CHAPTER SUMMARY: The chapter is presented in five sections: Corridor Travel Patterns, Transit, Private Vehicle Traffic, Nonmotorized Travel, and Parking. Each section discusses existing conditions and the potential benefits and impacts (i.e., positive and negative) of implementation of each of the BRT alternatives, including the LPA. Consistent with CEQA/NEPA requirements, each section also discusses the environmental impacts of each of the build alternatives in both the near-term (2015) and long-term (2035) horizon years and addresses significant impacts.

CHAPTER 3

Transportation Analysis

Environmental analyses presented in this chapter are primarily based on the Vehicular Traffic Analysis Technical Memorandum[17] (CHS, 2013) prepared for the proposed Van Ness Avenue BRT Project, and the Analysis of Nonmotorized Transportation Impacts Technical Report prepared in support of the proposed project (Arup, 2013). These technical studies are incorporated in this EIS/EIR by reference.

The Vehicular Traffic Analysis Technical Memorandum provides an overview of the methodology to create travel demand forecasting, traffic analysis, and microsimulation modeling inputs to represent future year conditions, along with the resulting traffic related environmental impacts. It also includes a validation report for the San Francisco Chained Activity Modeling Process (SF-CHAMP), San Francisco's travel demand forecasting model, which is referenced directly throughout Chapter 3. Similarly, the report includes a data portfolio for the VISSIM microsimulation model used to better understand the performance of BRT. The VISSIM model is referenced directly in this chapter as well.

The Vehicular Traffic Technical Memorandum and Nonmotorized Transportation Impacts Technical Report are available upon request to SFCTA through the following contact:

Michael Schwartz
San Francisco County Transportation Authority
1455 Market Street, 22nd Floor
San Francisco, CA 94103
415-522-4823
michael.schwartz@sfcta.org

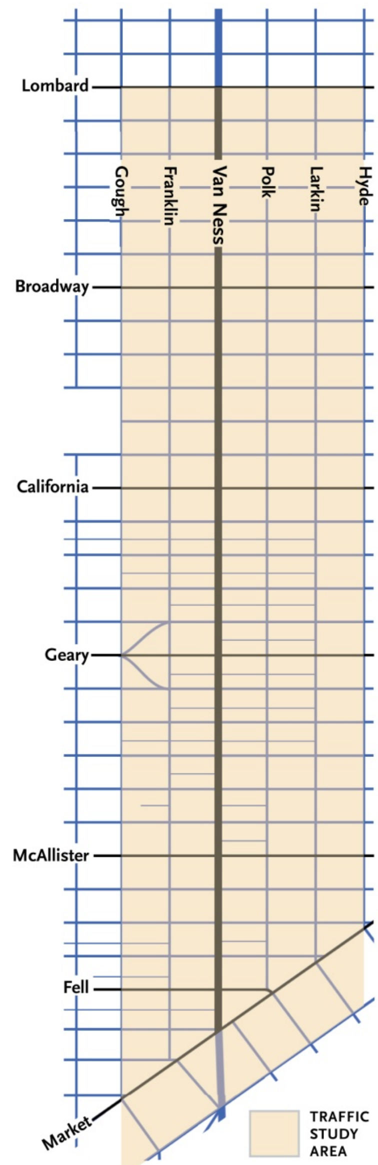


Figure 3.1-1: The Van Ness Avenue Corridor Study Area

3.0 Introduction

The Locally Preferred Alternative (LPA) is a refinement of the two center-running build alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B). For nearly all of the environmental impact areas and BRT performance areas described in Sections 3.1 through 3.3, the LPA has similar consequences to Build Alternatives 3 and 4 with Design Option B. In one instance (platform crowding in Section 3.2), the LPA performs similarly to Build Alternative 3 with Design Option B, but not Build Alternative 4 with Design Option B, and is so noted. The LPA performs differently than Build Alternatives 3 and 4 with Design Option B for metrics discussed in Sections 3.4 and 3.5, but the environmental consequences are consistent with Build Alternatives 3 and 4 with Design Option B. In addition, the Vallejo Northbound Station Variant performs similarly to the LPA on almost every environmental impact area and BRT performance area in Chapter 3.

[17] A draft of this study was prepared for the Draft EIS/EIR and it has been revised and finalized to address the LPA and responses to comments for the Final EIS/EIR.

Where there could be some minor differences in performance between the LPA and the Design Variant (mostly for transit travel time and reliability as discussed in Chapter 3.2), the text notes these differences.

3.1 Corridor Travel Patterns

Van Ness Avenue is a key thoroughfare within San Francisco's roadway grid system. It functions as a major transit spine in San Francisco's Muni network, and it is also part of the US 101 regional road system. This section provides an overview of the existing and future travel patterns along Van Ness Avenue, on parallel streets, and in the surrounding neighborhoods, with or without BRT. The travel demand projections discussed in this section serve as the basis for the operations models described in Sections 3.2 and 3.3, and provide several measures of performance of the build alternatives.

For Sections 3.1 through 3.3, Build Alternatives 3 and 4 are described together because these alternatives are not distinguishable by the travel demand forecasting, traffic analysis, or microsimulation models. Similarly, Build Alternatives 3 and 4 with Design Option B, along with the LPA, are described together for Sections 3.1 though 3.3. For Section 3.1 in particular, many of the figures reported for Build Alternatives 3 and 4 also apply to Design Option B (and the LPA) because travel demand forecasting estimates were not sensitive to the differences in travel patterns between those alternatives. For these analyses, the center-running alternatives are described together.

3.1.1 Existing Travel Patterns

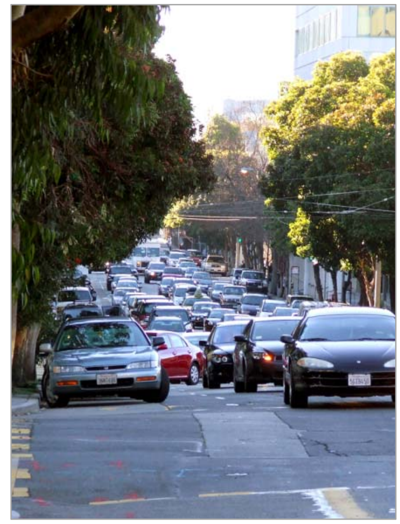
This section on existing travel patterns presents the following data to illustrate existing and future travel patterns: travel demand, regional versus local travel patterns, divertibility of trips, and mode splits. Most of the data for this section were obtained from SF-CHAMP.

SF-CHAMP is the San Francisco travel demand forecasting model, and it was used to determine how the project would change traffic patterns or modes of transport as described in Chapter 3 of the EIS/EIR. SF-CHAMP is a computer-based tool that can be used to assess the impacts of land use, socioeconomic, and transportation system changes on the performance of the local transportation system. SF-CHAMP was developed to reflect San Francisco's unique transportation system and socioeconomic and land use characteristics. The relationships and parameters in SF-CHAMP were statistically estimated from San Francisco residents' observed travel patterns and then tested to make sure the model matched observed transit line boardings, roadway volumes, and numbers of vehicles. For each modeled scenario, it uses a detailed representation of San Francisco's transportation system, as well as population and employment characteristics, to produce measures relevant to transportation and land use planning. Using future year transportation, land use, and socioeconomic inputs, the model forecasts future travel demand. A full description of SF-CHAMP and its validation report, the modeling inputs used in SF-CHAMP, including the representation of BRT in the model, and details about the modeling process used for this EIS/EIR can be found in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

For the purposes of this section, the Van Ness Avenue corridor study area is defined as Van Ness Avenue and five parallel streets, including Gough and Franklin streets to the west and Polk, Larkin, and Hyde streets to the east. Figure 3.1-1 shows the Van Ness Avenue corridor travel pattern study area and the analysis screenlines. Turning movement traffic volume counts[18] collected in 2007 and the SF-CHAMP travel demand forecasting model were used

[18] These traffic turning movement counts were taken at 91 intersections and were a separate effort from the 24-hour traffic counts collected in March 2007 at 5 locations along Van Ness Avenue and 1 location each along Franklin and Gough streets to determine the peak traffic hour.

to examine motorized traffic (i.e., auto and transit) volumes at various screenlines (i.e., cross streets) along the corridor from Market Street to Lombard Street.



Franklin and Gough average a combined 59,000 daily automobile person trips, which is 50 percent more than Van Ness Avenue, making this pair the primary automobile route within the corridor study area.

3.1.1.1 | DEMAND

Van Ness Avenue is a major street within San Francisco's transportation network carrying on average 55,000 trips via motorized modes for a roadway segment on an average weekday of travel (see Table 3.1-1). At an average screenline, 39,000 people travel by private vehicle[19] daily on Van Ness Avenue, referred to by shorthand in this section as "automobile." This is approximately 31 percent of the total number of private vehicle trips made every day along the entire corridor. By contrast, at an average screenline, more than 16,000 people travel via transit daily on Van Ness Avenue, which comprises 80 percent of all transit trips in the Van Ness Avenue corridor study area. Franklin and Gough average a combined 59,000 daily automobile person trips, 50 percent more than Van Ness Avenue, making this pair the primary automobile route within the corridor study area.

Table 3.1-1: Existing Weekday Motorized Travel Demand at Average Screenline

	PRIVATE VEHICLE	TRANSIT	TOTAL
Van Ness Avenue	39,000 (71%)	16,000 (29%)	55,000 (100%)
Van Ness Avenue Corridor Study Area	126,000 (86%)	20,000 (14%)	146,000 (100%)

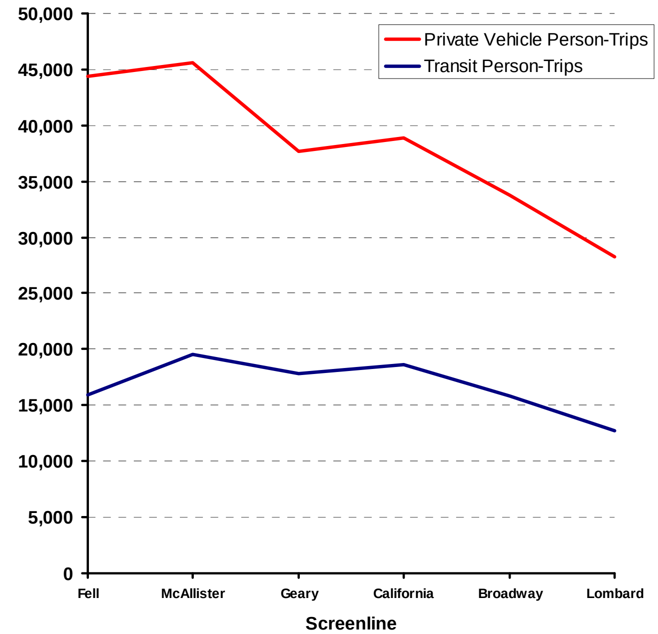
Note: The Van Ness Avenue corridor study area is defined as Van Ness Avenue and five parallel streets, including Gough and Franklin streets to the west and Polk, Larkin, and Hyde streets to the east. Screenlines were defined as motorized traffic that crossed specific streets up and down the corridor, specifically Fell, McAllister, Geary, California, Broadway, and Lombard.

Source: SF-CHAMP

Private vehicle trips along Van Ness Avenue are substantially higher in the southern portion of the study area near Fell and McAllister streets (see Figure 3.1-2) than in the northern portion. Van Ness Avenue automobile person trips peak at Fell Street, which has 60 percent more automobile trips than at Lombard Street; in the Van Ness Avenue corridor, inclusive of the parallel streets, there are more than twice as many daily automobile trips at Fell Street than at Lombard Street. Transit person trips have a different pattern. While the transit person trips are also higher in the southern section near Fell Street than in the northern section, the peak for transit demand is in the mid section between California and McAllister streets.

[19] Private vehicles include: automobiles, trucks, taxis, and motorcycles.

Figure 3.1-2: Existing (2005) Daily Motorized Person-Trips for Van Ness Avenue at Select Screenlines



Note: The existing conditions SF-CHAMP modeling is year 2005.

Source: SF-CHAMP

Although Van Ness Avenue is designated a regional arterial road in the San Francisco General Plan and is part of the US 101 system, the two parallel streets to the west, Franklin and Gough streets, carry more regional automobile trips than Van Ness Avenue.

Regional versus Local Trip Making

Although Van Ness Avenue is designated a regional arterial road in the San Francisco General Plan and is part of the US 101 system, the two parallel streets to the west, Franklin and Gough streets, carry substantially more regional automobile trips than Van Ness Avenue. Local trips are defined as having their origin and destinations within San Francisco; regional trips are defined as having at least one trip endpoint (i.e., origin or destination) outside of San Francisco; pass-through trips are a subset of regional trips that have both endpoints outside San Francisco (e.g., a trip from Marin County to San Mateo County). The one-way orientation of Franklin and Gough streets[20] (Franklin NB, Gough SB), comprising four lanes in each direction during the peak with coordinated signal timing, explains the higher attractiveness of the couplet to regional motorists.

Table 3.1-2 shows the typical origins and destinations of automobile drivers on Van Ness Avenue and Franklin and Gough streets during the PM peak period (i.e., 3:30 p.m. to 6:30 p.m.). The table shows that in the northern end of the corridor at Broadway, Franklin and Gough carry a higher number of regional auto trips than Van Ness Avenue and a significantly higher number of pass-through trips, even though there are fewer total vehicles during the PM peak. In the southern portion of the study area, Franklin/Gough carry a similar portion of regional auto trips, but a significantly higher number and percentage of pass-through auto trips. This indicates that during weekdays, Franklin and Gough streets serve as a regional connection for autos between the Golden Gate Bridge, the Bay Bridge, and the rest of the Bay Area, even more so than Van Ness Avenue.

[20] Gough Street is two-way north of Sacramento Street.

Table 3.1-2: Regional versus Local Auto Trips along Van Ness Avenue and Franklin/Gough Streets during the PM Peak

	TOTAL VEHICLE TRIPS	ALL LOCAL TRIPS[1]	ALL REGIONAL TRIPS[2]	REGIONAL PASS THROUGH TRIPS[3]
At Broadway Screenline				
Van Ness Avenue	8,200 (100%)	5,500 (67%)	2,600 (33%)	<100 (<1%)
Franklin/Gough Streets	6,500 (100%)	3,700 (58%)	2,800 (43%)	400 (6%)
Between Hayes and Grove				
Van Ness (SB only)	4,600 (100%)	3,700 (80%)	900 (20%)	<50 (<1%)
Franklin/Gough	13,000 (100%)	10,700 (80%)	2,600 (20%)	300 (2%)

1. All Local Trips are defined as trips beginning in San Francisco, passing through the screenline on Van Ness or Franklin/Gough, and ending in San Francisco.
2. All Regional Trips are defined as trips that cross the screenline on Van Ness or Franklin/Gough and have at least one of their end points in San Francisco.
3. Regional Pass-Through Trips are defined as trips that begin outside San Francisco, cross the screenline on Van Ness or Franklin/Gough, pass through the corridor, and end outside San Francisco. This is a subset of All Regional Trips.

Source: SF-CHAMP.

Trip Divertibility

San Francisco has a grid structure that allows drivers the opportunity to choose from many routes to get to their destinations. As shown in Table 3.1-3, SF-CHAMP forecasts indicate that less than half of local drivers on Van Ness Avenue have origins or destinations in neighborhoods surrounding Van Ness Avenue. This percentage is higher for regional travelers with an origin or destination outside of San Francisco. This means that these drivers could divert to a variety of routes outside of the main parallel streets in the corridor in the event BRT is implemented on Van Ness Avenue.

Table 3.1-3: Divertible and Nondivertible Trips along Van Ness Avenue (North of Broadway) during PM Peak Period

	TOTAL	LOCAL	REGIONAL
Divertible Trips	52%	41%	76%
Nondivertible Trips	48%	59%	24%
Total	100%	100%	100%

1. Divertible trips are trips that use Van Ness Avenue and pass through the corridor without either end point in a neighborhood surrounding Van Ness Avenue.
2. Nondivertible trips are trips that use Van Ness Avenue and have at least one end point in a neighborhood surrounding Van Ness Avenue, so the trips must use the corridor to depart from their origin and/or arrive at their destination.

Source: SF-CHAMP

3.1.1.2 | MODE SPLIT

Figure 3.1-3: Neighborhoods Surrounding Van Ness Avenue used for Mode Split Analysis

Figure 3.1-3 shows the neighborhoods that surround Van Ness Avenue, as used in the following analysis of mode split. The trips made to, from, and within the neighborhoods that surround Van Ness Avenue are roughly evenly divided between private vehicle trips and other modes (i.e., transit, walking, or bicycling trips). Table 3.1-4 shows the mode split for trips that have an origin and/or a destination in a neighborhood surrounding Van Ness Avenue. Roughly 20 percent of trips to, from, or within these neighborhoods occur by transit. Regional trips are slightly more likely than local trips be on transit, in part due to the catchment area of the Civic Center BART station. More than 25 percent of all the trips that start or end in the Van Ness Avenue neighborhoods are nonmotorized (mainly pedestrian trips). More than half of all trips that start *and* end in the Van Ness Avenue neighborhoods (not shown in table) are walk or bike trips.

Table 3.1-4: Mode Split for Daily Trips To, From, or Within Neighborhoods Surrounding Van Ness Avenue

	TOTAL DAILY PERSONAL TRIPS	PRIVATE VEHICLE TRIPS	TRANSIT TRIPS	WALK/BIKE TRIPS
All Trips	597,000	54%	20%	26%
Local Trips	518,000	51%	20%	30%
Regional Trips	78,600	78%	22%	<1%

Source: SF-CHAMP

3.1.1.3 | COLLISIONS

Within the 2-mile length of Van Ness Avenue in the study area, nearly all collisions over a six year period (approximately 97 percent or 252 of 261) occurred at intersections, based on the most recent data available (2003-2008). The most common types of collisions on Van Ness Avenue over this period were broadside (41 percent), which occurred during vehicle turns, especially left-turn movements; rear end (29 percent), which occurred due to sudden stops and poor traffic signal visibility; auto-pedestrian (11 percent), all of which occurred in the roadway and most of which occurred in crosswalks; and sideswipe (11 percent), which occur mostly during vehicle lane changes. Pedestrian collision injuries on Van Ness Avenue have increased between 2008 and 2010, in spite of the implementation of a double-fine zone for speeding along the length of the study area.

The build alternatives incorporate design features intended to reduce the likelihood of each of these collision types, especially collisions between vehicles and pedestrians. The reduction of left-turn pockets, combined with provision of dedicated left-turn signals, would significantly reduce the likelihood of broadside collisions. The traffic signal mast arms and new signal heads provided as part of SFgo would significantly improve signal visibility, reducing the likelihood of rear-end collisions. Pedestrian countdown signals, improved signal timing, and shorter crossing distances would reduce the likelihood of collisions between vehicles and pedestrians (a more detailed analysis of pedestrian conditions, including collisions, is provided in Section 3.4). Finally, removing bus vehicles, which frequently merge in and out of traffic, from the mixed traffic lanes would contribute to reduced sideswipe collisions.

3.1.2 | Future Travel Patterns

This section discusses future travel patterns in 2015 and 2035 for the No Build Alternative and the three build alternatives (Build Alternative 2 and Build Alternatives 3 and 4, including Design Option B and the LPA). Data for this section were obtained from the SF-CHAMP travel demand forecasting model.

