FINAL REPORT

# Balboa Park Station Area Circulation Study

April 2014

SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

FEHR & PEERS ARUP NELSON NYGAARD

# Table of Contents

# Appendices

Available Upon Request

**Appendix A: Transportation Analysis**

**Appendix B: Detailed Alternative Evaluation Results**

**Appendix C: Engineering Feasibility & Cost Estimates**

**Appendix D: Round 1 Outreach Summary**

**Appendix E: Round 2 Outreach Summary**

# EXECUTIVE SUMMARY

## Introduction and Study Purpose

The Balboa Park Station Area, located on the central south side of San Francisco, is a busy and multi-faceted hub of transportation activity. Home to the busiest Bay Area Rapid Transit (BART) station outside of Downtown San Francisco, a San Francisco Municipal Transportation Agency (SFMTA) Muni light rail terminal and maintenance facility, multiple bus lines along Geneva and Ocean Avenues, and a historic streetcar depot, this area is one of the most important and heavily used transit hubs in the region. Meanwhile, Interstate 280 (I-280) traverses the neighborhood, with six freeway ramps tying into the local street network directly adjacent to the BART Station. While this interchange provides vehicular access to regional transit and other neighborhood destinations, it also contributes to congestion, safety, and access issues, and degrades the quality of the surrounding area.

Multiple planning and engineering feasibility studies have explored ways to improve various aspects of the station area, beginning with the *Balboa Park Station Area Plan* (2009), the comprehensive long-range planning vision for the station area. Two recent technical studies - the *Balboa Park Station Pedestrian and Bicycle Connection Project* (2009) and the *Balboa Park Station Capacity and Conceptual Engineering Study* (2011) – identified projects to improve pedestrian access and transit operations at the station as well as the feasibility of the proposals for larger infrastructure improvements within the area. The SFMTA has also pursued opportunities to improve transit travel times along Geneva Avenue and pedestrian crossings along Ocean Avenue. While those efforts advanced some of the pedestrian and transit improvements identified previously, they also identified the need for multimodal operations analyses to develop a broader set of circulation changes for the surrounding roadway network, including and especially relating to freeway access.

Following these recent studies, the *Balboa Park Circulation Study,* made possible in part by a grant from the California Department of Transportation (Caltrans), has focused specifically on re-configurations of the I-280 Geneva and Ocean Avenue freeway ramps that could further improve station access and circulation. This study also addressed the impacts generated by the various station area automobile access and circulation alternatives on non-automobile travel modes to provide a comprehensive exploration of station area access and circulation.

The *Circulation Study's* purpose is to seek potential changes to the circulation system to:

1. Reduce the negative impacts on the local community resulting from automobiles accessing the regional road network
2. Support efficient, reliable bus and light rail operations
3. Enhance safety, accessibility, and convenience for pedestrians and bicyclists
4. Minimize impacts to traffic going to/coming from I-280
5. Develop feasible solutions that can be implemented within ten years

# Study Area Context

The Balboa Park Station Area, near the southern edge of San Francisco, functions as a key hub of transportation services, including BART, three Muni Metro light rail lines, seven Muni bus lines, private shuttle services, designated bikeway routes, and the I-280 freeway. The station is surrounded by residential neighborhoods and the main campus of City College of San Francisco.

In some ways, the Balboa Park BART station has attributes of an end-of-the-line station. Entering from the south side, it is the first station within the City's limits and is therefore the first station available for use with a Muni Fast Pass. This fare policy attracts many passengers from the south via I-280 who might otherwise board BART at other stations such as Daly City. In addition, the station area experiences a high number of drop-offs and pick-ups because of its easy freeway access. The J, K, and M Muni light rail lines terminate at Balboa Park. At the time of the study, 38 Muni buses and 14 light rail vehicles (LRVs) per hour traversed Geneva and Ocean Avenues during the peak period, navigating lanes shared with or crossed by automobiles, pedestrians, and bicyclists. The result of these conditions is tremendous intermodal activity, with over 25,000 transit passengers moving through the station area every day.

The Circulation Study's area of focus is bounded by Ocean Avenue, Geneva Avenue, and San Jose Avenue. Existing freeway access and transit routes are shown in **Figure ES-1**.

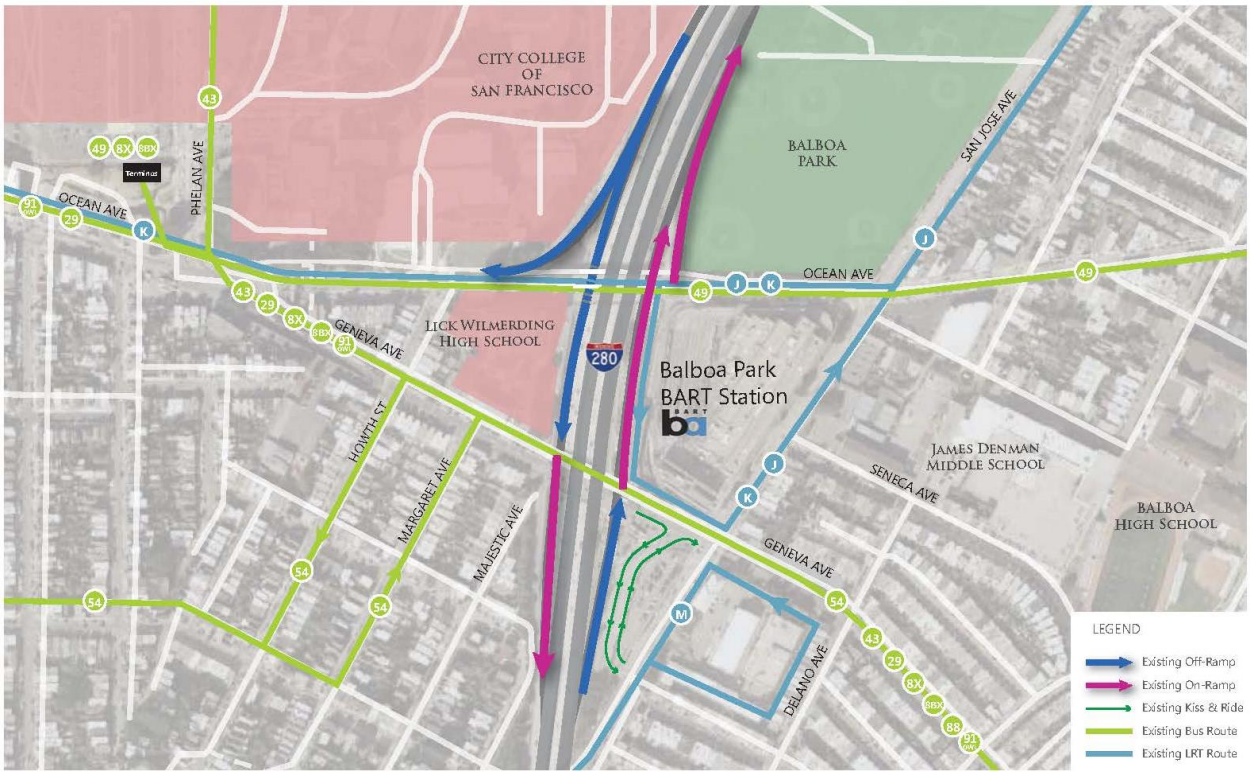



**Figure ES-1: Freeway Access and Transit Routes**

The local street network surrounding Balboa Park Station serves a diversity of travel modes. The streets accommodate high volumes of automobiles (many of which access the nearby I-280 ramps), Muni buses, Muni light rail vehicles, bicycles, and pedestrians. Several studies have been undertaken in recent

years that define many of the multimodal conflicts. The *Station Capacity Study* and *Pedestrian and Bike Connections Study* have identified the potential constraints of concepts discussed in the *Station Area Plan*.

The key multimodal issues and opportunities include:

1. **The southbound I-280 off-ramp at Ocean Avenue is a high-speed, uncontrolled merge.** This configuration presents a major pedestrian crossing challenge as well as automobile conflicts with bicycles and buses.

2. **The I-280 interchange has closely-spaced southbound off- and northbound on-ramps.** Reducing the number of ramps may create opportunities to improve transit service and the pedestrian and bicycle experience.

3. **The I-280 northbound off- and on-ramps at Geneva Avenue conflict with pedestrian activity.** Automobile volumes and the number of conflicts could be reduced at this intersection by reconfiguring one or more of the freeway ramps.

4. **I-280 northbound freeway access on Ocean Avenue conflicts with light rail vehicles entering the Muni Yard, bicycles using the westbound bicycle lane, and pedestrians.** This intersection experiences delays that may be improved through changes in circulation, lane configurations, and traffic signal timing.

5. **Geneva Avenue is the most congested street within the study area.** The congestion negatively impacts automobile movements, Muni bus operations, bicycle travel, and pedestrian activity.

6. **The designated passenger drop-off and pick-up (kiss-and-ride) area is underutilized, particularly during the AM peak period, and its owner, BART, has signaled a desire to remove it for new development on the site, posing a challenge for future PM peak period pick-up activity.** Morning drop-offs occur at bus stops and on off-ramps, presenting conflicts with other travel modes; alternative locations for kiss-and-ride activity are needed.

# Alternatives

The study began by generating several design concepts to address Station Area circulation issues, undertaking a screening process to identify two primary concept alternatives for the formal evaluation, described here in **Table ES-1** and in further detail in Chapter 4 of the report.

The alternatives incorporate a set of previously identified Baseline network improvements that are moving forward for implementation. In addition, they feature targeted freeway ramp closures and/or modifications designed to better manage congested locations and reduce pedestrian, bicycle, and transit conflicts at the freeway ramp intersections. The alternatives also consider and accommodate potential locations for kiss-and-ride operations.

**Alternative 1**, shown in **Figure ES-2**, is a partial split interchange between Ocean and Geneva Avenues, in which northbound I-280 traffic would exit onto Geneva Avenue but enter the freeway from Ocean Avenue. Southbound traffic would still be able to exit to both Geneva and Ocean Avenues while only entering from Geneva Avenue. The concept here would be to accommodate all travel modes

on both Ocean and Geneva Avenues while eliminating some key multimodal conflict points on both Geneva and Ocean Avenues. Alternative 1 is comprised of elements that are complementary to, but also partly independent of each other. One element is the re-configuration of the I-280 southbound off-ramp to Ocean Avenue from a high-speed merge to a signalized intersection to improve pedestrian safety (Element 2). Another element, as discussed above, is the closure of the northbound on-ramp from Geneva Avenue (Element 1). In its place would be a third element (Element 3) conditional on Element 1 being carried out, consisting of a new northbound frontage road on the east side of I-280 from Geneva Avenue to Ocean Avenue, which would exist in space diverted from the closure of the northbound I-280 Geneva Avenue on-ramp. The frontage road could be constructed without replacing the Ocean Avenue Bridge if paired with re-constructing and shifting the existing Westside Walkway. Alternative 1 envisions the use of this new frontage road as the new kiss-and-ride location. The Study recommends that all elements in this alternative be implemented, yet finds it appropriate to implement them separately over time, allowing simpler and less costly improvements to proceed while the more complex ones are developed further.

**Alternative 2**, shown in **Figure ES-3**, would consolidate the interchange at Geneva Avenue. This concept provides all freeway access only at Geneva Avenue, dramatically reducing the automobile volume on Ocean Avenue and therefore enabling Ocean Avenue to prioritize travel for transit and non-motorized modes. The alternative consists primarily of two elements: permanently closing the northbound on-ramp to I-280 from Ocean Avenue (Element 1) and permanently closing the southbound off-ramp from I-280 to Ocean Avenue (Element 2). Both elements should be implemented jointly to be most effective. A potential third element is a new transit- and bike-only frontage road from Geneva Avenue to Ocean Avenue (Element 3), split off from the northbound I-280 on-ramp from Geneva Avenue and accommodating a new transit stop. The frontage road could be constructed without replacing the Ocean Avenue Bridge if paired with re-constructing and shifting the existing Westside Walkway; direct access from the new station stop to a new walkway would be included in the design. While this rerouting is technically feasible and may mitigate negative effects to transit delay, further study and consultation with SFMTA is required to fully evaluate its overall impact and feasibility and is therefore considered as a *potential* element within Alternative 2.

**Table ES-1: Study Alternatives**

| ALTERNATIVE/ELEMENT | | COST |
|---|---|---|
| **ALTERNATIVE 1: PARTIAL SPLIT INTERCHANGE** | | **$18 MILLION** |
| Element 1 | Close the Geneva Avenue northbound on-ramp | |
| Element 2 | Realign Ocean Avenue southbound off-ramp into a "T" intersection | |
| Element 3 | Construct a new northbound frontage road between Geneva and Ocean to accommodate a new kiss-and-ride drop-off area with direct connection to the BART Westside Walkway. | |
| **ALTERNATIVE 2: CONSOLIDATED INTERCHANGE ON GENEVA AVE** | | **$3 MILLION** |
| Element 1 | Close the Ocean Avenue northbound on-ramp | |
| Element 2 | Close the Ocean Avenue southbound off-ramp | |
| Element 3 *[Potential]* | Construct a new northbound transit- and bike-only frontage road between Geneva and Ocean to accommodate a transit stop with direct connection to the BART Westside Walkway. | *[$9 MILLION]* |

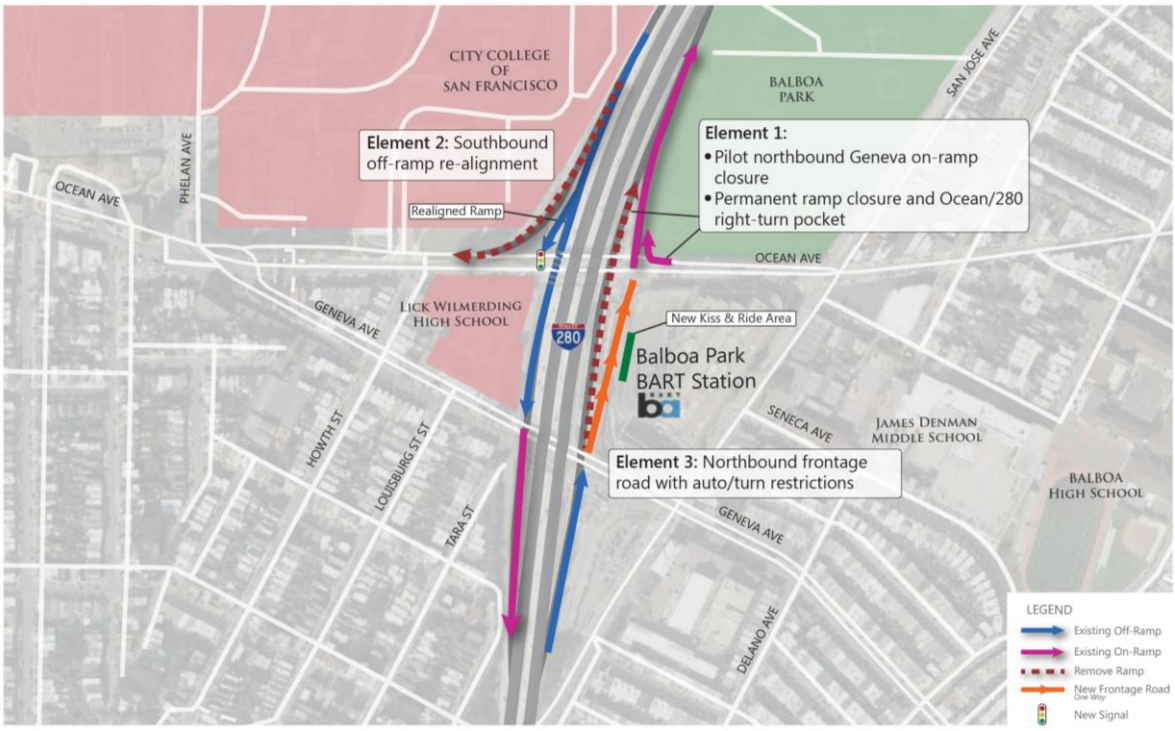



**Figure ES-2: Alternative 1: Partial Split Interchange**


**Figure ES-3: Alternative 2: Consolidated Interchange on Geneva Avenue**

# Evaluation

The study evaluated the two alternatives to understand their performance in criteria relating to the study goals. The evaluation included a traffic operations analysis, a feasibility analysis for engineering and capital cost considerations, and a multimodal performance assessment to identify benefits and constraints. The results are shown in **Table ES-2**. The study found Alternative 1 to fulfill all study goals but that both alternatives involve important trade-offs. For instance, while Alternative 1 addressed multimodal conflict points at the I-280 southbound off-ramp intersection at Ocean Avenue and at the I-280 northbound on-ramp intersection at Geneva Avenue, these changes increased traffic and transit delays on Ocean Avenue. The study found Alternative 2's trade-offs to be especially dramatic; in removing all freeway-related traffic from Ocean Avenue, it improved transit and multimodal conditions there, but in doing so, it significantly exacerbated traffic congestion, delays and conflicts on Geneva Avenue.

The study therefore identified Alternative 1 as the higher-performing alternative. It also found Alternative 1 to be composed of elements that, if implemented individually, could spread over time the funds required for implementation and allow the agencies and community to select, at a more fine-grained level, which trade-offs are deemed worthwhile.

**Table ES-2: Evaluation Summary**

| STUDY GOALS | ALTERNATIVE 1 | ALTERNATIVE 2 | NOTES |
|---|---|---|---|
| Goal #1: Reduce the negative impacts on the local community resulting from automobiles accessing the regional road network | - | ↓ | Alternative 1 would have a neutral impact, decreasing vehicle delay on Geneva and increasing vehicle delay on Ocean. While Alternative 2 would decrease delay on Ocean, it would substantially increase delay on Geneva, resulting in severe delays at both ramp intersections. |
| Goal # 2: Support efficient, reliable bus and light rail operations | - | ↓ | Alternative 1 would have a neutral impact and Alternative 2 would have a negative impact on transit operations since Muni vehicles would be subject to the intersection delays described above. |
| Goal #3: Enhance safety, accessibility, and convenience for pedestrians and bicyclists | ↑ | ↑ | Both alternatives have a net positive influence on the pedestrian and bicycle environment. |
| Goal #4: Minimize impacts to traffic going to/coming from I-280 | - | - | Neither alternative shows notable impacts to freeway operations. |
| Goal #5: Develop feasible solutions that can be implemented within ten years | ↑ | ↑ | Both projects can be feasibly implemented within 10 years. |

Notes:
"↑ " = positive impact; "—" = neutral impact; "↓ " = negative impact

# Agency and Community Process

The Study engaged the community and key agency stakeholders to inform its findings and recommendations. The public agencies that own, manage, and operate transportation facilities and services within the Balboa Station Area, including Caltrans, BART, and SFMTA, participated in a Technical Working Group (TWG) which convened three times to provide guidance and feedback on the project goals, analysis and recommendations. In addition, Transportation Authority staff met individually with SFMTA, BART, and Caltrans staff throughout the project to discuss specific issues.

Outreach to the community and key stakeholders included two community workshops held at the City College of San Francisco, regular presentations to the Balboa Park Community Advisory Committee meetings, presentations to existing neighborhood groups, a 250-address email list for project updates, over 3,500 postcards mailed to residents in the area, and over 700 flyers distributed at local businesses and gathering spots.

Key messages heard through the outreach include the following, with further detail provided in Chapter 5 of this report:

1. Strong support for reducing multimodal conflicts around the station
2. Desire for continuity with previous station area planning
3. Concern about existing and potential delays to auto travel
4. Desire to accommodate all travel modes on both Geneva and Ocean Avenues

The Study incorporated this input into its evaluation and recommendation by seeking a circulation alternative that not only reduced multimodal conflicts but also minimized impacts to automobile travel and balanced the needs of all travel modes on both Geneva and Ocean Avenue.

# Recommendations and Next Steps

While both Alternative 1 and Alternative 2 would improve pedestrian and bicycle conditions within the Study Area, Alternative 1 would provide a more balanced approach to the area, reducing conflicts between motorized and non-motorized users on both Ocean and Geneva Avenues. In addition, Alternative 1 provides new space directly adjacent to the station that can be used for kiss-and-ride activity, preventing that activity from occurring elsewhere and interfering with freeway ramp and transit stop operations.

The study recommends advancing **Alternative 1** as the higher-performing alternative for further study and implementation**.**

This study is the first stage of project development for proposed improvements, establishing a viable overall vision for re-configuring the I-280 Geneva and Ocean Avenue freeway ramps and the local transportation network to improve Balboa Park Station Area access and circulation. Several more steps lie between conclusion of this stage and the time improvements would be ready for implementation, including funding gathering and prioritization within overall city priorities, additional stakeholder and public outreach, environmental review including further transportation analysis, and detailed design and engineering.

In addition, given that some elements of Alternative 1 are independent of and may reflect stronger community and agency consensus than others, one step ahead is to identify parallel implementation tracks for the separate elements. For each element, potential subsequent phases of project development are shown in **Figure ES-4**. Overall, with agency and community consensus on all the elements of Alternative 1, a schedule could see the various elements constructed and potential pilot projects conducted within six years of the study approval date.


**Figure ES-4: Potential Implementation Steps**

As the project advances through the next steps of development and approvals, Transportation Authority staff will seek possible sources of funding for the project. Some funds are available from the Proposition K Sales Tax in its Balboa Park Station Access category; Chapter 6 of this report lists several additional potential sources.

This page intentionally left blank.

## CHAPTER 1

# INTRODUCTION

The Balboa Park Station Area is one of the busiest transit hubs in San Francisco, providing service to local and regional destinations via BART, Muni buses and light rail. However, it has long been recognized that the surrounding neighborhood has greater potential as a socially and economically vital place. Competing transportation functions and land uses have reduced the quality of the surrounding area. Specifically, six freeway ramps are sited directly adjacent to the BART Station and contribute to congestion, safety and access issues for all users. The Balboa Park Station Area Circulation Study identifies a set of implementable station- and freeway-related access and circulation improvements based on the conceptual vision set forth in the *Balboa Park Station Area Plan* and refined in subsequent technical analyses.

