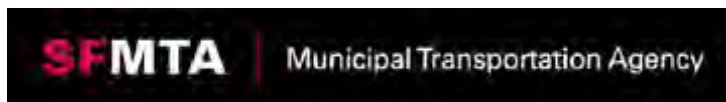


**Balboa Park**  
**Station Capacity and Conceptual Engineering Study**

**Revised Draft Final Report**

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**November 8, 2011**

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## **List of Acronyms**

ADA	Americans with Disabilities Act
AWSS	Auxiliary Water Supply System
BART	Bay Area Rapid Transit District
BRT	Bus Rapid Transit
EIR	Environmental Impact Report
HSC	Historic Streetcar
LRV	Light Rail Vehicle
LRT	Light Rail Transit
MME	Muni Metro East
RPP	Residential Parking Permit
SAR	Strategic Analysis Report
SR2T	Safe Routes to Transit
SFMTA	San Francisco Municipal Transportation Agency
SFCTA	San Francisco County Transportation Authority
SPUI	Single-Point Urban Interchange
TAC	Technical Advisory Committee
TEP	Transit Effective Project
TPS	Transit Preferential Streets

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**Balboa Park Station Capacity and Conceptual Engineering Study**

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**List of Balboa Park Station Area Studies and Projects****List of Balboa Park Station Area Studies and Projects**

Study/Project Title	Author	Publication Year
Balboa Park Station Area Plan	City of San Francisco Planning Department	2009
Balboa Park Station Area Plan Environmental (EIR)	City of San Francisco Planning Department	2008
Balboa Park Station Capacity and Conceptual Engineering Study ("Station Capacity Study")	San Francisco Municipal Transportation Agency (SFMTA)	n/a
Balboa Park Station Pedestrian and Bicycle Connection Project ("Ped and Bike Project")	SFMTA	2009
Comprehensive Station Plan ("BART Comprehensive Station Plan")	Bay Area Rapid Transit District (BART)	2002
Parkmerced Development Plan	Parkmerced	2011
San Francisco/San Mateo Bi-County Study	San Francisco County Transportation Authority (SFCTA)	n/a
Station Profile Study (Balboa Park)	BART	2008
Strategic Analysis Report (SAR) on Balboa Park BART Station Area Parking and Fast Pass	SFCTA	2003
Transit Effectiveness Project (TEP)	SFMTA	2008, 2011
Geneva Ave. Transit Preferential Streets (TPS) Study	SFMTA	2011



## **INTRODUCTION**

### **Purpose of the Study**

The Balboa Park Station Capacity Study included an engineering feasibility analysis and supporting studies to refine the long-range vision presented in the Balboa Park Station Area Plan (the adopted area plan developed through the Better Neighborhoods Program). It also assesses other proposals suggested in recent years by the BART *Comprehensive Station Area Plan* and by other public agencies and individuals. Its focus is on moving short-range and mid-range projects consistent with that vision toward funding and implementation. This *Study Final Report* provides additional information for investment decisions, but is not intended as a policy document to be adopted by the SFMTA Board of Directors or another policy body.

### **Scope and Goals**

The study focuses especially on the BART/Muni transit station/yard functions and site plans, including potential joint development projects. The study emphasizes:

- improving the transfer connections and access to the station and stops;
- enhancing safety and passenger amenities;
- reducing negative impacts of transportation facilities; and
- supporting a vibrant community.

The study includes findings about existing and forecast conditions and preliminary recommendations for improvements through 20 years into the future in several areas, including:

- Transit customer amenities;
- Accessibility;
- Muni light rail service operations;
- Pedestrian/bicycle/transit improvements on Geneva and Ocean avenues;
- Development of a transit village;
- Freeway circulation;
- Parking; and
- Light rail and historic streetcar maintenance and storage.

For selected “fast track” projects that can be implemented within the next several years, the study provides concept plans, preliminary cost estimates, project descriptions, and proposed schedules.

It also describes the outreach efforts undertaken in developing findings and recommendations. Finally, it provides an implementation element, including a funding strategy, proposed prioritization and preliminary environmental assessment. It also lays out the recommended next steps.

## **Relationship to Other Plans**

The study builds upon several other station area projects and is coordinated with other ongoing projects:

***The Balboa Park Station Area Plan*** was adopted as the official neighborhood land use and circulation plan by the Board of Supervisors in 2009. Developed by the SF Planning Department's Better Neighborhoods Program, it discussed the need to improve connectivity and passenger amenities around the station through the creation of a "transit station neighborhood." It proposed a number of major changes to the station area, including: a transit village on the Upper Yard and BART kiss & ride site (near the southwest corner of the Geneva/San Jose intersection), decking over I-280 between Geneva and Ocean to improve station access and reduce freeway impacts and reconfiguring the Geneva and Ocean freeway ramps.

***BART's Comprehensive Station Plan*** (2002) provided a vision for the station generally consistent with the City's Station Area Plan. However, it focused particularly on BART access improvements such as improving the connection to Ocean Avenue.

***The SFMTA's Balboa Park Station Pedestrian and Bicycle Connection Project*** (recently completed) identified and prioritized improvements for pedestrians and cyclists that can be implemented in the short and medium-term. It was the primary basis for obtaining over \$700,000 in Safe Routes to Transit implementation funding. The recommended improvements are now being designed and implemented.

***The SFMTA's Geneva Corridor Transit Preferential Streets Study*** (recently completed) analyzed a range of potential short and mid-term improvement measures consistent with Geneva Avenue's other long-term development plans. Coordinating with other planning efforts and community groups, the SFMTA is working with the community and stakeholders to develop a consensus that will help secure additional improvement grants for the corridor. The recommendations primarily call for bus bulb-outs and signal improvements (but no separate lanes) to reduce transit travel times and improve reliability.

## **STUDY PROCEDURES**

### **Technical**

The study was conducted by a consultant team led by Jacobs, a transportation planning and engineering firm with significant experience on similar studies in the station area and throughout the U.S. The team included specialists in transit facilities and service planning (CHS Consulting Group), bicycle/pedestrian/traffic analysis (Fehr & Peers Transportation Consultants), and civil/structural engineering (MSA Design & Consulting, Inc.). The consultant team was managed by the SFMTA Sustainable Streets Division, with active participation of other SFMTA divisions, and several agency partners. Community review and input was also an important element.

The study started with analysis of: (1) passenger station access and transfer needs; (2) light rail vehicles (and historic streetcar) storage and maintenance needs; and (3) parking conditions. The consultant team then reviewed the feasibility of key transportation proposals from the Balboa Park Station Area Plan and other short-range to long-range options. Feasibility analysis included: impacts on safety, accessibility, service quality and passenger convenience; potential environmental impacts; engineering issues; and cost considerations. Concept plans were prepared for short-range, mid-range and long-range timeframes. Consultants then conducted a more intensive evaluation of “fast track” improvement options (those that could be implemented within the next 2-5 years with a cost less than \$5 million).

### **Technical Advisory Committee**

The study was supported by two Technical Advisory Committees: an internal SFMTA group and an interagency group. Each met at least five times. They provided technical input and review from a wide range of perspectives. The SFMTA TAC included representatives of the following Agency sections: Accessible Services, Transit Operations, Safety, Capital Planning, Real Estate, Grants and Construction/Engineering.

The interagency TAC included representatives of BART, the San Francisco County Transportation Authority, San Francisco Planning Department, San Francisco Public Works Department and the Geneva Car barn and Powerhouse Youth Arts Center Project. City College was also invited.

Additional smaller meetings were held focused on specialized questions, such as transit operational issues and the development of the Balboa Park Station Area Plan.

### **Community Outreach**

Community outreach focused on several meetings and SFMTA website pages. Two major community meetings were held at Lick Wilmerding High School. The May 19, 2010 meeting focused on “fast track” projects, while the October 6, 2010 meeting covered mid/long-range improvements. Staff also presented at the December 11, 2010 meeting of the District 11 Neighborhood Council.

These venues provided important feedback on community priorities. They also showed that earlier planning efforts are starting to bear fruit in physical changes like BART’s Westside Walkway, which opened in April 2011.

## **STUDY FINDINGS AND PRELIMINARY RECOMMENDATIONS**

### **Existing and Future Conditions: Needs Assessment**

The Balboa Park station complex, adjacent to the interchange of I-280 and Geneva Avenue, is a key regional and local hub. The BART station is the southernmost in the City of San Francisco. With over 15,000 daily passenger boardings, it is the busiest in the BART system outside of downtown San Francisco (BART Station Profile Survey,

2008). In addition to BART, three Muni light rail lines (J, K, and M) serve the station. Over 2,700 customers board these lines daily. Several bus lines also serve the station. Almost 6,900 patrons board Muni buses each day at the North and South Geneva Transit Plazas, more boardings than at some entire rail stations (TEP, 2008). There is no passenger parking, and the passenger drop-off (kiss and ride) areas are inconvenient, especially for freeway travelers.

In general, the station area suffers from hosting so many major functions in a small area. Different modes compete uncomfortably for space. The station complex squeezes a BART station, several bus/light rail stops and transit storage/maintenance facilities next to a freeway interchange, all in the middle of a lively neighborhood. The proximity of several schools, a major community college campus and a regional park further underscores the value of developing a true transit neighborhood.

The needs assessment focuses on significant problems in passenger facilities, safety, accessibility, light rail vehicle storage/maintenance and integration with the neighborhood. (An overview of study findings and preliminary recommendations is presented in Table 1.)

### **Station Area Passenger Needs**

Station access and intermodal transfers are hindered by such problems as significant distances between major stops, minimal wayfinding signage and inadequate lighting. Safety and access issues focus on inaccessible stops in the street or near narrow walkways, as well as missing or below-standard curb ramps. These problems are especially significant considering that the station is one of the major transfer hubs in the entire San Francisco Bay Area.

Customer amenities and station aesthetics are below the level at many BART stations with lower activity. For example, the bus loading areas on Geneva have minimal weather protection and no real time bus or train arrival information.

Recommendations focused on improving the light rail transit and bus stops, improving both the experience of waiting to board and walking between stops. They would also enhance access to the station complex by walking, bicycling, transit and auto.

### **Transit Operations on Geneva and Ocean Avenues**

Bus operations on Geneva Avenue are hampered by friction with passenger loading, freeway entrance/exit movements, and kiss and ride entrance/exit movements. Improvements are needed also to meet the expected increase in bus service on Geneva including potential bus rapid transit (BRT). The Geneva Avenue Transit Preferential Street (TPS) Study has developed complementary recommendations that would reduce transit travel times.

Shifting some bus service from Geneva to Ocean (as recommended by the Transit Effectiveness Project) could improve Muni efficiency by reducing travel times. While this would take advantage of improved BART access from Ocean via the Westside

Walkway, it requires new and improved bus stops near that location. There is no westbound stop near the station and the eastbound stop has no facilities.

### **Light Rail Storage and Maintenance**

In order to meet significant population and employment growth and to limit auto use, the SFMTA needs to increase light rail service, and accordingly storage and maintenance facilities. The SFMTA is planning a major light rail extension, the Central Subway, and increased service on existing lines, which will require a major fleet increase. The Green Yard (northwest of the Geneva/San Jose intersection) has insufficient space to accommodate future forecast needs for light rail. The Geneva Yard (southeast of the Geneva/San Jose intersection) can accommodate the daily historic streetcar needs, but not the special service fleet or the inactive streetcars in need of repair.

The Upper Yard is a satellite LRV storage facility southwest of the Geneva/San Jose intersection. It has until recently been used for overnight LRV storage and for staging M-line pullouts that do not need to travel through the Geneva/San Jose intersection during the peak hours. It will be critical to help absorb the needs when tracks are replaced in the Green Yard. It also provides operational flexibility of increasing importance as the fleet grows.

Operational and space efficiency improvements are identified in this Final Report. However, these are insufficient to substitute for major facility expansions and enhancements, focused especially on the Muni Metro East light rail facility.

### **Transit Village Redevelopment**

The station area presents the opportunity for meeting broader community needs (such as affordable housing) while boosting transit ridership and revenue. The immediate BART station area has virtually no passenger services or shops, like dry cleaning. The long-standing transit storage/maintenance yards are less than ideal neighbors for a residential neighborhood, although they provide critical support for the growing light rail and historic streetcar fleets. Their long range role will be determined in a Strategic Real Estate and Facilities Plan to be developed shortly, with expected completion by early 2013.

### **Freeway Circulation**

Freeway entrance/exit movements interfere with pedestrian, bicycle and transit access to the station. The I-280 freeway itself divides the neighborhood. Additional study of these issues is expected in the Transportation Authority's upcoming Balboa Park Partnership Study, which is expected to start in early 2012.

### **Parking Conditions**

The Balboa Park BART Station provides no passenger parking. Most of the on-street parking near the station is in residential neighborhoods with Residential Permit Parking. On average only about 55% or less of the parking in RPP areas is occupied during

weekday midday periods, suggesting that spillover parking in these areas is minimal. However, in the area northeast of the Ocean/San Jose intersection about 87-90% of the spaces are occupied during weekday midday periods. Unrestricted parking next to Balboa Park typically fills early in weekday mornings, although it is uncertain whether this is from BART commuters or City College/school students and employees.

## **Recommendations**

Recommendations (summarized in Table 1) focus on improving the light rail transit and bus stops, improving both the experience of waiting to board and walking between stops. They would also enhance access to the station complex by walking, bicycling, transit and auto.

Recommended measures would also improve the station, stops and storage/maintenance facilities as neighbors.

Some of the key Balboa Park Station Area Plan recommendations were not found to be feasible or at least not likely within the next 20 years. In particular, decking the I-280 freeway between Ocean and Geneva Avenues, although likely beneficial to the neighborhood and to station access, would likely cost upwards of \$1 billion (and would be a regional-scale project similar to the Doyle Drive rebuild). Decking over the Green light rail maintenance/storage yard would be extremely difficult due partly to the clearance needed over the overhead wires, the limited street frontage and the need to keep the facility operating during extended construction.

In a couple of cases, it was not possible to analyze the feasibility and impacts of potential recommendations conclusively because of the complexity of the issues. Therefore, additional analysis is needed to: (1) determine the detailed costs and benefits of extending the M-line across Geneva Avenue in the short/mid-range and (2) determine whether some of the overhead contact system poles that create “pinch points” on the J/K walkway near the Geneva/San Jose northwest corner can be moved (and replaced with mast arm poles).

## **NEXT STEPS: FUNDING AND IMPLEMENTATION**

The study is expected to conclude with informational presentations to the SFMTA Board of Directors and possibly other policy boards. Additional outreach will be conducted as needed.

The study aims for a smooth, quick transition into the funding and implementation phase. Accordingly, the Final Report emphasizes Fast Track projects that can be implemented quickly due to their relatively low cost (under \$5 million) and limited environmental review needs. The Final Report also outlines a funding strategy that aims to continue the record of success in matching improvement projects with suitable funding sources. Implementation should also be smoothed by having a standing TAC to facilitate interagency coordination. Funding could be provided by the Transportation Authority’s Caltrans Partnership grant.

The proposed funding strategy calls for reserving roughly half of the \$2.4 million in Prop K “Balboa Park Intermodal Improvements” funds (Expenditure Program 13) for required local match and preliminary design for promising regional/state/federal grants such as Transportation for Livable Communities (TLC) and Safe Routes to Transit. It also calls for consideration of programming additional Prop K EP 13 funding during the FY 2013-2018 period, for which the Strategic Plan currently shows no funding. It also notes the potential to take advantage of innovative funding sources and student talent for special projects, given the proximity of City College, Lick Wilmerding High and the Geneva Car Barn and Powerhouse project.



**Balboa Park Station Capacity and Conceptual Engineering Study**  
Executive Summary

**STUDY FINDINGS AND RECOMMENDATIONS**

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<b>Customer Amenities and Information</b>	<p>Lack of wayfinding and transit arrival information.</p> <p>Limited weather protection at Geneva bus loading areas, although they are used by as many passengers as at some rail stations.</p> <p>Lighting levels could be improved in some areas.</p>	<p><b><i>Short-Range “Fast Track” (High Priority) Project:</i></b> Pursue dedicated sales tax (Prop K) funding for design of Geneva transit plaza improvements plus lighting and wayfinding improvements in the station area (bounded by Ocean, Geneva and San Jose). (BART has begun design of Geneva transit plaza wayfinding, real time transit signs and lighting improvements, while SFMTA has requested Prop K design funding for Geneva canopies and other lighting and wayfinding improvements.)</p>
<b>Geneva Ave. Transit Operations</b>	<p>Freeway-related traffic and kiss &amp; ride activity interfere with transit operations.</p>	<p><b><i>Short-Range:</i></b> Synchronize signals (Completed City/Caltrans coordination).</p> <p>Reconfigure westbound lanes approaching and in front of station and over I-280 bridge to reduce congestion and facilitate buses leaving stops with wider northern sidewalk (high priority project)</p> <p>Upcoming SFCTA Balboa Park Circulation Study should review proposals to:</p> <ul style="list-style-type: none"> <li>• Reconfigure kiss &amp; ride (to eliminate exits and entrances on Geneva) and</li> <li>• Straighten curbs in bus loading areas and provide wider sidewalks (Prop K design funds requested)</li> </ul>



## Balboa Park Station Capacity and Conceptual Engineering Study

### Executive Summary

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<p><b>Ocean Ave. Transit and Bike Facilities</b></p>	<p>Until recently there was no convenient, accessible walkway between BART station and Ocean Ave., leading to pedestrians walking next to light rail tracks, but an accessible connection to the J/K boarding area is still needed.</p> <p>Adopted SFMTA Bike Plan includes bike lanes on Ocean Ave. (critical east-west link with City College, schools, SFSU).</p> <p>SFMTA Transit Effectiveness Project recommends moving some bus service from Geneva to Ocean Ave.</p>	<p><b>Long-Range:</b> Complete bike lanes between Alemany and Phelan (replacing City College pedestrian bridge to facilitate this).</p> <p>Allow buses to use light rail track lane westbound (<i>like on Market St.</i>).</p> <p><b>Short-Range:</b> Recently completed: BART Westside Walkway and mid-block station entrance significantly improves connection to Ocean Ave. for BART passengers, but the Eastside Connection pedestrian bridge needed to connect the Westside Walkway to the J/K loading area.</p> <p>Recently completed: Crosswalks (and pedestrian countdown signals) from station across Ocean at I-280.</p> <p>Recently completed: Westbound bike lane on Ocean Avenue between San Jose Avenue and the existing I-280 southbound off-ramp.</p> <p>Provide new westbound bus stop at station.</p> <p>Improve Ocean/Geneva/Phelan for pedestrians.</p>

## Balboa Park Station Capacity and Conceptual Engineering Study

### Executive Summary

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<p><b>Muni Light Rail Routes and Stops</b></p>	<p>Station area is too crowded, with transit station/stop and maintenance facilities, plus a freeway interchange, in the middle of a lively neighborhood with multiple schools and City College.</p> <p>Transit stops have significant safety, accessibility and convenience issues. For example:</p> <ul style="list-style-type: none"> <li>• M-line final northbound stop is inaccessible, in the street about 400 feet from BART station entrance.</li> <li>• J and K boarding is convenient to BART, but adjacent walkway is narrow, inaccessible.</li> </ul>	<p><b>Mid to Long-Range:</b> Run M-line from Embarcadero to SFSU/Parkmerced, eventually to Daly City BART, at least on one branch, consistent with original TEP recommendation.</p> <p>Provide accessible, convenient K-line boarding near BART mezzanine entrance.</p> <p><b>Short-Range:</b> Following are largely funded, in preliminary design:</p> <ul style="list-style-type: none"> <li>• Provide Eastside Connection – pedestrian bridge from BART Westside Walkway over BART station box to J/K boarding area.</li> <li>• Close off walkway next to tracks near Ocean Ave.</li> <li>• Move J/K boarding to new accessible platform on San Jose Ave.</li> <li>• Upgrade existing J/K accessible boarding platform next to BART and convert to drop-off only.</li> </ul> <p>Analyze potential to move final northbound M-line stop to north side of San Jose &amp; Geneva Ave. intersection. Provide accessible boarding platforms in both directions. (Prop K funding requested for analysis as high priority.)</p> <p>Improve walkway from BART to San Jose Ave. and eliminate “pinch points” where feasible. (Prop K funding requested for design as high priority)</p>

## Balboa Park Station Capacity and Conceptual Engineering Study

### Executive Summary

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<b>Freeway Interchange</b>	<p>Adopted neighborhood plan supports decking over freeway and providing a single point urban interchange (SPUI).</p> <p>Deck completely over the freeway within less than 20 years appears infeasible due to significant cost and would need to be coordinated with freeway reconstruction.</p>	<p><b>Long-Range:</b> Refine and analyze proposal for elevated roadway between I-280 and BART's Westside Walkway, with short kiss &amp; ride facility, to be coordinated with Ocean and Geneva bridge replacement.</p> <p>Consider interchange reconfiguration as part of long-range area circulation plan (beyond 20 years).</p> <p>Both recommendations will be studied in upcoming SFCTA Balboa Park Circulation Study.</p>

## Balboa Park Station Capacity and Conceptual Engineering Study

### Executive Summary

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<b>Transit-Oriented Development</b>	<p>Muni Upper Yard and Muni Green Yard provide opportunities for supporting neighborhood revitalization and reducing transit facility impacts.</p> <p>Adopted neighborhood plan includes policies to convert Upper Yard/BART kiss &amp; ride to transit village and to consider decks above Muni Green Yard.</p> <p>While Upper Yard transit village is desirable, it is not feasible to give up this critical light rail vehicle (LRV) storage/staging facility in the short-term, and feasibility in the longer term is uncertain. SFMTA needs significant facility upgrades elsewhere to support current and future needs.</p> <p>Decking over the entire Green Yard appears infeasible.</p>	<p><b>Mid to Long-Range:</b> Upper Yard transit village would be valuable, but a comprehensive real estate and facilities study must be completed to determine whether the Upper Yard can be redeveloped. Even if the Upper Yard could be reused, the SFMTA would need funding for compensatory light rail maintenance facility and access upgrades.</p> <p>Kiss &amp; ride should be incorporated into design of transit village (i.e., build over a reconfigured kiss &amp; ride).</p> <p>Provide retail frontage between north Geneva transit plaza and Green Annex Building.</p>

## Balboa Park Station Capacity and Conceptual Engineering Study

### Executive Summary

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<b>Other Accessibility Concerns</b>	<p>Curb ramps are missing or below standard at some key locations.</p> <p>There is no elevator near the kiss &amp; ride location (south of Geneva) and no convenient auto loading near elevator (north of Geneva).</p> <p>Difficult for pedestrians to cross Geneva at Howth or to cross I-280 ramp intersections on Ocean.</p>	<p><b>Long-Range:</b> Kiss &amp; ride on new elevated roadway would help accessibility.</p> <p>Straighten out I-280 southbound off-ramp to T intersection at Ocean (eliminate high-speed merge)</p> <p><b>Short to Mid-Range:</b> Install or improve curb ramps (High priority; BART recently completed curb ramps across kiss &amp; ride driveway, with Prop K funds requested for additional locations).</p> <p>Funded: Straighten crosswalk across Geneva near I-280 and station, recently repaved.</p> <p>Install elevator south of Geneva to BART mezzanine level (per BART plans).</p> <p>Funded: Traffic/pedestrian signal at Geneva/Howth.</p> <p>Install flashing beacon and warning sign at I-280 southbound off-ramp (High priority: Prop K funds requested for design).</p>

## Balboa Park Station Capacity and Conceptual Engineering Study

### Executive Summary

ISSUE	KEY FINDINGS	RECOMMENDATIONS
<b>Transit Storage/ Maintenance Facilities</b>	<p>The light rail fleet is expected to grow significantly over the next 10-20 years, just to meet forecast SF population and employment growth.</p> <p>While the efficiency of facilities can be improved, it is not feasible to eliminate or move major part of facilities in short/mid-term.</p>	<p><b>Short to Mid-Range:</b> To use facilities more efficiently: Charge employees for parking (implemented).</p> <p>Relocate spare parts and repair wrecked light rail vehicles.</p> <p>With seismic strengthening of Geneva Office Building, use adjacent tracks at Geneva Yard.</p> <p>Improve capacity and access to Muni Metro East.</p> <p>Provide supplemental LRV/historic storage/staging facilities.</p>
<b>Parking</b>	<p>Average occupancy rate in Residential Permit Parking (RPP) areas during day below 56% vs. 86-90% outside RPP zones. BART patrons do not seem to be intruding on the RPP zones, but an estimated 500+ park throughout the non-RPP areas. Residents of the non-RPP area closest to the station have not exercised their majority option to convert to RPP.</p>	<p>Study parking management options focused on park and commercial frontage. As part of an upcoming citywide review of RPP and on-street parking policies, possibly study parking benefit districts (which may sell a limited number of daytime RPP permits to commuters and use additional funds for neighborhood improvements).</p> <p>Extending Fast Pass use on BART to Daly City part of study that is underway.</p>

## 1. Introduction

As part of its Better Neighborhoods 2002 program, the San Francisco Planning Department launched a new vision for the neighborhood surrounding the Balboa Park Station of the Bay Area Rapid Transit (BART) District. This vision foresaw the transformation of this area from a disjointed and confusing confluence of roadways and transit facilities to a coherent and attractive community. Many of the elements of this vision were bold and futuristic, such as constructing a deck over I-280 that would buffer the neighborhood from the impacts of the freeway and serve as a platform for new development. Others were more modest, short-term proposals, such as improving signage among the disparate elements that comprise the Balboa Park transit station complex. Several involved transforming areas now devoted to transportation uses with new shops and dwellings in order to “re-knit” the fabric of the community to be more than just a confluence of transport modes.

The *Balboa Park Station Area Plan* was adopted by the San Francisco Board of Supervisors in 2009. It serves as the template for all development activities in the area by public agencies and it guides those to be undertaken by private entities as well. The San Francisco Municipal Transportation Agency (SFMTA) is responsible for operation of the city’s public transportation system, its roadway network, and its bicycle and pedestrian facilities. For this reason, SFMTA commissioned this study to find ways to improve transit use and promote the development of transit-oriented land uses in Balboa Park. SFMTA chose the Jacobs Consulting Team (consisting of staff from Jacobs, CHS Consulting Group, MSA Design & Consulting, Inc. and Fehr & Peers Transportation Consultants) to assist it in this endeavor. This is the second Balboa Park project undertaken by SFMTA and the Jacobs Team. In 2009, the team completed the *Balboa Park Station Pedestrian and Bicycle Connection Project* together. That project is referenced many times in this current study as the “*Ped and Bike Project*”, and several of its recommendations have been incorporated.

This new endeavor is called the *Balboa Park Station Capacity and Conceptual Engineering Study* but abbreviated herein as the “*Station Capacity Study*”. **Its objective is to examine the feasibility of the many transportation improvements presented in the *Balboa Park Station Area Plan* as well as those suggested over the years by other public agencies and individuals. Those that are long-term in nature are considered at a “high level” of detail. The smaller scale improvements that could be accomplished relatively soon are the subject of more focused analyses. These, in turn, will lead to the development of grant applications for specific projects.** In either case, the goal is to refine and advance the *Balboa Park Station Area Plan* from a vision to a concrete reality that improves the lives of those living, working, and traveling through this busy crossroad in the city.

Five technical memoranda were prepared as part of the *Station Capacity Study*. This report is a summary of these memoranda:

- **Technical Memorandum 1: Intermodal Functional Analysis Report** analyzes current and planned transit and transfer functions, identifies short- and long-term space and operational needs, and provides a needs assessment.
- **Technical Memorandum 2: The Facilities Analysis Report** recommends short- and mid-term use of all station area yards, shops, and administration facilities related to light rail vehicle (LRV) storage and maintenance and phased strategy of all yards, shops, and administration facilities for space optimization in light of project goals, cost implications, constraints and priorities.
- **Technical Memorandum 3: Feasibility Report** reviews the feasibility of short- and long-term projects proposed in the *Balboa Park Station Area Plan*. In addition, it provides alternative recommendations.
- **Technical Memorandum 4: Preliminary Site Plan and Circulation/Access Plan** for the Balboa Park Station area proposes site, circulation, and access plans for the station and surrounding rail yards, as well as recommends an implementation schedule.
- **Technical Memorandum 5: Parking Analysis Report** reviews the parking supply and demand situation in the station area and recommends parking changes.

The technical memoranda were reviewed by an Internal Technical Advisory Committee (TAC) and an Interagency TAC. The Interagency TAC is comprised of agencies with an interest in the Balboa Park Station area. This report incorporates feedback received from the TACs. However, it should be noted that the recommendations in this report have not been vetted and endorsed by the SFMTA at this time. Additional TAC meetings and presentations to policy boards are planned.

This report reviews the feasibility of selected improvement proposals from previous studies and proposes additional improvements based on observations, analyses, and discussions with local stakeholders. **Chapter 2 provides a background for the Balboa Park Station area. Chapter 3 consists of a summary of related studies and projects. Chapter 4 provides a needs assessment that examines existing conditions and future needs of station operations, as well as rail yard maintenance and storage. Chapter 5 explores possible short-term, mid-term and long-term improvements. Chapter 6 discusses public outreach undertaken during the study. Chapter 7 discusses the next steps to be undertaken, including project prioritization, funding and implementation. Chapter 8 concludes the report.** The discussions in these chapters include both high-level and detailed analyses depending on the matter at hand. Both dimensions must be dealt with in this study to provide a complete understanding of the many issues involved.



## 2. Background

The Balboa Park neighborhood in San Francisco, shown in **Figure 1A and 1B**, is focused on a complex of transit facilities and a city park of the same name. The transit facilities consist of:

- The Balboa Park BART heavy rail station; and
- Bus stops, light rail transit (LRT) stations, and LRT and historic streetcar maintenance facilities of the San Francisco Municipal Railway (Muni); Muni is a division of SFMTA.

The Balboa Park station complex, located adjacent to the interchange of I-280 and Geneva Avenue, is a hub for local and regional travel in San Francisco. There is a constant interchange of customers between BART and the Muni stops located nearby. The BART station is the southernmost in the City of San Francisco. It experiences over 15,000 daily passenger boardings, making it the busiest in the BART system outside of downtown San Francisco (BART Station Profile Survey, 2008). In addition to BART, three Muni LRT lines—J, K, and M—serve the station. Over 2,700 customers board these lines daily. Several bus lines also serve the station. Almost 6,900 patrons board Muni buses in the area each day at the North and South Geneva Transit Plazas (TEP, 2008).

**Transfers are a critical activity at the station. There is no official parking and most customers (70 percent) access the station by transit.** The rest walk (18 percent) or are dropped off (7 percent); only 2 percent drive alone or carpool.<sup>1</sup> The importance of the station for transit transfers will increase as major redevelopment projects are built in the southwest and southeast corners of San Francisco.

Because the various components of the station were developed at different times, passenger interchange pathways are not coordinated and often unclear. Wayfinding signage is inadequate. Moreover, some of the Muni LRT lines must be boarded and alighted at stops located within the maintenance yard, which presents a potentially hazardous situation, as illustrated in **Figure 2**. The maintenance facilities themselves have been taxed beyond their design capacity. The confusing and conflicting movements of people, traffic, and transit vehicles have made the Balboa Park area feel like a place that's unfriendly to pedestrians. Ironically, the availability of so many transit lines here makes Balboa Park an excellent location for transit-oriented development.

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<sup>1</sup> Access mode percentages taken from the *2009 Transit Passenger Intercept Survey* completed as part of this study. The results of the survey are discussed in more detail in Chapter 4: Needs Assessment.

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 2. Background

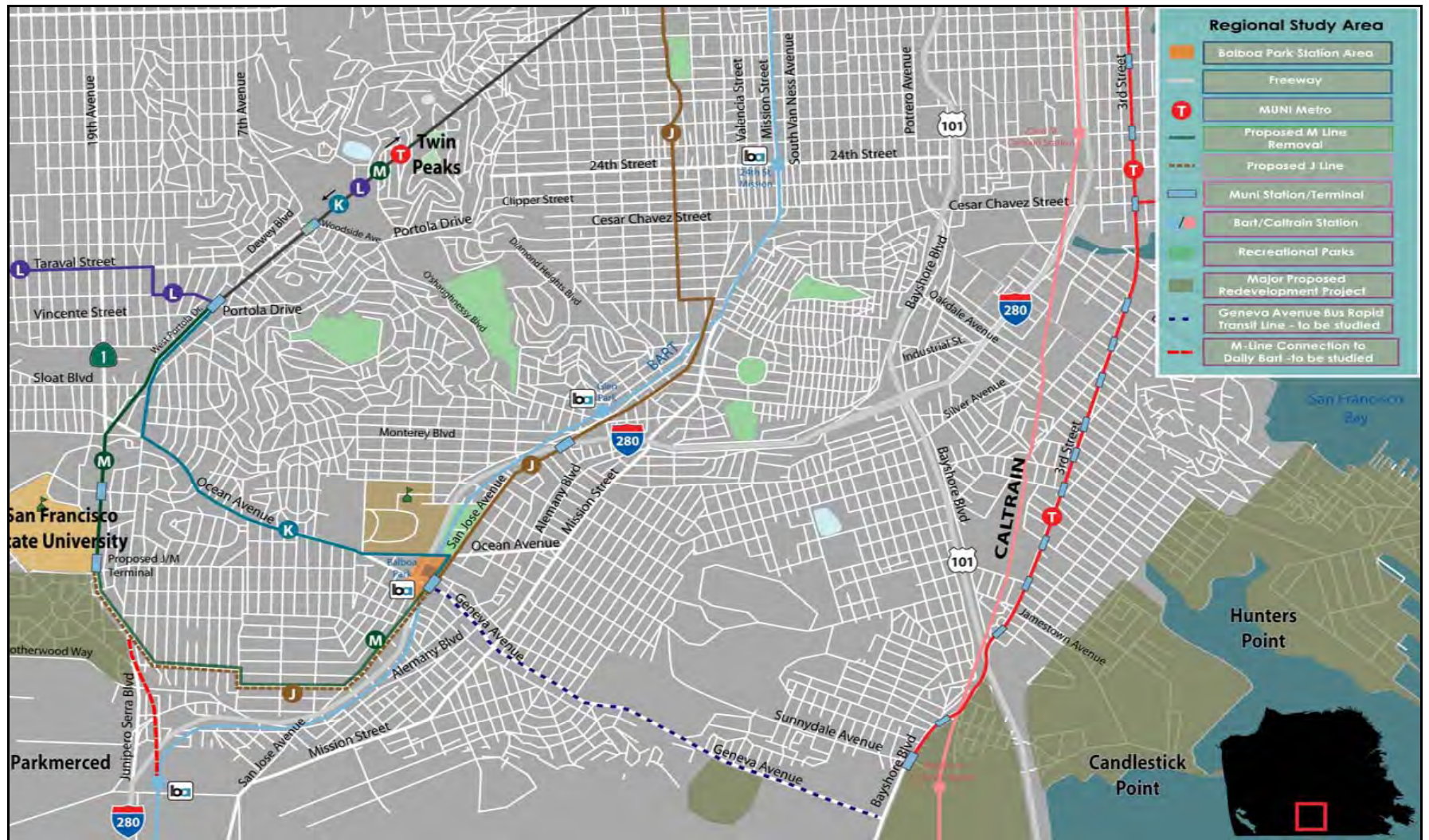


Figure 1A: Subregional Area of Balboa Park



# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 2. Background



Figure 1B: Subregional Area of Balboa Park



Figure 2: Customers Walking through the Green Yard on Revenue Track (i.e., track used for transit service)

Nonetheless, the importance of the site as a maintenance facility should be considered when assessing redevelopment opportunities. The maintenance facility is conveniently located at the termini of the J, K, and M LRT lines. Few other locations are suitable for such a facility, especially in a relatively central location.

Over the years, many recommendations have been developed for improving transit conditions at Balboa Park. The most definitive are presented in the *Balboa Park Station Area Plan* (adopted in April 2009), which provides a blueprint for safer and more convenient passenger interchange. The plan also encourages infill development to create a “sense of place” for what is now basically a utilitarian complex. The *Station Capacity Study* is one of several studies designed to help implement the vision of the *Balboa Park Station Area Plan*. It concentrates on improving the functionality of the station and maintenance facilities, as well as the viability of joint development nearby.

### 3. Related Studies and Projects

As part of the *Station Capacity Study*, the project team reviewed the feasibility of selected improvement proposals from previous studies involving this transit complex. These proposals were prepared by the City of San Francisco, BART, SFMTA and San Francisco County Transportation Authority (SFCTA). Table 1 summarizes the studies and projects reviewed during the preparation of this report.

*Table 1: Related Studies and Projects*

Study/Project Title	Year	Description
Balboa Park Station Area Plan (City of San Francisco Planning Department)	2009	This plan represents the vision for neighborhood development surrounding the Balboa Park Station, including transportation improvements to nearby streets, to fundamentally change the built environment in the Balboa Park Station area.
Balboa Park Station Area Plan Environmental Impact Report (EIR)	2008	This EIR analyzes the potential environmental impacts of the project and program level components of the Balboa Park Station Area Plan.
BART Comprehensive Station Plan & BART Station Profile Study	2002 & 2008	This plan specifies improvements that BART is planning for the Balboa Park Station. The 2008 Station Profile Study provides statistics on BART customers and includes survey data on travel patterns, access modes and demographics.
SFMTA Geneva Corridor Transit Preferential Streets (TPS) Study	2011	This study is intended to discuss implementation of a number of potential short- and mid-term transit improvement measures consistent with Geneva Avenue's other long-term development plans.
SFMTA Transit Effectiveness Project (TEP)	2008 (revised 2011)	The TEP contains comprehensive, systemwide recommendations designed to improve the reliability, speed, and frequency of transit service in San Francisco.
Balboa Park Station Pedestrian and Bicycle Connection Project	2009	The project identifies and proposes short- and mid-term improvements to improve conditions for pedestrians and bicyclists in the Balboa Park Station area.
San Francisco/San Mateo Bi-County Study	n/a	The study assesses transportation impacts and transportation improvements needed to address current and anticipated land use growth in the nearby Bi-County Study Area.
Parkmerced Development Plan	2011	A 30-year plan that proposes redeveloping the existing Parkmerced apartment complex located in the southwest corner of San Francisco. The plan includes extending the Muni M Line to Parkmerced and co-locating light rail storage and layover facilities.
SFCTA Strategic Analysis Report (SAR) on Balboa Park BART Station Area Parking and Fast Pass	2003	This study provides a brief analysis of on-street parking in the Balboa Park Station area. It was completed prior to the 2003 opening of the Millbrae/SFO BART extension, which may have changed the pattern of parking at Balboa Park by increasing BART parking closer to Peninsula commuter homes.

These studies provide insights on the problems experienced in Balboa Park over the years, as well as specific improvements proposed to remedy them. This chapter summarizes the content of these studies as they relate to the Station Capacity Study's objectives of examining long-term proposals at a "high level" and shorter term improvements in a more focused manner.

#### **Balboa Park Station Area Plan**

The *Balboa Park Station Area Plan*, launched in 2000 and adopted in 2009, is part of a citywide effort to balance job growth, housing needs, and quality of life in San Francisco. **A central aim of the *Balboa Park Station Area Plan* is to strengthen the link between transportation and land use.** Many of the plan's goals focus on the latter, encouraging the creation of a mixed-use, active neighborhood around the Balboa Park BART Station and developing additional retail space. These goals are intended to contribute to the creation of a pedestrian- and bicycle-friendly neighborhood that centers on convenient, reliable public transportation.

**Figure 3** illustrates the area encompassed by the *Balboa Park Station Area Plan*. The easternmost section Transit Station Neighborhood, is the approximate focus of the *Station Capacity Study*.

The plan's Transportation Element includes a number of objectives and policies to improve multimodal access around the Station Area, which are summarized in Table 2.



## Balboa Park Station Capacity and Conceptual Engineering Study

### Chapter 3. Related Studies and Projects



Figure 3: Balboa Park Station Plan Area (Source: Balboa Park Station Area Plan)

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 3. Related Studies and Projects

Table 2: Balboa Park Station Area Plan Transportation Element: Objectives, Policies & Implementation

Objective	Polices	Estimated Time Frame	Status/Report Recommending
2.1 Emphasize transit improvements that support the neighborhood.	2.1.1 Re-design the Balboa Park BART Station	Mid- to Long-term (6-10+ years)	Current Feasibility Analysis
	2.1.2 Reconfigure the Phelan Bus Loop	Short- to Mid-term (1-10 years)	Partially funded, seeking gap funding
2.2 Reconstruct and reconfigure major streets in the plan area to encourage travel by non-auto modes.	2.2.1 Re-design Geneva Ave station area	Short- to Mid-term (1-10 years)	<i>Ped and Bike Project</i> recommendations 3.1-3.3; included in Feasibility Analysis, and <i>Geneva Corridor TPS Study</i>
	2.2.2 Re-design San Jose Ave to better accommodate LRVs	Mid-term (6-10 years)	<i>Ped and Bike Project</i> recommendations 1.1-1.4; included in Feasibility Analysis
	2.2.3 Re-design Ocean Ave as a transit and pedestrian boulevard	Short- to Mid-term (1-10 years)	<i>Ped and Bike Project</i> recommendations 6.1-8.3; included in Feasibility Analysis
	2.2.4 Re-design Phelan Ave	Mid-term (6-10 years)	SFMTA <i>Bike Plan</i> and <i>City College Master Plan</i>
2.3 Reconnect neighborhoods bisected by the I-280.	2.3.1 Minimize the physical barrier of I-280 (SPUI & freeway deck)	Mid- to Long-term (6-10+ years)	Current Feasibility Analysis. Upcoming SFCTA Study.
2.4 Encourage walking, biking, public transit as the primary means of transportation.	2.4.1 Pedestrian, bicycle & transit improvements to main streets in Plan Area	Short- to Mid-term (1-10 years)	<i>Ped and Bike Project</i> , all recommendations
	2.4.2 Improve bicycle connections	Short-term (1-5 years)	<i>Ped and Bike Project</i> recommendation 7.1
	2.4.3 Improve transit	Short- to Mid-term (1-10 years)	<i>Ped and Bike Project</i> recommendations 1.3, 5.3, 8.2, 8.3; LRV improvements included in Feasibility Analysis



The plan also contains a number of Parking Element objectives that support the *Balboa Park Station Area Plan*'s overall goals:

Objective 3.1 Establish parking standards and controls that promote quality of place, affordable housing and transit-oriented development.

Objective 3.2 Ensure that new development does not adversely affect parking availability for residents.

Objective 3.3 Ensure that new off-street parking does not adversely affect neighborhood character or the pedestrian friendliness of streets in the plan area.

Objective 3.4 Establish parking policies to support revitalization of the Ocean Avenue neighborhood commercial district.

Objective 3.5 Establish parking policies to support the new transit station neighborhood.

In addition, the Built Form Element of the plan includes an objective to guide the design of the Balboa Park transit station area:

Objective 6.3 Develop the transit station neighborhood to emphasize its importance as a transit hub and local landmark.

Many of the plan's transportation objectives aim to improve pedestrian and bicycle safety as well as access to the Balboa Park BART Station and Muni light rail and bus lines that serve the area. Furthering this goal, the recently completed *Balboa Park Station Pedestrian and Bicycle Connection Project* provides a series of short- to mid-term recommendations to improve walking and bicycling to and from destinations around the Station Area.

In addition to providing transportation improvement recommendations, **the plan identifies two potential development sites adjacent to the station: one at the Upper Yard and one on the east side of San Jose Avenue, north of Geneva Avenue.** The *Balboa Park Station Area Plan EIR* assumed that the Upper Yard has the capacity for some 200 residential units and 10,000 gross square feet of retail use, while the site on the east side of San Jose Avenue could accommodate another 200 residential units.

The *Balboa Park Station Area Plan* proposes visionary solutions for the study area. The plan's development process, however, did not include a detailed level of conceptual engineering and feasibility review. The *Station Capacity Study* reviews the feasibility of the following specific projects proposed in the plan.

- Freeway Deck
- Single-Point Urban Interchange (SPUI)
- Redevelopment of the Upper and Green Yards

- Ocean Avenue Improvements
- Geneva Avenue Station Entrance Improvements

## **Balboa Park Station Area Plan Environmental Impact Report (EIR)**

The EIR assesses project and program level components of the *Balboa Park Station Area Plan*. The EIR includes two project-level components: the Phelan Loop and Kragen Auto Parts mixed-use redevelopments. It also assesses several program level components: street network changes; transit facility changes; changes to existing open space and proposed new open spaces; and urban design and architectural guidelines. The EIR was certified on December 4, 2008. Additional environmental review may be required for program-level transportation improvements addressed in the certified EIR.

## **Comprehensive Station Plan**

BART's *Comprehensive Station Plan* proposes specific modifications as part of future station development and suggests improvements to the surrounding neighborhood and its transportation infrastructure. A collaborative process incorporated input from external stakeholders, such as community organizations, educational institutions, and public and private sector entities. The purpose of the plan is to address the station's safety and capacity issues and help stimulate transit-oriented development. With its high ridership, BART considers these improvements to be critical. The following improvements were proposed in the *BART Comprehensive Station Plan* to help enhance accessibility and increase capacity at the station.

### ***South Geneva Transit Plaza Elevator***

Phase 1B of the *BART Comprehensive Station Plan* includes a proposal for new stairs, escalator and elevator at the south end of the BART mezzanine, on the south side of Geneva Avenue. These facilities would enhance access to and from the station for anyone for whom walking is difficult, as well as for families with young children. This enhanced entrance would also complement the proposed redevelopment of the Upper Yard. At this time, BART may not have the available capital to install these facilities and may have to postpone them. At such time as the Upper Yard is developed, the installation of the elevator would be of primary importance, followed by the escalator if funds are available.

### ***Westside Walkway and Entrance***

Phase 2 of the *BART Comprehensive Station Plan* includes a direct station entrance from Ocean Avenue, with new fare gates, stairs and an elevator. BART has since modified this proposal so that the new entrance is at the north end of the mezzanine level, closer to the midpoint of the station. The new west side entrance was completed in April 2011, providing access to and from Ocean Avenue via the new Westside Walkway. The new west side entrance includes fare gates, ticket machines and an

agent booth. This project provides more direct and safer pedestrian/bicycle access for BART customers from Ocean Avenue.

#### ***Eastside Connector Project***

The Eastside Connector, a companion project to the Westside Walkway, is currently in the conceptual design phase. The connector project was not included in the *BART Comprehensive Station Plan* but was developed to increase access to the Muni J and K lines. This project, shown in **Figure 4**, is envisioned to improve the accessible connections to the Muni J and K lines by providing unimpeded access between the Muni lines and the Westside Walkway. The connector will be constructed over the existing planter box north of the BART mezzanine. The project proposal includes a new accessible alighting platform and ramps to the new west side entrance and the existing BART mezzanine entrance within the yard. This crossing will be critical in order to close off the informal walkway between the station and Ocean Avenue along the Muni tracks east of the BART station box.



Figure 4: Westside Walkway and Eastside Connector with J/K Lines Alighting Platform (Source: BART)

#### **2008 BART Station Profile Study**

BART surveyed riders at its Balboa Park Station in 2008 to determine their mode of arrival, trip purpose, trip origin and destination, and relevant demographic data. **The survey results provide valuable information to help understand station circulation and identify areas of concern.**

This survey shows that on an average weekday, approximately 15,600 BART riders enter Balboa Park Station, of which 62 percent are coming from home and approximately 38 percent are arriving from other places. The access modes for home-based trips are provided in **Figure 5**.

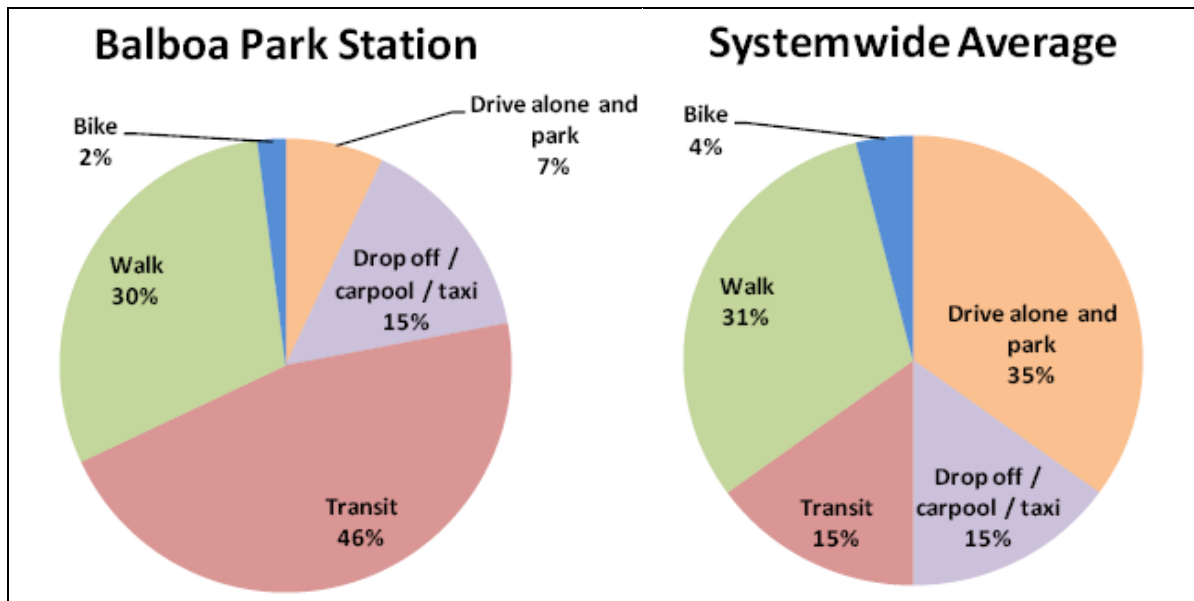


Figure 5: Mode of Access to BART Stations (Home-Based Trips) (Source: Balboa Park Station Pedestrian and Bicycle Connection Project)

**Alternative modes of transportation are important in accessing the Balboa Park Station.** The number of transit riders who are dropped off, carpool, or take a taxi (15 percent) is similar to other BART stations systemwide. However, a significantly lower percentage of Balboa Park Station users drive alone and park at the station. About seven percent of the home-based trips drive alone and one percent carpool to the Balboa Park Station. The study showed that the average driving distance from home is approximately 1.35 miles. Thus, the majority of BART riders who would potentially park in the vicinity of the Balboa Park Station live fairly close, generally within San Francisco.

**Pedestrian accessibility and safety are extremely important. Data from the 2008 study indicate that 30 percent of BART patrons coming from home walk, while two percent bike.** Analysis of these trips shows that while most passengers walk less than a half-mile to the station, a substantial number of passengers walk further. The bicycle catchment area is similar, with most bicyclists' home origins being within one half-mile of the station. A proportion of bicycle trips come from further away, although few bicycle trips exceed one mile.

Unlike other BART stations, the percentage of patrons that arrive at Balboa Park Station using transit is significantly higher, highlighting the importance of transit transfers. Approximately 46 percent of riders coming from home arrive via transit; the BART systemwide average is only 15 percent.

As part of this study, the *Station Profile Study's* results were compared with the 2009 Passenger Intercept Survey.

## **SFMTA Geneva Corridor Transit Preferential Streets (TPS) Study**

Geneva Avenue is one of the 12 “transit preferential streets” (TPS) identified in Muni’s *A Vision for Rapid Transit in San Francisco* (2000). TPS projects are composed of relatively low-cost changes that improve transit reliability and reduce travel time. They are part of the SFCTA Expenditure Plan and are eligible for Proposition K funds. The *Geneva Corridor TPS Study* aims to improve transit performance along the Geneva Avenue corridor and access to bus stops.

Findings from the *Geneva Corridor TPS Study* that are relevant to this study’s project area are:

- Intersection delay/vehicle congestion is caused by the lack of traffic controls at key intersections in the corridor—e.g., Geneva Avenue and Cayuga Avenue, and Geneva Avenue and Delano Avenue—creating unpredictable delays along the corridor.
- **Average bus speeds are low along Geneva Avenue**, especially in the mid-afternoon between 2:00 PM and 4:00 PM, due partly to large pedestrian volumes associated with the three schools in the vicinity of the Balboa Park Station.
- **Some Muni buses have difficulty accessing the bus stop on the north side of Geneva Avenue** (westbound) in front of the BART station. An obstacle for Muni buses is traffic queues on the westbound approach of the intersection with San Jose Avenue. It should be noted that with the service changes implemented on December 5, 2009, the conflicts with layovers are no longer an issue because Muni 26-Valencia route was eliminated and 36-Teresita line no longer serves the Balboa Park Station.
- Vehicle queuing on westbound Geneva Avenue often extends beyond Delano Avenue in the AM peak hour. Thus, motorists frequently use Geneva Avenue east of San Jose Avenue to drop off passengers, causing Muni bus delays at the intersection of Geneva Avenue and San Jose Avenue. (However, this phenomenon was not observed during the intercept survey conducted as part of this study.)

The *Geneva Corridor TPS Study* team has recommendations to:

- Modify the Geneva Avenue westbound approach at San Jose Avenue to include one left turn, one right turn and two through lanes (with a separate left turn phase);
- Signalize the intersection of Geneva Avenue and Cayuga Avenue
- Restripe Geneva Avenue at I-280 to create a westbound right turn pocket onto northbound I-280, westbound left turn pocket onto southbound I-280, and bus-only lane on the overpass; and
- Route Geneva Avenue bus service in mixed-flow curb lanes supplemented by bus bulbs at stops rather than provide exclusive transit lanes.

The *Geneva Corridor TPS Study* also recommends that the Geneva Avenue right-of-way near the Balboa Park BART Station be preserved. No exclusive bus lane is proposed in the vicinity of the station (other than the short section of exclusive curb-side lane adjacent to the station discussed in more detail in Chapter 5).

In the long term, **Geneva Avenue is a potential route for bus rapid transit (BRT) or light rail service.** The exact alignment and termini as well as the timing of this project have not been defined, but light rail on this street is included in the SFMTA long-range unconstrained Capital Improvement Program.

### **SFMTA Transit Effectiveness Project (TEP)**

The *Transit Effectiveness Project* (TEP) was initiated in 2006 and was endorsed by the SFMTA board of directors in 2008. It provides a comprehensive Muni ridership database and recommends ways to transform Muni into a faster, more reliable, and more efficient transit system. The TEP developed a set of preliminary proposals designed to improve reliability, reduce travel delay, and update routes to better meet current and projected travel patterns throughout the city. SFMTA staff is now developing an implementation plan with specific route-level changes. **The TEP recommends implementation or modification of the following routes that are part of the Balboa Park Station's service area:**

- Introduce 28L -19<sup>th</sup> Avenue Limited service to the Balboa Park Station;
- Extend the 43–Masonic from Chestnut/Fillmore to Fort Mason (Marina Boulevard/Laguna), replacing the existing 28-line terminal;
- Extend the 14L–Mission to Daly City BART with additional corridor improvements;
- Reduce service hours of 54–Felton with the last bus departing the Daly City



BART Station at 12:10 AM and departing Hunters Point at 12:50 AM;

- Relocate the Muni westbound bus stop on the far side of Ocean Avenue at San Jose Avenue to the near side of the I-280 northbound on-ramp intersection; and
- Discontinue some M Line service to Balboa Park (a change from an earlier recommendation to extend the J-line to San Francisco State University and discontinue M service to Balboa Park completely).

The TEP recommendations would potentially be implemented in three phases (with phasing and schedule subject to change).

### Balboa Park Station Pedestrian and Bicycle Connection Project

The *Balboa Park Station Pedestrian and Bicycle Connection Project* provide a series of short- to mid-term recommendations to improve walking and bicycling to and from destinations around the station area. Included in the study is an analysis of the streets bordering the station, the BART kiss-and-ride lot, the I-280 freeway ramps on Ocean and Geneva avenues, and potential pedestrian safety improvements at traffic conflict areas. (The *Balboa Park Station Pedestrian and Bicycle Connection Project* is referred to subsequently in this report as the *Ped and Bike Project*.)

The *Station Capacity Study* incorporates and expands on several of the proposed improvements from the *Ped and Bike Project*.

### San Francisco/San Mateo Bi-County Study

The *San Francisco/San Mateo Bi-County Study* identifies the transportation improvements needed to address local and regional land use growth adjacent to the San Francisco County and San Mateo County border. The Bi-County Study identifies **the following development projects that could generate a significant number of additional transit riders on Muni lines serving the Balboa Park Station**. A great deal of transportation investment is needed to serve these development projects, including the concept of BRT or LRT on Geneva Avenue. The proposed development projects (which are included in the demand forecasts in Appendix 1) include the following:

- Brisbane Bayland – Approximately 800 residential units and more that 6.5 million square feet of development is proposed east of the Geneva Avenue/Bayshore Boulevard intersection. An EIR for the project is currently being completed.
- Visitation Valley/Schlage Lock Master Plan – The plan for the former Schlage Lock site at Sunnydale Avenue and Bayshore Boulevard was recently adopted by the San Francisco Redevelopment Agency and construction is underway. It includes approximately 1,250 dwelling units of various sizes and affordability and 100,000 square feet of commercial space, including a mid-sized (40,000- to 50,000-square-foot) grocery store, ground-floor retail and office space.

- Bayview Hunters Point and Candlestick Point Project – This recently approved development includes 2,650 dwelling units, approximately 6 million square feet of mixed-use development and a potential stadium. Executive Park Neighborhood Plan – This plan involves the conversion of office space to create 1,600 residential units.
- India Basin Redevelopment – This project includes 1,240 residential units, 100,000 square feet of commercial uses and 1.4 million square feet of office.

### **Parkmerced Development Plan**

Parkmerced investors recently received approval for a 30-year plan for the existing Parkmerced apartment complex located in the southwest corner of San Francisco. Since it may affect service on the Muni M Line, it has implications to transit operations at Balboa Park. The project is envisioned to be a long-term, mixed-use development program. This effort involves re-planning and redesigning the Parkmerced site, increasing residential density, providing new commercial retail services and transit facilities, while improving utilities within the development site. Approximately 1,683 of the existing apartments located in 11 tower buildings are to be maintained. Over a period of about 30 years, the remaining 1,538 existing apartments are to be demolished in phases and fully replaced, with an additional 5,679 net new units added to the project site. The plan involves extending the Muni M Line into the southeast corner of the Parkmerced project site. It includes co-location of light rail vehicle (LRV) storage and layover facilities.

### **SFCTA Strategic Analysis Report (SAR) on Balboa Park BART Station Area Parking and Fast Pass**

This study, published in March 2003, provides a brief but comprehensive analysis of on-street parking in the Balboa Park Station area. This study was prepared in response to complaints about BART passengers parking in the area, making it difficult for residents and others to find parking. It also assesses the effectiveness of extending use of the Muni Fast Pass on BART to the Daly City Station as a way to alleviate parking problems at the Balboa Park Station. It should be noted that the SAR analysis was completed prior to the opening of the BART extension to Millbrae/SFO in June 2003. Thus, some of the study findings may be out of date. Specifically, the addition of BART stations and extensive parking between Daly City and Millbrae has changed the parking occupancy reported for the Daly City Station area in the SAR and potentially explains the drop in the percentage of people driving to the Balboa Park Station.

### ***Parking Needs Assessment***

A parking needs assessment was made based on the 1998 BART Station Profile Study findings, which shows a substantially higher percentage of people driving to the Balboa Park Station than that of the 2008 Station Profile Study (28 percent vs. 22 percent, including drop-off activities). The SAR estimates that approximately 1,560 BART



passengers were parking at the Balboa Park Station. This was based on the 1998 survey results and the BART daily station boarding counts at the station in 2002. The SAR also included a windshield survey of vehicles parked within a quarter-mile away from the Balboa Park Station. The study shows that approximately 39 percent of the respondents were BART riders.

#### ***Muni Fast Pass Assessment***

The SAR also assesses the potential implications of allowing BART patrons to use Muni Fast Passes at the Daly City Station. **This change could potentially shift some people who drive to the Balboa Park Station to use the Daly City Station for cost savings, thus reducing parking and passenger loading pressure at Balboa Park.** Because this issue is being actively restudied by BART and the SFMTA, the outdated findings on parking and the Fast Pass are no longer relevant.

The study recommends that SFMTA further develop a parking management plan for the Balboa Park Station area, addressing the immediate concerns of residents, visitors, employees, students and others. The study also recommends that a longer-term strategy be developed to complement the Better Neighborhoods Plan's vision for a more pedestrian, bicycle, and transit friendly area with a high density of land uses.

#### **Conclusion**

The studies cited above set the context of transportation and development improvements needed in the Balboa Park station area. They offer insights into the problems currently experienced there, and suggest specific solutions to remedy those problems. This information must be supplemented by more specific analyses that focus on the objectives of the *Station Capacity Study*. This is the subject of the chapter that follows.

## 4. Needs Assessment

As described thus far, Balboa Park Station, located next to I-280, is a transit hub for BART and Muni and also includes a Muni LRT maintenance yard. Due to the number of facilities and the variety of modes in such a small area, local circulation is highly complex and often impeded by the interaction between modes. There is significant interference between traffic, transit, pedestrians and bicyclists. The *Station Capacity Study* has identified issues that hinder circulation for these various modes. The overall purpose of this study is to provide suggestions to improve circulation and the functionality of the station while increasing the viability of the area for transit-oriented development.

This study has identified short-, mid- and long-term space and operating requirements—including passenger boarding/alighting, vehicle access, routing, and layover needs—for Muni bus and LRT lines serving the Balboa Park Station. This chapter includes an analysis of passenger transfer options and requirements based, in part, on the 2009 *Transit Passenger Intercept Survey* discussed earlier. The survey includes questions on passengers' access modes, transfers between Muni and BART lines, origins and destinations, and barriers to transfers (e.g., distances and slopes, characteristics of passengers, attitudes and concerns). *Transit Passenger Intercept Survey* results are available in Appendix 2.

This chapter also addresses:

- Station light rail and bus operations;
- Existing transit ridership;
- Trip origins and destinations;
- Station area accessibility and safety;
- Future transit needs;
- Existing parking demand; and
- Muni LRV maintenance and storage operations.