3.1.2.1 | PLANNED NETWORK IMPROVEMENTS

The build alternatives incorporate design features intended to reduce the likelihood of the most common types of vehicles collisions, especially collisions between vehicles and pedestrians.

SF-CHAMP, in its analysis of travel patterns in future years, incorporates transportation network improvements that are likely to be implemented independently of the Van Ness Avenue BRT. Between 2005 and 2015, the key changes to the transportation network assumed in the baseline and all of the build alternatives include:

- Two-way circulation on Hayes and Fell by 2015 (see Chapter 2, Project Description, for more details).

- Central Subway rail project by 2035. This project involves an extension of the T-Third light-rail line underground in the SoMa area beneath Fourth and Stockton Streets to Chinatown. For more information on this project, visit www.sfmta.com/cms/mcsp/cspover.htm.
- Geary BRT by 2035. This project involves similar improvements as the proposed project for Van Ness Avenue, including, a dedicated transit lane, proof of payment/all-door boarding, and TSP. For more information on the Geary BRT, visit www.gearybrt.org.

In addition, SF-CHAMP forecasts of future travel patterns assume growth in regional population and employment provided by ABAG (p2007), as used in the most recently adopted Regional Transportation Plan (RTP), Transportation 2035, for which an EIR was prepared[21]. The projections anticipate significant population and employment growth along the Van Ness Avenue corridor and throughout San Francisco. State of California Government Code 65089 states that databases (i.e., land use inputs) for models such as SF-CHAMP used to determine quantitative impacts of development on the circulation system "…shall be consistent with the databases used by the regional planning agency [i.e., MTC]". For this reason, land use projections used in the SF-CHAMP model for EIRs led by the San Francisco Planning Department, as well as this EIS/EIR, are within 1 percent of regional ABAG projections. The San Francisco Planning Department takes San Francisco's employment and housing growth forecast by ABAG at the county level and distributes the growth within the county to reflect anticipated developments in San Francisco, such as the CPMC and approved and planned projects within the Market and Octavia Area Plan study area. This methodology, which is consistent with local and regional best practices, has been approved by the MTC such that SF-CHAMP was found to be regionally consistent with MTC in San Francisco's Congestion Management Program Update. More information on the methodology to account for future land use growth in SF-CHAMP can be found in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Transit ridership would increase by 28 to 35 percent with the implementation of BRT; more than 50 percent of these new transit riders would be former private vehicle (auto) occupants.

3.1.2.2 | SYSTEM PERFORMANCE: PERSON THROUGHPUT, MODE SHARE, LANE PRODUCTIVITY, AND VEHICLE OCCUPANCY

Mode Share. With the BRT project, a greater percentage of trips in the corridor and on Van Ness Avenue will be made via transit relative to automobile than in the no-build scenario.

With the implementation of BRT, transit ridership would increase by 28 percent (Build Alternative 2) to 35 percent (Build Alternatives 3 and 4, with or without Design Option B, and the LPA); SF-CHAMP outputs indicate that up to 50 percent of these new transit riders could be former private vehicle (auto) occupants, contributing to one of the major goals of the project and the City's Transit First policy by reversing the trend towards declining mode share.

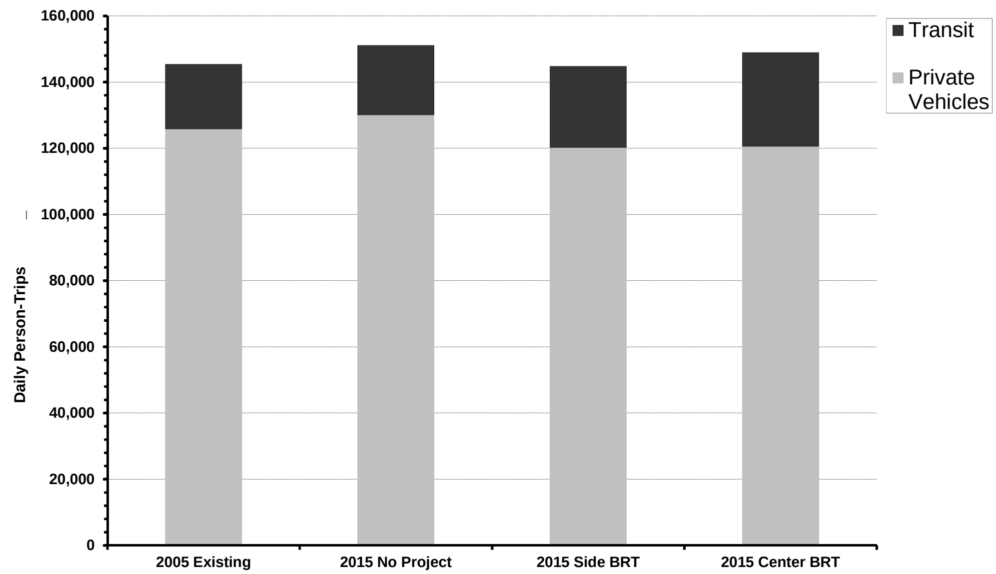
As a result of the increased ridership, average share of trips made by transit on Van Ness Avenue would increase from 29 percent to 40 percent (Build Alternative 2) or 44 percent (Build Alternatives 3 and 4, with or without Design Option B, and the LPA) of all motorized trips on Van Ness Avenue itself; at some locations, transit riders would comprise more than 50 percent of all motorized trips, meaning the two transit lanes would be carrying more people than the four remaining mixed-traffic lanes combined.

Person-Throughput. Person-throughput refers to the number of people that travel through a corridor (e.g., the Van Ness Avenue corridor, from Gough to Hyde streets) on a daily basis. Using outputs from SF-CHAMP, Figure 3.1-4 shows how average person-throughput levels are expected to change with the BRT alternatives. With Build Alternative 2, average daily person throughput in 2015 would decline slightly (4 percent) relative to the no project. With the center BRT alternatives (Build Alternatives 3 and 4, with or without Design Option B,

21 The RTP and its associated EIR are available to the public at the MTC office at 101 Eighth Street, Oakland, CA 94607, and on the MTC Web site at www.mtc.ca.gov.

and the LPA) average daily person-throughphput is maintained in the Van Ness Avenue corridor in the 2015 time horizon. This means that the corridor would carry as many people with center-running BRT as it would without the project. In 2035, all of the build alternatives maintain person throughput in the corridor versus 2035 No Project (change is less than 1 percent). While person-throughput levels are maintained (for Center BRT and the LPA) in the corridor on average between Market and Lombard, changes in person-throughput levels do vary from location to location due to changes in traffic patterns (see Section 3.1.2.3).

Figure 3.1-4: Average Daily Auto and Transit Trips in the Van Ness Avenue Corridor at Average Screenline*



*The LPA performs the same as Center BRT.

Source: SF-CHAMP

It should be noted that this analysis reports forecasted travel demand based on the assumption that the transit network and bus frequencies stay similar to existing conditions; however, BRT would create the capacity to carry more person-throughput than conservative assumptions forecast. Transit network improvements, such as the implementation of the Transit Effectiveness Project's Rapid Network, would also contribute to person-throughput increases in the Van Ness Avenue corridor, more cost effectively than in the No Build Alternative, and without additional vehicular traffic impacts. Preliminary results indicate that 1 to 2 more buses per hour could be added on both the 47 and 49 BRT routes at no additional operating cost based on the travel time savings in 2015 (see Section 3.2 and Chapter 9 of this EIS/EIR).

Lane Productivity. As shown in Table 3.1-5, SF-CHAMP outputs indicate that due to the increase in transit ridership on Van Ness Avenue with BRT service, each travel lane would carry more people per hour (both private vehicles and transit) as a result of BRT when compared with the No Build Alternative. While there would be a decrease in the number of mixed traffic lanes on Van Ness Avenue, the resulting auto travel lanes would carry more people on average than under the No Build Alternative. Transit would carry 13 percent to 36 percent more people in its dedicated lane than each mixed traffic lane carries, and it would provide the capacity to carry many more trips per hour as Muni's Rapid Network and the City's population grow.

Table 3.1-5: PM Peak Person Trips/Lane/Hour at Average Screenline

AVERAGE PM PEAK TRIPS/LANE/HOUR	TRANSIT	PRIVATE VEHICLES
2005 Existing	585	550
2015 No Build Alternative	610	620
2015 Build Alternative 2	780	670
2015 Build Alternatives 3 and 4*	930	670

*The LPA performs the same as Center BRT.

Source: SF-CHAMP

Vehicle Occupancy. Vehicle occupancy is another measure of roadway efficiency. In the 2015 No Build Alternative, an average of 1.7 people occupies each motorized vehicle on Van Ness Avenue, inclusive of private and transit vehicles. With the implementation of BRT and the increased number of people riding transit on Van Ness Avenue, vehicle occupancy would increase to 2.0 (Build Alternative 2) or 2.1 (Build Alternatives 3 and 4 and the LPA) people per vehicle. This means the street would function on average at typical high-occupancy vehicle (HOV) facility levels.

3.1.2.3 | VEHICLE DIVERSIONS

By converting one of the mixed travel lanes in each direction to a transit-only lane, Van Ness Avenue BRT would reduce the private vehicle capacity on Van Ness Avenue.[22] To predict the traffic volumes for all intersections under any scenario, a four-step process was followed and is described below. A complete description of this process can be found in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

68 to 81 percent of all private vehicle (auto) trips on Van Ness Avenue under the No Build Alternative would continue to use Van Ness Avenue if BRT were to be implemented in 2015. The remaining 19 to 32 percent drive on a parallel street within the corridor; use transit; walk or bike; change the time of day of their trip; forego the trip; or continue driving using routes in another part of the city.

1. Traffic turning movement counts were collected at 91 of the 139 intersections in the traffic study area (see Figure 3.3-1 for a map of intersections in the traffic study area) in spring 2007, with a few additional intersections collected in 2008 and 2009 to better model the traffic south of Market Street. The counts were collected at all intersections on Gough, Franklin and Van Ness Avenue, and at an additional 11 intersections on Polk, Larkin, and Hyde streets within the vehicular traffic study area. Traffic counts were also collected at the intersection of the Duboce/13th/US 101 Freeway off-ramp. Intersections where turning movement counts were collected can be found in Appendix 4 of the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).[23]

2. The specific turning movement counts collected as part of Step 1 were used, along with a signal timing plan provided by the SFMTA, to calibrate the existing conditions (2007) Synchro traffic analysis model for all intersections in the vehicular traffic study area. This original set of volumes was balanced for all 139 study area intersections between the total number of vehicles arriving at an intersection and departing from an intersection. For study area intersections along Polk, Larkin, and Hyde streets where existing condition volumes were not collected using turning movement counts, this balancing exercise was used to estimate the amount of traffic in the existing conditions Synchro Model. Section 2.2 of the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013) describes the results of the existing conditions (2007) Synchro traffic model.

   The traffic volume estimates generated by SF-CHAMP for the near-term 2015 and long-term 2035 horizon years were used to calculate growth factors (i.e., percent change in volumes) between 2005[24] and 2015 and between 2005 and 2035 for each north-south

[22] Capacity is reduced by less than one-third because both buses and private vehicles currently use the right-most travel lane, so private vehicles would lose access to slightly less than a full lane of capacity.

[23] Please note that these manual intersection level traffic counts are different than the 24-hour tube counts used to understand general traffic volumes and the highest volume peak period during the week, as described in Section 3.3.2.2.

[24] SF-CHAMP represents transportation in 5-year increments. The 2005 estimates most closely match the 2007 existing conditions traffic volumes collected through field data.

street in four different sections of the corridor from the Duboce/13th/US 101 Freeway off-ramp to Lombard Street, and for the east-west streets by facility type (e.g., arterial, collector, and local streets) in the traffic study area from Mission to Lombard streets. These growth factors were applied to the 2007 traffic volumes and calibrated the existing conditions (2007) Synchro model to estimate 2015 near-term No Build and 2035 long-term No Build traffic volumes to minimize margins of errors. The initial set of future traffic volumes was balanced between the upstream departure volumes and downstream arrival volumes to ensure equilibrium of traffic volumes within the study area. Similarly, traffic volumes generated by SF-CHAMP were used to create growth factors on the parallel streets and side streets for BRT project scenarios. These growth factors were applied to the calibrated Synchro existing conditions model to estimate traffic volumes for each intersection in 2015 and 2035 for all of the build alternatives. The next two steps involved adjustments to the raw model outputs that account for differences in turning opportunities to more realistically represent diverted traffic within the corridor.

Using the raw estimated traffic volumes created through Steps 1 through 3 above, a series of adjustments were made based on knowledge of San Francisco traveler behavior.

The traffic diversion analyses indicate that, on average, private vehicles would decrease by 19 percent to 32 percent in 2015 during the PM peak on Van Ness Avenue with any of the build alternatives (including the LPA), or by roughly 315 to 650 vehicles per hour.[25] This means that 68 percent to 81 percent of all private vehicle trips on Van Ness Avenue under the No Build Alternative would continue to use Van Ness Avenue if BRT were to be implemented.[26]

The remaining 19 percent to 32 percent of private vehicle trips that would otherwise have used Van Ness Avenue under the No Build Alternative 1 (i.e., former Van Ness Avenue drivers) would change their tripmaking in a number of different ways. The changes are forecast to mostly be split between the following choices:

- Continue to make the trip during the PM peak period, but use one of the parallel streets (i.e., Gough, Franklin, Polk, Larkin, or Hyde streets) in the corridor instead; or
- Use transit (see increase in ridership described in Section 3.2); walk or bike; change the time of day of their trip; forego the trip; or continue to drive during the PM peak, but use a route through another part of the city.

Changes in Circulation Patterns within the Van Ness Avenue Corridor. With implementation of BRT, some drivers are expected to change routes, or divert, from Van Ness Avenue to parallel streets due to the reduction in overall vehicle capacity, as well as the reduction of left-turn opportunities from Van Ness Avenue. The reduction in left turns on Van Ness Avenue may make the accessibility of parallel streets relatively more attractive for local drivers in comparison, even at similar speeds. The operational effects and traffic impacts of diversions within the Van Ness Avenue corridor are discussed in greater detail in Sections 3.3.3.2 and 3.3.3.3. In 2015, under Build Alternatives 2-4, including the LPA, approximately 105 to 450 total vehicles in both directions (2 to 7 vehicles per minute) could divert away from Van Ness Avenue and make their trip on a parallel street within the corridor during the PM Peak instead. Franklin Street would be the parallel route most frequently used during the PM peak hour, compared with Gough, Polk, Larkin, and Hyde streets. The amount of additional private vehicle traffic varies widely up and down the 2-mile stretch of corridor analyzed, but any given segment of Polk, Franklin, or Gough streets could experience an

[25] The number of vehicles and trips affected varies along the 2-mile stretch of Van Ness Avenue analyzed.

[26] For Design Option B and the LPA, the elimination of additional left turns would cause vehicles to find alternative routes before they enter South Van Ness and Van Ness Avenue, the very southern end of the corridor near Market Street, having a significantly greater reduction in vehicle traffic volumes on Van Ness Avenue, particularly in the NB direction (up to 965 fewer vehicles per hour than in the No Build Alternative – nearly 50 percent of the vehicular traffic that would have used Van Ness Avenue in the No Build Alternative).

additional 50 to 250 vehicles per hour (vph), or roughly one to four additional vehicles per minute during the PM peak hour in 2015. Larkin and Hyde could also see an increase in traffic volume of approximately 20 to 100 vph (less than two vehicles per minute between the two streets combined during the PM peak hour).[27]

Again, the effect of these increases on traffic speeds and delays are discussed in detail in Section 3.3. With the other transportation system improvements that the Authority and the City are studying, such as those discussed in Section 3.3.4, the number of added vehicles on Franklin and Gough streets may be reduced, along with an improvement in pedestrian conditions on these streets. Intersection level turning movement traffic volumes for existing conditions and each alternative in 2015 and 2035 for the entire traffic study area can be found in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Changes in Circulation Patterns outside the Van Ness Avenue Corridor.[28] SF-CHAMP results also indicate that drivers are also expected to divert to routes outside the Van Ness Avenue corridor. These changes are expected as a response to travelers changing destinations or routes because of left-turn reductions and relative increase in the attractiveness of other corridors compared to the Van Ness Avenue corridor. These drivers, who in the absence of the BRT would have used Van Ness Avenue, would have a number of alternate routes to choose from. SF-CHAMP results indicate that, with implementation of BRT, in 2015, streets outside the corridor (east of Van Ness Avenue to The Embarcadero and west of Van Ness Avenue to Presidio Avenue) may see a total increase in traffic of approximately 200 vehicles in each direction with no street experiencing more than a 50 vph increase in each direction. This increase represents a relatively small percentage of the overall volumes in those corridors.

3.1.2.4 | EFFECTS ON TAXI AND SHUTTLE OPERATIONS

The BRT alternatives would not affect taxi or shuttle operations beyond the effects on private vehicle traffic described above and in Section 3.3. Private shuttles are currently prohibited from using transit lanes or stops citywide. With BRT on Van Ness Avenue, both shuttle services and taxis would continue to operate in mixed-flow traffic lanes. In 2011, the Authority completed a Strategic Analysis Report (SAR) on the Role of Shuttle Services in San Francisco's Transportation System.[29] The report examined existing shuttle services and regulations and developed policy recommendations. The SFMTA is currently developing the Muni Partners Program, a component of the multi-agency Transportation Demand Management Partnership Project led by the Authority.[30] The Partnership Project will examine the feasibility of allowing private shuttles to use transit lanes and stops. The design of the BRT system does not preclude the use of the facilities by private shuttles if it is later adopted as a City policy.

3.1.2.5 | EFFECTS ON TRUCK TURNING MOVEMENTS AND DIVERSIONS

The BRT alternatives would result in some changes to truck circulation from changes to curbed medians and curb bulbs, specifically restrictions in truck turns onto Van Ness Avenue due to smaller turning radii. Preliminary engineering and analysis indicate the following truck turn restrictions may be required for all build alternatives: WB right turn to NB Van Ness Avenue at Market Street, EB left turn to NB Van Ness Avenue and EB right

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[27] The greatest increase in traffic volumes in the study area would be on Franklin Street, north of Market Street for Design Option B and the LPA. Due in large part to the reduction of left-turn pockets along Van Ness Avenue, left-turning vehicles under the Design Option B and LPA would use that segment of Franklin Street to go north, and thus would experience an increase of up to 560 vehicles in 2015 and 620 vehicles in 2035 with the implementation of the LPA. These increases in traffic volumes are significantly higher than the increases at other segments along Franklin Street (more than 3 times the average of increased volumes at other screenline intersections along the corridor), and even higher than intersections on other parallel streets (more than 5 times the increase on Gough Street). This causes operations at the intersection of Franklin and Market Street to operate at LOS F, with more than 100 seconds of delay for the left turn from Market Street onto Franklin Street in 2015 (see Section 3.3.3.2).

[28] Diversions outside the corridor were found to be similar for all of the build alternatives.

[29] The SAR is available at www.sfcta.org/shuttles.

