic conditions with the proposed Alemany Interchange Project street design with not traffic signal operational changes
- **Existing plus Project with signal modifications:** In addition to the proposed street design, signals were modified in limited capacity to reflect changes in traffic demand

The analysis was conducted using the signalized intersection methodology outlined in the Highway Capacity Manual, 2000 (HCM) for all study intersections. HCM 2000 was used over HCM 2010 due to HCM 2010's limitations in analyzing specific signal phasing schemes that exist in the study intersections for this project. Specifically, HCM 2010 methodology does not support more than four approach and departure legs at a signalized intersection. The intersections of (1) Alemany Boulevard EB at San Bruno Avenue / US 101 SB on-ramp and (2) Alemany Boulevard EB at 101 NB off-ramp / US 101 NB on-ramp/ US 101 Detour have five legs. Because of this limitation, the HCM 2000 methodology was used for all intersections for consistency.

The intersections were evaluated using level of service (LOS), which is a commonly used metric for signalized traffic analysis. LOS can range from A, which indicates little to no delay, to F, which indicates a significant amount of congestion and delay. Figure 3 summarizes intersection operations for autos according to the HCM.

Figure 3: Level of Service Definitions for Signalized Intersections

Level of Service	Description	Average Control Delay per Vehicle (Seconds)
A	Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay.	10.0 or less
B	Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay.	10.1 to 20.0
C	Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	20.1 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	This is considered by most drivers to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently.	55.1 to 80.0
F	This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes of such delay levels.	Greater than 80.0

Source: Transportation Research Board, 2000 Highway Capacity Manual (Washington, DC, 2000).

Synchro 9.0 software was used to model and analyze the levels of service at the study intersections. The existing signal timing plans were provided by the San Francisco Municipal Transportation Agency (SFTMA) and the California Department of Transportation (Caltrans). The outputs from the software are provided in a separate attachment to this memorandum and show traffic volumes, assumed signal timing/phases and the calculations used to estimate delay and level of service.

EXISTING CONDITIONS ANALYSIS

As indicated by the Synchro model, all intersections currently operate at level of service (LOS) D or better, except for Alemany Boulevard and San Bruno Avenue, which operates at LOS E for the morning peak hour. Figure 4 displays the results of this analysis, and Figure 5 and 6 show the summarized results with respect to the intersection locations in the project area.

Figure 4: Existing Conditions at Study Intersections

Intersection	Peak Hour	Existing Conditions	
		LOS	Average Intersection Delay (sec)
1. Alemany Blvd & 101 SB Off-Ramp/Putnam St	AM PM	C D	25 38
2. Alemany Blvd EB & San Bruno Ave/ 101 SB On-Ramp	AM PM	E B	62 15
3. Alemany Blvd EB & 101 NB Off-Ramp/101 NB On-ramp/ 101 Detour	AM PM	A B	6 12
4. Bayshore Blvd & Alemany Blvd/Industrial St	AM PM	D C	38 35
5. Alemany Blvd WB & 101 Detour	AM PM	A B	8 12

Figure 5: Map of Existing Conditions AM LOS Results

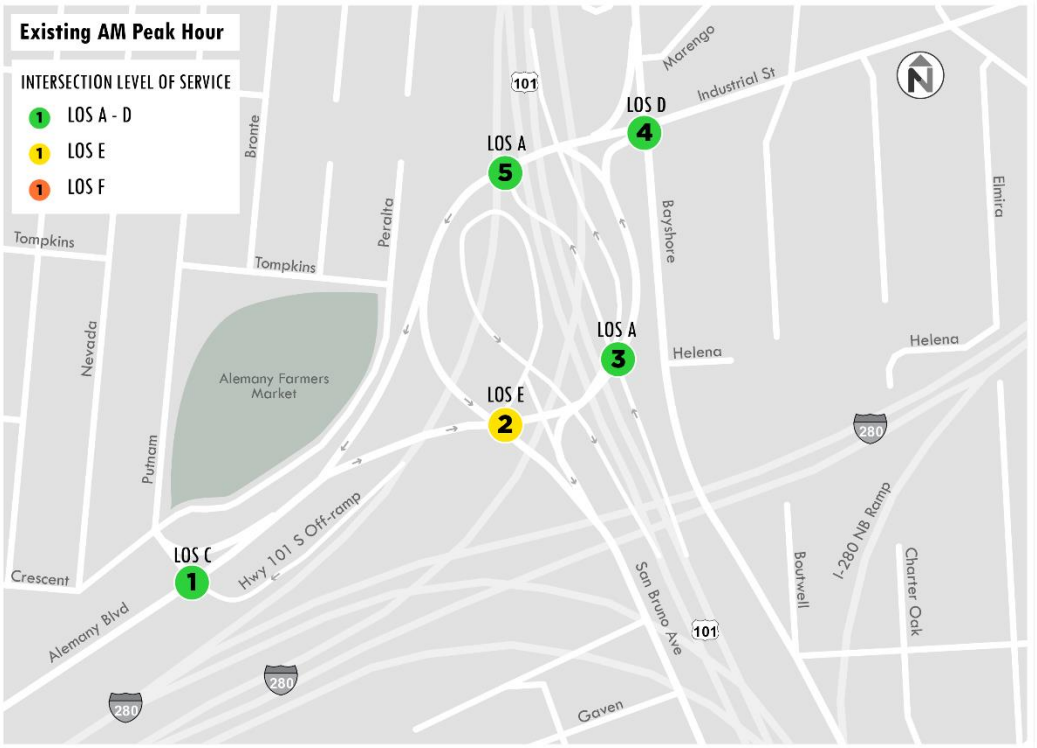
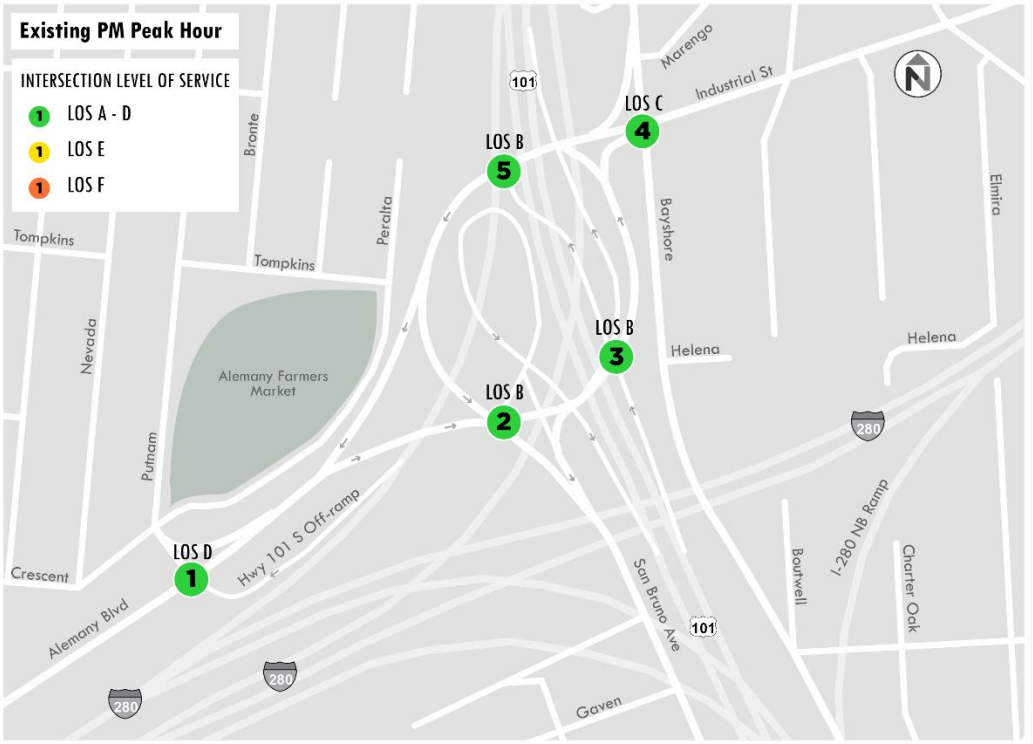