## 1.1 Study Purpose and Goals

This study is focused on potential re-configurations of the I-280 Geneva and Ocean Avenue freeway ramps and associated changes to the local transportation network that could further improve station access and circulation. This study also addresses other modes (i.e., transit, pedestrian and bicyclists) to the extent that modifications to the roadway network may affect them. The purpose of the Circulation Study is to identify potential ramp re-configurations to reduce multimodal conflicts at freeway ramp junctions and transit stops, with consideration toward automobile circulation for regional (i.e., freeway-bound) and local traffic, transit access and operations, kiss-and-ride (private automobile passenger drop-off and pick-up) activities; and pedestrian and bicyclist access.

While each previous study has built on the framework developed in the *Station Area Plan*, none has analyzed the potential vehicle circulation issues in depth. One of the primary purposes of this study is to identify a preferred circulation alternative that reduces the multimodal conflicts and identifies a feasible circulation alternative for freeway and local access. The five key goals of the project are to:

1. Reduce the negative impacts on the local community resulting from automobiles accessing the regional road network
2. Support efficient, reliable bus and light rail operations
3. Enhance safety, accessibility, and convenience for pedestrians and bicyclists
4. Minimize impacts to traffic going to/coming from I-280
5. Develop feasible solutions that can be implemented within ten years

# 1.2 Study Process

This Study began in the spring of 2012 and included a series of technical analysis and evaluation tasks to arrive at a final set of recommendations. The process was supported by an extensive public outreach effort that included partner agencies, key stakeholders and the community.

## 1.2.1 | Development of Goals and Objectives

The study, with input from the stakeholder agencies and the community, developed a set of goals and objectives to respond to the purpose and need of the study. This set of goals served as the policy framework for proposed freeway ramp reconfigurations and local network improvements. Chapter 4 describes these goals and objectives in detail.

## 1.2.2 | Existing Conditions

The study conducted a multimodal evaluation of existing conditions of 17 intersections within the study area to assess existing automobile traffic operations, transit delays, and pedestrian and bicycle conditions. Chapter 2 summarizes this information, which was used to develop the study's circulation improvements and assess the impact of the improvements on transit, traffic, pedestrians, and bicyclists.

## 1.2.3 | Alternatives Development and Evaluation

The study developed a number of initial alternatives to address multimodal conflicts and circulation issues within the Balboa Park Station Area based on findings from the existing conditions analysis. The process began with a planning charrette involving Transportation Authority staff and the consultant team, who worked collaboratively to develop several initial alternatives. A preliminary assessment conducted of the alternatives' engineering feasibility and operational performance resulted in elimination of some alternatives and refinement of others. The remaining two alternatives underwent an additional round of design evolution, the results of which are proposed in this report. Further analysis in a future phase will be needed to more fully assess the benefits and impacts of the alternative to be advanced.

## 1.2.4 | Agency and Community Process

Several public agencies operate transportation facilities and services in the station area, and decisions about each facility and service affect each other as well as overall circulation. The study aimed to bring these agencies together to build a coordinated and holistic vision for station area circulation. To do so, the study team created a Technical Working Group to enable discussions and consensus-building among the key stakeholder agencies, with supplemental in-depth discussions with particular agency staff as needed. **Table 1** shows the key agencies, including the funders of this study.

For community input, the study hosted two community workshops to inform the public about the study process and project alternatives, and to solicit feedback on initial ideas and recommendations. The study team also made presentations to existing neighborhood groups as well as the Balboa Park Community Advisory Committee (CAC). These outreach activities informed the analysis and final study recommendations.

**Table 1: Study Partner Agencies**

| AGENCY | STATION AREA ROLE |
|---|---|
| Bay Area Rapid Transit District (BART) | Own and operate BART facilities, including kiss-and-ride lane |
| California Department of Transportation (Caltrans)* | Own and operate I-280 freeway and interchange ramps |
| San Francisco Municipal Transportation Agency (SFMTA) | Own and operate local street system<br>Own and operate bus and light rail system and service |
| San Francisco County Transportation Authority (SFCTA) | Plan and fund transportation investments across all modes |

* Fund contributor to this study

This page intentionally left blank.

## CHAPTER 2

# EXISTING CONDITIONS

This chapter describes the Station Area's existing conditions, as well as how those conditions may change with future planned land use and transportation projects. Where relevant, the chapter also identifies the critical needs that the Study aims to address through the Station Area design alternatives (discussed in Chapter 3).

## 2.1 Land Use Context

The Balboa Park BART Station is located in a predominantly residential area in southwest San Francisco. The station sits alongside I-280, which is a ground-level freeway that divides local neighborhoods in two. To the immediate north of the station is Balboa Park, a public park with playing fields. There is also a large concentration of schools and colleges in the immediate area, including the main campus for the City College of San Francisco. The 2009 *Balboa Park Station Area Plan* proposed the creation of a transit village on the SFMTA's Upper Yard on the southwest corner of Geneva and San Jose Avenues as well as building a deck over I-280 to support additional land development. While the decking of the freeway has been found to be infeasible due to engineering limitations and significant costs (on the scale of the Presidio Parkway project, which had a total cost of over $800 million), redevelopment of the Upper Yard is moving forward in partnership with BART, which owns the adjacent site.

## 2.2 Related Studies and Plans

The Balboa Park Station Area has been the subject of a number of planning and engineering feasibility studies, most of which were direct follow-up studies on issues identified in the *Balboa Park Station Area Plan* (2009), the comprehensive long-range planning vision for the station area. The two most recent technical studies – the *Balboa Park Station Pedestrian and Bicycle Connection Project* (2009) and the *Balboa Park Station Capacity and Conceptual Engineering Study* (2011) – identified short-term and medium-term projects to improve pedestrian access and transit operations at the station as well as evaluated the feasibility of the proposals for larger infrastructure improvements within the area. The latter effort also addressed specific elements of station access and rider experience at Balboa Park, including uncomfortable or limited pedestrian access to the station, passenger drop-off activities in problematic areas, and feasibility of the long-range neighborhood planning vision (e.g., construction above the rail yards). The SFMTA has pursued opportunities to improve transit travel times in the area, specifically along Geneva Avenue through its Transit Effectiveness Project (TEP) as well as enhanced pedestrian crossings, such as the Ocean/San Jose Avenue crosswalk.

While those studies advanced some of the pedestrian and transit improvements identified in the *Station Area Plan*, they also identified the need to do additional multimodal operations analyses to develop a longer-range, feasible and preferred circulation plan for the Ocean and Geneva Avenue freeway on- and

off-ramps. This study focuses specifically on auto operations at and near the station. This study also addresses other modes (i.e., transit, pedestrian and bicyclists) to the extent that modifications to the roadway network may affect them.

**Table 2** summarizes the projects and studies that have examined issues and opportunities at the Balboa Park Station. This study relied heavily on these previous studies in order to advance and refine some of the circulation concepts previously considered.

**Table 2: Related Balboa Park Station Area Studies and Projects**

| STUDY/PROJECT TITLE | LEAD AGENCY | YEAR | KEY ISSUES | STATUS OF PROJECTS |
|---|---|---|---|---|
| Completed Studies | | | | |
| Daly City Fast Pass Extension Study | BART | 2012 | Evaluated the feasibility and potential transportation effects of extending the "in-city" BART/Muni Fast Pass agreement to Daly City Station | Recommended Strategies:<br>• Further analyze a Bus+BART Discount<br>• Further analyze a Muni Eco-Pass for participating organizations<br>• Reject Muni "A" Fast Pass extension<br>Reject creation of a new premium Muni Fast Pass |
| Capacity and Conceptual Engineering Study ("Capacity Study") | SFMTA | 2011 | Provided engineering feasibility analysis and planning recommendations for the long-range concepts identified in the Station Area Plan. | Improvements Identified and Subsequently Funded:<br>• Construct Eastside Pedestrian Connection<br>• Close Track Walkway near Ocean Avenue<br>• Construct Accessible J/K platform on San Jose Avenue<br>• Upgrade Existing J/K platform next to BART Station<br>• Improve pedestrian connection between the BART station and San Jose Avenue<br>• Straighten Geneva Avenue/NB I-280 crosswalk at BART Station<br>• Add signal at Geneva Avenue/Howth St |
| Pedestrian and Bicycle Connections Project ("Ped and Bike Study") | SFMTA | 2009 | Identified and prioritized short-term access and safety improvements for pedestrians and bicyclists around the station, including recommended conceptual designs. | Recently Completed:<br>• Westside Walkway between Ocean Avenue and the BART Station<br>• Ocean Avenue/NB I-280 Crosswalk<br>• Westbound Ocean Avenue Bike Lane<br>• Westbound Ocean Avenue Bus Stop at BART Station<br>• Pedestrian beacon at southbound Ocean Avenue off-ramp |

| STUDY/PROJECT TITLE | LEAD AGENCY | YEAR | KEY ISSUES | STATUS OF PROJECTS |
|---|---|---|---|---|
| Station Area Plan and EIR | SF Planning | 2008/09 | • Established preferred broad, long-term land use and circulation goals for Balboa Park neighborhood<br>• Identified the need for improvements to connectivity for transit passengers<br>• Identified the creation of a transit village on the Upper Yard and decking of I-280 | The Station Area Plan is the most current long-range vision for the Station Area. |
| Station Profile Study | BART | 2008 | Summary of BART station access characteristics by station and system-wide | |
| BART Comprehensive Station Plan | BART | 2002 | • Identified a vision for the BART station consistent with the City's prior Station Area Plan, including an intermodal transit village concept<br>• Focused on BART access to/from Ocean Avenue, including the Westside Walkway along the Muni tracks | |
| Forthcoming Studies | | | | |
| Transit Effectiveness Project (TEP) | SFMTA | On-going | • Identifies short- and long-range transit improvements to make Muni operate more efficiently and reliably<br>• Identifies specific route changes within the Balboa Park study area | Proposed Improvements:<br>• Reroute 29 Sunset from Geneva to Ocean<br>• Reroute the 54 Felton through Excelsior<br>• Create M Ocean View Short Line<br>• Make Various Headway Modifications<br>• Add WB transit-only lane on Geneva Ave between Delano Ave and the NB I-280 ramps.<br>• Add signal at Geneva Ave/Cayuga Ave |
| Geneva Avenue Transit Travel Time Reduction Project ("TTRP") | SFMTA | On-going | • Identifies short-term signal operation changes to improve transit operations on Geneva Avenue | |

Source: Prepared by Fehr & Peers, 2012

# 2.3 Transportation Context and Needs

This section describes the existing and future transportation context within the Station Area, as shown in **Figure 1**. It begins by describing the multimodal street network, addressing Geneva Avenue and Ocean Avenue in turn. Existing conditions are then discussed by mode. Finally, the key access needs identified in the early part of the study are described.

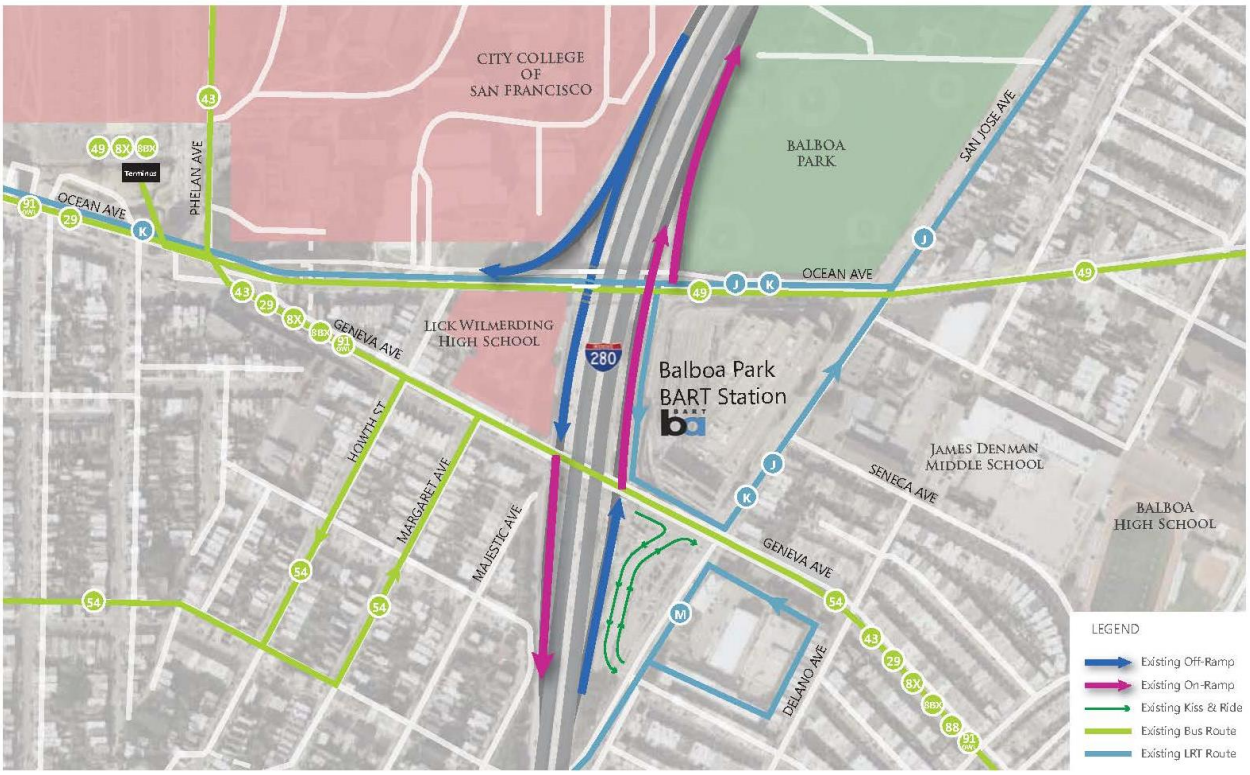



**Figure 1: Study Area Transportation Context**

## 2.3.1 | Geneva Avenue

Geneva Avenue is the neighborhood's key east-west arterial, carrying the most automobile and transit bus traffic of any street in the study area. Pedestrian activity is particularly high on Geneva Avenue in the immediate vicinity of the BART Station. Turning automobiles at the intersections of Geneva Avenue/I-280 ramps and Geneva Avenue/San Jose Avenue frequently conflict with pedestrians crossing at these locations (see Figure 2). Automobiles turning onto I-280 also frequently conflict with through bus service along Geneva Avenue, for which all lines in the area (8X Bayshore Express, 8BX Bayshore B Express, 29 Sunset, 43 Masonic, 54 Felton, 88 BART Shuttle, 91 Owl) use to provide access to the BART Station.

**Figure 2: Intersection at Geneva Avenue and I-280 NB On-Ramp**

## 2.3.2 | Ocean Avenue

Ocean Avenue is the other key east-west arterial in the neighborhood, although it carries lower volumes of travelers compared to Geneva Avenue. Ocean Avenue takes precedence over Geneva Avenue as the primary east-west bicycle route with a mix of Class II bike lanes and Class III bicycle routes in each direction. Bicycles conflict with automobiles turning to access the freeway as well as with light rail vehicles (LRVs) which turn to enter and exit the Green Yard. On Ocean Avenue, one bus route (49 Mission/Van Ness) operates curbside and one LRV route (K Ingleside) operates (west of San Jose Avenue) in center-running LRV-only lanes.

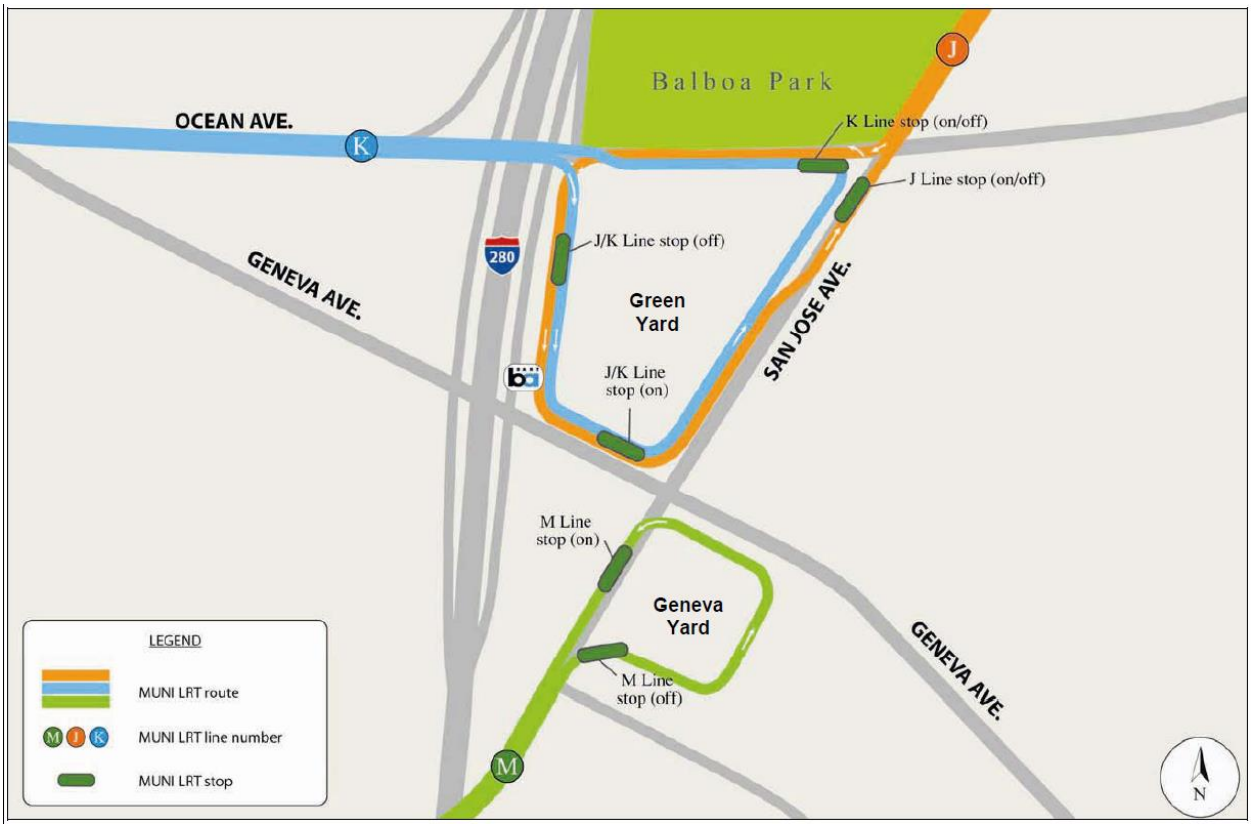
## 2.3.3 | Transit Conditions

The study area is served by regional BART rail service and citywide Muni bus services. **Figure 3** presents the existing transit network in the vicinity of the Balboa Park BART Station. **Table 3** provides details on the transit service, hours of operation, and frequencies for the BART and Muni service in the Balboa Park BART Station area. **Table 4** shows Muni bus and light rail ridership by transit stop.

Total daily ridership at the transit stops varies substantially depending on the number of transit routes serving the stop and whether the stop is a local stop serving the neighborhood or a transfer point to other bus or rail lines. The transit stops on Geneva Avenue between the Muni/BART station entrance and San Jose Avenue serve over 11,000 Muni passengers daily, whereas the stop at the station on Ocean Avenue serves only about 3,000 passengers daily. Realignment of the 29 Sunset and 54 Felton to Ocean

Avenue as part of the TEP will substantially increase the number of passengers using the Ocean Avenue entrance to the station; however, Geneva Avenue will continue to serve a substantial number of transit passengers. The bus routes with the greatest number of passengers in the study area are the 8X Bayshore Express, the 43 Masonic, and the 49 Van Ness-Mission, with a total of nearly 5,000 boardings and alightings per day in the study area. Of the light rail lines serving the study area, the M Ocean View has the highest ridership, with about 3,300 total boardings and alightings per day.

The Balboa Park BART Station is one of the highest volume intermodal transfer stations within the BART/Muni system. There are a number of existing constraints related to station and transit stop design/location that affect the efficiency and operations of transit in the vicinity of the Balboa Park BART Station.




Source: *Capacity Study*, SFMTA, 2011

**Figure 3: Light Rail Vehicle Circulation at Balboa Park BART Station**

**TRANSIT STOP/STATION DESIGN -** The primary entrance to the Balboa Park BART and Muni Metro Station is located on Geneva Avenue immediately east of the I-280 northbound off-ramp and on-ramp. Bus stops are located on both sides of Geneva Avenue, just east of the BART station. Most Muni bus routes that operate in this area stop at this location. However, there are several other bus and rail stops located on surface streets in the study area, including a major off-street terminal loop for buses and electric trolley buses at Ocean and Phelan Avenues. Two lines in particular are more disconnected from the station entrance: the M Ocean View's terminal stop is located 600 feet south of the Station entrance on San Jose Avenue, and the 49 Van Ness stops 350 feet north of the station on Ocean Avenue. The construction of the Westside Walkway at the station in 2010 improved north-south access; however, M

Ocean View riders must cross San Jose Avenue and walk two or three minutes to BART or other Muni bus routes on Geneva.

Passenger waiting areas for the J Church and K Ingleside light rail lines are located just to the east of the BART station, north of Geneva Avenue. Due to the design of the station complex and the high volume of light rail vehicles serving it, there is limited waiting space for passengers. In addition to loading and unloading passengers in the below-grade trench-like platform area for the J Church and K Ingleside lines, the site is also used for LRV layovers. The convergence of transit operations at this single location provides numerous services and routes for the community but also presents an uncomfortable pedestrian environment with potential conflicts between LRVs and passengers, particularly at the San Jose/Geneva intersection where LRV can exit the station area.