### Summary of Findings

This study has identified a number of key pedestrian and bicycle access deficiencies and transit needs, as well as opportunities in and around the Balboa Park Station area. The key deficiencies and needs include:

- **Lack of proper/accessible pedestrian pathways to the BART and Muni stations**, including:
  - Substandard pedestrian pathways from Ocean and San Jose avenues to

the station. As a result, a significant number of transit passengers walk next to (or even on) Muni LRT tracks to access the station, which results in actual and potential conflicts between pedestrians and Muni LRT vehicles within the Green Yard.

- Inadequate ADA-accessible routes to the station from Ocean Avenue, San Jose Avenue, and the north and south sides of Geneva Avenue.
- **Lack of proper Muni LRT boarding platforms at Balboa Park Station, including:**
  - Substandard Muni M Line stop near the Geneva Yard.
  - Substandard Muni M Line platform south of Geneva Avenue.
  - Substandard J/ K alighting platform inside the Green Yard.
  - Substandard J/ K boarding stops inside the Green Yard.
- **Traffic congestion along Geneva Avenue that causes delay for Muni buses.**
- **Illegal drop-offs at the north and south sides of Geneva Avenue** near the station and on the I-280 ramps pose safety hazards and lead to traffic conflicts.
- **Lack of station area amenities**, such as proper lighting and signage.
- **Crowded conditions for light rail operations, maintenance and storage** in the Green and Geneva Yards.

Two land use issues also bear upon the needs to be addressed at this station complex:

- Planned development at the Upper Yard could have implications to access, Muni services, kiss-n-ride activity, and parking needs in the area.
- Future land development in the southeast part of San Francisco would significantly increase transit ridership and, consequently, demand for transit services to and from the Balboa Park Station area.

## Station Light Rail and Bus Operations

### Existing Light Rail Circulation

Figure 6 presents Muni LRT routes and stops in the Balboa Park area.

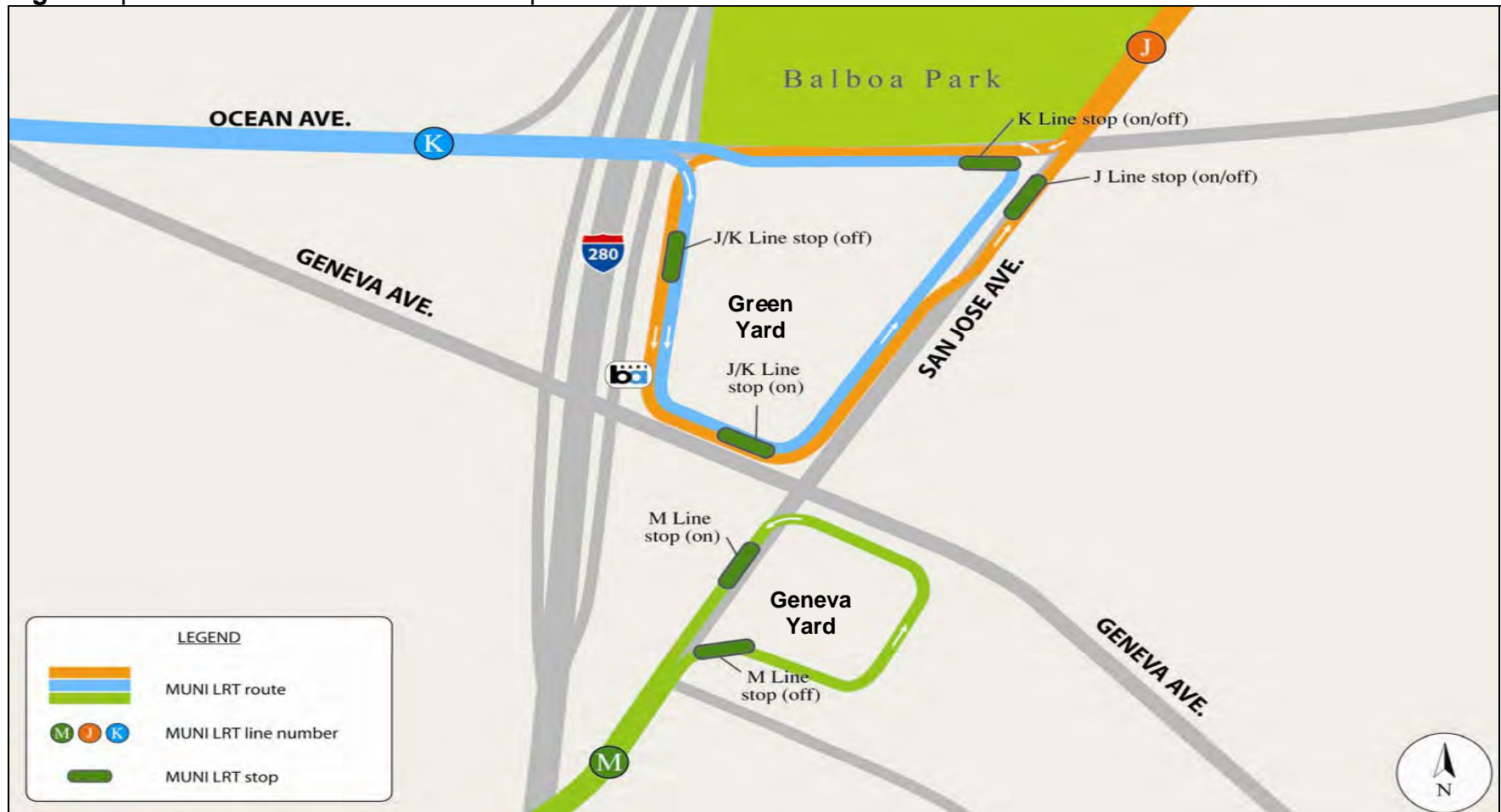


Figure 6: Existing Light Rail Circulation

***Existing J and K Lines Boarding and Alighting Locations in the Green Yard***

The J and K LRT lines share similar operating patterns and facilities at the Balboa Park Station, as follows: Heading east, the K Line enters the northwest corner of the Green Yard from Ocean Avenue, just opposite the I-280 northbound on-ramp. After circulating around the Balboa Park station, it exits onto Ocean Avenue to travel westbound from the yard at the same location. Heading west, the J Line enters the Green Yard from Ocean Avenue at the same location as the K Line. Both of these lines share an accessible mini-high platform for passenger drop-offs, shown in **Figure 7** on the east side of the BART station box.



Figure 7: J/K Line ADA Platform

After dropping off any mobility-impaired passengers, the LRVs pull forward and informally drop off passengers closer to the BART mezzanine. They then move toward two separate layover and passenger pick-up areas inside the yard near the BART mezzanine, shown in **Figure 8**. After laying over, the LRVs pick up passengers from the formal J and K stops parallel to Geneva Avenue. Since the J Line stop and track is lower than that of the K Line, the formal J Line stop is accessed through an underpass below the K Line track. Neither stop is ADA accessible. Mobility-impaired customers must board the J/K Line at the mini-high alighting platform and wait onboard through the layover. The LRVs then pull out, sometimes stopping again to informally pick up customers at the southeast corner of the yard, shown in **Figure 9**. The J Line then travels along the east side of the Green Yard and exits onto San Jose Avenue mid block. The K Line follows a similar route but continues along the runaround track within the yard, making a stop on the curve at Ocean Avenue and San Jose Avenue, and then proceeds to exit the yard near the I-280 northbound on-ramp where it entered.





Figure 8: J and K Lines Boarding Areas near BART Mezzanine



Figure 9: Informal Existing J/K Line Boarding Area at Southeast Corner of the Green Yard

The existing J and K passenger boarding areas, shown in **Figure 8** and **Figure 9**, are located on the south side of the Green Yard. (Since these photos were taken, this area has been reconstructed, but the clearances are essentially the same.) They provide few amenities for customers waiting to board. Due to the design of the station complex and the high volume of LRVs serving it, there is limited waiting space for customers. The stops are located below the grade of Geneva Avenue (with the J stop even lower than that of the K Line), giving the station a trench-like feeling.

The current operations present two major pedestrian and LRT conflict locations. The first is along the east side of the BART station. Currently, pedestrians and bicyclists use the LRT track area to access the BART station and Muni stops from Ocean Avenue, as shown in **Figure 10**. The Westside Walkway, which is currently under construction, and the Eastside Connector will help eliminate potential hazards that may arise due to the existing configuration.



Figure 10: Pedestrians Walking on the Track Area East of the BART Station Box from Ocean Avenue

The second location is between the BART station mezzanine and San Jose Avenue. **This walkway has insufficient width, and passengers often walk within the envelope of LRVs' maneuvering space.** Due to the very tight clearances, light rail cars pull out of the station and overhang the curved track, as shown in **Figure 11**. A traction power pole, shown in **Figure 12**, also creates a hazardous pinch point for customers using this narrow passageway, parallel to the LRT tracks. The width at the pinch point is only 16 ½ inches. The removal of the pole (funded as part of the Eastside Connection) would widen the walkway to 44 inches at this location. Less serious pinch points would remain. Muni operations have considered fencing off both of these areas from pedestrian access in order to reduce conflicts between pedestrians and LRVs. However, forcing those transferring from BART to the J/K boarding area (or traveling to San Jose Avenue) to use the sloped, narrow Geneva Avenue sidewalk could raise accessibility and legal issues. This area has been repaved and restriped since the photos were taken, but the basic issues remain.



Figure 11: Pedestrian Pathway between BART Mezzanine and San Jose Avenue

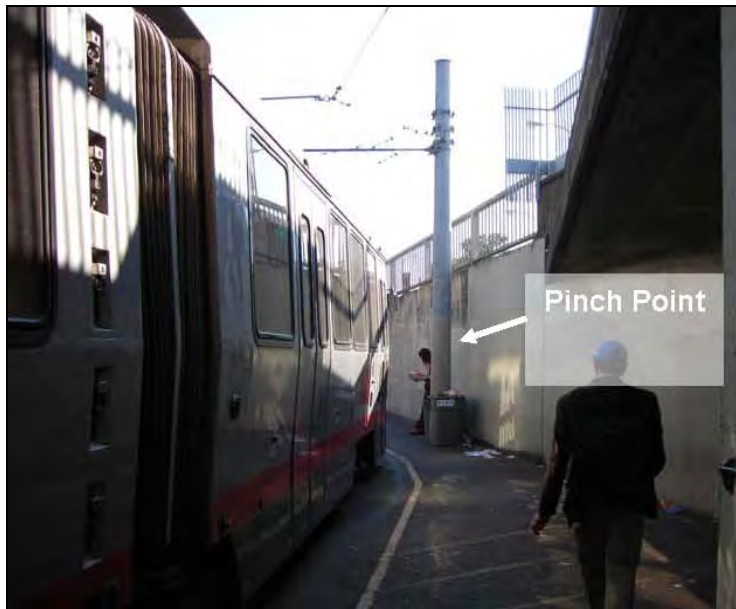


Figure 12: Pinch Point Created by Traction Power Pole

#### **Existing M Line Boarding and Alighting Locations on San Jose Avenue**

The M Line currently serves three stops in the vicinity of Balboa Park Station. Its normal outbound (northbound at this location) terminal stop is located on San Jose Avenue, near the entrance to the Geneva Yard. **This terminal stop is located more than 300 feet south of Geneva Avenue, requiring a long walk to BART or other Muni transit routes.** Moreover, the stop is not immediately adjacent to the intersection and is located on a curve, partially in the street, with no platform or other markings.



This location leads to mid-block pedestrian crossings, with pedestrians possibly obscured from oncoming drivers.

This stop is not accessible for mobility-impaired individuals. If wheelchair customers are aboard, the light rail operator does not turn into the Geneva Yard but drops the other customers off in the street and then continues north on San Jose Avenue to the mini-high platform north of Geneva Avenue (not shown in Figure 6) to drop off mobility-impaired passengers. After laying over, the LRV picks up inbound passengers at a substandard sized platform in the center of San Jose Avenue, just south of Geneva Avenue.

### ***Existing Bus Stop Operations***

The existing Muni bus stops in front of the Balboa Park Station on Geneva Avenue have very heavy customer loadings during both AM and PM peak hours. As of December 2009, there are 34 scheduled Muni buses per hour during the AM peak period (7:00 to 9:00 AM) and 23 per hour during the PM peak period (3:00 to 6:00 PM) at the stop on the north side of Geneva Avenue. At the stop on the south side of Geneva Avenue, there are 23 scheduled Muni buses per hour during the AM peak period and 29 per hour during the PM peak period.

Many of these buses experience delays due to traffic conditions on Geneva Avenue. According to the *Geneva Corridor TPS Study*, during the majority of the day, buses on Geneva Avenue near the station operate at speeds in the lowest quartile for the Geneva Corridor. The average speeds are especially low between 2:00 and 4:00 PM partly due to the large student pedestrian volumes associated with the three schools in the vicinity of the Balboa Park Station. Bus speeds average 13 miles per hour in the eastbound direction and 10 miles per hour in the westbound direction. The maximum average speeds for this segment range from 17 miles per hour in the eastbound direction to 21 miles per hour in the westbound direction. The following circulation conditions around the station cause bus delays:

- High pedestrian volumes;
- Passengers being dropped off illegally in bus zones;
- Existing bus turnouts and curb lines;
- Westbound vehicles queuing east of I-280 due to the previously unsynchronized lights at San Jose and the I-280 ramps;
- Westbound vehicles crossing the path of buses to turn right onto the I-280 northbound on-ramp; and
- Eastbound vehicles crossing the path of buses to turn right into the kiss-and-ride area.

According to the results of the *2009 Transit Passenger Intercept Survey* (discussed in more detail in the following Existing Transit Ridership section), approximately 4 percent of the transit customers at the Balboa Park Station are dropped off in the bus zones on the north and south sides of Geneva Avenue. This illegal action delays buses from reaching the bus loading zone.

Based on existing bus stop standards, **each stop should measure 125 linear feet**, which is sufficient to accommodate one articulated, 60' bus and one standard size, 40' bus, with a five-foot gap between them. **The current length of the existing bus stops is approximately 135 feet on the north side and 118 feet on the south side.** Field observation and video taken for the *Balboa Park Pedestrian and Bicycle Improvement Project (2008)* show occasional overloads by more buses than can be accommodated (approximately five percent of the time) at both of these bus stops. Appendix 3 provides the Muni bus arrival and departure data tabulated from the video. The deficiency on the north side of Geneva Avenue was eliminated after December 2009, when Muni 26-Valencia and 36-Teresita bus services and layovers were discontinued. The deficiency on the south side of Geneva Avenue is caused by both insufficient length to accommodate one articulated and one standard bus (by approximately seven feet) and by the occasional arrival of two articulated buses.

In addition to the length of the bus stops, the actual movement of buses could be improved. The stop on the north side of Geneva Avenue is located in a turnout. While this allows buses to layover without blocking traffic, this stop no longer has any scheduled layovers. Pulling out from such a turnout into mixed traffic can be difficult, as motorists rarely yield to buses. Moreover, at this location, westbound buses leaving the stop conflict with westbound autos turning right across the buses' path to access the I-280 northbound on-ramp.

Westbound buses also are impacted by delays caused by westbound vehicles queuing at the Geneva Avenue/San Jose Avenue intersection. During field observations, the intersection had one or more lanes blocked 14 times during a one-hour period during the PM peak. The majority of vehicles had been attempting to make a north- to westbound left turn onto Geneva Avenue coming from San Jose Avenue. Many of these vehicles were trying to get into the center lane so that they would be able to make a west- to southbound left turn onto the I-280 southbound on-ramp further down Geneva Avenue. Most of this queuing was caused by the fact that the signals along Geneva Avenue were not synchronized, but the SFMTA arranged for better coordination with Caltrans signals. The signal at Geneva and San Jose avenues is operated by SFMTA, while the signals at the I-280 ramps are operated by Caltrans. The queuing is also caused by pedestrians crossing the intersection and LRVs dropping off passengers at the M Line accessible alighting platform north of Geneva Avenue.

Across the street, the issues are somewhat different. There is no actual turnout, but the configuration of the curb line essentially forms one, as it is angled southerly away from the centerline of the street. As with the north side stop, buses can have problems leaving the curb. They are sometimes cut off by autos entering and leaving the kiss-and-ride facility directly south of the bus stop. Improvements are needed on both sides of the street for bus access and, especially, egress from the stops.

## **Existing Transit Ridership**

To supplement the 2008 TEP data, a *Transit Passenger Intercept Survey* was completed as part of this study to better understand existing ridership during peak periods. The objective was to collect more precise data on the volumes and pathways used by customers traveling to and from the station or transferring among the station's many component parts. The survey was performed on three days during both the AM and PM peak periods. It helps explain customers' access modes, transfers between Muni and BART lines, origins and destinations, and barriers to transfers (e.g., distances and slopes, characteristics of passengers, attitudes and concerns). Appendix 2 presents the *Balboa Park Station Transit Passenger Intercept Survey*.

To determine whether the *Transit Passenger Intercept Survey* results were consistent with the *BART Balboa Park Station Profile Study*, the access modes for BART customers were compared. The BART Station Profile data for home based and non-home based trips were combined.

Table 3 compares the Balboa Park Station access modes between the *2008 BART Balboa Park Station Profile Study* and the *2009 Balboa Park Station Transit Passenger Intercept Survey*. A consistent pattern is shown. **The modes most often used to access the Balboa Park Station are transit and walking, followed by auto drop-off.** Other modes, such as driving alone, carpooling, bicycling, and shuttle bus are less frequent. The *Transit Passenger Intercept Survey* updates the information collected from the *2008 BART Station Profile Survey* and also provides information for Muni customers. More detailed information is provided in Table A in Appendix 4.

*Table 3: Comparison of BART Station Profile Survey and Transit Passenger Intercept Survey*

Access Mode	Percentages	
	BART Station Profile	Intercept Survey
Walk	45%	36%
Transit	37%	36%
Drive Alone	5%	3%
Carpool	1%	2%
Dropped Off	10%	15%
Bicycle	2%	2%
Shuttle	-	3%
Taxi	-	0%
Other	-	2%
Total	100%	100%

### ***Existing Transit Ridership and Boardings***

Table 4 presents existing Muni customer volumes before buses arrive at the stops and after they depart, along with their associated load factors.<sup>2</sup> These data were collected prior to the December 5<sup>th</sup>, 2009 service changes. According to this data, **the vast majority of the Muni lines operating in the vicinity of the Balboa Park Station do not operate above capacity.** In fact, they operate with ample space to accommodate more customers. The peak load points for these lines are at other locations, not in the vicinity of Balboa Park.<sup>3</sup>

Table 5 presents existing daily, AM and PM peak hour boarding and alighting data for Muni bus routes and LRT lines serving the Balboa Park Station area. **Figure 13** provides the total boarding/alighting counts at all Muni transit stops in the Balboa Park Station area.

<sup>2</sup> Load factor is calculated by dividing ridership by 85 percent of total capacity (Muni standard load).

<sup>3</sup> The existing Muni line load factors calculated at these stops are based on bus frequencies from the TEP database rather than on frequencies from printed timetables.

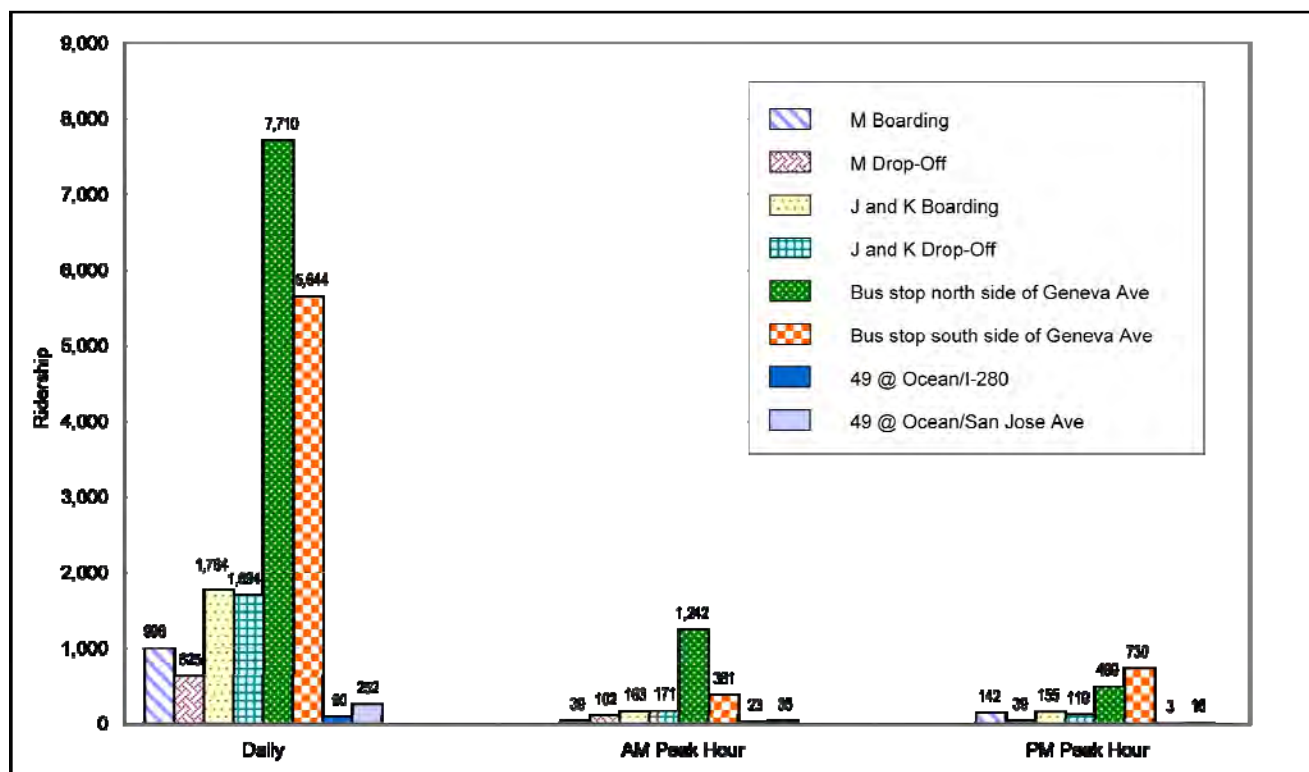


Figure 13: Total Boarding and Alighting Counts (Source: TEP, 2008)

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 4. Needs Assessment

Table 4: Muni Customer Volume and Load Factor at Balboa Park Station (Source: TEP, 2008)

Description	Line	Direction	Before Arriving				After Departure			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Passenger Volume	Load Factor	Passenger Volume	Load Factor	Passenger Volume	Load Factor	Passenger Volume	Load Factor
M Boarding	M	Inbound	29	4%	93	14%	68	10%	235	35%
M Drop-Off	M	Outbound	109	16%	39	6%	9	1%	0	0%
J and K Boarding	J	Inbound	0	0%	0	0%	69	10%	57	8%
	K	Inbound	0	0%	0	0%	94	14%	98	15%
J and K Drop-Off	J	Outbound	41	6%	83	12%	0	0%	9	1%
	K	Outbound	130	19%	45	7%	0	0%	0	0%
Bus stop north side of Geneva	9X	Outbound	500	52%	0	0%	176	18%	0	0%
	9AX	Outbound	0	0%	61	13%	0	0%	58	12%
	9BX	Outbound	0	0%	89	19%	0	0%	76	16%
	26	Inbound	20	12%	0	0%	0	0%	0	0%
	26	Outbound	0	0%	0	0%	4	2%	9	8%
	29	Inbound	316	98%	105	39%	291	91%	185	69%
	36	Inbound	0	0%	0	0%	30	26%	22	19%
	36	Outbound	11	10%	0	0%	0	0%	0	0%
	43	Inbound	302	94%	114	35%	217	68%	138	43%
	54	Outbound	139	87%	55	34%	55	34%	92	57%
	88	Outbound	244	65%	0	0%	1	0%	0	0%
Bus stop south side of Geneva	9X	Inbound	0	0%	268	28%	0	0%	609	64%
	9AX	Inbound	208	43%	0	0%	218	45%	0	0%
	9BX	Inbound	174	54%	0	0%	182	57%	0	0%
	29	Outbound	140	52%	108	50%	99	37%	151	70%
	43	Outbound	97	26%	109	34%	70	19%	176	55%
	54	Inbound	118	73%	26	24%	65	40%	79	74%
	88	Inbound	0	0%	0	0%	0	0%	142	44%
49@ Ocean and I-280	49	Inbound	83	13%	71	11%	64	10%	70	11%
49@ Ocean and San Jose	49	Outbound	148	19%	67	10%	121	15%	55	9%

# Balboa Park Station Capacity and Conceptual Engineering Study

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Notes: Load factor is calculated by dividing ridership by the capacity of the transit vehicle in question; the SFMTA peak period standard is an average load of 85% of vehicle capacity. Capacity is based on number of buses operating per peak hour, according to data collected by the TEP, not on the scheduled number of buses.

Table 5: Muni Boarding and Alighting Data at Balboa Park Station (Source: TEP, 2008)

Description	Boarding						Alighting						Total					
	Daily		AM Peak Hour		PM Peak Hour		Daily		AM Peak Hour		PM Peak Hour		Daily		AM Peak Hour		PM Peak Hour	
	Vol	%	Vol	%	Vol	%	Vol	%	Vol	%	Vol	%	Vol	%	Vol	%	Vol	%
M Boarding	993	10%	39	7%	142	11%	3	0%	0	0%	0	0%	996	5%	39	2%	142	8%
M Drop-Off	0	0%	1	0%	0	0%	625	7%	101	6%	39	10%	625	3%	102	5%	39	2%
J and K Boarding	1,751	18%	163	28%	155	12%	13	0%	0	0%	0	0%	1,764	9%	163	8%	155	9%
J and K Drop-Off	0	0%	0	0%	0	0%	1,694	19%	171	11%	119	31%	1,694	9%	171	8%	119	7%
Bus stop north side of Geneva	2,702	28%	242	41%	315	24%	5,008	55%	1,000	64%	174	45%	7,710	41%	1,242	58%	489	29%
Bus stop south side of Geneva	4,160	43%	139	24%	688	53%	1,484	16%	242	15%	42	11%	5,644	30%	381	18%	730	43%
#49 @ Ocean and I-280	25	0%	2	0%	1	0%	65	1%	21	1%	2	1%	90	0%	23	1%	3	0%
#49 @ Ocean and San Jose	32	0%	4	1%	2	0%	220	2%	31	2%	14	4%	252	1%	35	2%	16	1%
Total Muni Boarding/Alighting	9,663	100%	590	100%	1,303	100%	9,112	100%	1,566	100%	390	100%	18,775	100%	2,156	100%	1,693	100%

**About 18,800 daily boardings and alightings occur at Muni bus and LRT stops in the vicinity of the Balboa Park Station;** 2,200 passengers board or alight Muni buses or LRVs during the AM peak hour; and 1,700 customers board or alight during the PM peak hour. Of the total daily boardings, 6 percent occur during the AM peak hour, and 13 percent occur during the PM peak hour. This pattern is reversed for daily alightings, with 17 percent occurring during the AM peak hour, and 4 percent occurring during the PM peak hour.

Table 5 shows that **the largest number of boardings and alightings during the AM and PM peak hours occurs at the Geneva Avenue bus stops**, both on the north and south side of Geneva Avenue (76 percent during the AM peak and 72 percent during the PM peak). During the AM peak hour, the greatest amount of boarding and alighting of Muni buses occurs on the north side of Geneva Avenue—1,242 customers (58 percent). During the PM peak hour, the greatest number of boardings and alightings of Muni buses occurs on the south side of Geneva Avenue—730 customers (43 percent). The J/K Line stop has the second highest number of boardings and alightings, with eight percent of total Muni customer boardings during the AM peak hour. The M line stop has the lowest number of Muni customer boardings, with only five percent during the AM peak hour.

### ***Passengers' Access Modes***

According to the *Transit Passenger Intercept Survey*, 70 percent of customers arrive at Balboa Park Station via transit, as shown in **Figure 14**. **Figure 15** and **Figure 16** graphically depict the percentages of the various access modes for BART, Muni buses, and Muni LRT vehicles during AM and PM peak periods. More detailed information from the *Transit Passenger Intercept Survey* is provided in Tables B and C in Appendix 4.



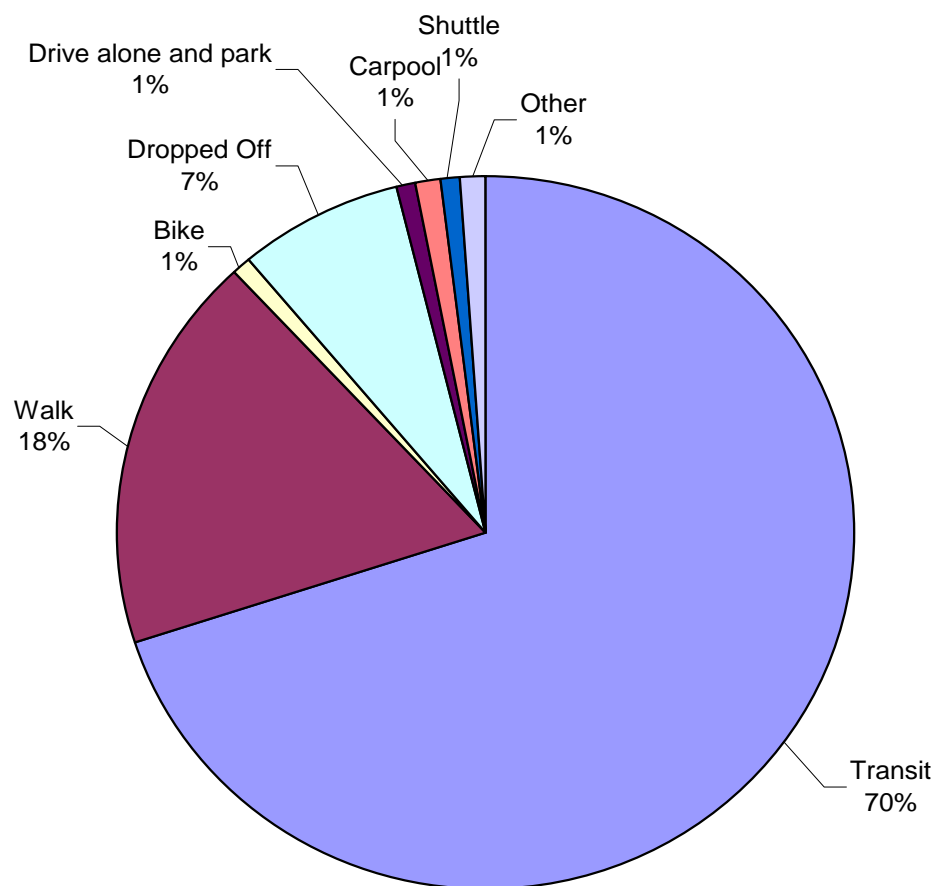


Figure 14: Access Modes for AM and PM Peak Periods (Source: Transit Passenger Intercept Survey, 2009)

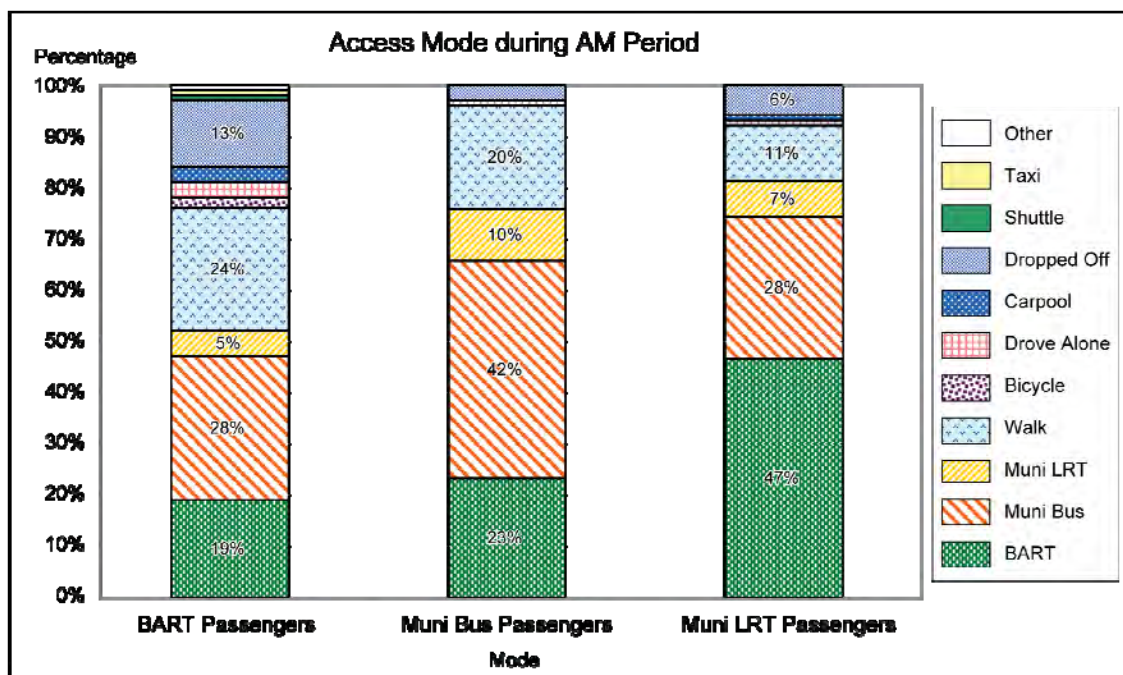


Figure 15: Percentage Access Mode during AM Peak (Source: Transit Passenger Intercept Survey, 2009)

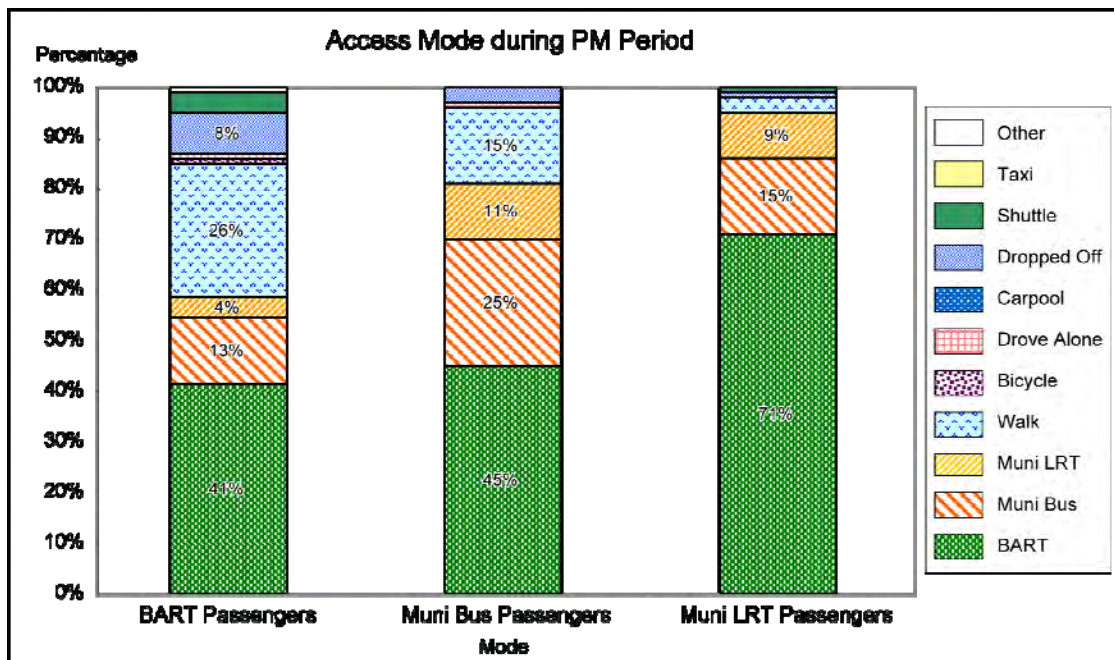


Figure 16: Percentage Access Mode during PM Peak (Source: Transit Passenger Intercept Survey, 2009)

The following observations were made from the survey data for the AM peak period:

- **Most BART riders take Muni buses (28 percent) or walk (24 percent) to the Balboa Park Station.** Fewer riders transfer from another BART line (19 percent) or are dropped off (13 percent). Only six percent reported that they drive or carpool, and two percent indicated that they bike to BART. It should be noted that the 19 percent of riders who transfer from one BART line to another BART line never leave the BART station. Internal BART station improvements were not considered for the transfer improvements in this study.
- Most Muni bus customers use transfers to other Muni bus lines (42 percent), transfer from BART (23 percent), or walk (20 percent). A few bus customers transfer from Muni LRT lines (10 percent), are dropped off (3 percent), or drive (1 percent). No bike users or carpoolers were surveyed.
- Most Muni LRT customers access the Muni LRT lines via BART (47 percent), Muni buses (28 percent), or walking (11 percent). Fewer customers transfer from other Muni LRT lines (7 percent), are dropped off (6 percent), or drive (2 percent). No bike users were observed.

The following observations were made from the survey data for the PM peak period:

- Most BART riders transfer from another BART line (41 percent) or walk (26 percent). Fewer transfer from other Muni buses (13 percent); and very fewer riders transfer from Muni LRT lines (4 percent), are dropped off (8 percent), drive (1 percent), take a shuttle bus (4 percent), or bike (1 percent).
- Respondents access the Muni bus lines via BART (45 percent) or another Muni bus (25 percent). Fewer walk (15 percent) or transfer from a Muni LRT line (11 percent). Significantly fewer (3 percent) are dropped off or drive (1 percent).
- Most Muni LRT customers transfer from BART (71 percent). Fewer transfer from Muni bus (15 percent) or another Muni LRT line (9 percent). Only 3 percent walk, 1 percent takes a shuttle bus, and 1 percent is dropped off. No respondents reported driving alone or carpooling.

### ***Trip Purpose***

As summarized in Table 6, **during the AM peak period, 56 percent of transit riders at the Balboa Park Station area take transit to work, 20 percent take transit to school**, and 16 percent take transit for recreation or some other purpose. During the PM peak period, 65 percent of transit riders take transit to go home, 17 percent take transit for recreation or some other purpose, and 10 percent take transit to work.

*Table 6: Trip Purpose during the AM and PM Peak Periods (Source: Transit Passenger Intercept Survey, 2009)*

Trip Purpose	AM Peak Period	PM Peak Period
Going Home	7%	65%
Going to School	20%	6%
Going to Work	56%	10%
Other/Recreational	16%	17%
Not Available	1%	2%
Total	100%	100%

Table 7 shows trip purpose by mode of departure from Balboa Park. Approximately 38 percent of users take BART to go home in the PM peak period, while 29 percent take a bus from the stop on the north side of Geneva Avenue. This bus stop, located in front of the BART station, is used most for trips to school (36 percent in the AM peak and 44 percent in the PM peak).

*Table 7: Trip Purpose for BART, LRT, and Bus Customers (Source: Transit Passenger Intercept Survey, 2009)*

Trip Purpose	BART		M Stop		J/K Stop		Geneva Avenue North Side		Geneva Avenue South Side	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Going Home	43%	38%	2%	10%	20%	11%	5%	29%	30%	11%
Going to School	15%	21%	18%	5%	16%	28%	36%	44%	15%	3%
Going to Work	65%	66%	2%	4%	6%	14%	9%	7%	18%	9%
Other/Recreational	69%	59%	1%	3%	15%	19%	4%	12%	11%	8%

More detailed information from the *Transit Passenger Intercept Survey* is provided in Tables D and E in Appendix 4.

### ***Passenger Transfer Activities***

As discussed several times in this report, **transit transfers abound at the Balboa Park Station**. These transfers can take place between systems (e.g., from Muni to BART or vice versa) within systems (e.g., transfer from one BART line to another) and between modes (e.g., transfer between bus and light rail). **Thus, providing wayfinding signage and accessible paths between transit modes is imperative to facilitate customers' transfer and travel activities.**

Transfer travel distance between the different stops are not all equivalent. For example, transfers between other stops and the bus stop on the south side of Geneva Avenue are extremely difficult for mobility-impaired customers. Since there is no elevator or escalator on the South Geneva Transit Plaza, these customers must cross Geneva Avenue at the I-280 northbound ramps or at San Jose Avenue to access the other stops.

To access the M Line from the station area, customers must travel to San Jose Avenue. Two principal routes are used: one is to walk along the southern edge of the Green Yard; the other is to walk along Geneva Avenue. The walking distance to the M Line boarding platform is between 350 and 500 feet from the South Geneva Transit Plaza and the BART mezzanine, respectively. It is over 300 additional feet to these locations from the alighting platform. The pathways have several obstacles, such as no ADA accessible curb ramps at the kiss-and-ride driveway on Geneva Avenue, slopes on Geneva Avenue that exceed those allowable for an ADA accessible route, and inadequate walkway clearance in the Green Yard. The Station Area Accessibility and Safety section of this report discuss many of these issues in more detail. Such obstacles to transfers are extremely important to identify in order to create practical solutions to improve the accessibility between stops.

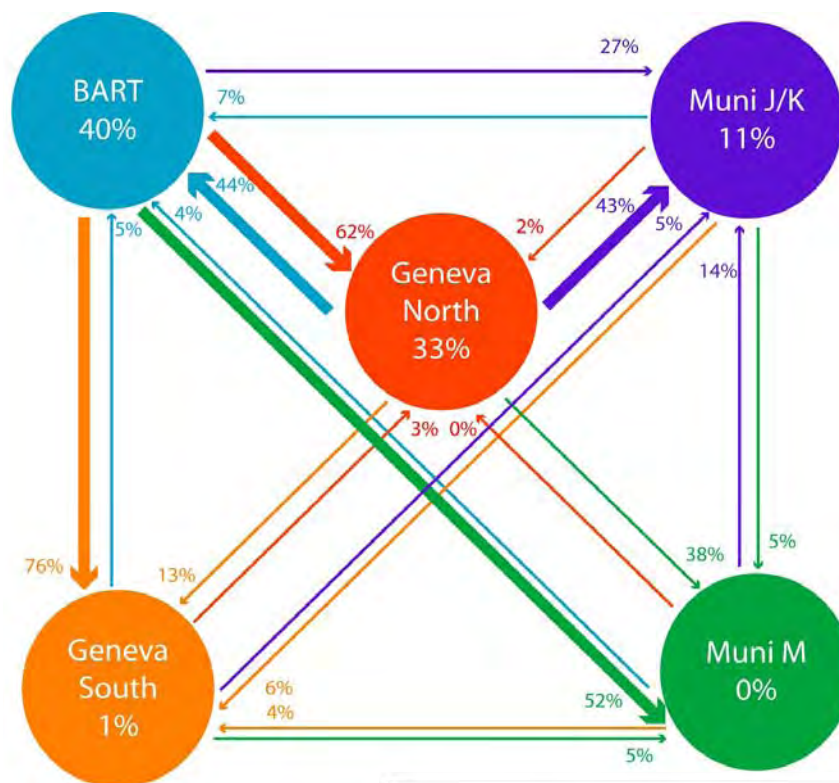
Chapter 5 discusses projects that would improve transfer accessibility. One such project is the relocation of the M Line platforms closer to the Geneva Avenue/San Jose Avenue intersection (Improvement 16). This measure would reduce the walking distance between the M Line and the other stops and providing adequate platforms. Other improvements include ADA accessible curb ramps (Improvement 7), enhancing the pedestrian walkway in the Green Yard (Improvement 6), and installation of an elevator on the South Geneva Transit Plaza (Improvement 5).

**Figure 17** presents passenger transfer modes at each transit stop during the AM and PM peak periods.

**During the AM peak period, most of the Muni bus customers transferring at the Balboa Park Station come from BART, and most of the BART customers transfer from Muni.** However, the intercept survey also shows a significant number of Muni bus customers on the north side of Geneva Avenue coming from another bus route in the same direction (33 percent) and a significant number of BART riders from another BART line (40 percent). Other noteworthy findings include:

- Muni M Line stop – More than half of M Line customers transfer from BART (52 percent) or buses on the north side of Geneva Avenue (38 percent). A small percentage of M Line customers transfer from other Muni lines.
- Muni J/K Line stop – The majority of the J and K customers transfer from Muni bus lines on the north side of Geneva Avenue (43 percent). Others transfer from BART (27 percent) or the Muni M Line (14 percent). A small percentage of J and K customers transfer from other Muni lines.

Transfers during AM Peak Period





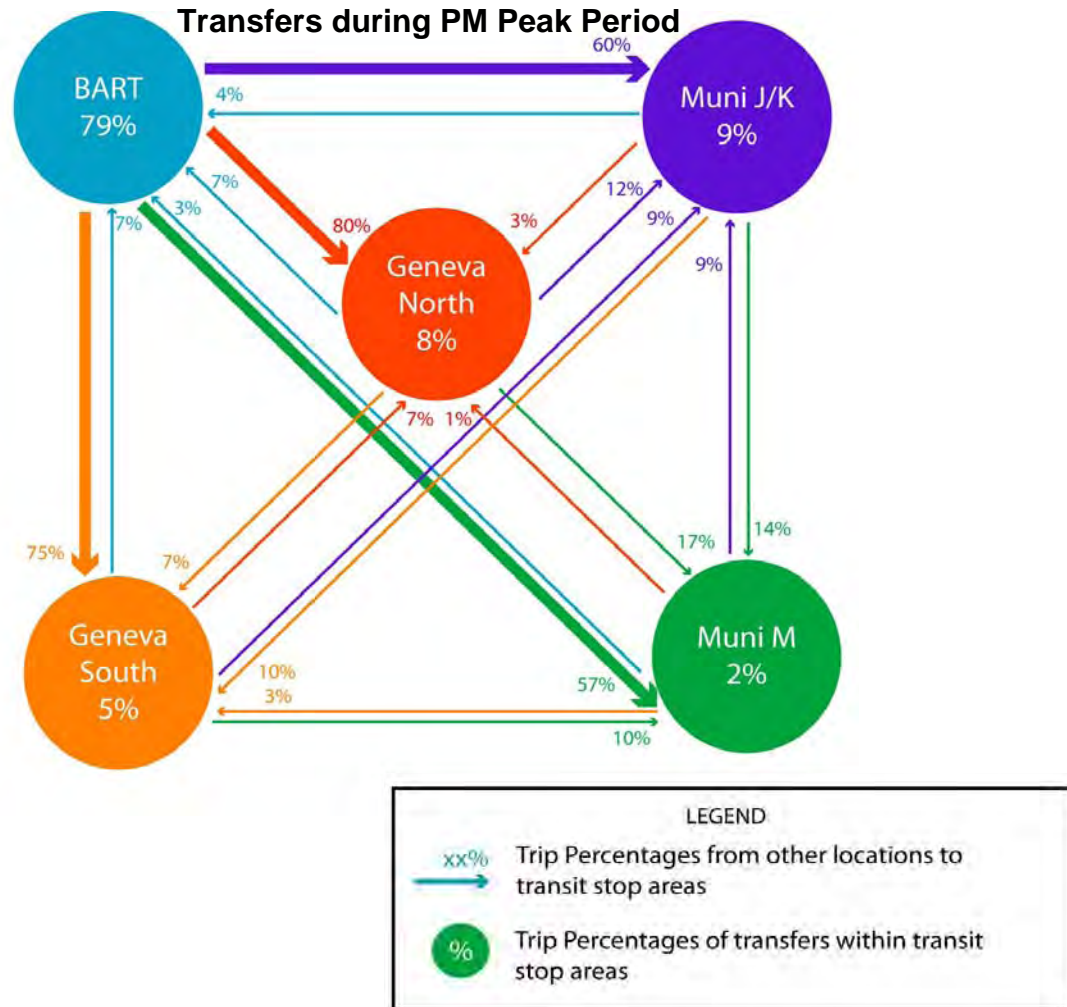


Figure 17: Transit Transfer during AM and PM Peak Periods (Source: Transit Passenger Intercept Survey, 2009)

**Muni stop on the north side of Geneva Avenue –** The majority of customers at this stop transfer from BART (62 percent) or another line stopping at this location (33 percent). A small percentage of Muni customers at this stop transfer from other Muni lines. The high number of transfers from the north side of Geneva Avenue is primarily due to the fact that several lines terminate at the station and, at the time of the survey, 26-Vallencia and 36-Vallencia still provided service to the Balboa Park Station. Service on these lines was discontinued to the station following the December 5<sup>th</sup>, 2009 service changes.

- **Muni stop on the south side of Geneva Avenue –** The majority of customers at this stop transfer from BART (76 percent). A smaller percentage transfer from buses on the north side of Geneva Avenue (13 percent).



- BART station – Almost half of the BART riders transfer from Muni buses on the north side of Geneva Avenue (44 percent). Other BART riders transfer from another BART line (40 percent), or Muni J or K line (7 percent).

**During the PM peak period, transfer activities between BART and Muni are somewhat different, with substantially higher transfers coming from BART (57 to 80 percent). Findings for the PM peak period also included the following:**

- Muni M Line stop – M Line customers transfer from BART (57 percent), buses on the north side of Geneva Avenue (17 percent), J and K lines (14 percent), or buses on the south side of Geneva Avenue (10 percent).
- Muni J/K Line stop – The majority of J and K customers transfer from BART (60 percent). An almost equal percentage of customers come from other Muni LRT and bus stops for the remainder of transfers.
- Muni stop on the north side of Geneva Avenue – The majority of customers at this stop transfer from BART (80 percent). A much smaller percentage of customers transfer from another line stopping at this location (8 percent) or on the south side of Geneva Avenue (7 percent).
- Muni stop on the south side of Geneva Avenue – Three-quarters of the customers at this stop transfer from BART (75 percent). Others transfer from the J or K line (10 percent) or buses on the north side of Geneva Avenue (7 percent). A small percentage of bus customers transfer from other Muni lines.
- BART station – The majority of the BART riders transfer from another BART line (79 percent). A much smaller percentage transfer from Muni buses on the north side of Geneva Avenue (7 percent) and Muni buses on the south side of Geneva Avenue (7 percent). A small percentage of BART passengers transfer from other Muni lines.

## Trip Origins and Destinations

The following section discusses findings related to trip origins and trip destinations. Table 8 and Table 9 summarize the origin and destination breakdown for customers on BART, Muni buses, and Muni LRT vehicles in Balboa Park. The majority of passengers' origins and destinations are within the City of San Francisco.

*Table 8: Trip Origins (Source: Transit Passenger Intercept Survey 2009)*

Origin	BART		LRT		Buses		TOTAL	
	AM	PM	AM	PM	AM	PM	AM	PM
Study Area	13%	7%	2%	1%	3%	1%	19%	9%
SD-1	2%	10%	0%	7%	5%	18%	7%	35%
SD-2	0%	1%	0%	0%	1%	1%	2%	2%
Rest of SD-3	18%	10%	9%	10%	9%	8%	37%	28%

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Origin	BART		LRT		Buses		TOTAL	
	AM	PM	AM	PM	AM	PM	AM	PM
SD-4	5%	2%	1%	2%	3%	2%	10%	6%
<i>San Francisco Subtotal</i>	<i>40%</i>	<i>29%</i>	<i>13%</i>	<i>20%</i>	<i>22%</i>	<i>31%</i>	<i>75%</i>	<i>80%</i>
East Bay	8%	5%	1%	1%	5%	2%	15%	8%
South Bay	6%	9%	1%	1%	2%	2%	10%	12%
North Bay	0%	0%	0%	0%	0%	0%	0%	0%
Out of Region	1%	0%	0%	0%	0%	0%	1%	0%
<b>Total</b>	<b>55%</b>	<b>43%</b>	<b>16%</b>	<b>22%</b>	<b>29%</b>	<b>34%</b>	<b>100%</b>	<b>100%</b>

Table 9: Trip Destinations (Source: Transit Passenger Intercept Survey, 2009)

Destination	BART		LRT		Buses		TOTAL	
	AM	PM	AM	PM	AM	PM	AM	PM
Study Area	0%	0%	2%	5%	4%	10%	6%	15%
SD-1	19%	5%	2%	1%	1%	0%	22%	7%
SD-2	0%	0%	1%	0%	2%	0%	3%	0%
Rest of SD-3	2%	2%	7%	13%	11%	17%	20%	32%
SD-4	0%	0%	5%	3%	4%	2%	9%	5%
<i>San Francisco Subtotal</i>	<i>22%</i>	<i>8%</i>	<i>16%</i>	<i>22%</i>	<i>23%</i>	<i>30%</i>	<i>60%</i>	<i>59%</i>
East Bay	16%	16%	0%	0%	0%	0%	16%	17%
South Bay	18%	19%	0%	0%	6%	4%	23%	23%
North Bay	0%	0%	0%	0%	0%	0%	0%	0%
Out of Region	0%	0%	0%	0%	0%	0%	0%	0%
<b>Total</b>	<b>55%</b>	<b>44%</b>	<b>16%</b>	<b>22%</b>	<b>29%</b>	<b>34%</b>	<b>100%</b>	<b>100%</b>

### ***Trip Origins***

Key patterns observed about trip origins include the following:

- During the AM and PM peak periods, between 75 and 80 percent of trips begin within San Francisco.
- During the AM peak period, the majority of transit riders come from Superdistrict<sup>4</sup> 3 (37 percent), followed by the study area (19 percent), the East Bay (15 percent), Superdistrict 4 (10 percent) and the South Bay (10 percent).
- During the PM peak period, the majority of transit riders come from Superdistrict 1 (35 percent), followed by Superdistrict 3 (28 percent), the South Bay (12 percent) and the study area (9 percent).

### ***Trip Destinations***

- During both the AM and PM peak periods, approximately 60 percent of transit riders are traveling to a destination within San Francisco.
- During the AM peak period, the majority of transit riders have destinations in the South Bay (23 percent), followed by Superdistrict 1 (22 percent), Superdistrict 3 (20 percent) and the East Bay (16 percent).
- During the PM peak period, the majority of transit riders have destinations in Superdistrict 3 (32 percent), followed by the South Bay (23 percent), the East Bay (17 percent) and the study area (15 percent).

More detailed information about trip origins and destinations from the *Transit Passenger Intercept Survey* is provided in Table F and Table G in Appendix 4.

### **Station Area Accessibility and Safety**

In the course of conducting this study as well as reviewing previous studies, a number of deficiencies in pedestrian access were identified in and around the station area. These deficiencies could discourage transit riders and cause safety concerns for both Muni customers and operators. To improve the capacity and accessibility of the station, these deficiencies must be addressed. The Balboa Park Station deficiencies relating to accessibility and safety include:

- **Steep grade - Geneva Avenue has an approximately eight percent continuous grade between San Jose Avenue and the BART station entrance on the North Geneva Transit Plaza.** This grade exceeds the ADA-allowable slope for an accessible route.

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<sup>4</sup> Superdistricts are based on the travel analysis zones established by the Metropolitan Transportation Commission (MTC). There are four superdistricts in the City of San Francisco. Appendix 5 presents the boundaries of these four superdistricts.

- **Lack of an elevator on the south side of Geneva Avenue** - Mobility-impaired customers must therefore cross Geneva Avenue at either the I-280 ramps or San Jose Avenue, adding additional travel distance and exposure to potentially fast moving autos.
- **Inadequate horizontal clearance for the walkway between San Jose Avenue and the BART station, parallel to the K Line tracks** - ADA requires at least three feet of clearance from obstructions for an accessible path.<sup>5</sup> The City of San Francisco *ADA Transition Plan for Curb Ramps and Sidewalks* also identifies any sidewalk narrower than four feet as posing a barrier that restricts access for mobility-impaired pedestrians. Portions of this walkway are narrower due to a traction power pole obstructing the path. The narrowest pinch point is 16 ½ inches. Also, there is no clear delineation between LRT vs. pedestrian right-of-way, and the area does not offer protection from the weather. These deficiencies are highly undesirable and potentially hazardous. Some staff in Muni's Operations Department would prefer to close off the section between the BART mezzanine entrance and San Jose Avenue to the general public. However, the alternative access path involves a narrow and steep sidewalk along the north side of Geneva Avenue, terminating at a small, obstructed corner at the northwest corner of Geneva and San Jose avenues.
- **No formal walkway between Ocean Avenue and the station** - Currently, many pedestrians walk along the east side of the BART station from Ocean Avenue. There is no sidewalk on the east side of the BART station, and pedestrians walk along the J/K tracks, which is both uncomfortable and hazardous. As described previously, this issue is being fully addressed through construction of the Balboa Park Westside Walkway and the East Side Connection Project, which will allow Muni to close off the walking route on the east side to the general public.
- **Non-ADA accessible J/K boarding areas** - Mobility-impaired customers must board at the alighting platform and wait through the layover. For other customers, the J/K boarding areas are near the corner of Geneva Avenue and San Jose Avenue, within the Green Yard. There is no clearly defined walkway and signage to the J/K Line boarding areas. Moreover, the transit passenger waiting areas are very narrow.

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<sup>5</sup> The minimum allowable walkway width clearance is 36 inches. The clear width may be reduced to 32 inches for a maximum length of 24 inches (610 mm) provided that reduced width segments are separated by segments that are at least 48 inches long and 36 inches wide. All accessible walkways with a clear width less than 60 inches require passing spaces at a maximum interval of 200 feet. Passing spaces shall be either: a space 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or, an intersection of two walking surfaces providing a T-shaped space complying with 304.3.2 where the base and arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection.

- Insufficient signage directing transit riders to BART, bus and LRT stops, and appropriate walkways - Wayfinding to the BART station is especially difficult on the south side of Geneva Avenue.
- Inadequate lighting - Currently, there is sufficient lighting at the Muni stops on both sides of Geneva Avenue. However, lighting along Ocean Avenue and other identified locations could be enhanced.
- Deficient M Line alighting area south of the entrance to the Geneva Yard - Customers who are not mobility-impaired are currently dropped off in the street before the LRV pulls into the yard to turn around. There is no platform or formal alighting area at this location.
- Lack of ADA accessible curb ramps at key locations: (1) the driveway of the kiss-and-ride area on Geneva Avenue (recently installed); (2) between the kiss-and-ride drop-off/pick-up area and the South Geneva Transit Plaza; (3) Geneva Avenue and the I-280 northbound ramps; (4) Ocean Avenue and San Jose Avenue; and (5) Ocean Avenue and the I-280 northbound on-ramp.
- Ineffective kiss-and-ride facilities - The existing kiss-and-ride area and the drop-off zone on the north side of Geneva Avenue east of San Jose Avenue are underutilized, most likely due to inconvenient access and the long walking distance to the station. Instead, many customers are dropped off at locations not designated for such use, like the I-280 northbound off-ramp and the location adjacent to the Geneva Transit Plazas. Drop-off activities at these locations are not permitted by current traffic regulations.
- Poor drop-off/pick-up access to the existing elevator on the North Geneva Transit Plaza. Further, the elevator takes customers directly into the paid BART area and not into the unpaid mezzanine area.

### ***Customers' Perceived Barriers to Transfers***

**According to the passengers** who were surveyed in the *Transit Passenger Intercept Survey*, the top five “barriers to transfers” are:

- 1. Lack of signs and information**
- 2. Street crossing/safety**
- 3. Lack of lighting**
- 4. Lack of proper boarding areas**
- 5. Station safety**

Approximately 40 percent of the respondents note the lack of signage (20 percent) and

street crossing/safety concerns (22 percent) as transfer obstacles. Only two respondents (1 percent) report “lack of disability access” as an obstacle for transfers. Five disabled respondents were surveyed: two people used crutches; two were blind; and one with arthritis who had difficulty climbing stairs. All but one of these disabled respondents were going to work. Two of these respondents said that safety at street crossings was an issue for transfers. Field observations record that there were only five disabled persons during the survey periods but there were several adults with young children. (However, station conditions may have discouraged those with disabilities from even using this station.)

### ***Pedestrian Access to the Station***

Table 10 summarizes the routes used by those who walk to the Balboa Park Station. Respondents were asked which intersection/pathway they used to access the station.

*Table 10: Pedestrian Access Route to Station (Source: Transit Passenger Intercept Survey, 2009)*

Access Route	TOTAL		
	AM	PM	AM & PM Combined
Geneva Ave & San Jose Ave	58%	30%	45%
Geneva Ave & I-280	19%	11%	15%
Ocean Ave through the yard	23%	39%	30%
Other			
CCSF	1%	18%	9%
West of I-280	0%	2%	1%
Total	100%	100%	100%

The results of the survey stress the importance of improving pedestrian access from Ocean Avenue. During the AM peak period, 23 percent of the respondents said that they walk from Ocean Avenue and along the J/K tracks to access the station area. Of these, approximately 80 percent are destined for the BART station. During the PM peak period, more than one-third of respondents (39 percent) said that they use Ocean Avenue and walk along the tracks to access the station. Approximately 80 percent of them are heading to the BART station.

Likewise, access from the intersection of Geneva Avenue and San Jose Avenue is also important. A significant percentage of customers (58 percent in the AM peak and 30 percent in the PM peak) access the station from this intersection.

Approximately 20 percent of the respondents during the PM peak period indicated their origin access route as either 'CCSF' or 'West of I-280'. The majority of the 'other' response was 'CCSF', which is fairly significant in the PM peak at 18 percent of the surveyed passengers' origins. These respondents should most likely have responded 'Geneva Avenue & I-280' or 'Ocean Avenue through the yard.'

More detailed information about pedestrian customers' access to the station area from the *Transit Passenger Intercept Survey* is provided in Table H Appendix 4.

### ***Transfer Passengers' Walking Routes***

Table 11 presents walking routes used by transfer passenger. For customers who transfer between BART and Muni buses or LRVs, the majority (57 percent in the AM peak hour and 54 percent in the PM peak hour) reported that they use the Geneva Avenue BART entrance on the North Geneva Transit Plaza for transfers. A relatively high percentage of transfer passengers use the Geneva Avenue underpass walkway (15 percent in the AM peak hour and 24 percent in the PM peak hour) and the Geneva Avenue and San Jose intersection entrance (14 to 13 percent during the AM and PM peak hours, respectively) to transfer between BART, bus and LRT stops. Approximately 10 percent of the transfer passengers reported that they used the BART mezzanine or Muni tracks for transfers in the AM peak hour and 6 percent during the PM peak hour.