Figure 6: Map of Existing Conditions PM LOS Results



PROJECT CONDITIONS ANALYSIS

Level of service analysis was conducted for the Alemany Interchange Project with the road diet configuration to determine its effects on auto delay in the study area. The details of the road diet and impact to the transportation system are presented in the following section and summarized in Figure 7 and illustrated in Figure 8 for the optimized signal scenario. The outputs from the analysis software are provided in a separate attachment to this memorandum, as referenced above.

1. Alemany Boulevard and Putnam Avenue/101 SB off-ramp

The intersection currently operates at LOS C and D in the morning and evening peak hour, respectively. The road diet would reduce the westbound and eastbound approach from three to two lanes. To offset the increased vehicle delay, signal timing modifications were made. With these modifications, the intersection delay is expected to increase to LOS C and E in the morning and evening peak hour, respectively. The Putnam Street and 101 Ramp approaches are not expected to see significant increases in delay, and the model shows most of the additional delay going to the westbound Alemany approach.

The SFMTA is currently constructing signal enhancement project at the Alemany Boulevard and Putnam Avenue/101 SB off-ramp intersection. The project includes signal head relocation, new ADA accessible curb ramps, and reconfigured signal timing. The eastbound Alemany Boulevard approach will now include a dedicated left turn pocket instead of a shared left-through lane, which often times causes vehicle backups. These plans coincide with the Alemany Interchange Project in that the eastbound direction of Alemany Boulevard will only have two through lanes,

allowing for the road diet further downstream. This lane configuration is integrated into the traffic model.

The traffic analysis explored the option to remove the Putnam Street southbound channelized free right turn as part of a potential traffic calming and pedestrian safety feature. Removal of this channelized turn showed an increase in delay at this intersection. The results of modeling the intersection both with the existing channelized right turn lane, and without a separate right turn, are shown in Figure 7 below.

2. Alemany Boulevard (EB) and San Bruno Avenue

The intersection currently operates at LOS E and B in the morning and evening peak hour, respectively. The road diet would reduce the eastbound approach from three to two lanes and turning radii would be reduced to slow vehicle speeds. The average intersection delay is expected to slightly increase for vehicles traveling on eastbound Alemany only, and the intersection is expected to remain at the existing level of service for both the morning and evening peak hours. No signal modifications were made at this intersection.

3. Alemany Boulevard (EB) and 101 NB off-ramp

The intersection currently operates at LOS A for the morning and LOS B for the evening peak hours. The eastbound approach will be reduced from three to two through lanes, and the existing left lane on Alemany will be designated as a left turn pocket. A very small increase in overall intersection delay is expected, and there is no change to LOS at this intersection. The model shows that signal timing changes, including optimizing the green splits, are expected to mitigate most additional vehicle delay back to existing levels.

4. Bayshore Boulevard and Alemany Boulevard/Industrial Street

The intersection currently operates at LOS D and C in the morning and evening peak hour, respectively. The road diet calls for no changes to the westbound approach, and no changes to the lane configuration of Bayshore Boulevard are proposed with this project. To maintain capacity for the high demand for Alemany eastbound left turns, the dual left turn lanes would be preserved. With the road diet, the intersection delay is expected remain at LOS D and C in the morning and evening peak hour, respectively. To offset the minor increase in vehicle delay, signal timing modifications were investigated. With optimized signal splits, vehicle delays were reduced slightly, but may not be necessary at this intersection.

5. Alemany Boulevard (WB) and 101 Detour

The intersection currently operates at LOS A in the morning peak hour and LOS B in the evening peak hour. The road diet would reduce the westbound approach from three to two lanes, therefore increasing the intersection delay to LOS B in the morning peak hour and LOS D in the evening peak hour. To offset the increased vehicle delay, signal timing modifications were investigated. With optimized signal timing, average vehicle delays are expected to reduce to approximate existing levels and the intersection will operate at LOS B for both the AM and PM peak hours.

6. Alemany Boulevard (WB) and Path Crossing (new signal)

The new pathway signal to accommodate pedestrians and bicyclists crossing the westbound direction of Alemany can be interconnected to the upstream signal at Alemany Boulevard (WB) and 101 Detour to allow for coordination. This signal can be set to operate under pedestrian push button calls because pedestrian and bicycle crossing demand will be substantially lower during non-peak hours. With this configuration and the time required for pedestrians to cross one

direction of Alemany Boulevard, vehicle delays at this intersection are expected to be minimal during the AM and PM peak hours.