**Table 3: Weekday BART & Muni Transit Service in the Balboa Park Bart Station Area**

| ROUTE | DESTINATION | DAILY HEADWAY RANGE (MIN.) | AM/PM PEAK HOUR HEADWAY (MIN.) | WEEKDAY HOURS OF OPERATION |
|---|---|---|---|---|
| BART | | | | |
| Richmond-Millbrae | | 15-20 | 15 | 4:00 am – 1:00 am |
| Fremont-Daly City | | 15-20 | 15 | |
| Dublin/Pleasanton-Millbrae | | 15-20 | 15 | |
| Pittsburg/Bay Point-SFO | | 15-20 | 15 | |
| Muni Light Rail | | | | |
| J Church | Balboa Park and downtown San Francisco via Church St and the Market St Subway (from the Van Ness Station to the Embarcadero Station) | 9-20 | 9 / 7 | 5:00 am – 12:50 am |
| K Ingleside | Balboa Park and downtown San Francisco via Ocean Ave, Geneva Ave, Junipero Serra Blvd, and the Market St Subway (from the West Portal Station to the Embarcadero Station). After the Embarcadero Station, the K Ingleside switches names to the T Third line | 9-20 | 10 / 9 | 5:00 am – 12:50 am |
| M Ocean View | Balboa Park and downtown San Francisco via San Jose Ave, Broad St, Randolph St, 19th Ave, and the Market St Subway (from the West Portal Station to the Embarcadero Station) | 9-20 | 9 / 9 | 5:00 am – 12:50 am |
| Muni Bus | | | | |
| 8X Bayshore Express | Balboa Park to Downtown San Francisco via Bayshore Blvd and US-101 | 8-15 | 8 / 8 | 4:40 am – 1:15 am |
| 8BX Bayshore Express | | 8 | 8 / 8 | 6:20 – 10:00 am; 3:30 – 7:50 pm |
| 29 Sunset | Visitacion Valley to Presidio via Balboa Park and Sunset District | 10-20 | 10 / 10 | 5:15 am – 1:30 am |
| 43 Masonic | Balboa Park BART to Forest Hill (serves CCSF campus) | 10-30 | 10 / 12 | 5:00 am to 1:30 am |
| 49 Van Ness-Mission | Balboa Park to North Point via Mission St and Van Ness Ave | 8-20 | 8 / 8 | 4:30 am – 1:15 am |
| 54 Felton | Daly City BART to Hunters Point via Balboa Park | 20-30 | 20 / 20 | 5:30 am – 1:00 am |
| 88 BART Shuttle | San Francisco State University to Balboa Park BART via Mission St | 20 | 20 / 20 | 6:40 – 9:00 am; 4:00 to 6:40 pm |
| Shuttle Service | | | | |
| Brisbane-Crocker Park BART/Caltrain Shuttle | Balboa Park BART Station to the Brisbane - Crocker Industrial Park via the Bayshore Caltrain Station. | 10-30 | -- | 5:45 am – 9:35 am |
| Red Brisbane | | 20-60 | -- | 3:15 pm – 7:30 pm |
| Blue Brisbane | | 10-30 | -- | 5:45 am – 9:35 am |
| Sierra Point | Balboa Park BART Station to Sierra Point Office Park via US 101 | 10-15 | -- | 7:00 am – 9:45 am; 4:00 pm – 6:45 pm |
| Paratransit | | | | |
| San Francisco Paratransit | -- | On-Call | On-Call | 24 hours/day; 7 days/week |

Source: SFMTA, 2012; LCW Consulting, 2012; Nelson\Nygaard, 2012

## Table 4: Daily Muni Ridership by Transit Stop

| STREET/STATION STOP | DAILY RIDERSHIP | | |
|---|---|---|---|
| | BOARDINGS | ALIGHTINGS | TOTAL |
| Geneva Avenue – Eastbound[1] | | | |
| Ocean Ave & Geneva Ave | 1,120 | 220 | 1,340 |
| Geneva Ave & Howth St | 160 | 110 | 270 |
| Balboa Park BART Station/Muni Metro Terminal | 2,990 | 1,100 | 4,090 |
| Geneva Avenue – Westbound[1] | | | |
| Balboa Park BART station/Muni Metro Terminal | 1,270 | 2,980 | 4,250 |
| Geneva Ave & Howth St | 80 | 340 | 420 |
| Phelan Loop at SFCC | 0 | 920 | 920 |
| Ocean Avenue – Eastbound[2] | | | |
| Ocean Ave & Geneva Ave | 450 | 10 | 460 |
| City College Pedestrian Bridge | 60 | 350 | 410 |
| Ocean Ave & Howth St | 300 | 10 | 310 |
| Balboa Park BART Station/Ocean Avenue | 50 | 1,180 | 1,130 |
| Ocean Ave & San Jose Ave | 220 | 50 | 270 |
| Ocean Avenue – Westbound[2] | | | |
| Ocean Ave & San Jose Ave | 40 | 220 | 260 |
| Balboa Park BART Station/Ocean Avenue | 820 | 0 | 820 |
| Ocean Ave & Howth St | 20 | 400 | 420 |
| City College Pedestrian Bridge | 470 | 60 | 530 |
| San Jose Avenue – Northbound[3] | | | |
| San Jose Ave & Geneva Ave | 0 | 1,530 | 1,530 |
| Geneva Terminal | 0 | 30 | 30 |
| Green Division Yard | 650 | 0 | 650 |
| San Jose Ave & Ocean Ave | 210 | 20 | 230 |
| San Jose Avenue – Southbound[3] | | | |
| San Jose Ave & Ocean Ave | 10 | 170 | 180 |
| Green Division Yard | 0 | 410 | 410 |
| Geneva Terminal | 30 | 0 | 30 |
| San Jose Ave & Geneva Ave | 1,750 | 0 | 1,750 |

Notes:
1. Includes 8x, 8BX, 29, 43, 54, and 88 (note pending data from SFMTA: 54 Felton not included in eastbound ridership, and 29 Sunset not included in westbound ridership)
2. Includes 49 Mission-Van Ness and K Ingleside.
3. Includes J Church and M Ocean View
4. Note pending data from SFMTA: 29 Sunset does not include southbound ridership

Source: SFMTA, 2007-2011; Fehr & Peers, 2012

On Ocean Avenue, the traffic signals stop all other traffic to allow LRVs to cross into the light rail yard, causing intermittent congestion at the northbound Ocean Avenue on-ramp intersection, as the LRVs enter the Muni Green Yard and hold traffic. When a number of light rail vehicles need to enter the site, this can cause substantial congestion on Ocean Avenue. When Muni vehicles enter the Green Yard from the west, eastbound traffic, both through-traffic on Ocean Avenue and left-turning automobiles traveling to the freeway, is held with a red light. According to scheduled headways, this occurs approximately seven to eight times per hour during the peak hours. Transit vehicles exiting the Green Yard at this intersection cause similar delay to automobiles along Ocean Avenue.

On Geneva Avenue, the high traffic volumes accessing I-280 freeway ramps and the bus activity at the station entrance conflict, resulting in transit vehicle delay. Transit vehicles pull out of the travel lane to pick up passengers on both the north and south sides of Geneva, but high traffic volumes make re-entering the travel lane challenging. Automobile queues on Geneva also result in additional travel delay. SFMTA is currently working on travel time reduction proposals for Geneva Avenue to address some of the existing issues in the area.

**INDEPENDENT SHUTTLES -** As indicated in **Table 3**, four independent shuttles travel to the Balboa Park BART Station. Employer shuttles currently use the section of Geneva Avenue adjacent to the entrance of the BART station as a loading and unloading location as well as for shuttle vehicle layovers. Because there is no official shuttle loading area, and shuttle operators may not perceive the nearby kiss-and-ride area as convenient, they wait along Geneva Avenue and reduce the available space for Muni buses to load and unload at the Balboa Park BART Station. Depending on bus and shuttle traffic, the loading area can reach capacity and cause queues that block through-traffic on Geneva Avenue. The Transportation Authority is currently evaluating the role these shuttles provide within San Francisco.

### 2.3.4 | Auto Conditions

The seventeen study intersections represent those most directly affected by traffic congestion and transit operations in the vicinity of the Balboa Park BART Station. They include those intersections adjacent to I-280 ramps to the north and south of the station, as circulation improvements may result in shifts in traffic patterns that could impact intersection operations.

Existing intersection operating conditions were evaluated for the peak hour (the hour of the day with the highest traffic volumes) of the PM peak period (4:00 to 6:00 PM). Intersection turning movement counts were obtained from previous studies conducted in the area, including the Station Area Plan and more recent analyses, and are shown in **Figure 4**.

The study assessed traffic conditions using intersection Level of Service (LOS) methodology. This method determines the average delay at the intersection and assigns a letter grade for that performance from A (lowest delay) to F (highest delay) and is summarized (for signalized intersections) in **Table 5**. The results of the intersection LOS analysis for the existing weekday PM peak hour conditions are presented in **Figure 5**. Appendix A contains the intersection LOS calculation sheets. During the PM peak hour, all but two intersections in the study area operate satisfactorily, i.e. at LOS D or better. Two study intersections operate at LOS E: Geneva/Cayuga and the Geneva/I-280 NB on-ramp. At Geneva Avenue/I-280 NB ramps, the LOS E reflects the peak period congestion associated with passenger drop-offs and pick-ups, transit service, and pedestrian movements. Also, there are anecdotal reports that the northbound and southbound off-ramp queues for both Ocean and Geneva sometimes extend upstream onto the freeway.

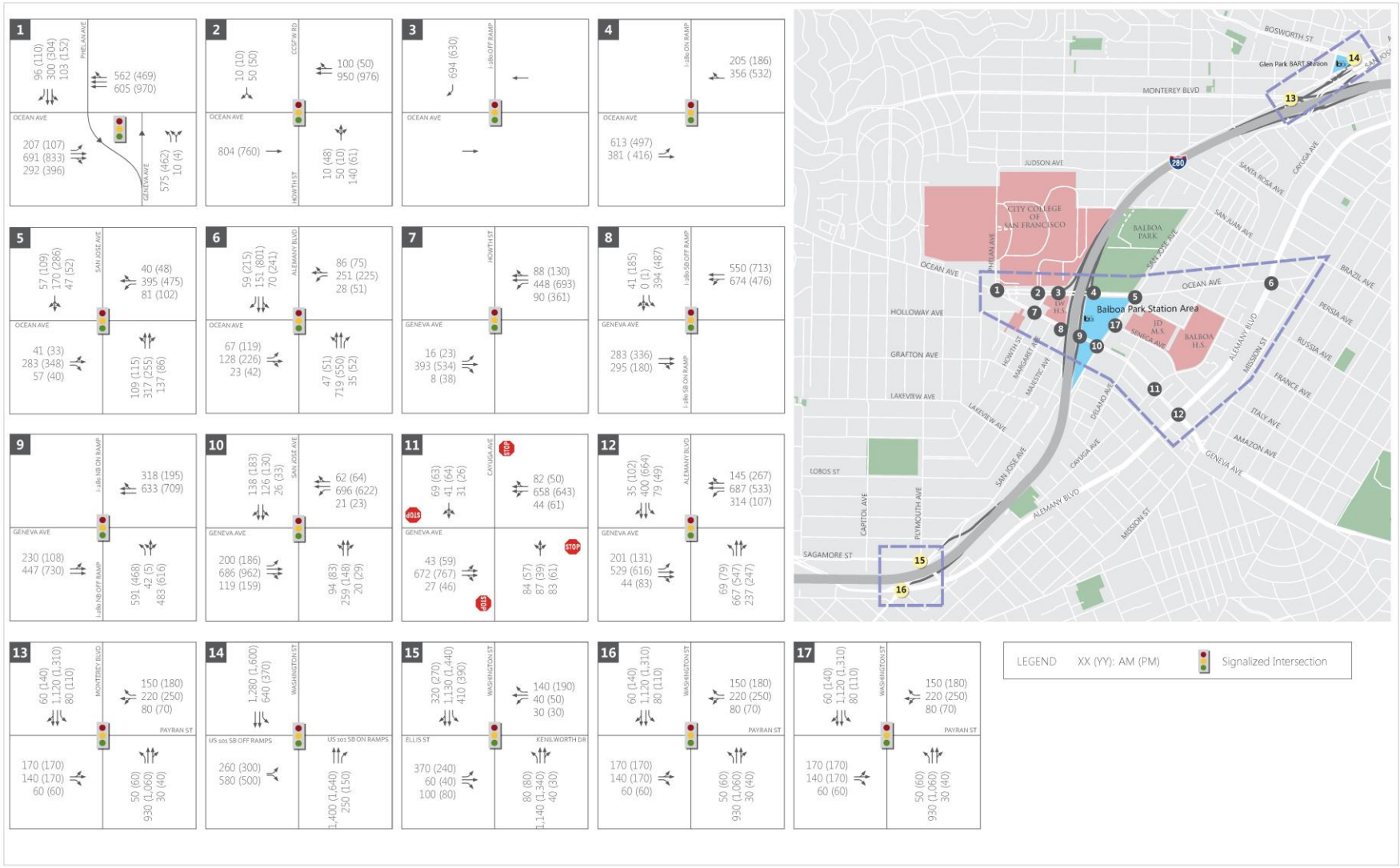



**Figure 4: Peak Hour Intersection Lane Configurations, Traffic Control, and Vehicle Volumes**

**Table 5: Signalized Intersection Level of Service Criteria**

| LEVEL OF SERVICE | DESCRIPTION | AVERAGE CONTROL DELAY PER VEHICLE (SECONDS) |
|---|---|---|
| A | Operations with very low delay occurring with favorable progression and/or short cycle length. | < 10.0 |
| B | Operations with low delay occurring with good progression and/or short cycle lengths. | 10.1 - 20.0 |
| C | Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. | 20.1 - 35.0 |
| D | Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable. | 35.1 - 55.0 |
| E | Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay. | 55.1 - 80.0 |
| F | Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, and/or very long cycle lengths. | > 80.1 |

Source: Highway Capacity Manual - Special Report 209 (Transportation Research Board, 2000).

In general, the intersections in the area were observed to operate with less delay and queuing during the summer as compared to the school year when automobile and pedestrian volumes in the area are higher.


**Figure 5: PM Peak Hour Automobile Level of Service**

## 2.3.5 | Pedestrian Conditions

Major pedestrian destinations within the Balboa Park BART Station vicinity include the City College of San Francisco, Lick-Wilmerding High School, Balboa Park, and neighborhood retail along Ocean Avenue to the west of the study area. The I-280 freeway ramps on Ocean and Geneva Avenue are a major impediment to safe, comfortable walking trips around the Station Area (see Figure 2 above and Figure 6 below). In addition, high pedestrian volumes at these crossings delay automobiles turning off and on to the ramps. Pedestrian volumes are shown in **Figure 7**.

**Figure 6: Intersection at Ocean Avenue and I-280 SB Off-Ramp**

Efforts to identify pedestrian safety issues and improve conditions have been an important citywide focus in recent years. As part of the WalkFirst pedestrian safety analysis, the San Francisco Department of Public Health (SFDPH) has identified trends in pedestrian-vehicle collision data for 2005 through 2011 across the city. Based on this analysis, SFDPH classified key streets and intersections where high numbers of pedestrian injuries occur as "High Injury Corridors" and "High Collision Density Intersections." Collision records from this dataset reveal the following findings for the Balboa Park BART Station Area:

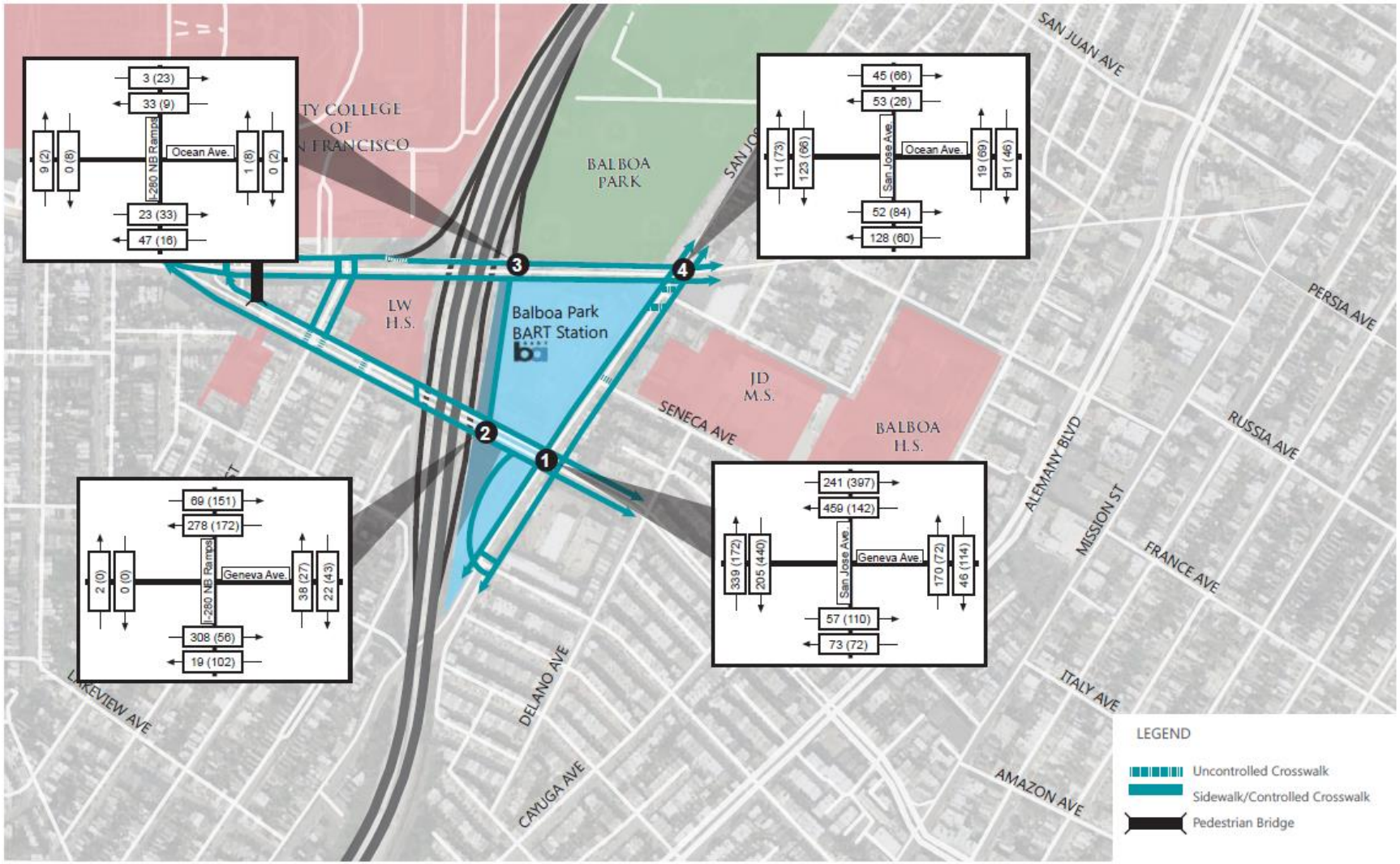
- The majority of pedestrian-vehicle collisions occurred at three intersections: Geneva/Ocean Avenue, Geneva Avenue/I-280 ramps, and Geneva/San Jose Avenue.
- Geneva Avenue has been identified as a High Injury Corridor for the length of the project study area, and the intersection of Ocean Avenue/I-280 southbound off-ramp has been identified as a High Collision Density Intersection.
- Collisions are attributed to a variety of different factors, including driver failure to yield, pedestrians crossing against crosswalk signal, pedestrians crossing not in crosswalk and midblock crossings.
- Half of all parties involved are between the ages of 15 and 32, indicating that students and student-age pedestrians are highly represented in these pedestrian collisions.

These findings reflect high levels of pedestrian and vehicle activity, at key intersections and corridors, the demographics of the local community, and the design of the freeway ramps and local street network. Collision locations are illustrated in **Figure 8**.