[30] Available on the project website at www.sfcta.org/tdm.

turn to SB Van Ness Avenue at O'Farrell Street, WB left turn to SB Van Ness Avenue at Geary Street, EB right turn to SB Van Ness Avenue at Union Street, EB right turn from NB Van Ness Avenue and WB right turn from SB Van Ness Avenue at Eddy Street, EB right turn from NB Van Ness Avenue at California Street. Build Alternatives 3 and 4 (and the LPA) are anticipated to require truck turn restrictions to EB right turn to NB Van Ness Avenue at Clay Street, EB right turn to SB Van Ness Avenue and WB right turn to NB Van Ness Avenue at Pacific Avenue, EB right turn to SB Van Ness Avenue at Broadway, Greenwich Street and Filbert Street, EB right turn from NB Van Ness Avenue and WB right turn from SB Van Ness Avenue at Hayes Street, WB right turn from SB Van Ness Avenue at Grove Street, McAllister Street and Clay Street, EB right turn from NB Van Ness Avenue and WB right turn from SB Van Ness Avenue at Pacific Avenue, Vallejo Street, Green Street, Union Street, Filbert Street, and Greenwich Street. Under the Vallejo Northbound Station Variant, WB trucks on Vallejo Street would not be able to turn right onto NB Van Ness Avenue.

The proposed Hayes Two-Way Street Conversion Project that is planned for completion in 2015 (see Section 2.7) is expected to preclude truck turns for all right turns, with the exception of the WB turn to NB Van Ness Avenue. In addition, advisory signs stating "Right Turn for Buses/Trucks Not Advised" are proposed at two-way street crossings at Pacific, Broadway, Vallejo, Green, Union, Filbert, Greenwich, and Lombard streets under all alternatives because of encroachment into opposing lanes. This is in addition to the existing advisory signs currently posted at Grove, McAllister, Eddy, California, and Clay streets. The aforementioned truck turning restrictions have been identified as potential turn restrictions during preliminary design. All truck turning restrictions would be identified during final design, and solutions will be sought to avoid prohibiting truck turns.

Under all of the build alternatives, including the LPA, it is unlikely that most trucks would divert from Van Ness Avenue to parallel streets due to the increased grade/slope on parallel streets (trucks are currently prohibited on Franklin Street north of California Street and are also prohibited on Gough Street north of Sacramento Street for this reason), and because they are either traveling regionally on US 101 or making deliveries on Van Ness Avenue.

3.1.3 Summary of Corridor Travel Patterns

The following are key findings about existing and future travel patterns in the Van Ness Avenue corridor and benefits of the proposed BRT project:

KEY FINDINGS

Van Ness BRT is the primary transit street in the corridor, as opposed to Franklin and Gough streets, which are the primary private vehicle streets. BRT would help Van Ness Avenue function more efficiently and increase transit ridership. Vehicle diversions to all other streets in the corridor would add up to less than 7 vehicles per minute under the build scenarios. The project design would improve conditions that factor into the primary collision types that currently occur on Van Ness Avenue.

- Van Ness Avenue is the primary transit street in the Van Ness Avenue corridor study area (see Figure 3.1-1). Under typical existing conditions along the corridor, Van Ness Avenue carries more than 55,000 people daily, with 29 percent of them on transit.
- Franklin and Gough streets are the primary private vehicle (auto) streets in the Van Ness Avenue corridor study area. In 2005, Van Ness Avenue carried less than 31 percent of the corridor's automobile traffic, but more than 80 percent of the transit riders.
- In existing conditions, Franklin and Gough streets are the primary regional routes for private vehicles in the Van Ness Avenue corridor. This pair currently carries a higher number and proportion of regional private vehicle (auto) traffic than Van Ness Avenue.
- Less than half of travelers in private vehicles on Van Ness Avenue under existing conditions have an origin or destination in neighborhoods surrounding Van Ness Avenue, meaning many of them could divert to streets throughout San Francisco rather than use Van Ness Avenue or streets immediately parallel.
- Pedestrian and bicycle trips comprise approximately 25 percent of trips to, from, or within the neighborhoods surrounding Van Ness Avenue.
- With BRT, transit trips would comprise an average of 40 percent (Build Alternative 2) to 44 percent (Build Alternatives 3 and 4, with or without Design Option B, and the LPA) of motorized trips along Van Ness Avenue. At select locations, transit trips would comprise more than 50 percent of motorized trips, meaning the two transit lanes would carry more people than the remaining four mixed travel lanes combined.

- With BRT, person throughput (total number of motorized trips on transit or in private vehicles) would decrease slightly under Build Alternative 2 and would be generally maintained in the center BRT alternatives, including the LPA, compared to the No Build Alternative; however, the number of trips made by transit would increase significantly.
- The BRT lane has significantly higher service capacity than the service assumed in the model. Future service investments would increase person-throughput without additional traffic operations impacts.
- With BRT, each remaining private vehicle lane would carry more people than under the No Build Alternative; however, transit would carry an average of 13 percent (Build Alternative 2) to 36 percent (Build Alternatives 3 and 4 and the LPA) more people in each of its dedicated lanes than each private vehicle lane would carry, and it would provide the capacity to carry many more trips per hour as Muni's Rapid Network and the City's population grow.
- BRT would increase the vehicle occupancy on Van Ness Avenue from 1.7 people per vehicle (existing and No Build Alternative) to 2.0 (Build Alternative 2) or 2.1 (Build Alternatives 3 and 4 and the LPA) people per vehicle. The street would function on average at typical HOV facility levels of approximately 2 people per vehicle.
- The proposed project would address all of the primary collision types that currently occur on Van Ness Avenue.

3.2 Transit Conditions

This section provides a discussion of the local and regional transit systems presently serving the corridor and the planned transit improvements that may affect the corridor; identifies and evaluates the potential environmental consequences of each of the alternatives on transit service; and describes mitigation measures that would reduce or avoid significant impacts. Other performance measures are shown in this section for planning purposes and to aid in the alternatives performance evaluation documented in Chapter 9.

The Locally Preferred Alternative (LPA) is a refinement of the two center-running build alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B). For nearly all of the environmental impact areas and BRT performance areas described in Section 3.2, the LPA (including the Vallejo Northbound Station Variant) has similar environmental consequences to Build Alternatives 3 and 4 with Design Option B, and is so noted. In one instance (platform crowding), the LPA performs the same as Build Alternative 3 with Design Option B, but not Build Alternative 4 with Design Option B, and is so noted. Unless otherwise noted, the Vallejo Northbound Station Variant is anticipated to perform similarly to the LPA. Some small differences in BRT performance (i.e., travel time and reliability benefits) between the LPA and the Vallejo Northbound Station Variant are noted in the text.

3.2.1 | Existing Transit Services, Ridership, and Performance

This section describes the existing transit setting in the Van Ness Avenue corridor, including existing transit services offered, demand, and transit operating performance. Two operators provide transit service along Van Ness Avenue: (1) SFMTA operates Muni buses; and (2) Golden Gate Bridge, Highway and Transportation District (GGBHTD) operates Golden Gate Transit (GGT) buses.

3.2.1.1 | SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY

SFMTA operates two Muni bus routes along the entire length of Van Ness Avenue within the project limits: Routes 47 and 49, which convert into one route, OWL 90, between 1:00 a.m. and 6:00 a.m.

SFMTA operates two 24/7 (i.e., 24 hours per day, 7 days per week) Muni bus routes along the entire length of Van Ness Avenue within the project limits: Routes 47 and 49, which convert into one route, OWL 90, between 1:00 a.m. and 6:00 a.m. Five other Muni routes, including one Sunday-only route, serve a portion of Van Ness Avenue, and one (#19) operates along Polk Street, which runs parallel to Van Ness Avenue to the east. In addition, 32 Muni transit routes, including all 6 Metro lines traveling under Market Street, cross Van Ness Avenue at various intersections along the corridor, providing transfer opportunities to other Muni routes. The subsections below describe each route that runs along the Van Ness Avenue corridor in detail, including service coverage, hours of operation, and headways.

The ridership data for Muni routes were obtained from SFMTA's TEP; the cited data were collected in 2006-2007. As part of the TEP, automatic passenger counter (APC) devices equipped with a GPS were installed on a statistically representative sample of the Muni bus fleet. These devices recorded the number of passengers boarding and alighting buses over a 24-hour period.

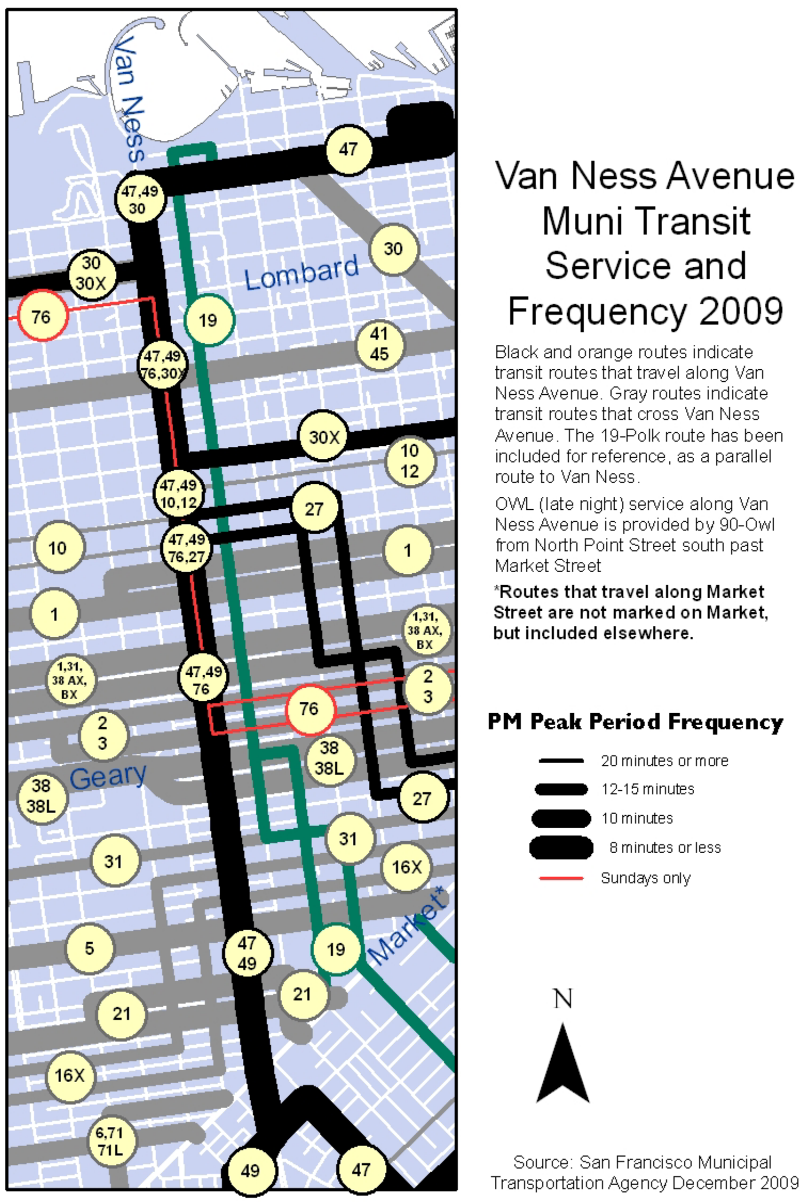
Current Muni fares are $2.00 for adults; $0.75 for seniors, people with disabilities, and youths (ages 5 to 17); and free for children under the age of 5. Transfer receipts are issued on board, free of charge, and are valid on any Muni route for up to 90 minutes from the time of boarding. Monthly passes are $64.00 for adults ($74.00 for passes that include BART fare within San Francisco city limits) $22.00 for seniors, youths, and persons with disabilities; and $32.00 for qualified low-income passengers. These basic fares apply to all buses, Metro/light rail lines, and historic streetcars, except cable cars. One-way cable car fares are $6.00 for those over the age of 5, and $3.00 for seniors and people with disabilities before 7:00 a.m.

and after 9:00 p.m. A proof-of-payment system is in effect on all Metro lines. Any person on an SFMTA vehicle or in the paid area of a Metro subway station must possess valid proof of fare payment in the form of a transfer/receipt, a monthly pass, or a Clipper (formerly Translink) card.

Existing Routes

Several Muni routes on Van Ness Avenue provide regional transit connections to BART, AC Transit, Caltrain, GGT, and SamTrans. Figure 3.2-1 shows the existing transit routes along the Van Ness Avenue BRT corridor.

Figure 3.2-1: Existing Transit Routes along and crossing Van Ness Avenue (does not include Market Street)



Routes Operating along Van Ness Avenue

Table 3.2-1 presents the routes operating along and parallel to Van Ness Avenue. Routes 47 and 49 are the principal transit routes serving the Van Ness Avenue corridor.

Table 3.2-1: Existing Muni Lines along the Proposed Van Ness Avenue BRT Corridor

ROUTES	SEGMENT WITHIN PROJECT AREA	WEEKDAY HOURS OF OPERATION	WEEKDAY AM/PM PEAK HEADWAYS (MIN)	AVERAGE WEEKDAY DAILY RIDERSHIP [(1)]	BOARDINGS BETWEEN MISSION & LOMBARD STREETS
ROUTES OPERATING ALONG VAN NESS AVENUE BRT PROJECT AREA					
47 – Van Ness (MC)	Lombard Street to Mission Street	6:00 a.m. – 1:05 a.m.	8	12,800	7,800
49 – Van Ness – Mission (TC)	Lombard Street to Mission Street	5:40 a.m. – 1:12 a.m.	8	25,300	9,000
90 – San Bruno Owl (MC)	Lombard Street to Mission Street	1:18 a.m. – 4:40 a.m.	N/A	350	200
76 – Marin Headlands (MC)	Lombard Street to Sutter Street	Sundays Only	N/A	N/A	N/A
30X – Marina Express (MC)	Lombard Street to Broadway	AM and PM Peaks Only	AM – 5 PM – 10	2,400	150
12 – Folsom – Pacific (MC)	Pacific Avenue to Washington Street	6:00 a.m. – 12:30 a.m.	20	6,900	360
27 – Bryant (MC)	Jackson Street to Washington Street	5:47 a.m. – 12:57 a.m.	12	7,400	230
ROUTES OPERATING PARALLEL TO VAN NESS AVENUE					
19 – Polk (MC)	Lombard Street to Eddy Street	5:21 a.m. – 1:23 a.m.	12	9,200	2,600

Note:
(1) Ridership accounts for the total daily boardings, in both the inbound and outbound directions.
MC = Motor Coach; TC = Trolley Coach

Sources: Muni Schedule (December 2009); Transit Effectiveness Project/APC Data (2006-2007)

47 – Van Ness. Muni Route 47 bus line, using diesel and diesel-hybrid buses, provides local service from Fisherman's Wharf to the Caltrain Station at Fourth and Townsend streets, passing through a mix of commercial, institutional, and residential uses along Van Ness and South Van Ness avenues and across SoMa areas on Bryant and Harrison streets. Route 47 runs along the entire length of the proposed Van Ness Avenue corridor.

49 – Van Ness – Mission. Muni Route 49 trolleybus line provides local service between Fort Mason and City College of San Francisco via Van Ness Avenue and Mission Street; it serves as a primary north-south arterial transit route in the city.

90 – San Bruno (Owl Service). Muni Route 90 Owl service is provided at night between North Point and Arleta via Van Ness Avenue, Potrero Avenue, Bayshore Boulevard, and San Bruno Avenue. Route 90 Owl replaces Routes 47 and 49 on Van Ness Avenue between 1:00 a.m. and 5:00 a.m.

76 – Marin Headlands. Route 76 provides local service between the Marin Headlands and the Caltrain Station via the Golden Gate Bridge and downtown, only on Sundays and some holidays.

30X – Marina Express. Route 30X operates over a limited portion of Van Ness Avenue and provides express bus service during weekday AM and PM peak periods only, connecting the Marina and Financial districts.

Routes 12 and 27. These two lines operate over a limited portion of Van Ness Avenue. Route 12 operates along Van Ness Avenue between Pacific Avenue and Washington Street, and Route 27 operates between Jackson and Washington streets.

Routes 12, 27, 30X, 76, and 90 use standard (40- foot) motor coach buses.

Routes Operating Parallel to Van Ness Avenue

19 – Polk. Route 19 provides service between the Marina District and Hunters Point along Polk Street, $7^{th}/8^{th}$ streets, various streets in Potrero Hill, and then Evans Street to the Hunters Point Shipyard. Route 19 runs on Polk Street, one block east of Van Ness Avenue, serving as an alternative north-south transit route next to Routes 47 and 49. Route 19 operates every 10 minutes during the AM and PM peak periods, every 24 minutes during midday (or every 12 minutes to the north of Townsend), and every 20 minutes from 6:00 p.m. to 1:30 a.m. Route 19 averages 9,200 daily passengers, 2,600 of whom board between Lombard and Eddy streets on Polk Street.

Routes Crossing Van Ness Avenue

There are 32 Muni transit lines that cross Van Ness Avenue between Mission and Lombard streets, including 24 bus routes, 6 light-rail transit lines (Metro), one historic streetcar (F-Line) and one cable car (C). Table 3.2-2 shows the basic characteristics of these lines. Appendix A gives more detailed description of each.