Figure 7: Comparison of Project Conditions LOS at Study Area Intersections

Intersection	Peak Hour	Existing Conditions		Existing with Project		Existing with Project (signal optimization)	
		LOS	**Average Intersection Delay (sec)**	**LOS**	**Average Intersection Delay (sec)**	**LOS**	**Average Intersection Delay (sec)**
1. Alemany Blvd & 101 SB Off-Ramp/Putnam St	AM PM	C D	25 38	C/D* E/E*	30/42* 56/62*	C/D* E/E*	28/42* 56/62*
2. Alemany Blvd EB & San Bruno Ave/ 101 SB On-Ramp	AM PM	E B	62 15	E B	69 16	E B	69 16
3. Alemany Blvd EB & 101 NB Off-Ramp/101 NB On-ramp/ 101 Detour	AM PM	A B	6 12	A B	8 14	A B	6 14
4. Bayshore Blvd & Alemany Blvd/Industrial St	AM PM	D C	38 35	D C	42 35.0	D D	41 35
5. Alemany Blvd WB & 101 Detour	AM PM	A B	8 12	B D	10 44	B B	10 17
6. Alemany Blvd WB & Path Crossing (New Signal)	AM PM	- -	- -	A A	3 5	A A	3 5

*Results show both with/without the southbound Putnam St channelized right turn, respectively

Figure 8: Map of Existing + Project Conditions (signal optimization) AM LOS Results

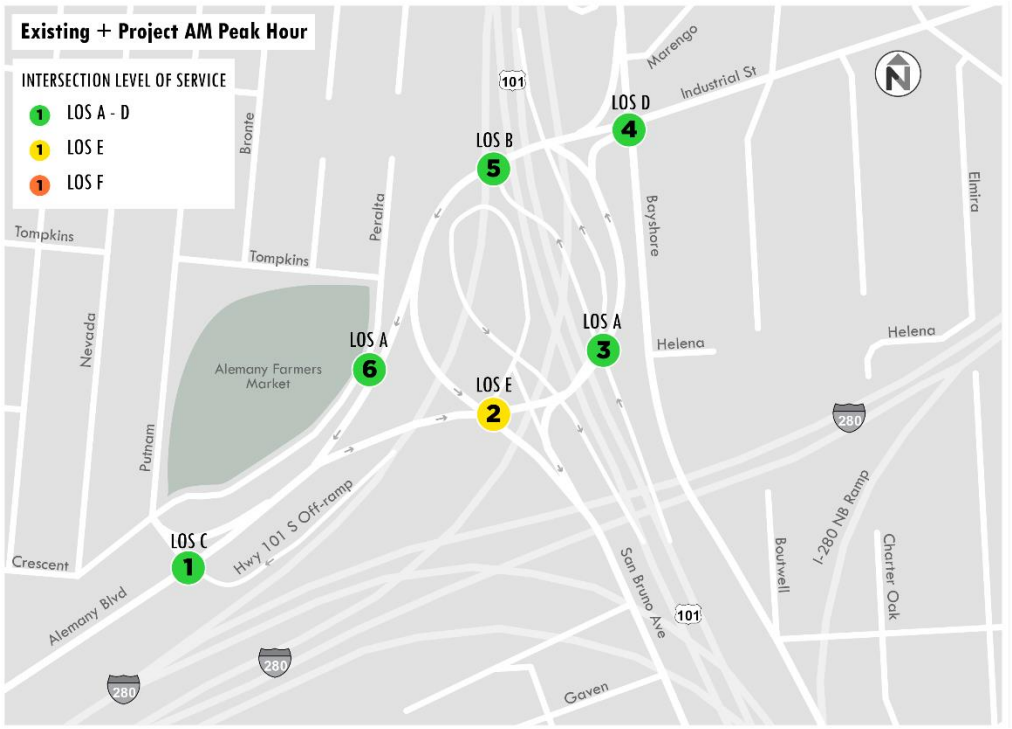
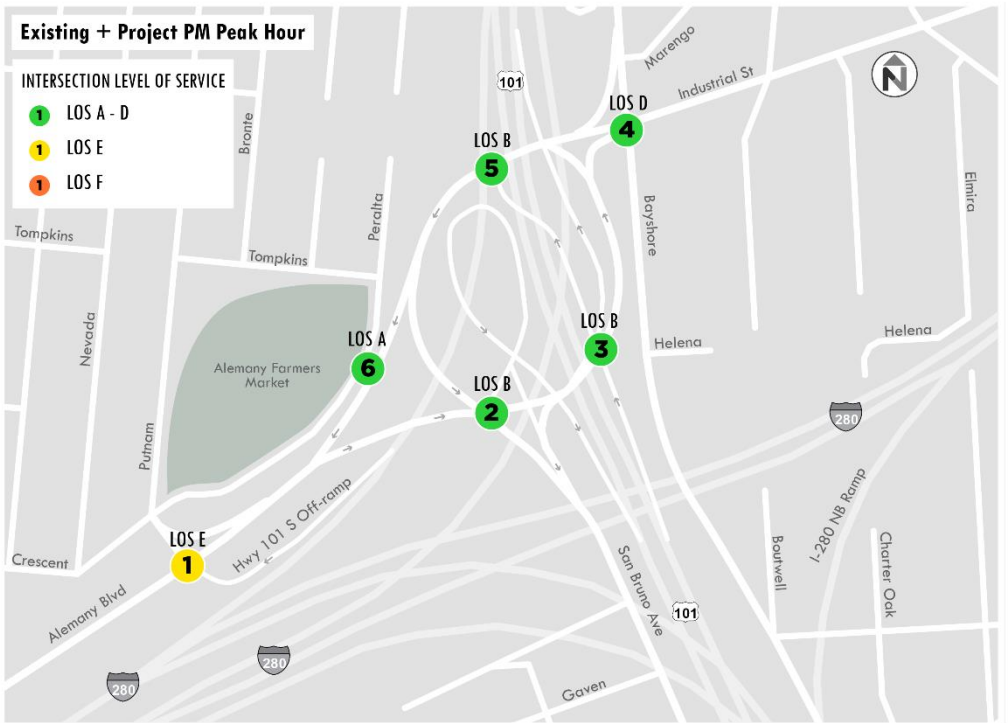


Figure 9: Map of Existing + Project Conditions (signal optimization) PM LOS Results



CALTRANS RAMP QUEUE ANALYSIS

As part of the traffic analysis to study the effects of intersection delay, additional analysis was conducted to determine if there was a substantial vehicle approach delay at the two Caltrans ramp intersection as a result of the Project. Figure 10 shows an overview of the ramp delay and LOS by specific approach, as well as the 95th% queue in feet for each approach over the three analysis scenarios. Reporting the approach-level performance metrics at the ramps gives a more detailed understanding of how the Project affects the individual ramp delay and queueing. The ramps' storage capacity is also reported in the figure, measured from the approach limit line to where the ramp meets the mainline. Both ramps do not have deceleration lanes on their respective freeway mainlines.

Results of the analysis show that the US 101 southbound off-ramp queue does not change between scenarios for both the AM and PM periods. Although signal timing is optimized for the 'Signal Optimization' scenario, the green time for the ramp is not changed. Both the AM and PM peak queues remain well below the storage length for this approach. Intersection 3, which contains the US 101 northbound off-ramp, shows slightly increased delays at the approach level analysis, which is also increased further due to signal retiming to accommodate more green time to Alemany Boulevard. While the delay slightly increases, the LOS does not change between scenarios for either the AM and PM peak periods. 95th% queue increases with the Project but all remains below the storage length for both periods in all scenarios.