### 2.3.6 | Bicycling Conditions

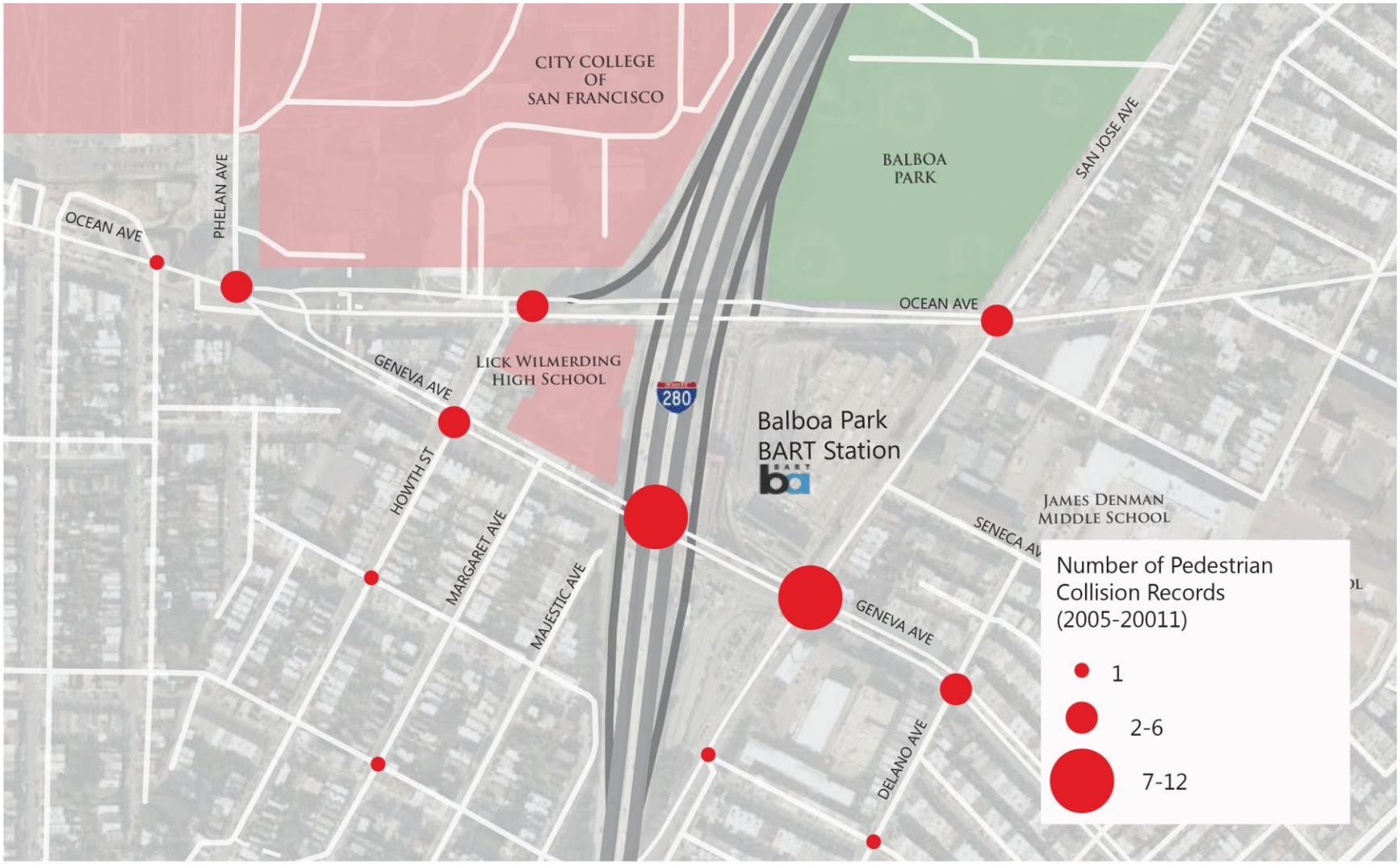
The Balboa Park BART Station Pedestrian and Bicycle Connection Project conducted in 2009 observed more bicyclists on Ocean Avenue than on Geneva Avenue and observed that bicycle volumes are generally low in the Balboa Park study area.[10] The low bicycle volumes were generally attributed to heavy traffic volumes, challenging topography, and the lack of on-street bicycle facilities. Bicycle volumes are shown in **Figure 9**.

[10] *Final Report, Balboa Park BART Station Pedestrian and Bicycle Connection Project*, SFMTA, October 2009.



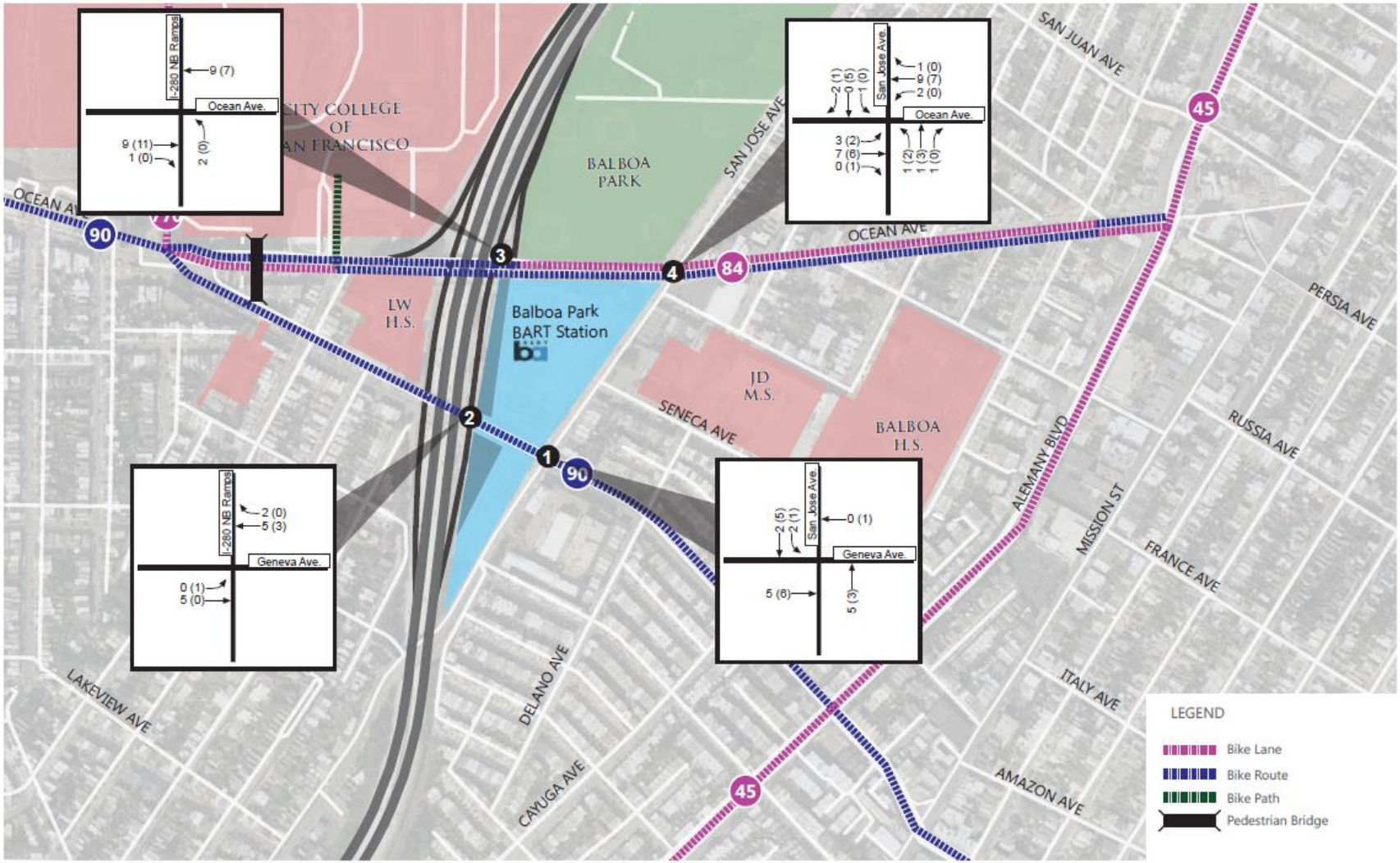

Source: Fehr & Peers, March 2009

**Figure 7: Pedestrian Volumes in 2009: AM (PM) Peak Hour**




Source: SWITRS, SFDPH

**Figure 8: Pedestrian-Vehicle Collisions in the Balboa Park BART Station Study Area (2005-2011)**




Source: Fehr & Peers, March 2009

**Figure 9: Bicycling Network with AM (and PM) Peak Hour Volumes**

## 2.3.7 | Kiss-and-Ride Conditions

Private automobile drop-offs and pick-ups of transit passengers, also referred to as kiss-and-ride activity, represent an important component of the station area circulation. BART's *2009 Transit Passenger Intercept Survey* noted that seven percent of all users of the Balboa Park BART Station are dropped off at the station[11], a figure representing several hundred passengers per day. The existing designated kiss-and-ride area is a two-lane facility with entrances and exits at Geneva Avenue, across from the main BART station entrance, and San Jose Avenue south of Geneva Avenue. The capacity is estimated at approximately 40 passenger automobiles.

The study collected observations of kiss-and-ride activity for multiple days in the fall of 2012 for both the AM and PM peak periods in order to better understand usage patterns. The study team found that the kiss-and-ride area serves about 58 percent of kiss-and-ride activity in the AM peak period and 84 percent of kiss-and-ride activity in the PM peak period. In the AM peak period, the existing kiss-and-ride area is underutilized, likely because of the out-of-direction travel required in order to utilize it. Many drivers would need to make a considerable detour before dropping off their passengers. Much of the activity was observed to occur at the curb on Geneva Avenue, including at the bus stops, at the curb on San Jose Avenue, and even on the northbound Geneva Avenue off-ramp during the red light phase, with passengers walking up the ramp to access the station.

In terms of the origins and destinations of drivers before and after their drop-offs, two-thirds of the drop-offs originated from the south (either from I-280, San Jose Avenue, or Niagara Avenue), half of which were from I-280. Only 12 percent of all drivers were observed to access the freeway after drop-off, of which almost all went northbound. A plurality of drivers, 45 percent, headed to the south after dropping off passengers, almost exclusively along San Jose Avenue. Five routes accounted for half of the drop-off activity in the AM peak hour. The five routes are shown in **Figure 10**.

[11] *Balboa Park BART Station Capacity and Conceptual Engineering Study*, SFMTA, 2011.

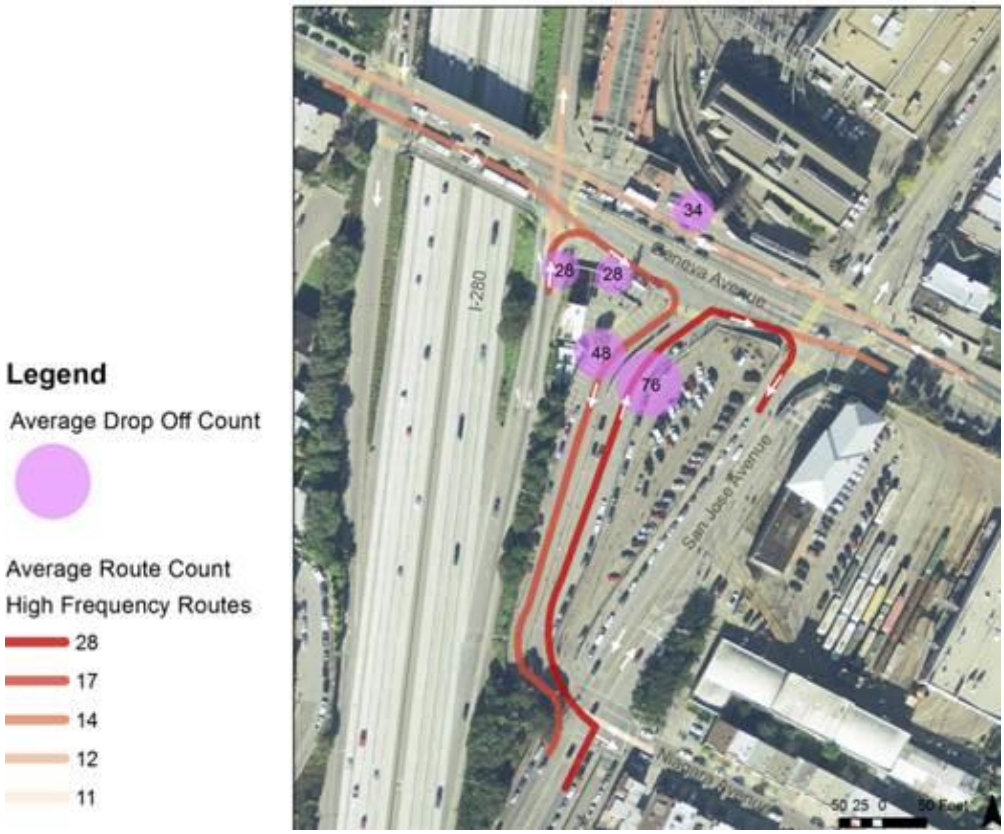



**Figure 10: AM Peak Drop-Off Route Frequencies, Top 50%**

In the PM peak period, when drivers need a place to wait for their passengers to arrive, the kiss-and-ride activity is more concentrated in the designated area. During the PM peak hours, the kiss-and-ride area is close to but not at capacity, with no queuing observed. Because of the time delay between the arrival of an automobile and its departure after obtaining its passenger, it was not feasible to observe the origin and destination of automobiles before and after the pick-up.

As a final note, BART owns and operates the kiss-and-ride area and has recently signaled plans to eliminate the kiss-and-ride area in order to develop affordable housing on that site. Therefore, it is likely that an alternative site for kiss-and-ride activity will be needed in the near future.

## 2.3.8 | Multimodal Conflicts

The local street network surrounding Balboa Park Station is highly multimodal. The streets accommodate high volumes of automobiles (many of which access the nearby I-280 ramps), Muni buses, Muni light rail, bicyclists, and pedestrians. Several studies have been undertaken in recent years that define many of the multimodal conflicts (see **Table 2** above). The *Station Capacity Study* and *Pedestrian and Bike Connections Study* identified potential constraints of concepts discussed in the *Station Area Plan*.

The key multimodal issues are shown in **Figure 11** and include:

1. **The southbound I-280 off-ramp onto Ocean Avenue is a high-speed, uncontrolled ramp.** It provides automobile access to westbound Ocean Avenue only. The ramp configuration creates an unsafe condition for pedestrians. Bicyclists and buses that are attempting to shift to the right lane immediately past the ramp intersection also face challenging operations and safety conditions. A realignment of the ramp to square off the intersection with a new traffic signal would improve pedestrian and bicyclist safety and also create an opportunity for automobiles exiting the freeway onto Ocean Avenue to turn left and head eastbound.

2. **The I-280 interchange has closely-spaced southbound off- and northbound on-ramps**. While distributed ramps disperse automobile traffic throughout multiple roads, the freeway-related traffic patterns negatively impact other travel modes. Freeway access at Ocean Avenue provides access to local destinations, whereas Geneva Avenue serves as a major transit transfer hub. Reducing the number of ramps may create opportunities to improve transit service, passenger drop-offs, and the pedestrian and bicycle experience. However, no ramp closure is without potential impacts to the local circulation network.

3. **The I-280 northbound on- and off-ramps on Geneva Avenue conflict with pedestrian activity**. Passenger drop-offs along the off-ramps create safety issues and contribute to queues. In addition, high pedestrian volumes at the ramp crossings conflict with automobile turning movements and cause delay along Geneva Avenue and the off-ramp. Automobile volumes and the number of conflicts could be reduced at this intersection by reconfiguring one or more of the freeway ramps.

4. **I-280 northbound freeway access on Ocean Avenue** conflicts with light rail vehicles entering and existing the Muni yard, bicycles using the westbound bicycle lane, and pedestrians. This intersection experiences delays that may be improved through changes to circulation, lane configurations, and traffic signal timing.

5. **Geneva Avenue is the most congested street within the study area**. The congestion negatively impacts automobile movements, SFMTA bus operations, bicycle travel, and pedestrian activity. The SFMTA's TEP recommendations to relocate some bus activity to Ocean Avenue are assumed as part of a Baseline scenario as discussed in Chapter 3.

6. **The designated passenger drop-off and pick-up (kiss-and-ride) area is underutilized, particularly during the AM peak period, and its owner, BART, has signaled a desire to remove it for new development on the site, posing a challenge for future PM peak period pick-up activity.** Morning drop-offs occur at locations where that activity creates multimodal conflicts, such as bus stops and freeway off-ramps. Afternoon pick-ups generally occur in the designated area, but that area has been slated for other future uses. Alternative locations for kiss-and-ride activity are needed.

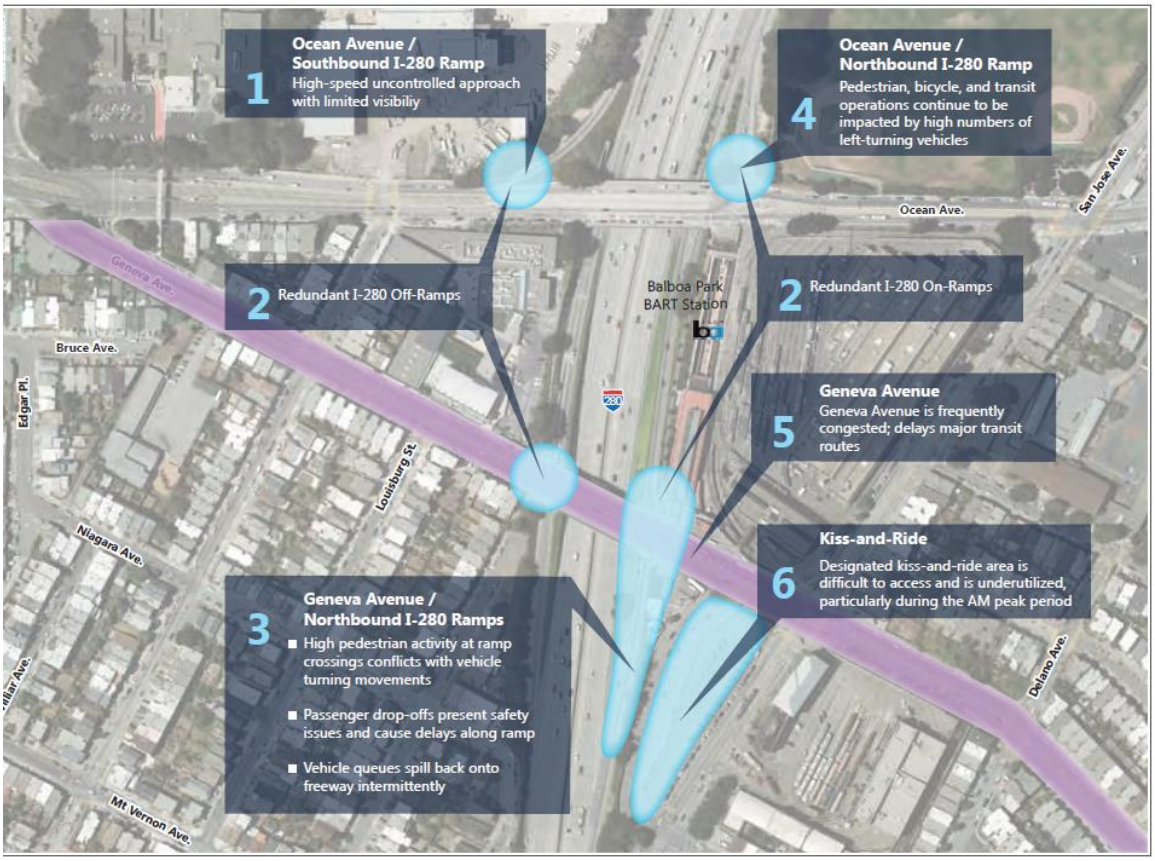



**Figure 11: Key Multimodal Issues**

This page intentionally left blank.

## CHAPTER 3

# STUDY ALTERNATIVES

A number of conceptual design alternatives were developed to improve circulation, access, and safety around the Station Area. In particular, alternatives were developed to explore ways to accommodate station design challenges such as providing convenient access to transit and connections between transit services, providing adequate freeway ramp access for automobiles, providing kiss-and-ride areas, and improving pedestrian and bicycle accessibility and safety. These alternatives were then evaluated to understand their performance on a range of criteria developed to assess consistency with the Balboa Park Station Area vision. This chapter describes the alternatives development process and the resulting concepts. This chapter also contains details on other planned local network improvements and enhancements to kiss-and-ride loading around the Station Area. The evaluation of the alternatives, including a discussion of potential traffic impacts, is provided in Chapter 4.

## 3.1 Alternatives Development Process

Based on findings from the Circulation Study Existing Conditions section, a series of design alternatives were developed to address multimodal conflicts and circulation issues within the Balboa Park Station Area. The process began with a planning charrette involving Transportation Authority staff and the Consultant team, who worked collaboratively to develop several initial alternatives. These alternatives were then refined through feedback from the Technical Working Group (TWG), which included representatives from SFMTA, BART and Caltrans; follow-up meetings with Muni Operations staff; and by the Balboa Park Community Advisory Committee (CAC).

**Study Goals**

- Reduce the negative impacts on the local community resulting from automobiles accessing the regional road network
- Support efficient, reliable bus and light rail operations
- Enhance safety, accessibility, and convenience for pedestrians and bicyclists
- Minimize impacts to traffic going to/coming from I-280
- Develop feasible solutions that can be implemented within ten years

Using the study goals as a guiding reference, a number of potential design concepts were explored, largely involving different combinations of modal priority along Geneva and Ocean Avenues. For example, the team discussed options to separate automobile traffic and transit routes across Geneva and Ocean Avenues. In addition, options to better accommodate kiss-and-ride activities, such as converting current on-street parking spaces and repurposing space adjacent to the freeway ramps, were identified. Based on these initial conversations, concepts were distilled into a set of primary alternatives and secondary or "modular" alternatives.

For each alternative, the dominant feature included some kind of modification to the freeway ramps. Based on a preliminary evaluation process, two alternatives were carried forward for more detailed analysis.

# 3.2 Conceptual Design Alternatives

The proposed alternatives incorporate the Baseline network improvements, and feature targeted freeway ramp closures and/or modifications designed to better manage congested locations and reduce pedestrian, bicycle, and transit conflicts at the ramp intersections. Where possible, kiss-and-ride operations have been considered and accommodated. The alternatives are listed below:

- Baseline Alternative
- Alternative 1: Partial Split Interchange
  - Element 1: Close northbound Geneva Avenue on-ramp (initiated as a pilot project)
  - Element 2: Realign southbound Ocean Avenue off-ramp into a "T" intersection
  - Element 3: Install kiss-and-ride northbound frontage road between ramps
- Alternative 2: Consolidated Interchange on Geneva Ave
  - Element 1: Close the northbound Ocean Avenue on-ramp
  - Element 2: Close the southbound Ocean Avenue off-ramp
  - Element 3 [Potential]: Construct a new northbound transit- and bike-only frontage road between Geneva and Ocean to accommodate a transit stop with direct connection to the BART Westside Walkway.

## 3.2.1 | Baseline Alternative

The Baseline alternative includes seven previously identified local network improvements that SFMTA is moving forward to implement (see **Table 6**). The Baseline alternative represents near-term future conditions in the Study Area once the City has implemented each of the improvements. For the purposes of this study, the Baseline is used as a point of comparison for the two alternatives, both of which incorporate all of the Baseline improvements.