Table 3.2-2: Existing Muni Service crossing the Proposed Van Ness Avenue BRT Corridor

ROUTES CROSSING VAN NESS AVENUE	CROSS STREET(S) AT VAN NESS/ SOUTH VAN NESS AVENUE	WEEKDAY HOURS OF OPERATION	WEEKDAY AM/PM PEAK HEADWAYS (MIN)	AVERAGE WEEKDAY RIDERSHIP (1)
1 – California (TC)	Sacramento Street (outbound)/ Clay Street (inbound)	5:22 a.m. – 1:25 a.m.	3 – 8	23,600
1AX – California 'A' Express (MC)	Pine Street (outbound)/ Bush Street (inbound)	AM and PM Peaks Only	AM – 10 PM – 15	760
1BX – California 'B' Express (MC)	Pine Street (outbound)/ Bush Street (inbound)	AM and PM Peaks Only	AM – 6 PM – 15	1,700
2 – Clement (MC)	Sutter Street (outbound)/ Post Street (inbound)	5:17 a.m. – 7:18 p.m.	10	7,100
3 – Jackson (TC)	Sutter Street (outbound) / Post Street (inbound)	7:06 a.m. – 1:05 a.m.	10	4,200
5 – Fulton (TC)	McAllister Street	24 Hours	AM – 6 PM – 5	14,000
6 – Parnassus (TC)	Market Street	6:20 a.m. – 12:22 a.m.	10	7,200
10 – Townsend (MC)	Jackson Street (outbound)/ Washington Street (inbound)	5:06 a.m. – 8:44 p.m.	20	3,200
14 – Mission (TC)	Mission Street	24 Hours	AM – 12 PM – 6	32,800
14L – Mission Limited (MC)	Mission Street	8:40 a.m. – 3:51 p.m.	N/A	4,900
16X – Noriega Express (MC)	Turk Street (outbound)/ Golden Gate Avenue (inbound)	AM and& PM Peaks Only	AM – 10 PM – 15	910
21 – Hayes (TC)	Hayes Street (outbound)/ Grove Street (inbound)	5:36 a.m. – 12:52 a.m.	7	8,800

Table 3.2-2: Existing Muni Service crossing the Proposed Van Ness Avenue BRT Corridor

ROUTES CROSSING VAN NESS AVENUE	CROSS STREET(S) AT VAN NESS/ SOUTH VAN NESS AVENUE	WEEKDAY HOURS OF OPERATION	WEEKDAY AM/PM PEAK HEADWAYS (MIN)	AVERAGE WEEKDAY RIDERSHIP (1)
30 – Stockton (TC)	Chestnut Street and North Point Street	4:49 a.m. – 1:30 a.m.	3-6	23,700
31 – Balboa (TC)	Eddy Street	5:25 a.m. – 12:39 a.m.	12	9,000
31AX – Balboa 'A' Express (MC)	Pine Street (outbound)/ Bush Street (inbound)	AM and PM Peaks Only	AM – 8 PM – 10	900
31BX – Balboa 'B' Express (MC)	Pine Street (outbound)/ Bush Street (inbound)	AM and PM Peaks Only	AM – 10 PM – 15	770
38 – Geary (MC)	Geary Boulevard (outbound)/ O'Farrell Street (inbound)	24 Hours	6 – 12	33,000
38L – Geary Limited (MC)	Geary Boulevard (outbound)/ O'Farrell Street (inbound)	6:00 a.m. – 6:40 p.m.	5 – 7	21,300
38AX – Geary 'A' Express (MC)	Pine Street (outbound) / Bush Street (inbound)	AM and PM Peaks Only	AM – 10 PM – 15	990
38BX – Geary 'B' Express (MC)	Pine Street (outbound) / Bush Street (inbound)	AM and PM Peaks Only	AM – 8 PM – 15	1,200
41 – Union (TC)	Union Street	AM and PM Peaks Only	AM – 6 PM – 7	3,000
45 – Union – Stockton (TC)	Union Street	6:10 a.m. – 1:03 a.m.	9	12,100
71 – Haight – Noriega (MC)	Market Street	Non-peak Hours	10	10,300
71L – Haight–Noriega Limited (MC)	Market Street	AM and PM Peaks Only	10	2,100
J – Church (LRV)	Market Street	5:09 a.m. – 12:16 a.m.	9	16,700
K Ingleside/ T Third (LRV)	Market Street	5:09 a.m. – 12:16 a.m.	9	32,700
L – Taraval (LRV)	Market Street	24 Hours	8	29,800
M – Ocean View (LRV)	Market Street	5:42 a.m. – 12:10 a.m.	9	28,700
N – Judah (LRV)	Market Street	24 Hours	7	45,300
S – Castro Shuttle (LRV)	Market Street	7:32 a.m. – 6:55 p.m.	9 – 11	N/A
F – Market & Wharves (HSC)	Market Street	5:47 a.m. – 12:38 a.m.	7	18,500
C – California (CC)	California Street	6:23 a.m. – 12:32 a.m.	AM – 6 PM – 8	3,700

Note:
(1) Ridership accounts for the total daily boardings in both the inbound and outbound directions.
MC = Motor Coach; TC = Trolley Coach; LRV = Light Rail Vehicle; HSC = Historic Street Car; CC = Cable Car

Sources: Muni Schedule (December, 2009); Transit Effectiveness Project/APC Data (2006-2007).

3.2.1.2 | REGIONAL TRANSIT SERVICES

Golden Gate Transit

The GGBHTD provides regional transit services between San Francisco, Marin, and Sonoma counties with GGT buses and Golden Gate ferries. The information listed in this section reflects service levels as of 2007. Twenty-two (22) GGT bus routes serve San Francisco: 3 basic routes and 19 commute routes. Buses on the basic routes run daily at 60-minute headways, while commute buses run during peak periods in the peak direction only (to San Francisco in the morning; to Marin and Sonoma in the afternoon/evening) with more frequent service.

Of the 22 GGT bus routes, 8 routes (Routes 10, 54, 70, 72, 73, 76, 80, 93, and 97) travel along Van Ness Avenue south of Lombard Street, and one route (Route 10) crosses Van Ness Avenue at Golden Gate Avenue (inbound) and at McAllister Street (outbound). The other 13 routes, as well as most trips on routes 54, 72, and 76, travel along Van Ness Avenue north of Lombard Street, using Beach and Battery streets inbound and Sansome and North Point streets outbound to serve the Financial District.

Routes 10, 70, and 80 are basic routes; all of the other routes are commute routes. Routes 70, 73, 80, and 93 travel along Van Ness Avenue between Lombard and Golden Gate Avenue (inbound) and McAllister Street (outbound); Route 97 travels along Van Ness Avenue between Lombard Street and Broadway. Table 3.2-3 shows the basic characteristics of these lines.

The Golden Gate Bridge Highway and Transportation District provides regional transit services between San Francisco and Marin and Sonoma counties with Golden Gate Transit buses and Golden Gate ferries.

Table 3.2-3: Existing Golden Gate Transit Service in or near the Proposed Van Ness Avenue BRT Corridor

ROUTE	SERVICE AREA	TYPICAL WEEKDAY HOURS OF OPERATION	WEEKDAY PM PEAK HEADWAYS (1) (MIN)	AVERAGE PM PEAK RIDERSHIP (SF BOARDING ONLY)	PM PEAK LOAD FACTOR (2)
10	Marin City – Sausalito – San Francisco	6:38 a.m. – 7:31 p.m.	60	17	45%
70	Novato – San Rafael – Marin City – San Francisco	5:16 a.m. – 12:43 a.m.	30	15	61%
80	Santa Rosa – Novato – San Rafael – San Francisco	4:01 a.m. – 11:43 p.m.	60	15	81%
54	San Marin – Novato – San Francisco	AM and PM Peaks Only	10	179	45%
72	Santa Rosa – San Francisco	AM and PM Peaks Only	20	80	47%
73	Santa Rosa – San Francisco Civic Center	AM and PM Peaks Only	30	25	54%
76	East Petaluma – San Francisco	AM and PM Peaks Only	20-30	20	40%
93	Golden Gate Bridge Toll Plaza – Van Ness Ave – San Francisco Civic Center	AM and PM Peaks Only	30	16	N/A
97	Larkspur Ferry Terminal – San Francisco	5:30 a.m.	Once a day	N/A	N/A

Notes:
(1) Peak 1-hour between 4:00 p.m. and 7:00 p.m.
(2) Load factor refers to the ratio of ridership to bus seating capacity (Golden Gate Transit policy does not allow standees).

Source: Joshua Widmann, Golden Gate Transit .

The GGT service area is divided into seven fare zones: one in San Francisco, three in Marin County, two in Sonoma County, and one in Contra Costa County. The fares vary depending on trip length and number of fare zones crossed. In 2007, one-way adult bus fares between San Francisco and Marin County range from $3.60 to $5.30, and one-way adult fares between San Francisco and Sonoma County range from $7.60 to $8.40. One-way adult fares between San Francisco and Contra Costa County were $6.60. Half-price discount fares apply to youths (ages 8 to 18), seniors 65 years and older, persons with disabilities, and Medicare cardholders. In addition, purchasers of 20 tickets or more are eligible for a 20 percent discount.

Basic Service Routes

Route 10. Route 10 provides daily service between Marin City, Sausalito, and San Francisco, with additional service on weekdays to Tam Valley. Route 10 travels on Park Presidio Boulevard, Geary Boulevard, Golden Gate Avenue/McAllister Street, and Mission Street and also serves the Transbay Terminal.

Route 70. Route 70 provides daily service between Novato, San Rafael, Marin City, and San Francisco. Route 70 travels on Lombard Street, Van Ness Avenue, Golden Gate Avenue/ McAllister Street, and Mission Street and serves the Transbay Terminal.

Route 80. Route 80 provides daily service between Sonoma, Marin, and San Francisco counties. Areas of service include Santa Rosa, Rohnert Park, Cotati, Petaluma, Novato, San Rafael, Marin City, and San Francisco (Civic Center and Financial District). Route 80 travels on Lombard Street, Golden Gate Avenue/McAllister Street, and Mission Street and serves the Transbay Terminal.

Commute Service Routes

Route 54. Route 54 is a weekday commute service that provides service between Novato and San Francisco. Most trips serve the Financial District, but one morning and one afternoon trip serve the San Francisco Civic Center via Lombard Street, Van Ness Avenue, and Golden Gate Avenue/McAllister Street.

Route 72. Route 72 is a weekday commute service that provides service between Santa Rosa, Rohnert Park, Cotati, and San Francisco. Most trips serve the Financial District, but one morning and one afternoon trip serve the San Francisco Civic Center via Lombard Street, Van Ness Avenue, and Golden Gate Avenue/McAllister Street.

Route 73. Route 73 is a weekday commute service that provides service between Santa Rosa, Rohnert Park, Petaluma, and San Francisco. It is an exclusive Civic Center service that operates via Lombard Street, Van Ness Avenue, and Golden Gate Avenue/McAllister Street.

Route 76. Route 76 provides service between East Petaluma and San Francisco during the AM and PM peak periods. While most Route 76 buses travel directly to the Financial District via Battery and Sansome streets, two buses (leaving Petaluma at 5:35 a.m. and 6:13 a.m.) are routed along Van Ness Avenue to Civic Center.

Route 93. Route 93. Route 93 provides weekday commute shuttle service from the Golden Gate Bridge Toll Plaza to the San Francisco Civic Center via Lombard Street, Van Ness Avenue, and Golden Gate Avenue/McAllister Street.

Route 97. Route 97 provides one morning express trip on weekdays from the Larkspur Ferry Terminal to the San Francisco Financial District via Lombard Street, Van Ness Avenue, and Broadway.

Employer Shuttle Services

Private shuttles, such as employer buses traveling to and from Silicon Valley and the Peninsula, are a rapidly growing regional transit service. The Van Ness Avenue corridor has recently seen expanded growth of large employer shuttle services traveling along Van Ness Avenue, in addition to pick-ups and drop-offs on Van Ness Avenue.

3.2.1.3 | EXISTING MUNI OPERATING CHARACTERISTICS

This section presents existing Muni bus performance along Van Ness Avenue, including crowding (i.e., load factor), travel speed and delay, travel time relative to driving, and reliability. Each of these measures was analyzed using the most recent data available. Crowding was analyzed using APC data collected in 2007 by SFMTA as part of the TEP. Both APC data (2007) and SFCTA's 2004 transit speed and delay survey data were used to analyze existing travel time, speed, and delay. Travel time and dwell time delay data were obtained from APC data; mixed traffic and signal time delay data are inferred from the APC data based on findings from the 2004 transit speed and delay survey. Reliability, which was measured by headway adherence, was based on headway data collected in 2004. The auto and transit travel time comparison was based on APC data (2007) and traffic counts performed in 2008.

Bus Stops and Transfers

Figure 3.2-2 presents the locations of existing bus stops for the Muni lines operating along Van Ness Avenue. There are 14 NB and 14 SB Muni bus stops along Van Ness Avenue between Market and Lombard streets, and an additional NB bus stop located at South Van Ness and Mission Street. The average stop spacing is approximately 700 feet, which is less than the Muni service standard of approximately 800 to 1,000 feet along streets with grades less than 10 percent, such as Van Ness Avenue.

Figure 3.2-2: Existing Transit Stops for Muni Routes 47/49 on Van Ness Avenue BRT Corridor

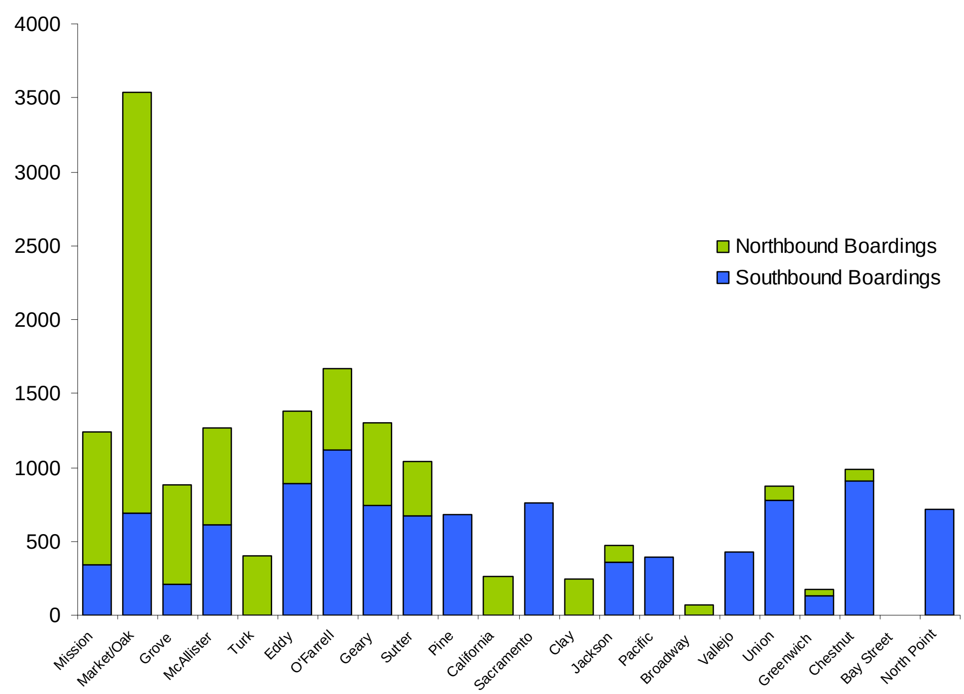
An onboard survey conducted in 2005 by SFCTA shows that major transfers between the 47/49 lines and crossing routes occur, in order of transfer activity, at Market Street, Geary Boulevard, Mission Street, Hayes Street, and California Street.

Today, the Muni 47 and 49 share the same stops along Van Ness Avenue in the study area between Mission and Greenwich streets. Outside the study area, they have different routes: Route 49 begins at North Point and travels south to City College along Van Ness Avenue, Mission Street, and Ocean Avenue, whereas Route 47 starts in Fisherman's Wharf, meets Route 49 at North Point and Van Ness Avenue, leaves South Van Ness Avenue at Mission Street and travels through SoMa to terminate at the 4th/King Caltrain station. The TEP recommended a slightly alternative route for the 47 through SoMa, which this study assumes is implemented in 2015 for all future year scenarios.

Ridership and Mode Shares

The total number of daily passenger boardings and loads on Routes 47 and 49 are shown by stop in Figure 3.2-3. As the chart indicates, boardings peak near Market Street in the NB direction, likely due to transfer activity. There are multiple locations with heavy boardings in the SB direction, and riders board the bus fairly consistently throughout the corridor. Major stops in the corridor are similar for both lines, and they consistently are at locations with transfers to other significant Muni transit lines. (e.g., Geary and O'Farrell have convenient transfers to the 38-Geary line).

Figure 3.2-3: Daily Boardings by Stop for Routes 47 and 49



Source: APC data (2006-2007).

Crowding (Load Factor)

Bus crowding is measured by load factor, which is the number of passengers on board a transit vehicle relative to capacity. Muni's Short-Range Transit Plan presents a definition of maximum capacity – the total number of passengers allowed, including the number of seats and a set number of standees – and a representative number for each vehicle type. Muni policy calls for vehicles to operate at 85 percent or less of the 100 percent, or "crush," load at the most crowded point (i.e., maximum load point [MLP]) along a route during the peak period. Table 3.2-4 shows the seating capacity, 85 percent capacity, and a 100 percent capacity for Routes 47, 49, and 19.

Table 3.2-4: Passenger Capacities

ROUTE	SEATING CAPACITY	85% CAPACITY	100% CAPACITY
Route 47 (MC)	39	54	63
Route 49 (AT)	57	80	94
Route 19 (MC)	39	54	63

MC – motor coach (40-foot); AT – articulated trolley coach (60-foot)

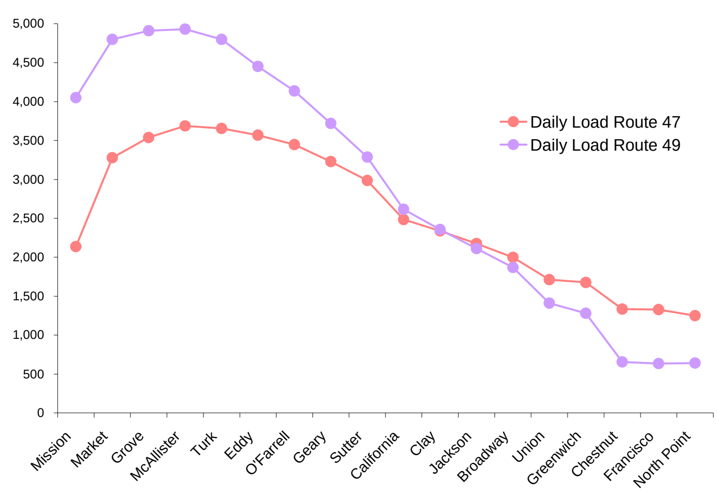
Table 3.2-5 presents the PM peak-hour ridership and vehicle load factors at the MLP for the Muni lines operating along Van Ness Avenue and Polk Street. For NB and SB trips, the MLP for Routes 47 and 49 occurs at Van Ness Avenue and McAllister Street near Civic Center, as seen in Figures 3.2-4 and 3.2-5. During the PM peak hour (usually between 3:00 p.m. and 5:00 p.m.), the Route 47 MLP occurs in the NB direction at Van Ness Avenue and McAllister Street, averaging 44 passengers per bus, with a load factor of 0.7. During the PM peak period, Route 49 can average as many as 49 people in the NB direction at its MLP at Van Ness Avenue and McAllister Street, with a load factor of 0.52. During the PM peak in the NB direction, Route 19 averages 45 passengers per bus at its MLP, with a load factor of 0.71.

Table 3.2-5: Existing Northbound PM Peak-Hour Muni Ridership and Load Factor

ROUTE (1)	MAXIMUM LOAD POINT	PM PEAK-HOUR RIDERSHIP	% OF SEATING CAPACITY AT MLP	% OF TOTAL CAPACITY AT MLP
47 – Van Ness (NB)	Van Ness Avenue & McAllister Street	340	113%	70%
49 – Van Ness – Mission (NB)	Van Ness Avenue & McAllister Street	391	86%	52%
19 – Polk Street (NB)	7th Street & Howard Street	223	114%	71%

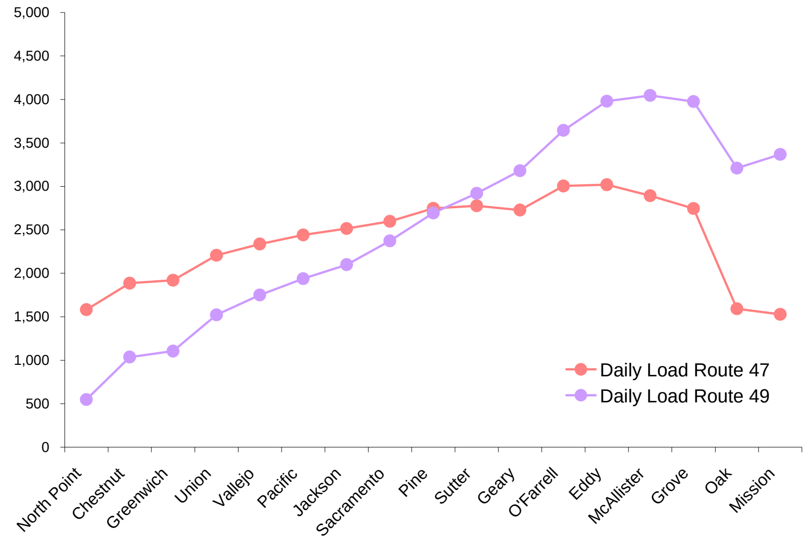
Source: APC data (2006-2007).