Figure 10 Off-Ramp Approach Delay and Queuing Results

Intersection	Peak Hour	Existing Conditions			Existing with Project			Existing with Project (signal optimization)			Queue Storage Length
		Approach Delay (sec)	LOS	95th% Queue (ft)	Approach Delay (sec)	LOS	95th% Queue (ft)	Approach Delay (sec)	LOS	95th% Queue (ft)	
1. 101 SB Off-Ramp at Alemany Blvd EB (NW intersection approach)	AM	35.3	D	70	35.3	D	70	35.3	D	70	530
	PM	32	C	96	32	C	96	32	C	96	
3. 101 NB Off-Ramp at Alemany Blvd EB (NB intersection approach)	AM	24.8	C	51	25.3	C	51	32	C	75	490
	PM	16.6	B	347	18.7	B	362	18.7	B	350	

COLLISION ANAYLSIS

Using data obtained from the Statewide Integrated Traffic Records System (SWITRS), a review of the most recent available five years of crash history (2009-2013) at the study intersections was performed. The Alemany Boulevard corridor had thirteen collisions along the corridor and nine collisions at nearby intersections. Four of the reported collisions involved a person bicycling and one collision involved a person walking. The primary reported causes for collisions were unsafe speeding followed by traffic signal violations.

Figure 11 Study Area Traffic Collisions Summary

Total Collisions in Study Area	**13**
Bicycle Collisions	4
Pedestrian Collisions	1

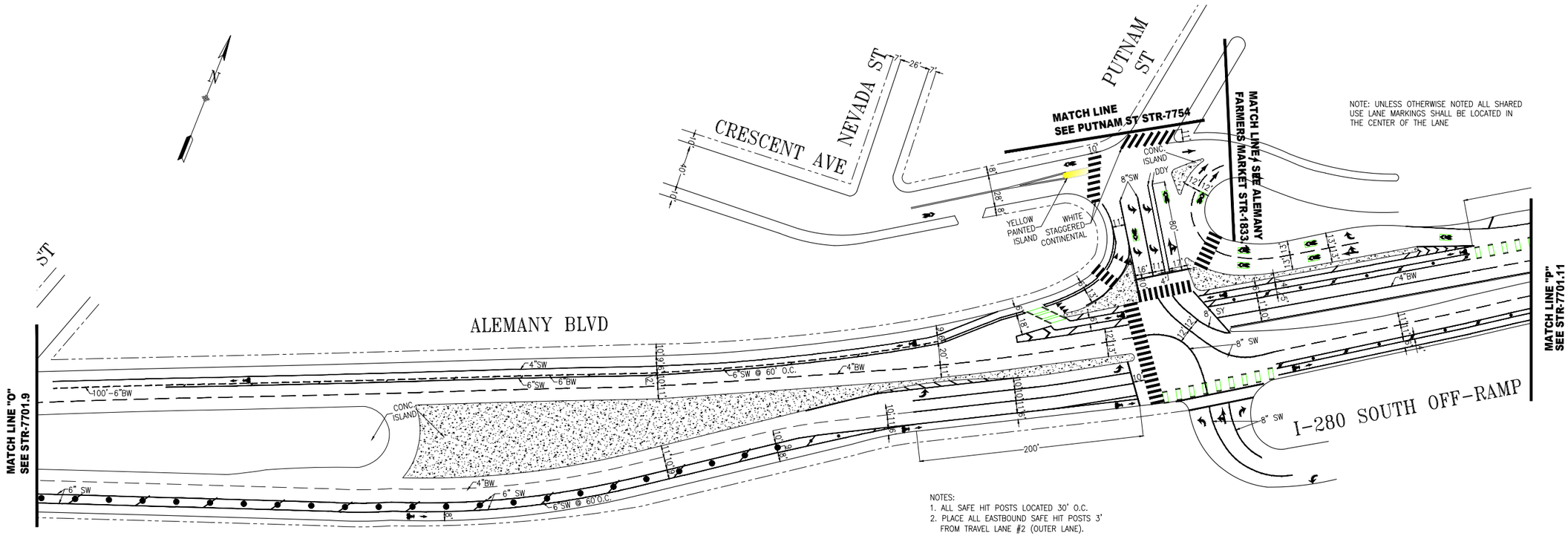
Source: SWITRS 2009-2013

CONCLUSIONS

The results of the capacity observations indicate all study intersection operate at LOS E or better during the weekday morning and evening peak hours for all scenarios. Although the proposed road diet reduces corridor capacity, the study intersections are expected to perform within the acceptable standards with minimal additional vehicle delay. In addition to the road diet improvements, signal modifications and shorter pedestrian crossing distances could reduce vehicle delay to near current levels, thereby minimizing the impact on the transportation system without compromising the goals of safety and accessibility.

Appendix D

Detailed Final Striping Drawings



NO.	DATE	DESCRIPTION	BY	APP.
2	11/3/12	UPDATED PER FIELD @PUTNAM: CRESCENT DY, SHIFT PAV ARROW &XWALK. ADD MTCHLN	DY	BW
1	6/8/11	ADDED BICYCLE LANES	RAC	DC

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

DESIGNED: DATE:

DRAWN: T.A DATE: 2005

CHECKED: R.0 DATE: 2005

APPROVED

THOMAS P FOLKS 2005
SECTION ENGINEER DATE:

BOND M. YEE 2005
CITY TRAFFIC ENGINEER DATE:

SCALE: 1"=50'

SHEET OF SHEETS

TRAFFIC STRIPING

ALEMANY BOULEVARD
FOLSOM STREET TO I-280 SOUTH OFF-RAMP

CONTRACT NO.