## 3.2.2 | Alternative 1: Partial Split Interchange

**Alternative 1**, shown in **Figure 12**, is a partial split interchange between Ocean and Geneva Avenues, in which northbound I-280 traffic would exit onto Geneva Avenue but enter the freeway from Ocean Avenue. Southbound traffic would still be able to exit to both Geneva and Ocean Avenues while only entering from Geneva Avenue. The concept here is to accommodate all travel modes on both Ocean and Geneva Avenues while eliminating some key multimodal conflict points on both Geneva and Ocean Avenues.

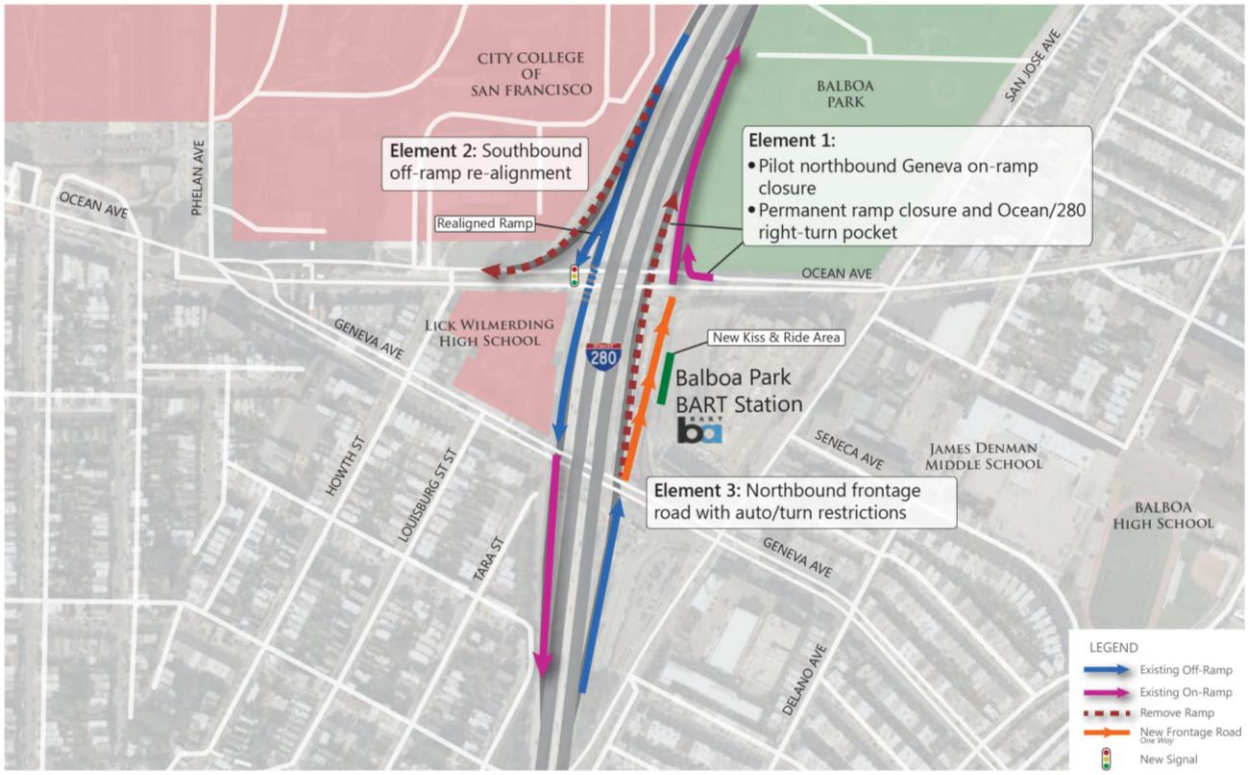



**Figure 12: Alternative 1 Partial Split Interchange**

The Study finds this alternative appropriate to implement in phases over time, allowing simpler and less costly improvements to proceed while the more complex and costly improvements are further developed. This approach also offers a modular set of improvements. Potential elements are as follows:

- *Element 1. Close the northbound Geneva Avenue on-ramp.* Closure of this ramp would greatly reduce the pedestrian and transit conflicts with turning automobiles at this intersection. This element would likely necessitate a new right-turn pocket on westbound Ocean Avenue by Balboa Park to accommodate the increase in right-turning automobiles accessing northbound I-280. The option to re-align the bus lines using Ocean Avenue into the existing center-running light rail lanes in order to minimize delays to transit could be explored based on SFMTA recommendations. This element lends itself to being first implemented as a pilot project, allowing for the traffic impacts associated with the circulation changes to be evaluated and mitigation measures fully developed prior to permanent closure of the ramp. No changes would be made to the Ocean Avenue/ I-280 on-ramp intersection under a pilot program. This element is shown in **Figure 13**.
- *Element 2. Realign the southbound Ocean Avenue off-ramp to a T-intersection and construct a new traffic signal to allow for left-turns onto Ocean Avenue.* The current off-ramp is a high-speed, uncontrolled, free right-turn to westbound Ocean Avenue, which creates an unsafe condition for pedestrians and bicyclists. This ramp realignment would entail some earthwork and minor utility and light rail adjustments. This element is shown in **Figure 14**.
- *Element 3. Construct a northbound frontage road between Geneva and Ocean Avenues.* This frontage road would serve as a new kiss-and-ride location but be designed to discourage general circulation usage. The road could be constructed without replacing the Ocean Avenue bridge if paired with

re-constructing and shifting the existing Westside Walkway; direct access from the drop-off to a new walkway would be included in the design. This element is shown in **Figure 15**.

It is important to recognize that Element 1 and Element 2 can be considered as independent projects. They do not need to be constructed sequentially, nor must they both be implemented. Element 3, however, is an option that would follow a permanent implementation of Element 1. **Figure 16** shows what Alternative 1 would look like if all three elements were constructed.

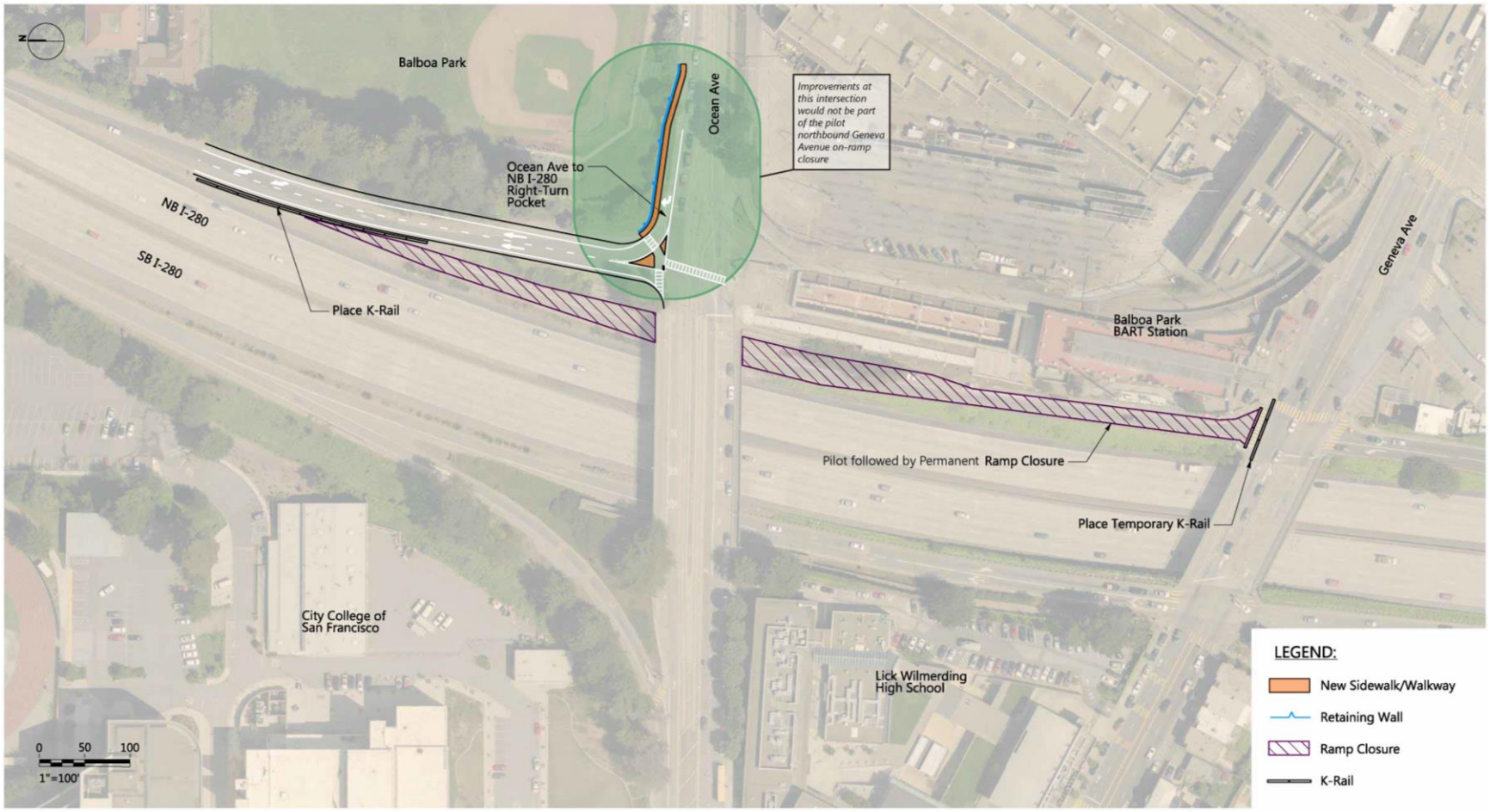



**Figure 13: Alternative 1, Element 1 – Closure of Northbound Geneva On-Ramp and Re-Configuration of Northbound Ocean On-Ramp Intersection**

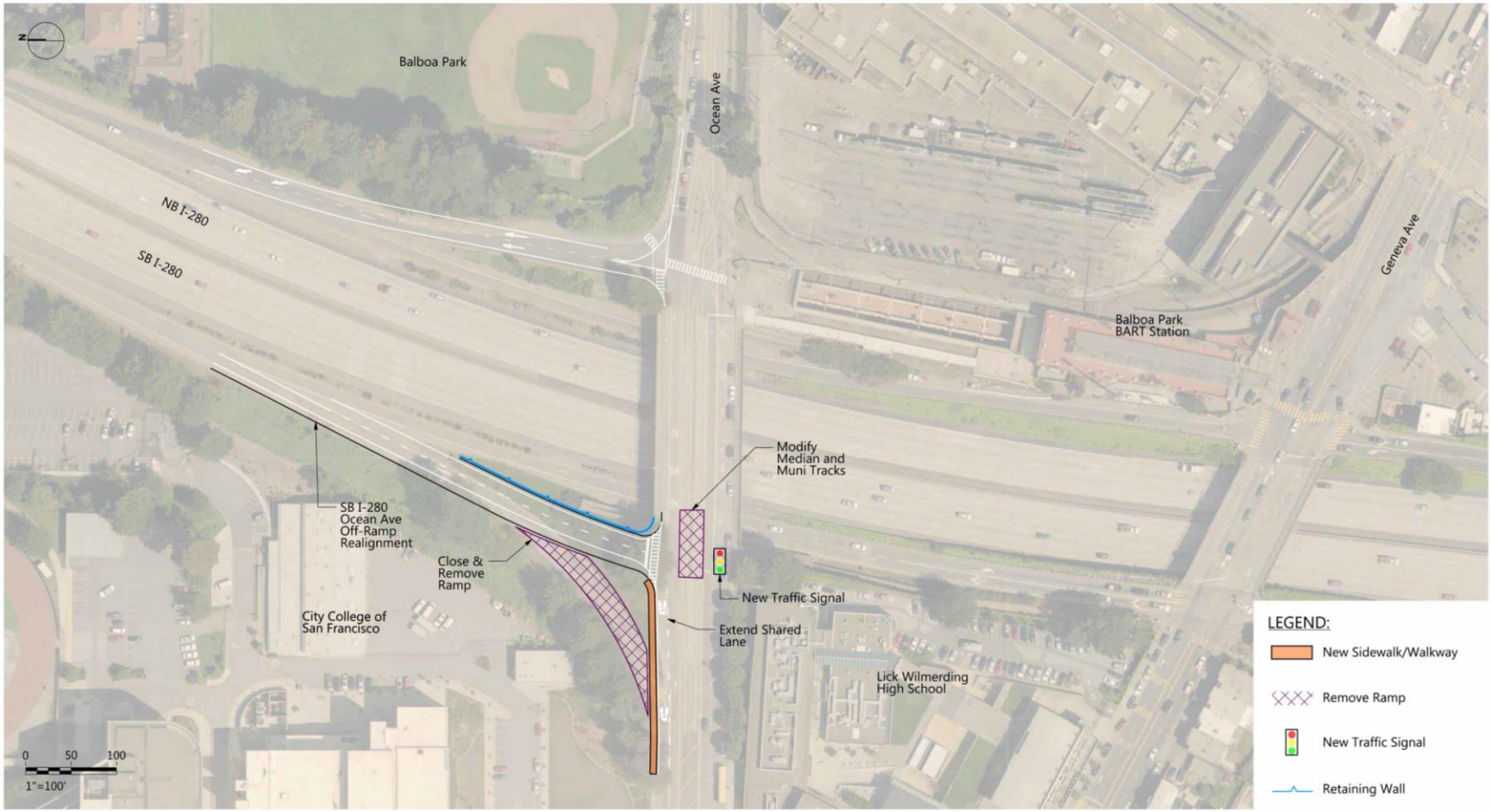



**Figure 14: Alternative 1, Element 2 – Re-Configuration of Southbound Ocean Off-Ramp Intersection**

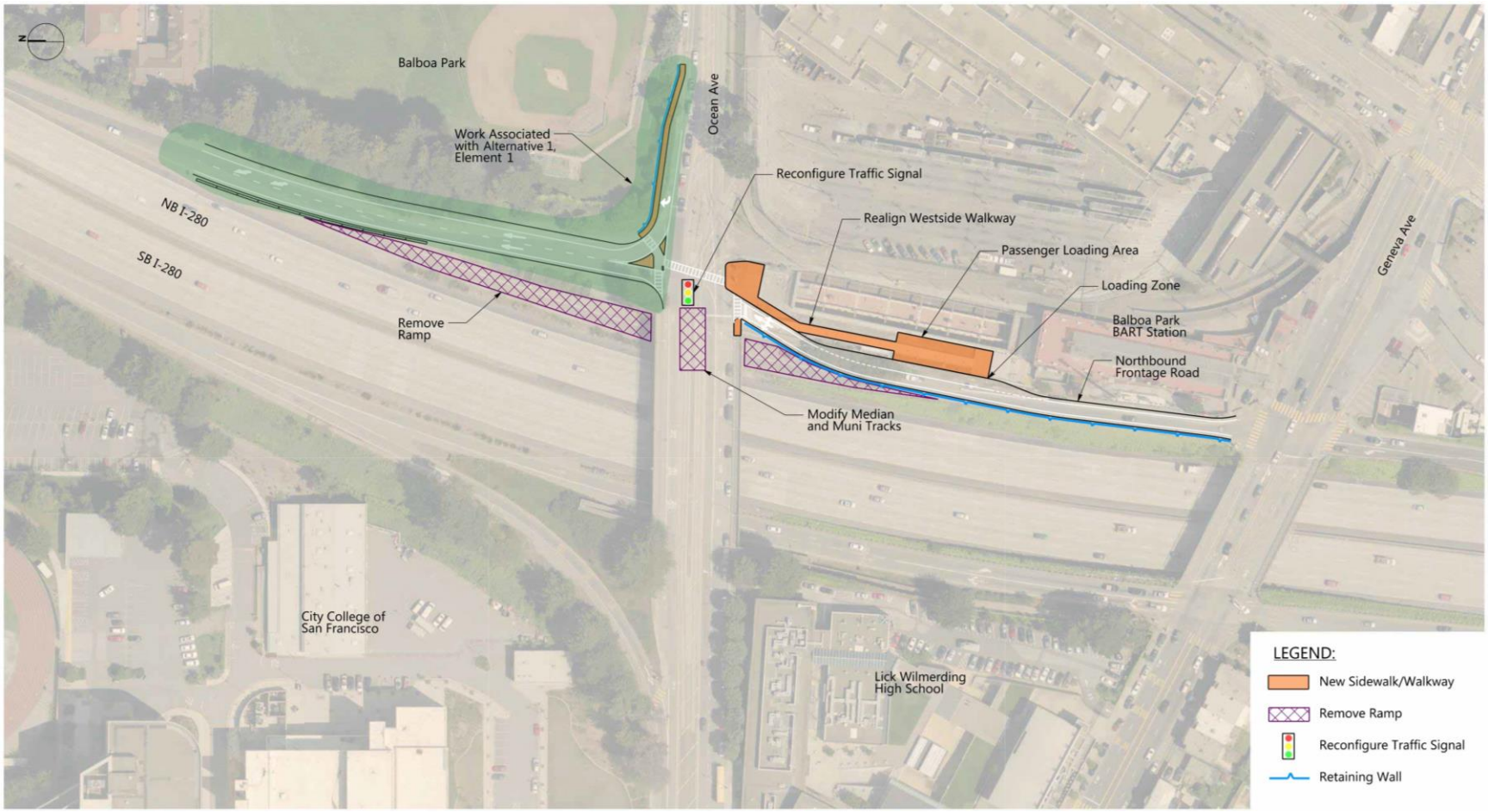



**Figure 15: Alternative 1, Element 3 – Addition of New Northbound Kiss-And-Ride Frontage Road**

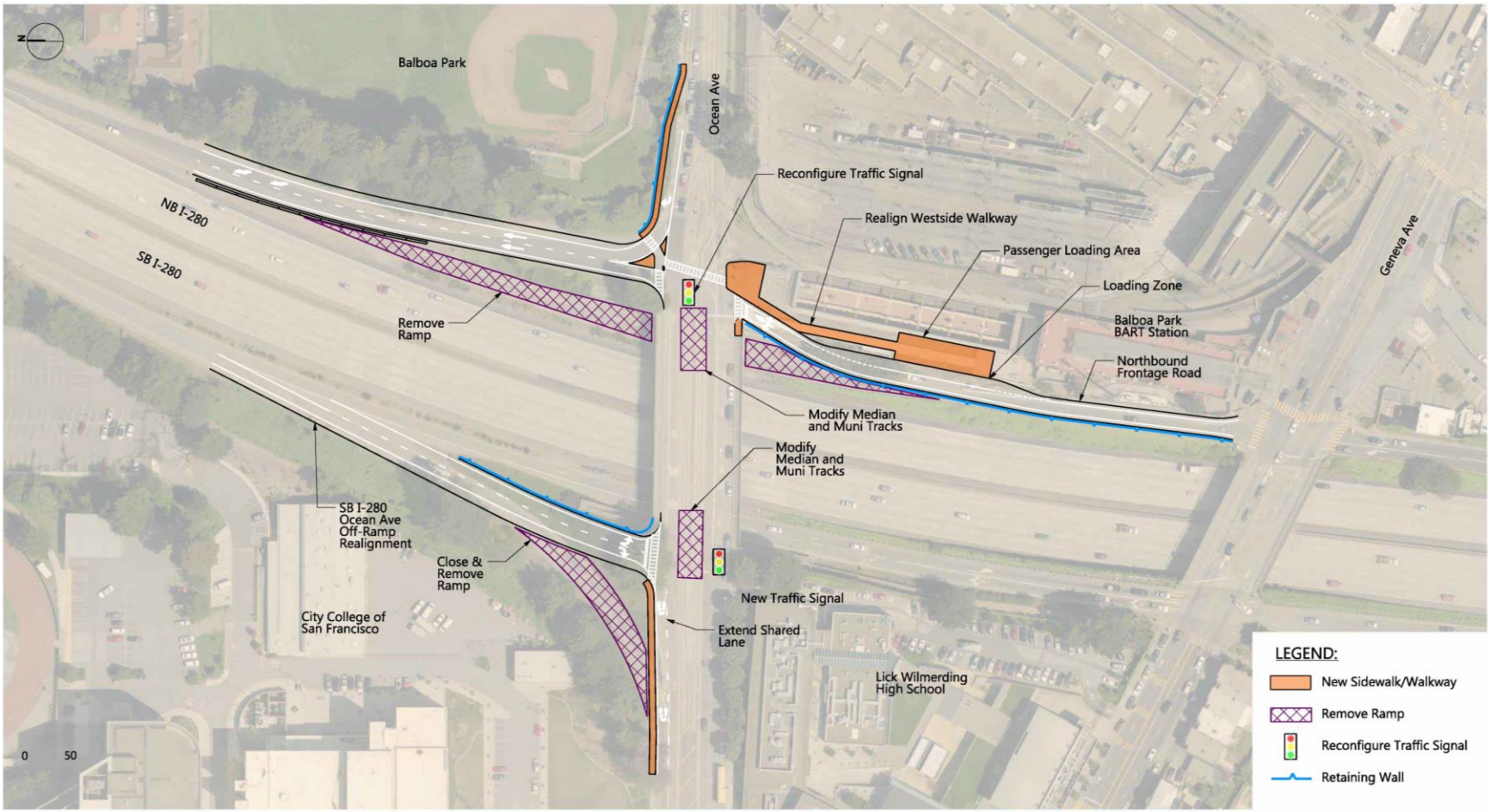



**Figure 16: Alternative 1, Combined Elements 1, 2, and 3**

### 3.2.3 | Alternative 2: Consolidated Interchange on Geneva Avenue

**Alternative 2**, shown in **Figure 17**, would consolidate the interchange at Geneva Avenue. This concept provides freeway access only to/from Geneva Avenue, dramatically reducing the automobile volume on Ocean Avenue and therefore enabling Ocean Avenue to prioritize travel for transit and non-motorized modes. The alternative consists primarily of two elements: permanently closing the northbound Ocean Avenue on-ramp and the southbound Ocean Avenue off-ramp.