Figure 3.2-4: Northbound Daily Load (Passenger Volume) for Routes 47 and 49



Source: APC (2006-2007).

Figure 3.2-5: Southbound Daily Load (Passenger Volume) for Routes 47 and 49



Source: APC data (2006-2007)

The load factor analysis indicates that Van Ness Avenue buses operate with crowded, but not crush conditions, which is contrary to some riders' experiences. The average load factor for the corridor can mask the situation on any individual bus and may be closely related to reliability.

The load factor analysis indicates that Van Ness Avenue buses operate with crowded, but not crush conditions, which is contrary to some riders' experiences. The average load factor for the corridor can mask the situation on any individual bus. Because these loads are averaged over the peak hour, the difference between the data and anecdotal experience of crowded Van Ness Avenue buses may be explained by reliability issues; when headways are not evenly spaced, some buses will be extremely crowded and others much less crowded. The discussion of transit reliability is presented later in this section under Route Segment Reliability.

Travel Time, Speed, and Delays

Transit travel times (i.e., speeds), and the amount of time spent in delay, is a key indicator of transit performance. Transit delays come in various forms. Dwell time is defined as the time elapsed from the opening to the closing of the bus doors. This includes the onboard service time associated with fare payment, as well as boarding and disembarking, and is not all delay time; however, delays do occur during the dwell period associated with fare collection and loading/unloading. Signal delay is the time spent waiting at red lights. Mixed traffic delay includes time spent waiting to pull in and out of traffic and time spent behind parking, double-parked, or right-turning cars. It should be noted that mixed traffic contributes to some dwell time delays due to bus bunching and difficulties for buses pulling out of stops.

KEY FINDING

Van Ness Avenue buses spend approximately half of their travel time stopped in some sort of delay.

During the PM peak period, travel speeds are marginally lower in the SB direction (i.e., 5.5 mph) than in the NB direction (i.e., 6.3 mph), and time spent for various delays is slightly greater. Van Ness Avenue buses spend about half of their travel time stopped in some sort of delay. Signal and mixed-traffic delays account for more than 50 percent of total delay; 58 percent in the NB direction and 50 percent in the SB direction.

Van Ness Avenue buses today spend approximately 17 seconds in delay at a typical intersection. Even when dwell time is subtracted from transit travel times, buses remain slower than autos because they experience greater signal and mixed traffic delays than automobiles.

Van Ness Avenue buses currently average 5.2 mph, inclusive of dwell time. Current transit travel times on the BRT route are 17.5 minutes for the Muni 49 segment between Clay Street and Mission/Otis/Duboce (approximately 1.5 miles) and 14.4 minutes for the shorter Route 47 segment between Clay and Mission/Otis/South Van Ness (approximately 1.2 miles).

Route Segment Reliability

Reliability affects the amount of time passengers must wait at a transit stop for a transit vehicle to arrive, the consistency of passengers' arrival times at a destination from day to day, and passengers' total trip time. Reliability is measured here in terms of travel time variability and headway adherence, including percent of bunched buses.

Headway adherence is a standard measure of reliability when bus service operates at frequencies of six buses or more per hour. Headway adherence is important for frequent service, because the inability to keep a uniform headway is an indication of bus bunching, which leads to overcrowding for the lead bus and longer waits than expected for passengers. Bus bunching is caused, among other reasons, by buses operating in mixed-traffic operation. When a downstream bus is substantially delayed because of traffic congestion or inefficient signal progression, it could arrive at a bus stop at the same time as the next scheduled bus.

Bus bunching is caused by buses operating in mixed-traffic operation. When a downstream bus is substantially delayed because of traffic congestion or inefficient signal progression, it could arrive at a bus stop at the same time as the next scheduled bus.

A February 2004 SFCTA field survey illustrates current reliability conditions. Although during the PM peak, Muni Routes 47 and 49 are not bunched (i.e., defined as headways of less than 1 minute) at the beginning of their routes, approximately 4 percent of SB buses become bunched by the time they reach O'Farrell Street, and 7 percent become bunched by the time they reach Oak Street. As shown in Table 3.2-6-6, 45 percent of buses arrive at North Point with fairly evenly spaced headways between 6 and 9 minutes, which is nearly three times the number of buses that arrive with extremely irregular headways of 2 minutes or less or 13 minutes or greater. By O'Farrell Street, the buses are just as likely to arrive with extreme headways as they are to arrive with even spacing, with the trend continuing to Oak Street. Furthermore, because buses with short headways are bunched closely together, randomly arriving passengers are more likely to experience longer headways and on buses that are also more crowded. Routes 47 and 49 are intended to operate in an evenly staggered manner along the corridor because a relatively high proportion of the passengers exit at Market Street; therefore, when the two routes are considered together, the bunching problems are amplified.

Table 3.2-6: Headway Variability for Routes 47 and 49, Southbound during PM Peak

STOP LOCATION (SOUTHBOUND DIRECTION ONLY)	% OF BUSES ARRIVING WITH 6- TO 9-MINUTE HEADWAYS	% OF BUSES ARRIVING WITH 2-MINUTE-OR-LESS OR 13-MINUTE-OR-GREATER HEADWAYS
North Point	45	17
O'Farrell Street	31	28
Oak Street	32	31

Source: SFCTA Field Survey (2004).

3.2.2 | Future SFMTA Transit Services, Ridership, and Performance

3.2.2.1 | STOP LOCATIONS

Each of the BRT alternatives would provide 8 station platform locations NB and 9 station platform locations SB (reduction of 6 locations in each direction), as shown in Chapter 2, Figure 2-2. The LPA would provide 8 stations in the NB direction and 9 stations in the SB direction (the Vallejo Northbound Station Variant would include an additional NB station for a total of 9 NB stations), with the Mission Street NB station relocated south of the BRT corridor (the 47 would continue to stop at Mission Street/South Van Ness Avenue, but on the south, nearside, of the intersection). BRT station platform locations were selected based on current and expected future demand levels, as well as to preserve key transfer points between the BRT and other Muni Rapid routes. Further stop distances, and therefore further walking distances, were taken into account in ridership forecasting. The BRT stop

Each of the BRT alternatives would provide 9 station platform locations northbound and 8 station platform locations southbound. BRT station platform locations were selected based on current and expected future demand levels, as well as to preserve key transfer points between the BRT and other Muni Rapid routes.

locations would be spaced approximately 900 feet apart on average, which is a spacing that falls within SFMTA standards for stop spacing on rapid routes. Secondary effects on pedestrians and universal design from increased walking distances are discussed in Section 3.4, Nonmotorized Transportation.

3.2.2.2 TRANSIT RIDERSHIP

Methodology

The future year (2015 and 2035) Muni ridership forecast was developed using SFCTA's travel demand forecasting model – SF-CHAMP. SF-CHAMP provides the percent change in ridership on each line for each scenario modeled. SF-CHAMP does not forecast any difference in ridership between Build Alternatives 3 and 4 with or without Design Option B, which also applies to the LPA.

Transit Ridership Forecasts

Ridership on Routes 47 and 49 is projected to increase by 8 percent in 2015 under the No Build Alternative, by 29 percent under Build Alternative 2, or by 37 percent under Build Alternatives 3 and 4.

SF-CHAMP results indicate that ridership on Routes 47 and 49 would increase by 8 percent in 2015 under the No Build Alternative due to an increase in population and employment in the study area and throughout San Francisco, as well as minor transit improvements such as low-floor buses and stop consolidation on Mission Street. Systemwide Muni ridership will increase by 5 percent during this time period for similar reasons.

With the proposed project, Year 2015 transit boardings on Routes 47 and 49 would increase by 29 percent (Build Alternative 2) and 37 percent (Build Alternatives 3 and 4, with or without Design Option B, and the LPA) relative to existing conditions (see Table 3.2-7). Of the growth in boardings between the Build and No Build Alternatives, more than 80 percent is expected to occur on the Van Ness Avenue portions of Muni Routes 47 and 49. SFMTA systemwide boardings would increase by 6 percent under Build Alternative 2 and 7 percent under Build Alternatives 3 and 4, with or without Design Option B, and the LPA relative to existing conditions.

Table 3.2-7: Existing and Near-Term (2015) Daily Transit Boardings on Muni Routes 47 and 49

	2007 EXISTING	2015 NO BUILD ALTERNATIVE	2015 BUILD ALTERNATIVE 2	2015 BUILD ALTERNATIVES 3 AND 4 (WITH OR WITHOUT DESIGN OPTION B)*
#47	12,800	13,600	15,600	16,700
#49	25,300	27,300	33,500	35,600
Total	38,100	40,900	49,100	52,300
% Change relative to Existing	n/a	8%	29%	37%

*Same performance as LPA.

Source: APC data (2006-2007) and SF-CHAMP.

In the long-term horizon year (2035), ridership increases further due to population and employment growth, in addition to transit operational improvements. As shown in Table 3.2-8, under the No Build Alternative (Alternative 1), daily ridership increases by 23 percent (33 percent systemwide) relative to existing conditions. Under the build alternatives, daily ridership on Muni Routes 47 and 49 increases by 51 percent (Build Alternative 2) and 59 percent (Build Alternatives 3 and 4, with or without Design Option B, and the LPA). Of the growth in boardings between the Build and No Build Alternatives, more than 70 percent is expected to occur on the Van Ness Avenue portions of Muni Routes 47 and 49.

Table 3.2-8: Existing and Long-Term (2035) Daily Transit Boardings on Muni Routes 47 and 49

	2007 EXISTING	2035 NO BUILD ALTERNATIVE	2035 BUILD ALTERNATIVE 2	2035 BUILD ALTERNATIVES 3 AND 4 (WITH OR WITHOUT DESIGN OPTION B)*
#47	12,800	16,300	19,500	20,700
#49	25,300	30,600	37,800	40,000
Total	**38,100**	**46,900**	**56,300**	**60,700**
% Change relative to Existing	**n/a**	**23%**	**51%**	**59%**

*Same performance as LPA.

Source: APC data (2006-2007) and SF-CHAMP.

3.2.2.3 | TRANSIT TRAVEL TIME, SPEED, DELAY, AND RELIABILITY

Methodology

Future year (2015) Muni travel time, speed, delay, and reliability were estimated using the VISSIM microsimulation model for the weekday PM peak hour (5:00 p.m. to 6:00 p.m.). VISSIM is able to represent transit operations, including TSP, as well as dwell and mixed traffic delays, as its own mode. The VISSIM data portfolio can be found as an appendix to the Vehicular Traffic Transportation Technical Memorandum (CHS, 2013). The study area for the VISSIM model is along the BRT route from South Van Ness Avenue at Mission Street to Van Ness Avenue at Clay Street. The model also includes the block between Duboce/Mission/Otis/US 101 off-ramp and Mission/Otis/ South Van Ness for Route 49 and autos. Travel time and speed estimates from the VISSIM model presented here will vary slightly from the Synchro model estimates presented in Section 3.3 due to different modeled study areas, the simulation of signal priority in VISSIM, and other factors. The purpose of the VISSIM estimates presented in this section is to measure the relative travel time and speed difference between autos and transit and differences in speeds and delays between the BRT alternatives, whereas the purpose of the Synchro model results shown in Section 3.3 is to analyze the relative difference in automobile intersection Level of Service (LOS).

Future Year (2015) Transit Travel Time, Speed, and Delay

2015 No Build Alternative transit travel times remain similar to existing conditions. While autos would be able to travel between Van Ness Avenue at Clay Street and Duboce/ Mission/Otis/US 101 in approximately 9 minutes, it would take Route 49 nearly twice that amount of time (see Figure 3.2-7).

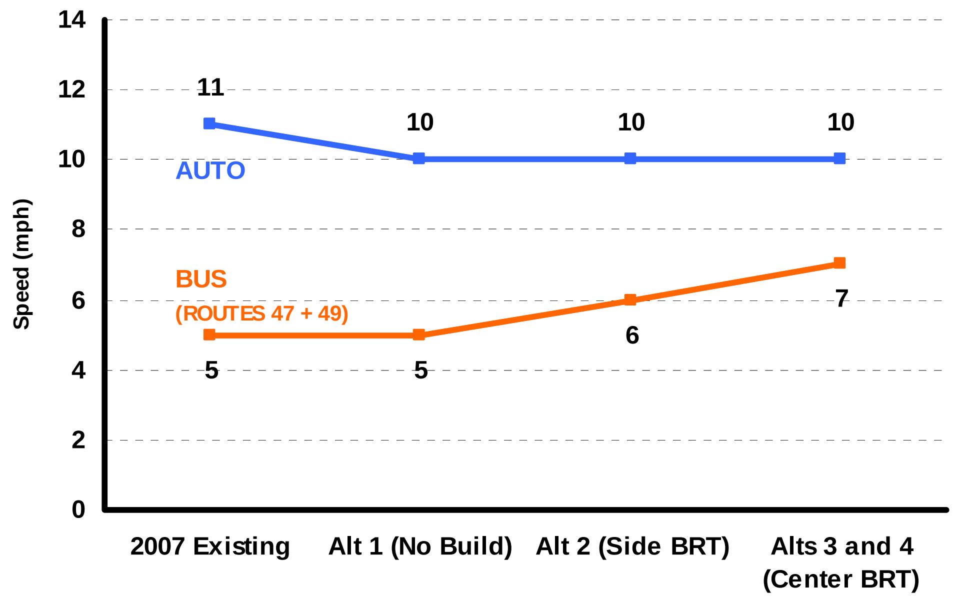
The proposed project would increase the average speed of Routes 47 and 49. As shown in Figure 3.2-6, average bus speed would increase from 5 mph under the No Build Alternative to 6 mph for Build Alternative 2 and to 7 mph under Build Alternatives 3 and 4 (with or without Design Option B) and under the LPA.[31] Auto speeds would be similar between the No Build Alternative and all of the build alternative scenarios (including the LPA)[32], resulting in a significantly reduced speed gap between modes.

The proposed project would increase the average speed of Routes 47 and 49 by 20 percent under Build Alternative 2 and 40 percent under Build Alternatives 3 and 4. Auto speeds are similar between the No Build Alternative and all of the build alternative scenarios, resulting in a significantly reduced speed gap between modes.

[31] The Vallejo Northbound Station Variant does not affect the VISSIM model study area, which stops at Clay Street in the north. Due to the need for the BRT to stop one additional time in the NB direction at Vallejo Street under the Vallejo Northbound Station Variant, the BRT speed could be slightly slower than for the LPA without the variant.

[32] The LPA would have fewer right-turn pockets than Build Alternatives 3 and 4; thus, the auto travel time could be slightly higher for the LPA than those alternatives. This change was taken into account for the auto traffic analysis in Section 3.3, which indicates minimal difference in travel time between the LPA and Build Alternatives 3 and 4 with Design Option B.

Figure 3.2-6: Average Speed on Van Ness Avenue by Mode – Existing, 2015 No Build Alternative, 2015 Build Alternative 2, and 2015 Build Alternatives 3 and 4*



*The LPA is anticipated to perform the same as Build Alternatives 3 and 4.

Source: VISSIM

Average transit travel times along Van Ness Avenue in a segment with full BRT treatment decrease by approximately 3 minutes with Build Alternative 2, approximately 4 minutes with Build Alternatives 3 and 4, and 4.5 minutes with Build Alternatives 3 and 4 with Design Option B, including the LPA.

As a result of the faster speeds shown above, average transit travel times along Van Ness Avenue between Mission/Otis/South Van Ness and Clay (approximately 1.2 miles in length) for Route 47 would decrease by 2.6 minutes (18 percent) with Build Alternative 2, 3.9 minutes (27 percent) with Build Alternatives 3 and 4, and 4.5 minutes (32 percent) with Build Alternatives 3 and 4 with Design Option B, and with the LPA (see Figure 3.2-7).[33,34] As shown in Figure 3.2-8, Route 49 would complete its longer segment to Duboce (approximately 1.5 miles in length and partially outside the area with full BRT treatment) in 12.9 to 14.3 minutes in the Build Alternatives (including the LPA) instead of 16.8 minutes under the No Build Alternative. Build Alternatives 3 and 4 with Design Option B (including the LPA)[35] would cut in half the travel time gap between autos and the Route 49 bus between Clay and Duboce/Mission/Otis. This travel time savings could be reinvested into more frequent headways or could be used as operational savings to be used throughout the Muni system.

Person delay on the Van Ness Avenue corridor provides a metric indicating the overall impact of the BRT project on the efficiency of traveling in the corridor for people on transit, in private vehicles, and on foot. Figure 3.2-9 summarizes average intersection delays per person between Clay and McCoppin streets by mode during the PM peak.

With the BRT alternatives, the average amount of delay per person along Van Ness Avenue intersections (18 seconds per person) would stay at similar levels to the No Build Alternative. Person-delay would decrease slightly with Build Alternatives 3 and 4 with

33 Travel times shown are bidirectional averages. The BRT travel time savings are only for the segment of the corridor that contains the VISSIM model (Mission to Clay Street). If similar benefits (i.e., a 32 percent reduction in travel time) were to be assumed for the corridor all the way to Lombard Street, transit travel time would be reduced by 6 to 7 minutes for the LPA versus existing conditions (a reduction from 20 minutes for existing conditions versus 13 minutes for the LPA); this would represent a reduction of up to 14 minutes round trip. (Source for existing conditions travel time: Transit Effectiveness Project/APC Data, 2006-2007.)

34 See note 33 above.

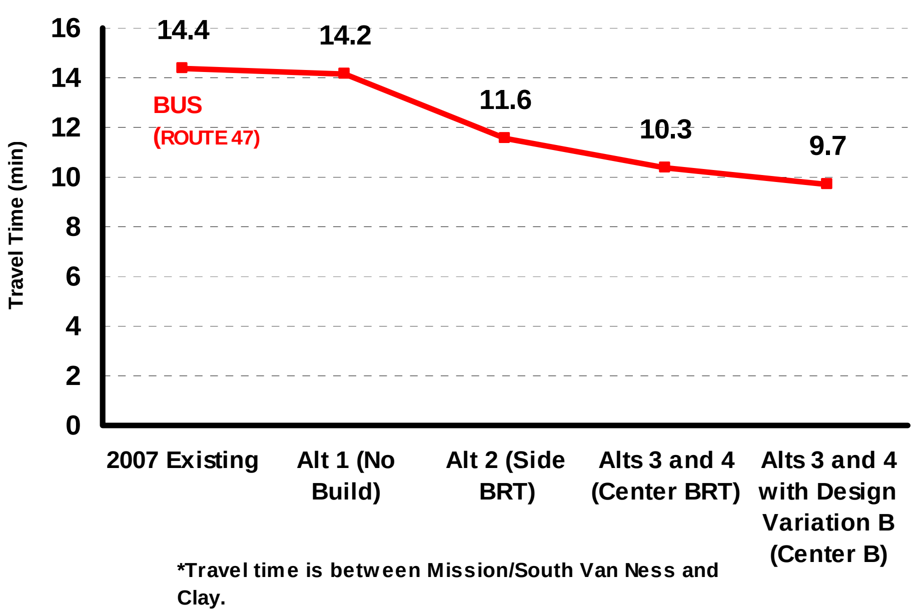
35 See note 33 above.