*Table 11: Walking Path of BART, Muni Bus, and Muni LRT Transfers (Source: Transit Passenger Intercept Survey, 2009)*

Access Path	AM Peak	PM Peak
BART Mezzanine & Muni track	10%	6%
Geneva Ave entrance on the north side	57%	54%
Geneva Ave & I-280 crosswalk	3%	4%
Geneva Ave & San Jose Ave crosswalk	14%	13%
Underpass walkway under Geneva Ave	15%	24%

More detailed information about transfer passengers' walking routes from the *Transit Passenger Intercept Survey* is provided in Table I in Appendix 4.

### ***Existing Bus Stop Sidewalk Levels of Service***

The width of the sidewalk on the north side of Geneva Avenue in front of the Balboa Park BART Station ranges from eight feet on the eastern end (for a distance of approximately 120 feet) to approximately 10 feet near the station stairway structure. The sidewalk on the south side is substantially wider, at approximately 19 feet.



The 8-foot narrow sidewalk on the north side is substandard, especially when a significant number of Muni customers congregate along this area and wait to board buses. A preliminary calculation of the sidewalk level of service (LOS) at this location, based on the Muni customer boarding and alighting data, shows the sidewalk on the north side of Geneva Avenue operates at the low levels of “E”<sup>6</sup> during the AM peak hour and at “D” during the PM peak hour. The sidewalk on the south side of Geneva Avenue operates at LOS “A” and “C” during AM and PM peak hours respectively. This is consistent with the field observations. Appendix 6 provides the LOS analysis results.

### ***Passenger Drop-Off Locations***

According to the *Transit Passenger Intercept Survey*, 7 percent of customers are dropped off at the station, as shown in Figure 14. The majority of drop-offs (69 percent) occur during the AM peak period.

During the AM peak period, just over half (51 percent) of these respondents reported that they are dropped off in front of the Balboa Park Station on the north side of Geneva Avenue. Nineteen percent stated that they are dropped off on the south side of Geneva Avenue. Neither of these locations is currently designated for drop-offs. A total of eleven percent of the respondents reported using the kiss-and-ride area, while 2 percent said that they are dropped off on the I-280 northbound off-ramp. The remaining 18 percent did not specify a location. (Note: numbers do not add to one hundred due to rounding.)

Other than the formal kiss-and-ride lot, drop-off activities at all these locations are illegal. No one responded that they used the drop-off zone formally designated by the SFMTA on the north side of Geneva Avenue east of San Jose Avenue.

## **Future Transit Needs**

### ***Forecasted 2030 Ridership***

Future Muni transit ridership data were provided by the SFCTA. These data can help determine if today’s walkways and station platforms will be adequate for future station needs. The future year (2030) transit ridership forecast includes the full build-out of several proposed major developments presented in Chapter 3. This ambitious forecast represents a high estimate. It is unlikely that all of these proposed projects would be constructed and occupied and that all of the recommended transportation improvements would be operational by 2030.

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<sup>6</sup> LOS is a qualitative representation of the service conditions. It is based on the average square feet pedestrians occupy. LOS “D” is typically considered as the threshold for potential congested conditions. Low LOS “E” means pedestrians will be in a condition where standing in physical contact with each other is unavoidable, circulation in the queue is not possible, and queuing can only be sustained for a short period without serious discomfort.

Table 12 presents forecasted Muni ridership on transit vehicles approaching and departing from Balboa Park Station. These ridership data were used to estimate the number of Muni buses needed to serve the Balboa Park area in 2030, which will be discussed later and depicted in subsequent tables.

The number of Muni passengers is projected to increase substantially in 2030 during the AM and PM peak hours in both inbound and outbound directions. The biggest change would be in the outbound direction **during the PM peak hour, where ridership would increase from 617 to 1,933 (a 213 percent increase)**. The smallest change would be in the inbound direction during the PM peak hour, where ridership would grow from 1,613 to 2,015 (a 25 percent increase).

The biggest changes in service would be the introduction of the 28L-19<sup>th</sup> Avenue Limited bus line to the project site from the Hunters Point area and the projected ridership increase on the J Line.

#### ***Future Muni Bus Route Modifications***

This study assumed the bus route modifications recommended in the 2008 TEP. According to the TEP, the Muni 29-Sunset and 54-Felton routes would be rerouted to Ocean Avenue adjacent to Balboa Park Station. The other major change in bus service would be the TEP recommendation to introduce the 28L-19<sup>th</sup> Avenue Limited to Balboa Park.

The TEP assumes that Geneva Avenue would continue to be the primary transit corridor. However, it may be possible to make Ocean Avenue the primary transit corridor or relocate additional bus lines to Ocean Avenue to reduce traffic congestion on Geneva Avenue. Additional study would be required. It should be noted that both of these modifications would increase the transfer walking distance between stops.

#### ***Future Muni Bus Schedule and Curbside Loading Needs***

Table 13 presents a preliminary, estimated resource schedule for future (year 2030) Muni bus services at the Balboa Park Station, while Table 14 presents a preliminary estimate of 2030 Muni bus capacity there. No estimation was made for LRT because the number of vehicles needed for light rail lines must serve the maximum load point (MLP) downtown, and there is no future ridership estimation available at these MLPs at this time.

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Table 12: Comparison of Existing and Forecasted (Year 2030) Muni Passenger Volume at Balboa Park Station (Source: SFMTA and SFCTA)

Description	Line	Direction	Before Arriving				After Departure			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Existing	Future	Existing	Future	Existing	Future	Existing	Future
M Boarding	M	Inbound	29	-	93	-	68	-	235	-
M Drop-Off	M	Outbound	109	-	39	-	9	-	-	-
J and K Boarding	J	Inbound	-	468	-	215	69	477	57	232
	K	Inbound	-	-	-	-	94	91	98	86
J and K Drop-Off	J	Outbound	41	86	83	375	-	137	9	444
	K	Outbound	130	158	45	38	-	-	-	-
Bus stop north side of Geneva Ave	8X	Outbound	500	659	-	-	176	230	-	-
	8AX	Outbound	-	-	61	-	-	-	58	-
	8BX	Outbound	-	-	89	99	-	-	76	79
	28L	Inbound	-	1003	-	575	-	733	-	437
	29	Inbound	316	494	105	200	291	370	185	259
	43	Inbound	302	259	114	90	217	194	138	112
	54	Outbound	139	141	55	56	55	67	92	99
	88	Outbound	244	244	-	-	1	1	-	-
Bus stop south side of Geneva Ave	8X	Inbound	-	-	268	292	-	-	609	706
	8AX	Inbound	208	-	-	-	218	-	-	-
	8BX	Inbound	174	174	-	-	182	214	-	-
	28L	Outbound	-	428	-	485	-	546	-	767
	29	Outbound	140	239	108	160	99	220	151	309
	43	Outbound	97	83	109	66	70	53	176	138
	54	Inbound	118	127	26	42	65	72	79	104
	88	Inbound	-	-	-	-	-	-	142	-
49@ Ocean/I-280	49	Inbound	83	113	71	83	64	91	70	79
49@ Ocean/San Jose Ave	49	Outbound	148	126	67	111	121	106	55	97
Total Muni Ridership		Inbound	1,230	2,638	677	1,497	1,268	2,242	1,613	2,015
		Outbound	1,548	2,164	656	1,390	531	1,360	617	1,933

Notes: Load factor is calculated by dividing ridership by the capacity of the transit vehicle in question; the SFMTA peak period standard is an average load of 85% of vehicle capacity. Capacity is based on number of buses operating per peak hour, according to data collected by the TEP, not on the scheduled number of buses.

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Table 13: Comparison of Post-December 5th, 2009 and 2030 Scheduled Number of Muni Vehicles per Hour (Source: SFMTA, SFCTA)

Description	Line	Direction	2010		2030	
			AM Peak Period	PM Peak Period	AM Peak Period	PM Peak Period
Bus stop north side of Geneva Ave	8X	Outbound	8	0	12	0
	8BX	Outbound	0	8	0	12
	28L	Inbound	0	0	19	11
	29	Inbound	10	6	-	-
	43	Inbound	6	6	6	6
	54	Outbound	3	3	-	-
	88	Outbound	7	0	7	0
	Subtotal		34	23	44	29
Bus stop south side of Geneva Ave	8X	Inbound	0	8	0	12
	8BX	Inbound	8	0	12	0
	28L	Outbound	0	0	10	14
	29	Outbound	5	6	-	-
	43	Outbound	7	6	7	6
	54	Inbound	3	3	-	-
	88	Inbound	0	6	0	6
	Subtotal		23	29	29	38
Bus stop at Ocean/I-280	49	Inbound	8	8	8	8
	29	Outbound	-	-	5	6
	54	Inbound	-	-	3	3
	Subtotal		8	8	16	17
Bus stop at Ocean/San Jose Ave	49	Outbound	8	8	10	8
	29	Inbound	-	-	10	7
	54	Outbound	-	-	3	3
	Subtotal		8	8	23	18
Total Bus/LRT Per Hour			73	68	112	102

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Table 14: Comparison of Post December 5th, 2009 and 2030 Muni Capacities (Source: SFMTA, SFCTA)

Description	Line	Direction	2010		2030	
			AM Peak Period	PM Peak Period	AM Peak Period	PM Peak Period
Bus stop north side of Geneva Ave	8X	Outbound	752	-	1,128	-
	8BX	Outbound	-	752	-	1,128
	28L	Inbound	-	-	1,197	693
	29	Inbound	630	378	-	-
	43	Inbound	378	378	378	378
	54	Outbound	189	189	-	-
	88	Outbound	441	-	441	-
	Subtotal		2,390	1,697	3,144	2,199
Bus stop south side of Geneva Ave	8X	Inbound	-	752	-	1,128
	8BX	Inbound	752	-	1,128	-
	28L	Outbound	-	-	630	882
	29	Outbound	315	378	-	-
	43	Outbound	441	378	441	378
	54	Inbound	189	189	-	-
	88	Inbound	0	378	0	378
	Subtotal		1,697	2,075	2,199	2,766
Bus stop at Ocean/I-280	49	Inbound	752	752	752	752
	29	Outbound	-	-	315	378
	54	Inbound	-	-	189	189
	Subtotal		752	752	1,256	1,319
Bus stop at Ocean/San Jose Ave	49	Outbound	752	752	940	752
	29	Inbound	-	-	630	441
	54	Outbound	-	-	189	189
	Subtotal		752	752	1,759	1,382
Total Muni Capacity			5,591	5,276	8,358	7,666

This preliminary resource schedule was developed to accommodate the forecasted future bus customers presented above. Future service headways were calculated to ensure that all Muni buses will have sufficient capacity to accommodate all riders before and after they arrive at Balboa Park Station. It should be noted that the estimated increase in ridership and changes in bus services would occur over time from now until 2030. Table 13 shows that the biggest change in Muni bus arrival and departure needs in the Balboa Park Station area would be spurred by the TEP recommendation of rerouting Muni 29-Sunset and 54-Felton to Ocean Avenue.

As a result, **the number of buses at the existing eastbound stop at Ocean Avenue and I-280 would be doubled** from 8 to 16 buses in the AM peak hour from 8 and to 17 in the PM peak hour. **The number of buses at the proposed westbound stop at Ocean Avenue and I-280 northbound on-ramp would be more than doubled**, from 8 to 23 buses in the AM peak hour and from 8 to 18 in the PM peak hour.

The introduction of route 28L-19<sup>th</sup> Avenue Limited to Balboa Park would increase the number of buses arriving at and departing from the north and south sides of Geneva Avenue, in spite of the reduction resulting from moving the 29 and 54 routes to Ocean Avenue. Total arrivals/departures from the north side would increase by 29 percent from 34 to 44 buses during the AM peak hour and by 26 percent from 23 to 29 buses during the PM peak hour. Bus activities at the south side of Geneva Avenue would increase by 26 percent from 23 to 29 buses during the AM peak hour and by 31 percent from 29 to 38 buses during the PM peak hour.

Based on the projected future Muni bus activities presented above, there would not likely be a need to make any changes to the bus stop located on the north side of Geneva Avenue. This bus stop is presently 300 feet long, which is more than sufficient to accommodate existing (post-December 9, 2009 service changes) and future needs. Bus activities on the south side of Geneva Avenue would increase by 9 buses (4 articulated and 5 standard) during the PM peak period (worst case scenario). The current stop would need to be lengthened from 120 feet to 172 feet, which would be sufficient to accommodate one standard size and two articulated buses at the same time (with five-foot spacing between them). This change would block the access to the kiss-and-ride lot and require either the closure or reconfiguration of this access point.

## **Existing Parking Demand**

The Balboa Park Station area does not have public off-street parking facilities for transit patrons. The availability of on-street parking spaces potentially affects how transit riders access the station. Conversely, parking demand generated by transit patrons may be causing adverse parking impacts in the adjacent neighborhoods.

In the *2009 Transit Passenger Intercept Survey*, participants were asked where they parked if they drove. The respondents reported parking throughout the entire study area. No particular location stands out as the primary location where most drivers parked.



SFMTA undertook a detailed parking study, the *2009 On-street Parking Supply and Occupancy Survey*, of the Balboa Park Station area. This study consisted of a series of field surveys of on-street parking supply and occupancy around the station, which were conducted to determine:

- The number of BART passengers parking in the vicinity of Balboa Park Station.
- The number of BART passengers parking in the adjacent residential neighborhoods.

#### ***2009 On-Street Parking Supply and Occupancy Survey***

SFMTA collected on-street parking supply and occupancy data on Wednesday, September 15, 2009 during three time periods (7:00 AM, 11:00 AM, and 3:00 PM) and on Saturday, September 26, 2009 at 11:00 AM. The data were collected within 1,500 feet walking distance (or approximately a six-minute walk) from the Balboa Park Station. The survey boundaries are shown in **Figure 18**. They consist of Mt. Vernon Avenue to the south, Howth Street to the west, Santa Ynez Avenue to the north, and Cayuga Avenue to the east.

The on-street parking supply and demand survey generally concludes that **the average occupancy rate for parking spaces within the RPP (Residential Permit Parking) zone is low, generally below 56 percent during the day. Parking occupancy is substantially higher in the non-RPP zones.** The average occupancy rate there is between 87 and 90 percent during weekday midday and 86 percent on Saturday midday. Vehicles parked in the non-RPP zone mostly belong to BART riders, employees and staff of City College of San Francisco (CCSF), and businesses owners and visitors in the area.

- Vehicles with Residential Parking Permit (RPP) V Permits - Limited sample surveys were conducted to identify how many vehicles park in the study area with a V permit. These surveys were conducted on Tuesday, September 22, 2009 from 7 AM to noon. Parking for two hours is allowed in the RPP zones. There is not a substantial number of vehicles parking over a longer period of time in the RPP zones regardless of whether the vehicle has a V permit or not.

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Figure 18: 2009 On-street Parking Supply & Occupancy Survey Study Area (On-street Parking Supply and Occupancy Survey, 2009)

- **Parking Duration Conditions** - SFMTA staff conducted limited sample surveys of parking durations on five street segments, of which one (Howth Street) is in the RPP zone and the other four are in the unrestricted parking areas in the vicinity of the Balboa Park Station. There are violators of the RPP parking time limits (non-RPP vehicles parking for more than two hours) along the east side of Howth Street between Ocean and Mt. Vernon avenues. It is unclear whether these violators are transit riders. An average of 90 percent of the vehicles along Ocean and San Jose avenues were parked before 9 AM and parked past noon.

Raw survey data and summary of the parking supply and occupancy during each survey period by block are included in Appendix 7. The study area has a total of 1,318 on-street parking spaces, of which 635 spaces are located within the RPP “V” zone and 683 are located in non-RPP zones. Spaces within the RPP zone have a 2-hour time limit for vehicles without RPPs from 8:00 AM to 6:00 PM on weekdays. Vehicles with a valid RPP can park without time restrictions. **Figure 19** illustrates the parking occupancy by block. **Figure 20** illustrates block faces with different levels of parking occupancy rates. It shows that many block faces in the immediately vicinity of the Balboa Park Station have occupancy rates higher than the generally accepted 85 percent, even over 95 percent. Most of the block faces with over 85 percent occupancy rates are in the non-restricted zones.

The on-street parking supply and demand analysis concludes that the average occupancy rate for parking spaces within the RPP zone is low, generally below 56 percent during the day and approximately 55 percent at night. However, parking occupancy is substantially higher in the non-RPP zones. The average occupancy rate for the non-RPP zones are between 87 and 90 percent during weekday midday times and 86 percent on Saturday midday. Observed occupancy rate in the non-RPP zones is over 90 percent at times.

There is a single yellow loading zone in the study area. It is located in front of a business along Ocean Avenue, between San Jose Avenue and Otsego Street. It can accommodate up to three vehicles. The midday occupancy rate of this yellow loading zone is 66 percent.

#### ***Vehicles with RPP V Permits***

Limited sample surveys were conducted to identify how many vehicles park in the study area with a V permit. These surveys were undertaken on Tuesday, September 22, 2009 from 7 AM to noon. They confirmed that there are not a substantial number of vehicles parking for a long period of time in the RPP zones, regardless of whether or not the vehicles have a V permit.



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Figure 19: Parking Occupancy Rate by Block (On-street Parking Supply and Occupancy Survey, 2009)



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Figure 20: Parking Occupancy Rate by Block Face (On-street Parking Supply and Occupancy Survey, 2009)

Other findings related to RPP V permit parking supply and occupancy in the study area include:

- North side of Niagara Avenue from San Jose Avenue to Delano Street and east side of Delano Street, from Seminole Street to Geneva Avenue: 10 observed parked vehicles out of 23 had the V residential permit. However, only 4 of the 13 non-V permit vehicles were parked for exactly two hours and none were observed parking for longer than two hours. Thus, there were no observed violations.
- East side of Howth Street from Ocean Avenue to Mt. Vernon Street: 8 observed parked vehicles out of 56 had the V residential permit. However, 15 of the 48 non-V permit vehicles were parked for more than 2 hours, some for much longer, including 3 with disabled blue plaques (which can park without a time limit).
- Geneva Avenue from Delano to Cayuga streets: A negligible number of V-permit parking vehicles were observed. It should be noted that this area is not within the RPP permit area.

#### ***Parking Duration Conditions***

SFMTA conducted limited sample surveys of parking duration at five street sections, of which one is in the RPP zone (Howth Street) and the other four are in the unrestricted areas in the vicinity of the Balboa Park Station. The last four digits of vehicle license plates were recorded at eight time periods from 7:00 AM to 11:30 AM on Tuesday, September 22, 2009. The survey shows that the turnover rates are relatively small in the surveyed area and that there are violators of RPP parking time limits along the east side of Howth Street between Ocean and Mt. Vernon avenues. It is unclear whether these vehicles belong to BART riders. An average of 90 percent of the vehicles along Ocean and San Jose Avenues were parked before 9:00 AM and past noontime.

#### ***Estimated Parking Demand for BART Riders in the Balboa Park Station Area***

An estimate of the parking demand at the BART Balboa Park Station area was undertaken by using the most current BART data on ridership and access modes. This estimate was compared with the parking occupancy survey to verify its consistency. It is estimated that approximately 540 to 700 BART riders potentially park in the Balboa Park Station area. The range of demand comes from two different sources:

- Based on *total daily* boardings at the Balboa Park Station and the *2008 BART Station Profile Study*, approximately 700 BART passengers park in the vicinity of the station.
- Based on the *2009 On-Street Parking Supply and Occupancy Survey*, **there are only about 600 vehicles that park in the un-restricted parking areas within**



**1,500 feet of the station.** It is unlikely that BART customers would park in an RPP zone unless the driver also lived within the RPP Zone V area. Using the limited sample survey, up to 90 percent of the vehicles observed in the non-RPP zone park for over four hours. Based on this, it is estimated that the *maximum number* of BART passengers that park in the Balboa Park Station area is 540 (90 percent of 600 vehicles).

Table 15 provides a comparison of the parking demand estimates. It appears that the original estimates included in the SAR have changed, partly because of a substantial change in access modes, including the 2003 opening of the BART Millbrae/SFO extension. The drive-alone percentage to the Balboa Park Station has declined from nine percent to one percent for non-home-based trips and to seven percent for home-based trips. The *Transit Passenger Intercept Survey*, in Appendix 2, further confirms that the drive-alones constitute approximately 1.4 percent, and carpoolers constitute approximately 1 percent.

*Table 15: Comparison of Balboa Park Station Area BART Passenger Parking Demand*

Study/Survey	BART Daily Boardings	BART Station Access Mode		Estimated Parking Demand
		Drive Alone	Carpool	
1998 BART Station Profile Study+2002 Daily Riders	13,584	9%	5%	1,560
2002 SAR	--	--	--	720-840
2008 BART Station Profile Study	15,600	1-7% <sup>1</sup>	1%	700 Maximum
2009 Parking Survey	--	--	--	540 Maximum

<sup>1</sup> The 2008 BART Station Profile Study estimates that the drive-alone percentage for the home-based boardings was approximately 7%, and the percentage of non-home-based boardings was about 1%.

### ***Commuter Parking in the Residential Neighborhoods***

Contrary to what might be expected, it does not appear that BART riders are parking in large numbers in the adjacent residential neighborhoods (exclusive of the RPP zone), as evidenced by the following observations:

- Approximately half of the on-street parking spaces in the study area are located within the RPP zone and many of the remaining spaces are not located along residential streets (e.g., they are located within commercial areas). It is unlikely that BART riders would risk a ticket parking in the spaces within the RPP zone.
- The average occupancy rate for the spaces within the RPP zone is low, approximately 65 percent. The portion of the study area east of San Jose Avenue and north of Ocean Avenue is not in the RPP zone, even though it consists predominately of residential buildings. This area has several blocks with 85 to 95 percent occupancy rates during the midday on weekdays.

***Coordination with the SFMTA SFpark Program***

SFpark focuses on creating more parking availability within the city's existing parking supply and reducing unnecessary auto travel (e.g. circling looking for parking). It includes the following strategies that are designed to work together to make parking in San Francisco more efficient:

- Make parking more convenient by offering new payment options and longer time limits;
- Reduce parking "hunting" by providing real-time information to direct drivers to available spaces; and
- Adjust prices to redistribute parking demand by shifting drivers to blocks, lots, or garages where spaces are available or by encouraging people to park at off-peak times.

The SFpark program does not currently have any improvements identified for the Balboa Park BART Station area. SFMTA staff is waiting for the completion of its pilot project before it proceeds with the development of a city-wide parking management plan. This plan could address the possibility of a "parking benefit district" (where a limited number of RPP permits could be sold to commuters, with the additional revenues dedicated to neighborhood improvements).

***Extending Muni Fast Passes to the Daly City Station***

The study does not have any recommendation regarding extending the use of Fast Passes to Daly City, which could divert some parkers away from Balboa Park Station. This matter involves a complex set of financial and planning issues to be addressed by BART and the SFMTA. There is an ongoing conversation between BART and multiple stakeholders regarding this issue and a formal study headed by BART is being initiated.

**Muni LRV Maintenance and Storage Operations**

One of the issues that the *Station Capacity Study* was designed to examine was the efficiency and adequacy of rail vehicle maintenance and storage at Balboa Park. For years, SFMTA has operated its rail fleet in the crowded conditions of Balboa Park's Green and Geneva rail yards by utilizing auxiliary facilities such as the Upper Yard, Sixth & King tail tracks, Duboce & Market storage tracks, and the Marin storage facility at Marin Street and Indiana Street. The 2008 opening of the Muni Metro East (MME) light rail facility has allowed SFMTA to transfer 60 of its 151 Breda light rail vehicles (LRVs) there and to move out of the Sixth & King tail tracks. The movement of more LRVs to MME is expected to continue, but operational constraints at MME need to be addressed.

**Even with the addition of MME, the Green Yard has many activities competing for space:** vehicle maintenance, vehicle overnight storage, vehicle dead storage, and

revenue operations. **Without additional facilities, these problems are likely to become more severe in future years if the light rail system is ever expanded** and more LRVs are needed. For example, it is currently projected that another 57 to 64 LRVs could be required for mid-term service expansion. SFMTA will need to consider this in its plans for system development. Sites for totally new storage and maintenance facilities are very difficult to find, especially considering the operational and deadheading needs of light rail service, rail car access issues, zoning and neighborhood compatibility, etc. In the meantime, there are some measures that can alleviate the tight conditions in the Green Yard.

Current storage and maintenance assignments store 91 LRVs in the Green and Geneva Yards, until recently using the Upper Yard at night to allow increased mobility in the Green Yard, with the remaining balance of the 60 cars of the 151 LRV fleet housed at MME. In addition, SFMTA operates its current 34-car historic streetcar (HSC) fleet out of the Geneva Yard and shop, with some support from the Green Yard. An additional 45 HSCs are stored in the Marin storage site at Marin & Indiana; this site is being leased from the Port of San Francisco.

**The current fleet of 151 LRVs can be easily stored and maintained in the Green and Geneva Yards and at the MME light rail facilities. Constraints related to the present fleet are operational.** Accessing the paint and body shop in the Geneva Yard requires LRVs to cross the busy intersection of Geneva Avenue and San Jose Avenue. Accessing the heavy repair shops in the Green Yard for the HSCs requires crossing this same intersection. A further constraint to the maintenance of LRVs is the lack of a paint and body shop at MME, which requires all MME-based LRVs to be moved to Geneva Yard for these repairs. SFMTA should place a very high priority on completing the paint and body shop at MME, as this practice is not sustainable as the fleet grows to meet increased service needs.

Below the Green maintenance building, there is underground parking for Muni employees. However, some of the parking area is being used for parts storage. As a result, there are not enough parking spaces for employees during the day. To compensate for this, daytime employee parking is allowed over the paved tracks in the Upper Yard.

### ***Existing LRV and HSC Fleet***

Table 16 details the current storage assignments for the Green Yard, Geneva Yard, Upper Yard, MME, and Marin facility. In calculating capacity, the length of a Breda LRV is considered 75 feet over the couplers. The largest HSC is approximately 51 feet long.

*Table 16: 2010 Storage Assignments for Muni Rail Cars (Source: SFMTA)*

Vehicle Type	Green Yard	Geneva Yard	Upper Yard	MME	Marin	Total
LRVs	73*	0	18*	60	0	151
HSCs	0	34	0	0	45	79

**\*Green Yard statistics before temporary reassignments to MME in response to Green Yard derailments. Upper Yard figure represents overnight storage until early 2010 when a switch was removed for a temporary repair elsewhere, preventing access to the Upper Yard.**

### ***LRV Fleet Description***

The SFMTA fleet of 151 Breda LRVs accommodates about 140,000 boardings each weekday. This fleet entered service between 1997 and 2003. These light rail vehicles are used in the operation of the six Muni Metro light rail lines (J, K, L, M, N, and T), carrying over 41 million customers a year, or about 20 percent of Muni's total passenger load. The LRVs operate in conditions which range from exclusive rights-of-way in the Muni Metro Subway, to mixed flow operation on city streets.

### ***HSC Fleet Description***

The SFMTA HSC fleet runs in regular revenue service and is a collection of electric rail vehicles now used on the F-Market & Wharves Line, carrying roughly 19,000 boardings per weekday. The HSC fleet consists of 34 vehicles, including 16 Presidents' Conference Committee (PCC) cars, 11 cars of a "Peter Witt" design from Milan, Italy, and 7 other vintage streetcars from the U.S. and around the world.

The F Line has been extremely successful, and future additional service is planned for an E Embarcadero line. These are both factors increasing the demand for additional cars. SFMTA has an additional 34 PCC and 11 vintage streetcars stored at the Marin facility. Many of these cars are missing parts and can best be described as "useful cores." These cars will need to be relocated once the Marin facility is converted into the Islais Creek bus maintenance facility. The current Marin storage site is leased from the Port of San Francisco and may not be available from the Port in the future. SFMTA has an additional storage at Duboce Avenue and Market Street, which was once used more heavily by HSCs but is currently being utilized to store about 14 vintage streetcars.

### ***Storage and Maintenance at the Green, Geneva, and Upper Yards***

SFMTA, until recently, has primarily serviced, maintained, and stored its active railcar fleet of 151 LRVs and 34 HSCs at three facilities in Balboa Park. These consist of:

- The Curtis E. Green Light Rail Center (referred to as Metro Green or just Green Yard), located west of San Jose Avenue between Ocean and Geneva avenues,

was designed primarily as an LRV operating and maintenance facility. (The track arrangement is shown in **Figure 21**.)

- The Geneva Yard, located diagonally across from the Green Yard at the southeast corner of Geneva Avenue and San Jose Avenue, was developed in the mid-1970s on the site of the old Geneva streetcar barn as a storage facility with a paint shop. (The track arrangement is shown in **Figure 22**.)
- The “Upper Yard”, located at the southwest corner of Geneva Avenue and San Jose Avenue, consists of seven storage tracks without any buildings or facilities to service rail vehicles. (The track arrangement is shown in **Figure 23**.)



Figure 21: Green Yard Storage and Maintenance Facility (Source: SFMTA)



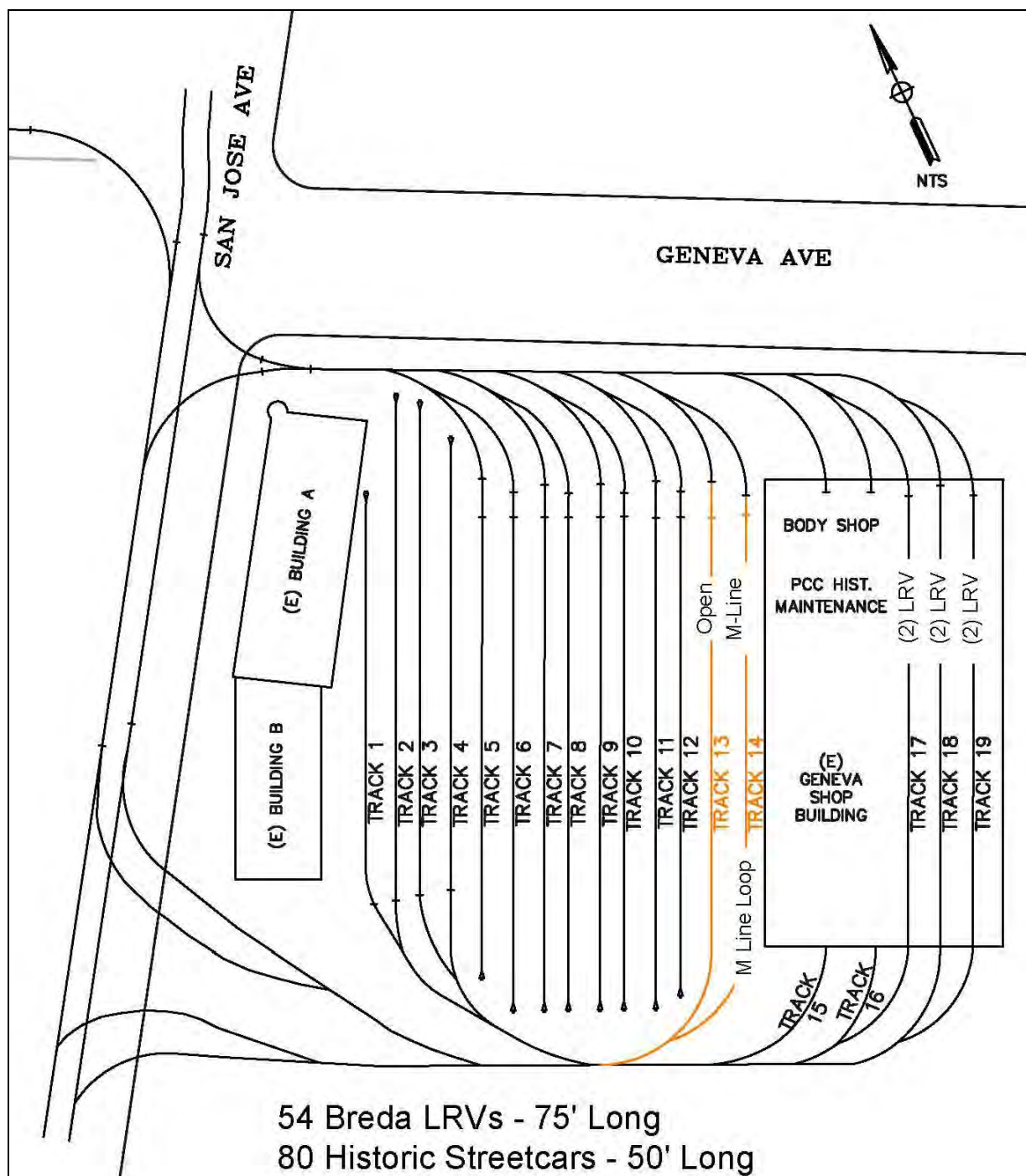


Figure 22 : Geneva Yard Storage and Maintenance Facility (Source: SFMTA)



Figure 23: Upper Yard Storage Facility (Source: SFMTA)

Additionally, a satellite yard at Sixth Street and King Street, shown in **Figure 24**, housed 20 LRVs in overnight storage until MME was completed.

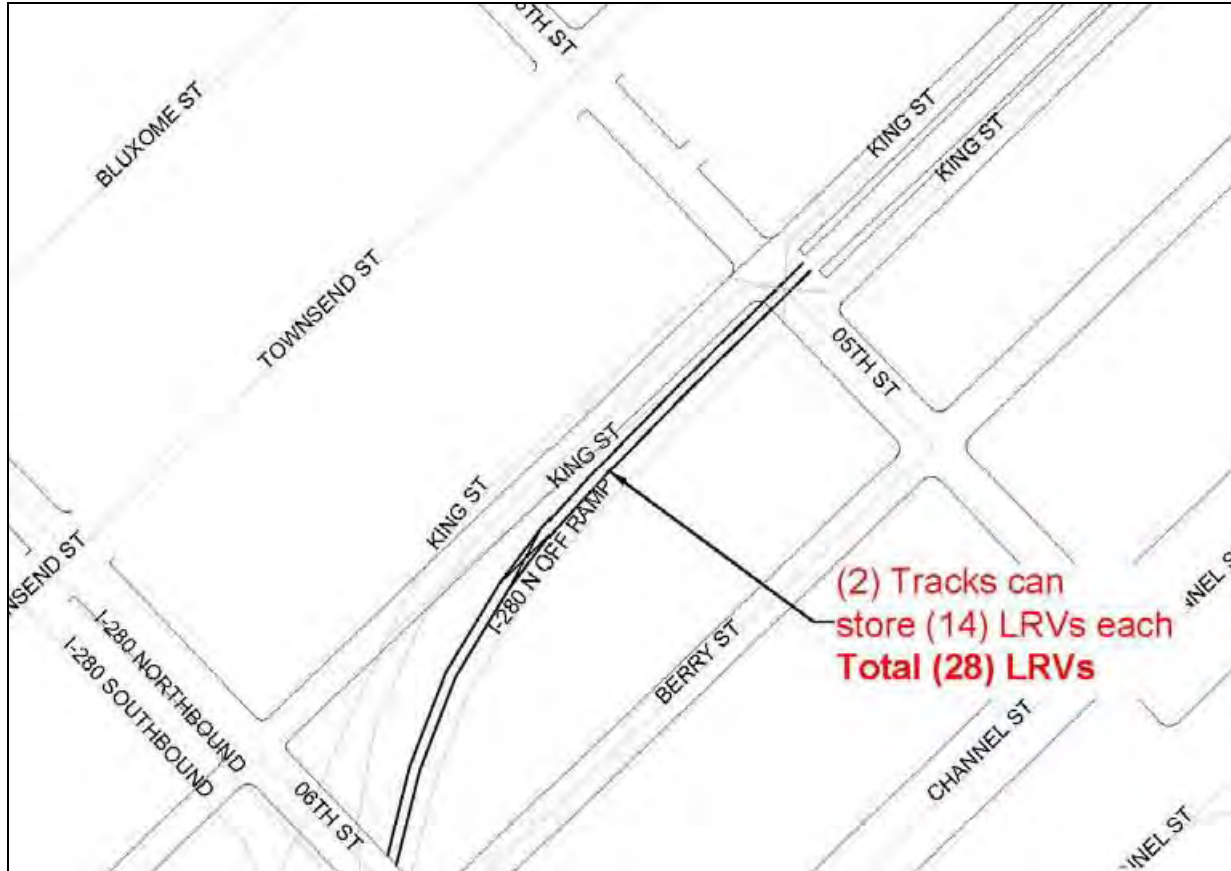


Figure 24: 6<sup>th</sup> & King Storage Tail Tracks at 6<sup>th</sup> Street and King Street (Source: SFMTA)

The Green Yard was originally built in the late 1970s to support a fleet of one hundred 60-foot Boeing LRVs, and the Geneva Yard was developed in the mid-1970s to accommodate an additional 30 Boeing LRVs. With most of the 151 Breda LRVs stored at these facilities, and some having to be parked overnight on storage tracks, SFMTA has operated in extremely crowded conditions for years. The opening of MME has relieved some of this pressure, but maintenance and storage capabilities in the Green and Geneva yards will worsen until 2013 when SFTMA is expected to complete the Green Yard re-rail project.

The object of the re-rail project is to renew worn rails in the yard and, wherever possible, to increase the minimum radius of tracks used on curves. The actual configuration of the tracks will remain about the same as it is today. The current draft of the re-rail project plan involves the phased shut-down of the Green Yard to assist the contractor in the timely completion of this project. The larger minimum curve radii included in this project will slightly reduce the effective storage capacity of the Green Yard down to approximately 88 LRVs, as shown in **Figure 21**. Moreover, the Geneva



Canopy Project scheduled for 2011 will impact the movement of LRVs at the Geneva Yard. The canopy, when finished, will cover 24 HSCs and will not impact any storage areas or yard moves.

The Upper Yard was until recently used only overnight and on weekends to store up to 18 LRVs to allow better movement of rail cars in the Green Yard. During the day, as mentioned, it is used for employee parking.

**Figure 21, Figure 22, and Figure 23** include schematic representations of LRV and HSC storage capacities for the Green, Geneva, and Upper Yards. Based upon measurements made on these schematics, the Green Yard can accommodate only 88 LRVs in storage and maintenance spots. The yard could facilitate more LRVs if the run-around, revenue and street tracks were used for storage at night, as they were in the past. These estimates include LRVs that are stored temporarily in the working areas of the shop. Geneva Yard can accommodate up to 54 LRVs or 80 HSCs. The Upper Yard can accommodate 18 LRVs. SFMTA has indicated that it is planning to cease storing any LRVs in the Geneva Yard once the canopy project is completed. Nonetheless, this yard will still be able to store them if needed.

The Upper Yard will be needed until the completion of the re-rail project (2013) in order to allow the flexibility of shutting down all or part of the Green Yard during construction. Once the re-rail project is completed, overflow cars can be accommodated in the Geneva Yard until MME improvements are made. The LRV fleet growth from the current 151 to the projected 208 for 2030 will mandate the expansion of MME, including an MME paint and body shop. Additional space for a few LRVs and HSCs will be made available as SFMTA sends LRVs and HSCs out for mid-life overhaul and sends LRVs out for major body damage repairs.

### ***Staffing Levels***

Parking currently takes up space in some yards that could be better utilized for rail vehicle storage. In order to analyze this problem, the number of employees at each site was ascertained from interviews with SFMTA staff. This information was used to determine how many employee vehicles would need parking at any one time.

The staffing levels in the Green and Geneva yards are provided in Table 17. SFMTA provided maintenance and operations staffing information from 2010, which is compiled in Appendix 8. PCC maintenance staff and operator “extras” were estimated by the consultants. “Extras” are defined as additional standby staff. Due to budget constraints effecting changing staffing levels, these estimates should be reviewed and updated over time.

*Table 17: 2010 Green and Geneva Yards Staffing Levels (Source: SFMTA)*

Staffing Type	Green/Geneva Staff
Maintenance	100
Operations	88
Total	188

It was mentioned earlier that the SFMTA Board is considering charging for employee parking. This action, if approved, is intended to reduce the magnitude of parking spaces required. The extent of this reduction has not been quantified at this time.

### ***Employee Vehicle Parking***

Currently, as shown in Table 18, approximately 50 employees park in the Upper Yard during the day and many others park on Geneva tracks 1 through 4 (approximately 10 employees), Green tracks 11 and 12 (approximately 9 employees), in the Green Yard underground parking area (approximately 75 employees), and on the street (estimated 30 employees).

*Table 18: 2010 Green and Geneva Yards Employee Vehicle Parking (Source: SFMTA)*

Parking Location	Parking Positions
Upper Yard	50*
Geneva Tracks	10
Green Tracks	9
Green Underground	75
Street	30
Total	174

\* These displaced employees will be able to park in the Green Yard Underground Parking once it is reconfigured.

Table 19 provides a summary of employee parking demand and spaces available in the Green and Geneva Yards.

*Table 19: Summary of Employee Parking Spaces (Source: SFMTA)*

Muni Yard	2010		2030	
	Need	Avail.	Need	Avail.
Green and Geneva Yards	188	174	175*	174

\* Estimate based on fewer LRVs stored at Green

***Non-Revenue Vehicle Parking***

Approximately 25 non-revenue vehicles (e.g., maintenance vehicles and equipment and other SFMTA-owned vehicles) are parked in the Green Yard underground parking facility, at the end of the yard near the “meet-and-greet” area, as well as on the street.

***Storage and Maintenance at Muni Metro East (MME)***

As part of its Third Street light rail program, SFMTA recently constructed MME, a new LRV maintenance and operations facility, south of Mission Bay, near the central waterfront in east San Francisco. The 13-acre site is situated east of Third Street and north of Pier 80 between 25<sup>th</sup> Street and Cesar Chavez Street. The facility is being developed in two stages, with Stage I having storage tracks arranged in a double-ended configuration to provide Muni with the capability to store, service, and maintain a minimum of 70 LRVs.

The Jacobs Team’s assessment is that based purely on space availability, MME’s configuration, illustrated in **Figure 25**, can store, service, and maintain up to 105 LRVs (including space in maintenance shops). MME could hold even more LRVs if tail tracks were used or if the paint and body shop were completed. It has been stated earlier in this report that the paint and body shop at MME should be made a high priority. Doing this work at Green Yard only is not sustainable, especially with the planned fleet expansions.

The major LRV maintenance activities that are not currently supported at MME are heavy component repairs and rebuilds, major electronic unit repairs, radio and farebox repairs, and paint and body repairs.

Phase 2 plans for this facility would consist of a paint and body shop (which was not completed as planned in Phase 1), additional storage tracks, heavy overhaul equipment, and increased in power to the yard. These projects are not funded or committed to at this time. It has been estimated that **development of the additional four acres available adjacent to MME would cost over \$30 million and increase capacity by an additional 40 LRVs or more.**

***Staffing Levels at MME***

Table 20 outlines the estimated staffing levels at full build-out from a preliminary engineering (PE) report written in 2000 and the current estimated staffing levels for the MME facility. SFMTA provided maintenance and operations 2010 staffing information, compiled in Appendix 8; operator “extras” were estimated by the consultants.



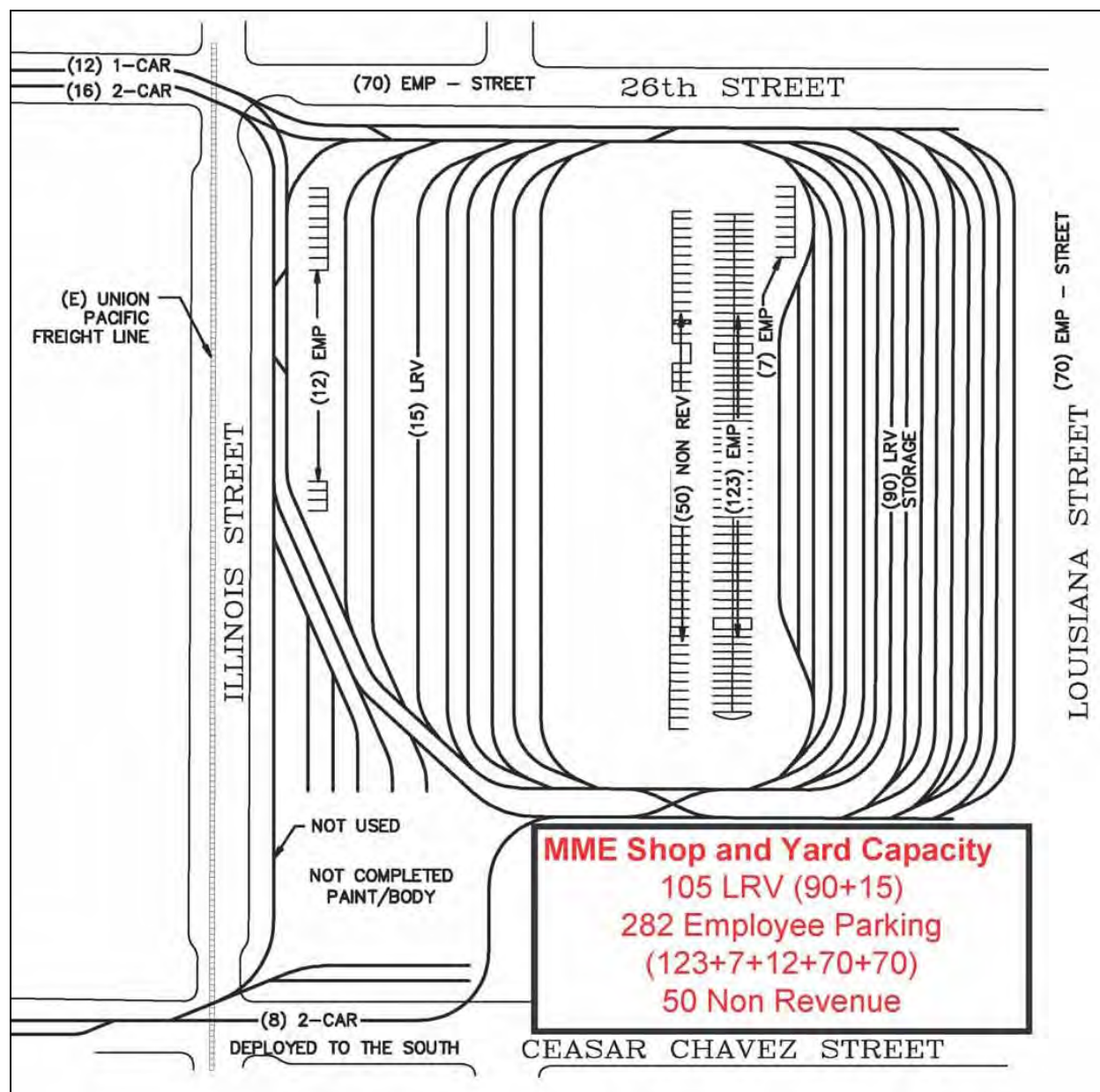


Figure 25: MME Storage and Maintenance Facility (Source: SFMTA)

Table 20: MME Staffing Levels (Source: SFMTA)

Staffing Type	2003 (Estimated)*	2009
Maintenance	121	69
Operations	109	48
Administration	137	NA
Total	367	117

\* Source: Gannett Fleming PE Report, 2000

### ***Employee Vehicle Parking at MME***

Parking for employees, non-revenue vehicles and visitors at MME is provided both on-site and on-street. Maintenance and operations personnel share the same employee parking lots. The number of employee parking spaces originally planned at MME was:

- 202 for Stage I facility; as all employees would not be working at the same time
- 253 for the ultimate build-out

The actual number of employee parking spaces currently provided is 282, including 142 on-site spaces, plus 140 available street parking spaces.

Table 21 provides a summary of employee parking at MME.

*Table 21: Summary of Employee Parking (Source: SFMTA)*

Muni Yard	2010		2030	
	Need	Avail.	Need	Avail.
MME	117	282	367*	282**

\* Source: Gannett Fleming PE Report, 2000

\*\* Note: If phase 2 of MME is built-out, then additional employee parking will be required for inclusion in the build-out plans

### ***Non-Revenue Vehicle Parking at MME***

Parking for maintenance vehicles and equipment and other SFMTA-owned vehicles is also provided at MME. The number of non-revenue vehicles planned to be parked on-site under the full build-out were:

- 15 maintenance vehicles
- 15 transportation vehicles
- 17 vehicles for rail operations
- 10 vehicles for the Track Department
- 10 vehicles for the Signal Department

In total, 67 service vehicles were anticipated. In actuality, only 50 spaces are available at the present time, and only about 15 of these are generally occupied by non-revenue vehicles.

### ***Other Rail Vehicle Storage Facilities***

As discussed earlier, Muni maintains two other minor facilities for the storage of rail transit vehicles. The Duboce & Market storage tracks, as shown in **Figure 26**, are used for the repair and storage of historic streetcars. It can accommodate approximately 14 HSCs.



Figure 26: Duboce & Market Storage Tracks at Duboce Avenue and Market Street (Source: SFMTA)

South of the Fourth & King light rail station, the Sixth & King tail tracks, shown in Figure 24, can accommodate approximately 28 LRVs, although fewer than 20 can be stored without interfering with the operation of the station. Alternatively, approximately 50 HSCs could be stored at this site. There are no service facilities here, as this facility only consists of space to store cars to be ready for deployment during peak periods. It should be noted that security improvements and staff to operate this yard would be required and are not planned or budgeted at this time.

A third minor facility for rail car storage, at Marin, is destined to be converted into the Islais Creek bus storage and will no longer be available for rail uses.

### ***Storage and Maintenance Needs Assessment***

Several elements must be accounted for with the increase in fleet size that SFMTA is planning for in the TEP. Increasing the number of LRVs will require increased storage space in the SFMTA rail maintenance facilities. Fleet size increases will also require increased staffing to maintain, operate, and oversee the LRV fleet. This will subsequently increase the need for parking to accommodate staff increases (as noted in Table 19 and Table 21). The following discussion assesses the fleet increase alongside the increased maintenance and storage needs to accommodate this fleet growth.

Requirements for LRV fleet size are driven by the number of vehicles needed to meet the AM and PM peak requirements. These peak vehicle requirements for the 2010 baseline and 2030 with TEP are summarized in Table 22. Additional vehicles are needed to support maintenance demands driven by preventive maintenance, overhauls, and campaigns.

*Table 22: Maximum Peak (AM or PM) Vehicle Requirements (Sources: TEP and SFCTA Feb. 2009 RPM9 2030 Model Run)*

Vehicle Type	FY 2010 Base	FY 2030 (With TEP)
LRV	121	175
Streetcar	26	37

## **Maintenance Demand**

To determine the total number of vehicles required, it is necessary to account for both maintenance and peak-period service demands. Vehicles on hold for maintenance fall into four categories: Preventive Maintenance, Major Overhaul/Heavy Repairs, Campaigns, Reconstruction and Running Repair.

- Preventive Maintenance (PM) is a key component of the Muni maintenance effort. PM is performed on a regular, programmed basis to keep equipment in good working order, to prevent in-service failures, and to meet certain vehicle regulatory requirements. At this time, all major LRV PMs are performed at MME, while HSC PMs are performed at Green and Geneva Yards.
- Major Overhauls/Heavy Repair includes work performed by the Support Shop and Paint & Body Shop. The Paint & Body Shop repairs accident damage and conducts ongoing programs to enhance fleet appearance. Major Overhauls/Heavy Repair comprises the largest number of maintenance vehicle holds. At this time, all major overhaul and repairs are performed at Green and Geneva Yards.
- Campaigns address a fleet defect or are the result of a needed modification to address a deficiency. Major campaigns also include mid-life overhauls that are undertaken to extend a vehicle's service life. At this time, many mid-life overhauls are contracted out, and this results in a few cars at a time from each fleet not needing to be stored by SFMTA.
- Reconstruction is unique to the HSCs that SFMTA operates on the F Line. These vehicles can be over 75 years old. Therefore, they need to undergo extensive reconstruction to keep them serviceable. This work is usually bid to specialty contractors who have the facilities to perform this work. These projects result in freeing up more space, but usually just one car at a time.
- Running Repair is performed by the SFMTA, and it addresses minor unscheduled in-service failures that can usually be repaired in a short time frame.

## Maintenance Demand by Fleet

Table 23 and Table 24 show in detail the daily number of vehicles planned to be in maintenance, by category, and how it is expected to grow over the next 20 years.

*Table 23: Maintenance Demand for LRVs (Source: Transit Fleet Management Plan, 2009)*

Maintenance Demand	2010	2030
Major Overhauls/Heavy Repairs	15	16
Preventive Maintenance	5	7
Campaigns	2	10
Total	22	33

*Table 24: Maintenance Demand for HSCs (Source: Transit Fleet Management Plan, 2009)*

Maintenance Demand	2010	2030
Major Overhauls/Heavy Repairs	5	9
Preventive Maintenance	3	6
Campaigns	2	4
Total	10	19

The maintenance demands shown in Table 23 and Table 24 must be added to the peak vehicle demands shown in Table 22 to calculate the total number of cars needed in the fleet. This total number of cars will need to be stored and maintained in order to support planned service. Table 25 contains the results of this calculation and shows the total fleet size needs by sub-fleet, based on peak vehicle requirements and maintenance demand.

*Table 25: Estimated Total Vehicle Demand (Source: Transit Fleet Management Plan, 2009)*

Vehicle Type	FY 2010 Vehicle Demand	FY 2010 Current Fleet	FY 2030 Projected Vehicle Demand	FY 2030 Planned Fleet
LRV	121+22=143	151	175+33=208	215
HSC	26+10=36	34*	37+19=56	56**

\* SFMTA stores an additional 45 HSCs at the Marin facility. Many of these cars are inoperable. SFMTA currently has a total 79 HSCs.

\*\* The remaining HSCs not being used for planned service and maintenance will be inoperable or will be used for charter services or stored in museums.

## Storage Yard

Table 26 summarizes the rail storage capabilities estimated by the consultant team and possible assignments that should be evaluated by SFMTA for the five listed storage yard facilities in 2010 and 2030.

Table 26: Rail Storage Assignments by Facility (Sources: SFMTA and Transit Fleet Management Plan, 2009)

Vehicle Type	Green		Geneva		Upper Yard		MME		Satellite / 6 <sup>th</sup> and King		Totals	
	2010	2030	2010	2030	2010	2030	2010	2030	2010	2030	2010	2030
LRV	73	88	0	0 (14)	18	0	60	107-118	0	9-20	151	204-226
HSC – active daily fleet	0	0	34	58	0	0	0	0	0	0	58	58

These estimated capabilities and potential assignments for 2030 include assumptions that railcar storage, relocation of long-term holds and parts, revised Green Yard underground parking, improvements at MME, and other storage yards will be made.

While Sixth & King, if secured and staffed, will have more storage capability in 2030 than 21 HSCs, the total daily HSC fleet needed for service and maintenance planned for that time is 58 cars, which can be accommodated in the Geneva Yard. (Maintenance management staff believe an additional 14 LRVs could be stored at Geneva, which would reduce or eliminate the need for a satellite LRV facility.) It is not known at this time how many additional HSCs SFMTA owns that are stored in various sites around the world, which may be brought to San Francisco for storage.

## Green Administration Building

One of the buildings in the Green Yard being considered for relocation or repurposing is the Green Administration Building. This building is generally in good working condition and appears to be sound structurally. This building comprises of the following levels:

- A Lower Level that includes a 4000 square foot repair shop with a run-through track and approximately 8500 square feet of repair shops, storage areas, and offices. This level also contains the meet-and-greet area where each operator checks LRVs into and out of revenue service. Approximately 2500 square feet of this space could be reconfigured or relocated, but these functions should be located nearby.
- A Mezzanine Level that is approximately 1800 square feet of storage area, which could be reconfigured and its functionality relocated elsewhere.
- An Upper Level that is approximately 12,000 square feet of total space, where about 4800 square feet is used for operations dispatch and layover/break space with some offices, lockers, and restrooms. The other approximately 7200 square feet of area is administrative space for maintenance staff. Most of this area could be reconfigured, and the functionality could be relocated elsewhere.



## 5. Analysis and Recommendations

This chapter discusses the feasibility of many improvement proposals for Balboa Park from previous studies prepared by the City of San Francisco's Planning Department, BART, and SFMTA. The various options have been analyzed for short-, mid- and long-term feasibility. Table 27 provides a list of the improvements reviewed during this study to improve station operations. Table 27 also identifies the needs documented in Chapter 4 that each improvement targets. Proposed short-term improvements are evaluated in more detail in Chapter 7 against criteria to improve safety, accessibility, transit service, etc. Table 28 provides a list of the recommendations to increase capacity of existing maintenance and storage facilities.

The proposed improvements are broken down into eight categories:

- Customer Amenities
- Accessibility
- Muni LRT Service Operations for J, K, and M Lines
- Geneva Avenue
- Ocean Avenue
- Redevelopment
- Freeway-Related Improvements
- Parking

The feasibility review addresses:

- Engineering constraints,
- Intermodal operations,
- Short-, mid-, and long-term needs, and
- Phasing of implementation.

Recommendations are also provided to improve Muni LRV maintenance and storage operations. These recommendations are not project improvements, *per se*, but rather suggestions on how to increase the capacity of existing facilities and/or relocate existing activities so that the Upper Yard can be redeveloped.

Table 27: Summary of Station Capacity Study Improvements

Improvement		Recommended?	Status	Estimated Cost (order of magnitude)	Implementation Period			Improvement Targets Identified Need											
					Short-Term (1-5 years)	Mid-Term (6-10 years)	Long-Term (greater than 10 years)	Safety and Security	Accessibility			Transit Service		Transit Facilities				Traffic & Parking Operations	Community Vitality & Sustainability
									Pedestrian Facilities	Bicycle Facilities	Transit Transfers	Travel Times	Real-Time Information	Passenger Information	Convenient Access	Waiting & Alighting Experience	Kiss-and-Ride Access		
Customer Amenities																			
1	Lighting Improvements	Yes	Design funding requested	\$700,000	X			+	+	+									+
2	Wayfinding Signage	Yes	Partly Funded	\$350,000	X				+					+					
3	Real-time Information	Yes	Under design	\$200,000	X								+	+		+			
4	Canopies and / or Enhanced Bus Shelters on the North and South Geneva Transit Plazas	Yes	Design funding requested	\$1,300,000	X			+								+			
Accessibility																			
5	South Geneva Transit Plaza Elevator	Yes		\$5,000,000		X		+	+		+				+		+		
6	Pedestrian Walkway between BART Mezzanine and San Jose Avenue through the Green Yard	Yes	Needs additional study	TBD	X			+	+		+				+				
7	ADA Accessible Curb Ramps	Yes	Funded	\$200,000	X			+	+		+				+		+		
8	Repaving of the East Side Crosswalk at Geneva Avenue and the I-280 Northbound Ramps <sup>1</sup>	Yes	Largely completed	NA	X			+	+		+				+				
9	Geneva Avenue Bridge Modification	Yes		\$500,000	X			+	+			+			+			+	
10	Pedestrian Crossing Improvements at Ocean Avenue and the I-280 Northbound On-Ramp	Yes	Partly completed	NA	X			+	+						+				
11	Closing off the Tracks at Ocean Avenue from Pedestrians	Yes	Funded	NA	X			+											
Muni LRT Service Operations																			
J and K Lines																			
12	Alighting Platform near Eastside Connector	Yes	Funded	NA	X			+	+		+				+	+			
13	J/ K Line Boarding Platform																		
	Option A. Boarding Platform near BART Mezzanine	No*																	
	Option B. Boarding Platform along San Jose Avenue	Yes	Funded	\$900,000	X			+			-				-	+			

Balboa Park Station Capacity and Conceptual Engineering Study

Chapter 5. Analysis and Recommendations

Improvement		Recommended?	Status	Estimated Cost (order of magnitude)	Implementation Period			Improvement Targets Identified Need											
					Short-Term (1-5 years)	Mid-Term (6-10 years)	Long-Term (greater than 10 years)	Safety and Security	Accessibility			Transit Service		Transit Facilities					Community Vitality & Sustainability
									Pedestrian Facilities	Bicycle Facilities	Transit Transfers	Travel Times	Real-Time Information	Passenger Information	Convenient Access	Waiting & Alighting Experience	Kiss-and-Ride Access	Traffic & Parking Operations	
14	K Line Reconfigured Boarding Platform South of the Green Administration Building <sup>2</sup>	Yes		TBD			X	+	+		+				+	+			
15	Relocation of Ocean Avenue K Line City College Stop to the Farside of Howth Street	Yes		TBD		X			+						+				
M Line																			
16	M Line Platform(s) on San Jose Avenue																		
	Option A. Center Platform on San Jose Avenue north of Geneva Avenue	No**																	
	Option B. Farside Platforms on San Jose Avenue at Geneva Avenue	Yes	Needs further study	\$10,000,000	X			+	+		+				+	+		-	
	Option C. Alighting Platform on San Jose Avenue south of Niagara Avenue	No*																	
Geneva Avenue																			
17	Westbound Improvements: Sidewalk Straightening & Street Restriping	Yes	Design funding requested	\$400,000	X			+	+			+				+			
18	Eastbound Improvements: Sidewalk Straightening & "BUS STOP" Box	Yes		\$750,000	X			+	+			+				+			
19	Kiss-and-Ride Reconfiguration																		
	Option A. One-Way Access with Exit onto Geneva Avenue	No*																	
	Option B. Cul-de-Sac with No Access to Geneva Avenue	Yes		\$1,000,000	X			+	+			+					-	-	+
	Option C. Cul-de-Sac with Exit onto Geneva Avenue	No*																	
20	Signal Synchronization	Yes	Completed	NA	X							+						+	
21	Signalization of Geneva Avenue and Howth Street and/or Geneva Avenue and Louisburg Street																		
	Option A. Signalization of Geneva Avenue and Howth Street	Yes	Funded	NA	X			+	+										
	Option B. Signalization of Geneva Avenue and Louisburg Street	No*																	
Ocean Avenue																			

Improvement		Recommended?	Status	Estimated Cost (order of magnitude)	Implementation Period			Improvement Targets Identified Need											
					Short-Term (1-5 years)	Mid-Term (6-10 years)	Long-Term (greater than 10 years)	Safety and Security	Accessibility			Transit Service		Transit Facilities					Community Vitality & Sustainability
									Pedestrian Facilities	Bicycle Facilities	Transit Transfers	Travel Times	Real-Time Information	Passenger Information	Convenient Access	Waiting & Alighting Experience	Kiss-and-Ride Access	Traffic & Parking Operations	
22	Intersection Consolidation of Ocean Avenue / Geneva Avenue / Phelan Avenue	Yes		\$300,000	X			+	+	+									+
23	Westbound Class II Bike Lane / Eastbound Sharrows along Ocean Avenue between San Jose Avenue and Howth Street	Yes	Completed	NA				+		+									
24	Replacement of Pedestrian Bridge over Ocean Avenue and Extension of Class II Bike Lanes <sup>3</sup>	Yes		TBD		X		+	+	+									
25	Center-Running Westbound Transit Lane on Ocean Avenue <sup>3</sup>	Yes		TBD			X	+				+				+			
The Ocean Avenue I-280 Southbound Off-Ramp																			
26	Flashing Beacon on the I-280 Southbound Off-Ramp at Ocean Avenue	Yes	Design funding requested	\$100,000	X			+	+										
27	Realignment of the Ocean Avenue I-280 Southbound Off-Ramp	Yes		\$7,000,000		X		+	+	+									
Redevelopment																			
28	Green Yard Redevelopment																		
	Option A. Green Yard Decking <sup>4</sup>	No**		\$89,000,000															
	Option B. Green Administration Building Renovation / Reconstruction	Yes	Needs Additional Study	TBD			X	+								+			+
29	Upper Yard Transit-Oriented Development (TOD)	No	Needs Additional Study	TBD		X		+								+			+
Freeway-Related Improvements																			
30	I-280 Freeway Deck	No**		\$2 billion			X	+	+										+
31	Single-Point Urban Interchange (SPUI)	No**		Included above			X	+	+	+									
32	Elevated Kiss-and-Ride Roadway																		
	Option A. Elevated Kiss-and-Ride Connecting to Ocean Avenue	No**																	

Improvement		Recommended?	Status	Estimated Cost (order of magnitude)	Implementation Period			Improvement Targets Identified Need											
					Short-Term (1-5 years)	Mid-Term (6-10 years)	Long-Term (greater than 10 years)	Safety and Security	Accessibility			Transit Service		Transit Facilities				Traffic & Parking Operations	Community Vitality & Sustainability
	Option B. Elevated Kiss-and-Ride Connecting to I-280 Northbound	Yes		\$65,000,000			X	+							+		+	+	
Parking																			
33	Expansion of Residential Permit Parking (RPP) Zone and Potential Study of Parking Benefit District	N/A <sup>5</sup>		NA														+	
34	Passenger Drop-off Zone on the west side of San Jose Avenue at Geneva Avenue	No*		NA				+							+		+		

\*

Feasible within next 20 years but not recommended.