**Figure 17: Alternative 2 Consolidated Interchange on Geneva Avenue**

A potential third element of this alternative would be the construction of a transit- and bike-only frontage road from Geneva Avenue to Ocean Avenue, split off from the northbound Geneva Avenue on-ramp and accommodating a new transit stop. The frontage road could be constructed without replacing the Ocean Avenue Bridge if paired with re-constructing and shifting the existing Westside Walkway; direct access from the new station stop to a new walkway would be included in the design. While this rerouting is technically feasible and may mitigate negative effects to transit delay, further study is required to fully evaluate its overall impact.

Although the potential transit- and bike-only frontage road is not shown in **Figure 17,** the frontage road with transit station would be similar to Alternative 1, Element 3 as shown in **Figure 15** above.

To replace the existing kiss-and-ride site that is likely to be eliminated in the near future, three different areas have been identified that could serve as designated on-street kiss-and-ride areas. These identified areas have on-street parking that could be repurposed as a kiss-and-ride lane with a short walk to a BART Station entrance. These three areas are: San Jose Avenue between Geneva Avenue and Niagara Avenue, the north side of Ocean Avenue between San Jose Avenue and the Ocean Avenue Bridge, and the south side of Ocean Avenue on the Ocean Avenue Bridge. Given the surrounding land uses and the

origin and destination patterns of BART patrons, the San Jose Avenue location is the preferred option. That location would need to be studied in more detail in relation to potential conflicts with the existing M-Ocean View light rail terminus stop, which may be moved in the future as discussed in the *Balboa Park Station Capacity and Conceptual Engineering Study* (2011), though plans have not yet been finalized.

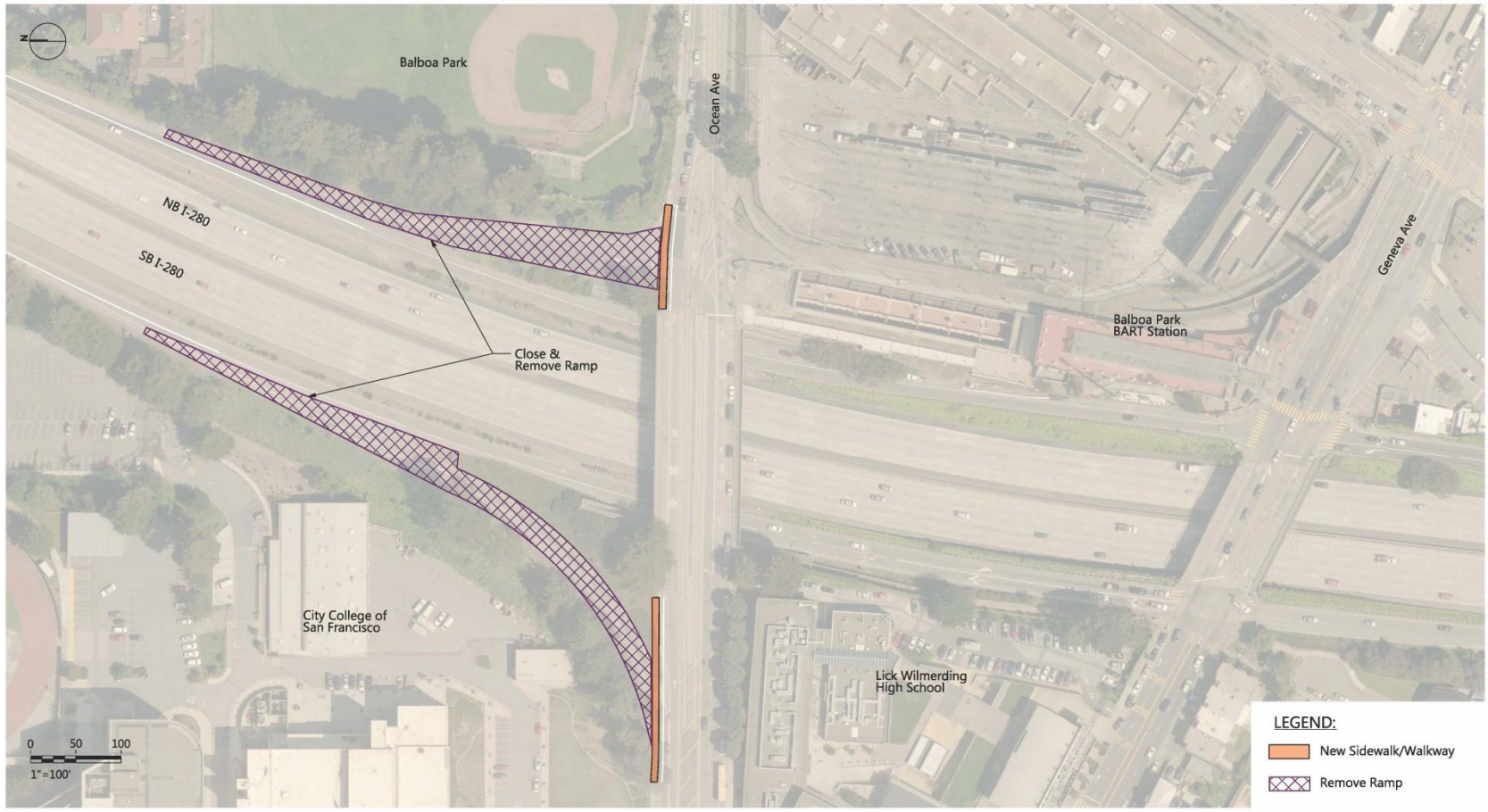



**Figure 18: Alternative 2 – Closure of Ocean Avenue Ramps**

# 3.3 Alternatives/Variants Considered and Discarded

Throughout the evaluation process, some alternatives and variants were found to be either unfavorable or unworkable within the framework of the study. The following alternatives were considered but eliminated from further consideration.

## 3.3.1 | Alternative 1, Element 4: Close the southbound Geneva Avenue off-ramp

This final element of Alternative 1 would complete a symmetrical split interchange by closing the southbound Geneva Avenue off-ramp. This element was evaluated in conjunction with Elements 1, and 2; and also in conjunction with Elements 1, 2, and 3 and the construction of a southbound frontage road along the west side of I-280 between Ocean and Geneva Avenues. Detailed traffic analysis indicated that this element may not provide meaningful benefit for the long-term circulation needs of the area. Preliminary analysis of the ramp closure indicated that there would be considerable congestion spilling back onto the I-280 mainline from the southbound Ocean Avenue off-ramp. In addition, construction of a southbound frontage road would require either the reconstruction of the Ocean Avenue Bridge, which would be a long-term improvement costing in excess of $500 million, or the acquisition of significant right-of-way from Lick Wilmerding High School. Due to these issues, this element was eliminated from further consideration.

## 3.3.2 | Alternative 3: Consolidated Interchange at Ocean Avenue

Alternative 3 would close the four freeway ramps on Geneva Avenue and construct a new northbound off-ramp and southbound on-ramp on Ocean Avenue to create a consolidated interchange. This alternative was conceptualized to shift automobile traffic to Ocean Avenue and enhance Geneva Avenue as a transit-priority street.

However, this alternative was determined to be infeasible because of traffic capacity limitations and impacts to both the local network and freeway operations, in addition to the need to re-construct the Ocean and Geneva Avenue Bridges. This alternative would be a long-term project due to the necessity to relocate the Geneva Avenue Bridge abutment back (to accommodate a 1,400-foot off-ramp likely needed for the ramp to meet Caltrans traffic warrants) and the need for a full reconstruction of the Ocean Avenue Bridge. Given that the preliminary traffic analysis also shows that multiple intersections would receive a Level of Service grade F, the viability of this alternative in the long-term is not promising and therefore this alternative was eliminated from further consideration.

## 3.3.3 | Conversion of Howth Street to Two-Way between Geneva Avenue and Ocean Avenue

The conversion of Howth Street to two-way operation was considered as part of Alternative 1 but ruled out when it was determined that very few automobiles would likely travel along Howth Street after exiting the freeway in the southbound direction due to the large delay that would be experienced when traveling along this route. The benefit of the additional travel options did not outweigh the inconvenience and disturbance caused to the local residents of this neighborhood street; thus, further consideration of this variant was dropped.

# 3.4 Local Network Improvements

There are a number of previously planned local network improvements within the Balboa Park Station Area, such as the Transit Effectiveness Project (TEP) and Geneva Travel Time Reduction Project (TTRP) recommendations. These improvements are reflected in the Baseline Alternative, a scenario against which the project alternatives were evaluated. Other improvements, such as the addition of a right-turn pocket on westbound Ocean Avenue at the northbound Ocean Avenue on-ramp, were identified to support the freeway ramp modifications and further improve multimodal circulation, safety and access. The pairing of these improvements with alternatives is shown in **Table 6**.

**Table 6: Local Network Improvements**

| | BASELINE | ALTERNATIVE 1 | ALTERNATIVE 2 | FUTURE OPPORTUNITY |
|---|---|---|---|---|
| Signalize Geneva/Howth to improve ped safety (adjacent to Lick Wilmerding HS) | ✓ | ✓ | ✓ | |
| Remove parking on south side of Ocean between Howth and northbound Ocean Avenue on-ramp, extend EB (eastbound) bike lane | | | | ✓ |
| TEP 29, 54 realignments | ✓ | ✓ | ✓ | |
| Remove parking on Ocean Ave bridge and extend bus stop adjacent to NB on-ramp | | | | ✓ |
| Re-time LRV priority at Ocean NB on-ramp so red cycle ends when intersection is clear | ✓ | ✓ | ✓ | |
| Convert LRV lanes on San Jose to transit-only | ✓ | ✓ | ✓ | |
| Geneva TTRP improvements:<br>Remove loading zone on north side of Geneva between San Jose and Delano, restripe to provide WB transit lane<br>Provide right-turn pocket on WB Geneva at San Jose Avenue<br>Addition of WB right-turn pocket and EB left-turn pocket at southbound Geneva Avenue ramp | ✓ | ✓ | ✓ | |
| Provide a transit only lane on WB Geneva between San Jose and the NB ramp (in lieu of queue jump stated in TTRP) | ✓ | ✓ | ✓ | |
| Signalize Geneva/Cayuga, provide transit priority | ✓ | ✓ | ✓ | |
| RT pocket on WB Ocean at NB I-280 on-ramp | | ✓ | | |

This page intentionally left blank.

CHAPTER 4

# KEY FINDINGS AND EVALUATION RESULTS

## 4.1 Evaluation Framework

The framework for evaluation consisted of 32 metrics and corresponding criteria that fall within each of the study goals, as shown in **Table 7**. The framework focused on automobile, transit, bicycle, and pedestrian performance. It called for analyses of transportation performance, engineering feasibility, and capital cost, providing ways to identifying benefits, constraints, and impacts for each alternative.

**Table 7: Evaluation Framework**

| GOAL | METRIC | CRITERIA |
|---|---|---|
| 1. Reduce negative impacts on the local community resulting from automobiles accessing the regional road network | Intersection configuration/geometry | Potential increase/decrease in intermodal conflicts (at each location) |
| | Volume of conflicting users (e.g., pedestrians-vehicle volumes) | Number of users benefitting/impacted |
| | Intersection operations, including delay to transit | Increase/decrease in transit travel time (select routes/segments) |
| | Existing and future intersection vehicle operations (v/c, average delay) | Increase/decrease in intersection LOS (various intersections) |
| | On- and off-ramp peak-hour volumes | Increase/decrease in automobile volumes (at each ramp) |
| | Ramp intersection operations | Increase/decrease in intersection LOS (at each ramp) |
| | Ramp queuing lengths | Increase/decrease in queue lengths |
| | Convenience of drop-off areas for users, proximity to transit connections | Distance from platforms/stops / # of arterial streets that must be crossed / likely usage of each location |
| | Kiss-and-ride design | Potential increase/decrease in intermodal conflicts (at each location) |
| 2. Support efficient, reliable bus and light rail operations | Number of types & character of conflicts, volume of conflicting movements involving buses | Peak transit/private vehicles per hour (at each location) |
| | Traffic operational delay for bus movements / pace | Increase/decrease in transit travel time (select routes/segments) |
| | Maximize opportunities to support goals of near- and long-term improvements | Level of support for/consistency with Transit Effectiveness Project recommendations |
| | Number of types & character of conflicts, volume of conflicting movements involving LRV | Increase/decrease in intersection LOS (at each location) |
| | Traffic operational delay for LRV movements | Increase/decrease in intersection LOS (at each location); increase in the number of conflicts for LRVs exiting Green Yard |
| | Location of stops, walk distance to station platforms | Aggregate walk distance (stop-level ridership x distance in feet from platform) |

| GOAL | METRIC | CRITERIA |
|---|---|---|
| | Ridership at stops | Aggregate walk distance (stop-level ridership x distance in feet from platform) |
| 3. Enhance safety, accessibility, and convenience for pedestrians and bicyclists | Alternative supports pedestrian demand/patterns (informed by pedestrian volumes, key institutions near the station, and transit ridership volumes) | Potential increase/decrease in intermodal conflicts (at each location) |
| | Number of types & character of vehicle-pedestrian conflicts, volume of motorized movements conflicting with pedestrian crossings | Numbers of pedestrians benefitting (e.g., in crosswalk where automobile traffic eliminated) |
| | Distance and character of intermodal transfers | Aggregate walk distance (stop-level ridership x distance in feet from platform) |
| | Supports bicycle activity (informed by bicycle volumes) | Increase/decrease in automobile volumes on bicycle routes |
| | Number of types & character of vehicle-bicycle conflicts, volume of motorized movements conflicting with bike routes | Increase/decrease in automobile volumes on bicycle routes |
| | Conflicts between bicycle routes and transit routes | Increase/decrease in transit vehicle volumes on bicycle routes |
| | Directness of pedestrian routes between transit stops and destinations. | Aggregate walk distance (stop-level ridership x distance in feet from platform) |
| 4. Minimize impacts to traffic going to/coming from I-280 | On- and off-ramp peak-hour volumes | Increase/decrease in automobile volumes (at each ramp) |
| | Ramp queuing lengths | Increase/decrease in queue lengths |
| 5. Develop feasible solutions that can be implemented within ten years | Ability to get through Caltrans PSR process | Qualitative assessment |
| | Relative cost | Order-of-magnitude cost estimates |
| | Engineering feasibility | Qualitative assessment |
| | Alternatives reflect community's vision & values | Qualitative assessment |
| | Alternatives are cost effective ways to address identified issues | Qualitative assessment |
| | Alternatives do not result in substantial rerouting of transit or automobiles to other ramps | Qualitative assessment |
| | Ability to integrate improvements into programmed routine maintenance/construction. | Qualitative assessment |

# 4.2 Analysis and Assumptions

The development of the alternatives involved two steps. First, a preliminary screening step explored potential traffic operational and engineering feasibility at a high level. Then, based on this analysis, the study advanced two alternatives for formal evaluation. The evaluation included two main elements: an in-depth analysis of traffic and transit operations for both the local roadway network and freeway ramp junction intersections and a civil engineering assessment of the feasibility, construction, and cost implications for each alternative.

For purposes of the evaluation, the Baseline Alternative was established to appropriately compare the proposed alternatives. The Baseline includes a package of near-term planned local network improvements that would also apply to Alternatives 1 and 2 (see **Table 6**), but does not include any

changes to the configuration of the I-280 freeway ramps. As such, the Baseline Alternative was compared to existing conditions, while the remaining alternatives were compared to the Baseline.

In addition, as part of the transportation analysis, several assumptions were made for vehicle volume shifts throughout the study area:

- For this study's analysis it was assumed that ramp closures would not result in any change in total travel demand within the study area.
- The proposed closure of the northbound Geneva Avenue on-ramp would divert all trips to the equivalent ramp on Ocean Avenue, via San Jose Avenue.
- The introduction of the signalized left turn at the realigned southbound Ocean Avenue off-ramp would shift 15% of the volume away from the SB left turn movement at the existing southbound Geneva off-ramp.
- No changes to transit routes, other than those associated with the TEP improvements, were assumed in the analysis.

The Study team recognizes that these assumptions are conservative and result in what could be considered a worst-case traffic analysis of the immediate station area.

Finally, the development and evaluation of the alternatives were refined in an iterative process. The transportation and engineering feasibility analysis led to a final round of design refinements for both Alternatives. As a result, the preliminary alternatives evaluated in the transportation analysis differ slightly from the ones presented in Chapter 3. In particular, Elements 1 and 2 of Alternative 1 were evaluated as distinct options, independent of one another. In addition, a full analysis of all the elements in Alternative 1 included the closure of the southbound Geneva Avenue off-ramp (Element 4), an element that was ultimately removed from consideration. This resulted in a more conservative evaluation than the final proposal for Alternative 1. For Alternative 2, the idea for the potential transit-only frontage road (Element 3) was identified after the transportation analysis was completed. Although the analyzed scenarios do not exactly match the final alternatives, the results here should be taken as representative of potential performance as a whole, but additional analysis is needed to confirm in the next phase of project development. Ultimately, future phases of project development would include more detailed analyses for the design alternatives.

The detailed analysis supporting the evaluation is documented in three appendices:

- **Appendix A: Transportation Analysis** documents the operational analysis of automobile and transit delays.
- **Appendix B: Detailed Alternative Evaluation Results** provides a detailed evaluation of how each alternative meets the goals of the study.
- **Appendix C: Engineering Feasibility & Cost Estimates** includes an assessment of the civil engineering feasibility of each alternative, a summary of the construction considerations required for each alternative, and planning-level cost estimates.

# 4.3 Key Evaluation Results

The Station Area has several competing land uses and modal functions that are often in conflict with one another. Station Area users (drivers, transit riders, pedestrians, and bicyclists) experience these issues on a daily basis. There is no single solution for these complex issues. Each alternative presents benefits and impacts for different modes, thus implementing any capital improvement inherently comes with trade-offs. This evaluation presents the preliminary traffic evaluation for each alternative as it pertains to the different modes, provides an assessment of how the alternative does (does not) meet each of the study goals, and gives a description of the engineering feasibility of each of the project elements. Cost estimates for each element of each alternative are provided in subsection 4.3.4; a summary of the evaluation results is provided in subsection 4.3.5. A comprehensive description of the evaluation, including all metrics for both alternatives, is provided in **Appendix B**.

## 4.3.1 | Baseline

The Baseline includes a range of multimodal improvements to the local roadway network, listed in **Table 6**, but no major changes to vehicular circulation in the area. These changes result in marginally better transportation performance compared with existing conditions, including small improvements in auto level of service at certain locations. Signal timing modifications at the northbound Ocean Avenue on-ramp improve operations at the intersection from LOS D to LOS C in the PM peak hour. The addition of a westbound left-turn pocket and an eastbound right-turn pocket on Geneva Avenue at the southbound Geneva Avenue off-ramp (in combination with signal timing modifications) improves operations at the intersection from LOS D to LOS C in the PM peak hour. Lastly, signal timing optimization at the northbound Geneva Avenue off-ramp intersection, in response to changes to street configurations in the area, improves operations at the intersection from LOS E to LOS D in the PM peak hour. The level of service results are shown in **Table 8** below.

The Baseline incorporates TEP recommendations, including a major shift of bus service from Geneva Avenue onto Ocean Avenue where there is currently less traffic congestion. This shift results in approximately twice as many transit vehicles on Ocean Avenue as on Geneva Avenue during peak periods. In addition, the TEP recommendations add a new westbound transit-only lane on Geneva Avenue from Delano Avenue to the I-280 ramps and include several signal improvement projects within the Study Area. The TEP plans also include implementation of eastbound-left and westbound-right turn pockets at the intersection of Geneva Avenue and the southbound ramps, both of which are included in the Baseline scenario. The preliminary traffic analysis comparing Baseline improvements to existing conditions indicates that there would be a reduction in average PM peak period delay of about 45 seconds for transit vehicles traveling westbound on Geneva Avenue, including Rapid Network Line 8BX. The eastbound delay would be reduced by around 20 seconds. On Ocean Avenue, transit delay would stay largely unchanged in the eastbound direction but would be reduced in the westbound direction by around 30 seconds. Baseline conditions would also experience a slight reduction in delay at the critical intersection of Ocean Avenue/northbound on-ramp, near where light rail vehicles exit the Green Yard. Converting LRV lanes on San Jose Avenue to transit-only will reduce transit delay on San Jose Avenue.

The Baseline also contains some modest improvements for both bicyclists and pedestrians. Conflicts between vehicles, bicyclists and pedestrians would be reduced due to the proposed eastbound bike lane on Ocean Avenue and the proposed flashing pedestrian warning signal on the southbound Ocean Avenue off-ramp.

**Table 8: PM Peak Hour Level of Service Analysis**

| | INTERSECTION | TRAFFIC CONTROL | EXISTING | BASELINE | ALTERNATIVE 1: PARTIAL SPLIT INTERCHANGE | ALTERNATIVE 2: CONSOLIDATED INTERCHANGE |
|---|---|---|---|---|---|---|
| | | | | | ELEMENTS 1 AND 2[1] | ELEMENTS 1 AND 2 |
| 1. | Ocean/Geneva | Signal | C | C | C | C |
| 2. | Ocean/Howth | Signal | A | A | A | A |
| 3. | Ocean/I-280 SB | Signal | N/A[2] | N/A[2] | C | N/A[3] |
| 4. | Ocean/I-280 NB | Signal | D | C | D | A |
| 5. | Ocean/San Jose | Signal | B | C | C | B |
| 6. | Ocean/Alemany | Signal | C | C | C | C |
| 7. | Geneva/Howth | SSSC | A | A[4] | A[4] | D[4] |
| 8. | Geneva/I-280 SB | Signal | D | C | C | **F (1.35[5])** → ↓ |
| 9. | Geneva/I-280 NB | Signal | E | D | D | **F (1.36[5])** → ↱ |
| 10. | Geneva/San Jose | Signal | C | C | C | D |
| 11. | Geneva/Cayuga | AWSC | E | B[4] | C[4] | C[4] |
| 12. | Geneva/Alemany | Signal | C | C | C | C |
| 13. | Monterey/I-280 Ramps | Signal | D | D | D | D |
| 14. | Bosworth/Arlington | SSSC | C | C | D | C |
| 15. | Sagamore/San Jose | Signal | C | C | C | C |
| 16. | Alemany/I-280 Ramp | Signal | C | C | C | C |
| 17. | Seneca/San Jose | SSSC | A | A | A | A |

Notes:

**Bold** indicates unacceptable operation. Red symbols indicate critical movements. AWSC = all-way stop control. SSSC = side-street stop control.