Design Option B (including the LPA)[36] to approximately 17 seconds per person rather than 18. Delays would decrease for travelers on Van Ness Avenue, whether on transit or in private vehicles, as shown in Figure 3.2-9. Build Alternative 2 shows a greater decrease in delay due to the flexibility of having permissive left turns in addition to fully protected left turns, whereas Build Alternatives 3 and 4 can only have fully protected left turns for autos. Travelers on cross streets see slight increases in delays (approximately 5 percent) as a result.

Cross-Transit Delay

Cross-transit delay was calculated using the same methodology employed by the San Francisco Planning Department for the San Francisco Bicycle Plan EIR. The delay calculation consists of (1) changes in mixed-traffic delay, (2) changes in dwell times due to increased boardings, and (3) changes in time to pull out from stops due to increased traffic delays. The analysis indicates that only one route on the SFMTA rapid network that crosses Van Ness Avenue BRT would have an increase in mixed traffic delay and dwell time delay across the traffic study area of more than 60 seconds with the implementation of BRT when compared with the No Build Alternative in 2035. For this analysis, Year 2035 with Design Option B and the LPA was used because it represents the largest increase in ridership and the largest increase in traffic delays (see Section 3.3). The one cross route with greater than a 60-second increase in delay during the PM peak hour with the implementation of BRT would be the 31 inbound. The delay for this route in 2035 would increase by just more than 3 minutes (190 seconds) with the implementation of BRT. This is nearly 3 minutes less than the threshold established by the San Francisco Planning Department (1/2 of the 12-minute headway or 6 minutes) that would create a potentially significant impact. Pullout time would need to increase significantly for all routes (more than 50 seconds) for the delay to reach a threshold of significance.

Figure 3.2-7: Average Travel Time in Both Directions on Van Ness Avenue for Route 47 between Mission/Otis/South Van Ness and Clay/Van Ness – Existing, 2015 No Build Alternative, 2015 Build Alternative 2, and 2015 Build Alternatives 3 and 4

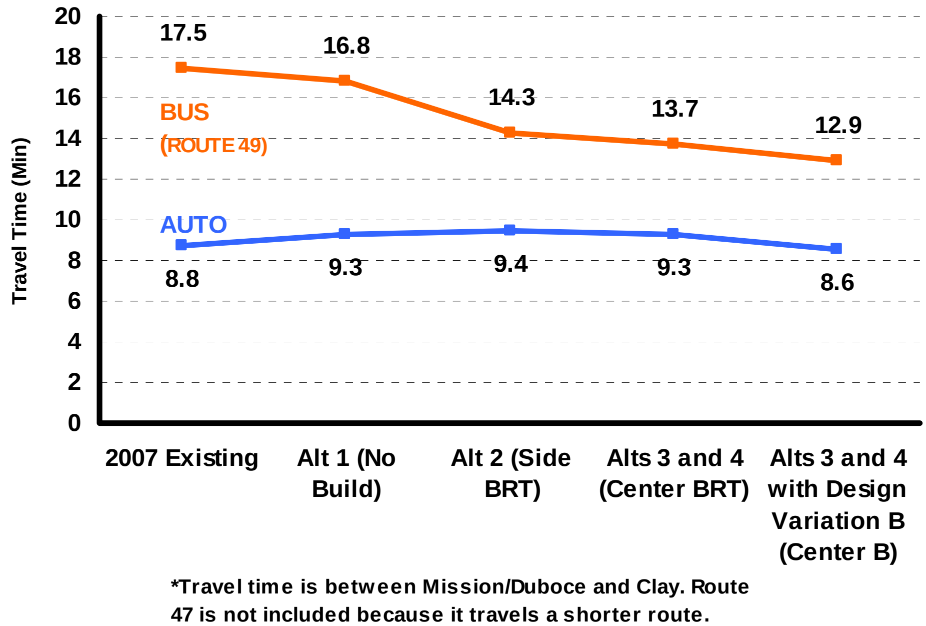


**The LPA is anticipated to perform the same as Build Alternatives 3 and 4 with Design Option B.

Source: VISSIM

[36] The LPA would have fewer right-turn pockets than Build Alternatives 3 and 4; thus, the auto travel time may be slightly different for the LPA than those alternatives. This change was taken into account for the auto traffic analysis in Section 3.3.

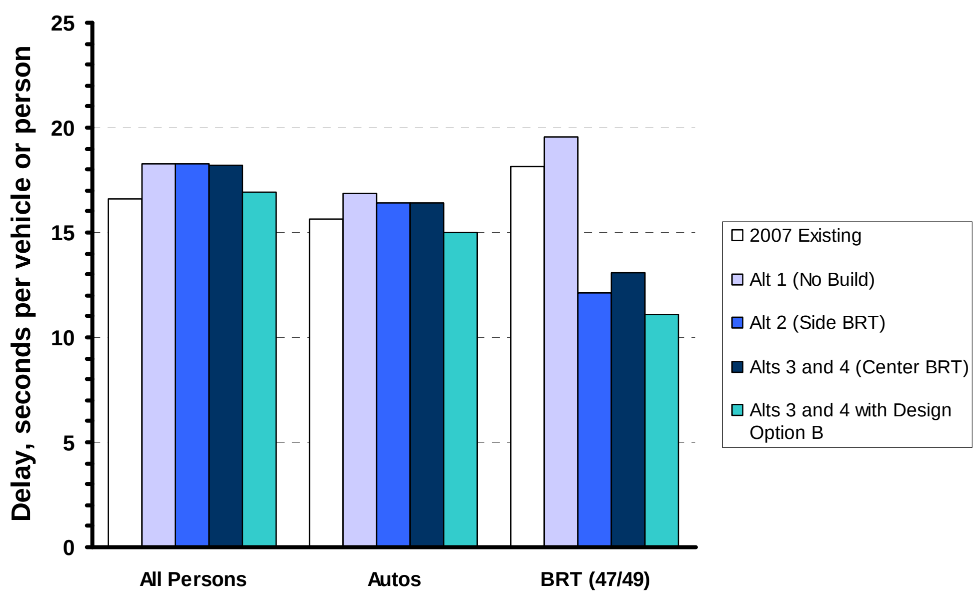
Figure 3.2-8: Average Travel Time in Both Directions on Van Ness Avenue by Mode from Duboce/Mission/Otis to Clay and Van Ness* – Existing, 2015 No Build Alternative, 2015 Build Alternative 2, and 2015 Build Alternatives 3 and 4**



**The LPA is anticipated to perform the same as Build Alternatives 3 and 4 with Design Option B.

Source: VISSIM

Figure 3.2-9: Average Delay by Mode for All Intersections between Clay and McCoppin*



*The LPA is anticipated to perform the same as Build Alternatives 3 and 4 with Design Option B.

Source: VISSIM

Reliability

Bus reliability is most easily measured in VISSIM by the number of unexpected stops experienced by the BRT service due to traffic signals, congestion, and mixed traffic movements. Under the No Build Alternative in 2015, Muni buses would have a 70 percent chance of at least one unexpected stop along any given block. With the proposed project, the likelihood of an unexpected stop would be reduced to 50 percent under Build Alternative 2 and to approximately 35 percent for Build Alternatives 3 and 4 with or without Design Option B, and for the LPA.[37] This is a strong indication that reliability would increase and headway variation would decrease significantly with BRT.

Similar travel time savings and reliability improvements are also expected for GGT, whose buses would benefit from traveling in the exclusive lane and TSP (see Table 3.2-9).

Table 3.2-9: Unexpected Delays Impacting Reliability of BRT Routes

SCENARIO	LIKELIHOOD OF AN UNEXPECTED STOP (PER BLOCK) FOR 47 AND 49 ROUTES
2015 No Build Alternative	71%
2015 Build Alternative 2	51%
2015 Build Alternatives 3 and 4	36%
2015 Build Alternatives 3 and 4 (with Design Option B)*	34%

*The LPA is anticipated to perform the same as Build Alternatives 3 and 4 with Design Option B. The Vallejo Northbound Station Variant could cause a slight increase (up to 10 seconds, on average) in travel time for GGT passengers due to Muni buses being stopped at the NB Vallejo Street station.

Source: VISSIM.

3.2.3 | Future Regional Transit Services

This section describes potential changes in service for regional transit service that operates on Van Ness Avenue and presents detailed future transit ridership and performance (i.e., travel time, speed, delay, and reliability) conditions for Muni transit operations under each proposed BRT project alternative. As with Section 3.1, Build Alternatives 3 and 4, and the LPA, are described together because transit ridership and performance are not measurably different for each within the constraints of the models.

Golden Gate Transit

The proposed BRT transitway would accommodate SFMTA and GGT vehicles under all build alternatives, and GGT service would continue to operate on Van Ness Avenue with implementation of the BRT project. The existing GGT curbside stops would be eliminated, and GGT would likely use the closest BRT stations. Under all BRT project alternatives, GGT travel times and reliability would improve, benefitting from use of the BRT transitway, separation from mixed-flow traffic, and TSP. While the existing GGT routes along Van Ness Avenue would not change under Build Alternatives 2 and 3, and the LPA, the routing under Build Alternative 4 may be modified to provide a northern stop, as described further below.

Table 3.2-10 shows the changes in station locations that would occur under each build alternative. Approximately 80 percent of GGT riders on routes that travel along Van Ness Avenue either use the Geary/O'Farrell stop or use stops off of Van Ness Avenue (i.e., in the financial district); thus maintaining the existing Geary/O'Farrell stop and stops that provide access to the northern end of the BRT project area (an important transit transfer point), as

[37] The Vallejo Northbound Station Variant does not affect the VISSIM model study area, which stops at Clay Street in the north. Due to the need for the BRT to stop one additional time in the NB direction at Vallejo Street under the Vallejo Northbound Station Variant, the BRT reliability benefits could be slightly lower than for the LPA without the variant.

well as stops near City Hall, were identified as critical to GGT operations, and all build alternatives would achieve this. Under all build alternatives, the existing GGT Turk stop would be eliminated, although GGT could utilize the proposed Eddy Street BRT station one block north of Turk Street under Build Alternatives 2 and 3, and the LPA.

Table 3.2-10: Likely GGT Stop Locations with BRT Project by Project Alternative

EXISTING GGT STOPS ON VAN NESS AVENUE	PROPOSED GGT STOP LOCATIONS WITH BRT PROJECT		
	GGT STOP WITH ALTERNATIVE 2	GGT STOP WITH ALTERNATIVE 3	GGT STOP WITH ALTERNATIVE 4
Union Street (NB & SB)	Union Street Station (NB & SB)	Union Street Station (NB & SB)	Chestnut Street curbside stops *–or-* Union Street Station (NB & SB)*
Broadway Street/ Pacific Avenue (NB/ SB)	Jackson Street Station (NB & SB)	Jackson Street Station (NB &SB)	stop eliminated**
Clay Street/ Sacramento Street (NB/SB)	Sacramento Street Station (NB & SB)	Sacramento Street Station (NB & SB)	stop eliminated
Sutter Street (NB & SB)	Sutter Street Station (NB & SB)	Sutter Street Station (NB & SB)	stop eliminated
Geary Street/ O'Farrell Street (NB/SB)	Geary/O'Farrell Street Station (NB &SB)	Geary/O'Farrell Street Station (NB &SB)	Geary/O'Farrell Street Station (NB &SB)
Turk Street (NB)	Eddy Street Station (NB)	Eddy Street Station (NB)	stop eliminated

Notes:

* Under Build Alternative 4, either GGT would use curbside stops at Chestnut Street in association with a rerouting of GGT service along four blocks of Chestnut Street or GGT would utilize the BRT Union Street Station.

** Under Build Alternative 4, existing GGT stops would be eliminated, with the exception of a stop at Union Street and Geary/O'Farrell Street. Approximately 80 percent of GGT patrons either use the Geary/O'Farrell stop or do not stop on Van Ness Avenue.

Because GGT plans to use existing vehicles that do not permit left-side boardings, GGT routes would only stop at the Geary/O'Farrell BRT station within the BRT project area under Build Alternative 4. They would continue to utilize McAllister and Golden Gate stops, just off of Van Ness Avenue, in the southern end of the corridor. GGT routing to the north for Build Alternative 4 may utilize a new stop on Chestnut Street at Van Ness Avenue in the northern end of the corridor.

To create the new Chestnut Street stop under Build Alternative 4, GGT buses would travel along Chestnut Street instead of Lombard Street between Van Ness Avenue and Laguna Street. The GGT buses would share the existing EB curbside Muni stop with the Muni 30 and 30X buses, possibly requiring a lengthening of the stop, resulting in the removal of one to two street parking spaces next to these stops. For the creation of the new WB stop on Chestnut Street, another one to three spaces may be removed.

This proposed Chestnut Street rerouting would result in approximately 5 GGT vehicles per hour in each direction on Chestnut Street during peak periods, with lower frequencies during off peak times. GGT operating hours in San Francisco for routes that would be affected are from approximately 6:00 a.m. to 12:00 a.m., similar to current Muni service hours on Chestnut Street. As standard practice, GGT rerouting and stop consolidation that would indirectly result from implementation of the proposed BRT project would be subject to the agency's standard procedures for such operational changes, including public outreach to inform patrons of changes in service.

As an alternative to the above changes, under Build Alternative 4, a dual-median and center-lane transitway and station configuration similar to Build Alternative 3 could be provided at

Union Street. This would allow for right-side boarding required by GGT buses; thus, GGT would share the Union Street Station with BRT. Under this scenario, GGT buses would continue to travel along Lombard Street between Van Ness Avenue and Laguna Street.

Under all BRT project alternatives, GGT travel times and reliability would improve because service would benefit from use of the BRT transitway, separated from mixed-flow traffic, as well as TSP, even considering additional walk time due to elimination of existing GGT stops, under each build alternative, as well as the potential change in routing onto Chestnut Street under Build Alternative 4 (see Section 10.2.4.1).

Because the LPA would have right-side boarding, it would not require the above-described variation in GGT routing.

Employer Shuttle Services

Private shuttles are currently prohibited from using transit lanes or stops citywide. With implementation of BRT on Van Ness Avenue, employer and other private shuttles traveling along Van Ness Avenue would continue to operate in mixed-flow traffic lanes and would not travel within the BRT transitway or use BRT stations. In 2011, the Authority completed an SAR on the Role of Shuttle Services in San Francisco's Transportation System,[38] which examined existing shuttle services and regulations and developed policy recommendations. The SFMTA is currently developing the Muni Partners Program, a component of the multi-agency Transportation Demand Management Partnership Project led by the Authority.[39] The Partnership Project will examine the feasibilities of allowing private shuttles to use transit lanes and stops. The design of the BRT system does not preclude the use of the facilities by private shuttles if it is later adopted as a City policy.

3.2.3.1 | ENVIRONMENTAL IMPACTS – NEAR-TERM HORIZON YEAR (2015)

This section discusses Muni transit operations and cumulative impacts for the near-term (2015) No Build Alternative and the build alternatives.

Platform Crowding (2015)

Alternative 1: No Build (Baseline Alternative)

In existing conditions, there are no platforms. Instead, the bus stops make use of the existing 16-foot-wide sidewalk along Van Ness Avenue (on South Van Ness Avenue between Market and Mission streets, the sidewalk is 22 feet wide on both sides). This width is effectively reduced at bus stop locations. While there is evidence of crowding along sidewalks at high ridership stops (e.g., Oak/Market, Geary), there is sufficient sidewalk space farther down the block for passengers to wait in the event of extreme crowding. At the busiest stops, such as Market and Geary, waiting bus riders conflict with pedestrians trying to use the sidewalk. In the 2015 No Build Alternative scenario, the increase in transit ridership would worsen these situations.

KEY FINDING

Under all the Build Alternatives, there would not be a significant platform crowding impact.

Build Alternative 2: Side-Lane BRT with Street Parking

Build Alternative 2 would create right-side boarding platforms through sidewalk extensions (bus bulbs) approximately 9 feet in width and 160 feet in length. Expected passenger loads at the busiest station platform, Market Street, were analyzed to determine the likelihood of crowding under the project scenarios. Build Alternative 2 in 2015 would provide 27 to 30 square feet per passenger on the Market Street station platforms. Even in the event of extreme bus bunching, where the platform could be as much as twice as crowded, the amount of space would be greater than 13 square feet per person, which is higher than

[38] The SAR is available at www.sfcta.org/shuttles.

[39] Available on the project website at www.sfcta.org/tdm.

national standard guidelines and more than twice as much as local guidelines of 5 square feet per person. There would not be a significant platform crowding impact in 2015.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians (with or without Design Option B, including the LPA)

Build Alternative 3 would create dual platforms, each with similar dimensions and amount of usable space as Build Alternative 2 (25 to 28 square feet per passenger on the Market Street station platforms). The LPA platforms would have similar dimensions to Build Alternative 3, although the LPA would provide an additional 1-foot buffer between the station and the adjacent traffic lane, for a total of 5.5 feet of buffer between the center of the platform and traffic. Even in the event of bus bunching, where the platform could be as much as twice as crowded, the amount of space would be greater than 12 square feet per person, which is higher than national standard guidelines and more than twice as much as local guidelines (5 square feet per person). There would not be a significant platform crowding impact in 2015.

The LPA platform crowding conditions would be the same as Build Alternative 3. There would not be a significant platform crowding impact in 2015.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median (with or without Design Option B)

Build Alternative 4 would create platforms on the existing single center median. Each platform would be 13 feet to 14 feet wide and 160 feet in length and, in many cases, it would serve passengers in both directions. Build Alternative 4 would provide 22 to 26 square feet per passenger on the Market Street station platforms. Even in the event of bus bunching, where the platform could be as much as twice as crowded, the amount of space would be greater than 11 square feet per person, which is higher than national standard guidelines and more than twice as much as local guidelines (5 square feet per person). There would not be a significant platform crowding impact in 2015.

Crowding/Vehicle Load Factors (2015)

The future year (2015) load factor analysis is presented in Table 3.2-11. Note that peak load factor refers to occupancy of the vehicle; thus, the peak load at a particular location is not necessarily the same as the station with the most boardings.

Table 3.2-11: Year 2015 Muni Load Factor Analysis

PEAK HOUR (5:00 PM TO 6:00 PM)			EXISTING*	2015		
				NO BUILD ALTERNATIVE**	BUILD ALTERNATIVE 2	BUILD ALTERNATIVES 3 AND 4 (INCLUDING DESIGN OPTION B)**
Load Factor at Peak Location (% of total vehicle capacity)	47	SB	0.39	0.46	0.32	0.32
		NB	0.61	0.76	0.53	0.80
	49	SB	0.44	0.43	0.71	0.80
		NB	0.45	0.50	0.68	0.80

* Existing Load Factors are different than in Section 3.2.1.3 because the VISSIM model was coded with a peak hour of 5:00 pm to 6:00 pm instead of 3:00 pm to 4:00, which is the peak transit hour in existing conditions.

**The LPA is anticipated to perform the same as Build Alternatives 3 and 4.

Source: APC data (2006-2007) and SF-CHAMP.

Alternative 1: No Build (Baseline Alternative)

The crowding (i.e., Load Factor) increases slightly on the 47 to 0.46 SB and 0.76 NB under the No Build Alternative relative to the existing conditions. The load factor for Route 49 stays similar to existing conditions (0.43 SB and 0.5 NB). All of these load factors are below Muni's 0.85 load factor standard.