\*\*

Not feasible within next 20 years.

1

Improvement 14 can only be completed with the removal of the J Line from the Green Yard.

2

The repaving of the crosswalk has been completed; however, the straightening has not occurred.

3

Improvement 25 is dependent on the replacement of the pedestrian bridge over Ocean Avenue.

4

Improvement 28 could be completed prior to the completed of Improvement 14. However, this would complicate construction of Improvement 14 in the future.

5

Improvement 33 – RPP expansion is a decision that would be left up to the residents if/when conditions warrant. A Parking Benefit District could be studied within the context of citywide parking management study, but not as a stand-alone measure.

*Table 28: Summary of Station Capacity Study Recommendations*

Recommendations		Recom- mended?	Implementation Period		
			Short-term (1-5 years)	Mid-term (6-10 years)	Long-term (Greater than 10 years)
<i>Muni LRV and HSC Maintenance and Storage Operations</i>					
I	Removal of Storage Uses from the Green Yard	Yes	X		
II	Improved Track Utilization in the Geneva Yard	Yes	X		
III	Maintenance and Storage Improvements at Muni Metro East (MME)	Yes	X		
IV	Expansion of Muni Metro East (MME)	Yes		X	
V	T Line Connection to Muni Metro East (MME) from the Green and Geneva Yards	Yes		X	



Design improvements would enhance the station area and improve its pedestrian friendliness. Possible improvements include plaza treatments, landscaping, and artwork. Design improvements were reviewed in this report only as they pertain to station capacity and access. Additional work is recommended to deal with aesthetics. Possible references include the Better Streets Plan and the Mission Streetscape Plan.

## **Funded and Committed Balboa Park Station Improvements**

Numerous improvements to the Balboa Park Station and its surrounding area have been proposed by BART, SFMTA, and various other city agencies. These improvements are designed to help address the circulation and accessibility issues highlighted in Chapter 4.

The following three station improvements have recently been completed or have received funding. They are included here to give a full picture of the total scope of changes recommended for the Balboa Park station area.

- Westside Walkway - BART, working with SFMTA, developed the Westside Walkway. This pathway connects Ocean Avenue along the west side of the BART station box to the new west side BART station entrance. The walkway and entrance were completed in April 2011.
- Eastside Connector - Lifeline funds for the Eastside Connector have been committed to connect the Westside Walkway and the J/K Line alighting platform in the Muni Green Yard via a pedestrian bridge over the BART station box. BART has nearly completed conceptual design and will begin design development for the connector.
- J/K Boarding and Alighting Platforms - Lifeline funds for the new J/K boarding platform on San Jose Avenue and the new alighting platform near the Eastside Connector (Improvement 12) have been committed.

These new facilities will improve access to the station from Ocean Avenue, allowing for the closure of the substandard existing informal walkway along the east side of the BART box in the Muni Green Yard.

In addition to funding for station improvements, Safe Routes to Transit (SR2T) funding has been obtained for several accessibility improvements identified in the *Ped and Bike Project*. The following improvements have received 2009 SR2T funding:

- Signalization of Geneva Avenue and Howth Street (Improvement 21);
- ADA-accessible curb ramps at Geneva Avenue and the I-280 northbound ramps, Ocean Avenue and San Jose Avenue, and Ocean Avenue and the I-280 northbound on-ramp (Improvement 7);

- The relocation of the signals at Geneva Avenue and San Jose Avenue onto mast arms to improve signal visibility;
- A new crosswalk, pedestrian-actuated signal, and curb ramps at Ocean Avenue and the I-280 northbound on-ramp (Improvement 10); and
- The straightening of the east side crosswalk and ADA-accessible curb ramps at Geneva Avenue and the I-280 northbound ramps (Improvement 8). Since the initial preparation of this report, the crosswalk area and a major portion of the intersection have been repaved; however, the crosswalk has not been repainted as a straight alignment.

Additionally, the installation of a westbound bike lane on Ocean Avenue from San Jose Avenue to the I-280 southbound off-ramp (Improvement 23) received Proposition K funding and has been completed. A combination of Proposition K and SR2T funding will be used to finish the wayfinding improvements.

BART funded the recent installation of curb ramps at the kiss-and-ride driveway and Geneva Avenue.

## **Improvement Phasing**

One of the objectives of this study is to identify the appropriate implementation period for proposed improvements in the Balboa Park Station area. The proposed implementation period is shown along the right side of Table 27. The three time periods used are short-term (within 5 years), mid-term (6 to 10 years) and long-term (beyond the 10-year horizon). A detailed description of each improvement proposal follows.

## **Customer Amenities**

### ***Improvement 1. Lighting Improvements [Short-Term]***

This improvement would increase transit customer safety and potentially encourage transit ridership. Although a calibrated illumination study was not performed, the locations shown in **Figure 27** and listed in Table 29 were identified during several night site visits by the study team. Pedestrian-scale lighting would be installed every 50 feet. The current spacing of luminaires is approximately 100 feet. Additional lights would be attached to the existing light poles.



Figure 27: Improvement 1 - Lighting Improvements

*Table 29: Proposed Lighting Improvements*

No	Location		Side of Street	Linear Feet	Number of Lights
1	Ocean Ave	West of I-280	North Side	100	1
2	Ocean Ave	West of I-280	South Side	250	3
3	Ocean Ave	I-280 - San Jose	North Side	555	6
4	San Jose Ave	Ocean - Mid block	West Side	420	4
5	Geneva Ave	Muni access wall	North Side	50	2
6	BART access		South Side	50	1
7	Green Yard walkway			125	2
8	San Jose Ave	South of Geneva	West Side	400	4
Total				1,950	23
a	Lighting near the BART station will be completed as part of BART Eastside Connector project.				

The lighting improvements would include not only the station area, but would extend into the surrounding neighborhood to improve access to and from the station. These locations would have improved lighting, with additional luminaires or upgraded lamps on existing luminaires:

- North side of Ocean Avenue along Balboa Park,
- Both sides of Ocean Avenue near the I-280 southbound off-ramp,
- Southwest corner of Ocean Avenue and San Jose Avenue,
- West side of San Jose Avenue south of Geneva Avenue,
- Green Yard walkway between BART mezzanine and San Jose Avenue,
- Southern wall of the BART station stairway and escalator entrance on the North Geneva Transit Plaza, and
- South Geneva Transit Plaza between the kiss-and-ride area and the BART station stairway.

Assuming a cost of \$3,000 per 18-foot standard dual-head light and \$120 per linear foot for conduit, trenching, conductors and wiring, the total cost of the lighting improvements listed in Table 29 is estimated to be approximately \$700,000.<sup>7</sup>

Additional artistic lighting could be used to create an identity for the station and the neighborhood. An example would be the San Bruno BART station's internal artistic neon lighting.

<sup>7</sup> Specific assumptions related to cost are provided in Table A in Appendix 9.



***Improvement 2. Wayfinding Signage [Short-Term]***

The *Transit Passenger Intercept Survey* identified insufficient wayfinding signage at the station as a transfer barrier. This improvement would help direct customers and improve customer information between Muni stops and the BART station. At the present time, it is unclear where to walk to transfer from one transit platform/stop to another. Increased signage would also clarify pedestrian access from Ocean Avenue when the Eastside Connection Project is constructed.

The Metropolitan Transit Commission (MTC) has studied extensively the issue of transit wayfinding and signage, starting with its Transit Connectivity Report in 2005. The MTC Regional Hub signage standards developed in response to that report are being used where possible for these signs at Balboa Park Station. (Accessibility considerations may affect use of these standards.) The signage program would further enhance safe pedestrian access from Ocean Avenue when the Westside Walkway and Eastside Connector are completed. The wayfinding signage could also be used to create a unique community identity for the Balboa Park Station area.

Signage at the following locations would direct customers in the appropriate direction toward BART, Muni LRT, and Muni buses:

- North and South Geneva Transit Plazas;
- Ocean Avenue near the Pedestrian Plaza north of the BART Station Box;
- Southwest corner of Ocean Avenue and San Jose Avenue;
- BART mezzanine;
- Green Yard near J and K alighting and boarding areas;
- M Line boarding and alighting platforms at Geneva Avenue on San Jose Avenue;
- Northwest and southwest corners of Geneva Avenue and San Jose Avenue; and
- East side of San Jose Avenue north of the informal M Line alighting stop.

Warning and “Do Not Enter” signs at locations where LRVs enter and exit the Green Yard would help protect pedestrians:

- Ocean Avenue near the Pedestrian Plaza north of the BART Station Box;
- LRV entrances to and exits from the Green Yard along San Jose Avenue; and
- Northwest corner of Geneva Avenue and San Jose Avenue.

Updated map cases in the BART mezzanine and platform would help passengers navigate the station and plan their trip. The four map cases would include: transit stops, transit routes, station map, and fare & schedule information.

MTC's Regional Hub signage standards would be used for these signs. Approximately 80 signs and seven kiosks would be needed to improve wayfinding from the transit plazas. The kiosks would be located on the North and South Geneva Transit Plazas, the pedestrian plaza near the BART Westside Walkway entrance on Ocean Avenue, the southwest corner of Ocean Avenue and San Jose Avenue, the northwest corner of Geneva Avenue and San Jose Avenue, and near the BART mezzanine entrance in the Green Yard. The seven kiosks would display a station map toward customers approaching the station and a transit stop map toward customers leaving the station. Due to the limited pedestrian space on the northwest corner of Geneva Avenue and San Jose Avenue, a modified kiosk could be used that would be mounted flat against the hand railing on Geneva Avenue.

### ***Improvement 3. Real-time Information [Short-Term]***

Real-time information for both BART and Muni services should be provided at key locations. These locations include the bus stops on the Geneva Transit Plazas, boarding and alighting platforms/stops for the J, K, and M Lines, and at key access points, such as in the BART mezzanine, in the Green Yard near the BART mezzanine, and the Ocean Avenue entrance to the Westside Walkway. Many of the signs should include both Muni and BART real-time information and be readable from a reasonable distance, such as the sign at the 4<sup>th</sup> Street Caltrain Station. The sign located in the Green Yard would be located such that it would be visible for customers aligning the J and K lines as well as those leaving the BART mezzanine. The real-time information signs on the Geneva Transit Plazas could be attached to the proposed canopy (Improvement 4) or attached to the existing BART structures. The sign on each plaza would be visible both to customers on the plaza and those leaving BART and/or waiting on the plaza.

Clear Channel has identified potential problems with providing real-time information on the bus shelters on the Geneva Transit Plazas. The sidewalk is built directly on top of the BART box, and there is insufficient depth to trench the conduit. As a result, providing power for real-time information at the bus shelters is not feasible at this time. Clear Channel has installed a shelter with NextMuni on San Jose Avenue just south of Geneva Avenue.

### ***Improvement 4. Canopies and/or Enhanced Bus Shelters on the North and South Geneva Transit Plazas [Short-Term]***

Standard size bus stop shelters can typically accommodate up to 12 people comfortably. However, more than 40 customers often wait at one time at the Geneva Transit Plazas to board Muni buses. Therefore, the existing standard bus shelters are inadequate. Larger shelters (16 feet long) have been installed, but even more extensive canopies and windscreens would provide additional protection during inclement weather, such as the shelters at 4<sup>th</sup> and King streets Muni Metro station in San Francisco (shown in **Figure 28**).





Figure 28: Canopy at the 4th Street and King Street Station in San Francisco (Source: Wikipedia)

The canopies would be equipped with attached lighting. The large real-time bus information sign on each plaza (Improvement 3) could be suspended from each canopy in order to provide weather protection for the sign. The signs would use the same power source as the canopies' lighting.

## Accessibility

### ***Improvement 5. South Geneva Transit Plaza Elevator [Mid-Term]***

Phase 1B of the *BART Comprehensive Station Plan* includes a proposal for a new escalator and elevator at the south end of the BART mezzanine, on South Geneva Transit Plaza. These facilities would enhance entry to the station for families with young children and for anyone for whom walking is difficult. At this time, BART plans on pursuing only the elevator. The escalator would become more important with the development of the Upper Yard.

The construction of the elevator would be complicated by the fact that the mezzanine does not extend south of Geneva Avenue. Therefore, the elevator would only serve the paid area unless the mezzanine is extended. BART is currently reviewing options to construct the elevator. The agency's preliminary cost estimate for the elevator is approximately \$5 million. As mentioned earlier, lack of funding may require that this improvement wait until the Upper Yard is developed. (BART is also considering relocating the elevator on the North Geneva Transit Plaza to the unpaid area or providing street-level access controls in the form of a Clipper card reader.) Currently, the elevator goes only into the paid platform area and does not stop at the BART mezzanine.)

***Improvement 6. Pedestrian Walkway between BART Mezzanine and San Jose Avenue through the Green Yard [Short-Term]***

Traction power poles near Geneva Avenue south of the Green Administration Building create a hazardous pinch point for walking customers by narrowing the walkway adjacent to the tracks (see **Figure 11** and **Figure 12**). In addition, the track that exits the Green Yard at its southeast corner creates an uneven surface that makes it difficult for customers to negotiate the northwest corner of the Geneva Avenue and San Jose Avenue intersection.

***Pedestrian Walkway***

The required horizontal curve radius for the tracks and the location of the Green Administration Building constrain the options to improve this walkway. Initially, the possibility of modifying the revenue tracks at the south end of the Green Yard was explored in order to widen the walkway. However, the new horizontal curve radius standards in the Green Yard re-rail project would make it difficult to design the track geometry for two tracks with a 50-foot radius. Then, use of a single track in this area instead of two tracks was studied to create more room for a walkway. To accommodate today's operations of the J and K lines, two revenue tracks are required at the south end of the Green Yard. The separate revenue tracks allow for J and K LRVs to lay over independently. In contrast, a single revenue track could require operators to switch vehicles after layovers. The issue with using one revenue track for two lines is discussed further in Option A of Improvement 13. As a result, realigning the revenue tracks is not recommended unless and until the J Line is extended to San Francisco State University and removed from operating in the Green Yard.

The tentatively recommended short-term improvement, shown in **Figure 29**, would involve the removal or relocation of three traction power poles and the enhancement of the existing pedestrian walkway parallel to the Geneva Avenue sidewalk, from the northwest corner of Geneva Avenue and San Jose Avenue to the BART mezzanine. (The pole relocation requires additional engineering feasibility study.) It would be rebuilt with a three-inch curb along the dynamic envelope of the trackway. The curb would extend from the entrance at Geneva Avenue/San Jose Avenue to the K Line boarding stop. The curb would most likely be an asphalt dike so that it would be compatible with the yard construction. A 24-inch wide truncated dome strip would be installed along the K Line boarding stop. Additionally, strips would be installed at both ends of the walkway where it narrows to warn visually-impaired customers. It is assumed that with this improvement, customer boarding would no longer occur at the southeast corner of the yard. Instead boarding would occur near the BART mezzanine and/or a platform along San Jose Avenue, proposed in Improvement 13.

Since LRVs would no longer pick up customers at the southeast corner of the yard, they might proceed around the curve more quickly. It is recommended that, for safety reasons, this not be permitted, and that LRVs continue to proceed around the corner at the low speeds that they operate at today.

It should be noted that a column supporting the pedestrian bridge to the Administration Building would still obstruct the walkway and may need to be relocated. This might require the reconstruction of the entire pedestrian bridge. If the pier is not removed, a detectable warning would need to be installed to warn visually-impaired customers.

This project would provide a clear definition of customer walkways to the BART station and Muni LRT stops, improving customer safety and access to BART and the J and K lines. This walkway would be within the Green Yard and at the same grade as the San Jose Avenue sidewalk in order to avoid the steep grade of the Geneva Avenue sidewalk. It would replace the narrow walkway in use today. With the removal of the three traction power poles, the minimum width of the walkway would be increased to approximately 44 inches and would meet the minimum width for an ADA accessible pathway (3 feet or 36 inches). ADA guidelines also require passing spaces at a maximum of 200 feet for all walkways less than 60 inches wide.<sup>8</sup> The width of the walkway at other locations would meet the width requirements for an ADA accessible path. The pinch point of the walkway would still pose a barrier to access for mobility-impaired customers as defined in the City of San Francisco *ADA Transition Plan for Curb Ramps and Sidewalks*.

ADA requires a detectable warning for any protruding objects in a walkway. The pedestrian bridge pier would likely still pose an obstacle for visually-impaired customers. Standardized surface features built in or applied to walking surfaces would likely be required to inform visually-impaired customers of the potential hazard on the circulation path. The width between the bridge pier and the dynamic envelope is 58 inches.

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<sup>8</sup> The minimum walkway width clearance is 36 inches. All accessible walkways with a clear width less than 60 inches require passing spaces at a maximum interval of 200 feet. Passing spaces shall be either: a space 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum; or, an intersection of two walking surfaces providing a T-shaped space complying with section 304.3.2 where the base and arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection.

**Balboa Park Station Capacity and Conceptual Engineering Study**  
Chapter 5. Analysis and Recommendations

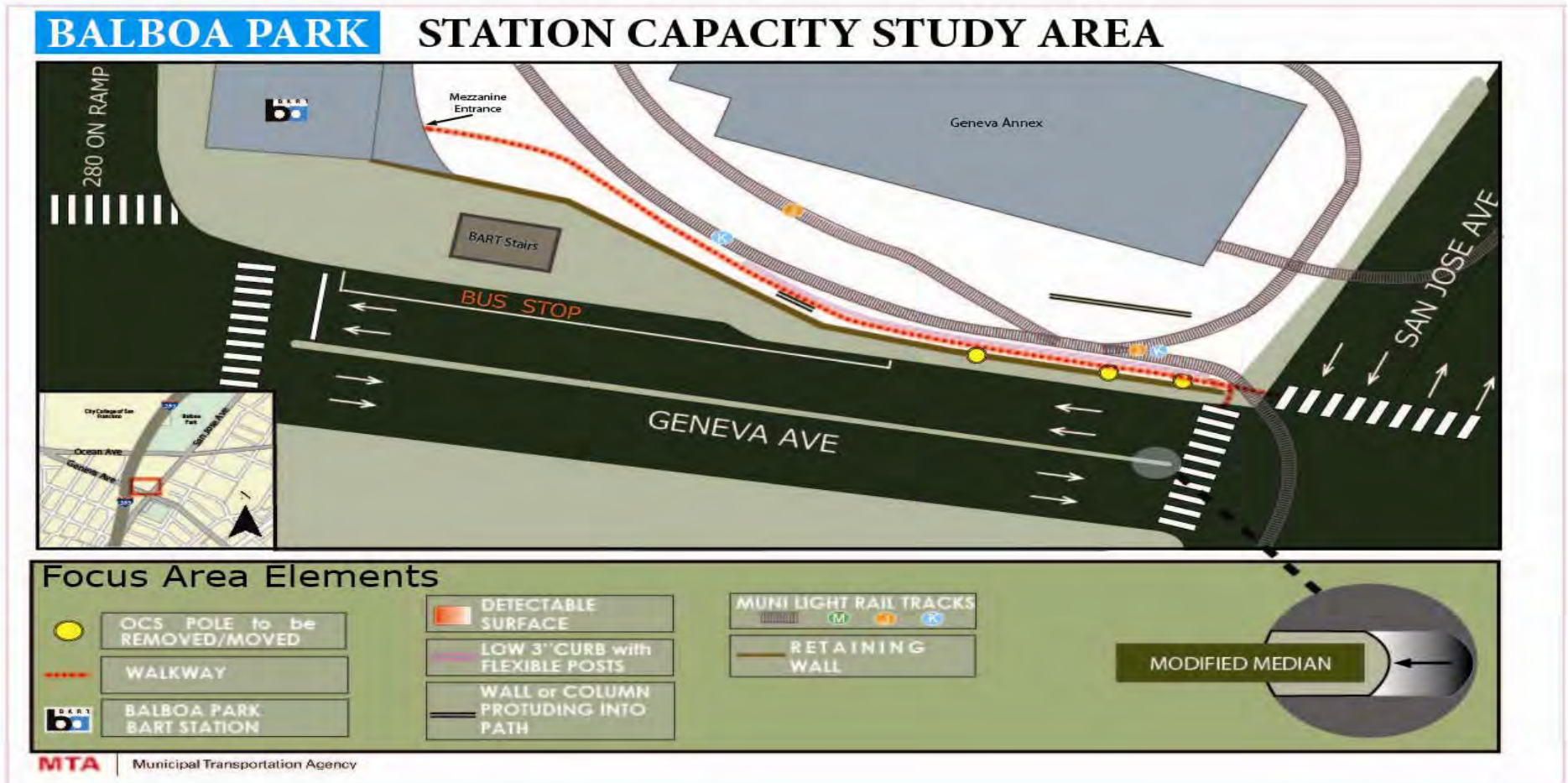


Figure 29: Improvement 6 - Pedestrian Walkway



The curb would help deter pedestrians from walking on the tracks and would provide a detectable warning for visually-impaired customers. It would also help wheelchairs stay in the walkway away from the tracks. One drawback of installing only a curb is that able-bodied customers could step over the curb and walk on the trackway. Originally, a fence was considered to prevent this. However, during field observations, several LRVs were observed extending beyond the painted dynamic envelope while passing through the curved track. Therefore, the fence would need to be built further into the pedestrian walkway than where the painted dynamic envelope is today, reducing the width of the walkway. Instead, the proposed asphalt curb would help delineate the tracks from the pedestrian walkway, but in the event that an LRV extends beyond the dynamic envelope, the LRV would be able to clear the asphalt.

A long-term improvement to enhance the walkway further would become possible if the J Line is extended to San Francisco State University and is removed from the Green Yard as originally proposed in the TEP. While a J Line extension is still a long-term possibility, it would depend on major capital improvements. (It could be paired with the extension of the M to Daly City BART, and would probably need a west side 19<sup>th</sup> Avenue terminal, such as at Stonestown.) The tracks north of Geneva could then be realigned, providing additional width to the walkway and the possible relocation of the boarding platform (Improvement 14). Option B for Improvement 28—redevelopment of the Green Administration Building—would provide weather protection to passengers on the walkway and platform below.

It should be noted that the Green Yard Rail Replacement project considered closing this walkway except to the mobility impaired through the use of gates and fences. The objective was to reduce the number of customers walking close to, or within, the operating envelope of LRVs. However, there are several negative aspects of this recommendation. One is that assisting the mobility impaired through the walkway would require dedicated personnel, perhaps supplemented by electronic devices for customers to signal their desire for the gate to be opened. Another is the increased walking distance for non-disabled customers wishing to access the station from San Jose Avenue, particularly those destined to J or K line trains. They would be forced to walk up the steep and narrow sidewalk along Geneva Avenue, proceed downstairs through the BART entrance, and then double back to the light rail boarding platforms. In balance, it would be better to keep the entrance open to all users but to improve it as described above.

#### *Northwest Corner of Geneva Avenue and San Jose Avenue*

The northwest corner of Geneva Avenue and San Jose Avenue, shown in **Figure 30**, is difficult for pedestrians to negotiate. It is difficult to improve this corner fully without the removal of the track exiting the yard at this point. It is highly recommended that a viable option to remove this track from the northwest corner be developed, as the track is a major impediment for pedestrian access.



Figure 30: Northwest Corner of Geneva Avenue and San Jose Avenue

The *Pedestrian and Bicycle Connection Project* recommended a bulb-out at the northwest corner of Geneva Avenue and San Jose Avenue. The project also recommended making the sidewalk flush with the street and installing a special paving treatment to help delineate the pedestrian zone, as shown in **Figure 31**.

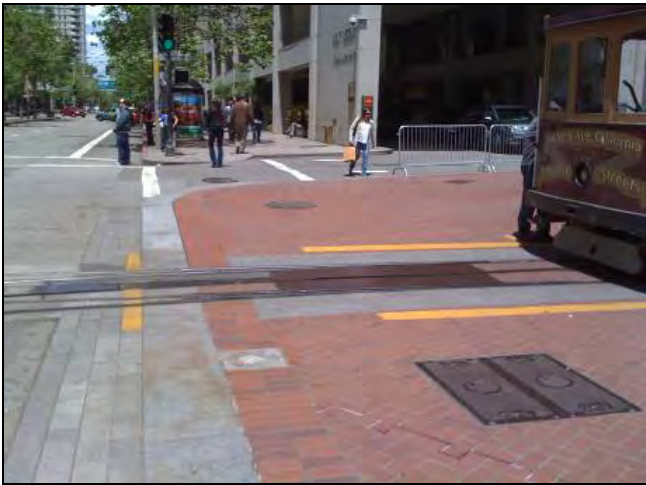


Figure 31: Example Treatment for Rail Tracks across a Curb at the Cable Car Terminus on California Street at Drum Street in Downtown San Francisco (Source: Ped and Bike Project)

The curb extension is not feasible with the recommended restriping of Geneva Avenue (Improvement 17) or the improved M Line platforms (Improvement 16). The cross-sectional width of Geneva and San Jose avenues is not adequate to accommodate such extensions.



The removal of the light rail track running through this corner would allow for the most dramatic improvement for pedestrians. However, this track provides the only direct connection between the Green and Geneva yards for maintenance movements. An option to remove the track entirely from the corner, as shown in **Figure 32**, was developed that could be implemented during the Green Yard re-rail project. The track passing through the corner of the intersection would be removed and replaced by one making a reverse curve with the existing runaround track in the yard area parallel to San Jose Avenue. This proposed improvement should be further engineered to confirm its viability and the changes required in the configuration of traction power poles and wires.

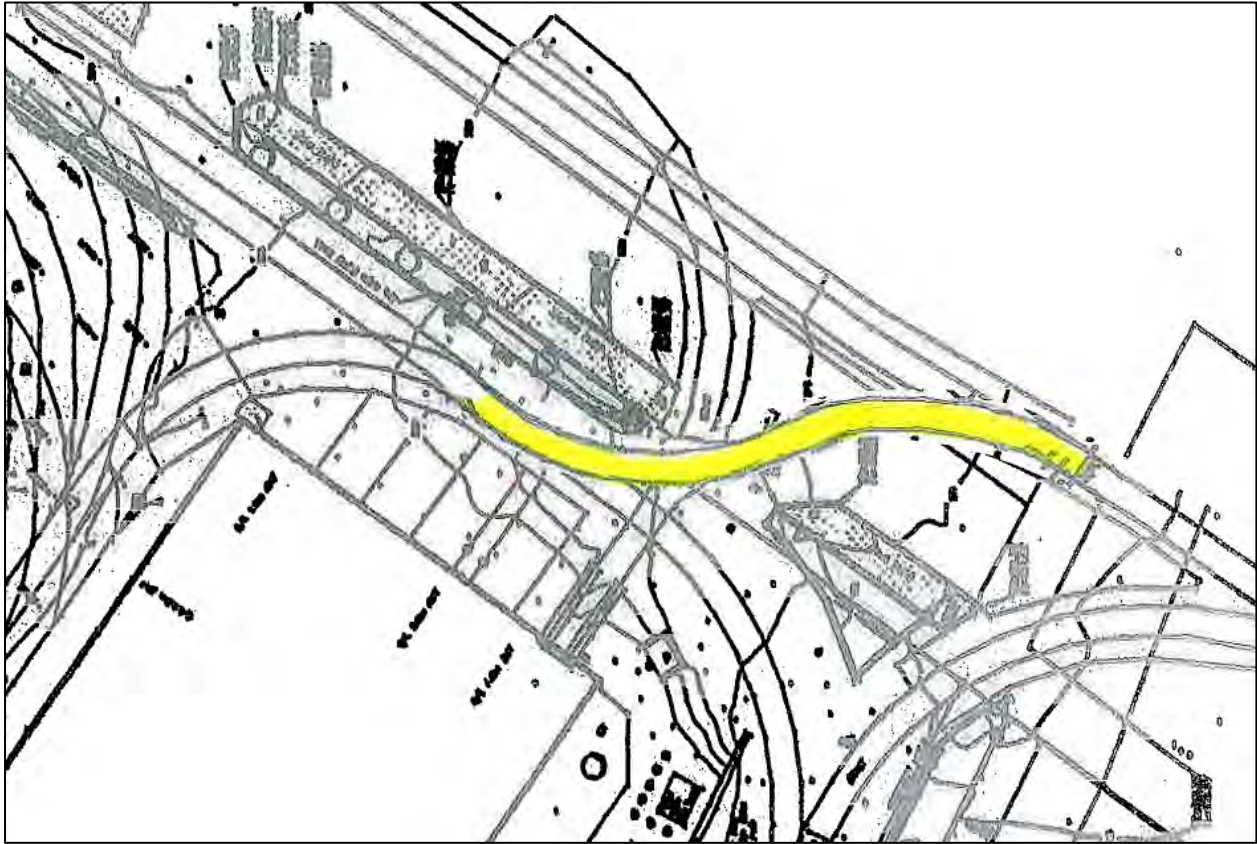


Figure 32: Track Removal from the Northwest Corner of Geneva Avenue and San Jose Avenue

Once the track, through the corner of the intersection is removed, the sidewalk would be reconstructed with new ADA curb ramps. This would provide additional waiting space for pedestrians on the corner and improve the maneuverability of those in wheelchairs.

The existing track coming out of the east side of the lower level of the Green Administration Building may have to be removed to make this proposal financially feasible. Otherwise, an expensive diamond would have to be installed where the new track crosses it. If this track were to be removed, LRVs and HSCs being repaired below the Administration Building would have to back out through the west side entry of the building.

Another issue involved with this proposal is that southbound trains using the new track would be running counter to the flow of traffic on a short segment of the runaround track. This movement would likely require protection by a flagman stationed near the corner of Geneva and San Jose, similar to the practice used when cars exit the lower level of the Administration Building. Since there is usually a dispatcher on duty near that corner, this should not be a difficult procedure to arrange.

#### *Other Alternatives Examined*

An additional option, shown in **Figure 33**, was explored. In this option, the track through the corner would remain, but the sidewalk would be reconstructed to be flush with the street. This would provide a level waiting space outside of the trackway and an ADA compliant track crossing. A pedestrian ramp on the sidewalk directly west of this corner would be needed if the corner sidewalk were lowered. Yellow truncated cones would have to be installed to provide warning of the vehicular intersection and LRV tracks. This improvement would shift the crosswalks westward on Geneva Avenue and northward on San Jose Avenue and would require cutting back the median on Geneva Avenue. The existing planter in the yard along San Jose Avenue would need to be modified to provide adequate space. The traffic light pole on Geneva Avenue and a traction power pole on San Jose Avenue might need to be relocated. The SFMTA CAD drawings and striping plans do not positively locate these poles, so their estimated locations are shown on Figure 33.

After further investigation by SFMTA Accessible Services, it was agreed that this option, would not be viable due to the complications of providing a pedestrian ramp on Geneva Avenue, given the grade involved. In addition, there were concerns that shifting the crosswalks away from the corner would reduce the visibility of pedestrians to motorists. There would be maintenance problems, as well. Since the corner sidewalk would be flush with the street, run-off would deposit silt and debris there.

As a result of all these problems, this alternative was not pursued.

## Balboa Park Station Capacity and Conceptual Engineering Study

### Chapter 5. Analysis and Recommendations

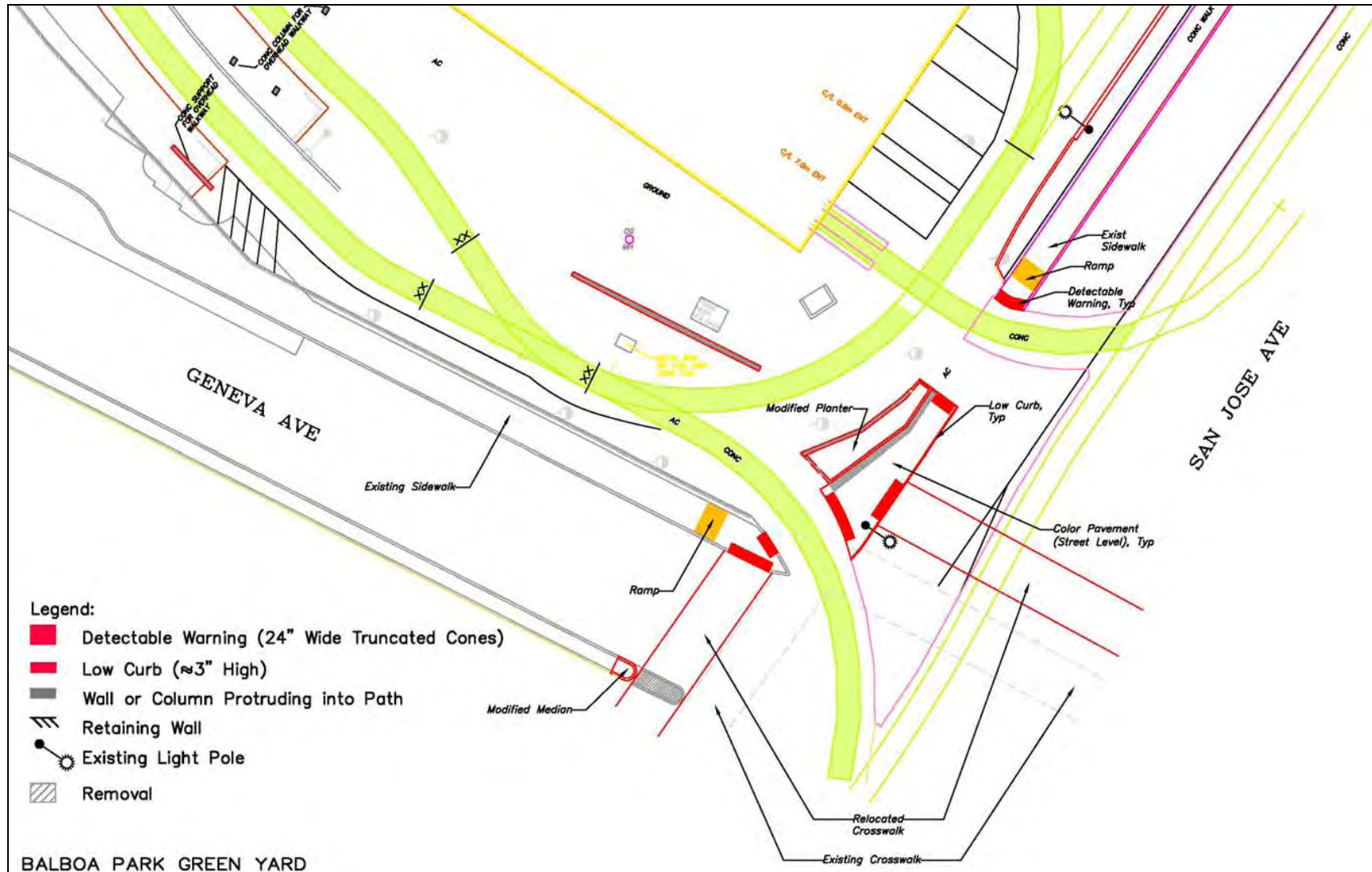


Figure 33: Improvement 6 - Northwest Corner of Geneva Avenue and San Jose Avenue



***Improvement 7. ADA-Accessible Curb Ramps [Short-Term]***

This improvement would increase access for people who are mobility-impaired, pushing strollers, carrying large packages or bags, pulling wheeled luggage, etc. ADA-accessible curb ramps would be installed (1) at the driveway of the kiss-and-ride area on Geneva Avenue and (2) between the kiss-and-ride drop-off/pick-up area and the South Geneva Transit Plaza. In addition, the *Ped and Bike Project* identified the need for ADA curb ramps at three intersections: (1) Geneva Avenue and the I-280 northbound ramps, (2) Ocean Avenue and San Jose Avenue, and (3) Ocean Avenue and the I-280 northbound on-ramp. These three intersections have already received 2009 SR2T funding.

ADA curb ramps and detectable warning treatments are also needed at the three track crossings south of the Ocean Avenue Plaza (Improvement 10B) and at driveways leaving the Green Yard on San Jose Avenue

BART recently installed ADA curb ramps at the driveway of the kiss-and-ride area on Geneva Avenue. Currently, there are no plans to install ADA curb ramps between the kiss-and-ride area and the South Geneva Transit Plaza, shown in **Figure 34** and **Figure 35**. Installing these curb ramps would become more important with the installation of an elevator on the South Geneva Transit Plaza (Improvement 5).



*Figure 34: Lack of ADA curb ramp from kiss-and-ride to South Geneva Transit Plaza*

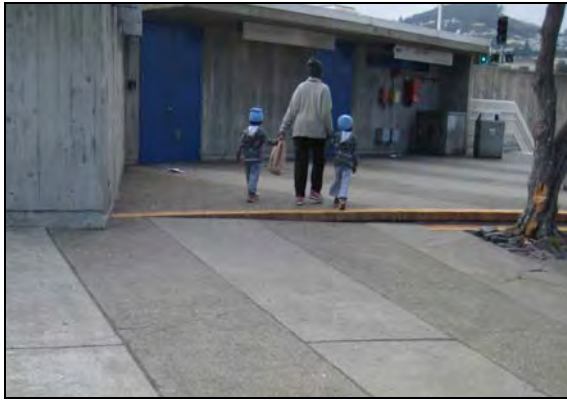


Figure 35: Lack of ADA curb ramp on South Geneva Transit Plaza between kiss-and-ride and stairs

**Improvement 8. Repaving the East Side Crosswalk at Geneva Avenue and the I-280 Northbound Ramps [Short-Term]**

This improvement was identified in the *Ped and Bike Project*. It would realign and repave the east side crosswalk. This would shorten the crossing distance from 85 feet to approximately 75 feet. Straightening the crosswalk may have a slight adverse effect on westbound traffic queues.

After further inspection, accessibility would be improved with the repaving of the entire intersection due to the level of deterioration of the pavement. Current paving of the crosswalk and intersection is in poor condition and poses a barrier for mobility-impaired individuals. This improvement will increase accessibility and reduce crossing distance by ten feet. Improvement 7 proposes new ADA-accessible curb ramps at this location. The straightening of the east side crosswalk and the installation of the ADA-accessible curb ramps has received 2009 SR2T funding. The intersection has recently been repaved since initial preparation of this report.

**Improvement 9. Geneva Avenue Bridge Modification [Short-Term]**

Locations of the sidewalks on the Geneva Avenue Bridge, particularly on the north side, are constrained and cannot comfortably accommodate the existing pedestrian volumes. Traffic signals, as shown in **Figure 36**, and “No Parking” signs obstruct the sidewalk.

Increasing the capacity of the sidewalk by either widening the sidewalk or removing obstructions is necessitated by pedestrian volumes on Geneva Avenue. Approximately 300 to 350 pedestrians use the north sidewalk on the Geneva Avenue’s bridge during the AM and PM peak periods. The pedestrian volumes on the south sidewalk vary from over 300 to slightly over 150 pedestrians during the AM and PM peak periods, respectively. These pedestrian volumes are significantly higher than on the Ocean Avenue’s bridge. Peak-hour volumes average slightly over 50 pedestrians per sidewalk.



Due to existing non-standard clearances to the freeway below, opportunities to widen the bridge are limited. Existing profiles and constraints on ramp lengths to and from Geneva Avenue preclude widening to the south. Widening to the north is not possible without lowering the freeway and/or reconstructing the bridge. In addition, Caltrans design exceptions would be required for modifying the existing lanes, since Caltrans has jurisdiction over the local facility as it crosses over and connects to a freeway.<sup>9</sup>



Figure 36: Traffic Signal Obstructing North Sidewalk

Widening the north side sidewalk by expanding it into the adjacent travel lane was one of three options examined in the *Ped and Bike Project* for reallocation of space on the bridge itself. Other ways of better using the bridge deck were to install left- and right-turn lanes onto southbound I-280, or to install a median transit-only lane. The eastbound transit-only lane was determined to be infeasible and was not analyzed further.

The *Geneva Corridor TPS Study* proposes restriping the lanes on the bridge, and adding a westbound left-turn lane. It also recommends converting the westbound through curb lane into a transit-only lane. These improvements would undergo environmental review and possible implementation through the TEP. Widening the sidewalk on the north side of the bridge would also be possible, but would be pursued under separate funding and implementation (not through the TEP).

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<sup>9</sup> Minimum design standards for Caltrans require a minimum 12 foot travel lane with a four foot shoulder. Therefore, the curb lane would be required to be a minimum of 16 feet wide. Design exceptions would be required for any widths less than these.

It should be noted that narrowing of the lanes could require a design exception from Caltrans, as they would not meet the required lane width of 12 feet or shoulder width of four feet. Any lane restriping should ideally reduce the lane offset in the eastbound direction. Depending on the final geometry, a guiding dotted stripe may benefit eastbound drivers by directing them into the appropriate lane.

***Improvement 10. Pedestrian Crossing Improvements at Ocean Avenue and the I-280 Northbound On-Ramp [Short-Term]***

This recently partially completed improvement, shown in **Figure 37** and **Figure 38**, modifies the existing curb and gutter and install new crosswalks and pedestrian-actuated signals at Ocean Avenue and the I-280 northbound on-ramp, as proposed by the *Ped and Bike Project*. There are four separate improvements, described below.

- 10 A. Stripe new north-south crosswalk on the east side of the intersection and install pedestrian-actuated signals. Due to the high traffic volumes and limited pedestrian volumes at certain times of day, it is unlikely at this time that Caltrans would approve and install a pre-timed signal. If pedestrian volumes increase in the future, the possibility of installing a pre-timed signal could be reassessed.

As shown in **Figure 37**, one crosswalk would cross Ocean Avenue from the north end of the BART station box to a point east of the I-280 northbound on-ramp. This crosswalk has received 2009 Safe Route to Transit (SR2T) funding. The existing east-west crosswalk along the north side of the street would remain, though presently it can be hazardous because of traffic turning onto the on-ramp.

Previously, no pedestrian signal was installed at this location. In order to accommodate pedestrian crossings, an eastbound left-turn phase is accompanied with a pedestrian phase to cross Ocean Avenue. The pedestrian-actuated signal improvements have received 2009 SR2T funding.

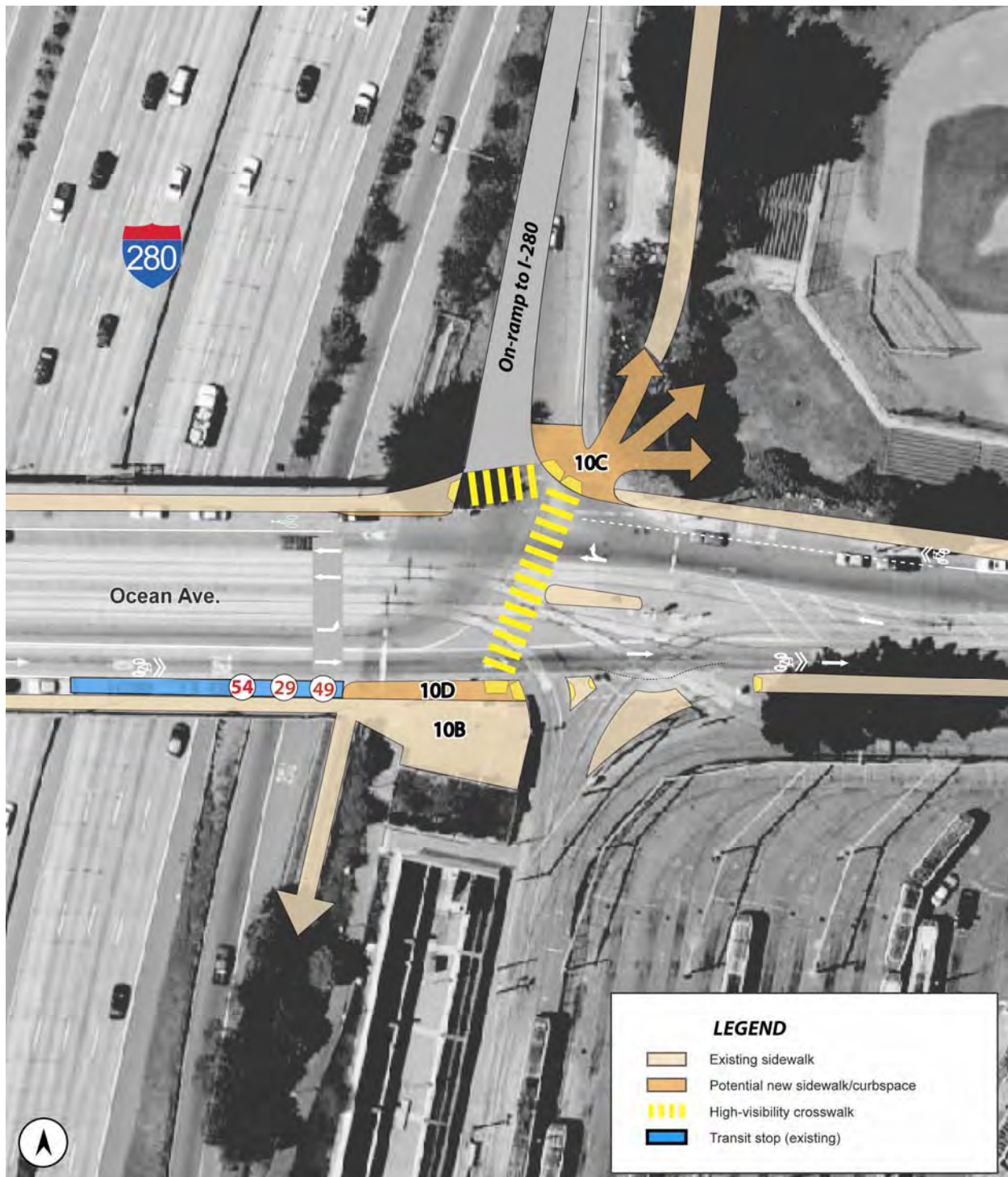


Figure 37: Improvement 10 - Pedestrian Crossing Improvements at Ocean Avenue and the I-280 Northbound On-Ramp

Initially, an additional crosswalk was proposed on the west side of the intersection, along with a “scramble” phase. This crosswalk would minimize the number of crossings necessary for pedestrians to reach the northwest corner of the intersection and City College.

However, after discussions with SFMTA Traffic Engineering staff, only the east side and north side crosswalks are being pursued with 2009 SR2T funding. It should be noted that without the pedestrian “scramble” phase, pedestrian movements in the north side crosswalk will at times conflict with vehicles turning onto the northbound on-ramp.

- 10 B. Reconstruct the pedestrian plaza north of the BART station box to create a northern entrance “gateway” to the BART station, incorporating pedestrian amenities such as seating, public art, an outdoor kiosk, and/or a street vendor. Other potential amenities suited to this area are shown in Figure 38. This is strictly a conceptual illustration, and additional input is needed. BART initially commented that blocking off the view of the station from Ocean would be undesirable and the plaza needs to be accessible. This improvement would redevelop the pedestrian plaza to create a northern entrance “gateway” to the BART Station. Ideally, the electronic boxes on the plaza would be relocated. However, due to the cost of relocating these boxes, it is likely that the plaza design would have to accommodate them.
- 10 C. Reduce the corner radius of the northwest corner of the Ocean Avenue and I-280 northbound on-ramp intersection to reduce the pedestrian crossing distance.
- 10 D. Install curb extensions. Two curb extensions would be installed on the south part of the crosswalks and on the northwest corner of the intersection. These extensions would also include ADA-accessible curb ramps.



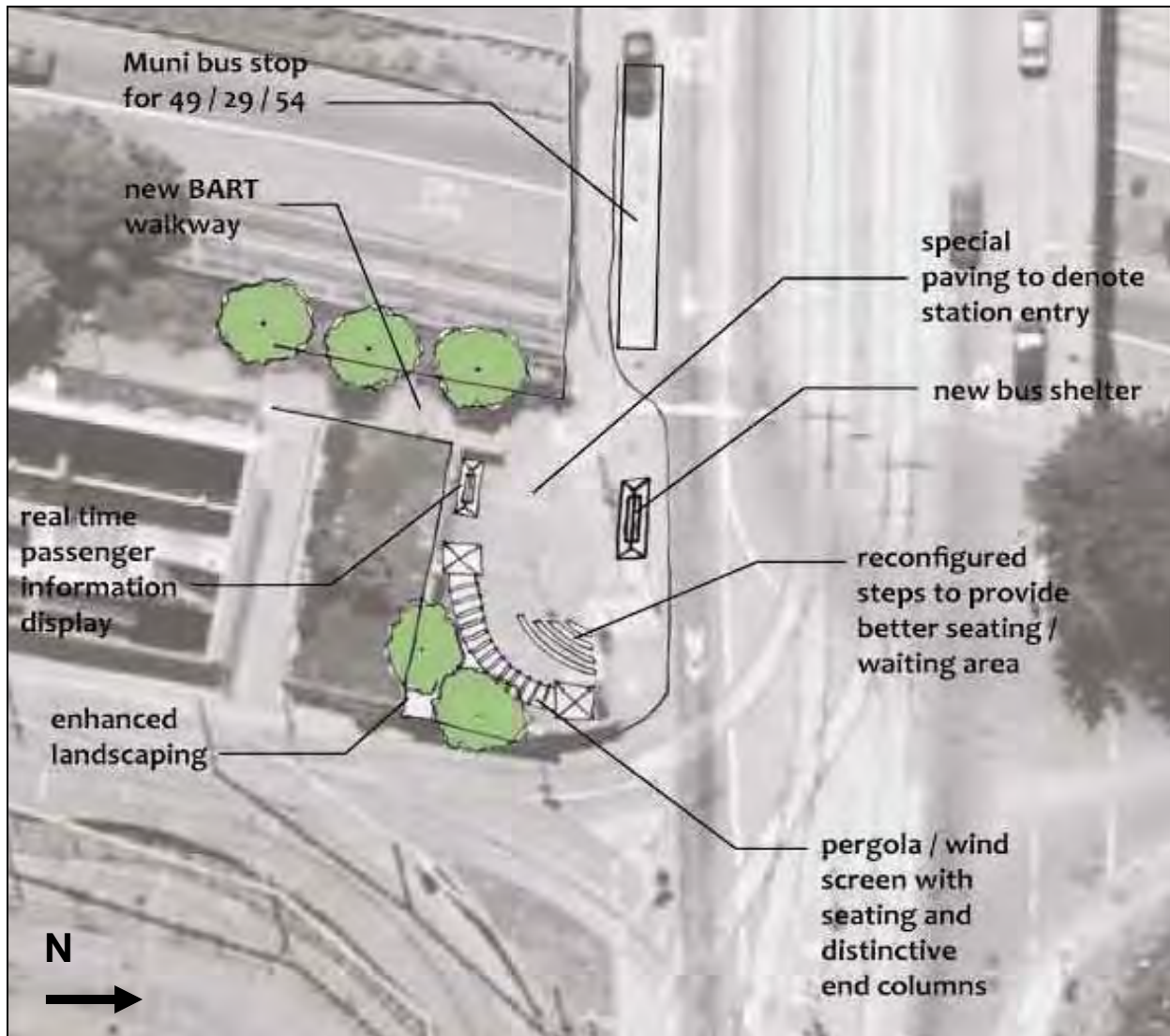


Figure 38: Improvement 10 B - Pedestrian Plaza North of the BART Station Box (Source: Ped and Bike Project)

### **Improvement 11. Closing off the Tracks at Ocean Avenue from Pedestrians [Short-Term]**

Pedestrians often walk on revenue tracks and Yard Track 24 between Ocean Avenue and the BART mezzanine. The Westside Walkway and the Eastside Connector will provide an improved walkway from Ocean Avenue, which would remove pedestrians from the yard and create an accessible walkway for people with mobility impairments. The Westside Walkway is currently under construction. The Eastside Connector has received a Lifeline grant. Once both projects are completed, two sub-improvements would help deter pedestrians from walking through the yard on the current path using the tracks:



- 11 A. Install open ballast on the revenue and “24” tracks during the Green Yard re-rail project to discourage people from walking on them. This sub-improvement is an alternative in SFMTA’s Conceptual Engineering Report for the Green Yard re-rail project. The project recommends concrete seeded with stone 4” to 6” in diameter.
- 11 B. Construct a fence on Ocean Avenue, along the tracks, and at the end of the proposed alighting platform (Improvement 12) to prevent pedestrians from walking along the east side of the BART station box.

Improvement 2 would install warning and “Do Not Enter” signs at this location to help alert pedestrians to the potentially hazardous situation.

## **Muni LRT Service Operations**

### ***J and K Lines***

Objectives 2.1 and 6.3 of the *Balboa Park Station Area Plan* call for transit improvements and the development of a new transit station. The new transit station would be designed to improve internal circulation so that the BART platforms and Muni Metro LRT terminals are incorporated within the same facility. The concept in the *Balboa Park Station Area Plan* involved a new light rail station constructed on the deck over the freeway. As discussed later, development of such a deck is dependent on Caltrans’ plans and timing for freeway reconstruction. It is unlikely to occur in the next 20 years.

The current J and K revenue tracks at the south end of the Green Yard are constrained by the Green Administration Building on the north and a retaining wall along Geneva Avenue on the south. Realigning the revenue tracks is limited by the existing structures and the Green Yard re-rail horizontal curve radius standards. The new curve radius would make it difficult to design the track geometry for two tracks with a 50-foot radius given the existing structures. To accommodate today’s operations of the J and K lines, two revenue tracks are required at the south end of the Green Yard. The separate revenue tracks allow for J and K LRVs to lay over independently. Converting to just one revenue track could require operators to switch vehicles after layovers. The issue with using one revenue track for two lines is discussed further in Option A of Improvement 13. As a result, realigning the revenue tracks is not recommended unless the J Line is removed from the loop. The TEP had earlier recommended extending the J to San Francisco State University and thus it could be removed from the Green Yard.

It is assumed that the Green Yard re-rail optimizes the efficiency of the Green Yard so that it can better meet its maintenance and operation demands. Additional maintenance capacity is available at MME. However, the electric power supplied to MME and signal capacity at the Fourth Street and King Street intersection restricts the ability to operate more rail cars from MME. Due to limitations at MME and the increasing size of the LRV fleet, space for storage and maintenance cannot be reduced in the

Green Yard at this time. This study therefore does not recommend modifying any of the tracks in the Green Yard in the short term. However, in the mid term, realigning the tracks is recommended in Improvement 14 if the J Line can be removed from the current loop on the border of the Green Yard.

The Muni TEP recommends splitting the M-line into two branches and terminating one branch at Parkmerced, while the other branch continues on the current route to Balboa Park. An earlier proposal had recommended terminating the M Line at or near San Francisco State University and replacing between Balboa Park Station and San Francisco State University by extending the J Line. While a J Line extension is still a long-term possibility, it would depend on major capital improvements. (It could be paired with the extension of the M to Daly City BART, and would probably need a west side 19<sup>th</sup> Avenue terminal, such as at Stonestown.) If this earlier proposal were implemented, the J Line would no longer have to loop through the Green Yard, creating a significant time savings. Instead, the J Line could follow a more expeditious route directly along San Jose Avenue and use the new M Line platforms proposed at Geneva Avenue (Improvement 16). This service change would also eliminate J and M layovers at Balboa Park. While this option slightly increases the walking distance between transfers, it would significantly improve J Line operations and travel times in both directions. In addition, the existing K Line stop could be reconfigured (Improvement 14). With the requirement of handling only one line, the area where layovers currently take place could be re-graded and the track moved slightly north to create a more generous waiting and walking area. The poor pedestrian linkage between the BART mezzanine level and the new K Line boarding area, as well as San Jose Avenue, would be significantly improved.

An eventual extension of the M Line to the Daly City BART station would improve access between SFSU/Parkmerced/Stonestown and BART, especially for those customers traveling south to the Peninsula. Replacing one branch of the M with the J along the Ocean View segment would increase frequency of service.

Access to the J and K lines would be substantially improved once the BART Eastside Connector project is completed. At that time, Muni could fence off the informal pedestrian walkway between Ocean Avenue and the BART mezzanine. Pedestrians walking to and from Ocean Avenue would use the Westside Walkway and the proposed Eastside Connector to access the J and K stops.

### ***Improvement 12. Alighting Platform near Eastside Connector [Short-Term]***

This plan, developed as part of the Green Yard re-rail project, would establish an alighting area for customers adjacent to the BART station near the Eastside Connector, as shown in **Figure 39**. LRVs would then proceed into the existing J or K layover areas. When ready to depart, the cars would pull out and then stop at a new platform located parallel to San Jose Avenue, where they would load inbound passengers. This new platform would be approximately 260 feet from Geneva Avenue and equipped with a

mini-high platform (Improvement 13). The J/K LRVs would then proceed on their respective routes.

Lifeline funds have been committed for this new alighting platform.

The new Eastside Connector and alighting platform would allow for the closure of the J/K Line tracks from pedestrians between Ocean Avenue and the new platform (Improvement 11).

### ***Improvement 13. J/K Line Boarding Platform [Short-Term]***

Option A. Boarding Platform near BART Mezzanine

Option B. Boarding Platform along San Jose Avenue

#### ***Option A. Boarding Platform near BART Mezzanine***

Option A would minimize the distance between the light rail and BART platforms and eliminate the need for patrons to walk through the yard area. Under this scenario, both J and K LRVs entering the yard would stop and let customers alight at the new alighting platform near the proposed Eastside Connector. They would then proceed to a layover area (most likely the current track used for J Line boarding). When ready to proceed, the LRVs would loop the yard on the runaround track, pick up customers at a new platform adjacent to the BART mezzanine but somewhat south of the proposed alighting area. They would then leave on the track currently used for K Line layovers and boardings. In order to clear the switch to the current J Line boarding track (which would be used for K Line layovers), a two-car K LRV train would have to stop to board with the front section of the first car on a curved section of track. The operator would need a platform-mounted mirror to be able to see the outside of the doors on the rest of the train.

This option would require all LRVs to loop the yard more than once, adding mileage to the vehicles and time to the schedule. In addition to the time-consuming and circuitous loop around the yard, this method of operation would require whichever LRV is first on the layover track to be assigned to the next line (J or K) that is scheduled to depart. Operators would have to be directed frequently to new LRVs so that they could continue on their assigned run. This option also would take an additional four to six minutes to travel on the loop around the Green Yard. Given this increased cycle time, maintaining the same headways would require an additional LRV (at \$300 per car-hour) or roughly \$4 million annually in extra operating costs. This option is therefore less desirable for the short term but has merit if and when the J Line is extended south to San Francisco State University. At that point, the K Line would no longer share tracks with the J Line in the Green Yard. It could lay over at the boarding area and would not have to loop through the yard nor require operators to change vehicles.

*Option B. Boarding Platform along San Jose Avenue*

Option B, shown in **Figure 39**, is relatively inexpensive, simple to implement, and could be in service in a short period of time. It would involve a new platform, as in Option A, for alighting customers near the proposed Eastside Connector after entering the Green Yard. Then J and K LRVs would lay over in the same locations where they do today. When departing, the appropriate car would pull up to a new platform on the runaround track parallel to San Jose Avenue to board customers. Customers would not be allowed to board at any platform in the yard.

This plan keeps the alighting area close to the BART station and avoids both excessive looping around the yard and requiring operators to change trains when departing. However, the new boarding platform would be further from the BART station than the existing J/K boarding areas. More walking (an additional 260 feet) is involved for customers coming from BART and transferring to J or K cars. (Locating the proposed platform further south--so that it's just east of the Administration Building--to shorten the walking distance is not feasible. Only 100 feet of tangent track is available between the curve near Geneva Avenue and the vehicular driveway to and from the Green Yard; at least 150 feet would be needed to accommodate a two-car train of LRVs.) Further, the driveway on San Jose Avenue provides important vehicular access to the yard, especially for trucks, as shown in **Figure 40**. Other driveways into the yard would not be able to accommodate these movements. Blockage of this driveway would essentially eliminate vehicular access to the yard.