DRAWING NO. STR-7701.10

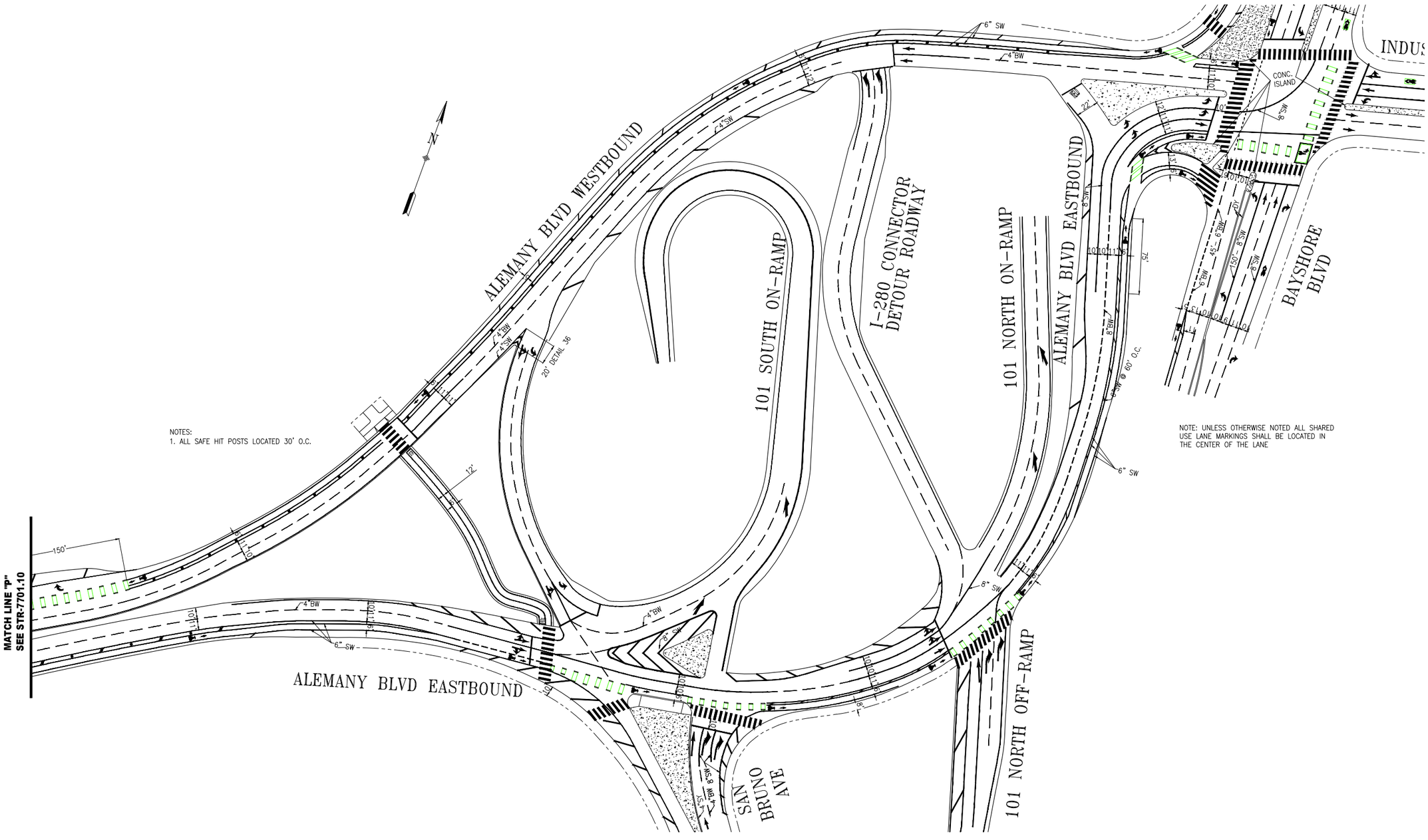
FILE NO.

REV. NO. 2

EXTERNAL REFERENCES:
FONTS USED:

SCALE FACTOR:
PLOT SCALE:

FILE NAME: T:\e\Off_rec\dwgs\a_z\a\alemany\str-7701
DATE: ORIGIN: OPERATIONS



NO.	DATE	DESCRIPTION	BY	APP.
1	6/8/11	ADDED BICYCLE LANE AND SHARROWS	RAC	DC

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

CITY AND COUNTY OF SAN FRANCISCO

DESIGNED: DATE:	
DRAWN: T.A DATE: 6/2010	
CHECKED: M.V DATE: 6/2010	

APPROVED

THOMAS P FOLKS 2005
SECTION ENGINEER DATE:

BOND M. YEE 2005
CITY TRAFFIC ENGINEER DATE:

SCALE: 1"=50'

SHEET OF SHEETS

TRAFFIC STRIPING

ALEMANY BOULEVARD
I-280 OFF-RAMP TO BAYSHORE BOULEVARD

CONTRACT NO.

DRAWING NO. STR-7701.11

FILE NO.

REV. NO. 1

EXTERNAL REFERENCES: FONTS USED:

SCALE FACTOR: PLOT SCALE:

FILE NAME: T_e\Off_rec\dwgs\a_z\o\alemany\str-7701
DATE: ORIGIN: OPERATIONS

Appendix E

Cost Estimate Details

Alemany Interchange Improvement Project
Striping Phase 1

	ITEM	*UNIT*	*QUANTITY*	*UNIT COST*	*TOTAL COST*	*NOTES*	
Phase 1							
	Remove/grind existing pavement striping	L.S.	--	--	$24,323		See worksheet tab for line items
	Proposed pavement striping	L.S.	--	--	$152,984		See worksheet tab for line items
	Safe hit bollards	each	61	$150.00	$9,150		30' spacing
	SFTMA Planning, Engineering, and Design	L.S.	--	--	$65,000		Per discussions with SFMTA
				Total Phase 1	$251,457		
				Wih 10% Contingency	$276,603		

GRINDING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: **ALEMANY INTERCHANGE IMPROVEMENT PROJECT**

PUTNAM @ ALEMANY to INDUSTRIAL/BAYSHORE

Computed by: MS

Checked by: MR

ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION
1	12" Crosswalk Lines / Stop Bars/ Chevrons	1073	Lin Ft	$6.39	$6,856
2	4" Broken White or Yellow	4738	Lin Ft	$1.82	$8,623
3	4" Solid White or Yellow	0	Lin Ft	$3.20	$0
4	6" Broken White	0	Lin Ft	$2.63	$0
5	6" Solid White	0	Lin Ft	$4.00	$0
6	8" Broken White or Yellow	0	Lin Ft	$3.60	$0
7	8" Solid White or Yellow	200	Lin Ft	$4.69	$938
8	Double Yellow	0	Lin Ft	$6.27	$0
9	Two Way Left Turn Lanes (ea line)	0	Lin Ft	$4.17	$0
10	Raised Pavement Markers (White or Yellow)	214	Each	$14.66	$3,138
11	Per Block Fees	0	Each	$1,013.85	$0
12	Messages (see page 2)	784	Sq Ft	$6.08	$4,767
13	Parking Stalls (Angle Stalls or "T"'s)	0	Each	$35.25	$0
14	International Symbol of Accessibility	0	Each	$306.00	$0
15	Bus Zones	0	Lin Ft	$7.76	$0
16	a. Ped Ramp Painting (inside Metro Dist.)	0	Int.	$382.93	$0
17	b. Ped Ramp Painting (outside Metro Dist.)	0	Int.	$256.50	$0
18	Color Curb Painting	0	Lin Ft	$10.21	$0
19	Wheel Stops (4" x 6" x 48" - Rubber)	0	Each	$309.99	$0
20	3.5" x 5.5" x 18" Pavement Bars (concrete)	0	Bar ft	$62.00	$0
21	Staggered Yellow/White Continental Crosswalks (see page 3)		Lump Sum	-	$0
22	Green Sharrow Backing - thermoplastic	0	Sq Ft	$16.00	$0
23	Green Bike Lane - thermoplastic (conflict markings)	0	Sq Ft	$16.00	$0
24	Bike box	0	Sq Ft	$16.00	$0