1. As part of the iterative process, Alternative 1 with only 3 elements emerged after the detailed analysis was completed.
2. The ramp at this location is a free right-turn SB off-ramp onto WB Geneva Avenue.
3. There is no ramp or signalized intersection at this location.
4. This intersection is signalized in this scenario. A traffic signal at Geneva/Howth was constructed after this analysis had been completed.
5. Volume/capacity ratio shown only for intersections with unacceptable operations (i.e., LOS E or F). A value greater than 1.0 indicates that the traffic volume exceeds the available capacity of the roadway.

Source: Prepared by Fehr & Peers, 2013

## 4.3.2 | Alternative 1: Partial Split Interchange

This section summarizes the evaluation of Alternative 1, including key travel patterns, the effects on each mode, overall ability to meet each of the study goals, and construction feasibility and impacts.

#### 4.3.2.1 | KEY TRAVEL PATTERNS

As discussed above, a number of volume shifts were assumed due to the closure of freeway ramps. In analyzing Alternative 1, the closure of the northbound Geneva Avenue on-ramp is assumed to result in all of the freeway-bound traffic (approximately 200 automobiles from the east and 100 automobiles from the west during the peak hour) rerouting via San Jose Avenue from the east and via Ocean Avenue from the west to access the freeway using the northbound Ocean Avenue on-ramp. In addition, the realignment of the southbound Ocean Avenue off-ramp and introduction of a new signal allowing left turns is assumed to result in a15 percent shift (approximately 75 automobiles) in the left turning traffic at the southbound Geneva Avenue off-ramp to make this movement from the Ocean Avenue off-ramp instead.

#### 4.3.2.2 | PERFORMANCE

**GOAL #1 Vehicle Circulation Maintained** – This alternative has a neutral impact overall on Goal #1, improving vehicle circulation in some locations and making it worse in other locations. As a whole, Alternative 1 would result in decreases to vehicle delay on Geneva and increases for Ocean and, as shown in Table 8, slightly better LOS conditions along Geneva Avenue and slightly worse LOS conditions along Ocean Avenue.

Element 1, the closure of the northbound Geneva Avenue on-ramp, would have a minor effect on traffic operations, removing traffic from Geneva Avenue while adding slightly to Ocean Avenue traffic. The Study assumed that all of the automobiles currently using the Geneva Avenue on-ramp would instead use the Ocean Avenue on-ramp. Although this diversion would add an additional 300 turning automobiles in the peak hour to Ocean Avenue, the effect on vehicular operations there would be small, especially given the alternative's proposed addition of a westbound right-turn pocket on westbound Ocean Avenue adjacent to Balboa Park to accommodate the added volume.

The realignment and signalization of the southbound Ocean Avenue off-ramp in Element 2 would also have a minor effect on traffic operations on Ocean Avenue. This element results in a small reduction in eastbound traffic along Geneva Avenue, as approximately 75 peak-hour automobiles would now exit the freeway onto Ocean Avenue and use the newly permitted left turn. This small volume shift could be accommodated with appropriate signal timing and would not impact the freeway mainline. Anecdotal evidence indicates some current queue spillback onto the mainline of I-280; further study for this alternative would determine the extent to which this is occurring and, if needed, additional design work could be done to address queues, including adding lanes to the off-ramp. In combination, Elements 1 and 2 would cause minor changes to automobile LOS at intersections on Ocean Avenue compared to the Baseline, and only one additional intersection would deteriorate to LOS D, which is the worst level in Baseline conditions at which any one intersection operates.

The introduction of the kiss-and-ride-only frontage road in Element 3 has the potential to provide space for station-related passenger access closer to the station's BART and light rail platforms. For instance, the frontage road could be used as a new kiss-and-ride area or for new bus routing and loading. Within the context of this study, the project team proposes that the new frontage road be used as a kiss-and-ride area as a way to reduce the intermodal conflicts and safety concerns around the station area that result from informal kiss-and-ride activity. The frontage road would be designed to discourage through-traffic from using the road to cut across from Geneva Avenue to Ocean Avenue. The analysis indicates potential signal phasing issues related to the new northbound movement that would require more detailed analysis to consider operational solutions such as signage, turn movement restrictions, and other measures that would restrict the new frontage road strictly to automobiles

conducting kiss-and-ride activity. All other aspects of the circulation system appear to function well for this element. While the analyzed scenarios do not exactly match the final alternatives, the results here should be taken as representative of potential performance as a whole. A more detailed analysis will be conducted in the future to this effect.

**GOAL #2 Efficient and Reliable Transit** – Alternative 1 also has a neutral impact on Goal #2 to support efficient transit operations. Element 1's northbound Geneva Avenue on-ramp closure provides an opportunity to further improve transit travel times by removing a key auto-transit conflict. In Element 2, while transit travel times on Geneva Avenue are largely similar to Baseline conditions, travel times on Ocean Avenue worsen slightly from the addition of the new signal for the southbound off-ramp and slight increase in traffic, increasing bus delay by approximately one minute in each direction. This added delay is in exchange for remedying the major pedestrian and bicycle safety issue that the existing I-280 southbound free-right off-ramp design presents. In addition, the re-design of the off-ramp would eliminate the current weave movement that westbound buses must make to transition to the right lane immediately after the ramp merge, thus improving transit safety. Element 3 would have little impact to transit conditions on either Geneva or Ocean Avenues. When evaluated cumulatively, the three elements of Alternative 1 would have a relatively neutral impact on transit operations in the study area.

**GOAL #3 Ped-Bike Safety, Accessibility, and Convenience** – Alternative 1 greatly improves safety, access and convenience for pedestrians and bicycles, achieving Goal #3. For pedestrians, elimination of the northbound Geneva Avenue on-ramp and associated automobile turning movements would reduce conflicts at a key location, vastly improving pedestrian conditions adjacent to the BART entrance. While that ramp closure would increase traffic and westbound-right turning movements at the northbound Ocean Avenue on-ramp, the re-design and signalization of the southbound Ocean Avenue off-ramp in Element 2 would greatly improve pedestrian safety at what is now a high-speed, uncontrolled crossing. Similarly, bicycle travel along Ocean Avenue's designated bicycle route would improve with removal of the high-speed weaving maneuver that bicyclists must currently undertake with automobiles exiting the freeway. While the proposed frontage road in Element 3 would increase turning movement conflicts where Element 1 had removed them, its design and restriction to kiss-and-ride activity imply low automobile volumes. Taken in total, Alternative 1 would provide a significant reduction in conflict movements over existing or baseline conditions.

**GOAL #4 Freeway Ramp Operations Maintained** – The study's analysis of observed automobile volumes for the northbound Geneva Avenue off-ramp concludes no effect on mainline operations. There are anecdotal reports that queues sometimes extend back to the mainline, but Alternative 1 does not alter that circulation movement in comparison to existing conditions or the baseline. The study also concludes that the southbound Ocean Avenue off-ramp would have no effect on mainline operations, even upon re-design and signalization. Since there are anecdotal reports here as well that queues sometimes extend back to the mainline, further analysis and design could identify the required Ocean Avenue off-ramp re-configuration to address needed queue storage capacity. There is enough space to include a turn pocket on the re-configured off-ramp, not only increasing the capacity for throughput at the location but also increasing the queue storage. Therefore, the study concludes that Alternative 1 meets Goal #4 because it does not have an impact on freeway mainline operations.

**GOAL #5 Feasibly Implementable within Ten Years** - Alternative 1 is feasible from a civil engineering standpoint with no major challenges. Element 1 of this alternative (shown in Figure 13 above) proposes construction of a 100-foot-long right-turn pocket for accommodating right-turning automobiles from Ocean Avenue onto the northbound on-ramp to accompany the closure of the northbound Geneva

Avenue on-ramp. The turn pocket would lead into its own lane on the on-ramp for approximately 300 feet. A new crosswalk island would be constructed for pedestrian refuge and right-turn channelization. The new turn pocket on Ocean Avenue would shift the north sidewalk along Balboa Park approximately 12 feet to the north, which would require constructing a 160-foot long retaining wall of approximately five feet in height with safety railing and fencing between Ocean Avenue and Balboa Park. There are several utilities that would require relocation and modifications, such as: traffic signals, Muni Overhead Contact System (OCS), street lights, and pedestrian crossing devices.

Element 2 (shown in Figure 14 above) proposes the permanent realignment of the southbound Ocean Avenue off-ramp to a T-intersection just west of the western abutment for the Ocean Avenue. The realigned ramp would be expanded to two lanes for approximately 380 feet before the intersection, with one lane each dedicated to right-only and left-only turning movements. The intersection would be located west of the Ocean Avenue Bridge western abutment to avoid impacts to the bridge. A new 200-foot long retaining wall would be required as well as re-grading of the area near the ramp. The retaining wall would rise along with the ramp and be approximately 20 feet at its highest point near Ocean Avenue. The existing southbound Ocean Avenue off-ramp would be removed, with limited re-grading for erosion control.

For Element 3 (Figure 15), the proposed frontage road is planned to be 20 feet wide to accommodate a 12-foot wide lane with four-foot buffers. The Westside Walkway to the BART Station would be reconstructed adjacent to the frontage roadway. A retaining wall would run along the west side of the frontage road, vertically separating the roadway from NB I-280. A 110-foot-long passenger loading area is proposed to be placed just north of the BART entrance plaza. The road would be widened for several hundred feet on either side of the loading area to accommodate additional automobile standing zones and a sidewalk connection to the loading area, thus providing waiting area capacity similar to the existing area.

Element 1 could be implemented initially as a pilot project, with full implementation (including construction of the right-turn pocket by Balboa Park). Element 2 could also be implemented in a relatively short time period, with Element 3 requiring a slightly longer time frame due to the need to reconstruct the Westside Walkway. The total cost of Alternative 1 is approximately $18 million (see Section 4.1.4 of this chapter below.); it does not require the reconstruction of either the Ocean Avenue or the Geneva Avenue bridges. Therefore, Alternative 1 meets Goal #5 to develop a feasible solution implementable within 10 years.

## 4.3.3 | Alternative 2: Consolidated Interchange

This section summarizes the evaluation of Alternative 2, including key travel patterns, the effects on each mode, and overall ability to meet the study goals, and construction feasibility and impacts.

#### 4.3.3.1| KEY TRAVEL PATTERNS

In analyzing Alternative 2, the closure of the Ocean Avenue freeway ramps is assumed to result in all of the freeway traffic utilizing the Geneva Avenue ramps. An estimated 500 automobiles would shift from the southbound Ocean Avenue off-ramp to the southbound Geneva Avenue off-ramp, and 500 automobiles would shift from entering the freeway at the northbound Ocean Avenue on-ramp to entering at the northbound Geneva Avenue on-ramp.

#### 4.3.3.2 | PERFORMANCE

**GOAL #1 Vehicle Circulation Maintained** - Eliminating the Ocean Avenue freeway ramps would substantially decrease vehicle volumes and delay on Ocean Avenue. However, it would also increase vehicle volumes and delay on Geneva Avenue, resulting in level of service (LOS) F traffic operating conditions at both ramp intersections in the PM peak period. This would result in substantial traffic congestion along Geneva Avenue; thus, Alternative 2 would not be able to fully achieve Goal #1. **Table 8** shows LOS conditions at the area intersections for Alternative 2. With regard to accommodating kiss-and-ride activity, the feasible options for such locations under this alternative are Ocean Avenue curb space on the bridge over I-280, next to the park, or San Jose Avenue curb space south of Geneva Avenue. The San Jose Avenue location is most promising considering the overall origin and destination patterns. That location would need to be studied in more detail in relation to potential conflicts with the existing M-Ocean View light rail terminus stop. The light rail stop may be moved in the future, but plans have not yet been finalized.

**GOAL #2 Efficient and Reliable Transit** - The decreased automobile volumes on Ocean Avenue would slightly improve transit operations on Ocean Avenue, reducing travel times by around 30 seconds in the westbound direction, while eastbound travel times would stay largely constant. In both directions, turning movement conflicts would also be reduced on Ocean Avenue. However, due to the increased automobile volumes on Geneva Avenue, this alternative would negatively affect transit on Geneva Avenue, increasing the PM peak delay in the eastbound direction by close to five minutes per trip. This alternative could potentially be paired with a transit-only northbound frontage road, which would alleviate some of the transit impacts from this alternative. This concept would be similar to the kiss and ride frontage road but for the purpose of rerouting transit away from congested areas of Geneva Avenue instead. Therefore, there could be a mix of benefits and dis-benefits for transit users in the area and Goal #2 may not be fully attained.

**GOAL #3 Bike-Ped Safety, Accessibility, and Convenience** - By shifting traffic away from Ocean Avenue and eliminating turning movement conflicts at the closed ramp entrances, Alternative 2 would provide an enormous benefit to cyclists and pedestrians on Ocean Avenue. However, shifting large volumes of traffic from Ocean Avenue onto Geneva Avenue, where there are many more pedestrians in the vicinity of the station area, would not result in a positive outcome for pedestrian safety, access and comfort on Geneva Avenue. In particular, there would be more turning movements and conflicts at the northbound on-ramp and southbound off-ramp. Therefore, Goal #3 would only be partially attained.

**GOAL #4 Freeway Ramp Operations Maintained** - The Study's analysis based on observed automobile volumes indicates that the southbound Geneva Avenue off-ramp would provide sufficient capacity to store exiting automobiles so as not to affect the mainline, even with the southbound Ocean Avenue off-ramp closed. Alternative 2 therefore meets Goal #4 of not affecting the mainline of I-280. However, the study recognizes that, under existing conditions, there is anecdotal evidence reported of queue spillback along the southbound Geneva Avenue off-ramp from the mainline which would require further analysis to clarify.

**GOAL #5 Feasibly Implementable Within Ten Years** - Alternative 2 (shown in Figure 18) proposes the permanent closure of the northbound Ocean Avenue on-ramp and the southbound Ocean Avenue off-ramp. The ramp closures would require removing the existing ramp pavement, guardrail, and utilities associated with the ramps. Sidewalks would be extended across the closed ramp intersections creating a continuous path on the north side of Ocean Avenue between Balboa Park and the City College of San Francisco.

Alternative 2 is feasible from a civil engineering standpoint and does not present any significant engineering challenges. This alternative would only close ramps and would not require any major construction, resulting in a total cost of approximately $3 million for Elements 1 and 2 (plus $9 million for the potential Element 3). Therefore, it meets Goal #5 to develop a feasible solution implementable within 10 years.

### 4.3.4 | Cost Estimates

The purpose of the cost estimates in this study is to provide a Level 5 or Rough Order of Magnitude (ROM) estimate for the proposed alternatives. The cost estimate for each alternative was developed for each of its major components of work. This includes ramp modifications to and from I-280, new frontage roads along I-280, and other improvements identified herein on Ocean and Geneva Avenues.

The Level 5 ROM is typically used for schematic or conceptual level design. The estimated cost is prepared using factored historical costs in accordance with accepted professional standards and procedures agreed on by organizations including the Association for the Advancement of Cost Engineers (AACE), American Society of Professional Estimators (ASPE), and the Royal Institute of Chartered Surveyors (RICS).

**Table 9** summarizes the cost estimate for each component by alternative. The total estimated cost for each component, which is also the Total Expected Price, is presented along with a -20% Total Optimistic Price and +30% Total Pessimistic Price. The Optimistic and Pessimistic Prices form an accuracy range, typical for this Level 5 estimate.

**Table 9: Cost Estimate Summary of Alternatives**

| PROPOSED IMPROVEMENT | ALTERNATIVE 1: PARTIAL SPLIT INTERCHANGE | | | ALTERNATIVE 2: CONSOLIDATED INTERCHANGE | | |
|---|---|---|---|---|---|---|
| | ELEMENT 1 | ELEMENT 2 | ELEMENT 3 | ELEMENT 1 | ELEMENT 2 | ELEMENT 3 [POTENTIAL] |
| Northbound Geneva Avenue on-ramp | Close & Remove<br>$ 1,641 K | - | - | - | - | - |
| Northbound Ocean Avenue on-ramp | Right-Turn Pocket<br>$ 2,373 K | - | - | Close & Remove<br>$ 1,024 K | - | - |
| Southbound Ocean Avenue off-ramp | - | T-Intersection<br>$ 5,623 K | - | - | Close & Remove<br>$ 2,064K | - |
| Northbound Frontage Road with Station Access | - | - | $ 8,483 K | - | - | $ 8,483 K |
| Total | $ 4,014 K | $ 5,623 K | $ 8,483 K | $ 1,024 K | $ 2,064 K | $ 8,483 K |
| Total Optimistic Cost (-20%) | $ 3,211 K | $ 4,498 K | $ 6,786 K | $ 819 K | $ 1651 K | $ 6786 K |
| **Total Expected Cost** | **$ 4,014 K** | **$ 5,623 K** | **$ 8,483 K** | **$ 1,024 K** | **$ 2,064 K** | **$ 8,483 K** |
| Total Pessimistic Cost (+30%) | $ 5,218 K | $ 7,310 K | $ 11,028 K | $ 1331 K | $ 2683 K | $ 11,028 K |
| **TOTAL EXPECTED COST EACH ALTERNATIVE** | **$ 18,120 K** | | | **$ 3,088 K**<br>*[+ $ 8,483 K for Potential Element]* | | |

## 4.3.5 | Evaluation Summary

**Table 10** summarizes the alternatives in terms of their ability to fulfill the Study goals. Evaluation results indicate trade-offs associated with each element of each alternative: any improvement that benefits one mode of transportation may be a dis-benefit to other modes. **Table 11** shows these the benefits and dis-benefits for each element of each alternative as it relates to each mode of transportation on Ocean and Geneva Avenues in comparison the Baseline scenario, using a plus (+)/minus (-) scale; a zero (0) indicates there is no net impact to the mode. Note that for Alternative 1, Elements 1 and 2 are evaluated independently, each in comparison to the Baseline, while Element 3 is assumed to include Element 1 as a prerequisite element.

## Table 10: Evaluation Summary

| STUDY GOALS | ALTERNATIVE 1 | ALTERNATIVE 2 | NOTES |
|---|---|---|---|
| Goal #1: Reduce the negative impacts on the local community resulting from automobiles accessing the regional road network | - | ↓ | Alternative 1 would have a neutral impact, decreasing vehicle delay on Geneva and increasing vehicle delay on Ocean. While Alternative 2 would decrease delay on Ocean, it would substantially increase delay on Geneva, resulting in severely congested conditions at both ramp intersections. |
| Goal #2: Support efficient, reliable bus and light rail operations | - | ↓ | Alternative 1 would have a neutral impact and Alternative 2 would have a negative impact on transit operations since Muni vehicles would be subject to the intersection delays described above. |
| Goal #3: Enhance safety, accessibility, and convenience for pedestrians and bicyclists | ↑ | ↑ | Both alternatives have a net positive influence on the pedestrian and bicycle environment. |
| Goal #4: Minimize impacts to traffic going to/coming from I-280 | - | - | Neither alternative shows notable impacts to freeway operations. |
| Goal #5: Develop feasible solutions that can be implemented within ten years | ↑ | ↑ | Both projects can be feasibly implemented within 10 years. |

Notes:
"↑" = positive impact; "—" = neutral impact; "↓" = negative impact

## Table 11: Summary Comparison Findings by Mode

| MODE | ALTERNATIVE 1 | | ALTERNATIVE 2 | |
|---|---|---|---|---|
| | Elements 1, 2, and 3 | | Elements 1 and 2 | |
| | Geneva | Ocean | Geneva | Ocean |
| **Automobile** | ↑ | ↓ | ↓↓ | ↑↑ |
| **Transit** | ↑ | (↓)[1] | (↓)[1]↓ | ↑↑ |
| **Pedestrian** | ↑ | ↑ | ↓↓ | ↑↑ |
| **Bicycle** | ↑ | ↑ | ↓ | ↑↑ |

Notes:

1. Parentheses indicate an impact that may be mitigated with the inclusion of additional improvements that have not been fully vetted, such as running the buses in the median LRV lanes on Ocean Avenue.
2. "↑" = positive impact; "↓" = negative impact
3. A double up-arrow (↑↑) or down-arrow (↓↓) indicates a higher level of benefit or impact than a single arrow.

## CHAPTER 5

# AGENCY PARTNERSHIPS AND COMMUNITY PROCESS

Outreach to the community and key stakeholders was a fundamental part of the project that informed the Study findings and recommendations. This chapter describes the outreach activities conducted during the Study, then summarizes the key feedback messages heard during outreach and describes how public input was incorporated into the Study's findings and recommendations. Summaries of the two outreach events are included in Appendix D and Appendix E.

## 5.1 Outreach Activities

### 5.1.1 | Agency Partnerships

Many public transportation agencies play an important role in the planning and oversight of the Balboa Park Station Area, including Caltrans, BART, and SFMTA. Representatives from each of these agencies participated in a Technical Working Group (TWG) to provide guidance and feedback on the project goals, analysis and recommendations. The TWG also provided insight on concurrent planning activities and agency priorities that affected the study outcomes. The TWG convened three times correspondent to key project milestones. In addition, Transportation Authority staff met individually with SFMTA, BART, and Caltrans staff throughout the project to discuss specific issues. **Table 12** lists the key stakeholders.