## BALBOA PARK STATION CAPACITY STUDY AREA

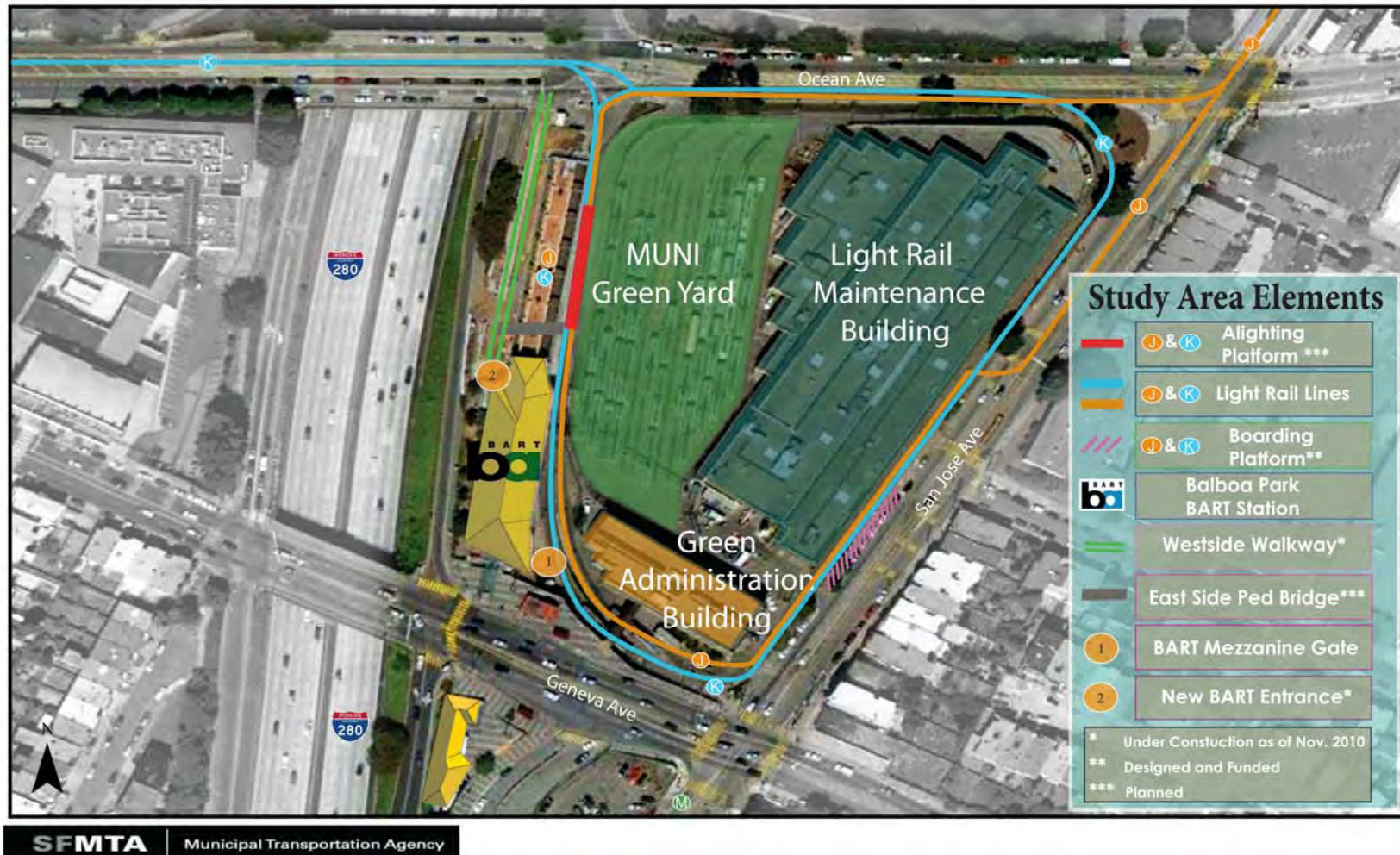


Figure 39: Improvements 12 and 13 - Proposed J/K Boarding and Alighting Platforms





*Figure 40: Truck Carrying a Two-car LRV on its Truck Bed Exiting the Driveway South of the Proposed San Jose Platform*

For this alternative to work, it will be imperative to improve the walkway between the BART mezzanine and San Jose Avenue (Improvement 6). To accommodate the new platform, the sidewalk on the west side of San Jose Avenue would need to be reconstructed. This would require removing the existing wall and landscaped area. Wayfinding signage would have to be added.

This option could be a short-term and mid-term solution to improve boarding. The TEP originally proposed extending the J Line south to San Francisco State University. However, the current recommendation is to retain the current J route, while the M Line is split into a branch terminating at Parkmerced and a branch continuing through Ocean View to Balboa Park. A J extension to SFSU/Stonestown is still a long-term possibility, but dependent on other major capital improvements. (A J extension would probably be paired with an M Line extension to Daly City BART and may need a west side 19<sup>th</sup> Avenue terminal, such as at Stonestown.) If this long-term extension occurred, J cars could still loop through the Balboa Park station, it would be a time-consuming diversion, especially in the northbound direction. It is preferable to serve Balboa Park station from San Jose Avenue. While the walking distance for transfers is longer, the simplification in operations and the decrease in travel time are significant. In this case, the new platform described above could be removed if the J Line is extended to San Francisco State University, and the K Line tracks could be reconfigured with a new boarding platform south of the Green Administration Building (Improvement 14).

The possibility of using the platform proposed in Option A for only the K Line that uses the south track was considered. In this variation, the K Line would use the platform near the BART mezzanine, and the J Line would use the San Jose platform. This would minimize walking distance to the K Line. However, this practice would result in

complications with layovers for the K Line. Since the platform would have to be located prior to the curve on the southwest side of the yard, there would be insufficient space to accommodate layovers for the two-car K LRVs without fouling the bypass track for J cars. Alternatively, keeping the K platform at the south side of the yard would perpetuate constriction of pedestrian movements currently experienced in this area today.

### Recommended Option

Given the pros and cons of these two alternative schemes, the most practical option from a short-term perspective would appear to be Option B, involving the creation of a new boarding area along San Jose Avenue. The walking distance would be somewhat longer, although the walkway between the BART mezzanine and San Jose Avenue could be enhanced to improve walking conditions (Improvement 6).

In the long-term, if the TEP recommendations are implemented and the J Line leaves the yard, the K Line would remain, using the new alighting platform (Improvement 12) and could continue using the San Jose boarding platform. However, this is not recommended. Instead, a new boarding platform closer to the BART mezzanine could be constructed (Improvement 14). This would bring customers closer to BART and allow for K Line layovers between the new boarding and alighting platforms. The reconfigured tracks proposed in Improvement 14 would allow for the widening of the pedestrian walkway to San Jose Avenue.

Funding using Lifeline grants have been committed for the new boarding platform parallel to San Jose Avenue (Option B). This new platform is expected to cost between \$500,000 and \$600,000 (in 2010 dollars) for construction and mobilization, assuming a 25 percent contingency. This project is expected to be part of the Green Yard re-rail project.

### *Other Alternatives Examined*

In addition to the options described above, several other alternatives were considered for improving transfers between BART and the light rail terminals nearby. These were suggested by community stakeholders to try to replicate a light rail terminal on the deck over I-280 that was proposed in the *Balboa Park Station Area Plan*. Instead of waiting until the costly deck could be constructed, the concept was to build a cheaper terminal in the short term west of the BART station box on land between the station and the freeway. Two alternatives were considered: one using a stub track configuration, the other using a light rail loop. Both alternatives are further discussed below.

#### LRT Stub-End Station

This alternative would feature two stub tracks constructed between I-280 and the BART station box, as shown in

**Figure 41.** In order to accommodate 2 LRT tracks, platforms, and the BART west side entrance, the Geneva Avenue northbound I-280 on-ramp would have to be eliminated. As a result, the Ocean Avenue northbound I-280 on-ramp would have to be enhanced to carry the increased demand, and Ocean Avenue and certain intersecting streets would have to be modified with new lanes and signals to handle this increase.



Figure 41: LRT Stub-End Station

The Ocean Avenue Bridge would need to be replaced to provide geometry for the new rail intersection (Ocean/LRT entrance/Muni Yard entrance/freeway on-ramp). Additionally, the auxiliary water supply system (AWSS) would need to be relocated below deck and the existing LRT tracks realigned.

A stub end operation would create operating difficulties for Muni, especially with two light rail lines (J and K) using the facility. These difficulties involve conflicts between LRVs pulling in or out of the proposed station and those laying over.



#### LRT Rail Loop

This alternative would be similar to that described above, except that instead of stub tracks west of the BART station box, a loop would be formed, as shown in Figure 42. The tracks would continue south to Geneva Avenue then east to connect with existing tracks on San Jose Avenue. This configuration, whether double- or single-tracked, would eliminate the Muni operations difficulties mentioned above. However, this alternative is fatally flawed unless significant traffic capacity reduction is acceptable on Geneva Avenue, since Geneva Avenue and its bridge are generally 64 feet wide curb-to-curb. What would be needed here could be gleaned from Ocean Avenue, which can accommodate 2 tracks of LRT, 3 traffic lanes, and a turn pocket (78 feet wide curb-to-curb). Moreover, the track would not be centered in the street because of the curve from the station.



Figure 42: LRT Rail Loop

To accommodate 2 LRT tracks, platforms, and the BART west side entrance, the Geneva Avenue northbound I-280 on-ramp would have to be eliminated and the Ocean Avenue bridge would have to be rebuilt, with the same impacts as described in the LRT stub-end alternative. Unlike the previous option, however, the Geneva Avenue Bridge would have to be replaced to accommodate the track curve and

relocation of the northbound I-280 off-ramp.

Further, in order to have a platform roughly level with BART, the grade to Geneva Avenue would be at a 7.8 percent slope. This grade is not accessible, nor is it desirable for LRT operations, particularly from a cold stop. To relax this grade, the LRT platform would have to be higher than the BART station. This would require accessible ramps down to the BART entrance, which may preclude a second track.

The capacity of the Green Yard could not accommodate a stub-end station or an LRT loop east of the BART box. All existing tracks are in use today and provide the required flexibility to store and maintain LRVs. Additionally, similar to the options west of the BART box, the options east of the BART box would not be feasible due to operational and engineering feasibility constraints. A stub-end station would have the same operational issues as the option west of the BART box. These difficulties involve conflicts between LRVs pulling in or out of the proposed station and those laying over. The LRT loop would not be feasible due to same grade issues mentioned with the stub tracks west of the BART box.

In conclusion, while initially proposed as a way of improving rail-to-rail transfers in the short term at modest cost, investigation has revealed that neither the stub-end station nor an LRV loop offers a cost-effective method of improving the interface between BART and Muni LRT customer transfers. It is recommended that they not be pursued further.

#### ***Improvement 14. K Line Reconfigured Boarding Platform south of Green Administration Building [Long-Term]***

This improvement, shown in **Figure 43**, would keep the light rail alighting platform near the Eastside Connector but would improve boarding conditions by realigning the tracks at the south end of the yard. The existing J and K layover tracks south of the Green Administration Building would be removed and replaced by a single track. A new K platform with standard width and ADA access would be constructed. This improvement would allow space for more amenities at the platform. It would also improve the pedestrian walkway between the BART mezzanine and San Jose Avenue by widening it and eliminating the intrusion of the LRV operating envelope into the pedestrian walking area.

Originally, it was hoped that two platforms of sufficient size could be built here for the J and K lines. However, the new horizontal curve radius standards in the Green Yard re-rail project would make it difficult to design the track geometry for two tracks with a 50-foot radius. As a result, engineering constraints would permit only one platform, which would be used by a single line. So this improvement is contingent on moving the J out of the loop bordering the Green Yard.



**Balboa Park Station Capacity and Conceptual Engineering Study**  
Chapter 5. Analysis and Recommendations

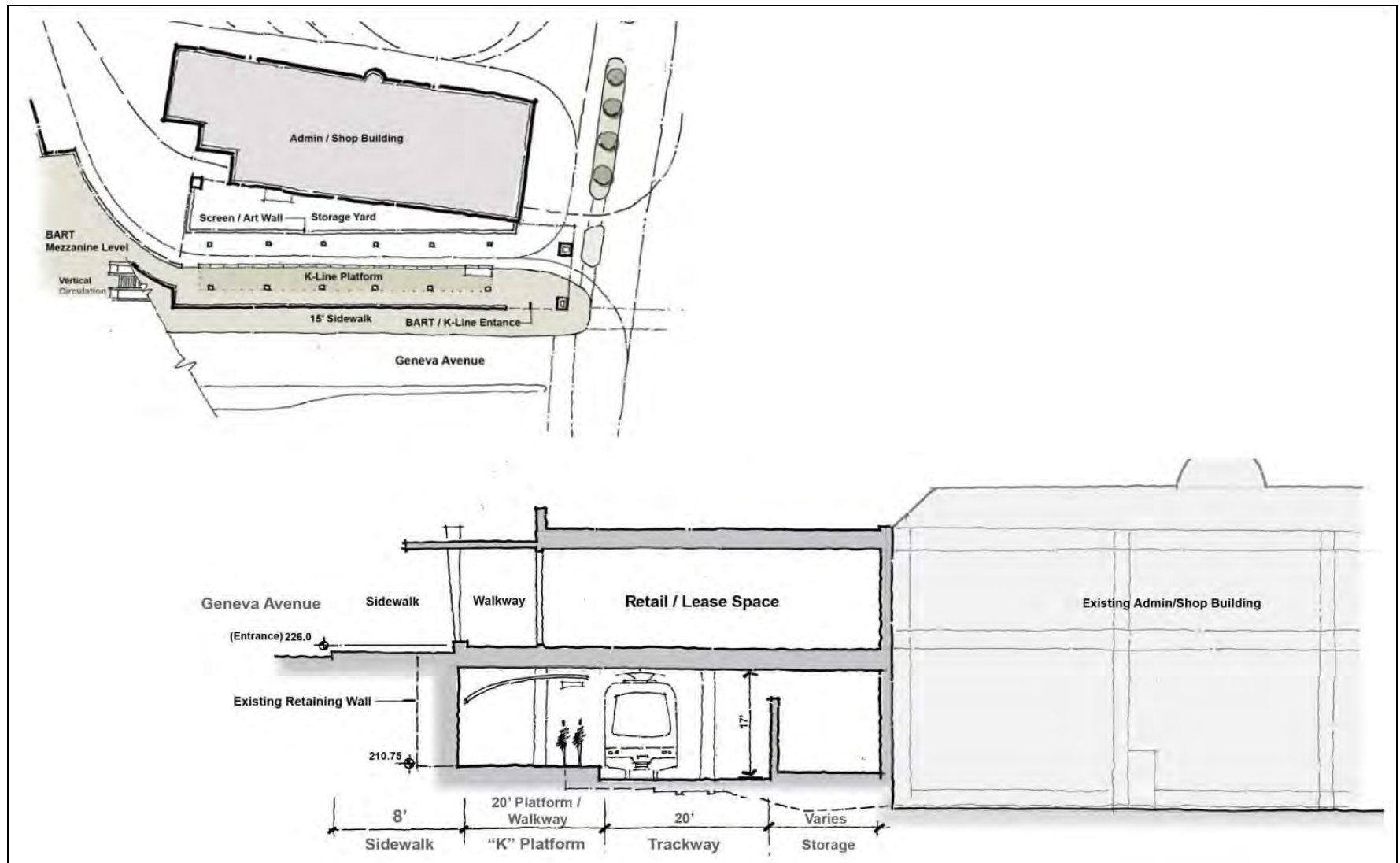


Figure 43: Improvement 14 - K Line Reconfigured Boarding Platform south of Green Administration Building

***Improvement 15. Relocation of Ocean Avenue K Line City College Stop to the Farside of Hawth Street [Mid-Term]***

The K Line stops at City College would be relocated east to the farside of Hawth Street, closer to the new main entry of the college. This would eliminate the need for customers to use the existing pedestrian overpass. New ADA-accessible platforms would be installed at this location, providing better access to Lick-Wilmerding High School, as well as the college. As discussed in the *Pedestrian and Bicycle Connection Project*, it is also possible for westbound Muni bus routes 29-Sunset and 49-Van Ness-Mission to operate in the same westbound lane as LRVs to take advantage of the new westbound platform, as well as to avoid traffic congestion in the mixed-flow lanes on Ocean Avenue (Improvement 25).

***M Line***

Objectives 2.1 and 2.2 in the *Balboa Park Station Area Plan* call for transit improvements along San Jose Avenue. Policy 2.2.2 recommends the redesign of San Jose Avenue between Ocean and Geneva Avenues and improving the existing platforms to better accommodate public transit.

The *Balboa Park Station Area Plan* and the *Pedestrian and Bicycle Connection Project* both recommend improving these platforms. The *Balboa Park Station Area Plan* suggests constructing a transit-only lane between Ocean and Geneva Avenues. Meanwhile, the *Pedestrian and Bicycle Connection Project* proposes designating transit-only lanes along San Jose Avenue between Ocean Avenue and Niagara Avenue to improve LRT performance. Both options would allow LRVs to operate in their own right-of-way where they would not be affected by general traffic, particularly left-turning vehicles. However, based on more recent traffic analyses, extending the proposed transit-only lanes south of Geneva Avenue is not recommended. Transit-only lanes north of Geneva Avenue should not impact traffic as much and would be necessary to accommodate LRV layovers.

***Improvement 16. M Line Platform(s) on San Jose Avenue [Short-Term]***

The present informal northbound stop between Niagara and Geneva Avenues does not afford the protection of a passenger island, nor does it provide ADA access. Moreover, both north- and southbound stops are somewhat removed from the other Balboa Park transit stops. This study evaluated three platform options for the M Line:

Option A. Center Platform on San Jose Avenue north of Geneva Avenue

Option B. Farside Platforms on San Jose Avenue at Geneva Avenue

Option C. Alighting Platform on San Jose Avenue south of Niagara Avenue

All three options would require removing parking adjacent to the platforms, as shown in the figures. Options A and B would improve both waiting and transferring conditions for Muni customers by providing an enhanced platform and significantly reducing an alighting customer's walking distance. Option C would provide a platform south of where M Line customers are dropped off in the street today.

*Option A. Center Platform on San Jose Avenue north of Geneva Avenue*

This option, shown in **Figure 44**, would provide the most direct passenger access to the BART Balboa Park Station, the Muni bus stops along Geneva Avenue, and the J and K line platforms. The M Line would terminate at a center platform north of Geneva Avenue, just east of the Balboa Park Station. LRVs would then lay over north of Geneva Avenue in transit-only lanes on San Jose Avenue. Twelve parking spaces on San Jose Avenue north of Geneva Avenue would be removed.

The center platform design would include a mini-high platform at each end of the main platform. In the southbound direction, the mini-high platform would create a constriction at the entrance/exit of the station closest to Geneva Avenue. Moreover, the center platform would block the path of a track coming out of the lower level of the Green Administration Building. Although it is rarely used, Muni Operations expressed the desire to retain this track connection with the northbound track on San Jose Avenue to facilitate LRV maintenance logistics.

The northbound and southbound light rail tracks on San Jose Avenue north and south of Geneva Avenue would need to be reconfigured in order to provide the spacing needed between them to accommodate the center platform. M Line drivers would have to change ends to reverse direction rather than looping through the Geneva Yard without changing ends, as they do now.

The *Pedestrian and Bicycle Connection Project* recommendation to install sidewalk bulb-outs at the northwest corner of Geneva Avenue and San Jose Avenue would likely conflict with the proposed platforms for Option A and B north of Geneva Avenue.



# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 5. Analysis and Recommendations

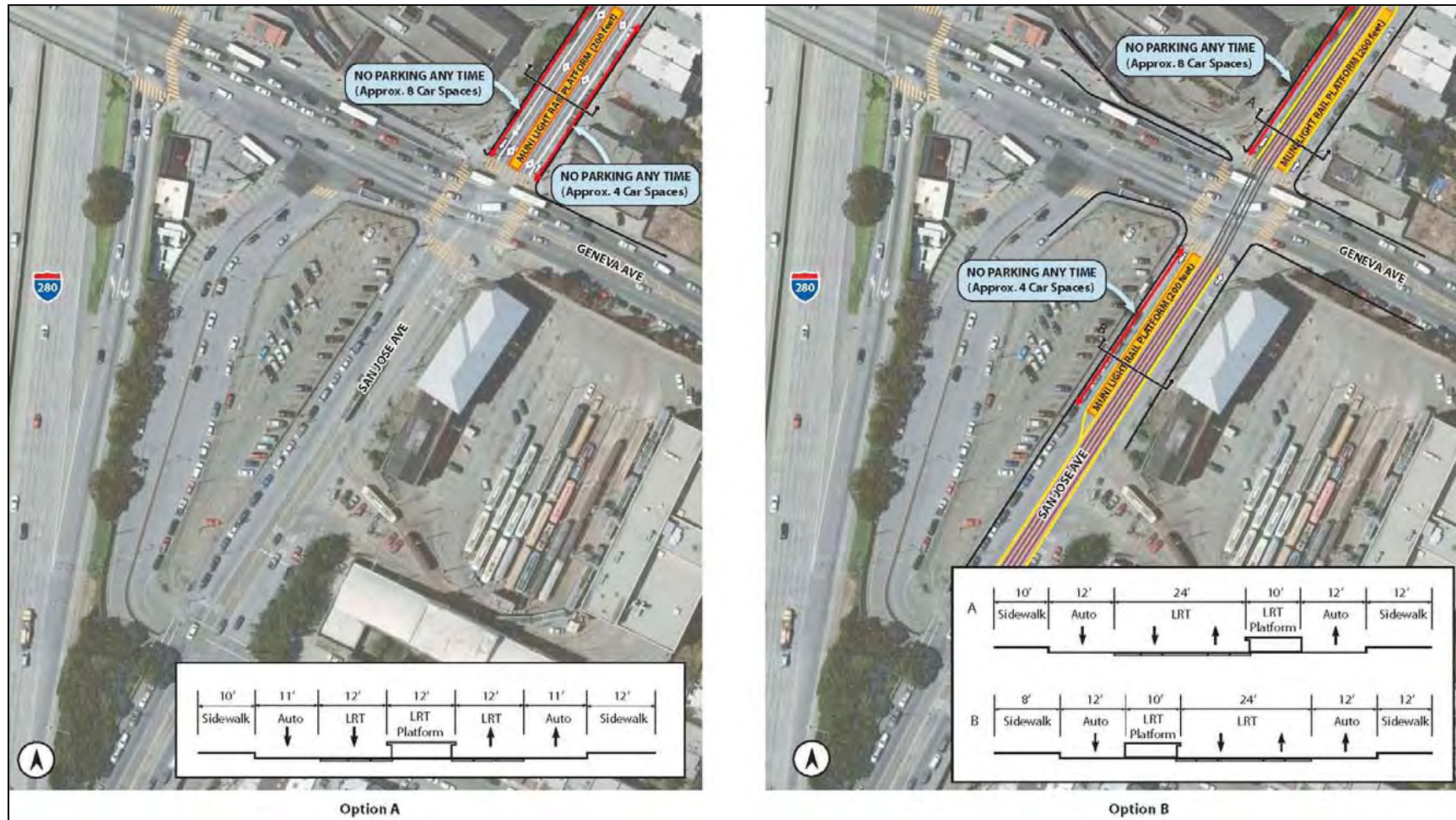


Figure 44: Improvement 16 - M Line Platform(s) on San Jose Avenue (Options A and B)



Figure 45: Improvement 16 - M Line Platform(s) on San Jose Avenue (Option C)



A center platform south of Geneva Avenue was not formally evaluated. Locating the platform south of the intersection would increase the number of street crossings and walking distance for alighting customers to reach the BART station. The platform would also have similar flaws as the center platform north of Geneva Avenue. In the northbound direction, the mini-high platform would create a constriction at the entrance/exit of the Geneva Yard. Additionally, due to the number of northbound left turns, it would be difficult to install an exclusive transit lane and prohibit northbound left turns. Moreover, the platform would not generate time savings for operators. LRVs would still need to pass through the Geneva Avenue and San Jose Avenue intersection to lay over and switch ends. Due to these drawbacks, the center platform was not considered in depth during this study.

#### *Option B. Farside Platforms on San Jose Avenue at Geneva Avenue*

To overcome the drawbacks of Option A, a split farside platform configuration, shown in **Figure 44**, is suggested. Instead of center platform, M Line trains would terminate at a conventional right-side platform farside north of Geneva Avenue. As with Option A, the new alighting platform would reduce walking distance to the station. Boarding customers would wait at a new southbound farside platform south of Geneva Avenue (an upgrade of the existing boarding platform at this location). This arrangement would provide closer proximity between the M Line northbound stop and the other transit stops at Balboa Park than the current configuration.

The split farside platform option would provide substantially more benefits to northbound alighting passengers than today. Only minor benefits would be provided to southbound boarding passengers since the existing boarding platform is also south of Geneva Avenue. The platform north of Geneva Avenue would not block the track coming out from the Green Administration Building, as it would in Option A. These stations could look similar to those on Judah or Church Streets, combining both a level platform and a mini-high accessible platform on the same island. The mini-high platforms would be at the end of each station farthest from the intersection, thus avoiding the constriction of the platform area closest to the intersection.

The curb-to-curb width of this section of San Jose Avenue is approximately 58 feet, which should be sufficient to accommodate two Muni LRT tracks (12 feet each), a passenger loading platform (10 feet), and two travel lanes (12 feet each). The curb cuts for driveways near the northbound farside platform may need to be widened. Access for these driveways adjacent to the platform would need to be right-in and right-out. Twelve parking spaces on the west side of San Jose Avenue would be removed.

The 12-foot northbound traffic lane would require approval from the Fire Department because of its constrained width between the alighting platform and the east curb of the street. However, there are multiple precedents within the City for this arrangement, such as along Judah Street. In addition, due to the narrow northbound and southbound receiving lanes, the platforms would need to be set back from the intersection to

accommodate turning trucks. Semi-mountable curbs are not recommended. They can provide a false sense of security for waiting customers. Instead, painted medians would be used to provide customer access to the platforms from the crosswalks. The painted median could also be used as a refuge for pedestrians.

The section of trackway located north of Geneva Avenue could be placed on a Judah-like median, with a low curb that would discourage, but not prevent, automobiles from operating on the tracks. On this reserved section of track, LRV operators on terminating trains would drop off their last customers at the farside platform, then pull further north into unused tracks for their layover. The existing tracks on San Jose Avenue south of Seneca Avenue could accommodate the layover of a two-car LRV. A new switch would have to be installed about 160 feet north of Geneva Avenue to allow M trains to cross over from the northbound to the southbound track to return inbound. The southbound track could accommodate a second two-car LRV laying over between this new switch and Geneva Avenue. M Line drivers would have to change ends to reverse direction, rather than looping through the Geneva Yard without changing ends, as they do now.

The northbound platform described in this improvement could inhibit the movements of trucks into and out of the vehicular driveway south of the proposed San Jose J/K boarding platform (Improvement 13B). To remedy this, the driveway would have to be widened toward the south to allow for a tighter turning radius. The wall south of the driveway would have to be replaced with a movable gate. Large trucks moving LRVs would encroach on the LRT lanes as they exited the driveway in the southbound direction, and they would have to operate over the northbound LRT lanes in order to access the yard from the south. The mountable curbs proposed above should be able to accommodate this encroachment by trucks. Alternatively, a pavement treatment, such as colored pavement and low reflectors, could be used to demarcate the LRT lane instead of a mountable curb, although this would not provide as effective a buffer for LRVs laying over as the mountable curbs. (It should be noted that LRVs would not be able to lay over at the platform while a truck is pulling in or out of the yard.)

In order to ensure that the southbound platform does not interfere with pullouts from the Geneva Yard, the east edge of the north end of the platform may need to be modified somewhat. A slight narrowing of the platform at this point would allow for LRVs to head southbound on San Jose Avenue out of the Geneva Yard. (This should be confirmed during further design.) Depending on the placement of the platform and the dynamic envelope of the LRVs leaving the Geneva Yard, safety elements would be required to protect customers on the platform. The Geneva Yard would not be used routinely for M-line pullouts.

There are two major issues with this option requiring further study. LRVs stopping or laying over north of Geneva could interfere with F-line pullouts and pullins from the Geneva Yard. The amount of interference would depend on how quickly LRVs were switched over and the track storage length. The additional time to cross the congested Geneva/San Jose intersection is estimated at roughly four minutes per trip. This would cost an estimated \$750,000 annually in added operating costs.

These platforms are expected to cost between \$7 and \$10 million (in 2010 dollars).<sup>10</sup> The following assumptions were made for the purposes of cost estimation:

- The concept level costs include track modifications for two tracks for 2,000 feet, roughly from the San Jose Avenue I-280 overcrossing to Ocean Avenue. It is assumed that the track can conform to the existing layout at the San Jose Avenue overcrossing and Ocean Avenue. However, this would need to be confirmed during design.
- In order to remain within the existing curb to curb width, the farside platforms and associated lane arrangements would require the track to shift about 4.5 feet to the west (towards the Green and Upper yards).
- Within the stretch from the overcrossing to Ocean Avenue, there are 11 switches to be removed and replaced (one to the Upper Yard, six to/from Geneva Yard, four to/from Green Yard). A new switch would be added 160 feet north of Geneva Avenue. The total number of switches would be 12.

*Option C. Alighting Platform on San Jose Avenue south of Niagara Avenue*

Option C, shown in **Figure 45**, would be the least desirable option. While it provides safer passenger egress than today, it would further increase walking distance for alighting customers by approximately 170 feet. The total distance to the BART station mezzanine via San Jose Avenue and the walkway through the Green Yard would be over 900 feet. However, the relatively flat slope through the kiss-and-ride area to the South Geneva Transit Plaza provides a shorter alternative. It would allow for easier accessibility for mobility-impaired customers if the elevator at the South Geneva Transit Plaza is installed (Improvement 5). The distance via the kiss-and-ride area to the South Geneva Transit Plaza is approximately 700 feet.

Due to the rail alignment to enter the Geneva Yard, the platform cannot be accommodated north of Niagara Avenue. There is adequate space for the platform on San Jose Avenue south of Niagara Avenue. However, south of Niagara Avenue, San Jose Avenue crosses over I-280. As a result, the grade of San Jose Avenue at this location is significant. Consequently, the steepness of the platform would pose an accessibility issue for customers alighting at this location.

In the future, if the J Line is extended and replaces the M Line, SFMTA may decide to demolish this platform and construct a new alighting platform near Geneva Avenue. This platform would not be a long-term solution.

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<sup>10</sup> Specific assumptions related to cost are provided in Table B and C in Appendix 9.

### *Traffic Impacts*

Options A and B would require LRVs to pass through the intersection of Geneva Avenue and San Jose Avenue. This is not a movement made by light rail vehicles today except for those dropping off mobility-impaired customers at the existing ADA-accessible platform north of Geneva Avenue; entering or leaving service; or those making shop movements. This maneuver through a busy intersection may introduce delay to the operating schedule. However, this delay is not more than what occurs today when an LRV drops off a mobility-impaired customer at the mini-high platform north of Geneva Avenue. This delay could be reduced by giving LRVs priority at the traffic signal (at the expense of autos and buses on Geneva Avenue).

To gauge the impact of moving the M platforms closer to Geneva Avenue, several lane geometries were analyzed in a preliminary traffic analysis of this intersection.<sup>11</sup> There is limited unused capacity here. In order to avoid delay, two lanes in each direction would need to be maintained, with one lane functioning as a through/left lane and the other as a through/right lane. However, to accommodate M Line layovers in Options A and B, dedicated transit lanes north of Geneva Avenue would be needed to accommodate layovers. Consequently, southbound left turns would have to be prohibited and northbound through lanes would need to be consolidated into one lane. Southbound left-turn volumes are very low, with less than one turning vehicle every two minutes during peak hours. (Only 26 vehicles during both AM and PM peak hours make a southbound left-turn at this intersection.) The elimination of this lane will affect relatively few motorists. This would leave one through traffic lane in each direction on San Jose Avenue north of the Geneva intersection.

South of Geneva, left turns are heavy in the northbound direction. For this reason, the center northbound lane would be shared by M Line LRVs and motorists turning left. There would also be one through traffic lane in each direction.

Consequently, the new configuration would increase delay at the intersection in the north and south directions. As a result, average vehicle delay would increase from an estimated 41 seconds to 46 seconds during the AM peak hour and from 27 seconds to 34 seconds in the PM peak hour. Option C would not impact traffic operations at Geneva Avenue and San Jose Avenue.

### *Recommended Option*

SFMTA is actively reviewing options and has not decided on preferred alternative. Option B has clear merits, but raises questions about conflicts with F-line operations and operating budget impacts. As long as the M Line terminates at Balboa Park, LRVs will have to change ends here, as described earlier. This would be done on a protected

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<sup>11</sup> See Appendix 10 for preliminary traffic analysis.

track on a reserved median. Operators would have to walk across San Jose Avenue to access rest rooms in the Green Administration Building. If and when the J Line is extended south to San Francisco State University, these platforms would be used by single-car J trains, not two-car M trains. Since LRVs would not be terminating here, there would be no longer be any need for changing ends in the median of the San Jose Avenue.

Option C is not recommended, since it increases the walking distance to the station and would be the least convenient option for transfers. Admittedly, Option C would provide a platform for alighting customers and would not require trains to pass through the Geneva Avenue and San Jose Avenue intersection, as they would continue to layover in the Geneva Yard. Thus, it would be an improvement compared to today's situation. However, it would not be as desirable as Option B, which considerably shortens customers' walking distance to the main part of Balboa Park Station. The platform at Niagara should be considered only as a stop-gap measure to improve safety if there is a delay in implementing Option B.

## **Geneva Avenue**

### ***Improvement 17. Westbound Improvements: Sidewalk Straightening & Street Restriping [Short-Term]***

The *Geneva Corridor TPS Study* proposes the following pedestrian and transit improvements on Geneva Avenue between San Jose Avenue and the I-280 southbound on-ramp. It includes modifying the north side of Geneva Avenue adjacent to the North Geneva Transit Plaza and the Geneva Avenue Bridge. The Geneva Avenue Bridge is discussed in Improvement 9. The modifications adjacent to the Transit Plaza would include the following two sub-projects in the westbound direction:

- 17 A. Straighten the curb on the north side by eliminating the existing bus turnout and expanding the sidewalk by about six feet, as shown in **Figure 46**. This could be accomplished by widening the sidewalk into the roadway pavement by about six feet. Currently, the widest point on the north side of Geneva Avenue is approximately 39 feet in this block. The widened area would provide more space for waiting customers and space for an enhanced shelter.



# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 5. Analysis and Recommendations

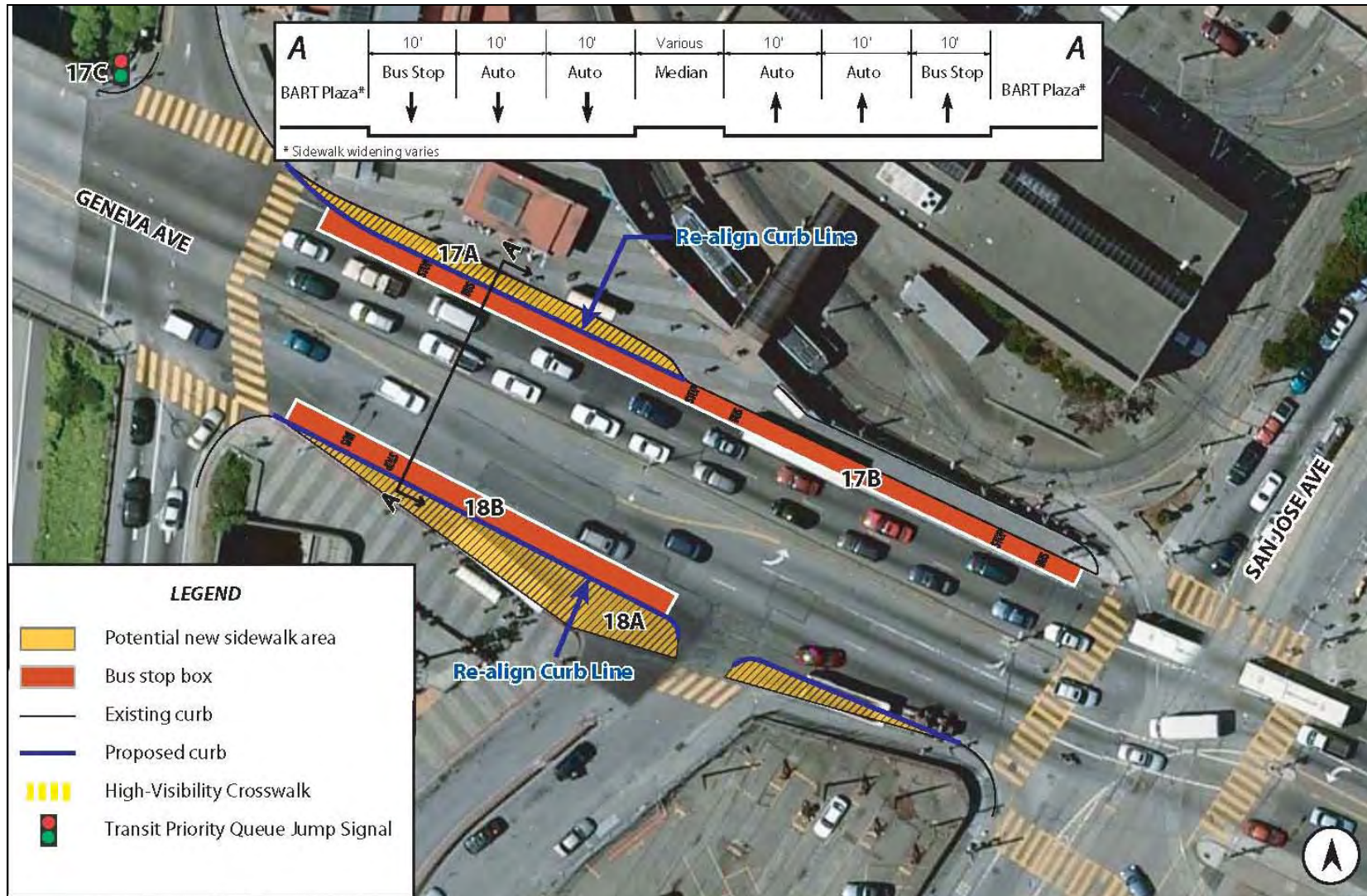


Figure 46: Improvements 17 and 18 - Westbound and Eastbound Improvements on Geneva Avenue

Eliminating the turnout on the north side of Geneva should improve both transit and traffic operations. While the turnout allows buses to lay over without blocking traffic, the revised SFMTA operating plan no longer has layovers at this location. Pulling out from such a turnout into mixed traffic can be difficult, as motorists rarely yield to buses. Moreover, at this location, westbound buses leaving the bus stop conflict with westbound autos and trucks turning right across their path to access the I-280 northbound on-ramp. Moreover, existing lane widths would be reduced, calming through traffic as a result. There would be no loss of vehicular travel lanes on Geneva.

- 17 B. Re-stripe Geneva Avenue east of the I-280 northbound on-ramp as one left-turn lane, one through lane, and one right-turn/Muni bus lane. The right-turn/Muni bus lane would be signed as “Right lane must turn right except Muni buses.” The bridge in the westbound direction would be re-stripped as one left-turn lane, one through lane, and one “transit-only” lane, as discussed in Improvement 9.

It has been suggested that, as an alternative to making these improvements, buses should instead be routed onto an elevated roadway parallel to the freeway that would allow access to the west side of the BART station (see Improvement 32). However, this arrangement would not measurably improve bus access to the station, and buses would have to compete with or replace the kiss-and-ride function of this area in a very limited space. Another suggestion was to relocate buses from the surface of Geneva Avenue to a grade-separated station somewhere along the street. Because of the cost and difficult logistics in creating such a station in such a constrained linear distance, it was not pursued.

#### *Other Alternatives Examined*

An additional alternative was evaluated that would include the creation of a “BUS STOP” box on the northside of Geneva Avenue between San Jose Avenue and the I-280 northbound on-ramp. This would effectively be an exclusive bus lane for this segment, alongside the existing two westbound auto lanes. This exclusive lane was designed to help eliminate conflicts between autos turning right to access the I-280 northbound on-ramp and buses pulling away from the bus stop.

The bus lane would be accompanied by a queue jump signal for westbound Muni buses at the Geneva Avenue and I-280 northbound ramps. This signal would allow buses to cross this intersection expeditiously and then rejoin traffic. The queue jump was an important part of the strategy, as it would help increase bus travel speeds. However, the queue jump would require taking green time away from the other traffic movements, though it would make this particular conflict safer in the process. Preliminary capacity analysis showed an average of 10 seconds per cycle to Muni only during the AM peak

hour. The intersection would experience a slight increase in delay but would continue to operate at the same level of service. It should be noted that the queue jump signal phase would not be activated every signal cycle.

The queue jump signal would not be necessary with the lane configuration proposed in the Geneva Corridor TPS Study. If, in the future, an exclusive “transit-only” lane cannot be accommodated and needs to be converted into a shared lane, the alternative proposed here could be implemented.

A curb radius reduction was also considered at the northwest corner of Geneva Avenue and the I-280 northbound on-ramp to reduce the crossing distance for pedestrians. This improvement was recommended in the *Ped and Bike Project*. It would enhance the pedestrian experience by reducing walking distance and exposure time in the roadway. SR2T funding has been received to install an ADA accessible curb ramp at this corner. In order to accommodate this ramp, the curb will likely need to be extended into the intersection.

The eastbound left turn truck turning radius constrains the degree that the curb radius can be reduced. Reducing the curb radius on the northwest corner may inhibit the movement of larger trucks traveling eastbound on Geneva Avenue onto the ramp. The new curb radius would need to meet the turning radius requirements for trucks and require Caltrans’ approval. It may require a design exception, which is a process that involves preparing a detailed justification for a variation from standard freeway ramp design criteria and obtaining approval from Caltrans’ Geometric Design group. The impact on drainage would need to be addressed during the design process.

After installing the curb ramp, the distance that the curb could be extended would likely be minimal. It is recommended that during the design process for the ADA accessible curb ramp, the curb be extended the maximum allowable.

### ***Improvement 18. Eastbound Improvements: Sidewalk Straightening & "BUS STOP" Box [Short-Term]***

Geneva Avenue pedestrian and transit improvements between the I-280 northbound off-ramp and San Jose Avenue, shown in **Figure 46**, were identified in the *Ped and Bike Project*. The eastbound improvements would include the following two sub-projects:

- 18 A. Straighten the sidewalk on the south side of Geneva Avenue so that the curb is parallel to the travel lanes. This project would result in the widening of the sidewalk on the south side of Geneva Avenue, thus providing more pedestrian storage and circulation space.

There is no actual turnout here, but the configuration of the curb line essentially forms one, as it is angled southerly away from the centerline of the street. As with the north side stop, buses can have problems leaving



the curb and returning to the traffic stream. They are sometimes cut off by autos entering and leaving the kiss-and-ride area south of the bus stop.

The reconfiguration of the kiss-and-ride area (Improvement 19) would also narrow or eliminate the kiss-and-ride driveway on Geneva Avenue. Kiss-and-ride users would, therefore, enter the kiss-and-ride area using the driveway on San Jose Avenue south of Geneva Avenue. Depending on the selected configuration, the driveway on Geneva Avenue would be restricted to autos exiting the kiss-and-ride or would be closed off. The new configuration would help reduce conflicts between autos and buses and allow the extension of the curb line to accommodate more buses. It would also shorten the crossing distance across the driveway, reducing pedestrian time in the roadway and consequently improving pedestrian safety.

Future forecasts show a potential need for up to 38 buses arriving and departing during the PM peak hour in year 2030. The sub-improvement would lengthen the current stop from 120 to approximately 160 feet. This would not meet the required length of 172 feet needed in the future. This change would block access to the kiss-and-ride lot and require the closure of this access point (Improvement 19). With the closure of the driveway, approximately 180 feet could be designated for bus loading and unloading. The remaining curb space would continue to be made available for shuttle service.

- 18 B. Paint a “BUS STOP” box on the curb line from the I-280 northbound ramps to the kiss-and-ride driveway. The “BUS STOP” box could be accommodated without changing the existing lane configuration. The “BUS STOP” box would give buses exclusive use of the space adjacent to the curb. Shuttles would continue to use the curb area east of the kiss-and-ride driveway.

### ***Improvement 19. Kiss-and-Ride Reconfiguration [Short-Term]***

This improvement was identified in the *Ped and Bike Project*. The *2009 Transit Passenger Intercept Survey* notes that seven percent of all customers at the Balboa Park Station are dropped-off at the station. The existing kiss-and-ride facility is underutilized, serving only eight percent (eleven percent during the AM peak period) of those who are dropped-off. Most passengers are dropped off at informal locations, including the I-280 ramps and bus loading areas along Geneva Avenue. Enforcement of prohibitions at the informal drop-off areas would help encourage better use of the kiss-and-ride area.

The reconfiguration of the kiss-and-ride area would narrow or eliminate the kiss-and-ride driveway on Geneva Avenue. Kiss-and-ride users would, therefore, enter the kiss-and-ride area using the driveway on San Jose Avenue south of Geneva Avenue. Depending on the selected configuration, the driveway on Geneva Avenue would either be restricted to autos exiting the kiss-and-ride area or it would be closed off completely. The new configuration would help reduce conflicts with buses and pedestrians. It would also shorten or eliminate pedestrian crossing distance across the driveway, reducing their time in the roadway and consequently improving pedestrian safety.

Nonetheless, the closure of the Geneva Avenue driveway for ingress would require rerouting eastbound autos to the kiss-and-ride entrance on San Jose Avenue, adding approximately 1,000 feet of travel distance. The closure of the Geneva Avenue driveway would be inconvenient for drivers heading northbound on I-280. To mitigate the travel distance for these drivers, an elevated kiss-and-ride area for dropping off passengers is proposed in Improvement 32. The elevated kiss-and-ride would connect drivers directly to I-280 northbound.

During a field observation completed by SFMTA, approximately 60 percent of the users enter from Geneva Avenue during the PM peak period. As shown in **Figure 47** and **Figure 48**, a maximum of 80 vehicles in the AM peak period and 140 vehicles in the PM peak period enter the Geneva Avenue driveway. Without modifying travel patterns to the station, approximately 140 additional eastbound right turns in the PM peak period would occur at the Geneva Avenue and San Jose Avenue intersection.



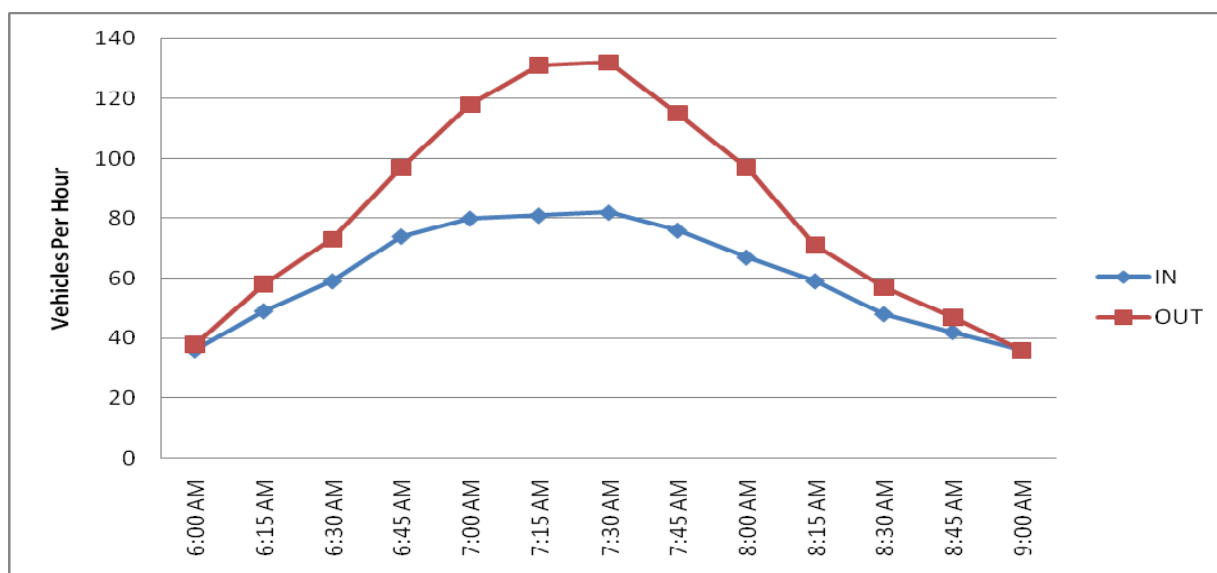


Figure 47: Existing Geneva Kiss-and-Ride Driveway Counts (AM Peak Period)<sup>12</sup>

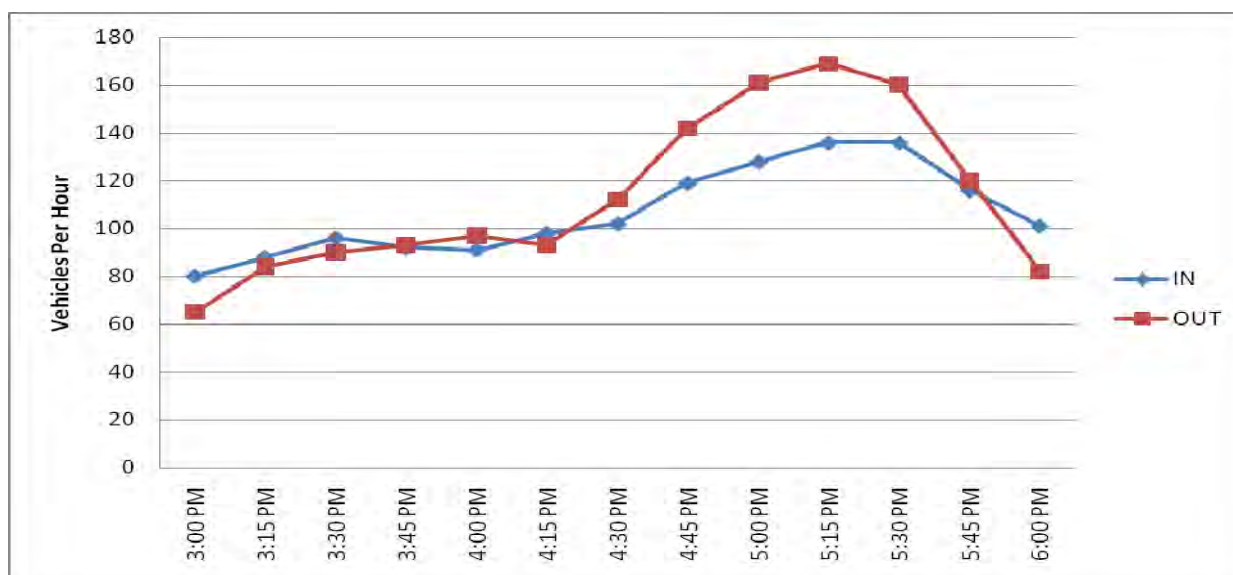


Figure 48 - Existing Geneva Kiss-and-Ride Driveway Counts (PM Peak Period)<sup>13</sup>

The kiss-and-ride facility would be reconfigured to minimize bus/auto conflicts at the Geneva Avenue driveway while continuing to encourage drop-offs and pick-ups in the designated area. Policy 20.2 of the San Francisco General Plan Transportation

<sup>12</sup> Volumes shown are hourly volume equivalents beginning at the 15 minute increment shown on the horizontal axis.

<sup>13</sup> Volumes shown are hourly volume equivalents beginning at the 15 minute increment shown on the horizontal axis.

Element requires the reduction, relocation, or prohibition of automobile facility features on transit preferential streets, such as driveways and loading docks, to avoid traffic conflicts and automobile congestion. Restricting access at the Geneva Avenue driveway for the kiss-and-ride area would be consistent with the General Plan.

Currently, there are approximately 50 spaces available for temporary parking. Only about half of the spaces are used during the AM and PM peak periods. The majority of the use of these kiss-and-ride spaces occurs during the PM peak period when many drivers wait to pick-up passengers.

Changes to the kiss-and-ride area would improve pedestrian safety, reduce Muni bus delays, and provide additional bus loading area. Increased enforcement would help to reduce drop-off activity on the I-280 ramps (thus reducing queuing on the ramps). The following three options were developed in the *Ped and Bike Project*. The options are shown in **Figure 49**.

Option A. One-Way Access with Exit onto Geneva Avenue

Option B. Cul-de-Sac with No Access to Geneva Avenue

Option C. Cul-de-Sac with Exit onto Geneva Avenue

The narrowing of the driveway on Geneva Avenue would provide additional storage for bus loading and unloading at the south side bus stop. However, without the closure of the driveway, the space available would not meet the length required to meet future needs assuming the existing eastern limit of the driveway. Narrowing the driveway to permit egress only would allow for the lengthening of the bus zone from approximately 120 feet to 160 feet. Closure of the driveway would provide approximately 180 feet. In the future, 172 feet will be required to accommodate the service needs.

None of these options would restrict the redevelopment of the Upper Yard (Improvement 29). All of the options would be compatible with air rights development above.

Alternative kiss-and-ride locations were considered, including a curbside option along San Jose Avenue and an elevated roadway west of the BART station box. M Line platform improvements on San Jose Avenue (Improvement 16) would eliminate the possibility of implementing a curbside passenger drop-off zone on the eastside of San Jose Avenue (Improvement 34). Ocean Avenue options should be studied further, but would be inconvenient to both I-280 travelers and residents living south of the station. The best alternative location would be the elevated kiss-and-ride west of the BART station box (Improvement 32). However, due to the limited length of the elevated roadway, the kiss-and-ride lot there would not be able to accommodate pick-up needs fully. Therefore, this option would only supplement the existing kiss-and-ride area.

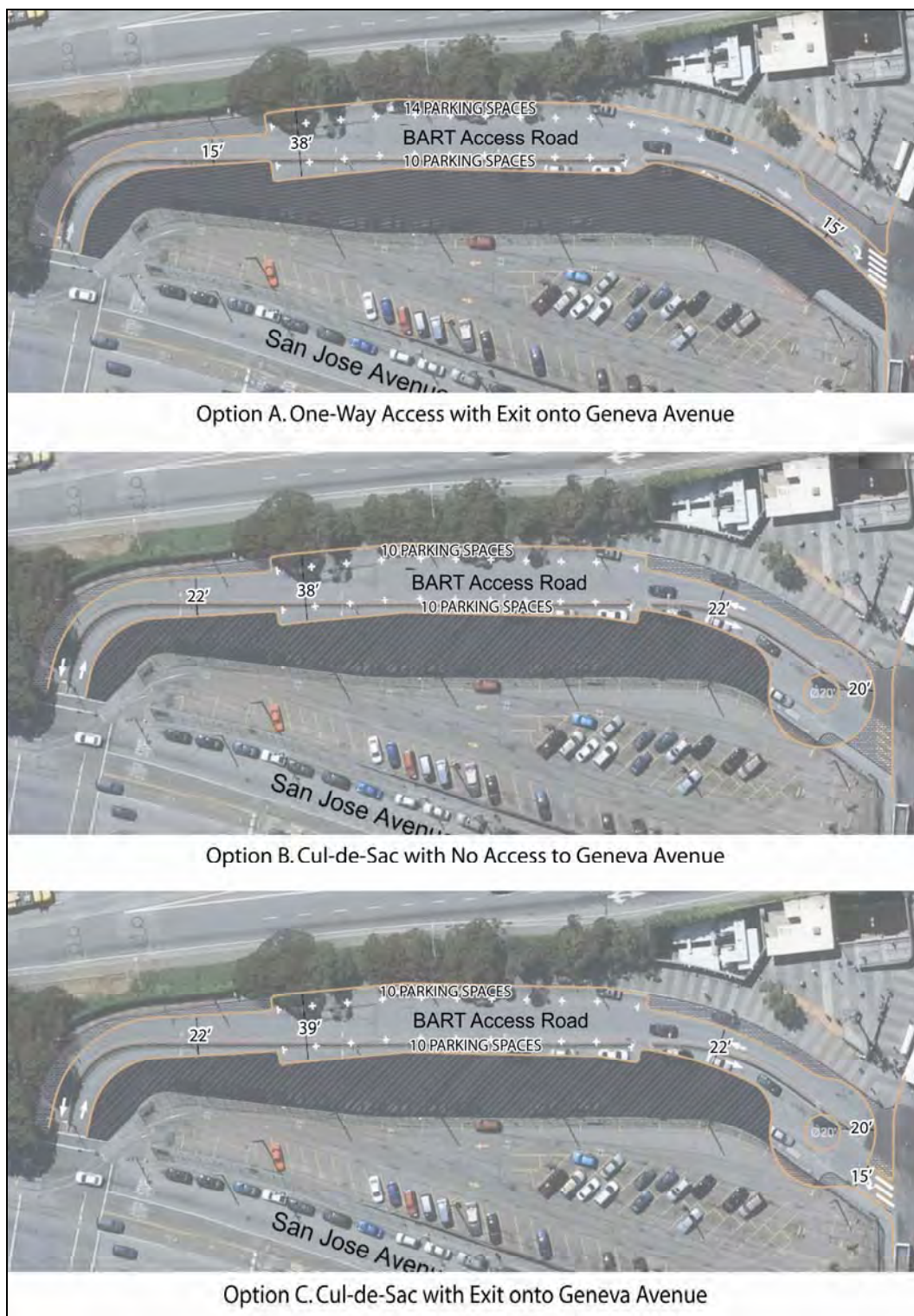


Figure 49: Improvement 19 - Kiss-and-Ride Reconfigurations

*Option A. One-Way Access with Exit onto Geneva Avenue*

Under Option A, the kiss-and-ride access road would become one-way northbound. Vehicles would enter from San Jose Avenue and exit onto Geneva Avenue. This design would provide 24 parallel parking spaces (14 along the west side of the kiss-and-ride access road and 10 along the east side).

This option would eliminate ingress vehicular/pedestrian conflicts at the current driveway entrance on Geneva Avenue. In addition, it would provide approximately 10 to 12 additional feet for the Muni bus stop area, thereby reducing potential spillover of Muni buses into the Geneva Avenue and I-280 northbound intersection.

While kiss-and-ride vehicles would continue to exit to Geneva Avenue, there would be limited conflicts along Geneva Avenue. Any vehicle queuing would occur inside the kiss-and-ride lot. Reduced roadway pavement width would be needed in the kiss-and-ride lot, creating the potential for increased land area for redevelopment of the Upper Yard.

A drawback of this option is that there would continue to be an automobile and pedestrian conflict at the kiss-and-ride exit driveway. Additionally, many vehicles using the lot would need to travel through the Geneva Avenue and San Jose Avenue intersection two times: once when turning south onto San Jose Avenue and a second time when exiting the lot onto Geneva Avenue.

*Option B. Cul-de-Sac with No Access to Geneva Avenue*

Under Option B, the access road would remain two-way, but it would terminate in a cul-de-sac south of Geneva Avenue. Vehicles using the kiss-and-ride area would enter and exit on San Jose Avenue. This design would provide 20 parallel parking spaces (10 along each side of the access road).

This option would eliminate vehicular/pedestrian conflicts at Geneva Avenue and the kiss-and-ride driveway. It would optimize benefits to Muni and would lengthen the adjacent Muni bus stop by approximately 24 feet, so the potential of Muni bus spillover to the Geneva Avenue and I-280 northbound ramps could be eliminated.

Reduced roadway pavement width would be needed in the kiss-and-ride area, creating potential for increased land area for redevelopment of the Upper Yard.

The elimination of access to Geneva Avenue would provide additional bus loading space on the south side of Geneva. This additional space could be designated as a waiting area for the private shuttle vehicles that use the station and currently layover in this location.



A drawback of this option is that it would add travel time for drivers. Similar to Option A, many drivers would need to travel through the Geneva Avenue and San Jose Avenue intersection twice when using the lot.

*Option C. Cul-de-Sac with Exit onto Geneva Avenue*

This option is different than Option B only in that it would have an exit to Geneva Avenue from the cul-de-sac. This design would provide 20 parallel parking spaces along both sides of the access road.

This option would function similar to Option A, except that departing vehicles would have the opportunity to exit either to Geneva Avenue or San Jose Avenue. This additional exit to Option B would eliminate the circuitous route to the San Jose Avenue driveway for drivers wishing to proceed east on Geneva Avenue and north on San Jose Avenue. However, automobile/pedestrian conflicts would continue at the kiss-and-ride exit driveway on Geneva Avenue, though to a lesser degree than both the existing situation and Option A.

*Recommended Option*

Recent discussions with SFMTA staff favor a simple cul-de-sac, with both the entrance and the exit on San Jose Avenue (Option B). This would eliminate conflicts with autos crossing the path of both buses and pedestrians along the south side of Geneva Avenue.

The cost to reconfigure the existing kiss-and-ride adjacent to the Upper Yard is estimated to be between \$0.5 and \$1 million (in 2010 dollars).<sup>14</sup> This assumes no modifications to lighting.

It should be noted that Improvement 19 can reduce many, but not all, of the station's kiss-and-ride problems. The area is too broad for everyone to conveniently converge on one spot, especially since that spot may be out of direction for those on their way elsewhere after dropping off a passenger. Moreover, other improvements discussed in this report may lead to new patterns of access. BART's Westside Walkway, for example, may encourage increased kiss-and-ride activity on Ocean Avenue. Nonetheless, the improvement of the existing kiss-and-ride site will provide a place where passenger pick-ups and drop-offs can be made safely and comfortably, particularly after an elevator and, eventually, escalator is installed at this location.

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<sup>14</sup> Specific assumptions related to cost are provided in Table C in Appendix 9.



The new Westside Walkway may increase the number of drop-offs on Ocean Avenue. This could create demand for a drop-off zone on Ocean Avenue east of the I-280 northbound on-ramp. This zone would require eliminating parking. It would need to be midblock in order to accommodate the westbound transit platform (Improvement 25) at the nearside of the I-280 on-ramp. Due to the location of the drop-off, some passengers may decide not to cross at the signal and instead cross Ocean Avenue midblock to access the station. The need for the additional drop-off zone should be evaluated once the Westside Walkway (and Eastside Connector) is completed and in use.

### ***Improvement 20. Signal Synchronization [Short-Term]***

This improvement was identified in the *Balboa Park Station Ped and Bike Project*. The signal at Geneva Avenue and San Jose Avenue was not coordinated with those at the I-280 ramp intersections on Geneva Avenue. This resulted in inefficient traffic operations that delayed vehicles and buses on Geneva Avenue and caused queue backups on the northbound I-280 off-ramp.