Build Alternative 2: Side-Lane BRT with Street Parking

Using SF-CHAMP ridership forecasts, Build Alternative 2 would show a decrease in load factors for Route 47 (0.32 SB and 0.53 NB) due to the greater effective capacity caused by increasing the vehicle size from 40 feet (existing) to 60 feet. Route 49 would show increased load factors under Build Alternative 2 (0.71 SB and 0.68 NB). The MLP is expected to be at either Market/Oak or McAllister under this alternative. These load factors are still below Muni's 0.85 load factor standard, so there would not be a significant crowding impact due to Build Alternative 2. As indicated in Section 3.2.1.3, reliability is a significant contributor to vehicle crowding levels in operation, so the reliability improvements (i.e., decrease in headway variation) relative to the No Build Alternative (see Section 3.2.2.2) could result in a less-crowded passenger experience even though the average loads would be higher.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians (with or without Design Option B)

Using SF-CHAMP ridership forecasts, Build Alternative 3 would show a decrease in load factors for Routes 47 (0.32 SB and 0.80 NB) due to the greater effective capacity caused by increasing the vehicle size from 40 feet (existing) to 60 feet. Route 49 would show increased load factors under Build Alternative 2. Route 49 would show increased load factors under Build Alternative 3 (0.80 SB and 0.80 NB). The MLP is expected to be at Market/Oak or McAllister for this alternative. These load factors are still below Muni's 0.85 load factor standard, so there would not be a significant in-vehicle crowding impact. As discussed above, reliability is a significant contributor to vehicle crowding levels in operation, so the reliability improvements (i.e., decrease in headway variation) relative to the No Build Alternative (see Section 3.2.2.2) could result in a less-crowded passenger experience even though the average loads would be higher.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median (with or without Design Option B) and the LPA

The findings for Build Alternative 4 and the LPA are the same as for Build Alternative 3. There would not be a significant crowding impact in 2015.

The LPA vehicle crowding conditions would be the same as Build Alternatives 3 and 4. There would not be a significant vehicle crowding impact in 2015.

3.2.3.2 | ENVIRONMENTAL IMPACTS – LONG-TERM HORIZON YEAR (2035)

This section discusses transit operations and cumulative impacts for the near-term (2035) No Build Alternative and the build alternatives.

Reliability improvements relative to the No Build Alternative could result in a less-crowded passenger experience even though the average hourly loads would be higher under the Build Alternatives.

Platform Crowding (2035)

Alternative 1: No Build (Baseline Alternative)

As in 2015, no separated platforms would be built for the No Build Alternative in 2035; therefore, there would still be spillover space on the sidewalk to hold waiting passengers, potentially causing sidewalk crowding. Similar to 2015, 2035 No Build Alternative conditions could get worse through the increase in transit ridership and no increase in space.

Build Alternative 2: Side-Lane BRT with Street Parking

The size and usable space on the platforms would not differ from year 2015, but the busiest station platform location is expected to be at Geary and O'Farrell due in part to the expected completion of the CPMC hospital, and BRT on Geary Boulevard (note that this peak boarding location is different than the MLP, which would continue to be at Oak/ Market or McAllister, as described later in this section). Build Alternative 2 in 2035 would provide 25 to 29 square feet per passenger on the Geary and O'Farrell station platforms. Even in the event of extreme bus bunching, where the platform could be as much as twice as crowded, the amount of space would be greater than 13 square feet per person, which is higher than national standard guidelines and more than twice as much as local guidelines. There would not be a significant platform crowding impact in 2035.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians (with or without Design Option B)

The amount of space on the station platforms in Build Alternative 3 and the LPA would not change between 2015 and 2035, but like Build Alternative 2, the busiest platform is expected to be at Geary and O'Farrell. Even in the event of bus bunching, where the platform could be as much as twice as crowded, the amount of space would be greater than 12 square feet per person, which is higher than national standard guidelines and more than twice as much as local guidelines. There would not be a significant platform crowding impact in 2035.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median (with or without Design Option B) and the LPA

Build Alternative 4 would provide similar platforms at the Geary and O'Farrell location as under Build Alternative 3 due to the need to accommodate Golden Gate Transit vehicles. Thus, the crowding analysis and results for Build Alternative 4 (with or without Design Option B) would be the same as Build Alternative 3. There would not be a significant platform crowding impact in 2035.

The LPA platform crowding conditions would be the same as Build Alternatives 3 and 4, although the LPA would provide an additional 1-foot buffer between the station and the adjacent traffic lane, for a total of 5.5 feet of buffer between the center of the platform and traffic. There would not be a significant platform crowding impact in 2035.

Crowding/Vehicle Load Factors (2035)

The future year (2035) load factor analysis is presented in Table 3.2-12.

Table 3.2-12: Year 2035 Muni Load Factor Analysis

PEAK PERIOD			EXISTING*	2035		
				NO BUILD ALTERNATIVE	BUILD ALTERNATIVE 2	BUILD ALTERNATIVES 3 AND 4 (WITH OR WITHOUT DESIGN OPTION B)**
Load Factor at Peak Location (% of total vehicle capacity)	47	SB	0.39	0.68	0.37	0.39
		NB	0.61	0.79	0.63	0.91
	49	SB	0.44	0.51	0.67	0.78
		NB	0.45	0.56	0.76	0.89

*Existing Load Factors are different than in Section 3.2.1.3 because the VISSIM model was coded with a peak hour of 5:00 pm to 6:00 pm instead of 3:00 pm to 4:00 pm, which is the peak transit hour in existing conditions.

**The LPA is anticipated to perform the same as Build Alternatives 3 and 4.

Source: APC data (2006-2007) and SF-CHAMP.

Alternative 1: No Build (Baseline Alternative)

The load factors for both Routes 47 (0.68 SB and 0.79 NB) and 49 (0.51 SB and 0.56 NB) would increase in 2035 relative to existing conditions. All of these load factors are below Muni's 0.85 load factor standard.

Build Alternative 2: Side-Lane BRT with Street Parking

Build Alternative 2 would increase load factors on both Routes 47 and 49, as shown in Table 3.2-12. The MLP is expected at either Oak or McAllister in this alternative. These load factors would still be below Muni's 0.85 load factor standard, so there would not be a significant in-vehicle crowding impact. As indicated for the near-term horizon year, reliability is a significant contributor to vehicle crowding levels in operation, so the reliability improvements (i.e., decrease in headway variation) relative to the No Build Alternative (see Section 3.2.2.2) could result in a less-crowded passenger experience even though the average loads would be higher.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians (with or without Design Option B)

Build Alternative 3 would show an increase in load factors on both Routes 47 and 49. The MLP is expected be at Market or McAllister for this alternative. The 2035 0.91 load factor for the NB Route 47 and the 0.89 load factor for the NB Route 49 would exceed Muni's 0.85 threshold and would constitute a significant in-vehicle crowding impact. As indicated in Section 3.2.1.3, reliability is a significant contributor to vehicle crowding levels in operation, so the reliability improvements (i.e., decrease in headway variation) relative to the No Build Alternative (see Section 3.2.2.2) could result in a less-crowded passenger experience even though the average loads would be higher.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median (with or without Design Option B) and the LPA

The findings for Build Alternative 4 are the same as for Build Alternative 3. There is a potentially significant vehicle crowding impact in 2035.

The LPA platform crowding conditions would be the same as Build Alternatives 3 and 4. There is a potentially significant vehicle crowding impact in 2035.

KEY FINDING

Implementation of Build Alternative 2 would not have a significant impact on vehicle crowding in 2015 or 2035. Implementation of Build Alternatives 3 and 4 (with or without Design Option B) and the LPA would not have a significant impact on vehicle crowding in 2015 but would have a potentially significant impact in 2035.The impact could be mitigated by adding an additional vehicle to each route during the peak to decrease headways This may be possible at no additional operating cost through the reinvestment of travel time savings.

3.2.4 | Avoidance, Minimization, and/or Mitigation Measures

Implementation of the following mitigation measure would reduce or avoid significant impacts from vehicle crowding, applicable to Build Alternative 3 and 4, with or without Design Option B, and the LPA:

M-TR-1: A mitigation measure of adding one additional vehicle operating on Routes 47 and 49 would decrease headways for each route sufficiently to bring the load factors below the 0.85 standard. This reduction in headways could be possible with no additional operating costs due to the expected travel time savings forecast in that horizon year.

3.2.5 | Transit Summary

Transit analysis through the use of SF-CHAMP, which is San Francisco's travel demand forecasting model, and the VISSIM microsimulation model indicates the following:

- Transit ridership would increase on Routes 47 and 49, as well as systemwide, with the Van Ness Avenue BRT Project.

- Transit travel time would decrease and speed would increase for Routes 47 and 49 with the proposed project, significantly closing the travel time gap between autos and transit.
- Transit reliability would increase, with reduced variation in headways, with the proposed project.
- Implementation of the BRT under any of the alternatives would not have a significant impact on platform crowding in either 2015 or 2035.
- Implementation of Build Alternative 2 would not have a potentially significant impact on vehicle crowding in 2015 or 2035. Implementation of Build Alternatives 3 and 4 (with or without Design Option B) and the LPA would not have a significant impact on vehicle crowding in 2015 but is anticipated to have a significant impact in 2035. The impact could be mitigated by adding an additional vehicle to each route during the peak to decrease headways This may be possible at no additional operating cost through the reinvestment of travel time savings.
- Total GGT passenger travel times and reliability would improve under all of the build alternatives because service would benefit from use of the BRT transitway separated from mixed-flow traffic, as well as TSP.

3.3 Traffic

This section presents the local and regional roadway systems in the traffic study area and planned roadway improvements that may affect the study area; evaluates potential traffic impacts; and presents mitigation measures that would mitigate significant traffic impacts.

The Van Ness Avenue BRT Project traffic study includes six north-south streets that would most likely be affected by the proposed project: Van Ness Avenue, Franklin Street, and Gough Street from Mission Street to Lombard Street; Polk Street from Market Street to Pacific Avenue; Larkin Street from Market Street to California Street; and Hyde Street from Market Street to Pine Street (Figure 3.3-1). Please note that in this section "traffic" refers to private vehicle traffic (i.e., automobiles, trucks, motorcycles, shuttles, and taxis) only unless otherwise explicitly stated.

DEFINITION

In this section, "traffic" refers to private vehicle traffic (i.e., automobiles, trucks, motorcycles, shuttles, and taxis) only unless otherwise explicitly stated.

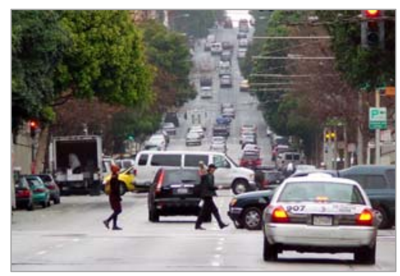
This section also presents the potential traffic impacts of the Locally Preferred Alternative (LPA) that was approved by the SFMTA Board in May 2012. The LPA is a refinement of the two center-running build alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B). For nearly all of the environmental impact areas described in Section 3.3, the LPA (including the Vallejo Northbound Station Variant) has similar environmental consequences to Build Alternatives 3 and 4 with Design Option B, and is so noted.

3.3.1 Traffic Evaluation Methodology

Traffic operations were analyzed for the existing conditions and future years 2015 and 2035, for the No Build Alternative, the three build alternatives, and Build Alternatives 3 and 4 with Design Option B and the LPA. Traffic volumes used in the existing conditions analysis were based on field counts collected mostly in 2007, and future traffic volumes were developed using the SF-CHAMP travel demand forecasting model described in Section 3.1 and in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).[40] Traffic volumes for the intersections in the vicinity of the proposed CPMC hospital and medical office building were modified to reflect the projected vehicle trip generation for these two buildings in the CPMC EIR for the 2035 build alternatives and manually adjusted for reasonableness. Traffic operations analysis for existing and future year analyses used a SYNCHRO operations model created by CHS Consulting Group and further described in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Future-year intersection traffic volumes were developed based on growth factors obtained from the SF-CHAMP model between the years of 2005 and 2015, and between 2005 and 2035. The SF-CHAMP model uses the forecast population and employment produced by ABAG as the basis for future traffic volume forecasts. ABAG, the regional planning organization, provides biannual population and employment forecasts for each city in the Bay Area. The San Francisco Planning Department further breaks down the estimated total population and employment in San Francisco by various traffic analysis zones (TAZ) for the SF-CHAMP model based on zoning limitations and known development projects. For the Van Ness Avenue BRT modeling, the projected land use data for both the Year 2015 and 2035 scenarios were used as inputs in the SF-CHAMP model and were based on ABAG's Projections 2007. The Projection 2007 land use inputs were also used in the most recently adopted RTP, Transportation 2035, for which an EIR was prepared.

SFCTA provided growth factors from the SF-CHAMP model for each north-south street in four different sections – northern, mid, and southern sections of Van Ness Avenue and the SoMa – in the traffic study area and for the east-west streets by facility type (e.g., arterial,

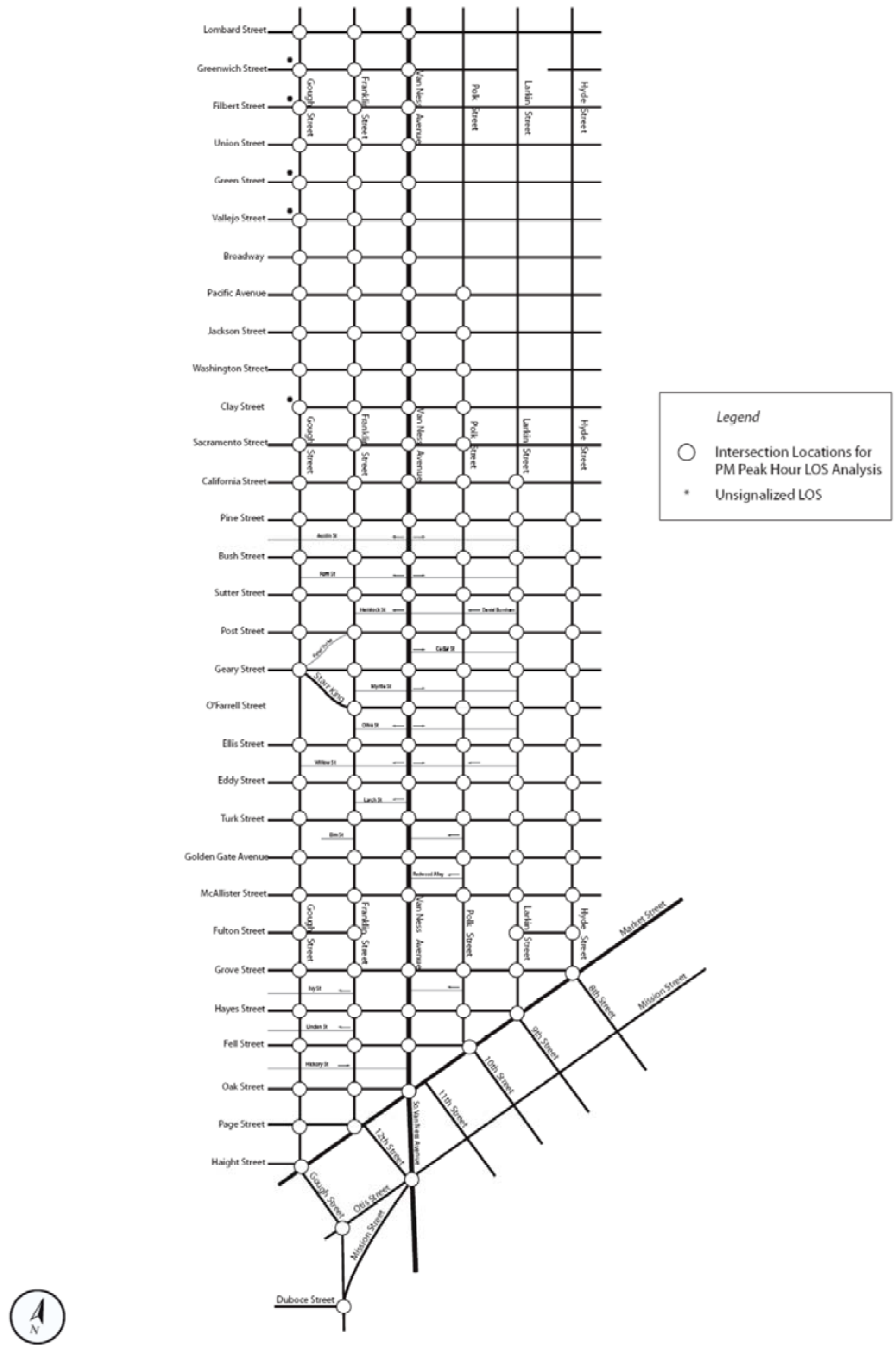


The Van Ness Avenue BRT Project traffic study included six north-south streets: Van Ness Avenue (top), Franklin Street (middle), and Gough Street from Mission to Lombard; Polk Street from Market to Pacific; Larkin Street (bottom) from Market to California; and Hyde Street from Market to Pine.

40 As described in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013), the existing conditions SYNCHRO Model includes the following field counts: traffic turning movements at 91 intersections, pedestrian counts, parking maneuver counts, and travel time and queue length data.

collector, and local streets). These growth factors were applied to the existing counts to obtain future traffic volumes for each intersection. The initial set of forecast traffic volumes were balanced within the traffic study area to ensure equilibrium of traffic volumes within the study area. The process for developing the traffic volumes used in the existing and future conditions traffic operations (i.e., SYNCHRO) models is more fully explained in Section 3.1 and the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Figure 3.3-1: Street Network in the Proposed Van Ness Avenue BRT Project Corridor Traffic Study Area



Future-year signal timing and phasing data were initially provided by SFMTA and then optimized using the SYNCHRO model, which uses the same methodology specified in the Highway Capacity Manual (HCM) 2000. For the three build alternatives and the LPA, intersection geometries were modified in the SYNCHRO model for certain intersections where left-turn pockets were removed as a result of the proposed project. Details of the left-turn pocket locations are presented in Chapter 2, Table 2-3 and Figure 2-2.

As presented in Section 3.2, a VISSIM simulation model was created primarily for assessing the project's benefits to transit operations. VISSIM is a microsimulation model that is utilized for modeling transit, automobile, and pedestrian operations; simulating parking operations; and incorporating signal priority systems. This section, however, uses a SYNCHRO traffic operations model to assess intersection LOS impacts caused by the Van Ness Avenue BRT Project build alternatives along Van Ness Avenue and the five parallel north-south streets east and west of Van Ness Avenue.

Signalized intersection operations are evaluated based on average vehicular delay (seconds per vehicle). Unsignalized intersections are analyzed using an LOS based on the approach with the highest delay. The LOS is used to describe how efficiently an intersection operates for private vehicle traffic. The method used for signalized intersections generally defines LOS in terms of "control delay per vehicle," which refers to the average time spent by vehicles decelerating, stopping, and accelerating at traffic signals. Signalized intersection LOS is affected by traffic volumes, intersection lane configuration, and signal timing and coordination in a corridor. Unsignalized intersection LOS is defined in terms of average delay experienced per vehicle along the stop-controlled approach(es) at the intersection. Intersection LOS designations range from "A," which indicates negligible delays with free-flow speed (i.e., less than 10 seconds per vehicle for signalized intersections and unsignalized approaches) to "F," which indicates delays with queuing that may block upstream intersections (i.e., greater than 80 seconds per vehicle for signalized intersections and greater than 50 seconds for unsignalized approaches). Criteria used to assess the significance of private vehicle traffic impacts are presented in Section 3.3.3.