Labor: $23,350 Total: $24,323

Mat'ls: $5,837 **Added 20% Contingency =** **$29,187**

Labor: 80%, Materials: 20%

CALCULATION FOR RAISED PAVEMENT MARKERS

	Spacing,ft	Qty/Spacing	Total Qty
for 4" Broken White/Yellow	48	2	197
for 4" Solid White	24	1	0
for 8" Broken White	30	1	0
for 8" Solid White	24	2	17
for Double Yellow	24	2	0
for 2-Way Left Turn Lanes (ea line)	48	3	0
			214

Note: For Methacrylate spray material messages please see table below. Formula is already embeded to take in account for this table

Per Block Fees = Normalized Striping Costs per block for a Project with small striping painted at several scattered locations.

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: ALEMANY INTERCHANGE IMPROVEMENT PROJECT
PUTNAM @ ALEMANY to INDUSTRIAL/BAYSHORE

ITEM #	MESSAGE or ARROW	QUANTITY	Ea. in Sq. Ft.	Total Area
1	Type I Straight Arrow (10')	0	14	0
2	Type IV Left/Right Arrow (8')	0	15	0
3	Type III Left/Right Arrow (24')	0	42	0
4	Type VII Straight+Lt/Rt Arrow (13')	14	27	378
5	Type V Straight Arrow (24')	0	33	0
6	Type VI Merge Arrow (10')	0	24	0
7	HOV (Diamond) Symbol (12')	0	11	0
8	Handicap Parking Symbol (4')	0	4	0
9	Bike Lane Symbol (78")	0	14	0
10	STOP (8')	0	22	0
11	LANE (8')	0	24	0
12	NO	0	5	0
13	LEFT	0	19	0
14	RIGHT	0	26	0
15	TURN	0	24	0
16	SIGNAL	0	32	0
17	DO / coach (muni, black letters on yellow)	0	5	0
18	NOT	0	18	0
19	ENTER	0	31	0
20	YIELD	0	24	0
21	ONE	0	20	0
22	WAY	0	20	0
23	AHEAD	0	31	0
24	KEEP	0	24	0
25	CLEAR	0	27	0
26	Bike SHARROW Symbol	29	14	406
27	SLOW	0	23	0
28	SCHOOL	0	35	0
29	XING	0	21	0
30	PED	0	18	0
31	BUS	0	20	0
32	ONLY	0	22	0
33	STREET	0	35	0
34	Yield Teeth (Typically 3 per lane)	0	3	0
35	BUS STOP (5')	0	23	0
36	MISCELLENOUS MESSEGES	0	0	0

Total Area of Messages (in square feet) ----> 784 sq ft

Methacrylate Spray Material Messages

1	Less than 100 sq ft	$12.16	/ sq ft
2	Between 100 and 200 sq ft	$8.51	/ sq ft
3	More than 200 sq ft	$6.08	/ sq ft

Total **$4,767**

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: PROJECT NAME
LIMITS

Computed by:
Checked by:

COST PER LF OF 24" SOLID YELLOW OR WHITE: $6.52

	LOCATION	WIDTH	LENGTH OF ONE LEG (FT)	# OF 24" BARS	COST PER XWALK	# OF XWALKS	TOTAL
1	INDUSTRIAL @ BAYSHORE (N-CR)		21.00	5	$0.00	1	0.00
2	INDUSTRIAL @ BAYSHORE (N)		90.00	15	$0.00	1	0.00
3	INDUSTRIAL @ BAYSHORE (W)		80.00	15	$0.00	1	0.00
4	INDUSTRIAL @ BAYSHORE (W-CR)		20.00	5	$0.00	1	0.00
5	INDUSTRIAL @ BAYSHORE (S)		70.00	13	$0.00	1	0.00
6	ALEMANY @ 101 N OFF-RAMP (S)		70.00	13	$0.00	1	0.00
7	ALEMANY @ SAN BRUNO (S)		60.00	11	$0.00	1	0.00
8	ALEMANY @ SAN BRUNO (W-CR)		35.00	7	$0.00	1	0.00
9				5	$0.00	1	0.00
10				5	$0.00	1	0.00
11	ALEMANY @ PUTNAM (W)		90.00	15	$0.00	1	0.00
12	ALEMANY @ PUTNAM (N)		45.00	9	$0.00	1	0.00
13	ALEMANY @ PUTNAM (N-CR-WB)		25.00	5	$0.00	1	0.00
14	ALEMANY @ PUTNAM (N-CR-NB)		30.00	5	$0.00	1	0.00
15				5	$0.00		0.00
16				5	$0.00		0.00
17				5	$0.00		0.00
18				5	$0.00		0.00
19					$0.00		0.00
20					$0.00		0.00
21					$0.00		0.00
22					$0.00		0.00
23					$0.00		0.00
24					$0.00		0.00

Total: **$0**

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: **ALEMANY INTERCHANGE IMPROVEMENT**
PROJECT - PHASE 1 STRIPING
PUTNAM @ ALEMANY to INDUSTRIAL/BAYSHORE

Computed by: MS

Checked by: MR

ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION
1	12" Crosswalk Lines / Stop Bars/ Chevrons	1343	Lin Ft	$6.39	$8,582
2	4" Broken White or Yellow	4727	Lin Ft	$1.82	$8,603
3	4" Solid White or Yellow	741	Lin Ft	$3.20	$2,371
4	6" Broken White	0	Lin Ft	$2.63	$0
5	6" Solid White	13210	Lin Ft	$4.00	$52,840
6	8" Broken White or Yellow	1524	Lin Ft	$3.60	$5,486
7	8" Solid White or Yellow	2354	Lin Ft	$4.69	$11,040
8	Double Yellow	0	Lin Ft	$6.27	$0
9	Two Way Left Turn Lanes (ea line)	0	Lin Ft	$4.17	$0
10	Raised Pavement Markers (White or Yellow)	475	Each	$14.66	$6,961
11	Per Block Fees	0	Each	$1,013.85	$0
12	Messages (see page 2)	807	Sq Ft	$6.08	$4,907
13	Parking Stalls (Angle Stalls or "T"'s)	0	Each	$35.25	$0
14	International Symbol of Accessibility	0	Each	$306.00	$0
15	Bus Zones	0	Lin Ft	$7.76	$0
16	a. Ped Ramp Painting (inside Metro Dist.)	0	Int.	$382.93	$0
17	b. Ped Ramp Painting (outside Metro Dist.)	0	Int.	$256.50	$0
18	Color Curb Painting	0	Lin Ft	$10.21	$0
19	Wheel Stops (4" x 6" x 48" - Rubber)	0	Each	$309.99	$0
20	3.5" x 5.5" x 18" Pavement Bars (concrete)	0	Bar ft	$62.00	$0
21	Staggered Yellow/White Continental Crosswalks (see page 3)		Lump Sum	-	$8,626
22	Green Sharrow Backing - thermoplastic	600	Sq Ft	$16.00	$9,600
23	Green Bike Lane - thermoplastic (conflict markings)	1941	Sq Ft	$16.00	$31,056
24	Bike box	182	Sq Ft	$16.00	$2,912