By synchronizing two Caltrans-controlled traffic signals at the I-280 on- and off-ramps with the SFMTA-controlled traffic signal at San Jose Avenue, signal progression along Geneva Avenue was improved. This would reduce both vehicle and bus delay on Geneva Avenue by reducing queue backups on the northbound I-280 off-ramp and on Geneva Avenue east of San Jose Avenue. SFMTA recently worked with Caltrans to synchronize the signals.

### ***Improvement 21. Signalization of Geneva Avenue and Howth Street and/or Geneva Avenue and Louisburg Street [Short-Term]***

The *Ped and Bike Project* recommended signalizing both intersections, as shown in **Figure 50**. Due to the grade of Geneva Avenue, the unsignalized intersection of Geneva Avenue and Howth Street has poor sight lines for both pedestrians and drivers. Both projects would include installation of a traffic signal with transit priority for Muni buses on Geneva Avenue. The signals would also include a protected crossing phase for pedestrians traveling to/from the Balboa Park Station, Lick Wilmerding High School and nearby residential areas. Since the intersections are so close to each other, it would more desirable to signalize just one or the other.



Figure 50: Improvement 21 - Signalization of Geneva Avenue and Howth Street and/or Geneva Avenue and Louisburg Street

In the *Ped and Bike Project*, the signalization of Geneva Avenue and Howth Street was to be coupled with the conversion of Howth Street to two-way traffic operations between Ocean and Geneva avenues. This project would improve circulation by providing a direct connection for vehicles from City College to Geneva Avenue and southbound I-280, instead of routing them through the constrained intersection of Phelan Avenue/Ocean Avenue/Geneva Avenue. However, due to Fire Department concerns, the Transportation Advisory Staff Committee (TASC) has decided to forgo the conversion. Without the conversion of Howth Street to two-way operations, the new signal would function more as a pedestrian-actuated signal.

The signalization of Geneva Avenue and Howth Street has received 2009 SR2T funding. For this reason, signalizing Louisburg Street need not be included as an improvement project.

## **Ocean Avenue**

Policy 2.2.3 of the *Balboa Park Station Area Plan* includes the removal and rebuilding of the K Line stops under the pedestrian overpass near City College to better accommodate pedestrian, bicycle and transit amenities along Ocean Avenue. In the short-term, the *Pedestrian and Bicycle Connection Project* proposes an option to allow Muni buses to operate within the light rail right-of-way to improve transit operations along Ocean Avenue, between San Jose and Geneva avenues.

Given recent City College expansion to the west of the bridge and the improvements considered for Balboa Park frontage to the east, the feasibility of widening Ocean Avenue to continue the improved non-motorized corridor was investigated. As with other alternatives, existing non-standard freeway clearances limit the opportunities to widen the Ocean Avenue Bridge. Profiles for the ramps to and from Geneva Avenue preclude widening Ocean Avenue to the south. Widening to the north will likely require lowering the freeway. The age of the existing bridge will be an important factor in planning for this work.

The bridge is relatively close to the theoretical design life for this type of structure, ranging from 50 to 75 years. The impact of the age of this structure on the timing of plans for changes to it is similar to that of the analysis for the I-280 freeway deck. As a result, the long-term SFMTA project planning horizon and the Caltrans bridge replacement planning horizon are likely to coincide. However, in the short term and given the current constraints, the best that can be done is to optimize the existing width of Ocean Avenue.

### ***Improvement 22. Intersection Consolidation of Ocean Avenue/Geneva Avenue/Phelan Avenue [Short-Term]***

This improvement, shown in **Figure 51**, was recommended in the *Ped and Bike Project*. It would improve traffic operations at the Ocean Avenue/Geneva Avenue/Phelan Avenue intersection by consolidating vehicle access and removing free right turns. The southwest corner of Ocean Avenue and Geneva Avenue has multiple access points for vehicles entering and exiting a 150-foot residential side street parallel to Ocean Avenue.

There are two sub-improvements to improve pedestrian connectivity and reduce potential turning conflicts.

- 22 A. Consolidate vehicular access at the southwest corner of the intersection by closing the driveways closest to the intersection, requiring all vehicles entering/exiting the parking lot at this corner to use the west Geneva Avenue driveway.



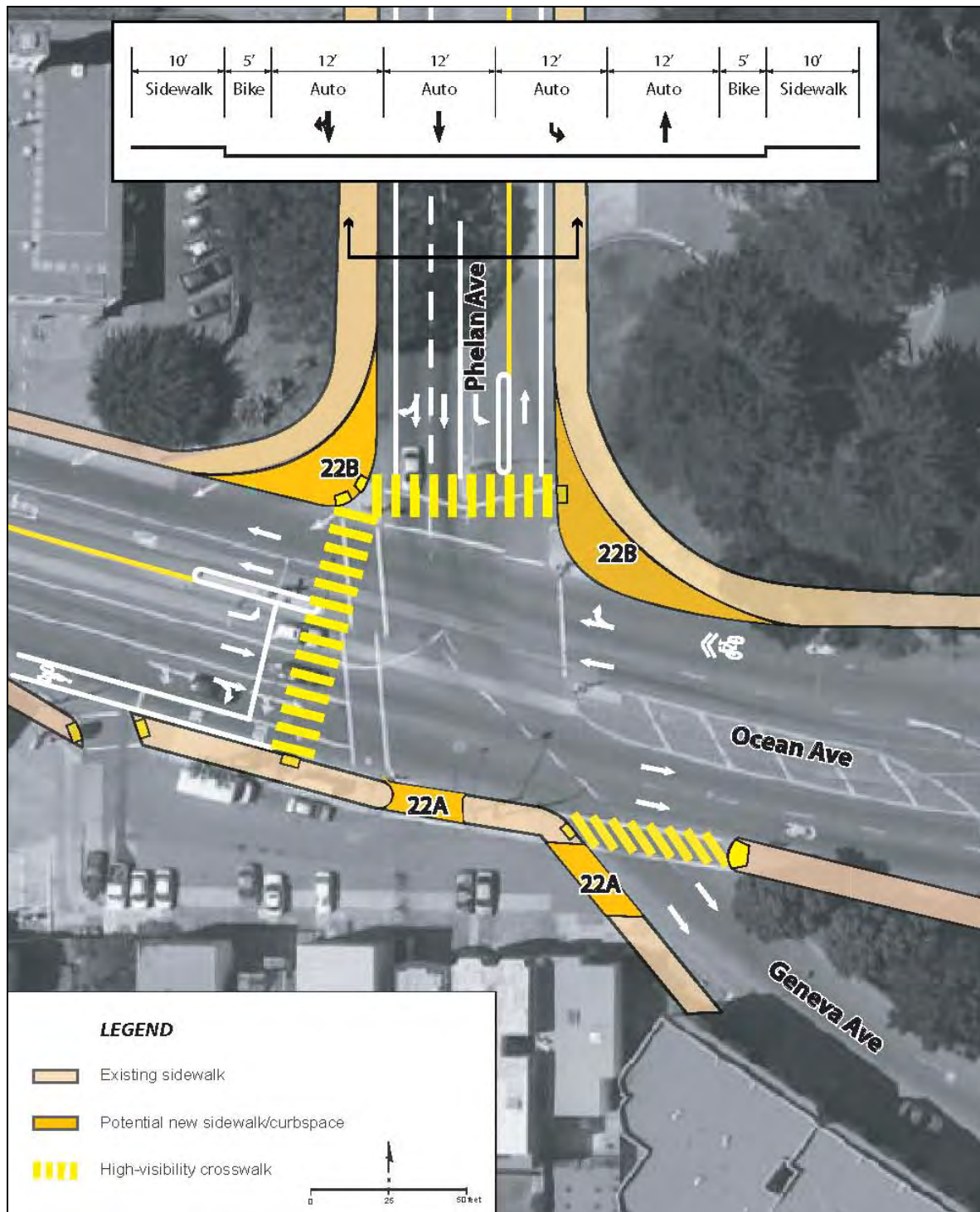


Figure 51: Improvement 22 - Intersection Consolidation of Ocean Avenue/Geneva Avenue/Phelan Avenue

- 22 B. Remove southbound and westbound free right turn lanes by extending the sidewalks curbs to the existing “pork chop” islands on the northeast and northwest corners of the intersection.

***Improvement 23. Westbound Class II Bike Lane/Eastbound Sharrows along Ocean Avenue [Completed]***

This improvement, shown in **Figure 52**, was identified in the *Ped and Bike Project*. It includes bicycle improvements on both sides of Ocean Avenue between Howth Street and San Jose Avenue:

- 23 A. Installed a westbound Class II bike lane on Ocean Avenue between San Jose Avenue and the existing I-280 southbound off-ramp. In addition, it is recommended to install a curb ramp onto the sidewalk where the bike lane ends. The Class II bike lane is part of SFMTA’s approved Bicycle Master Plan. In order to stripe a separate bike lane on the bridge as well, parking was removed from the bridge.
- 23 B. Painted “sharrows” on Ocean Avenue eastbound between Howth Street and I-280. Maintains existing parking.

This improvement has been completed using Proposition K funding.

***Improvement 24. Replacement of Pedestrian Bridge over Ocean Avenue and Extension of Class II Bike Lanes [Mid-Term]***

This improvement, shown in

**Figure 53**, was proposed in the *Ped and Bike Project*. A redesigned pedestrian bridge would provide adequate right-of-way to extend Class II bike lanes and construct a transit-only lane in the long-term (Improvement 25).

- 24 A. Replace the existing pedestrian bridge connecting Geneva Avenue and City College of San Francisco with a new bridge without columns in the median. Relocate the Muni K line stop to the far side of Howth Street (Improvement 15).



- 24 B. Extend the westbound Class II bicycle lane from the I-280 southbound off-ramp to the Geneva Avenue/Ocean Avenue/Phelan Avenue intersection by moving the sidewalk north. The sidewalk would need to shift approximately 10 feet north and may require purchasing right-of-way from City College. Install an eastbound Class II bicycle lane from the Geneva Avenue/Ocean Avenue/Phelan Avenue intersection to Hawth Street. The removal of the piers and platform would add the width required to extend the Class II bicycle lanes.

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 5. Analysis and Recommendations

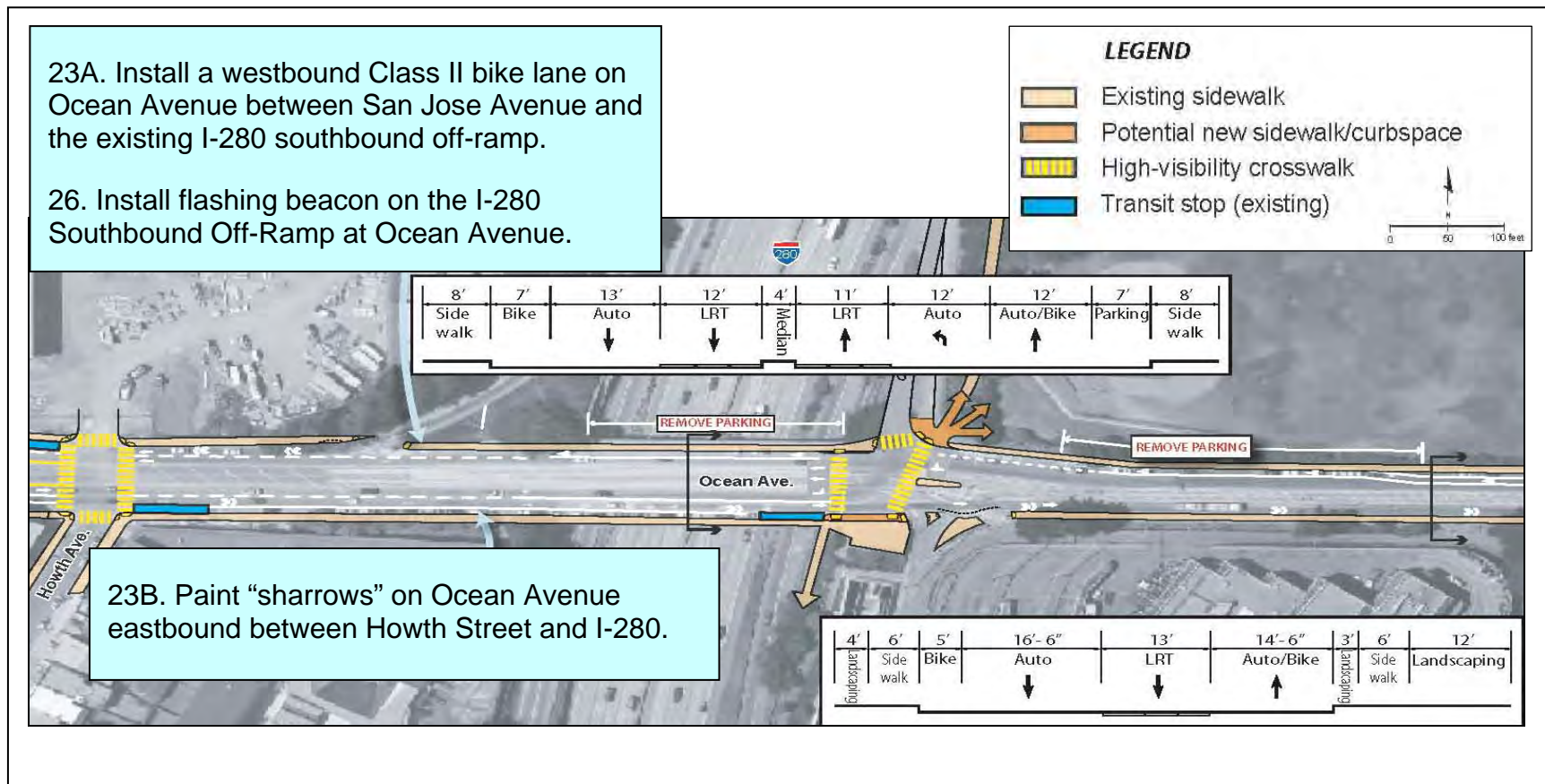


Figure 52: Improvement 23 - Westbound Class II Bike Lane / Eastbound Sharrows along Ocean Avenue and Improvement 26 - Flashing Beacon on the I-280 Southbound Off-Ramp at Ocean Avenue

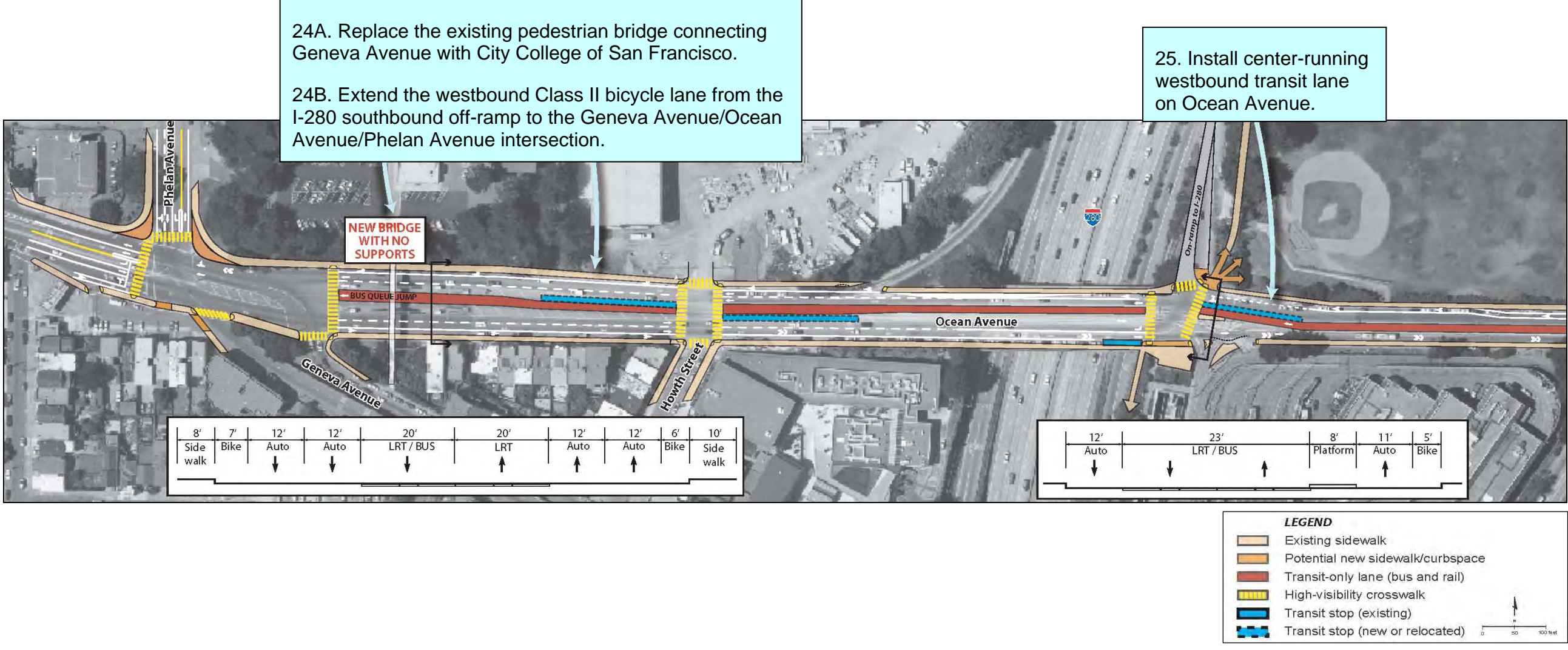


Figure 53: Improvement 24 - Replacement of Pedestrian Bridge over Ocean Avenue and Extension of Class II Bike Lanes and Improvement 25 - Center-Running Westbound Transit Lane on Ocean Avenue



***Improvement 25. Center-Running Westbound Transit Lane on Ocean Avenue [Long-Term]***

Due to the traffic movements in this area to and from the I-280, a curbside bus stop is not desirable. Therefore, a center-running bus lane with side platforms is proposed to allow buses to operate on the Muni LRT trackway and serve a new bus stop located on a pedestrian island.

This improvement, shown in Figure 53, was identified by the *Ped and Bike Project*. It would permit westbound Muni buses to use the center LRT lane between San Jose Avenue and Geneva Avenue/Phelan Avenue and the westbound LRT farside platform at the Ocean Avenue and Howth Street intersection. Bus loading would continue to be on the right side of the bus.

This improvement would allow westbound buses to operate in an exclusive right-of-way to reduce delays and improve travel times. Today, intermittent congestion causes delays along the corridor for buses. Adding this bus lane would be particularly important if the Muni TEP recommendations of relocating 29-Sunset and 54-Felton to Ocean Avenue are implemented. In the future, a minimum of 17 westbound buses per hour are expected to use the corridor.

The center-running westbound transit lane would use a new passenger waiting platform for buses in the median of Ocean Avenue, just east of the I-280 northbound on-ramp. The platform would be used only by westbound buses on Ocean Avenue. This recommendation would also move the westbound bus stop from the curbside to the center relocated Muni K line stop at the farside of Howth Street (Improvement 15). In order to allow buses to return to the right lane from the center-running transit lane, a westbound bus queue jump phase would be added to the traffic signal at the Ocean Avenue/Geneva Avenue/Phelan Avenue intersection. The addition of the queue jump phase would likely increase traffic delay at this intersection, with preliminary analysis indicating significant impacts on traffic level of service. This improvement is a long-term improvement. Therefore, a detailed analysis should be performed in the future to determine the traffic impact that would be caused by the queue jump.

In order to accommodate the Ocean Avenue center-running westbound transit lane and platforms, the pedestrian bridge would need to be replaced (Improvement 24) and parking in the westbound direction would need to be removed in the vicinity of the bus/LRV loading platforms. The westbound track may need to be relocated slightly south to accommodate a five-foot bike lane, 11-foot traffic lane, and an eight-foot platform. Given the existing westbound right turn volumes onto the I-280 northbound on-ramp (approximately 190 vehicles per hour) and bike counts (approximately ten bikes per hour), the proposed westbound lane configuration should be adequate.

This improvement could be completed in the midterm; however, the timing is dependent on replacement of the pedestrian bridge (Improvement 24).

A center-running eastbound transit lane was also proposed in the *Ped and Bike Project*. However, buses in such a lane would have difficulty accessing the existing curbside bus stop near the BART station entrance on Ocean Avenue. Therefore, a center-running eastbound transit lane is not proposed in this study. There would, however, continue to be an eastbound center running LRT lane for the K Line.

### ***The Ocean Avenue I-280 Southbound Off-Ramp***

The existing I-280 southbound off-ramp enables vehicles to exit the freeway and enter westbound Ocean Avenue at high speeds. Further, the current alignment of this ramp limits visibility and presents safety concerns for pedestrians and bicyclists crossing the off-ramp.

#### ***Improvement 26. Flashing Beacon on the I-280 Southbound Off-Ramp at Ocean Avenue [Short-Term]***

This improvement, proposed in the *Ped and Bike Project*, would add a pedestrian-actuated flashing beacon to improve pedestrian and bicycle crossing safety at the I-280 southbound off-ramp. It includes two phased improvements. This improvement is the short-term project that involves installation of a flashing beacon at this crossing, shown in **Figure 52**. This improvement would slow vehicle speeds to create safer conditions for pedestrians and bicyclists crossing the ramp. In addition, pedestrian and bicycle crossing signs would be installed on the off-ramp. The signs would follow Manual on Uniform Traffic Control Devices (MUTCD) guidelines.

A mid-term option (Improvement 27) would improve visibility at this crossing by realigning the off-ramp.

#### ***Improvement 27. Realignment of the Ocean Avenue I-280 Southbound Off-Ramp [Mid-Term]***

The relocation of the I-280 southbound off-ramp eastward to create a straight alignment, as shown in Figure 54, was identified in the *Ped and Bike Project*. Assuming that the existing lane configuration is maintained at this location, vehicles exiting I-280 would retain their own receiving lane but would have to cross the bike lane (Improvement 24) to access the receiving lane. At a minimum, a yield sign with pedestrian actuated in-roadway warning lights would be installed. A stop sign would help improve pedestrian and bicyclist safety but, as described below, but could negatively impact freeway operations. The new ramp alignment would increase the visibility of pedestrians and bicyclists. Consequently, this project would further improve safety for pedestrian and bicycle crossings beyond that offered by Improvement 26.



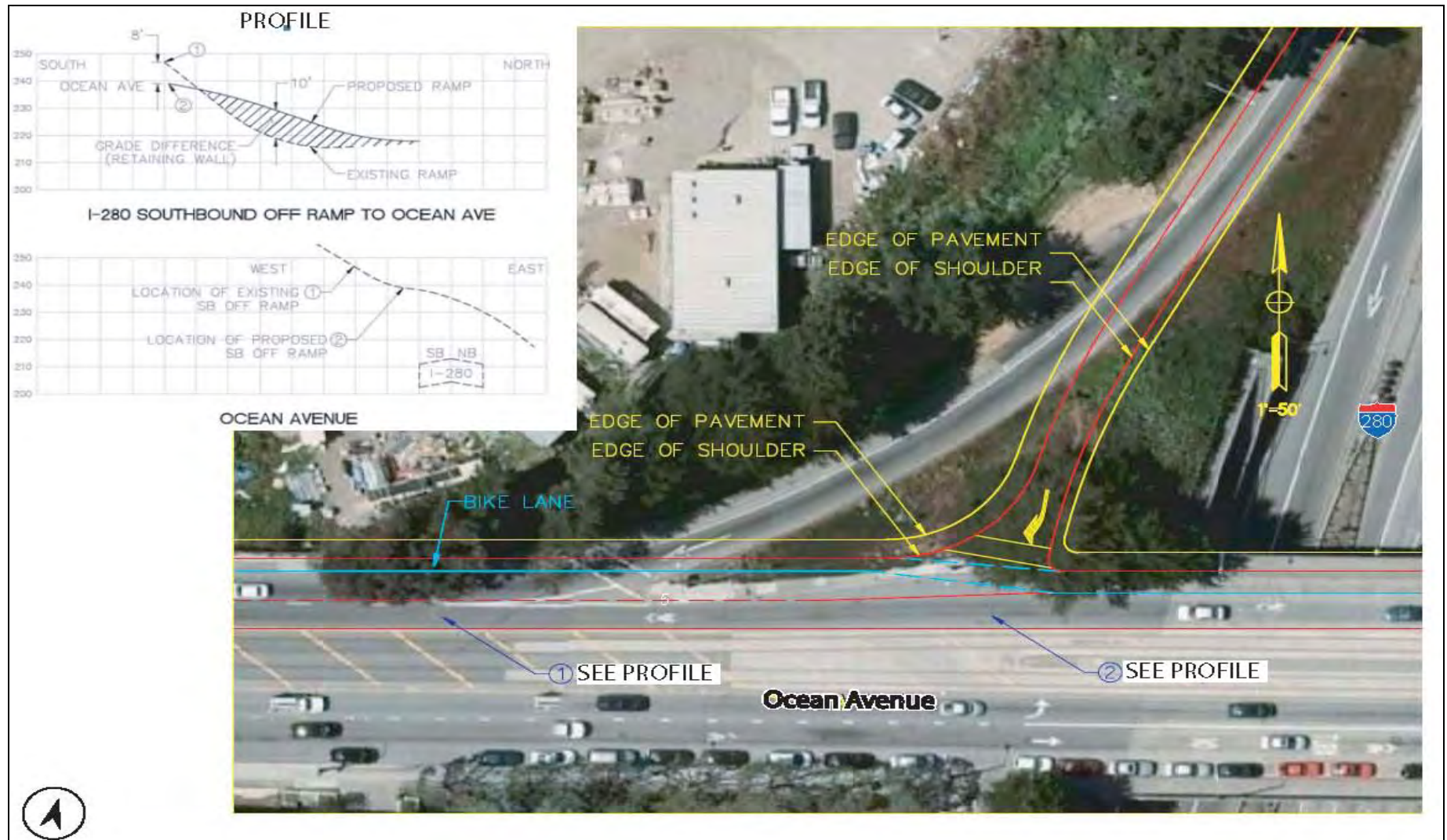


Figure 54: Improvement 27 - Realignment of the Ocean Avenue I-280 Southbound Off-Ramp

The profile of Ocean Avenue, in Figure 54, is shown, looking north. Point 1 is the current location where the southbound off-ramp meets the street, and Point 2 is its proposed location. The new off-ramp would provide a flatter approach to the pedestrian crossing at Ocean Avenue, increasing visibility. The proposed location is approximately eight feet lower than the existing pedestrian crossing; therefore it would provide for a flatter slope of the ramp and better visibility for motorists to see crossing pedestrians. Further, the greatest height difference is where the proposed ramp would be approximately 10 feet higher than the existing ramp. The ramp will be longer, as well, to accommodate the change in grade. A new retaining wall would be needed with this proposed ramp, along the west side of the ramp.

It is likely that pedestrian crossing volumes would increase with the creation of a safer crosswalk at Ocean Avenue and the I-280 northbound on-ramp (Improvement 10) and the new K Line stop at Howth Street (Improvement 15). As mentioned, crossing protections that should be considered here include in-roadway warning lights and a yield sign at the top of the relocated off-ramp.

A stop sign at the intersection may provide better safety for pedestrians and cyclists, as cars stop before would crossing the bike lane and crosswalk in order to proceed onto Ocean Avenue. A preliminary intersection analysis was performed to evaluate the impact of a stop sign on the ramp and on freeway operations. A stop sign with a separate receiving lane for the southbound off-ramp would create a maximum queue length of approximately 570 feet. The approximate distance of the ramp is 560 feet before conflicting with the southbound off-ramp to Geneva Avenue. It might be problematic to have a stop sign in place at all times; however, this problem would only occur during peak traffic periods. To minimize this potential back-up, a yield sign with pedestrian activated in-roadway warning lights would be preferred instead to slow or stop traffic when pedestrians are crossing. A more detailed analysis during design should be undertaken.

The relatively low cost and low impacts on surrounding properties make this a viable short-term/mid-term option for improving pedestrian safety on Ocean Avenue. This portion of the project would require a Caltrans Project Initiation Document (PID) process. In order for this project to move forward, the City would need to allocate money to the project and put the project in the City's top two Caltrans priority projects. The project is anticipated to cost between \$5 and \$7 million (in 2010 dollars). Once the combined Project Study Report/Project Report (PSR/PR) begins, the project should take between two and a half years to three and a half years for completion. This would include a PSR/PR, environmental analysis, surveying, design, Caltrans permitting, and construction. The existing ramp would need to be closed while it is being reconstructed. Southbound traffic that would normally exit at Ocean Avenue would be detoured to the Geneva Avenue exit. Alternatively, the new ramp could be designed with an alignment just east of the existing ramp in order to allow the latter to function until such time as the new ramp can be opened.

## Redevelopment

As mentioned earlier, the Balboa Park station complex is a major focal point for transit transfers, as well as a facility depended upon by the area's extraordinary concentration of middle school, high school, and community college students. Beyond these transportation needs, a key element of the *Balboa Park Station Area Plan* is the redevelopment of the area around the station to better support mixed land uses, including new residential and commercial space. Such redevelopment would provide more ridership for the station, as well as enable more residents to be less dependent upon automobiles for their daily travel.

### ***Improvement 28. Green Yard Redevelopment [Long-Term]***

The *Balboa Park Station Area Plan* suggests redeveloping the Green Yard, which is owned and operated by SFMTA. The yard provides LRV storage space and a large shop building for LRV maintenance. A separate administration building on the south side of the Yard houses a diagnostic track, operator break room, electric shop, radio shop, and operational dispatch area. In addition to these functions, the Yard also includes tracks and alighting/boarding areas used by J and K LRVs in service that terminate at Balboa Park. The Muni Metro J/K Line customer waiting areas are located below grade in a trench-like platform area within the Green Yard, while the M Line stops are located on San Jose Avenue south of Geneva Avenue.

The Green Yard is important for the maintenance of Muni LRVs and HSCs. This facility is strategically located near the south central part of the city. The removal of the maintenance uses in the Green Yard would require them to be relocated to another site. However, there are not many alternative locations that are close to rail, suitable for industrial uses, minimize dead-heading, and meet seismic requirements. One area that has been mentioned in the past is the reservoir site northeast of Balboa Park station, just west of Phelan Avenue. This area is currently utilized as a parking facility, and various other uses have been proposed there by CCSF. Even if available, relocation of the Green Yard functions there would be costly and time consuming.

Today the capacity of MME could not accommodate transferring the operations of the Green Yard. There are 151 LRVs in the current fleet. MME currently supports 60 LRVs with a maximum capacity of 107 LRVs. The number of LRVs operating out of MME is limited by the electric power supplied to MME, as well as signal capacity at the Fourth Street and King Street intersection. Increasing maintenance and operations in MME would require mitigating the signal capacity issues at Fourth Street and King Street. Some relief is expected with the completion of the Central Subway Project.

An additional possibility to mitigate signal capacity issues at the Fourth Street/King Street intersection would be to create a track connection between MME and the Green and Geneva yards (Recommendation V). Currently, all LRV rail traffic between the Green and Geneva yards and MME must utilize the Muni Metro subway under Market Street and the Third Street T Line tracks. The suggested connector would

likely use the Geneva Corridor, reducing the impact at Fourth Street and King Street, and allowing for occasional or emergency access to the J, K, and M lines without traveling through the Market Street tunnel.

Nonetheless, even if the T Line connection were constructed, MME would likely need to be expanded, and the paint and body shop would need to be built and staffing increased. Phase 2 of MME includes a 4-acre expansion to accommodate an additional 40 LRVs. Without the Green Yard, the expanded MME could not accommodate all the required maintenance and storage needs, especially with an expanding fleet. In addition, it would eliminate redundancy of the system.

Redevelopment opportunities exist without having to relocate maintenance and storage in the Green Yard. They would require the repurposing or demolition and replacement of the Green Administration Building on the south side of the yard. The current Green Administration Building, opened in 1982, fronts Geneva Avenue and is accessed by steps and a bridge over the J/K Line in the yard below. The building is not ADA-accessible and does not fit the urban context or architectural style of the neighborhood. The building provides space for SFMTA offices, a gilley (crew) room and radio room in the upper level, a mezzanine used primarily for storage, and repair shops and storage in the lower level. Of particular importance in the lower level is a copper-lined room used for repair of radios. Discussions with SFMTA staff indicate that these functions need to remain in some capacity, although they could be reconfigured or relocated.

The environment created by the building and the surrounding yard may be deterring redevelopment of the area. Nonetheless, relocation of the Administration Building functions would allow for the demolition of the building and construction of a deck over the building footprint, extending to the Geneva Avenue sidewalk. However, an important consideration of relocation, in addition to cost, is where to house the functions that would be displaced.

A thorough analysis of alternative sites was not undertaken as part of this study but would be necessary should relocation become the desired option. For example, the meet-and-greet, gilley room, and operator's dispatch would have to be relocated to another location within the Green Yard, where they would occupy space now used for other functions. The copper-lined radio room could conceivably be relocated to a new building at MME but at considerable capital expense. Assuming that the current access and power issues at MME are solved, then more LRVs could be moved there and the run-through track would not be necessary. However, removal of the building would not create sufficient space to provide any measurable increase in storage capacity. This is because of the configuration of tracks in the yard and the need to lead those tracks into the maintenance building.



This study evaluates two different options to redevelop the Green Yard:

Option A. Green Yard Decking

Option B. Green Administration Building Renovation / Reconstruction

*Option A. Green Yard Decking*

The *Balboa Park Station Area Plan* introduced the concept of developing a deck structure over the Green Yard to provide a platform for new development. The vision included elements to enhance integration with the neighborhood at street level and divide the redeveloped space into blocks, rather than functioning as one large super block. The feasibility of this concept was examined as part of this study to determine if further investigation was warranted. This analysis assumed that a deck would cover the entire yard area and maintenance building, as described in the *Balboa Park Station Area Plan*.

Feasibility Analysis

The following criteria were used to analyze the feasibility of decking Green Yard:

- Impacts on Green Yard operations in terms of construction phasing and yard efficiency.
- Vehicular and pedestrian access to the deck.
- Integration of the deck with the existing urban fabric of the neighborhood.
- Estimated cost of the deck versus real estate values.

Green Yard Operations Analysis

The construction of a deck above the Green Yard storage tracks and maintenance building would require the relocation of several yard tracks and the reconstruction of the maintenance building. While the yard tracks are scheduled to be replaced in the near future, relocation of the tracks to allow space for the deck structure supports would reduce operational efficiency and storage capacity.

While creating the deck, there would be necessary closures at the Green Yard, and Muni operations would be substantially affected. Access to the site to drill the piers and construct the deck would require the disposition of yard operations for approximately one year. Reconstruction of the maintenance facility would require suspension of operations for approximately 2 years (overlapping with the yard closure). SFMTA currently has no available location or funding for the temporary displacement of the operations.



### Vehicular and Pedestrian Analysis

The height of the deck (40 feet above track level to clear the top of the maintenance building) would require a 430 feet ramp at 7 percent grade for vehicular and service access to the deck. Due to the site constraints and operation of the yard, locating the ramp in an area that would not interfere with yard operations is problematic and most likely a fatal flaw.

Pedestrian access presents further constraints. In order to connect the deck area to the street and sidewalk network, a street level plaza would be required to provide elevator and stair access. Location of this plaza is again problematic due to the site constraints of the BART station and yard operations below.

### Urban Fabric Integration

The success of a transit-oriented development is highly dependent on the integration of the project with both transit and the neighborhood. Due to its height above the street, the proposed deck would be disconnected from the neighborhood from the pedestrian's perspective. Moreover, the presence of loop tracks around the periphery of the site makes integration at street level problematic. The height and scale of the project would also be imposing on the relatively low- to medium-density urban fabric east of San Jose Avenue. While the plan discourages development of a super block, the platform supporting the development would essentially become one, as it would be difficult to establish a vehicular street system on the deck. However, buildings could be distributed in a way that breaks up the mass into separate components, appearing to observers at ground level as a series of blocks.

### Cost and Real Estate Analysis

In order to maintain current Green Yard operations without complete demolition of the maintenance building, a deck structure approximately 40 feet in height (above grade on the east side of the yard) would be required. This datum was established based on the height of the existing maintenance building, clearances over the building, a structural depth of 5 feet, and an assumed concrete structure with 40-foot support column spacing. The columns themselves would have to be 5 feet in diameter in order to survive a 9.0 earthquake. This elevation could be lowered approximately 10 feet with reconstruction of the maintenance building, utilizing the deck as the roof of the structure, resulting in a deck height of 30 feet. It is assumed that reconstruction of the maintenance building would be required to facilitate construction of the deck without spanning over the building. The estimated cost for the deck is as follows:

Concrete support structure	
283,000SF @ \$250/SF	\$70,750,000
Maintenance building reconstruction	
140,000SF @ \$130/SF	+ <u>\$18,200,000</u>
Total	\$88,950,000

Based on the above conceptual estimate, the approximate cost per square foot of the deck (concrete support structure, 283,000 sq. ft.) is \$314. Comparative real estate cost for undeveloped land in the immediate area based on recent sales is \$175 per square foot. Since undeveloped land in the project area is limited, an allowance should be added for demolition of existing structures. Adding an allowance of \$15 per square foot for demolition of improvements, it is estimated that the comparative cost of land for the purpose of this analysis is \$190 per square foot. The limited availability of undeveloped land in the area might provide an incentive for the marketability of the deck property. However, given the existing densities and land uses and the assumption that development of the deck would be primarily office and live/work residential, the maximum expected market value is \$190 per square foot.

In order for the deck parcel to be feasible, SFMTA would need to underwrite the gap between the costs of the deck and the market value. This would be \$124 per square foot, or a total of \$35 million. The magnitude of this investment would be similar to a major capital project such as the Octavia Boulevard and Central Freeway Replacement project (\$26 million) and one quarter of the Van Ness Avenue BRT project (\$120 million). It is also improbable that SFMTA would achieve a reasonable return on investment from a public/private partnership that would be required to develop the property.

The cost to construct plus the difficulty of selling the concept of living over traction power wires hurt the viability of residential development over the Green Yard. Other yard decking projects in use today (such as the Barclays Center over the Atlantic Yards in Brooklyn, NY) did not involve being above wires.

While a complete decking of the Yard does not appear feasible based on this analysis, partial decking where street level access can be provided (Option B) may prove to be viable.

#### *Option B. Green Administration Building Renovation / Reconstruction*

During the analysis of Option A, an alternative to constructing a deck over the Green Yard was developed, as shown in **Figure 55** and **Figure 56**. Option B would provide a mid-term improvement that would leave the Green Administration Building in place but would provide a deck between it and Geneva Avenue. This option would provide a retail face along the north sidewalk of Geneva Avenue while improving the entrance to the station from San Jose Avenue.

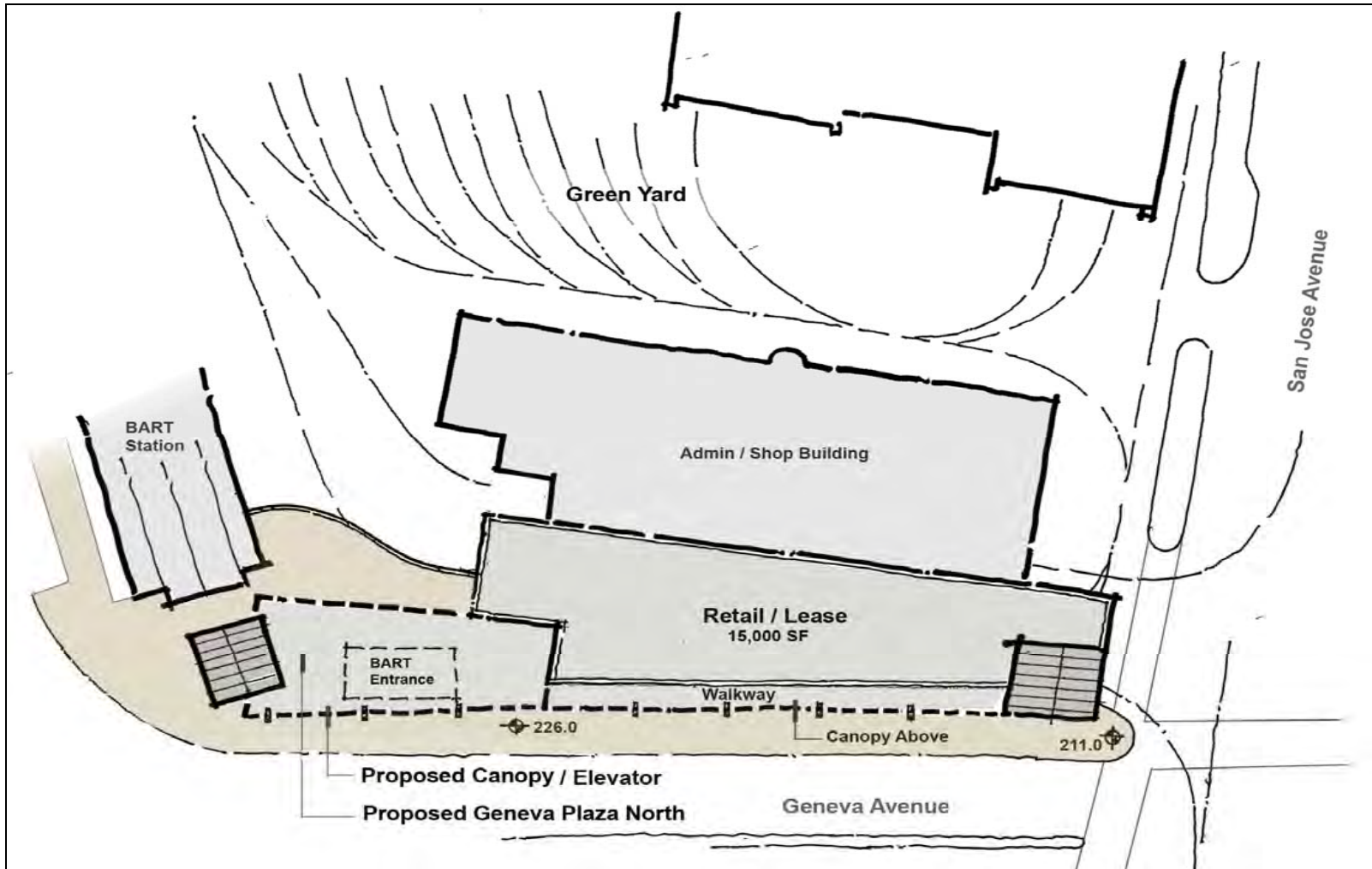


Figure 55: Improvement 28 - Geneva Plaza and Retail Space Layout (Option B)

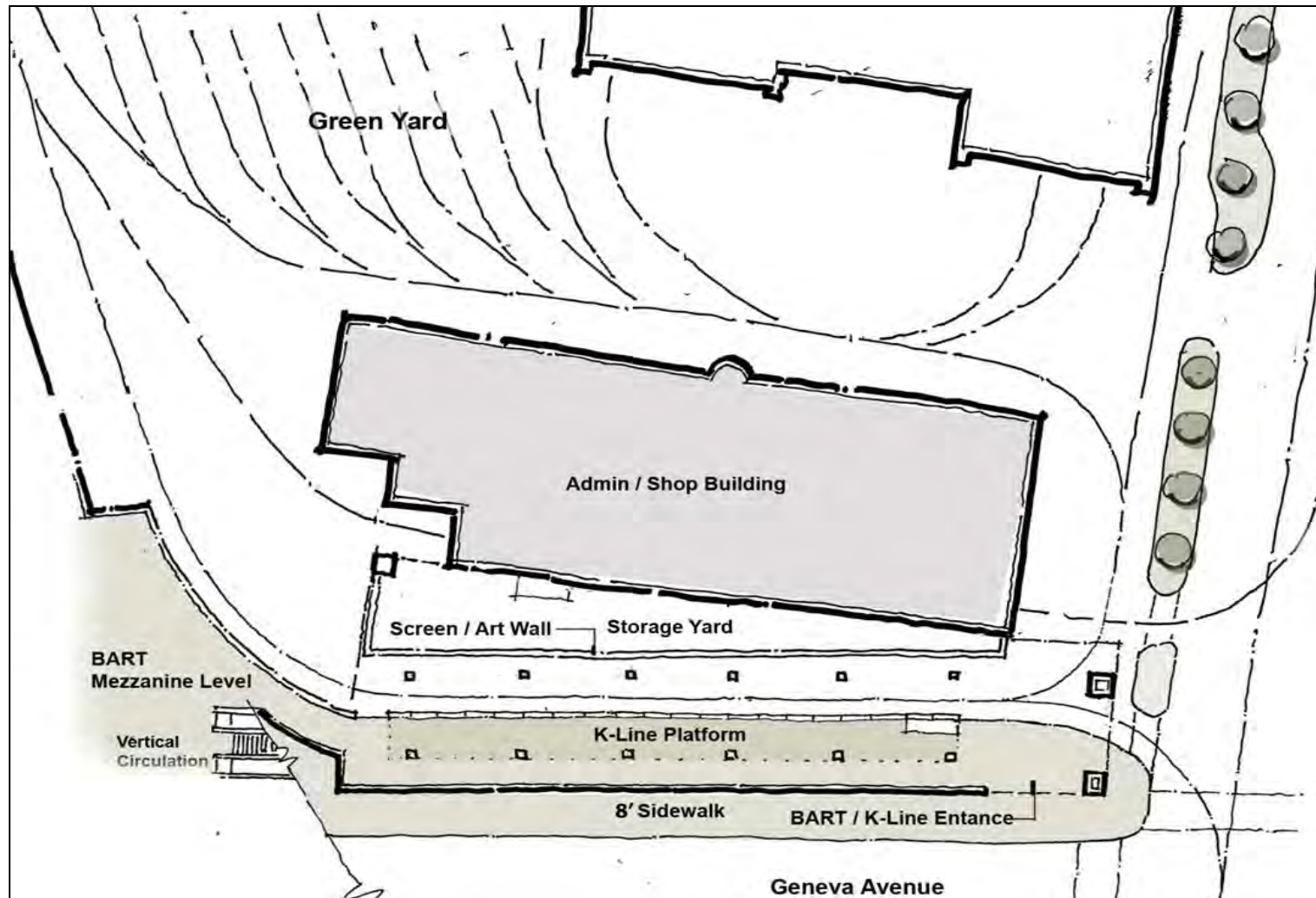


Figure 56: Improvement 28 - Geneva Plaza and Retail Space Layout - Lower Level (Option B)

While Option A assumes a complete coverage of the yard and shop areas of the Green Yard, several alternatives were explored with much more modest decking. To avoid the constraints of Option A, the footprint of the deck was located where it could be accessible from Geneva Avenue. The most viable alternative is a new structure along Geneva Avenue, with the possible reconstruction of the existing Green Administration Building and infill of the space between the Green Administration Building and Geneva Avenue with transit-serving retail. The mezzanine and the east end of its upper floor could be considered for other uses, such as a possible addition to the retail space.

Approximately 15,000 square feet of available retail space would be provided with access by walkway from the North Geneva Transit Plaza. The retail space could accommodate a variety of uses; however, the space is envisioned to provide convenience transit oriented retail for the transit customer. Anticipated uses could include newsstand/bookstore, coffee/donut/pastry shop, or dry cleaner storefront. A police storefront could also be a desirable use at this location.

A deck would be constructed between the south face of the building and the north sidewalk along Geneva Avenue. The deck would be accessed from the proposed North Geneva Transit Plaza in the vicinity of the BART station entrance. The deck would allow for transit-related retail and possibly office uses above or behind to house SFMTA office and shop functions below. The area below the deck between the existing Green Administration Building footprint and Geneva Avenue could provide a covered platform area for the realigned K Line (Improvement 14). The new development would screen the yard from Geneva Avenue and provide a new “urban face” to the neighborhood, possibly creating a catalyst for development at the Upper Yard.

The current functions on the lower level of the building (such as repair shops and storage) would be difficult to relocate and are best left in place. The upper level, however, is underutilized. This upper level is currently accessed from Geneva Avenue through a pedestrian bridge but could alternatively be accessed from the yard below. With this modification, a new retail building could be constructed along the Geneva Avenue frontage (see Figure 55 which illustrates the North Geneva Transit Plaza level layout of the retail space).

This scenario provides a way to improve the entrance to the Balboa Park Station complex from San Jose Avenue, as well as providing full weather protection for the proposed K Line boarding platform on the lower level (Improvement 14). It was originally conceived as part of a realignment of both the J and K tracks and boarding platforms. However, the geometry of these tracks turned out to be too tight, so this concept is more appropriate for accommodating only the K track and platform, if and when the J Line is relocated to San Jose Avenue.

The K Line platform would serve as the connecting at-grade link between the Geneva Avenue/San Jose Avenue intersection and the BART station. Locating the K platform at approximately elevation 210 feet provides relatively level access between the intersection and the BART mezzanine level. It would provide an accessible path serving both the K Line platform and BART. **Figure 56** and **Figure 57** illustrate



the layout of the platforms and related track realignment for this proposed improvement.

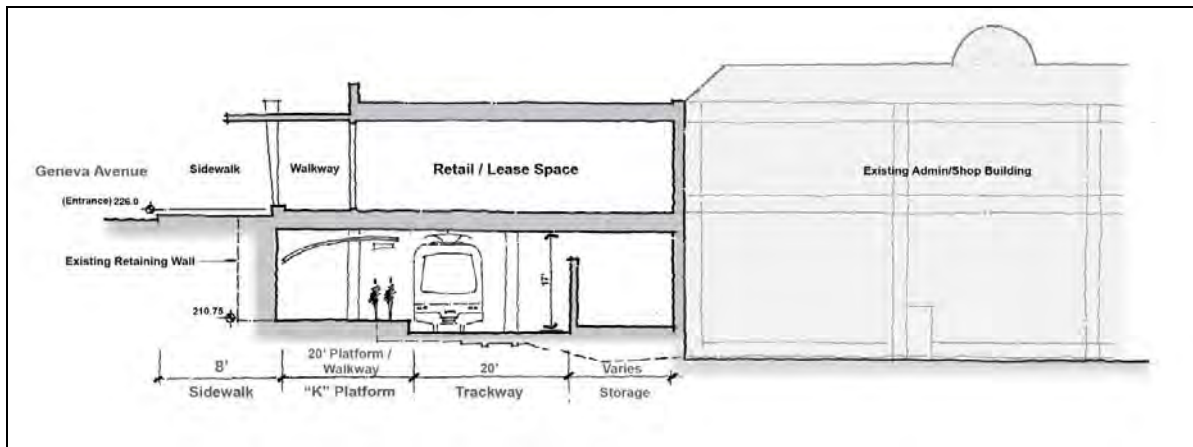


Figure 57: Improvement 28 - Cross Section of K Platforms, Retail Space, and Administration Building (Option B)

The elevation of the retail space would have to provide for clearance over the trackway below of approximately 17 feet, meeting the current minimum clearance at the K Line tracks. This elevation is approximately 5 feet below Level Two of the Administration Building, resulting in a vertical grade change between the existing building and the new retail addition. This change could be accommodated by accessing the Administration Building from the yard level via existing stairs and elevators, or by providing a ramp/stair system between the buildings. Due to the location of the proposed retail space abutting the Administration Building, a fire wall would be required to separate the two occupancies. This would result in the loss of exterior windows on the south wall of the Administration Building. Reconfiguration of existing space within the Administration Building would be required to accommodate the loss of exterior offices.

Due to the slope of the existing Geneva Avenue sidewalk, access to the retail space would be limited to the area adjacent to the BART station entrance, as shown in **Figure 58**, at approximately elevation 226 feet, resulting in a single retail or office tenant or the addition of an upper level walkway to access multiple tenant spaces. This walkway may require a fire exit at its east end which could also serve as access to the K Line platform below.

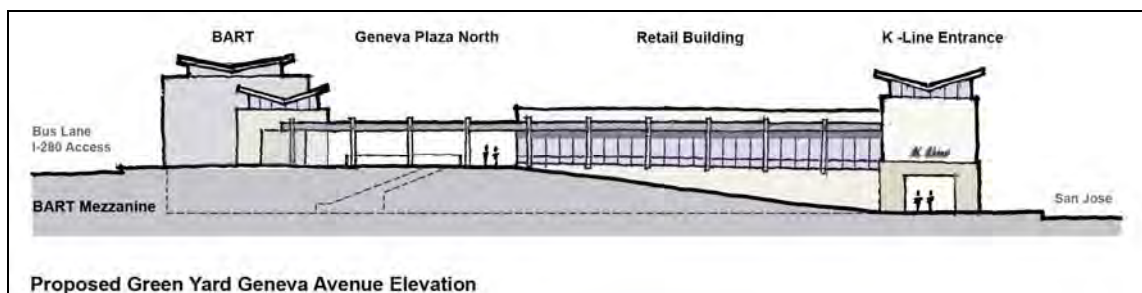


Figure 58: Improvement 28 - Geneva Avenue Proposed Elevation (Option B)

The retail building frontage along Geneva Avenue would screen the Green Yard operations and provide an incentive for redevelopment of the Upper Yard across

the street. The new façade would also provide a new signature gateway to the K Line platform, as well as the BART station. While the structure could conceivably have multiple levels, it is envisioned to be a single-level structure at this time, primarily serving transit-related retail uses that do not require parking. Given the high amount of pedestrian traffic at this location and experience in similar stations elsewhere, such uses should be economically viable.

#### *Recommended Option*

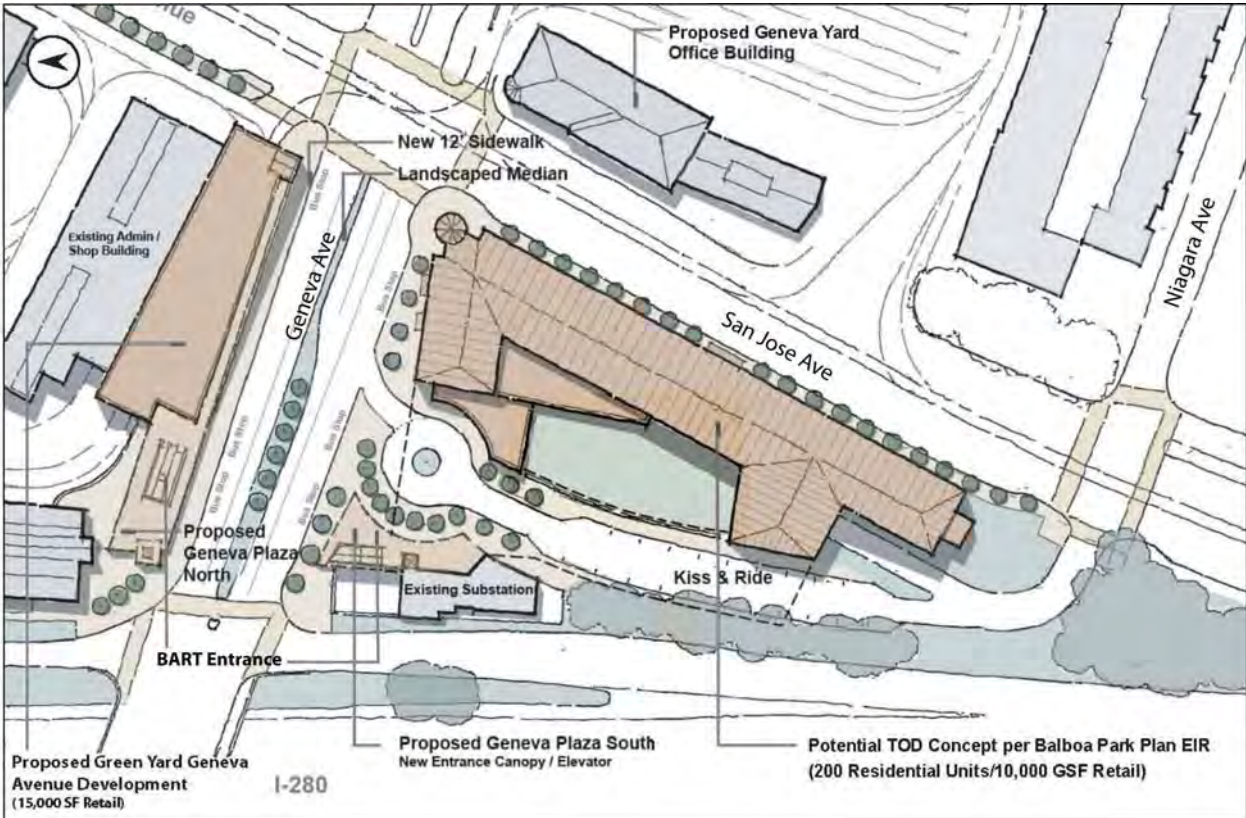
Due the infeasibility of Option A to construct a deck over the Green Yard, Option B is the recommended alternative for further consideration in the SFMTA's *Real Estate and Facilities Vision for the 21<sup>st</sup> Century*, scheduled for completion around spring 2013. Option B would improve the face of the Balboa Park Station on Geneva Avenue and provide transit-serving retail.

#### ***Improvement 29. Upper Yard Transit-Oriented Development (TOD) [Mid-Term]***

The Upper Yard, located at the southwest corner of Geneva Avenue and San Jose Avenue, adjacent to the BART kiss-and-ride area, is owned by SFMTA and is currently used for off-street employee parking during the day (and until recently, LRT vehicle storage at night).

Under the vision provided in the *Balboa Park Station Area Plan*, the Upper Yard TOD would develop a mixed residential and retail project on the land now occupied by the Upper Yard and the BART kiss-and-ride lot. This concept is assessed in the following section from the standpoint of transportation feasibility and broad real estate economics and environmental feasibility. The following section is not intended to substitute for the evaluation of the SFMTA's need for the Upper Yard considering the Agency's systemwide facility needs. (This should be provided by the SFMTA's *Real Estate and Facilities Vision for the 21<sup>st</sup> Century*, which is scheduled for completion around spring 2013.) Nor is it intended to substitute for detailed market and real estate analysis that could be provided in cooperation with real estate experts and developers.

The relocation of LRT storage and parking away from the Upper Yard site could provide space for this new private development with direct access to the BART, as shown in the illustrative concept plan in



**Figure 59.** This concept takes off from the vision provided in the *Balboa Park Station Area Plan*, with high-density residential over ground-floor retail fronting directly onto San Jose and Geneva avenues, reinforcing a pedestrian environment. The mixed-use transit-oriented development would be integrated with the Balboa Park Station with a new South Geneva Transit Plaza, providing a covered waiting area for bus passengers (Improvement 4) and a new accessible entrance to the BART station (Improvement 5). The use of air rights over the kiss-and-ride facility would allow for an increase in density on the Upper Yard site and the continued use of the kiss-and-ride.

Modifications to storage and maintenance operations in the Green and Geneva Yards and MME (Recommendations I, II, III, and IV) would provide additional storage and maintenance capacity needed to offset the loss of the Upper Yard. Light rail vehicle storage capacity provided in other Muni yard facilities would provide sufficient capacity for relocation of the 18 Muni LRVs currently stored overnight in the Upper Yard sometime after 2013. Employee parking would be relocated to the Green Yard garage with the proposed modifications.

After reviewing the conditions for light rail storage and servicing in Balboa Park, the Upper Yard could only be freed from its transit functions and redeveloped with other uses at the completion of the Green Yard re-rail project after 2013 if the Green Yard underground parking is reconfigured. At that time, the Upper Yard would not be needed to store LRVs if the tracks at the Geneva Yard were better utilized. However, the development of the Upper Yard would require modifications to maintenance and storage in the Green Yard, Geneva Yard, and MME that are discussed in Recommendations I-V. With the completion of the Upper Yard and the modifications to the other yards, the Upper Yard could be considered for mixed-use property development.

The relocation of these LRVs and staff parking could open the site for joint development, providing a revenue stream and/or capital to SFMTA. Due to the amount of passenger drop-off activity at the station (seven percent of total ridership), the existing kiss-and-ride area would need to be maintained at the Upper Yard site unless an alternative site adjacent to the BART station box could be developed. At this time, no adequate alternative has been identified.

The existing kiss-and-ride facility has approximately 50 spaces. Only about half of these spaces are used during the AM and PM peak periods. Improvement 19 would reconfigure the kiss-and-ride area to provide additional space for development. The proposed kiss-and-ride facility would provide 20 to 24 spaces.

The kiss-and-ride facility could remain even if the Upper Yard is redeveloped. The roadway could also provide shared access for residential parking for the new development on the Upper Yard site.