### 5.1.2 | Balboa Park Community Advisory Committee

The Balboa Park Community Advisory Committee (CAC) is an advisory body to the SFMTA, and provides recommendations on local transportation issues. The CAC was kept apprised of the Circulation Study and process through informational presentations and updates during the regularly scheduled meetings. In addition, Transportation Authority staff met with District 7 Supervisor Norman Yee, District 11 Supervisor John Avalos, and the District 11 Council (another citizen advisory group) to provide information about the project and gather input on key issues.

**Table 12: Key Stakeholders**

| AGENCY |
|---|
| San Francisco County Transportation Authority (Transportation Authority) |
| San Francisco Municipal Transportation Agency (SFMTA) |
| San Francisco Planning Department |
| California Department of Transportation (Caltrans) |
| Bay Area Rapid Transit District (BART) |
| San Francisco Department of Public Works |
| District 7 Supervisor Norman Yee |
| District 11 Supervisor John Avalos |
| Balboa Park Community Advisory Committee |

### 5.1.3 | Community Meetings

The Study hosted two rounds of public outreach. The Transportation Authority conducted the following outreach and noticing activities to promote the community meetings as well as the overall project:

- Posted announcements and updates on the Balboa Park Station Area Circulation Study website: **www.sfcta.org/balboa.**
- Emailed invitations to San Francisco County Transportation Authority's Balboa Park email group, which included community groups and local stakeholders, multiple times in advance of each meeting.
- Outreach to partners/stakeholders who committed to forwarding the above email blast notifications to their email lists.
- Reached out to over 30 community-based organizations to inform them about the community meeting times and dates (see **Table 13**).
- Distributed over 500 meeting announcement flyers to the Balboa Park Station Area's surrounding businesses, grocery stores/corner markets, libraries, schools, community centers, gathering places, and transit shelters.
- Displayed Muni bus banner ads on local lines to promote the project and notify about the meetings.
- Sent a mailer notification to all addresses within a 300-foot radius of the primary project area (3,740 total).
- Distributed a media advisory to various media outlets in advance of the meetings.

**Table 13: Community Stakeholders**

| | |
|---|---|
| **EDUCATIONAL INSTITUTIONS** | |
| Balboa High School and PTSA | James Denman Middle School and PTSA |
| Center for Arts Education | Lick Wilmerding High School |
| City College of San Francisco | Riordan High School |
| Civic Center Secondary School | Seventh Day Adventist Elementary School |
| **COMMUNITY/RESIDENTIAL** | |
| Bernal Heights Neighborhood Center | Miraloma Park Improvement Club |
| Balboa Park Community Advisory Committee | New Mission Terrace Improvement Association |
| Cayuga Improvement Association | Ocean Avenue Association |
| Coleman Advocates for Children and Youth | OMI Community Collaborative (OMI-CC) |
| Communities United for Health and Justice (CUHJ) | OMI Neighbors in Action (OMI-NIA) |
| District 7 Council | OMI/Excelsior Beacon Center |
| District 11 Council | Outer Mission Merchants and Residents Association (OMMRA) |
| Excelsior Action Group (EAG) | People Organizing to Demand Environmental & Economic Rights (PODER) |
| Excelsior District Improvement Association (EDIA) | Rebuilding Together |
| Excelsior Planning Collaborative | Ridge Lane Neighbors* |
| Filipino Community Center (FCC) | San Francisco Recreation and Park* |
| Friends of Balboa Playground | Sunnyside Neighborhood Association* |
| Geneva Car and Barn Power House | Westwood Park Association* |
| Glen Park Association | |

* These stakeholders were added between Outreach Event 1 and Outreach Event 2

The purpose of the meetings was to present findings of the Circulation Study and demonstrate how the Study would address community values and issues raised during previous studies. Another objective was to build understanding of feasible concepts, related trade-offs and phasing of circulation options. Most importantly, the meetings were a venue to explain the implementation process and solicit community feedback on circulation options. **Table 14** summarizes the purpose and solicited feedback for each meeting. Input received at these meetings informed the Study process and recommendations and is summarized in the following section.

**Table 14: Summary of Community Meetings, Purpose and Solicited Feedback**

| COMMUNITY MEETINGS | PURPOSE | SOLICITED FEEDBACK | MEETING FORMAT |
|---|---|---|---|
| Community Meeting 1<br>September 30, 2013<br>City College of San Francisco | Present preliminary findings. Demonstrate how the Study addressed community values and issues raised during previous studies.<br>Build understanding of feasible concepts and introduce trade-offs and constraints of circulation options.<br>Explain implementation process and how to follow and provide feedback on the Study.<br>Solicit community feedback. | Community goals and issues. Community priorities for improving the circulation of the station and evaluation criteria.<br>Public comments on Study products. | Presentation with break-out group discussions |
| Community Meeting 2<br>January 30, 2014<br>City College of San Francisco | Present preliminary findings of the Circulation Study.<br>Build understanding of feasible concepts and introduce trade-offs and constraints of circulation options.<br>Provide explanation of project process and timeline, next steps and possibility of pilot projects.<br>Solicit community feedback. | Community goals and issues.<br>Community prioritization of transportation modes on Ocean and Geneva Avenues.<br>Public comments on Study products. | Presentation with Q&A and open house with staffed info-stations |

# 5.2 Community Feedback and Input

The community provided multiple types of input throughout the study. This section lists key messages heard through the Study's outreach activities and describes how the Study responded to the feedback. It also summarizes the input received as responses to survey questions on prioritizing improvements, locations, and travel modes in the study area.

## 5.2.1 | Key Messages and Study Responses

### 1. Support for improving multimodal travel around the station area

**COMMUNITY MESSAGE:** Balboa Park residents are generally supportive of improving pedestrian and bicycle safety and movement, and transit service. There is particular agreement with the study's identification of key pedestrian safety and access issues. Moreover, residents are eager to see planned concepts be implemented.

**STUDY RESPONSE:** The study alternatives and final recommendations described in Chapter 3 include a series of multimodal improvements that can be implemented over the next two to 10 years in phases as funds become available.

### 2. Desire for continuity with previous planning

**COMMUNITY MESSAGE:** Some community members recall previous planning efforts, such as the Balboa Park Station Area Plan (2009), and want to understand how current projects are adhering to the vision.

**STUDY RESPONSE:** The study included an alternative in its analysis (Alternative 1) to represent a circulation network similar to that envisioned in the Balboa Park Station Area Plan. While that plan's

vision for the area's transportation network, including a deck over I-280, has been shown to be financially infeasible in the short term, this study's Alternative 1 network reproduces some of the same vehicle circulation patterns.

### 3. Concern about existing and potential delays to auto travel

**COMMUNITY MESSAGE:** Balboa Park stakeholders are sensitive to changes that would exacerbate traffic congestion, particularly along residential streets. In addition, although the community recognizes that the existing I-280 freeway configuration presents problematic conditions for other travel modes, many feel that auto access is similarly hampered and should be at least maintained, if not improved. Some community members stated they are hesitant to support moving forward with freeway ramp closures and would like to see more incremental measures implemented first, such as improving sidewalks and pavement markings, improving bike lanes, and restriping interchange off-ramp lane configurations.

**STUDY RESPONSE:** The study's alternatives development process incorporated considerations for auto travel in order to generate a set of alternative circulation networks that did not overly impact auto travel. For instance, the study dropped alternatives from consideration in part because of their potential impacts to auto travel. Based on the input received, the study looked to develop balanced approaches to improving travel conditions in the Study Area, such as the final version of Alternative 1.

### 4. Desire to accommodate all travel modes on both Geneva Avenue and Ocean Avenue

**COMMUNITY MESSAGE:** Travelers of all modes use both Geneva and Ocean for circulation and access, as these streets make connections in and through the area. They are the only two east-west through-routes in this part of the city. Many transit routes, pedestrians, bicyclists, and automobiles, for varying reasons, are reliant on one or the other corridor and alternative routing would create more difficult travel conditions or require out-of-direction travel. Both streets, therefore, need to accommodate all travel modes.

**STUDY RESPONSE:** The study's recommendation incorporates this feedback and proposes a balanced approach to area circulation.

## 5.2.2 | Community Meeting Survey Responses

At the Study's Round 2 community workshop, the project team solicited structured feedback from community members via a written survey. The survey asked respondents to indicate the priority they thought should be placed on the various travel modes for Geneva Avenue and Ocean Avenue. Results are shown in **Figure 19** and **Figure 20** below.

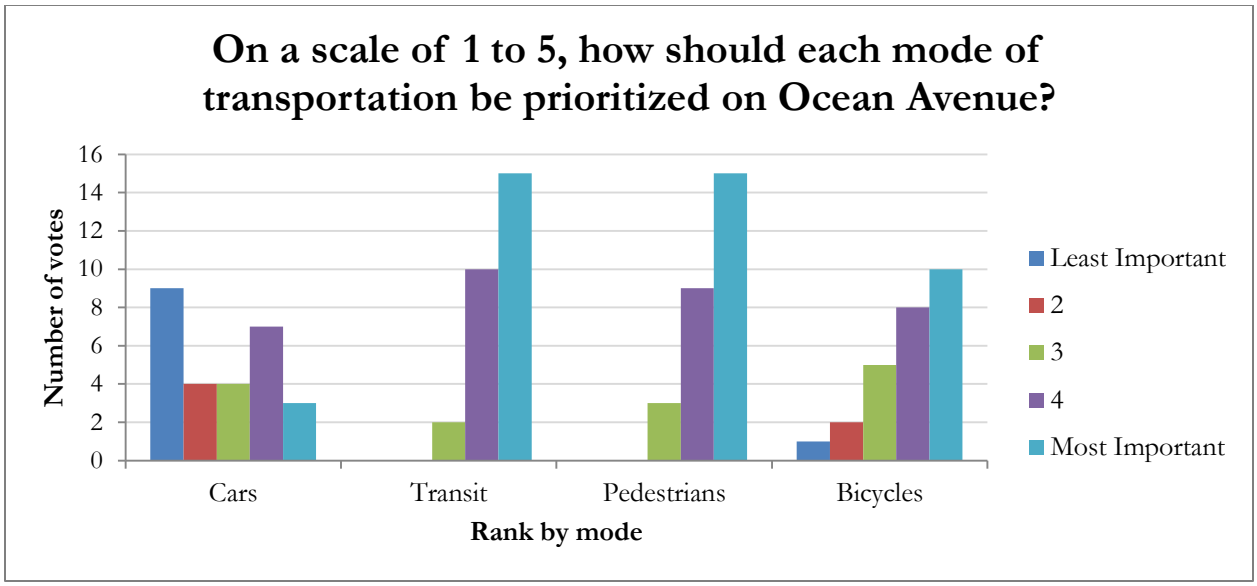



**Figure 19: Survey Results for Modal Priorities on Ocean Avenue**

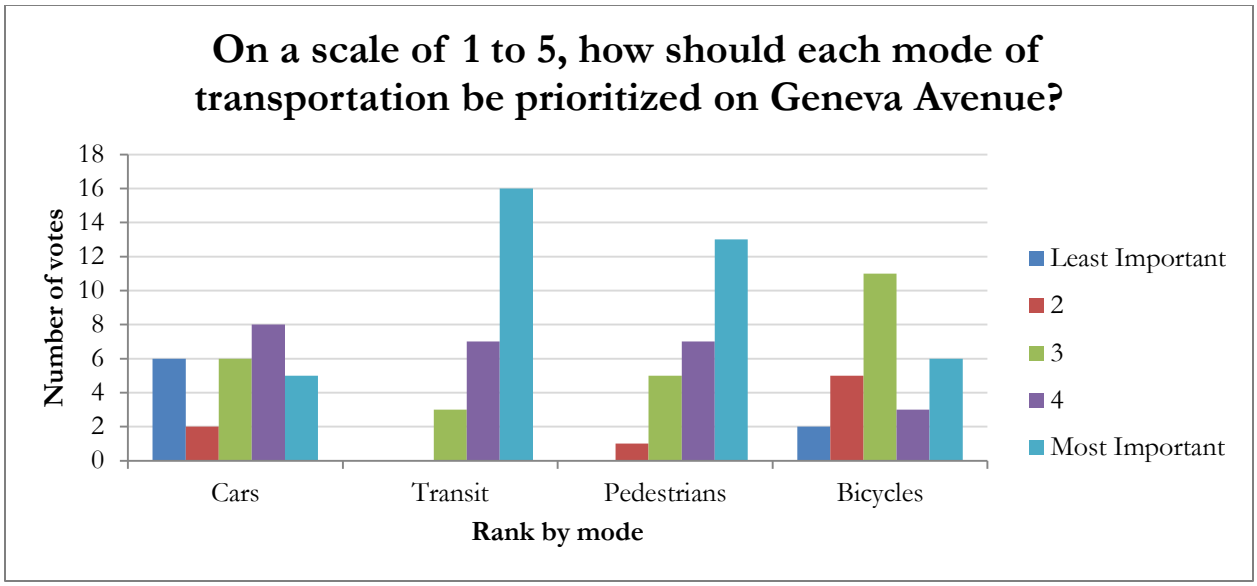



**Figure 20: Survey Results for Modal Priorities on Geneva Avenue**

In total, 27 survey responses were collected. Overall, survey respondents indicated that both streets are important for all modes of travel. The varied distribution of votes suggests a desire against prioritizing any particular mode for either street. However, a few trends did emerge. For Ocean Avenue, respondents indicated a preference for prioritizing transit and pedestrians, and then bicycles. Similarly, on Geneva Avenue transit was given the highest priority, followed closely by pedestrians. Bicycles and cars each split community opinion on Geneva Avenue, where some favor prioritization and some do not. In general, cars received the lowest priority compared to other modes.

## CHAPTER 6

# RECOMMENDATION AND NEXT STEPS

This Study is the first stage of project development for the proposed project: a feasibility study that identifies viable re-configurations of the Geneva Avenue and Ocean Avenue I-280 freeway ramps and the local transportation network in order to improve Balboa Park Station Area access and circulation. Several more steps lie between conclusion of this stage and the time a project is ready for implementation, including additional stakeholder and public coordination and outreach, environmental review, and more detailed design and engineering work. This chapter provides an initial description of the staff recommendation, key implementation considerations, including project development steps and schedule, and funding strategy options.

## 6.1 Staff Recommendation

Within the Balboa Park Station Area there are numerous projects at various stages of development. Many of them aim to improve the pedestrian experience immediately proximate to the station. While the area will benefit from planned improvements to existing infrastructure, such as sidewalks, pavement markings, and signage, none of those improvements would satisfy Goal #1: Reduce the negative impacts on the local community resulting from automobiles accessing the regional road network.

As seen in **Table 11** above, both Alternative 1 and Alternative 2 would improve pedestrian and bicycle conditions on Ocean Avenue, with Alternative 2 providing significant benefits and eliminating all turning-movement conflicts between non-motorized and motorized users. However, Alternative 2 would induce heavy traffic delays on Geneva Avenue and increase the multimodal conflicts associated with the northbound ramps, particularly for pedestrians crossing at the Geneva Avenue ramp intersections. In addition, Alternative 2's traffic delays on Geneva Avenue could heavily affect transit travel times.

Alternative 1 would provide a more balanced approach to the area, reducing conflicts between motorized and non-motorized users on both Ocean and Geneva Avenues and also reducing the weave conflict between transit and auto vehicles on Ocean Avenue. Elements 1 and 2 of Alternative 1 can be considered as separate and independent projects. They do not need to be constructed sequentially, nor must they both be implemented. Element 3 is an option that would follow a permanent implementation of Element 1 and offers a new location for kiss-and-ride drop-offs that would reduce the conflicts currently resulting from impromptu use of the freeway ramps and transit stops for dropping off passengers. As shown in **Table 10** above, Alternative 1 satisfies all five Study goals, whereas Alternative 2 does not.

Therefore, this study recommends **Alternative 1** as the high-performing Alternative to advance for additional study and development.

# a. Project Development Steps and Schedule

The subsequent phases of development for the potential improvements are described below and shown in **Figure 21**. The overall schedule is uncertain given the early stage in the planning process, but with strong support, consensus, and high priority from the community, agencies, and elected officials, the initial pilot projects could begin in 2016, with full implementation by 2020.


**Figure 21: Potential Implementation Steps**

**Implementation Planning:** Immediately following approval of this final report, a three-month period for implementation planning is needed. During this period, the SFCTA will coordinate with its partner agencies to develop detailed scopes of work for the next steps, which involve determining whether and how to divide the recommended alternative into separate elements to advance. This coordination also entails identifying roles for each agency, including which agency will lead the next steps and how the other agencies will support the work.

**Full Traffic Analysis:** The next phase of work would be to complete a full traffic analysis, including 20-year projection forecasts, for all elements of the project as both independent and cumulative projects. This analysis would use the SF-CHAMP travel demand model to more accurately predict vehicle circulation changes resulting from the project improvements and highlight any additional areas where improvements may also be needed. This phase of work could be completed within approximately six months.

**Pre-Environmental Review Conceptual Design:** The subsequent phase of work for the improvements would be to advance project development and to define the scope of environmental analysis. This phase fulfills a required document by Caltrans as part of that agency's multi-step process to implement improvements on the State Highway System. The purpose of this phase is to develop enough project definition to enter environmental review with a clear understanding of the project's potential environmental impacts while maintaining flexibility to modify aspects of the project to minimize potential significant environmental impacts. This phase would include advancing engineering design to approximately 10% and preparing a Project Study Report (PSR) for the portion of the project affecting the state-owned right-of-way as required by Caltrans. This phase of work is expected to last approximately 12 to 18 months.

**Potential Pilot Projects:** The closure of any ramp could potentially be implemented initially as a pilot project in order to more effectively gauge the potential impacts to traffic circulation. For Alternative 1, a pilot closure of the northbound Geneva Avenue on-ramp would be recommended. This pilot could be feasibly implemented for less than $100,000. Data from site evaluations of the pilot project would inform the traffic analysis necessary for environmental approval of a permanent closure and would ensure that necessary mitigation measures are included in full project implementation.

**Environmental Review and Design:** Next, the proposed project's environmental impacts would be analyzed both under the state California Environmental Quality Act (CEQA) as required for any project requiring local action as well as under the Federal National Environmental Protection Act (NEPA) to make the project eligible for Federal funding sources. Environmental review would identify resource

areas potentially affected by the proposed project (e.g. transportation, air quality, visual, noise, etc.) and quantify and analyze potential impacts. The process would identify any impacts that are found to be significant and develop mitigations to those impacts. Engineering design would be advanced to 30% in order for impacts to be assessed adequately. This phase would also include a Caltrans Project Report, which provides the scope, schedule and estimated cost of the project, analyzes alternatives considered, and documents the design criteria and special considerations that would guide detailed design. The environmental review process is expected to last approximately one year.

**Detailed Design and Construction**: After completion of environmental review and the Caltrans Project Report, detailed design and construction of each project phase would proceed. The duration of the design and construction of each phase depends on funding availability and the complexity of the phase, but all construction is expected to be completed by 2020.

## b. Funding Opportunities

As the project advances through the next steps of development and approvals, Transportation Authority staff will continue to identify possible sources of funding for the project. The project will seek funds from multiple sources. The following are some of the most promising opportunities:

- **Proposition K Sales Tax.** This half-cent sales tax program, managed by the Transportation Authority, includes approximately $6.5 million in remaining funds in the Balboa Park Station Access category and approximately $3 million in remaining funds for the general BART Station Access, Safety, and Capacity category. Other expenditure plan categories that this project could draw from for eligible scope components include Pedestrian Safety and Circulation, Bike Safety and Circulation, and Traffic Calming.

- **Proposition AA Vehicle Registration Fee.** Also administered by the Transportation Authority, this modest grant program (approximately $5 million/year citywide) includes funding for pedestrian safety and transit efficiency projects.

- **One Bay Area Grant (OBAG) Program.** Projects funded through this program are selected by the Transportation Authority to compete for regional funding through the Metropolitan Transportation Commission (MTC). With nearly $40 million programmed to San Francisco projects through the first grant cycle in 2012, it represents a significant investment in streetscape upgrades, bicycle and pedestrian safety improvements, and local road rehabilitation. Funding for the next OBAG cycle is anticipated to be available in Fiscal Year 2016/17.

- **Lifeline Transportation Program (LTP).** Similar to OBAG, LTP is comprised of state and federal funds programmed by MTC, but San Francisco projects are selected by the Transportation Authority. The LTP supports projects that improve transportation choices for low-income or otherwise disadvantaged communities or close barriers to mobility. Infrastructure projects in and around the Balboa Park station have received funding through prior grant cycles, so a project providing additional mobility and safety improvements would likely compete well in future cycles.

- **Balboa Park Community Infrastructure Impact Fee.** This fee, established in 2009 to be levied on new land development and managed by the San Francisco Planning Department,

supports a range of transportation improvements at the Balboa Park station. However, the funding is anticipated to be modest, with projected revenues of approximately $750,000 through Fiscal Year 2018/19.

Other funding programs could support certain subsets of the project's scope, particularly those elements that improve pedestrian and bicyclist safety or transit efficiency. For instance, the bicycle and pedestrian safety components could compete well for funding from California's new **Active Transportation Program**, with grant cycles administered both regionally and at the state level, or for the state **Highway Safety Improvement Program** which focuses on reducing fatalities and injuries on public roads. Improving safety and access to Lick Wilmerding High School or other nearby schools could also compete for **Safe Routes to Schools** funding at the regional or state level. There are fund sources for projects that improve the efficiency of transit infrastructure and operations, including MTC's **Transit Performance Initiative** grant program.

Aside from these known funding opportunities, this project would likely compete well for new sources of transportation funding since its focus on pedestrian and bicyclist safety and transit efficiency is consistent with San Francisco's overall transportation priorities. As the City and the region set their sights on new revenue measures for transportation, advancing this project through conceptual design would give it further definition and improve its attractiveness as a project ready to receive funds as various new expenditure plans are developed.