Labor: $146,865
Mat'ls: $36,716

Total: $152,984
Added 20% Contingency = **$183,581**
Labor: 80%, Materials: 20%

CALCULATION FOR RAISED PAVEMENT MARKERS

	Spacing,ft	Qty/Spacing	Total Qty
for 4" Broken White/Yellow	48	2	197
for 4" Solid White	24	1	31
for 8" Broken White	30	1	51
for 8" Solid White	24	2	196
for Double Yellow	24	2	0
for 2-Way Left Turn Lanes (ea line)	48	3	0
			475

Note: For Methacrylate spray material messages please see table below. Formula is already embeded to take in account for this table

Per Block Fees = Normalized Striping Costs per block for a Project with small striping painted at several scattered locations.

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: ALEMANY INTERCHANGE IMPROVEMENT PROJECT - PHASE 1 STRIPING
PUTNAM @ ALEMANY to INDUSTRIAL/BAYSHORE

ITEM #	MESSAGE or ARROW	QUANTITY	Ea. in Sq. Ft.	Total Area
1	Type I Straight Arrow (10')	4	14	56
2	Type IV Left/Right Arrow (8')	9	15	135
3	Type III Left/Right Arrow (24')	0	42	0
4	Type VII Straight+Lt/Rt Arrow (13')	4	27	108
5	Type V Straight Arrow (24')	0	33	0
6	Type VI Merge Arrow (10')	0	24	0
7	HOV (Diamond) Symbol (12')	0	11	0
8	Handicap Parking Symbol (4')	0	4	0
9	Bike Lane Symbol (78")	23	14	322
10	STOP (8')	0	22	0
11	LANE (8')	0	24	0
12	NO	0	5	0
13	LEFT	0	19	0
14	RIGHT	0	26	0
15	TURN	0	24	0
16	SIGNAL	0	32	0
17	DO / coach (muni, black letters on yellow)	0	5	0
18	NOT	0	18	0
19	ENTER	0	31	0
20	YIELD	0	24	0
21	ONE	0	20	0
22	WAY	0	20	0
23	AHEAD	0	31	0
24	KEEP	0	24	0
25	CLEAR	0	27	0
26	Bike SHARROW Symbol	12	14	168
27	SLOW	0	23	0
28	SCHOOL	0	35	0
29	XING	0	21	0
30	PED	0	18	0
31	BUS	0	20	0
32	ONLY	0	22	0
33	STREET	0	35	0
34	Yield Teeth (Typically 3 per lane)	6	3	18
35	BUS STOP (5')	0	23	0
36	MISCELLENOUS MESSEGES	0	0	0

Total Area of Messages (in square feet) ----> 807 sq ft

Methacrylate Spray Material Messages

1	Less than 100 sq ft	$12.16	/ sq ft
2	Between 100 and 200 sq ft	$8.51	/ sq ft
3	More than 200 sq ft	$6.08	/ sq ft

Total **$4,907**

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: PROJECT NAME
LIMITS

Computed by:
Checked by:

COST PER LF OF 24" SOLID YELLOW OR WHITE: $6.52

	LOCATION	WIDTH	LENGTH OF ONE LEG (FT)	# OF 24" BARS	COST PER XWALK	# OF XWALKS	TOTAL
1	INDUSTRIAL @ BAYSHORE (N-CR)	10.00	21.00	5	$326.00	1	326.00
2	INDUSTRIAL @ BAYSHORE (N)	10.00	90.00	15	$978.00	1	978.00
3	INDUSTRIAL @ BAYSHORE (W)	14.00	80.00	15	$1,369.20	1	1369.20
4	INDUSTRIAL @ BAYSHORE (W-CR)	22.00	20.00	5	$717.20	1	717.20
5	INDUSTRIAL @ BAYSHORE (S)	10.00	70.00	13	$847.60	1	847.60
6	ALEMANY @ 101 N OFF-RAMP (S)	11.00	70.00	13	$932.36	1	932.36
7	ALEMANY @ SAN BRUNO (S)	10.00	60.00	11	$717.20	1	717.20
8	ALEMANY @ SAN BRUNO (W-CR)	10.00	35.00	7	$456.40	1	456.40
9				5	$0.00	1	0.00
10				5	$0.00	1	0.00
11	ALEMANY @ PUTNAM (W)	10.00	90.00	15	$978.00	1	978.00
12	ALEMANY @ PUTNAM (N)	10.00	45.00	9	$586.80	1	586.80
13	ALEMANY @ PUTNAM (N-CR-WB)	10.00	25.00	5	$326.00	1	326.00
14	ALEMANY @ PUTNAM (N-CR-NB)	12.00	30.00	5	$391.20	1	391.20
15				5	$0.00		0.00
16				5	$0.00		0.00
17				5	$0.00		0.00
18				5	$0.00		0.00
19					$0.00		0.00
20					$0.00		0.00
21					$0.00		0.00
22					$0.00		0.00
23					$0.00		0.00
24					$0.00		0.00

Total: **$8,626**

Alemany Interchange Improvement Project
Striping Phase 2 Cost Summary

ITEM	*UNIT*	*QUANTITY*	*UNIT COST*	*TOTAL COST*	*NOTES*
Phase 2 (Planning Level Estimate)					
Asphalt concrete path	Lin. Ft.	228	$2,500.00	$570,000	12' w/ 4' shoulder shared-use path, per DPW estimate
Proposed pavement striping (all)	L.S.	--	--	$4,476	See worksheet tab for line items
Pedestrian Signal (construction)	L.S.	--	--	$500,000	Planning level cost estimate (subject to review)
Lighting Installation	L.S.	--	--	$200,000	Planning level cost estimate (subject to review)
SFTMA Planning, Engineering, and Design	L.S.	--	--	$150,000	Planning level cost estimate (subject to review)
DPW Engineering and Design	L.S.	--	--	$385,000	50% of path and lighting construction (subject to review)
			Total Phase 2	$1,809,476	
			With 20% Contingency	$2,171,371	