## Balboa Park Station Capacity and Conceptual Engineering Study

### Chapter 5. Analysis and Recommendations

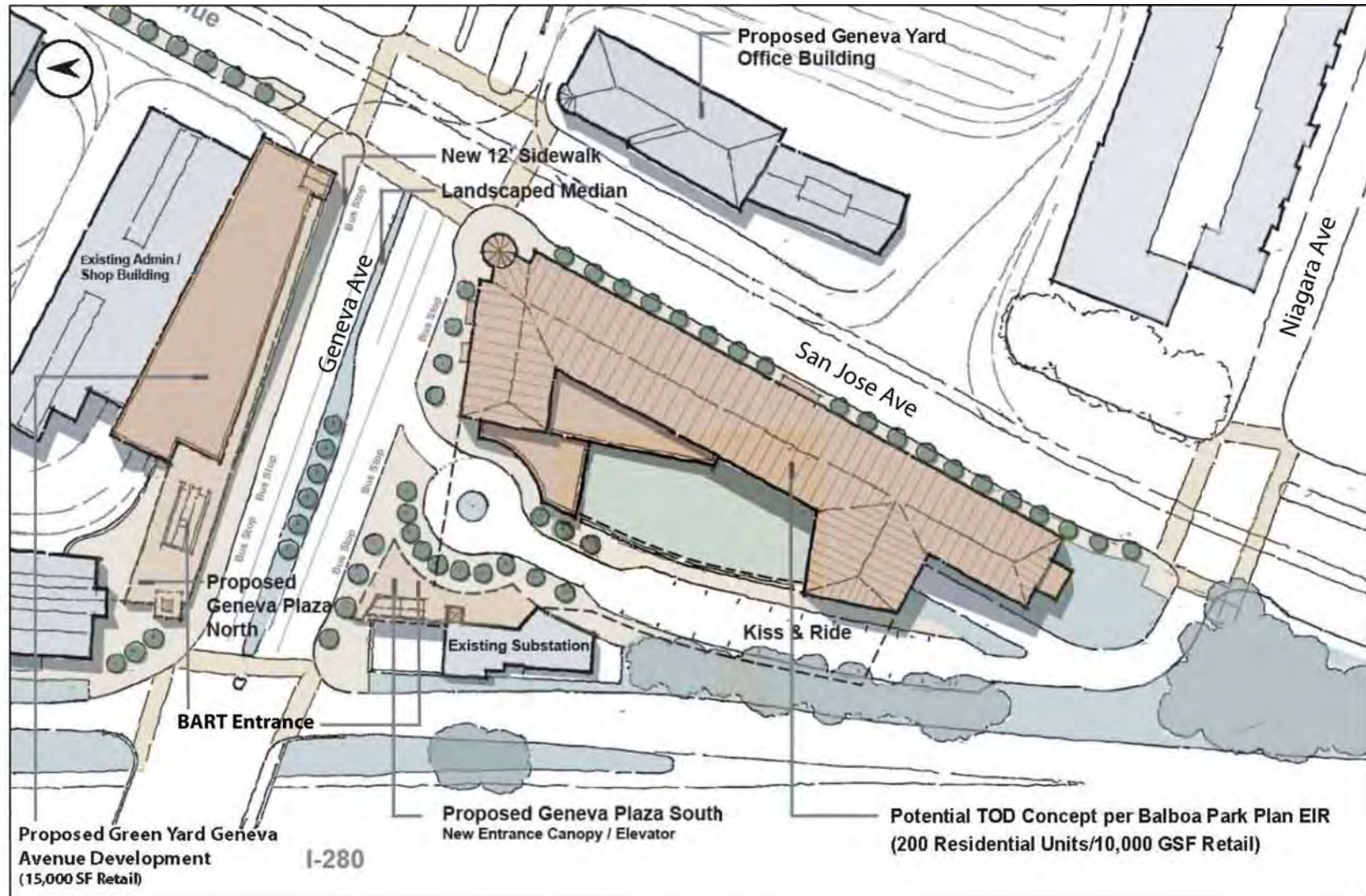


Figure 59: Improvement 29 - Upper Yard Transit-Oriented Development (illustrative concept plan)



*Upper Yard Mixed-Use Development*

An EIR conducted by the City of San Francisco assumed 200 dwelling units and 10,000 square feet of retail for redeveloping this site. Actual densities of these land uses could vary based on market conditions. Alternative development considerations could include office, educational, institutional, or hotel uses.

For this study, a development of 150 multifamily units was assumed (for a five-level structure with underground parking) and 33,000 square feet of lower-level retail. Planning code section 151.1 establishes a maximum of three spaces for four dwelling units in residential, transit-oriented developments. A 150-unit residential building could provide a maximum of 112 parking spaces (approximately 2 levels of parking). An air rights footprint would provide an additional 120 living units, assuming five levels. The use of the air-rights over the kiss-and-ride facility would provide a financial benefit to BART without closing the existing kiss-and-ride.

Residential appears to be an appropriate use for this site, based on the site configuration and proximity to transit. This is reinforced by the relatively low parking requirements for residential as opposed to other uses. Nonetheless, the market for other uses may prove stronger at this location, and the development community may wish to weigh in at the appropriate time on what uses it feels are economically viable.

With proximity to the I-280 freeway and the Geneva Avenue off-ramp, development on the Upper Yard would be subject to a certain amount of noise and fumes generated by freeway traffic. Its housing would be within 500 feet of I-280 and, therefore, inconsistent with the California Air Resources Board (CARB) Land Use recommendations and with Bay Area Quality Management District (BAAQMD) and California Environmental Quality Act (CEQA) Guidelines. Some portions of this site are as close as 75 feet from the off-ramp. Moreover, even without the freeway, this site's location at the corner of two busy arterials, Geneva and San Jose Avenues, would make it subject to possible traffic noise, vibration, and fumes. These are not fatal flaws but do require careful design treatment to mitigate any impacts that are confirmed during the development process.

To minimize exposure to pollutant emissions and odors, for example, development on the site would need an upgraded ventilation system. There are numerous examples of such development throughout the City, including row houses constructed recently along 19<sup>th</sup> Avenue and new residential towers adjacent to the west approach to the Oakland Bay Bridge. These units have double-pane windows to dampen the noise and HVAC systems to filter the air. Such mitigations seem to be effective in allowing these units to command prices similar to those of units less subject to the impact of nearby traffic. (The Bay Area Air Quality Management District has also required mitigation of outdoor common area air quality impacts for similar developments.)

*Feasibility Analysis*

Similar criteria for the constraints and opportunities analysis for the Green Yard redevelopment were used for the evaluation of the Upper Yard redevelopment, as follows:

- Impacts on the Upper Yard storage operations.
- Vehicular and pedestrian access to the site.
- Integration of the transit-oriented development with the existing urban fabric.
- Estimated market value of the project.

*Upper Yard Storage Operations*

The Upper Yard is currently used for employee parking and is equipped to store excess LRVs at night so that yard movements in the Green Yard can be more efficient. It can also be used for morning pull-outs of the M Line to avoid sending multiple cars across the very busy intersection of Geneva Avenue and San Jose Avenue. These problems could be mitigated by using the excess storage available in the Geneva Yard, as mentioned earlier. The Upper Yard provides no additional maintenance capabilities. It is only used for LRV storage and employee parking. It should be noted that the Upper Yard is not currently being used to store LRVs, as the switch tongue for the yard was moved to Church & Duboce for urgent repair. Once the Green Yard re-rail starts, however, the Upper Yard will again be used for LRV storage. In the future, the Upper Yard is anticipated to store LRVs or HSCs until additional storage capacity is available elsewhere.

The redevelopment of the Upper Yard would impact employee parking, which could be resolved by revisions to the Green underground parking (Recommendation I). Employee parking in the Upper Yard is underutilized right now and should be moved to the Green Yard underground parking area in the long term. The recent measure to charge employees for parking on SFMTA property should reduce the demand for parking in the Upper and Green Yards.

The Upper Yard cannot be released from rail storage needs until after 2013 due to the Green Yard re-rail and Geneva canopy projects. Both of these projects are funded. The Geneva Canopy Project is expected to start in 2010 and be completed in 2011. The re-rail project is currently in final design and expected to be completed by 2013. Development potential of this site can be realized after LRVs are relocated back to the Green Yard and MME. Any reuse of the Upper Yard can and should retain the current kiss-and-ride function.

### Vehicular and Pedestrian Analysis

Alternatives for modifying the current station auto kiss-and-ride facility with a more efficient footprint (Improvement 19) were discussed above. The reconfiguration of the kiss-and-ride facility would not be an impediment to redevelopment, and the options presented in Improvement 19 would be compatible with air rights mentioned above, while allowing continued use of the kiss-and-ride. The concept of a roundabout with an exit to Geneva Avenue was used in determining the site area required for the kiss-and-ride function. While the roundabout with no exit is favored by SFMTA, the exit option was assumed in the case that this feature was to be desired in the future. Elimination of the driveway on Geneva Avenue would reduce conflicts between autos and buses and improve safety for pedestrians that would otherwise cross this driveway.

The concept used for this analysis provides two-way vehicular access from San Jose Avenue, exiting on Geneva Avenue or returning to San Jose Avenue via a roundabout. The kiss-and-ride area would also create a buffer between proposed new development at the Upper Yard and the I-280 freeway to the west. Alternatively, the proposed development could be extended west to cover the kiss-and-ride area. This would provide for a larger footprint for development but a smaller buffer from the freeway. Primary pedestrian access would be from the building frontages along San Jose and Geneva avenues.

The Balboa Park Station south entrance, adjacent to the Upper Yard, requires enhancement to make it more accessible and pedestrian-friendly. A new pedestrian oriented South Geneva Transit Plaza is proposed, with a covered passenger waiting area (Improvement 4) and a new elevator to the BART platform below (Improvement 5). The plaza would serve as a drop-off point for buses; a waiting area for the bus and kiss-and-ride functions; and a linkage between the BART station, the neighborhood and potential new development at the Upper Yard.

If the site is developed with the kiss-and-ride lot, the proposed development could share the access driveway. Given the size of the development and the kiss-and-ride's current use, no conflict is anticipated if the access driveway is shared. The circulation pattern selected in Improvement 19 would be followed.

If the site is developed without the kiss-and-ride lot, the vehicular access to the development should be from San Jose Avenue only. Its Geneva Avenue frontage is a major Muni transit hub, and the Planning Code prohibits new driveway access on Geneva Avenue.

The trips generated by the potential size of the development and the existing kiss-and-ride would not warrant the signalization of the driveway at Niagara Avenue and San Jose Avenue. An informal level of service analysis showed that the existing all-way stop control would function satisfactorily (LOS D or better) with an additional 300

vehicles in and out during the AM and PM peak hour; however, a more detailed traffic analysis would be required if an EIR is required for the proposed development. A signal warrant analysis would also be required at that time.

### Urban Fabric Integration

The mixed-use development is intended to fit the scale and context of the neighborhood by being no more than five levels high, with an “urban edge” along San Jose and Geneva avenues. The edge would be lined with retail at the lower level to encourage a pedestrian atmosphere and activity. The sidewalk along this edge is envisioned to include pedestrian amenities such as street trees, benches and awnings. This pedestrian atmosphere would reinforce the linkage between the existing neighborhood and Balboa Park Station, which currently is not well-defined.

### Cost and Real Estate Analysis

The illustrative example of 150 units, 112 parking spaces and 33,000 square feet of retail is anticipated to be valued at \$40 million, excluding land costs. A market study and real estate analysis should be developed to determine if the projected cost is realistic relative to market-based sale and lease rates and the advantage of being adjacent to transit. (Conversely, the site has several drawbacks, such as its proximity to busy streets and to transit yard operations, its triangular shape, and the restriction of its vehicular access to San Jose Avenue.)

If necessary, development costs can be partially offset by a public/private partnership, leveraging the land owned by SFMTA and public funding sources. These sources could include a Tax Increment Finance District or Public Improvement District to pay for streetscape or other public improvements as a catalyst for development. Due to the site’s proximity to transit, numerous federal grant programs and tax credits may also apply. The cost to reconfigure the existing kiss-and-ride area adjacent to the Upper Yard (Improvement 19) is assumed to be between \$0.5 and \$1 million (in 2010 dollars).

<sup>15</sup>

It should be noted that any monetary gain to SFMTA from the sale or lease of this land must be balanced with the loss of flexibility in operations for the Green Yard. The Upper Yard now serves as a “safety valve” for Green by providing overflow storage space for light rail vehicles. Another non-financial part of the decision is the impact of retaining the Upper Yard site for industrial uses as opposed to the housing infill envisioned by the *Balboa Park Station Area Plan*. The ultimate solution will require weighing the site’s utility to transit operations with its ability to revitalize the community and bring monetary value to SFMTA.

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<sup>15</sup> Specific assumptions related to cost are provided in Table C in Appendix 9.

### *Recommended Option*

SFMTA is actively reviewing alternatives for future use of Upper Yard and has not yet decided whether it is feasible to relocate uses and redevelop the site. The decision will depend on the analysis for the entire system in the *SFMTA's Real Estate and Facilities Vision for the 21<sup>st</sup> Century*. This study is expected to start around December 2011 and conclude around spring 2013. It will consider a range of factors for determining the future treatment of SFMTA properties, including current and future facility needs, environmental and community planning considerations, TOD/joint development potential, and other similar factors.

## **Freeway-Related Improvements**

I-280 follows a 250-foot-wide north-south swath through the Balboa Park neighborhood. This freeway, with its attendant noise, fumes, and traffic movements at numerous on- and off-ramps, divides the community both physically and psychologically. Overcoming this division was one of the chief motivations for developing the *Balboa Park Station Area Plan*.

### **Freeway Circulation**

Both Geneva and Ocean avenues have direct connections to I-280; however, Ocean Avenue is only a half interchange. That is, it is connected to a southbound off-ramp and a northbound on-ramp, whereas Geneva Avenue has a full diamond interchange. A detailed analysis of these ramps was not undertaken as part of this study. Nonetheless, some general observations can be offered here. While the southbound off-ramps at both Geneva and Ocean avenues are duplicative, the Ocean Avenue ramp does help accommodate the occasionally very heavy City College traffic. The northbound off-ramp and the southbound on-ramp on Geneva Avenue are not duplicative. The nearest similar ramps are located north of Balboa Park near the Glen Park BART Station and south of Balboa Park at Junipero Serra Boulevard/Alemanay Boulevard near the Daly City BART Station. Eliminating these Geneva ramps would have significant local circulation impacts.

There are many ways of modifying these ramps. This study concentrated on a subset of these options, including a variety of split SPUI configurations and elevated kiss-and-ride options. Beyond the split SPUI, this study did not consider the possibility of closing any of the existing ramps. Ramp closure would require the rerouting of traffic in the area and creation of circuitous routes. Potential intersection and freeway ramp storage capacity impacts may result due to the closures. A cursory level review was performed. If the Geneva Avenue northbound on-ramp were closed, traffic would be forced to use the Ocean Avenue northbound on-ramp. Although the Ocean Avenue intersection with the ramp could accommodate the traffic volumes with signal timing adjustments, the adjacent intersections would likely experience significant delay. In addition, retaining the Geneva Avenue I-280 northbound on-ramp is important for constructing an elevated



kiss-and-ride area (Improvement 32). Additional study of the effects of removing any existing ramps is recommended but is beyond the scope of this study. This future detailed analysis should include in-depth research of trip origins and destinations as well as travel patterns in the area. This study could be follow-up work to this report.

### ***Improvement 30. I-280 Freeway Deck***

Perhaps the boldest concept proposed in the *Balboa Park Station Area Plan* is a deck over I-280, between Ocean and Geneva avenues, as shown in **Figure 60** and **Figure 61**. This deck would contain the sight and sound of freeway traffic while providing a platform for infill development. Such development could include new residential and commercial buildings and a new station for the three light rail lines terminating at Balboa Park. The new light rail station would allow the removal of the current J/K rail stops from the cramped Green Yard area and the inadequate M platforms on San Jose Avenue.

There are numerous examples of buildings constructed on freeway decks (or “lids”) throughout the United States. Many of these buildings are commercial structures, but residential units can be so constructed as well. The advantage of a full freeway deck is that it provides the building with a buffer from the noise and fumes created by traffic on the freeway below it. Buildings on the deck would likely be quieter and less subject to pollution than those directly adjacent to sections where the freeway is not covered. Provisions would have to be made to vent the exhaust air from the freeway tunnel in ways that do not impact residents or workers in the buildings on the deck above. Examples of tower ventilation shafts are common in urban areas above and adjacent to similar tunnels worldwide.



Figure 60: Improvement 30 - I-280 Freeway Deck (Source: Balboa Park Station Area Plan)



deck would be classified as a tunnel, the construction of which requires more stringent Fire Life Safety requirements<sup>16</sup> to allow for overhead tunnel systems like lighting, fire safety, and ventilation. Even if the deck were shorter than 500 feet and not classified as a tunnel, the freeway decking would still require lowering the freeway.

The proper clearances for both deck and bridges could, perhaps, be accomplished by lowering the freeway in this section. To meet Fire Life Safety overhead clearance requirements, the roadway would have to be lowered by an estimated eight to ten feet to account for the depth of the deck and its ventilation equipment. The primary reasons for the freeway lowering include:

- Meeting the minimum vertical clearance standard for bridges (up to two feet);
- Accommodating jet fans for the tunnel (approximately four feet); and
- Providing room for lighting and signage (at least four feet).

Freeway lowering would require that the project limits be extended a significant distance to the north and south of Balboa Park Station. In order to accommodate lowering the freeway by eight to ten feet under the freeway deck and regrading the freeway, a one-mile stretch of I-280 would have to be lowered to provide the necessary clearance, a considerable endeavor. Variables that impact the extent of the lowering include:

- Lowering the freeway by eight to ten feet beneath the freeway deck;
- Lane and shoulder clearances (inside and outside shoulders);
- Drainage (cross slope modification);
- Grade of the deck between Geneva and Ocean avenues;
- Grades needed to meet standards and reconnect the segment at the boundaries of the freeway reconstruction (this is complicated by the fact that this segment is on an “S” curve);
- Retaining wall layout (freeway widening and lowering would require walls to be either modified or replaced); and
- Construction staging.

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<sup>16</sup> Fire Life Safety refers to the safety systems that facilitate firefighting and evacuation. This would include smoke removal (jet fans), fire suppression, fire protection (fire-rating of structure), escape protocols, surveillance, etc.



To provide minimally acceptable ramp geometry, freeway widening of approximately 50 feet on either side would also be required. This widening would result in the replacement of the bridge at San Jose Avenue and could interfere with BART, the open trench north of Balboa Park Station and the tunnel box and trackway to the south.

The existing sub grade drainage would need to be rebuilt due to the age of the facility, to accommodate the new freeway grades, and to handle the new flow demand from fire-fighting water and the new treatment of run-off. Final freeway grade and super-elevation design would be strongly influenced by the demands of handling surface water.

The complete closure of I-280 for construction is unlikely. It would be expected that the freeway would remain operational to some extent. Currently, however, the northbound and southbound directions do not share the same profile grade. There is a “step” between the routes. The step varies in height. Due to grade differences, more than just re-striping to maintain traffic during construction is anticipated. Temporary routes would need to be created through the site. An example of the work needed is the rehabilitation, re-grading, and widening of the Brooklyn/Queens Expressway in New York City (between the Long Island Expressway and the Grand Central Expressway in Queens).

The age of the freeway and the Ocean and Geneva bridges offers an opportunity to construct the deck in a more immediate timeframe, assuming that funds were available. The freeway’s walls and overcrossings are approximately 45 years old. Theoretical design life for structures of that vintage is estimated to be 50 to 75 years. The precise end of facility life is difficult to predict, but I-280 will sooner or later approach the point where rehabilitation will be necessary. However, both the Ocean Avenue and Geneva Avenue bridges have very low truck accident history, a quality often looked to when deciding if bridges need replacement. These low accident numbers do not create much pressure on Caltrans to provide standard clearances by replacing these bridges.

The improvement is expected to cost between \$1.3 and \$2 billion (in 2010 dollars).<sup>17</sup> This cost estimate assumes the construction of the SPUI in addition to the freeway decking. Right-of-way acquisition is anticipated but was not included in the cost estimate.

Given its complexity and lack of funding, this improvement would not be feasible in the next 20 years. Nonetheless, the freeway decking concepts could potentially be feasible if they were to occur at the same time as Caltrans’ corridor rehabilitation efforts. It is, therefore, recommended that plans for any I-280 decking be coordinated with Caltrans in the short-term so that such plans can be incorporated into the agency’s rehabilitation program. Caltrans, as the owner-operator of the facility, has the authority and obligation

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<sup>17</sup> Specific assumptions related to cost are provided in Table C in Appendix 9.



to ensure that all modifications or additions to the freeway, regardless of the project sponsor or funding source, meet stringent requirements pertaining to safety, operation, and cost effectiveness.

As an alternative to full decking, the consulting team examined partial decking of the freeway. The partial deck alternatives were researched in conjunction with SPUI/kiss-and-ride concepts and are addressed with freeway-related improvements later in this report. Costs and impacts would be reduced, but the issues of clearance over the freeway and matching the elevations of the bridges at either end are still present. Thus, even the construction of a partial deck would have to await rehabilitation of the freeway by Caltrans. Moreover, the benefits of buffering the noise and fumes of the freeway would be reduced.

### ***Improvement 31. Single-Point Urban Interchange (SPUI)***

Another element proposed by the *Balboa Park Station Area Plan* was the mitigation of traffic movements to and from the freeway ramps through the use of a pair of single-point urban interchanges (SPUI).

A typical SPUI, as shown in **Figure 62**, provides a design alternative that takes up less space and allows for non-conflicting left turns off of the freeway. Another advantage of a typical SPUI is that the intersection created can be controlled by one traffic signal. A disadvantage of SPUIs, however, is that they create larger intersections than typical diamond off-ramps. The larger intersections require longer clearances for bicyclists. The lengthened green and all-red clearance intervals required to accommodate the slower speeds of bicyclists would reduce the capacity of the intersection, increasing delay for motorists. In addition, the intersections created have very little space for pedestrian refuge due to the large open space required for vehicular left turns.

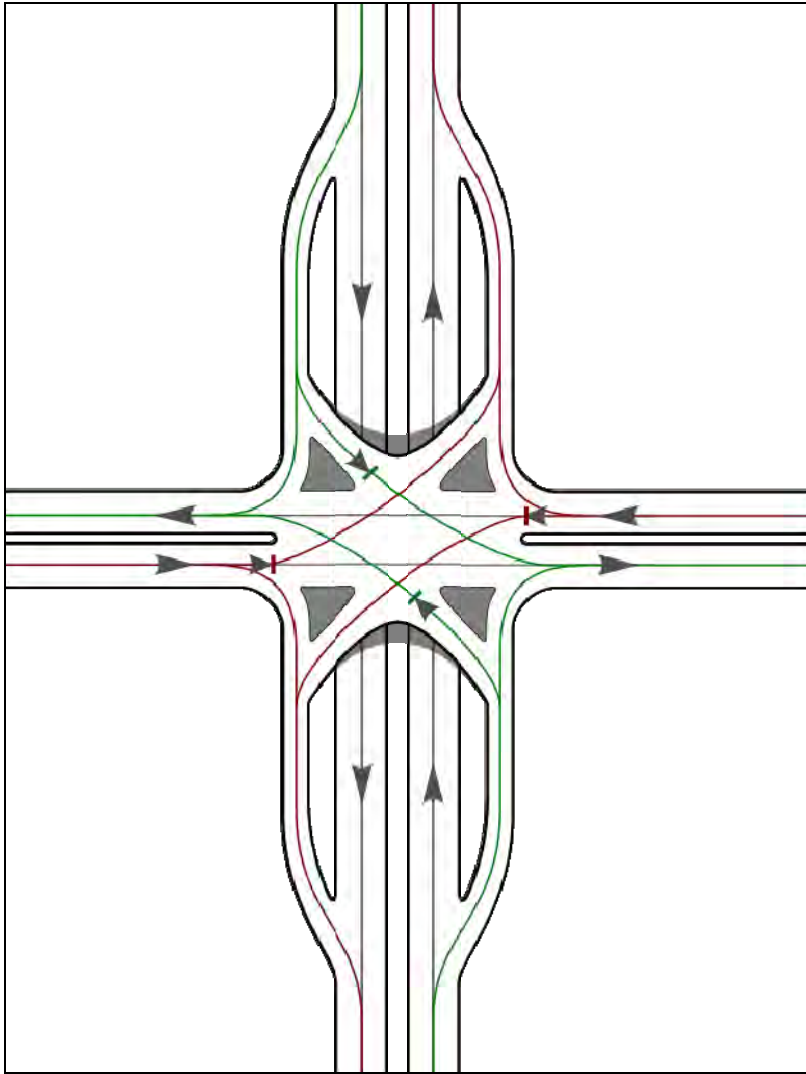


Figure 62: Traffic Movements in a Typical SPUI

The SPUI proposed in *Balboa Park Station Area Plan* is not a typical SPUI. The concept envisioned in the *Balboa Park Station Area Plan* featured a central north-south roadway that would run the length of the proposed freeway deck. This roadway would join each of its intersecting streets—Ocean Avenue to the north and Geneva Avenue to the south—as shown in **Figure 63**. This configuration would technically be a split SPUI, as all the on- and off-ramps would not converge to a single point but would be connected by a new street created on top of the deck above I-280.

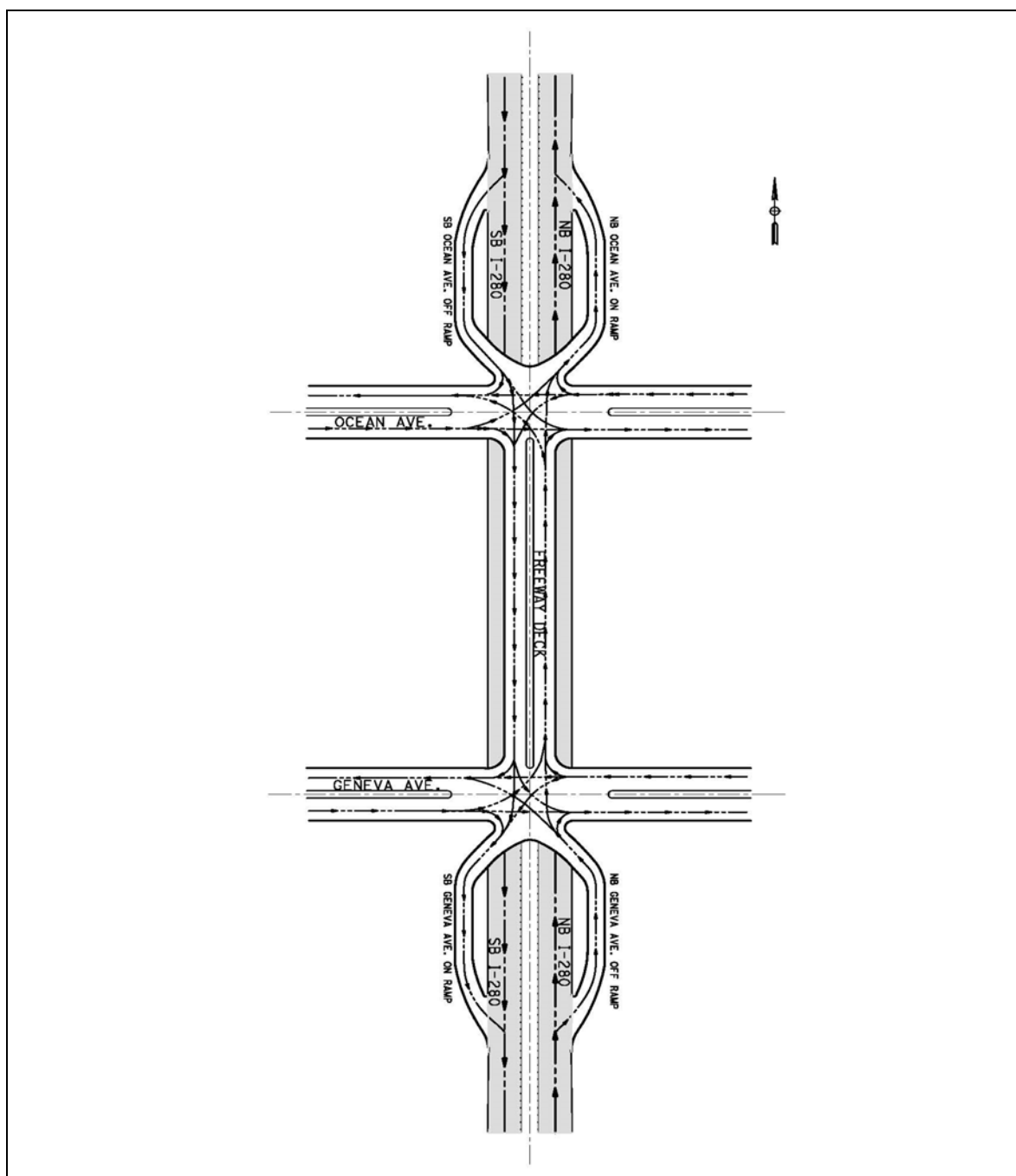


Figure 63: Improvement 31 - Traffic Movements in the Balboa Park Station Area Plan's Proposed SPUI

The split SPUI would consolidate the intersections on both Ocean and Geneva avenues. However, the size of the intersections would increase and could negatively impact pedestrians and bicyclists, as crossing times would increase.

However, there are several advantages, as well. Combining the ramps on Ocean Avenue west of the existing I-280 northbound on-ramp could potentially improve J and K LRT operations into and out of the Green Yard. Additionally, the new intersection configuration on Ocean Avenue would eliminate the free right turn onto Ocean Avenue from the I-280 southbound off-ramp and would provide additional turning options to exiting vehicles. Currently, exiting vehicles are forced to make a right turn onto westbound Ocean Avenue. The consolidation of the ramps would improve pedestrian and bike safety, especially with the elimination of the existing southbound off-ramp to Ocean Avenue. Pedestrian and bike safety would also be improved on Geneva Avenue, as the freeway ramps on the north side of Geneva Avenue are replaced with one local street.

In addition to the central roadway on the freeway deck, several alternative configurations for the SPUI were examined by the consulting team for this study. These alternatives were researched due to the challenges of the full deck and exploration of partial decking of I-280:

- Align the SPUI along the western edge of I-280 between Ocean and Geneva avenues. This option would move the SPUI interchanges and connecting elevated roadway to the west side of the freeway, adjacent to Lick Wilmerding High School. The freeway ramps would be moved away from the transit station area, thereby reducing congestion along Geneva Avenue around the Balboa Park Station. This option would replace the existing northbound off- and on-ramps at Geneva Avenue and the on-ramp at Ocean Avenue. Drivers wishing to access I-280 from Geneva Avenue would have to travel on the new street located on the partial deck, where they would enter the highway from the newly created Ocean Avenue on-ramp.
- Align the SPUI along the eastern edge of I-280, between Ocean and Geneva avenues. This option would involve replacement of grade-separated on- and off-ramps between Ocean and Geneva Avenues. The SPUI would be moved closer to the Balboa Park Station, east of the I-280 centerline. This option would provide direct access to the station and could be used to access a kiss-and-ride area.

Since the SPUI was conceived in concert with the freeway deck, its implementation would depend on the reconstruction of the freeway. Moreover, the grades involved appear to be too severe for the ramps to and from the split SPUI to clear the existing freeway and meet Caltrans' standards. As discussed in the freeway decking section, the existing non-standard freeway and under-bridge clearances preclude any short-term SPUI alternatives. Lowering of I-280 for one mile and reconstruction of the bridges would be required. The proposed ramps to and from the SPUI themselves exacerbate the clearance issues as they cross over I-280.

In the long term, the feasibility of the SPUI improvements is dependent on corridor-wide reconstruction. Limits of the reconstruction for the SPUI alternatives are judged to be less than for the full decking alternatives. However, they would remain significant, making this a corridor project rather than just a station area project.

Since all of the SPUI alternatives require the lowering of the freeway and the reconstruction of the ramps, the cost estimate is assumed to be similar to that of the freeway decking. The improvement is, therefore, is estimated to cost between \$1.3 and \$2 billion (in 2010 dollars).<sup>18</sup> Right-of-way acquisition is also anticipated.

### ***Improvement 32. Elevated Kiss-and-Ride Roadway [Long-Term]***

Both the *Balboa Park Station Area Plan* and the *Pedestrian and Bicycle Connection Project* identified several safety and operational issues resulting from the proximity of the I-280 freeway ramps to the Balboa Park BART Station. According to the *Transit Passenger Intercept Survey*, approximately seven percent of Muni and BART customers are dropped off at the station. Many drivers choose to drop customers destined for the station along the freeway ramps (2 percent) and in bus loading zones on Geneva Avenue (almost 70 percent) instead of using the designated kiss-and-ride area south of Geneva Avenue (8 percent). This practice results in longer off-ramp queues, increased congestion along Geneva Avenue, and the pick-up and drop-off of customers in hazardous environments with high traffic volumes.

While the roadway proposed on top of the freeway deck (Improvement 31) could provide kiss-and-ride access to the west of the station in the long term, a shorter-term solution to provide kiss-and-ride facilities close to the station was sought. One proposal outlined in the *Pedestrian and Bicycle Connection Project* was the improvement of the existing kiss-and-ride area south of Geneva Avenue (Improvement 19). Another approach is the construction of an elevated roadway just east of the freeway, between Ocean and Geneva Avenues, to supplement the existing kiss-and-ride area south of Geneva Avenue. During the AM peak period, a significant proportion of the vehicles dropping off customers at Balboa Park Station head northbound on I-280. This roadway would provide a new kiss-and-ride zone adjacent to the west side station entrance (now under construction by BART) to better accommodate these northbound drop-offs. Its drawback is that there would not be enough room at this site to handle PM peak pick-up needs. The existing kiss-and-ride area south of Geneva Avenue would remain as the main facility used for picking up passengers. Two options were evaluated:

Option A. Elevated Kiss-and-Ride Connecting to Ocean Avenue

Option B. Elevated Kiss-and-Ride Connecting to I-280 Northbound

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<sup>18</sup> Specific assumptions related to cost are provided in Table C in Appendix 9.



*Option A. Elevated Kiss-and-Ride Connecting to Ocean Avenue*

Option A, shown in **Figure 64**, would create a surface level kiss-and-ride area that delivers traffic to Ocean Avenue. This option was created to test an alternative that functioned similar to the proposed SPUI on the deck over the freeway; it essentially would allow northbound movements between Geneva and Ocean avenues, serving the new kiss-and-ride area. Customers would access the station by using the new west side entrance. They would, therefore, have direct access to the BART mezzanine. From there, they could access BART, the Muni J and K lines, the North and South Geneva Transit Plazas, and the Westside Walkway. Access to the M Line would undoubtedly be the least convenient.

This alternative would involve the reconstruction of the existing northbound on-ramp from Geneva Avenue and the construction of an adjacent elevated roadway leading to the proposed kiss-and-ride area near the new BART station entrance. Construction would require closing the Geneva Avenue on-ramp. This alternative would require a Caltrans design exception and space to construct retaining walls. Caltrans may also have issues with two structures being built in such close proximity to each other.

In the process of formulating this alternative, however, it was apparent that its problems outweighed its advantages. The new northbound leg at Ocean Avenue would create a new conflict zone between vehicles and pedestrians. Due to structural issues, the new roadway would not be able to attach to the Ocean Avenue Bridge unless the latter were rebuilt and designed in concert with the kiss-and-ride roadway. Even then, traffic using the new roadway would be forced to make a right turn onto Ocean Avenue. Since an emergency water supply (AWSS) line is mounted on top of the bridge deck and would extend into the intersection, left turns and through movements to the I-280 on-ramp from the new kiss-and-ride roadway would be prohibited. Drivers would thus be required to make a right turn onto Ocean Avenue. The added eastbound traffic on Ocean Avenue would increase the conflict between vehicles and LRVs entering and exiting the Green Yard from/to Ocean Avenue. Additionally, the BART plaza adjacent to the Ocean Avenue Bridge would require modification, and a new signal would have to be installed at Ocean Avenue.

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 5. Analysis and Recommendations

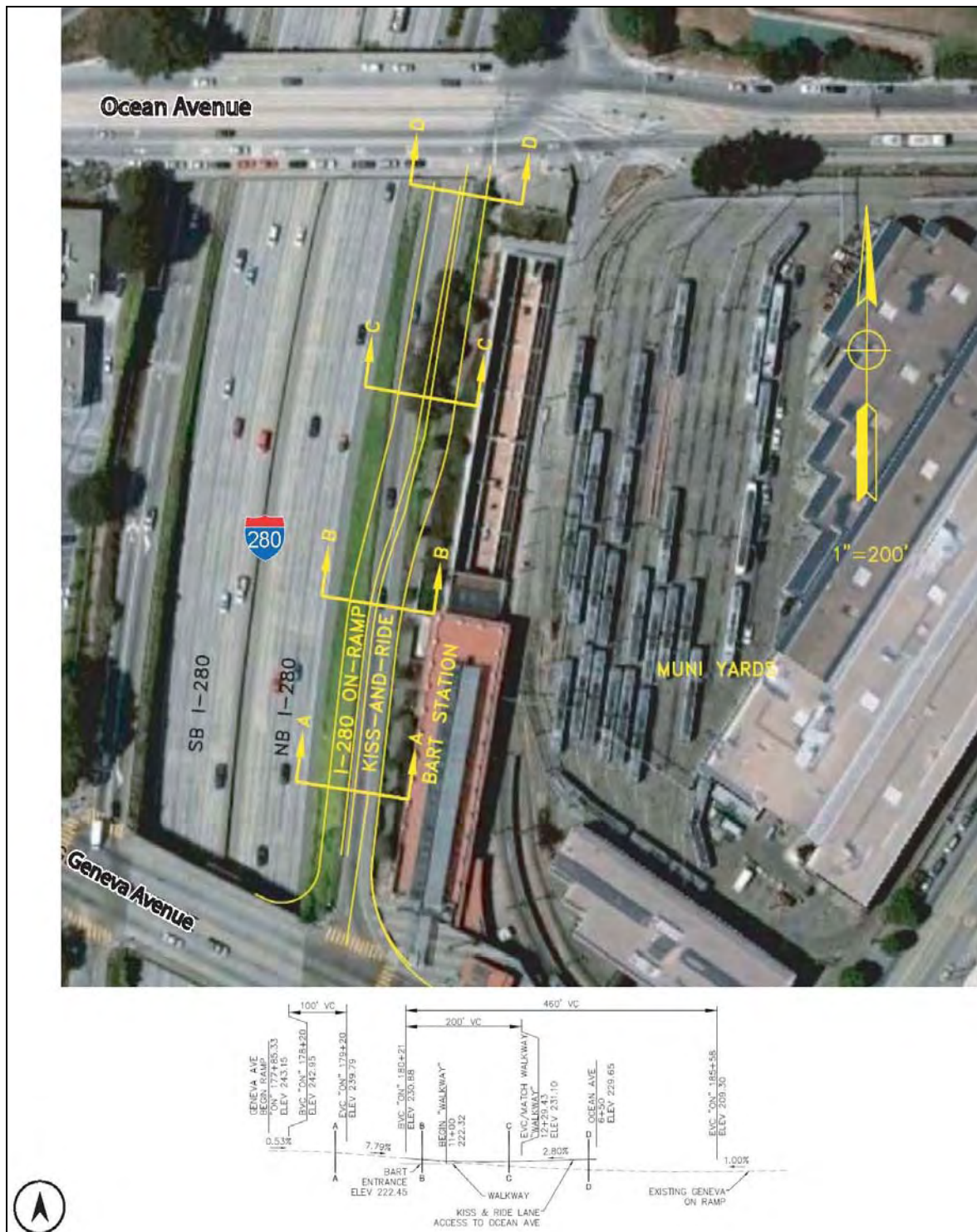


Figure 644: Improvement 32 - Elevated Kiss-and-Ride Connecting to Ocean Avenue (Option A)



# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 5. Analysis and Recommendations

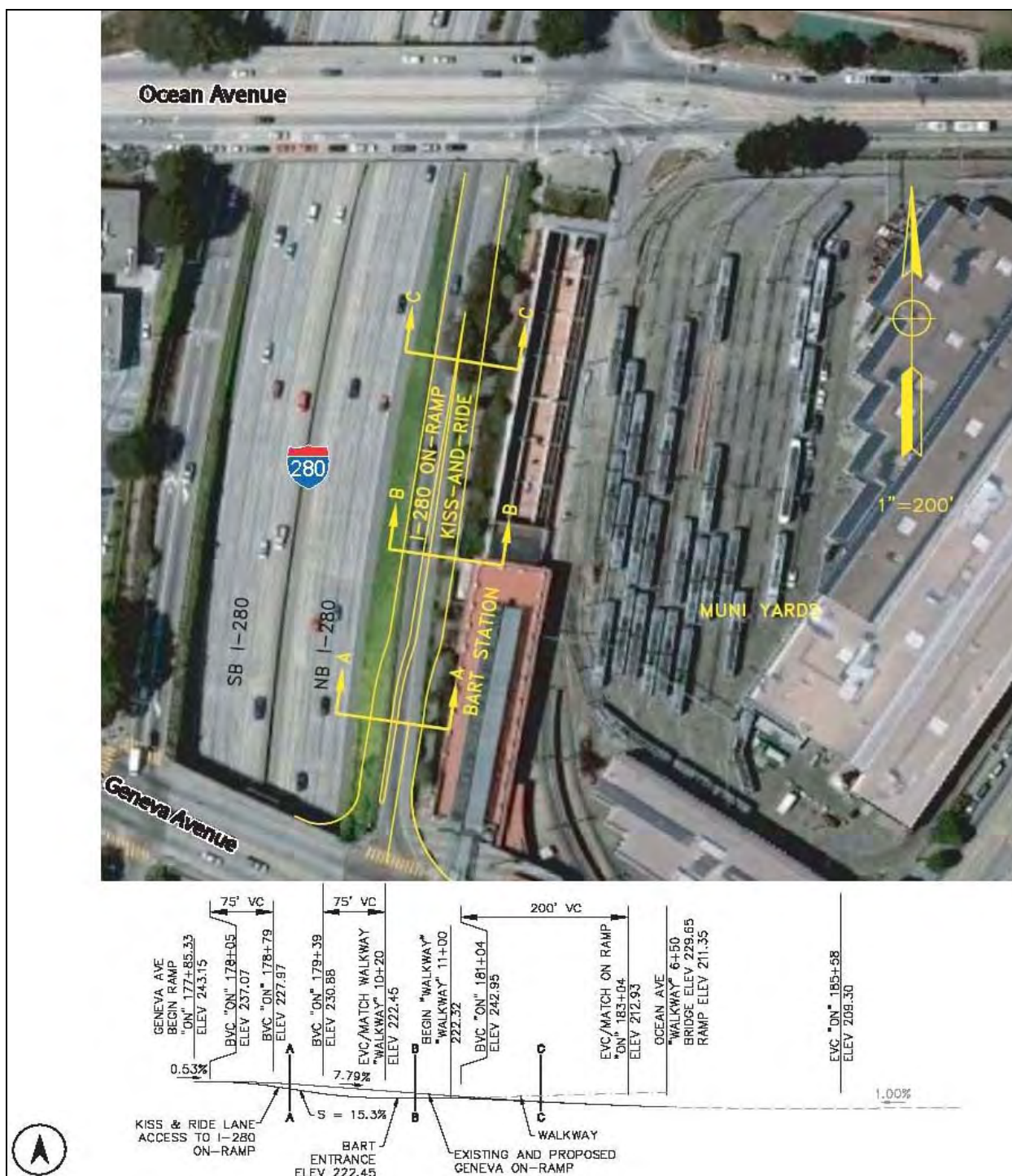


Figure 65: Improvement 32 - Elevated Kiss-and-Ride Connecting to I-280 Northbound (Option B)

Additional engineering would be required to determine whether it would be possible to design the bridge with the AWSS line below the deck so that it would not pose a barrier. Most likely, this would require lowering the freeway as discussed for the freeway deck (Improvement 30). If feasible, through and left turns could be permitted. However, the north-south legs of the intersection with the bridge would be offset due to the location of the BART box east of the proposed elevated kiss-and-ride area.

The forced right turn and lack of direct connection to I-280 north creates an undesirable situation for most motorists. They would be forced to make a u-turn on Ocean Avenue or travel clockwise around the block, to the Geneva Avenue northbound on-ramp. For these reasons, this design option is impractical.

The possibility of using the elevated roadway for bus loading was also reviewed. The existing bus stop could then be used as a passenger drop-off zone. Customers would have direct access to the BART mezzanine without using the existing stairs, escalators, or elevator. It would give an exclusive location for buses and a priority travel path to Ocean Avenue. Customers would access the station via the new west side entrance. However, the same issues identified in the elevated kiss-and-ride option, such as reconstructing both of the bridges and relocating the AWSS line, would need to be addressed. The AWSS line would need to be lowered in order to allow for buses to turn left onto Ocean Avenue. In addition to the issues for the elevated kiss-and-ride, conflicts between pedestrians and buses as well as between buses and LRVs would be created as buses enter and exit the elevated roadway. The walking transfer distance to the M Line and the South Geneva Transit Plaza would also be increased. Moreover, using the elevated roadway for bus operations would increase the travel time for buses by adding mileage and increasing the number of turns required for buses to reach Ocean Avenue. It would benefit only riders boarding and alighting at Balboa Park while penalizing other riders.

#### *Option B. Elevated Kiss-and-Ride Connecting to I-280 Northbound*

Option B, Figure 65, would create a surface level kiss-and-ride area that delivers traffic back to the reconstructed I-280 northbound on-ramp from Geneva Avenue. After dropping off or picking up transit customers, motorists would continue north and rejoin the freeway on-ramp, rebuilt with a steeper slope. Grades in this section of the new roadway would be very steep.

Northbound ramp users would be separated from the kiss-and-ride lane by a barrier. The kiss-and-ride roadway profile would be higher near the BART station entrance to provide a plateau, an approximately 90-foot long drop-off area. The kiss-and-ride lane would be 16 feet wide with a 4-foot shoulder to allow for both standing vehicles and through traffic.

This alternative would involve the reconstruction of the existing Geneva on-ramp and construction of a parallel roadway to the proposed kiss-and-ride area. The horizontal curves of the new ramps would require a Caltrans design exception and space to construct retaining walls. The vertical grade change of the kiss-and-ride ramp would require Caltrans to identify the kiss-and-ride approach as a city street and the slip ramp connecting to the I-280 on-ramp as a freeway ramp.

While this option appears promising, it involves a very steep (15.3 percent) grade for the section of roadway closest to Geneva Avenue. Given the speeds likely on this roadway, this grade would most likely have to be reduced by increasing the height of the kiss-and-ride area or by moving the kiss-and-ride further north and rebuilding the Ocean Avenue bridge. Its feasibility would have to be confirmed by more detailed engineering analyses, especially if coupled with a lowering of the freeway.

### *Recommended Option*

The existing non-standard freeway clearances constrain the design and make both of these alternatives infeasible in the short term. Both design options would involve the reconstruction of the northbound on-ramp from Geneva Avenue and could require the reconstruction of the Ocean Avenue Bridge as well. Both also would likely result in Caltrans design exceptions for the shoulder near Geneva Avenue. Additional detailed engineering analysis would be required to determine the feasibility of the options in regards to grade and tie-ins with existing bridges. These alternatives would, therefore, have to be considered as long-term options if and when Caltrans reconstructs the bridges at higher elevations or lowers the freeway.

Option B is the recommended alternative since it would provide direct access onto I-280 northbound. Option A would be inconvenient for many drivers trying to access I-280 northbound.

Including the reconstruction of the Ocean and Geneva bridges, the cost is estimated to be between \$45 and \$65 million (in 2010 dollars).<sup>19</sup>

## **Parking**

The following improvement recommendations concentrate on short-term improvements to improve parking in the area. However, in the long run, several major changes may occur in the Balboa Park Station area that could affect parking. These could include:

- Proposed changes in land uses at the Upper Yard and on the east side of San Jose Avenue between Geneva and Ocean Avenues;
- Changes in Muni services due to the TEP project; and

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<sup>19</sup> Specific assumptions related to cost are provided in Table C in Appendix 9.



- Potential change in BART ridership and access modes.

Most likely, Muni's TEP recommendations would not affect parking demand in the area. However, changes in future land uses could. It is suggested that future parking needs be re-assessed when the development and concept designs of the projects become clearer. Changes in BART ridership and access modes may also affect future parking needs in the area, especially in light of the changes in parking demand estimates at the Balboa Park Station provided by the SFCTA SAR in 2002 (1,560) and current estimates (maximum of 540, 90 percent of 600 vehicles observed during the parking survey). The observed drop in parking demand between 2002 and now by the SFCTA SAR may be attributed to the opening of the BART Peninsula/SFO extension. Monthly reserved parking is available at Colma, San Bruno, Millbrae and South San Francisco stops, and these stations are closer and probably more favorable to San Mateo County commuters.

The proposed development at Upper Yard and on the east side of San Jose Avenue may potentially generate more parking demand than the Planning Code requires for the development. Future unmet parking demand in the Balboa Park Station area may require that some spaces be metered along the retail frontage for shoppers or time-limited for visitors near the new residential development projects.

Two programs that may affect parking in the future include:

- Coordination with SFMTA's SFpark program – SFpark does not currently identify any improvements for the Balboa Park BART Station area. SFMTA staff is waiting for the completion of the pilot project before it proceeds with the development of a city-wide parking management plan. Much of the daytime on-street parking in this area is currently occupied by transit users. Future increases in transit ridership will have to be accommodated by the construction of parking facilities near the station or, conversely, by discouraging park-and-ride activity through increases in transit accessibility (such as the BRT or LRT line proposed on Geneva Avenue).
- Extending Muni Fast Passes to the Daly City Station – There is an on-going conversation between BART and other local stakeholders regarding this issue. It can be assumed, however, that from a parking standpoint, the extension of Fast Passes to Daly City would reduce parking demand at Balboa Park Station. This study does not have any recommendation for this issue because it involves a complex set of financial issues to be addressed by Muni and BART.

### ***Improvement 33. Expansion of Residential Permit Parking (RPP) Zone***

This improvement would expand the RPP zone to include on-street parking east of San Jose and north of Ocean Avenue. Parking in this area would be converted from unregulated to RPP.

The Balboa Park area is predominantly residential, except for City College of San Francisco, the adjacent pocket of commercial uses (located in the northwest corner of the study area), Balboa Park (located in the northeast corner), and the station area itself.

Time limited zones are usually imposed in areas with spillover problems. As discussed in the previous chapter, SFMTA has an RPP program that allows residents in the residential neighborhoods adjacent to commercial establishments to establish RPPs so that residents can park without time limits, while those without RPPs would only be able to park within the specified time limits.

SFMTA would typically install parking meters in the neighborhood commercial areas with high parking demand (such as the small commercial section of Ocean Avenue east of San Jose Avenue). In the Balboa Park Station area, parking shortages are not severe enough to warrant being metered. Current parking regulations are generally consistent with those found in similar areas elsewhere in the city.

The section of the study area east of San Jose Avenue and north of Ocean Avenue consists of primarily residential buildings, except at the corner of Ocean Avenue and San Jose Avenue. There are 364 parking spaces in this zone. Parking occupancy at this location is high, averaging 85 percent, with several blocks having occupancy rates above 95 percent. Changes to on-street parking in this zone from unregulated to RPP would potentially benefit the area's residents. This change would displace a maximum of 280<sup>20</sup> BART riders who drive to the Balboa Park Station. These BART riders may shift their driving behavior by taking transit to the Balboa Park Station, or they may drive to another station, such as Daly City. If, however, some ceased using BART altogether, there would be a commensurate reduction of farebox revenue to BART.

There does not appear to be strong justification for changes in parking regulations (either imposing time limits or adding parking meters) at this time. The average occupancy of 86 to 90 percent in the non-RPP area is generally consistent with the SFpark objective of maintaining approximately 10 percent of the spaces available for the public. Commercial uses are not intense enough to justify the conversion of unregulated spaces to metered parking. Conversion of unregulated spaces to time-limited zones would not generate considerable benefits to the public and would most likely impact the accessibility of customers to the Balboa Park Station. Furthermore, if the RPP within the vicinity of the station is expanded within the study area, it would likely push BART patrons further away from the station (greater than 1,500 feet). Since these areas were not assessed in this study, there is no way to determine the exact impact in those areas from BART patrons.

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<sup>20</sup> 364 (total supply) \* 90% (non-RPP parking) \* 85% (average occupancy rate) = 280 spaces

Creating a Parking Benefits District was assessed. The concept would allow transit riders to park in the RPP zone during the day for a fee, similar to the policy on high occupancy toll (HOT) lanes, which allow single-occupant vehicles to use HOV lanes for a fee. However, the City would have to ensure that the number of permits issued to the transit riders would not cause parking occupancy in the RPP zone to exceed 85 percent. Up to 184 additional parking spaces could be made available to transit users.<sup>21</sup> These additional parking spaces could potentially be beneficial to transit riders in the future, as there is no other viable opportunity to increase parking supply in the vicinity of Balboa Park Station. The important policy question for SFMTA, of course, is whether the agency wants to encourage park-and-ride activity at this station. Supporting park-and-ride activity at the station would contradict the *Balboa Park Station Area Plan* Policy 3.2.2. The policy seeks to “manage the existing supply of on-street parking in the plan area to prioritize spaces for residents, shoppers and non-commute transit trips.” This policy question should be considered in a citywide parking management study, rather than as a stand-alone neighborhood question.

At this time, an RPP does not appear necessary. Metering and imposing time restrictions may be needed in the future to increase turnover. Should this situation develop, residents may request the formation of an RPP, which would initiate further technical evaluation.

### ***Improvement 34. Passenger Drop-off Zone on the west side of San Jose Avenue at Geneva Avenue***

The Balboa Park Station area has only one on-street passenger drop-off zone, located on the north side of Geneva Avenue some distance to the east of San Jose Avenue. Currently, it is not used by kiss-and-riders, probably because of its distance from the station. The only other legal passenger drop-off area is the off-street kiss-and-ride lot. The *Transit Passenger Intercept Survey* shows that the majority of drop-off activities (89 percent) occur in areas not permitted for such activities. SFMTA could consider a closer on-street drop-off area. For example, striping the west side of San Jose Avenue for passenger loading only from 7:00 to 9:00 AM and from 4:00 to 6:00 PM would provide more convenient and safe passenger drop-off activities. Approximately 22 spaces could be accommodated along San Jose Avenue immediately north and south of Geneva Avenue. It would be coupled with enforcement at the three illegal locations: the north and south sides of Geneva Avenue near the station and the Geneva Avenue I-280 northbound off-ramp. In addition, signage directing motorists to the legal passenger drop-off/pick-up zones would be implemented. This recommendation would be in addition to the reconfiguration of the kiss-and-ride area (Improvement 19).

However, the cross-sectional width of San Jose Avenue would not be able to accommodate the M Line platforms at Geneva Avenue (Improvement 16) and the drop-

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<sup>21</sup> 635 RPP spaces x (85% desired occupancy level - 65% current occupancy) = 184 spaces

off zones. Therefore, this project is not recommended if platforms are needed for the M-line extension. Furthermore, a transit passenger drop-off zone in front of the potential Upper Yard transit village may conflict somewhat with that development's need for short-term parking or loading for its own retail uses or residential visitors.

## **LRV and HSC Maintenance and Storage Operations**

This study developed a series of recommendations to improve Muni's LRV and HSC maintenance and storage operations. **These are not improvement proposals *per se*, but rather a mechanism to increase the capacity of the Green and Geneva yards and MME in order to redevelop the Upper Yard as a TOD.** This would require relocating the overnight LRV and daytime employee parking.

### ***Recommendation I. Removal of Storage Uses from the Green Yard***

The following three recommendations would help improve operations in the Green Yard.

- I - A. Relocate the wrecked and long-term hold LRVs from the Green Yard to MME for long-term storage until they can be contracted out for repairs. The contract repair process has started, but it will take several years to return the current 12 long-term holds back to service. Long-term holds are currently stored on tracks 12, 13, and 14 in the Green Yard and occupy up to 12 LRV storage spots, as shown in **Figure 66**. Moreover, employees are parked on Track 11, which could accommodate an additional three LRVs if needed, as shown in **Figure 67**.

This recommendation requires no capital funding but rather operational funds to move the involved LRVs. It would not be part of the Green Yard re-rail project. However, since the 12 LRVs will have to be moved off their present tracks during the re-rail anyway, it would make sense to move them at that time to MME, rather than simply shifting them to another set of tracks (and back again) in the Green Yard.

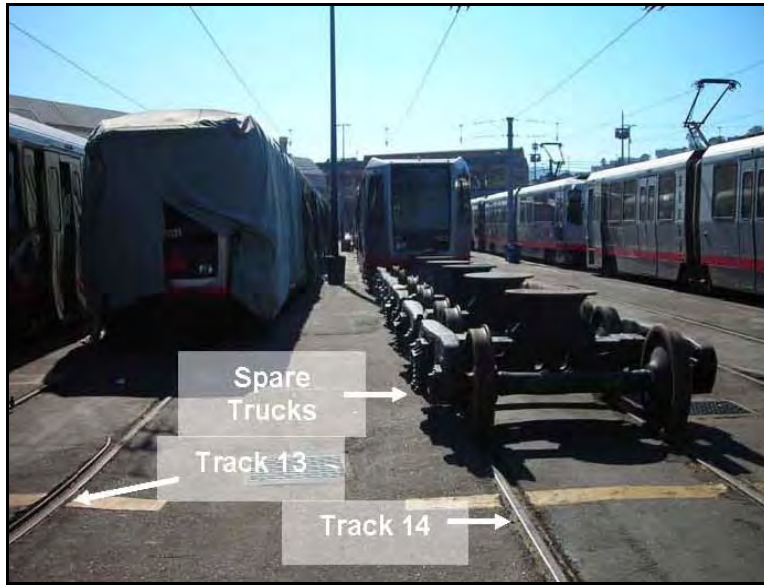


Figure 66: Spare Parts Stored on Tracks 13 and 14



Figure 67: Employee Vehicles Parked on Track 11

- I - B. Relocate the spare large parts inventory that is occupying some of the Green Yard underground parking to MME. These parts are slow moving inventory that could be brought back as needed, which should not be often. There is excess storage capacity at MME. Relocating these LRV parts and reconfiguring the underground area will provide adequate parking for the remaining employees in the Green Yard and allow SFMTA to remove employee parking from storage tracks in the Upper, Green, and Geneva yards. The existing parking and parts storage configuration in the Green Yard is depicted in **Figure 68**.



- I - C. A suggestion for reconfiguration is shown in **Figure 69**. MME has adequate parking for the long-term built into its design. The only funding required would be to tear down the parts cages in the Green Yard basement and re-stripe the parking garage. Moving the parts, as recommended here, is not contingent upon relocating the long-term holds (Recommendation I-A), nor is the reverse.
- I - D. Relocate the HSC fleet that will be displaced when the Marin facility is converted into a bus storage facility (Islais Creek). Possible sites include the Mirant site near MME, supplemented by Market & Duboce storage tracks. (Initially, the use of the tail tracks at 6<sup>th</sup> & King was proposed. However, these tracks are necessary to turn LRVs around during operating periods and are no longer being considered.)

### ***Recommendation II. Improved Track Utilization in the Geneva Yard***

This recommendation would utilize tracks 1, 2, 3 and 4 in the Geneva Yard for railcar storage, shown in **Figure 22**. Currently, these tracks are being utilized for employee parking, not railcar storage. This recommendation may require strengthening the adjacent historic building to prevent a seismic event from damaging the cars proposed to be stored here. The historic building located on the premises of Geneva Yard is already slated for rehabilitation.

Once the Green Yard underground parking is re-configured (Recommendation I-B), employees should park in the Green Yard underground parking only and not on the storage tracks. While daytime parking on storage tracks may not decrease railcar storage capability, as the railcars are in revenue service, this practice can restrict yard movement. It can also require more time to make moves and may reduce options for temporary storage that could create a back-up onto the street.

Including the shop, this site can accommodate 54 LRVs or 80 HSCs. Currently, SFMTA operates the 34-car HSC fleet from Geneva Yard. While SFMTA chooses not to use the excess storage capacity for overflow LRVs from the Green Yard or for long-term stored HSCs, it is recommended that this policy be reconsidered during the Green Yard re-rail project and in relation to development options for the Upper Yard.

### ***Recommendation III. Maintenance and Storage Improvements at Muni Metro East (MME)***

Currently, the very large parts storage room is underutilized at MME due to a lack of storekeeper staffing. There are many large parts being stored in the Green Yard underground parking area that could be moved to this storage area to allow for more employee parking the Green Yard (Recommendation I-B).

MME currently supports 60 LRVs but is configured to accommodate 105. While the electric power supplied to MME and signal capacity at Fourth Street and King Street restrict the ability to operate more cars from MME, there would be no impact to MME if long-term holds were moved here. This would allow for more storage space for active railcars in the Green and Geneva yards.

The paint and body shop at MME was not completed due to budget constraints during Phase 1 of its construction. SFMTA should set completing these and other facilities at MME as a high priority in order to expand the limited capabilities of the Geneva shop and to support an expanding fleet.

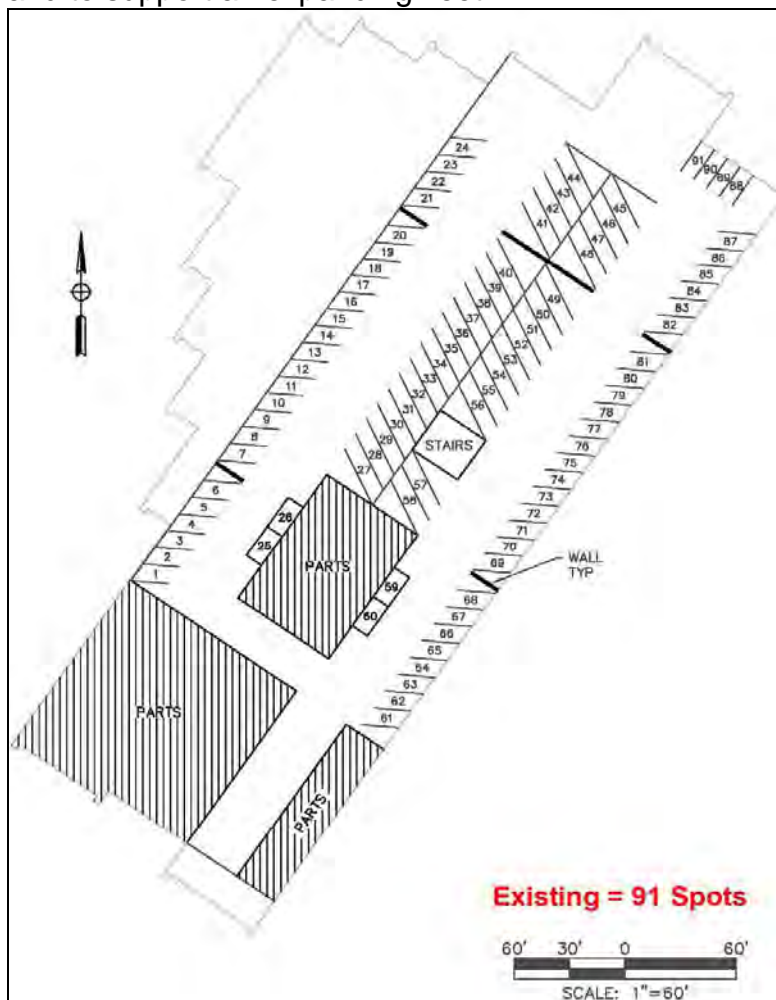


Figure 68: Existing Underground Parking in the Green Yard

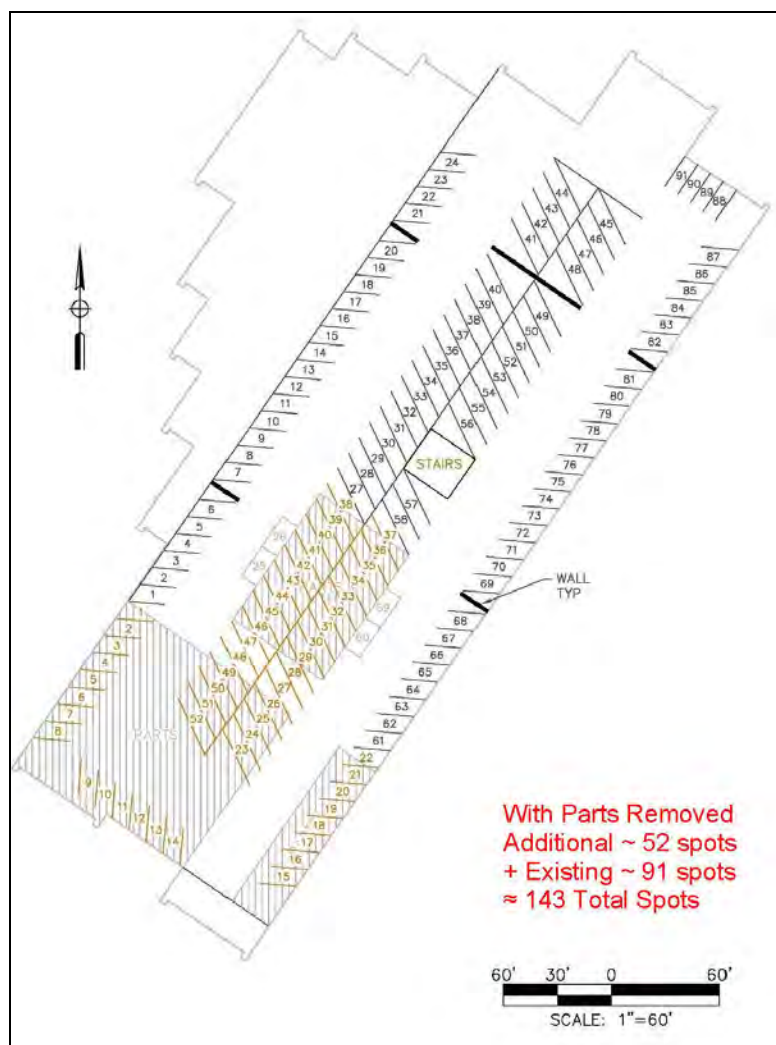


Figure 69: Proposed Underground Parking in the Green Yard

***Recommendation IV. Expansion of Muni Metro East (MME)***

SFMTA should prioritize the Phase 2 completion of the MME 4-acre expansion on the Louisiana Street side of the yard to accommodate 40 or more additional LRVs and relocate some Green Yard maintenance activities, which are currently estimated at \$30 million. This would require mitigating the signal capacity issues at Fourth Street and King Street. There is currently no estimate of the costs of this mitigation, but some relief is expected with the completion of the Central Subway Project. Additionally, yard electrical power deficiencies such as the substation and feeder improvements would need to be addressed. These are currently estimated at \$3 million.