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: **ALEMANY INTERCHANGE IMPROVEMENT PROJECT - PHASE 2**

PUTNAM @ ALEMANY to INDUSTRIAL/BAYSHORE

Computed by: MS

Checked by: MR

ITEM #	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	EXTENSION
1	12" Crosswalk Lines / Stop Bars/ Chevrons	58	Lin Ft	$6.39	$371
2	4" Broken White or Yellow	0	Lin Ft	$1.82	$0
3	4" Solid White or Yellow	690	Lin Ft	$3.20	$2,208
4	6" Broken White	0	Lin Ft	$2.63	$0
5	6" Solid White	74	Lin Ft	$4.00	$296
6	8" Broken White or Yellow	0	Lin Ft	$3.60	$0
7	8" Solid White or Yellow	0	Lin Ft	$4.69	$0
8	Double Yellow	0	Lin Ft	$6.27	$0
9	Two Way Left Turn Lanes (ea line)	0	Lin Ft	$4.17	$0
10	Raised Pavement Markers (White or Yellow)	29	Each	$14.66	$421
11	Per Block Fees	0	Each	$1,013.85	$0
12	Messages (see page 2)	22	Sq Ft	$12.16	$268
13	Parking Stalls (Angle Stalls or "T"'s)	0	Each	$35.25	$0
14	International Symbol of Accessibility	0	Each	$306.00	$0
15	Bus Zones	0	Lin Ft	$7.76	$0
16	a. Ped Ramp Painting (inside Metro Dist.)	0	Int.	$382.93	$0
17	b. Ped Ramp Painting (outside Metro Dist.)	0	Int.	$256.50	$0
18	Color Curb Painting	0	Lin Ft	$10.21	$0
19	Wheel Stops (4" x 6" x 48" - Rubber)	0	Each	$309.99	$0
20	3.5" x 5.5" x 18" Pavement Bars (concrete)	0	Bar ft	$62.00	$0
21	Staggered Yellow/White Continental Crosswalks (see page 3)		Lump Sum	-	$913
22	Green Sharrow Backing - thermoplastic	0	Sq Ft	$16.00	$0
23	Green Bike Lane - thermoplastic (conflict markings)	0	Sq Ft	$16.00	$0
24	Bike box	0	Sq Ft	$16.00	$0

Labor: $4,297 Total: $4,476

Mat'ls: $1,074 **Added 20% Contingency =** **$5,372**

Labor: 80%, Materials: 20%

CALCULATION FOR RAISED PAVEMENT MARKERS

	Spacing,ft	Qty/Spacing	Total Qty
for 4" Broken White/Yellow	48	2	0
for 4" Solid White	24	1	29
for 8" Broken White	30	1	0
for 8" Solid White	24	2	0
for Double Yellow	24	2	0
for 2-Way Left Turn Lanes (ea line)	48	3	0
			29

Note: For Methacrylate spray material messages please see table below. Formula is already embeded to take in account for this table

Per Block Fees = Normalized Striping Costs per block for a Project with small striping painted at several scattered locations.

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: ALEMANY INTERCHANGE IMPROVEMENT PROJECT - PHASE 2
PUTNAM @ ALEMANY to INDUSTRIAL/BAYSHORE

ITEM #	MESSAGE or ARROW	QUANTITY	Ea. in Sq. Ft.	Total Area
1	Type I Straight Arrow (10')	0	14	0
2	Type IV Left/Right Arrow (8')	0	15	0
3	Type III Left/Right Arrow (24')	0	42	0
4	Type VII Straight+Lt/Rt Arrow (13')	0	27	0
5	Type V Straight Arrow (24')	0	33	0
6	Type VI Merge Arrow (10')	0	24	0
7	HOV (Diamond) Symbol (12')	0	11	0
8	Handicap Parking Symbol (4')	0	4	0
9	Bike Lane Symbol (78")	0	14	0
10	STOP (8')	0	22	0
11	LANE (8')	0	24	0
12	NO	0	5	0
13	LEFT	0	19	0
14	RIGHT	0	26	0
15	TURN	0	24	0
16	SIGNAL	0	32	0
17	DO / coach (muni, black letters on yellow)	0	5	0
18	NOT	0	18	0
19	ENTER	0	31	0
20	YIELD	0	24	0
21	ONE	0	20	0
22	WAY	0	20	0
23	AHEAD	0	31	0
24	KEEP	0	24	0
25	CLEAR	0	27	0
26	Bike SHARROW Symbol	0	14	0
27	SLOW	0	23	0
28	SCHOOL	0	35	0
29	XING	0	21	0
30	PED	0	18	0
31	BUS	0	20	0
32	ONLY	0	22	0
33	STREET	0	35	0
34	Yield Teeth (Typically 3 per lane)	0	3	0
35	BUS STOP (5')	0	23	0
36	MISCELLENOUS MESSEGES (4' 'stop' on MUP)	2	11	22

Total Area of Messages (in square feet) ----> 22 sq ft

Methacrylate Spray Material Messages

1	Less than 100 sq ft	$12.16	/ sq ft
2	Between 100 and 200 sq ft	$8.51	/ sq ft
3	More than 200 sq ft	$6.08	/ sq ft

Total **$134**

STRIPING COST ESTIMATE **Date: 10/13/2016** **SPEC: xxxx**

Project: PROJECT NAME
LIMITS

Computed by:
Checked by:

COST PER LF OF 24" SOLID YELLOW OR WHITE: $6.52

	LOCATION	WIDTH	LENGTH OF ONE LEG (FT)	# OF 24" BARS	COST PER XWALK	# OF XWALKS	TOTAL
1	ALEMANY WB @ SAN BRUNO (W)	10.00	50.00	9	$586.80	1	586.80
2	ALEMANY EB @ PHASE 2 XING	10.00	30.00	5	$326.00	1	326.00
3				5	$0.00	1	0.00
4				5	$0.00	1	0.00
5				5	$0.00	1	0.00
6				5	$0.00	1	0.00
7				5	$0.00	1	0.00
8				5	$0.00	1	0.00
9				5	$0.00	1	0.00
10				5	$0.00	1	0.00
11				5	$0.00	1	0.00
12				5	$0.00	1	0.00
13				5	$0.00	1	0.00
14				5	$0.00	1	0.00
15				5	$0.00		0.00
16				5	$0.00		0.00
17				5	$0.00		0.00
18				5	$0.00		0.00
19					$0.00		0.00
20					$0.00		0.00
21					$0.00		0.00
22					$0.00		0.00
23					$0.00		0.00
24					$0.00		0.00

Total: **$913**