***Recommendation V. T Line Connection to Muni Metro East (MME) from the Green and Geneva Yards***

The T Line connection would be used for non-revenue rail car movements between the Green and Geneva yards and MME. It would reduce the impact at Fourth Street and King Street, and allow for occasional or emergency access to the J, K, and M lines without traveling through Market Street tunnel. All LRV rail traffic between the Green and Geneva yards and MME must utilize the Muni Metro subway under Market Street and the Third Street T Line tracks. This movement is constrained by passage through the Fourth Street and King Street intersection and electrical power deficiencies. These would be addressed in Recommendation IV. Creating a rail connection from the Green and Geneva Yards to MME that does not require using this route would dramatically improve the utilization of MME and allow SFMTA operational flexibility. A potential route is represented in the **Figure 70**. This alignment uses Geneva Avenue directly from the Balboa Park Station area and would require further investigation of the planned uses and availability of this corridor. It could be considered the first phase of an eventual light rail line in the Geneva Corridor that could serve major transit-oriented developments in the southeast quadrant, such as Candlestick Point/Hunters Point and the Brisbane Baylands.

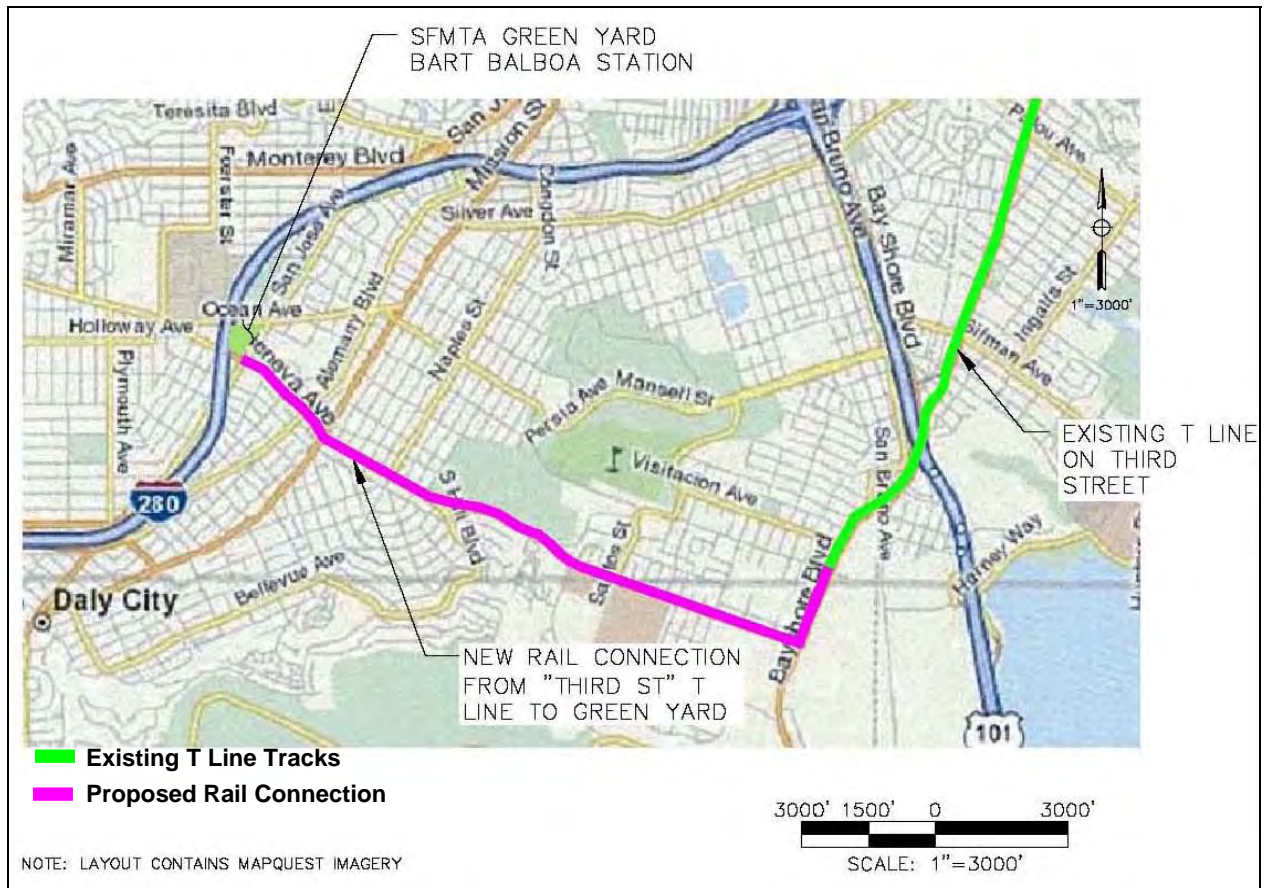


Figure 70: Alternative Connection to Muni Metro East (MME) from the Green and Geneva Yards



## **6. Outreach**

To ensure that the *Station Capacity Study* reflects the interests and priorities of stakeholders and the community-at-large, agency and public outreach has been a high priority throughout the course of the project. Outreach activities have consisted of an SFMTA Internal Technical Advisory Committee (TAC) and Interagency TAC, a series of community public meetings held during the course of the project, and several other internal SFMTA meetings (e.g., with Accessible Services, Transit Operations).

The outreach in this study was an extension of public participation activities conducted as part of the *Ped and Bike Project*. These activities included a series of three public workshops held to garner public input to identify issues and opportunities, develop potential improvements, and prioritize implementation.

### **Internal Technical Advisory Committee**

As a first step, SFMTA established an Internal TAC to serve as a forum in which various departments at the agency could review the progress of the study and exchange ideas on the pros and cons of the recommendations. The Internal TAC consisted of members from the following disciplines at SFMTA:

- Muni Service Planning / Transit Effectiveness Project
- Safety
- Capital Programs and Construction
- Accessible Services
- Livable Streets (Pedestrian / Bicycle / Traffic Calming)
- Long Range Planning
- Real Estate

### **Interagency Technical Advisory Committee**

To obtain feedback from partnering agencies with an interest in the Balboa Park Station area, an Interagency TAC was formed with representatives from the following agencies and organizations:

- SFMTA
- San Francisco Planning Department
- BART
- Caltrans District 4

- San Francisco County Transportation Authority
- Geneva Car Barn and Power House (youth arts center)
- Department of Public Works
- City College (invited, did not participate).

Each TAC convened five to six times from the beginning of the study through November 2010 to discuss general project issues and opportunities, provide information on past planning efforts, and provide input on and review the proposed recommendations.

## **Community Meetings**

The *Station Capacity Study* was presented to the public during two evening public meetings: May 19<sup>th</sup>, 2010 and October 6<sup>th</sup>, 2010 at Lick-Wilmerding High School. (Project staff also made a presentation and led a discussion at the December 11, 2010 meeting of the District 11 Neighborhood Council.)

The first public meeting, sponsored by the office of Supervisor John Avalos, was a “Town Hall” forum updating the community on current Balboa Park Station area projects. Participating organizations included SFMTA, BART, the City of San Francisco’s Planning Department, and Supervisor Avalos’s office. Projects discussed were:

- BART Westside Walkway and Entrance,
- BART Eastside Connector,
- Ped and Bike Project
- Station Capacity Study
- Geneva Avenue Transit Preferential Streets (TPS) Study
- Phelan Loop and Public Plaza Project

Public input was incorporated in the development of project prioritization.

SFMTA, BART, and SFCTA held a second public meeting to obtain additional feedback from the community regarding preliminary recommendations. The improvements were broken down into Transit Routes & Stops, Pedestrian & Station Access, Land Use & Auto Access, and Geneva Ave. Corridor TPS Study. The attendees showed strongest support for Geneva Avenue transit plaza improvements (NextMuni/NextBART electronic signs and lighting improvements), an Upper Yard transit village, and pedestrian enhancements at the Ocean/Geneva/Phelan intersection. The strongest concerns were expressed in regards to the proposal to extend the J Line down San Jose Avenue to a new terminal on 19<sup>th</sup> Avenue near San Francisco State University and Stonestown and move the M Line terminal from Balboa Park to 19<sup>th</sup> Avenue near Parkmerced. While this change would allow for the J and K Line boarding areas to be separated,

creating more boarding space for both lines, it would eliminate a one-seat ride for some residents to reach the West Portal area.

#### **Other Outreach**

SFMTA staff also led a discussion at the December 11, 2010 meeting of the District 11 Neighborhood Council, which includes representatives of area neighborhood associations. Staff offered by email also to attend individual neighborhood association meetings, but this did not attract any invitations.

Projects summaries and meeting handouts were posted on the web site: [www.sfmta.com/balboapark](http://www.sfmta.com/balboapark). The website provided contact information including a phone hotline.

## 7. Next Steps

### Continued Outreach

SFMTA, as well as its partners BART and SFCTA, will continue to engage the public as the project moves towards design and implementation. The community's input will remain crucial to identify community priorities as conditions change. The SFCTA has received a Caltrans Partnership Planning grant that will support a new Citizens Advisory Committee (CAC) that can address these issues. Prop K grant funding applications will also need to be reviewed by the SFCTA's own CAC and its Board.

### Phasing and Implementation

The following is a phasing plan for improvements at the Balboa Park Station area, which includes plans for the Upper Yard, Geneva Yard and Green Yard. Table 30 provides a short-term (within 5 years), mid-term (6 to 10 years) and long-term (beyond the 10-year horizon) phasing plan to implement the recommended projects from Chapter 5 over the next 20 years. This phasing would be implemented as shown in Figure 71 (short-term), Figure 72 (mid-term), and Figure 73 (long-term). SFMTA will need to assess the funding availability and the pros and cons of each project.

Table 30: Improvement Phasing

Completed Improvements	
Ocean Avenue	
23	Westbound Class II Bike Lane / Eastbound Sharrows along Ocean Avenue between San Jose Avenue and Howth Street
8	Repaving of the East Side Crosswalk at Geneva Avenue and the I-280 Northbound Ramps
Accessibility	
10	Pedestrian Crossing Improvements at Ocean Avenue and the I-280 Northbound On-Ramp
Geneva Avenue	
20	Signal Synchronization
Short-Term Improvements (1-5 years)	
Customer Amenities	
1	Lighting Improvements
2	Wayfinding Signage
3	Real-time Information
4	Canopies and / or Enhanced Bus Shelters on the North and South Geneva Transit Plazas
Accessibility	
6	Pedestrian Walkway between BART Mezzanine and San Jose Avenue through the Green Yard
7	ADA-Accessible Curb Ramps

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 7. Next Steps

9	Geneva Avenue Bridge Modification <i>Option C. Removal of Sidewalk Obstructions</i>
11	Closing off the Tracks at Ocean Avenue from Pedestrians
<b>Short-Term Improvements (1-5 years)</b>	
<b>Muni LRT Service Operations</b>	
<i>J and K Lines</i>	
12	Alighting Platform near Eastside Connector
13	J/K Line Boarding Platform <i>Option B. Boarding Platform along San Jose Avenue</i>
<i>M Line</i>	
16	M Line Platform(s) on San Jose Avenue – investigate feasibility of: <i>Option B. Farside Platforms on San Jose Avenue at Geneva Avenue</i>
<b>Geneva Avenue</b>	
17	Westbound Improvements: Sidewalk Straightening & Street Restriping
18	Eastbound Improvements: Sidewalk Straightening & "BUS STOP" Box
19	Kiss-and-Ride Reconfiguration
<b>Geneva Avenue Continued</b>	
21	Signalization of Geneva Avenue and Howth Street and/or Geneva Avenue and Louisburg Street <i>Option A. Signalization of Geneva Avenue and Howth Street</i>
<b>Ocean Avenue</b>	
22	Intersection Consolidation of Ocean Avenue / Geneva Avenue / Phelan Avenue
<i>The Ocean Avenue/I-280 Southbound Off-Ramp</i>	
24	Flashing Beacon on the I-280 Southbound Off-Ramp at Ocean Avenue
<b>Mid-Term Improvements (6-10 years)</b>	
<b>Accessibility</b>	
5	South Geneva Transit Plaza Elevator
<b>Muni LRT Service Operations</b>	
15	Relocation of Ocean Avenue K Line City College Stop to the Far Side of Howth Street
<b>Ocean Avenue</b>	
24	Replacement of Pedestrian Bridge over Ocean Avenue and Extension of Class II Bike Lanes
<i>The Ocean Avenue/I-280 Southbound Off-Ramp</i>	
27	Realignment of the Ocean Avenue I-280 Southbound Off-Ramp
<b>Redevelopment</b>	
29	Upper Yard Transit-Oriented Development (TOD)



<b>Long-Term Improvements (Greater than 10 years)</b>	
<b>Muni LRT Service Operations</b>	
14	K Line Reconfigured Boarding Platform south of the Green Administration Building
<b>Ocean Avenue</b>	
25	Center-Running Westbound Transit Lane on Ocean Avenue
<b>Redevelopment</b>	
28	Green Yard Redevelopment
<b>Freeway-Related Improvements</b>	
32	Elevated Kiss-and-Ride Roadway <i>Option B. Elevated Kiss-and-Ride Connecting to I-280 Northbound</i>

## Preliminary Environmental Assessment

Some of the projects described in this report were already included in the San Francisco Planning Department's *Balboa Park Station Area Plan EIR* (2008). The study team conducted a preliminary assessment of all the improvements to identify potential environmental impacts. The results of this preliminary evaluation are included in Table **31**. Medium and high ratings are in bold. A more detailed review of applicable environmental regulations would be required as an improvement is selected for implementation.

Based on a preliminary assessment, several of the improvements would have little or no possibility of adversely impacting any of the 18 environmental resource topic areas. Several of the improvements have a medium possibility of being vulnerable to seismic activity in the region. Other impacts for some of the improvements may include visual, energy, and transportation. None of the improvements have a high possibility of impacting any of the 18 environmental resource topic areas.



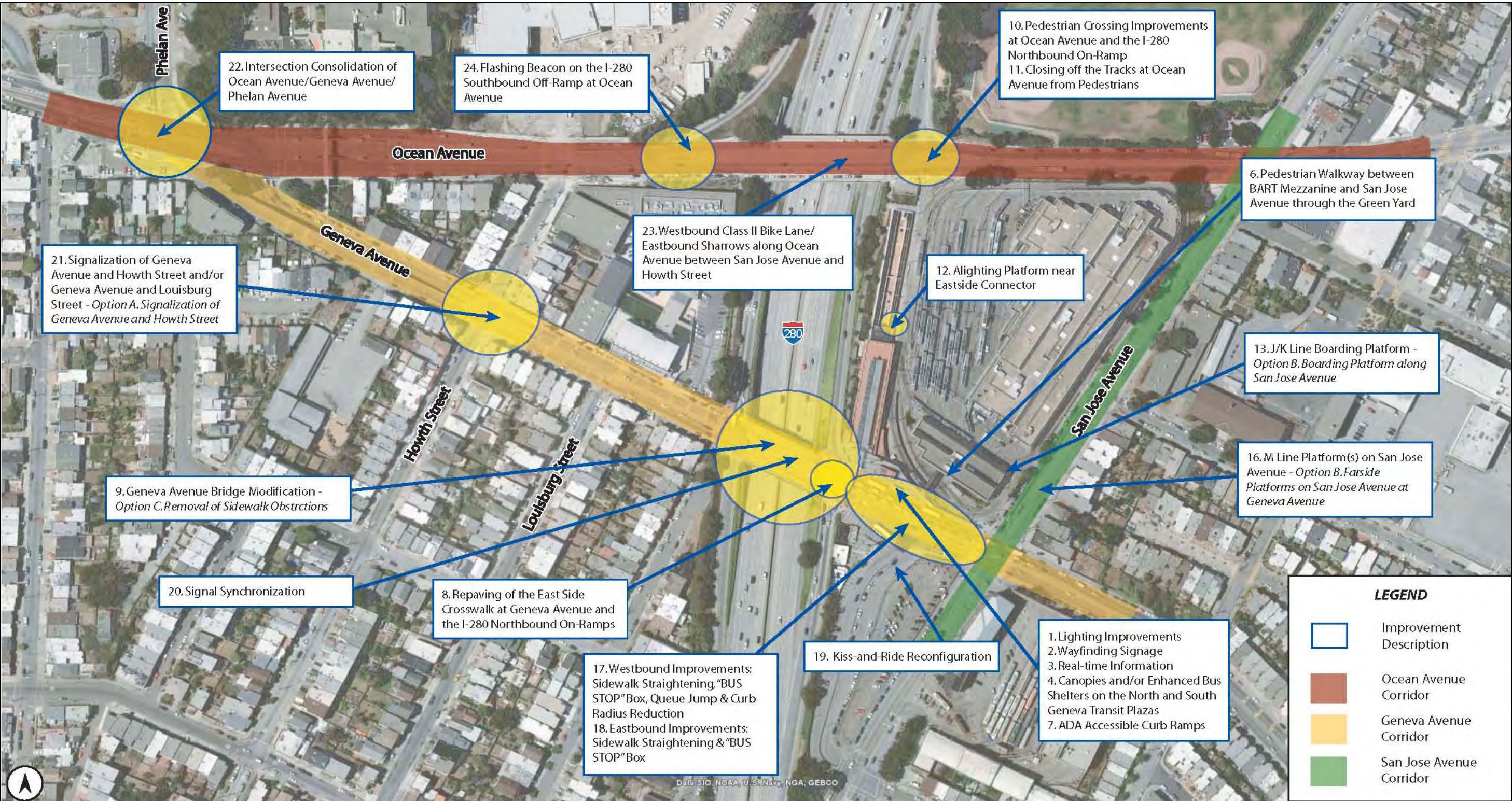


Figure 71: Short-Term Improvements





Figure 72: Mid-Term Improvements





Figure 73: Long-Term Improvements



Table 31: Preliminary Assessment of Potential Environmental Impacts

Improvement		Environmental Resource Topic																	
		Visual	Agricultural	Air Quality	Biology	Cultural	Geology	Hazards	Hydrology	Land Use	Mineral Resources	Noise	Population and Housing	Public Services	Utilities	Recreation	Energy	GHG	Transportation
<b>Short-Term Improvements (1-5 years)</b>																			
<b>Customer Amenities</b>																			
1	Lighting Improvements	medium	none	none/c	none	none/c	medium	none/c	none/c	none	none	none/c	none	none	none	none	low	low	none
2	Wayfinding Signage	low	none	none	none	none	medium	none	none	none	none	none	none	none	none	none	none	none	none
3	Real-time Information	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	low	low	none
4	Canopies and / or Enhanced Bus Shelters on the North and South Geneva Transit Plazas	low	none	none	none	none	medium	none	none	none	none	none	none	none	none	none	none	none	none
<b>Accessibility</b>																			
5	South Geneva Transit Plaza Elevator	none	none	none/c	none	none/c	medium	none/c	none	none	none	none/c	none	none	none	none	low	low	none
6	Pedestrian Walkway between BART Mezzanine and San Jose Avenue through the Green Yard	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	none
7	ADA Accessible Curb Ramps	none	none	none/c	none/c	none/c	medium	none/c	none	none	none	none/c	none	none	none	none	none	none	none
8	Repaving of the East Side Crosswalk at Geneva Avenue and the I-280 Northbound Ramps	none	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	none
9	Geneva Avenue Bridge Modification <i>Option C. Removal of Sidewalk Obstructions</i>	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	none
10	Pedestrian Crossing Improvements at Ocean Avenue and the I-280 Northbound On-Ramp	none	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	low
11	Closing off the Tracks at Ocean Avenue from Pedestrians	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
<b>Muni LRT Service Operations</b>																			
<i>J and K Lines</i>																			
12	Alighting Platform near Eastside Connector	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	none
13	J/K Line Boarding Platform <i>Option B. Boarding Platform along San Jose Avenue</i>	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	none
<i>M Line</i>																			
16	M Line Platform(s) on San Jose Avenue <i>Option B. Farside Platforms on San Jose Avenue at Geneva Avenue</i>	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	medium
<b>Geneva Avenue</b>																			
17	Westbound Improvements: Sidewalk Straightening & Street Restriping	low	none	none/c	none/c	none/c	medium	none/c	none	none	none	none/c	none	none	none	none	none	none	medium
18	Eastbound Improvements: Sidewalk Straightening & "BUS STOP" Box	low	none	none/c	none/c	none/c	medium	none/c	none/c	none	none	none/c	none	none	none	none	none	none	none
19	Kiss-and-Ride Reconfiguration	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	low
20	Signal Synchronization	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	low
21	Signalization of Geneva Avenue and Howth Street and/or Geneva Avenue and Louisburg Street <i>Option A. Signalization of Geneva Avenue and Howth Street</i>	none	none	none	none	none	medium	none	none	none	none	none	none	none	none	none	none	none	none



Improvement		Environmental Resource Topic																	
		Visual	Agricultural	Air Quality	Biology	Cultural	Geology	Hazards	Hydrology	Land Use	Mineral Resources	Noise	Population and Housing	Public Services	Utilities	Recreation	Energy	GHG	Transportation
Short-Term Improvements (1-5 years)																			
Ocean Avenue																			
22	Intersection Consolidation of Ocean Avenue / Geneva Avenue / Phelan Avenue	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	low
23	Westbound Class II Bike Lane / Eastbound Sharrows along Ocean Avenue between San Jose Avenue and Howth Street	none	none	none	none	none	medium	none	none	none	none	none	none	none	none	none	none	none	low
The Ocean Avenue I-280 Southbound Off-Ramp																			
26	Flashing Beacon on the I-280 Southbound Off-Ramp at Ocean Avenue	medium	none	none	none	none	medium	none	none	none	none	none	none	none	none	none	none	none	none
Mid-Term Improvements (6-10 years)																			
Accessibility																			
5	South Geneva Transit Plaza Elevator	none	none	none/c	none	none/c	medium	none/c	none	none	none	none/c	none	none	none	none	low	low	none
Muni LRT Service Operations																			
14	K Line Reconfigured Boarding Platform south of the Green Administration Building	none	none	none	none	none	medium	none	none	none	none	none/c	none	none	none	none	none	none	none
15	Relocation of Ocean Avenue K Line City College Stop to the Farside of Howth Street	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none	none	none
Ocean Avenue																			
24	Replacement of Pedestrian Bridge over Ocean Avenue and Extension of Class II Bike Lanes	low	none	none/c	none	none/c	medium	none/c	none	none	none	none/c	none	none	none	none	none/c	none/c	low
The Ocean Avenue I-280 Southbound Off-Ramp																			
27	Realignment of the Ocean Avenue I-280 Southbound Off-Ramp	none	none	none/c	none/c	none/c	medium	none	low	none	none	none/c	none	none	none	none	none/c	none/c	none/c
Redevelopment																			
28	Green Yard Redevelopment Option B. Green Administration Building Renovation / Reconstruction	medium	none	none/c	low	none/c	medium	none/c	none/c	none	none	none/c	none	low	low	none	medium	low	low
29	Upper Yard Transit-Oriented Development (TOD)	medium	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	low	low	low	none	medium	low	low
Long-Term Improvements (Greater than 10 years)																			
Ocean Avenue																			
25	Center-Running Westbound Transit Lane on Ocean Avenue	none	none	none/c	none/c	none/c	medium	none/c	none	none	none	none/c	none	none	none	none	none	none	low
Freeway-Related Improvements																			
32	Elevated Kiss-and-Ride Roadway Option B. Elevated Kiss-and-Ride Connecting to I-280 Northbound	low	none	none/c	none/c	none/c	medium	none/c	low	none	none	none/c	none	none	none	none	none/c	none/c	low

Key:  
none = no environmental impact likely  
none/c = possible impact related to construction activities  
low = low possibility of environmental impact  
medium = medium possibility of environmental impact  
high = high possibility of environmental impact

## **Prioritization and Implementation**

Recommended short-term improvements that were identified in the *Balboa Park Station Area Plan* and during the *Station Capacity Study* were evaluated. These “fast track” projects complement but do not duplicate the projects proposed in the *Ped and Bike Project*. Most improvements were evaluated individually. Some projects would require the completion of other projects to maximize effectiveness; therefore, these improvements were reviewed as packages.

SFMTA developed the following criteria for selecting and prioritizing the improvements and packages with assistance from BART and other TAC members.

### ***Primary Criteria***

1. Safety and Security
2. Accessibility (ease of using transit facilities and making transfers)
  - For people with disabilities
  - For elderly, people with small children, etc.
3. Transit Service: Reliability and Quality (on board)
  - Convenience
  - Comfort
  - Travel time
4. Transit Facilities: Quality and Passenger Experience (at/near stations and stops)
  - Passenger information and other amenities
  - Convenience
  - Comfort
5. Community Support
  - Inclusion in adopted plan
  - Public meeting or policy maker input
6. Agency Economic Benefits
  - Reduced operating costs
  - Protection of agency assets

***Secondary Criteria***

7. Transit Ridership and Vehicle Miles Traveled (VMT) Impacts<sup>22</sup>
8. Community Vitality and Sustainability
  - Strong local economy
  - Visual quality of built environment and landscaping
  - Community cohesiveness and identity
  - Minimizing other adverse environmental and social/equity impacts
9. Traffic and Parking Impacts

***Implementation Criteria***

10. Project Readiness and Funding Availability
11. Capital Cost
12. Construction Impacts
  - Duration
  - Intensity
  - Time horizon for implementation

The Primary and Implementation Criteria were weighted twice as high as the Secondary Criteria.

Based on the prioritization results in Table 32, four small to medium-sized “fast track” improvement packages (less than \$5 million) were identified. These improvements were packaged to prevent piecemealing the projects. The four packages are:

1. Geneva Transit Plaza Improvements
  - Lighting
  - Wayfinding signage
  - Real-time information
  - Canopies
  - Repaving the intersection of Geneva Avenue and the I-280 northbound ramps

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<sup>22</sup> Limited direct impact on ridership expected from most “fast track” projects

2. Station Area Lighting Improvements, Wayfinding Signage, and Real-time Information
  - Lighting: Along Ocean and San Jose avenues
  - Wayfinding Signage: Ocean & Westside Walkway, existing J/K Alighting and Boarding areas, San Jose north and south of Geneva
  - NextMuni real-time information: Near existing J/K boarding
  - BART and NextMuni real-time information: at entrance to BART mezzanine
3. Westbound Geneva Avenue Corridor Improvements
  - Sidewalk straightening
  - Street restriping
  - Westbound left-turn lane on bridge
  - Westbound "transit-only" lane on bridge
  - Westbound right-turn lane onto I-280 northbound on-ramp
4. Eastbound Geneva Avenue Corridor Improvements
  - Sidewalk straightening
  - "BUS STOP" box
  - Kiss-and-ride reconfiguration

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Table 32: Fast-Track Project Evaluation

Project Ranking	Improvement Description	Capital Cost	Primary Criteria							Secondary Criteria				Implementation Criteria			Total Score
			Safety & Security	Accessibility	Transit Service: Reliability & Quality	Transit Facilities: Quality & Passenger Experience	Community Support	Agency Economic Benefits	Subtotal (weighted 2x)	Transit Ridership & VMT Impacts	Community Vitality & Sustainability	Traffic & Parking Impacts	Subtotal (weighted 1x)	Project Readiness & Funding Availability	Construction Impacts	Subtotal (weighted 2x)	
1	Improvement 1 - Lighting Improvements: Incorporate lighting improvements along key walkways and all bus and LRT stops.	\$700k	+2	+1	+0	+2	+2	+0	+14	+0	+1	+0	+1	+1	+1	+4	
2	Improvement 2 - Transit Wayfinding Signage: Add transit wayfinding signage to direct customers to appropriate bus and LRT stops, BART entrances, and walkways.	\$1 million	+1	+1	+0	+2	+0	+0	+8	+0	+0	+0	+0	+1	+2	+6	+14
3	Improvements 17 & 20 - Westbound Geneva Avenue Corridor Improvements: A: Fill in bus turnout and straighten sidewalk on north side of Geneva Avenue. B: Restripe street to include westbound “transit-only” lane and left-turn lane on bridge. C: Add westbound right-turn lane to I-280 northbound.	\$400k	+1	+0	+2	+1	+1	+1	+12	+0	+0	+2	+2	+1	-1	+0	+14
4	Improvement 3 - Real Time Information: Provide real time NextMuni & BART information at Muni stops and BART entrances.	TBD	+0	+0	+0	+2	+1	+0	+6	+0	+0	+0	+0	+1	+2	+6	
5	Improvement 4 - Improved Bus Shelters on North and South Side of Geneva Avenue: Install improved bus shelters near BART entrance on north and south sides of Geneva Ave. Shelters would be installed by Clear Channel. Projects 5 and 6 may be duplicative.	Paid for by Clear Channel	+1	+0	+0	+2	+1	+0	+8	+0	+0	+0	+0	+2	+0	+4	+12
6	Improvement 4 - Canopies over The Plazas on Geneva Avenue: Install full canopy over the north and south Geneva plazas. Projects 5 and 6 may be duplicative.	\$1.3 million	+2	+0	+0	+2	+2	+0	+12	+0	+2	+0	+2	+0	-1	-2	+12



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Project	Improvement Description	Capital	Primary Criteria							Secondary Criteria				Implementation Criteria			Total
7	Improvements 18 & 19 - Eastbound Geneva Avenue Corridor Improvements: A: Straighten curb line on south side of Geneva Avenue. B: Install "BUS STOP" box on south side of Geneva Avenue. C: Reconfigure kiss-and-ride (Improvement 3.1 in BP Ped/Bike Study).	\$750k to \$1.5 million	+1	+1	+2	+0	+2	+1	+14	+0	+0	+0	+0	+0	-1	-2	+12
8	Improvement 8 - Repaving of the East Side Crosswalk at Geneva Avenue and the I-280 Northbound Ramps: Repave intersection to improve safety and accessibility. Install ADA-accessible curb ramps.	\$250k	+2	+2	+0	+0	+0	+0	+8	+0	+0	+0	+0	+1	+0	+2	+10
9	Improvement 16 (Option B) - New M Line Farside Platforms on San Jose Avenue at Geneva Avenue: Install split M farside platforms at San Jose Ave & Geneva Ave (Modified Improvement 1.3 in BP Ped/Bike Study). Projects 9 and 11 are mutually exclusive.	\$7 million to \$10 million	+1	+2	+1	+2	+1	+1	+16	+0	+0	-2	-2	-1	-1	-4	+10
10	Improvement 13 (Option B) - New J/K Boarding Platform along San Jose Avenue: Construct new J/K boarding platform along San Jose Ave west sidewalk. This project would be designed by the Green Yard Re-rail Project and would receive funding from Lifeline grants.	\$500k to \$600k	+1	+1	+0	+0	+0	+0	+4	+0	+0	+0	+0	+2	+0	+4	
11	Improvement 16 (Option C) - New M Line Alighting Platform on San Jose Avenue south of Niagara Avenue: Install northbound M alighting platform at San Jose Ave and Niagara Ave. Projects 9 and 11 are mutually exclusive.	\$400k to \$500k	+2	+1	+0	+1	+0	+1	+10	+0	+0	-1	-1	+0	-1	-2	+7
12	Improvement 9 (Option C) - Option C. Removal of Sidewalk Obstructions on Geneva Avenue Bridge: Relocate traffic signals and remove No Parking signs that obstruct the sidewalks	TBD	+1	+1	+0	+0	+0	+0	+4	+0	+1	+0	+1	+0	+0	+0	+5
13	Improvement 6 - Pedestrian Walkway between BART Mezzanine and San Jose Avenue through the Green Yard	TBD	+1	+1	+0	+1	+0	+1	+8	+0	+0	+0	+0	-2	+0	-4	+4

Key: Evaluation criteria rated from -2 (high negative impact) to +2 (high positive impact).

## Development of the Upper Yard

The possible development of the Upper Yard is dependent on the conclusions of a systemwide real estate and facilities plan, expected to be completed in spring 2013. Several factors complicate freeing up the Upper Yard for property development, summarized in Table 33. SFMTA has identified several steps that could address the need for additional storage capacity.

*Table 33: Steps to Developing Upper Yard*

Issue to be Addressed	Recommended Steps	Approximate Cost	Timeframe
A. Sufficient LRV Storage During Green Yard Re-rail	1. <b>Retain Upper Yard during Green Yard Rerail for LRV storage</b> , when parts of Green Yard will not be usable	None	Through 2014
B. Sufficient LRV Storage for Short-term Needs	After Green Yard Rerail is completed: 2. <b>Move long-term holds</b> from Green tracks 12-14 to MME. 3. <b>Backfill, moving 12 LRVs</b> from Upper Yard to Green tracks 12-14. 4. <b>Move 6 LRVs</b> from Upper Yard to Geneva tracks 1-4 after seismic strengthening of Geneva Office Building. (Green could also accommodate these 6 LRVs.)	Not significant	By 2014
C. Sufficient LRV Storage to Meet Future Requirements including Growth  LRV expansion based largely on funding availability. Fleet Plan: current 151 to 175 in FY 17/18, 215 in FY 26/27	5. <b>Assign LRVs</b> as follows: - Green: 88 LRVs (including those in shops) - MME: 107 LRVs (including those in shops) - Satellite yard at 6th & King: Up to 22 LRVs 6. <b>Expand and enhance MME:</b> (a) Construct Paint & Body Shop, (b) Equipment needs assessment and procurement, and (c) LRV storage expansion on 4-acre site. 7. <b>Make off-site improvements:</b> (a) Increase electric power feed for MME (b) 4 <sup>th</sup> & King signal capacity expansion (c) 6 <sup>th</sup> & King satellite yard development (d) Non-revenue track between Third Street LRT and Green Yard	\$ 185 million	2017-2027

Issue to be Addressed	Recommended Steps	Approximate Cost	Timeframe
<b>D. Sufficient Historic Streetcar Storage to Meet Future Requirements (with the possible loss of Marin)</b>  Forecast HSC fleet larger than Geneva capacity. Current inactive storage outside Marin will eventually be lost. Current daily need for 24 HSCs. FY 2030 daily need for 58 HSCs, plus special/inactive storage up to 39 HSCs.	<b>8. Assign Historic Streetcars</b> as follows: - Active HSC fleet up to 58 can be housed at Geneva - Special service fleet up to 22 requires a new facility (such as Mirant site near MME, supplemented by Market/Duboce mini-yard) - About 17 other HSCs (inactive/damaged) should be housed at museums or other non-revenue facility	TBD	2012
<b>E. Employee Parking Needs</b>	<b>9. Move spare parts</b> from Green garage to MME when parts room operational, freeing up about 50 spaces. <b>10. Implement employee parking charges</b> <b>11. Support employee carpooling</b>	Not significant	2012
<b>F. Upper Yard Allows M Line Pullouts south of Geneva Avenue</b>	<b>12. Explore potential to pre-position LRVs</b> at Geneva Yard, on San Jose Avenue, or eventually perhaps at Parkmerced during off-peak periods. LRVs would still be serviced and stored overnight at Green.	Not Significant	2012-2013
<b>G. Extra Storage Needed during Rail Replacement or Other Special Periods</b>	<b>13. Explore additional or back-up storage</b> options near Bayshore Station (joint project with High Speed Rail?).	TBD	2012-2013

## Funding Strategies

### ***Funding Strategy Needed to Maximize Limited Funding***

There are a number of challenges to funding improvements to the station area. The needs are relatively large. The SFMTA has to balance numerous funding needs, including basic State of Good Repair backlog, which would tend to use up formula funds. Discretionary funding is generally limited and highly competitive. The most likely grant sources are typically limited to \$1 million or less per award.

The short-term recommended projects alone have an estimated total cost of at least \$14 million beyond currently allocated funding. The mid-range

recommended projects have an estimated total cost of at least \$12 million. Long-range recommendations would total over \$65 million.<sup>23</sup>

The SFMTA has estimated State of Good Repair (replacement and rehab) needs of \$1.7 billion over the next five years. Federal formula funding expected at about \$530 million during this same time frame would only fulfill about a third of this need.

While there is dedicated Prop K Expenditure Program (EP) 13 funding of \$2.4 million now available specifically for “Balboa Park Intermodal Improvements,” this is far below the need. The SFCTA strongly prefers Prop K funds to be leveraged, matching larger external grants.

Therefore, a funding strategy is recommended to match needs with the most applicable funding sources. The intent is to maximize the funding and use it most efficiently and effectively. This funding strategy also identifies issues and suggests steps to refine the approach. The funding strategy is summarized in Table 34.

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<sup>23</sup> This does not include any unfunded costs for the Eastside Connection nor the cost of facilities and access improvements needed to compensate for the possible loss of the Upper Yard. Cost estimates for several recommended improvements were not yet available, pending further conceptual engineering.



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Table 34: Recommended Funding Strategy Framework: Short Term

<b>Funding Source</b>	<b>Available When?</b>	<b>Potential Amount</b>	<b>Use</b>
<b>Prop K EP 13</b>	<b>Now and FY 2011-12</b>	<b>\$2.4 M total programmed</b>	
	May 2011 application	\$0.3 M	Eastside Connection funding gap (San Jose Avenue boarding platform) - construction
	TBD (BART designing now)	\$0.6 M	Geneva Plaza construction (wayfinding signs, lighting, real time bus/train arrival signs, BART elevator card access)
	October 2011 application	\$0.35 M	Conceptual/preliminary design of: Geneva Plaza canopies; Geneva Avenue north side sidewalk widening; lighting, wayfinding signs, accessibility improvements outside of Geneva Plaza; flashing beacon on I-280 southbound off-ramp at Ocean Avenue. Also conceptual design of J/K walkway improvements and analysis of light rail access issues (to be ready for TLC 35% design requirement)
		\$1.1 M	Reserved for local match for TLC or other grants (see below) – or for basic Eastside Connection improvements if funding gap increases.
<b>TLC (may be included in OneBayArea consolidated CMA funding)</b>	Call: Spring 2012?	\$4.0 M	Amenities/accessibility: Canopies at Geneva Plaza, other lighting, curb ramps, sidewalk improvement, wayfinding improvements around station
<b>Development Impact Fees</b>	FY 2012-13 through FY 2015-16	\$1.0 - 2.0 M	Improving walkway near current J/K boarding area (as feasible)
<b>Safe Routes to Transit/School</b>	Cycle V Call: Summer 2013	\$1.0 – 2.0 M	Widening sidewalk on Geneva Ave., reconfiguring kiss & ride on Geneva.
<b>Prop AA (VLF)</b>	Call: Winter 2012?	\$0.2 – 0.5 M	Flashing beacon on SB I-280 off-ramp at Ocean

***Balboa Park Competitive Position***

Balboa Park Station Area improvements are in a strong competitive position to obtain funding. Balboa Park projects are high priority for funding agencies, such as the San Francisco County Transportation Authority and the Metropolitan Transportation Commission, and for advocacy groups. For example, the Transportation Authority declared Balboa Park one of its focus areas during recent updates to the 5 Year Prioritization Programs and the Strategic Plan. The Safe Routes to Transit program (administered by the MTC and the advocacy group, Transform) has funded three straight Balboa Park applications.

These organizations understand that the needs are large. Station area deficiencies are readily apparent, and that the station area is the largest transit hub in the San Francisco Bay Area outside of a major downtown. Previous studies have documented the needs.

This area has a natural constituency even beyond the transit users and residents. City College, two high schools, a middle school, and a regional park all benefit from station access.

***What Has Already Been Secured***

Future fundraising efforts can build on recent successes. Approximately \$11 million has been recently allocated or already spent , primarily on engineering and construction. This includes about \$5.2 million for BART's westside walkway and new station entrance. (See Table 35.)

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Table 35: Recent Funding for Balboa Park Projects

<b>Funding Source</b>	<b>Project</b>	<b>Amount</b>	<b>Project Status/Notes</b>
<b>Lifeline (STA, I-bond)</b>	Eastside Connection	\$1,083,277 (requested by SFMTA) \$1,906,050 (requested by BART)	PROJECT IN DESIGN. \$219,567 already allocated to SFMTA. Requires Prop K match.
<b>Safe Routes to Transit</b>	Pedestrian improvements implementation	\$722,000	PROJECT IN DESIGN/CONSTRUCTION. Recently allocated. Funds must be spent by December 2012
	BP Pedestrian/Bicycle Connection Project	\$381,280	COMPLETED. 2 separate SR2T grants.
<b>ARRA, STP, CMAQ (RBPP), BART match, Prop K</b>	BART Westside Walkway	\$5,171,431	COMPLETED
<b>Caltrans Planning Grant</b>	BP Station Area Circulation Study	\$262,400	EXPECTED START: Early 2012.
<b>Prop K EP 8</b>	BART Eastside Connection	\$870,000	PROJECT IN DESIGN.
<b>Prop K EP 13</b>	Balboa Park Station Capacity Study	\$570,000 (plus over \$80,000 in SFMTA and partner agency funds)	NEARLY COMPLETED
	Eastside Connection	\$25,000 in BART application \$270,819 in SFMTA	Under design

<b>Funding Source</b>	<b>Project</b>	<b>Amount</b>	<b>Project Status/Notes</b>
		application	

***Potential Funding Sources: Prop K***

When voters approved the Prop K transportation sales tax in November 2003, the ballot measure explicitly included \$9.72 million for “Balboa Park BART/MUNI station access improvements to enhance BART, bus and MUNI light rail transit connections. Includes project development and capital costs.”

The eligible agencies for this funding are BART, the SFMTA, and the Department of Public Works. In practice, if the Transportation Authority, BART and the SFMTA all agree, access to this funding is virtually guaranteed.

The latest Prop K 5 Year Prioritization Program for this Expenditure Program (EP) 13 funding programmed \$2.4 million through FY 2011-12, which can be accessed now. The Strategic Plan has not funding programmed in this category from FY 2012-13 through FY 2017-18. Then additional funding is programmed starting in FY 2018-19, at \$285,000, with a slightly increased level every year thereafter through FY 2033/34. The total funding of \$9.6 million over 30 years is expected to be allocated in this program.

Of the \$2.4 million, \$25,000 has already been programmed to help with local match for the BART Eastside Connection Lifeline award. In addition, nearly \$271,000 will be needed as the local match for the SFMTA Lifeline award (which is primarily being used for the San Jose Avenue boarding platform).

There has been discussion of using some of the \$2.4 million funding pot to support a new Balboa Park Citizens Advisory Committee (CAC), however a recent Caltrans planning grant should obviate this potential need. There is also the likelihood that some will be needed to support the Eastside Connection project, which is already under design.

There are other Prop K Expenditure Programs that could possibly support recommended improvements. The availability of the dedicated EP 13 funding pot may reduce the potential to receive such funds, but they should still be considered. In particular, the following funding pots appear to be the most promising for further consideration:

***EP 1. BRT/Muni Metro Network:*** Includes BRT and Transit Preferential Streets improvements on key transit corridors that include Geneva Avenue. Improvements may include sidewalk bulb-outs, transit-priority lanes, traffic signal modifications, real-time passenger information information systems, as well as associated landscaping, lighting and signage improvements. The 5 Year Prioritization Program includes \$400,000 during the FY 2010 - 2014 period for TPS spot improvements, \$1.2 million for TEP rapid



network design and \$5.8 million for TEP rapid network implementation. This is probably the most promising Prop K category outside of EP 13 for significant funding in the short term.

**EP 8. BART Station Access, Safety and Capacity.** Although this category would cover a broad range of improvements, BART staff have indicated that it is unlikely to fund further Balboa Park station improvements in the short term because (1) the 5 Year Prioritization Program already includes \$870,000 for the Eastside Connection and (2) the remaining \$630,000 is spread among several projects targeted at all San Francisco stations.

**EP 20. Rehab/Upgrades to Existing Facilities:** Includes rehabilitation, upgrades and/or replacement of maintenance/operations facilities and station. However, there is far greater demand for this funding pot than available funds, and it is not realistic option.

**EP 40. Pedestrian Circulation & Safety:** This funding pot is completely programmed for measures such as high-visibility crosswalks and Accessible Pedestrian Signals (APS). It is unlikely to be available for station area improvements in the short term.

Other possible Prop K categories that could be investigated include:

- EP 16. Other Transit Enhancements
- EP 22. Guideways
- EP 38 Traffic Calming
- EP 39 Bicycle Circulation/Safety
- EP 41 Curb Ramps

These categories are also fully programmed in the short-term.

### **Other Sources**

This section discusses key funding sources, starting with those grant programs that appear most promising. These have the highest potential because:

- Eligibility requirements closely track the type of projects recommended by the Station Capacity Study
- Funding levels are reasonably large
- They have funded similar projects recently.

It is difficult to determine what funding will be available when, particularly for federal funding sources that will be shaped by pending reauthorization, such as Transportation for Livable Communities.

- **Transportation for Livable Communities (TLC)** has funded very similar projects in the recent past, for larger amounts than most similar grant programs (e.g., Berkeley Downtown BART Plaza and Transit Area Improvements, SF 24<sup>th</sup> Street/Mission BART Plaza and Pedestrian Improvements, and Union City Intermodal Station East Plaza for \$4.4 million). TLC has been administered by MTC to support transit-oriented development. It is expected that TLC funding will be wrapped into a new consolidated funding source administered by the CMAs, for OneBayArea grants, but the details have not been determined. The call for projects is expected in early 2012. Local match is typically around 20%.

There are some major challenges to using TLC funds. In the last round, TLC grants were essentially reserved for projects that had reached the 35% design level. Also, TLC uses federal funds and therefore requires extensive NEPA environmental review and following other elaborate federal requirements. During the last regional round (in winter/spring 2010), jurisdictions were limited to three applications each.

- **Safe Routes to Transit (SR2T)** has funded two projects (via three grants) at Balboa Park. The first two grants funded the Balboa Park Pedestrian and Bicycle Connection Project (planning and conceptual engineering), while a recent grant funded implementation of pedestrian safety and accessibility improvements (expected to be completed by December 2012). Therefore, Balboa Park is clearly an attractive location for this funding, but a question is whether the relatively high level of prior funding may possibly be considered a detriment to future funding.

Planning and capital grants are to support transit and improve traffic conditions in the Bay Bridge corridor and its approaches. They are typically under \$1 million. No local match is required, but it can help the application's competitiveness. Project are selected by TransForm and administered jointly with MTC. The next and final call for projects is expected around summer 2013.

- **Regional Bicycle Program** (formerly the Regional Bicycle and Pedestrian Program) uses federal Congestion Mitigation and Air Quality (CMAQ) funding. It is unclear how federal reauthorization may affect this funding program, which may be folded into the OneBayArea grant program. A recent award of RBPP funding to the SFMTA was swapped for other funding due to the challenge of meeting "timely use of funds" and extensive federal procedural requirements.
- **Lifeline Program** uses different sources to support transportation capital and operating projects that serve low-income communities. Lifeline funding has been

obtained by the SFMTA for the Balboa Park Eastside Connection and by BART for the under-construction Westside Walkway. Any proposal will be questioned about the extent to which it supports basic safety and accessibility needs, as opposed to customer amenities.

- **Federal Discretionary** grants are typically awarded by the US Department of Transportation for larger projects, and will likely be reshaped by the expected federal reauthorization legislation. The criteria are broad and include: state of good repair, economic competitiveness, livability, safety, and environmental sustainability. Innovative projects built on partnerships also are considered more competitive. There have been two rounds of TIGER grants so far for this highly competitive funding program, and it is unknown when the next round will be held. The only Bay Area recipient in the latest round of the TIGER grants was a \$10.2 million award for East Bay Pedestrian & Bike Network. Therefore, it would be very questionable to rely on this ultra-competitive funding source. FTA Bus Livability funding is another source that should be considered.
- **Impact Fees for Balboa Park Station Area Development** were set up by the Balboa Park Station Area Plan (the Better Neighborhoods Plan) Community Improvements Plan. Roughly \$1.4 million is expected to be available for street improvements (design and construction) on streets including Geneva, Ocean, and San Jose avenues over the four-year period from FY 2012-13 through FY 2015-16, but most likely available only in the final two years of this period. In addition, about \$500,000 is expected to be available for transit stop upgrades, plus \$1.1 million for parks, plazas, and open space.

This funding is administered by the Interagency Plan Implementation Committee, chaired by the San Francisco Planning Department. However, it is possible that a new Citizens Advisory Committee could become involved in monitoring or guiding this funding.

- **Caltrans Highway Safety Improvement Program (HSIP)** funds street improvements (including roadway, bicycle, pedestrian, and railroad grade crossing projects) based on a safety cost-effectiveness formula. It is administered by Caltrans on an annual basis. The maximum grant is \$900,000, and it is highly competitive as it is a statewide program with broad project eligibility. It should be considered only for improvements with a primary safety purpose.

- **Prop AA** was recently approved by San Francisco voters to raise \$5 million annually from increased vehicle license fees. The initial call for applications is expected by early 2012. Half of the funds will go to street resurfacing. One quarter (about \$1.25 million annually) will go to pedestrian safety projects, and the last quarter (about \$1.25 million annually) to transit service efficiency improvement projects. Pedestrian safety projects include sidewalk widening, pedestrian lighting, and crosswalk improvements. Transit improvements include station and stop enhancement and passenger information. Although Balboa Park projects would be competitive, given the small size of the funding pots, this is unlikely to fulfill a major portion of the need, but may serve as local match.
- **Transportation for Clean Air** grants fund projects that reduce emissions and support alternative modes. Roughly annual grants are administered by the Bay Area Air Quality Management District and the SFCTA. Regional grants are awarded up to \$1.5 million. Grants are awarded based largely on a cost-effectiveness formula for reducing emissions. This cost-effectiveness formula tends to favor bicycle and low-emission-fleet projects.
- **Transportation Enhancements** funds special or auxiliary projects, like education and station artwork. Federal funding is administered by Caltrans. It is questionable how this will be affected by federal reauthorization. Three of 12 eligible activities are related to bicycles. In recent years, 75% of the Bay Area's share has been awarded by MTC through the TLC program (described above), while 25% is administered by Caltrans at the district level. A call for projects was released in summer 2011.
- **Safe Routes to School (SR2S)** funds safety and other improvements adjacent to schools. It is administered roughly annually by Caltrans. San Francisco has obtained numerous SR2S grants, and recently received an award for Denman Middle School. The City was previously unsuccessful with applications for Balboa High. The Denman High application did not include improvements in the immediate station area. However, because of the number of schools in the area, this is still a fairly promising funding source. The new SF-SR2S program uses CMAQ funds through MTC's Bay Area Climate initiatives program to fund projects that will reduce vehicle emissions stemming from school-related travel. Funds are programmed by SFCTA and will be administered by Caltrans.

A Call for federal SR2S funds was released by the SFCTA, but it only includes \$579,000 total. The federal paperwork requirements are a major impediment to efficient use of this limited funding.



- **FTA Section 5309 Fixed Guideway** formula funds go to urbanized areas with rail (or controlled right-of-way) systems. Eligible costs include capital projects to modernize or improve existing fixed guideway systems, including purchase and rehabilitation of rolling stock, track, structures, passenger stations and maintenance facilities. This requires a 20% local match (typically provided by Prop K). The major barrier to using this, for example, for changes to light rail terminals, is that the SFMTA State of Good Repair needs far exceed the amount available.
- **FTA Section 5307 Transit Capital Priorities Program** has a 10% flexible set aside for allocation to operator priorities, regardless of score. It is distributed to operators by formula. In the 2009 TCP Program, this represented \$21 million.
- **Prop 1B I-Bonds** provide State funding for large capital projects in the State Transportation Improvement Program (STIP). This is an unlikely source because the SFMTA will likely use its share for filling a Central Subway funding gap. For San Francisco, a Transportation Authority resolution 08-40 states that the Central Subway and three other projects will receive STIP funding before other projects are programmed.

### ***Issue 1: Stand-alone Prop K ARF or Leverage It?***

While the Prop K EP 13 funding of \$2.4 million is sufficient to support a major project by itself, the Transportation Authority favors using Prop K funds to leverage other regional, state or federal funding. For example, the 5 Year Prioritization Program provided an illustrative funding program, with \$1.2 million assumed from Safe Routes to School and \$8.4 million in federal funding.

The major risk in reserving Prop K funding to leverage other funds is that this strategy may delay making physical improvements. It could be 2-4 years before a substantial amount of non-Prop K funds are actually in hand, due to strong competition and the elaborate selection process. The next likely date for Regional TLC funds to actually be available for use is late 2012.

Therefore, it is recommended that the highest priority for Prop K funding be to cover any shortfall in the basic needs for the Eastside Connection project. Assuming there is no unanticipated further need for further Prop K funding for the Eastside Connection project (beyond about \$300,000 now needed), about \$350,000 should be used for conceptual and preliminary design to position projects to be competitive for larger external grants. (Such an application was submitted in October 2011 to the SFCTA.) About \$600,000 could be used for construction of Geneva Transit Plaza improvements, led by BART. The remaining \$1.1 million could be reserved to leverage regional/state/federal funding for a project of \$4-5 million assuming a typical 80/20 federal match requirement. It is questionable whether more than \$5 million could be obtained in the next several years from regional/state/federal grants for new Balboa Park projects. (Only one TLC grant in

the recent round was for \$4+ million, and Safe Routes to Transit is unlikely to award more than \$1 million.)

***Issue 2: Revise Prop K Strategic Plan?***

The Prop K funding schedule in the Strategic Plan “front loads” funding in the FY 2010-2012 period, but then has no additional funds programmed during the FY 2013-2018 period. The Transportation Authority’s practice is to levy finance charges on programs that are allocated funding at a rate faster than the annual prorated basis (with the exception of certain “grandfathered” projects). However, considering that Balboa Park is a special focus area, Authority staff could explore the potential for Balboa Park projects to tap funding programmed for the FY 2013-2018 period, but not actually used. Staff would need to make a compelling case for an amendment.

Another alternative is to accept financing charges to make key improvements earlier. However, this would require a high-level commitment and needs to consider factors such as the overall cap on bond issuance.

***Issue 3: Preparation for TLC or Other Large Grants***

It is unknown how TLC will change in future rounds, so it is challenging to strategize how to compete for this source. MTC will decide on program changes through its Sustainable Communities Strategy, expected to be released in early 2012. It is likely that TLC funding will not be available for expending until late 2012 or 2013.

The SFMTA and BART can position themselves to be competitive for TLC and similar larger grants by completing feasibility analyses and advancing design for the highest priority improvements. (For example, there are alternative concepts for relocating and improving the M-line terminus that should be analyzed further.) Prop K funding could be used to help advance design to the 35% level needed for TLC (in the last round).

BART and the SFMTA should also make sure that high-priority Balboa Park projects are listed in agency capital investment plans. While there is now an umbrella program of “Balboa Park intermodal improvements” in the SFMTA CIP, the Capital Plan will eventually be restructured to have more detailed, multi-level project/program listings that will support close monitoring and strategizing.

***Complete Balboa Park Eastside Connection Project***

BART and the SFMTA have been participating on the Eastside Connection project to provide an accessible connection between the new westside walkway and Muni J/K boarding areas. BART is refining conceptual design and cost estimates for the project, but initially estimated a shortfall of roughly \$3 million (over available funding of about \$4.1 million), which BART has recently proposed to fill with its station modification funds. BART continues to refine its internal station needs.

***Consider Innovative Funding Potentials***

The Balboa Park Station Area has unusual potential to take advantage of innovative funding sources and low-cost skilled design for station art, landscaping, and other enhancement projects. The proximity of City College, Lick Wilmerding High, and the Geneva Car barn and Powerhouse project could be useful in attracting foundation money or providing student talent for special projects.

**Implementation: Next Steps*****A. Fast Track Implementation Plan***

Table 36 proposes a fast track implementation plan for the next two years. It indicates that significant improvements are underway, and further improvements are possible in a relatively short time period. However, achieving this aggressive schedule depends on the cooperation of multiple agencies and prompt action.

***B. Prop K ARF and Eastside Connection Project***

Since key partner agencies have agreed on the use of at least part of the \$2.4 million programmed in Prop K funds, including funding gaps in the Eastside Connection project, SFMTA took the lead on preparing a Allocation Request Form (ARF). This was circulated for review by partner agencies, then submitted in October 2011.

***C. Model Projects***

Successful TLC applicant projects such as 24<sup>th</sup> & Mission BART Station plaza improvements and the Union City Intermodal Station should be assessed to provide guidance on such issues as:

- Features that proved attractive to funders;
- Funding structure; and
- How they addressed environmental and design requirements.

***D. Work with Potential Funders Before Grant Opportunities***

SFMTA and BART staff could work with key funding agencies before a call for applications is released. The Transportation Authority, MTC and TransForm could be helpful in understanding how to prepare for and structure funding applications.

# Balboa Park Station Capacity and Conceptual Engineering Study

## Chapter 8. Conclusion

Table 36. Proposed Fast Track Implementation Plan

	Fall 2011	Winter 2012	Spring 2012	FY 2012-2013
STATION ACCESS IMPROVEMENTS (All Fully Funded)	Complete installation of crosswalk and pedestrian countdown signals at Ocean Ave./I-280.		Construct pinch point improvement on J/K walkway and San Jose Ave. J/K boarding platform (key stop)	Complete installation of traffic signal on Geneva at Howth  Relocate signal to mast arm at San Jose and Geneva
CUSTOMER AMENITIES		Design amenities (Lighting, Real Time signs).  Planter boxes and cleaning at Green Yard.		Complete installation of Wayfinding Signs along San Jose, Geneva and Ocean Aves. (FUNDED). Install Lighting Improvements, Real Time Signs, and BART Elevator Card Access
OTHER ACCESS AND SAFETY IMPROVEMENTS		Complete design of Eastside Connection (pedestrian bridge) (LARGELY FUNDED)  Repair Sidewalks		Widen sidewalks on Geneva Ave. Reconfigure kiss & ride on Geneva. Improve J/K walkway near San Jose Ave. Install flashing beacon on SB I-280 off-ramp at Ocean. Complete Eastside Connection pedestrian bridge. (LARGELY FUNDED)



## 8. Conclusion

The *Station Capacity Study* has examined a comprehensive list of potential projects to improve transportation and land use in the vicinity of Balboa Park Station. During the course of this study, many suspicions about the deficiencies in the study area were confirmed and quantified, such as the poor connections between different modes of transit. Others have been assessed, such as a deficiency of parking spaces in the neighborhood. Of particular importance is this study's examination of remedies for the area's problems that have been suggested over the years. Some have proven to be easily implementable at modest cost in the short term. Others are more daunting, requiring huge expenditures and agency commitment over many years. A few may never reach fruition.

Some of the technical questions not fully answered in this study can be addressed in the Transportation Authority's upcoming Balboa Park Station Area Circulation Study. This will also provide more systematic, extensive community involvement. This study, funded by a Caltrans Partnership Planning grant, is scheduled to start in early 2012 and be completed by early 2014.

Nevertheless, this current study can serve as a stepping stone to ensure that the vision laid out in the *Balboa Park Station Area Plan* becomes manifest in improvements that can be seen and experienced. These improvements will be enjoyed both by residents of the area and by the many commuters who are just passing through.

Balboa Park is truly a key crossroad in San Francisco's transportation network. Its continued health as a transfer point as well as a community in which to live and work depends on further efforts to realize the vision of the Plan.

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Appendix 5: San Francisco Superdistrict Map

Appendix 6: Geneva Avenue Sidewalk Level of Service Analysis

Appendix 7: 2009 On-Street Parking Supply and Occupancy Survey

Appendix 8: LRV Maintenance Staffing

Appendix 9: Conceptual Cost Estimates for Balboa Park Station Area Proposals

Appendix 10: Memorandum: Traffic Impacts at San Jose/Geneva Intersection