The Van Ness Avenue BRT Project traffic study area includes 139 intersections: 134 signalized intersections and 5 unsignalized intersections. Due to the large number of intersections in the traffic study area, the discussion of existing and future intersection and approach LOS focuses on those signalized intersections or worst approaches at unsignalized intersections operating at LOS E and F. The City and County of San Francisco uses LOS D as a threshold, so signalized intersections or worst approach at unsignalized intersections operating at LOS E or F are discussed in this chapter. Details of the intersection LOS for all 139 intersections in the traffic study can be found in Appendix 8 of the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Average vehicular travel speed is presented in this EIS/EIR for planning and informational purposes. There are no criteria established by SFCTA or by the City and County of San Francisco to assess vehicular traffic's CEQA impacts using average travel speeds. Travel speed data provided in this EIS/EIR are presented for planning and informational purposes to compare overall changes in the operating conditions of roadway operations.

DEFINITION

LOS: Level of Service

Unsignalized Intersection Delay Criteria

LOS	AVERAGE DELAY (SEC/VEH)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

Signalized Intersection Delay Criteria

LOS	AVERAGE DELAY (SEC/VEH)
A	≤ 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	> 80

Source: Highway Capacity Manual, 2000

3.3.2 | Existing Conditions

This section describes the existing roadway operating conditions (including traffic volumes, travel speed, and intersection LOS) of the regional roadways and local streets in the Van Ness Avenue BRT Project area. Additional information on existing travel patterns in the Van Ness Avenue corridor traffic study area can be found in Section 3.1, Corridor Travel Pattern Overview.

3.3.2.1 | ROADWAY NETWORK

The discussion in this section presents only the role of the roadways in the traffic study area for private vehicle traffic. These roadways also serve various roles for transit, pedestrian, and bicycle traffic; those roles are described in Sections 3.2 and 3.4.

Regional Roadways

Van Ness Avenue and South Van Ness Avenue. Van Ness Avenue and South Van Ness Avenue within the traffic study area are part of US 101, which is a north-south principal arterial on the NHS whose purpose is to provide international, interstate, interregional, and intraregional travel (i.e., commute and non-commute) and goods movement. It is also a Strategic Highway Network (STRAHNET) Route and part of the Interregional Road System (IRRS). In 1998, the State specified certain portions of the IRRS as "Focus Routes" – State highway segments that are critical to the interregional movement of people and goods. This segment of US 101 was identified as a high-emphasis "Focus Route." In the project region, US 101 is a conventional highway that connects San Francisco with Marin County to the north and the Peninsula to the south.

Along the project alignment, Van Ness Avenue typically has six traffic lanes, a landscaped median, and parking on both sides. The San Francisco General Plan classifies Van Ness Avenue as a Major Arterial Road and Freight Traffic Route between North Point and Market streets. It is also part of the Congestion Management Program (CMP) and Metropolitan Transportation System (MTS) network, and it is designated as a Primary Transit Street (Transit Important) and a Citywide Pedestrian Network.

Local Roadways

There are 5 north-south parallel streets and 28 major east-west streets crossing Van Ness Avenue and South Van Ness Avenue in the traffic study area; their function and characteristics are described below.

North-South Streets

Gough Street. Gough Street is a Major Arterial Road and Freight Traffic Route between Pine and Market streets, a secondary arterial road between Sacramento and Pine streets, and a local street north of Sacramento Street. It is also part of the CMP and MTS network. It is a two-way street north of Sacramento Street and a one-way SB street south of Sacramento Street. On-street parking is prohibited on some sections during the AM and PM peak periods to create additional lanes for traffic circulation.

Franklin Street. Franklin Street is a Major Arterial Road between Market and Lombard streets and a Freight Traffic Route between Market and California streets and a secondary arterial road between Lombard and Bay streets. It is also part of the CMP and MTS network. It is a one-way NB street from Market to Lombard streets and a two-way street north of Lombard Street. Franklin Street has three travel lanes. On-street parking is prohibited on some sections during the AM and PM peak periods to create additional lanes for traffic circulation.

Polk Street. Polk Street is a two-way street north of Grove Street, with one lane NB and one lane SB, and becomes a one-way SB street south of Grove Street. It is part of Citywide Bicycle Route 25, including a combination of Class II and Class III bicycle facilities.

Larkin Street. Larkin Street is a Secondary Arterial street between Market and Pine streets. Larkin Street, between Pine and Market streets, is part of the MTS network. It is a one-way NB street with three lanes from Market to California streets, and a two-way street north of California Street and between McAllister and Grove streets.

Hyde Street. Hyde Street is a Secondary Arterial from Pine to Market streets, a Transit-Oriented Street from Beach to Washington streets, and part of the MTS network between Pine and Market streets. It is a one-way street with three SB lanes between California and Market streets, and a two-way street with one lane in each direction between Jefferson and California streets. It shares the ROW with cable cars between Beach and Washington streets.

East-West Streets

There are 28 east-west streets in the traffic study area crossing Van Ness Avenue: 15 are arterial roads defined by the San Francisco General Plan, and 13 are collector and local streets. The following provides a brief description of the arterial roads.

Lombard Street. Lombard Street is a Major Arterial Road, Freight Traffic Route, and Transit Important Street west of Van Ness Avenue. It is also part of the CMP and MTS networks. Lombard Street between Van Ness Avenue and Richardson Avenue is part of US 101.

Broadway. Broadway is a Major Arterial Road and Freight Traffic Route, and it is part of the CMP and MTS networks between Franklin Street and The Embarcadero. Broadway is part of Citywide Bicycle Route 10 east of Webster Street.

Pine Street. Pine Street is a Major Arterial Road, a Freight Traffic Route, and a Transit Important Street east of Sansome Street. It is also part of the CMP and MTS networks. Pine Street is a WB one-way roadway with three traffic lanes.

Bush Street. Bush Street is a Major Arterial Road, a Freight Truck Route, and a Transit Important Street east of Kearny Street. It is also part of the CMP and MTS networks. Bush Street is an EB one-way roadway with three traffic lanes

Geary Street. Geary Street is a Major Arterial, a Transit Important Street, and a Freight Traffic Route. It has a bus-only lane between Gough and Market streets. East of Gough Street, it is a one-way WB street with two mixed travel lanes and a bus-only lane.

O'Farrell Street. O'Farrell Street is a Major Arterial, a Transit Important Street, and a Freight Traffic Route. It is a one-way EB arterial from Market Street to Franklin Street. O'Farrell Street forms a one-way couplet with Geary Street. Between Gough and Powell streets, O'Farrell Street has two EB travel lanes and a bus-only lane.

Hayes Street. Hayes Street is a Major Arterial and a Freight Traffic Route between Market and Gough streets. It is a one-way WB street from Market Street to Gough Street, with three to five travel lanes. West of Gough Street, it has one traffic lane in each direction.

Fell Street. Fell Street is a Major Arterial and Freight Traffic Route. It is also part of the CMP and MTS networks. Fell Street is a one-way WB street west of Gough Street. It forms a one-way couplet with Oak Street.

Market Street. Market Street is a Primary Transit Street, a Freight Traffic Route west of Franklin Street, and a Citywide Bicycle Route. Market Street is a two-way, four-lane street with a 120-foot ROW and wide sidewalks in downtown. It also has exclusive transit lanes from 12th to 5th streets in the EB direction and from 8th Street to Van Ness Avenue in the WB direction, boarding islands, and marked Class I and Class II bicycle lanes west of 8th Street. Market Street primarily serves as a transit corridor, providing rail and bus transit service on the surface and two underground levels of rail service – Muni Metro and BART.

Mission Street. Mission Street is a Transit-Oriented Street. It generally has two travel lanes in each direction, including transit-only lanes between 11th and Beale streets in the EB direction and between Spear and 11th streets in the WB direction. It also has left-turn restrictions between Main and 11th streets.

3.3.2.2 | ROADWAY TRAFFIC VOLUMES FOR DETERMINING THE PEAK TRAFFIC HOUR

Twenty-four (24)-hour traffic counts were collected in March 2007 at five locations along Van Ness Avenue and one location each along Franklin and Gough streets.[41] The purpose of the 24-hour counts was to determine the peak traffic hour. The twenty-four (24)-hour traffic count locations were selected because they represent blocks in the traffic study area with arterial roads as cross streets in the northern, mid-, and southern sections. These counts were taken to determine the peak hour for the intersection LOS analysis. Table 3.3-1 shows that Van Ness Avenue carries approximately 37,500 to 41,500 vehicles daily in the northern and mid-sections; approximately 7 percent of this volume occurs during the PM peak hour (5:00 p.m. to 6:00 p.m.), and approximately 6 percent occurs during the AM peak hour. Traffic volumes are generally higher in the southern portion of the corridor, with approximately 44,500 daily vehicles in both directions. The bidirectional Van Ness Avenue traffic volumes are higher during an average weekday PM peak hour than during an average weekday AM peak hour and weekend peak hours; therefore, the PM peak hour represents the worst-case scenario to assess vehicular traffic impacts of the proposed project and is used for the intersection LOS analysis. The two arterial roads to the west of Van Ness Avenue, Franklin and Gough streets, carry approximately 31,000 and 27,000 daily vehicles, respectively.

Van Ness Avenue carries approximately 37,500 to 41,500 vehicles daily in the northern and mid-sections. Traffic volumes are generally higher in the southern portion of the corridor, with approximately 44,500 daily vehicles in both directions. The PM peak hour represents the worst-case scenario to assess vehicular traffic impacts and is used for the intersection LOS analysis.

Table 3.3-1: Existing (2007) Traffic Counts: Average Weekday, Saturday, and Sunday Daily, AM and PM Peak-Hour Traffic Link Volumes

STREET SEGMENT	AVERAGE WEEKDAY			SATURDAY			SUNDAY		
	DAILY	AM PEAK HOUR	PM PEAK HOUR	DAILY	AM PEAK HOUR	PM PEAK HOUR	DAILY	AM PEAK HOUR	PM PEAK HOUR
VAN NESS AVENUE NORTHBOUND AND SOUTHBOUND									
Greenwich and Filbert	38,281	2,541	2,625	38,977	1,363	2,523	33,042	969	2,257
Pacific and Broadway	36,487	1,981	2,553	39,394	1,361	2,351	34,275	932	2,336
Geary and Post	41,499	2,356	2,762	--	--	--	39,357	1,042	2,500
Hayes and Grove	42,910	2,662	2,947	--	--	--	--	--	--
Market and Fell	44,499	2,702	2,966	--	--	--	--	--	--
GOUGH STREET SOUTHBOUND									
Ellis to Geary	27,007	1,959	1,787	25,435	920	1,637	21,315	510	1,425
FRANKLIN STREET NORTHBOUND									
Post to Sutter	30,901	2,309	2,225	29,681	1,335	1,857	24,556	735	1,725

Source: SFCTA, March 2007.

3.3.2.3 | VEHICULAR TRAVEL SPEED

Table 3.3-2 provides the average vehicular travel speeds for Van Ness Avenue and the five major north-south parallel streets in the traffic study area for the 2007 existing PM peak-hour conditions. Under the 2007 existing conditions, the speed within the traffic study area is lowest along Van Ness Avenue in the SB direction and highest along Van Ness Avenue in the NB direction. This is because during the PM peak hour, traffic signals are synchronized in the NB direction, but not in the SB direction. In other words, vehicles in the NB direction can have a relatively uninterrupted flow of traffic, but vehicles in the SB direction often have to stop at a red traffic light because of the lack of synchronization.

[41] These 24-hour traffic counts were a separate effort from the turning movement counts taken at 91 intersections by the Authority in spring 2007 (and some additional counts in 2008 and 2009) to calibrate the existing conditions (2007) SYNCHRO model. More information on traffic counts, including a figure showing the traffic count locations, is provided in the Traffic Memorandum (CHS, 2013).

Table 3.3-2: Average Speed – 2007 Existing Conditions

STREET	AVERAGE SPEED (MPH)	
	SOUTHBOUND	NORTHBOUND
Gough	8.4	-
Franklin	-	10.1
Van Ness	7.7	10.5
Polk	8.9	9.1
Larkin	-	9.5
Hyde	8.5	-

Source: SYNCHRO model, CHS Consulting Group (2013)

3.3.2.4 | PM PEAK-HOUR INTERSECTION LEVELS OF SERVICE

All of the intersections in the traffic study area, except for the intersection of Gough Street and Green Street, operate at LOS D or better conditions in 2007. The SB Gough approach is the only approach that operates at LOS F at the four-way stop-controlled intersection of Gough Street and Green Street. This is mainly due to the high volumes of SB traffic (531 vehicles) that must stop at the intersection. Figure 3.3-2 shows the intersection LOS for all 139 intersections analyzed for the 2007 existing conditions scenario.

Although most intersections within the traffic study area operate with minimal delays overall, certain specific movements along the six north-south roadways operate in stop-and-go conditions.

3.3.3 | Environmental Consequences

Year 2015 represents the near-term year for traffic analysis, as project construction is scheduled to begin in 2015. Year 2035 represents the long-term horizon year of approximately 20 years after the opening of the project. This section presents the anticipated traffic conditions in 2015 and 2035 for the No Build Alternative and the three build alternatives, including Design Option B and the LPA. It presents the future-year traffic volumes, and assumptions used to forecast future volumes, future travel speeds, intersection LOS for signalized intersections, and approach LOS for unsignalized intersections.

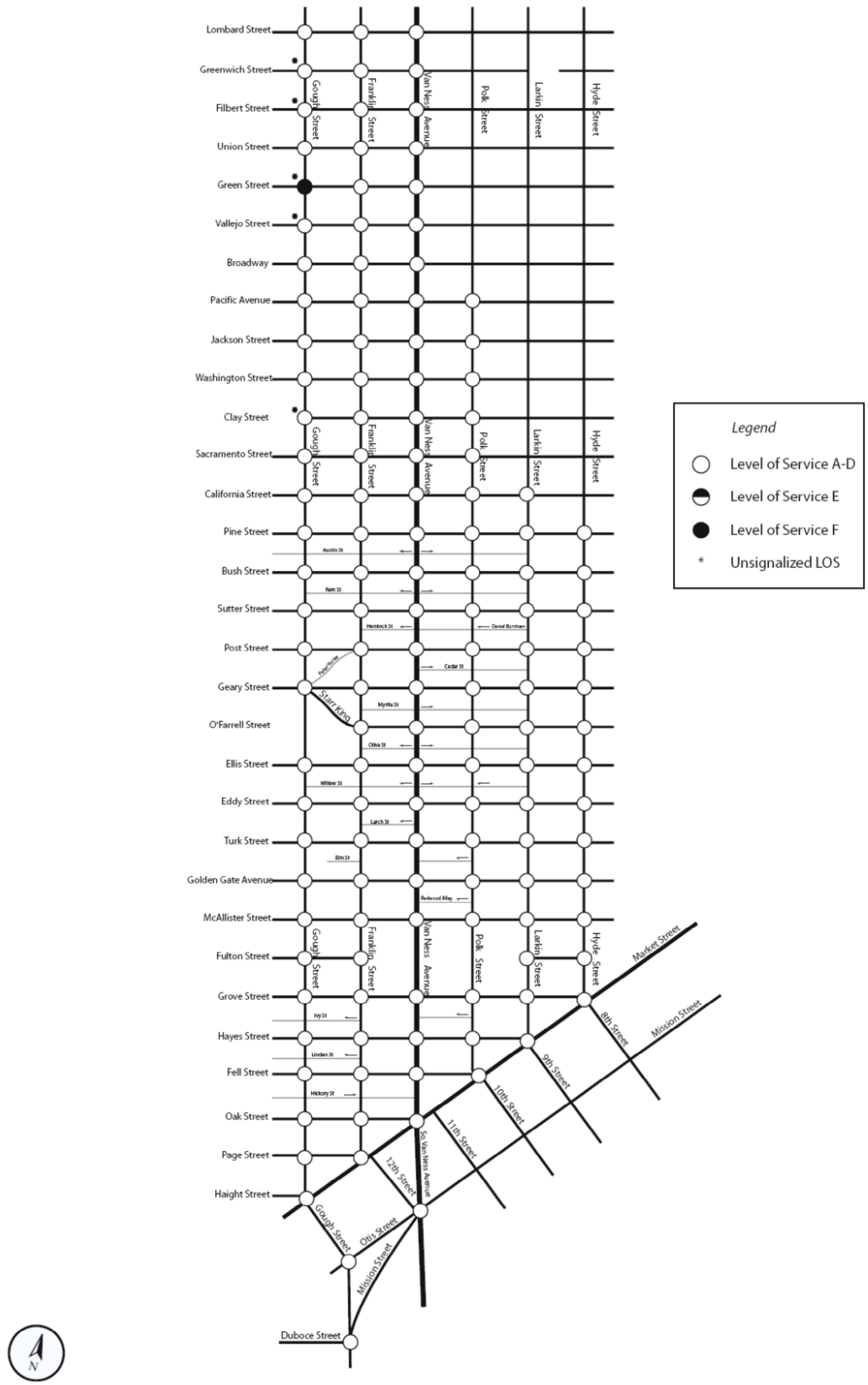
Traffic analysis results are presented in this section. For this EIS/EIR, the project-specific impacts were determined by comparing the existing conditions to the build alternatives, including the LPA, in Year 2015. It is important to note that this approach is a conservative way to define traffic impacts because the build alternatives in Year 2015 reflect traffic volumes and operations associated with population and employment growth in the study area expected between 2007 and 2015, in addition to the traffic volumes and operational changes associated with the project. For this reason, industry standard practice is to compare the build alternatives to the No Build Alternative in the future baseline year; however, to comply with the California Court of Appeal ruling for *Sunnyvale West Neighborhood Association v. City of Sunnyvale City Council* regarding selection of a CEQA baseline year, traffic impacts in this EIS/EIR were identified by comparing scenarios as follows:

- **Project-Specific Impacts:** Existing conditions compared with existing plus project[42] conditions;
- **Cumulative Impacts:** Existing conditions compared with Year 2035 Build Alternatives (including the LPA) conditions;
- **Project Contribution to Cumulative Impacts:** 2035 No Build Alternative conditions compared with Year 2035 Build Alternatives (including the LPA) conditions.

Traffic operating conditions under the No Build Alternative are also presented in Year 2015 for informational purposes.

[42] For this EIS/EIR, traffic operations for the Year 2015 build alternatives were used to represent the Existing plus Project scenarios for purposes of impact analysis. Conditions for the 2015 build alternatives are equivalent traffic operations or have a lower LOS than Existing plus Project conditions.

Figure 3.3-2: 2007 Existing PM Peak-Hour Intersection LOS



Although most intersections within the traffic study area operate with minimal delays overall, certain specific movements along the six north-south roadways operate in stop-and-go conditions, especially the southern sections of Van Ness Avenue and Gough Street. As presented above, the primary reasons for the differences are (1) higher traffic volumes in multiple, conflicting directions in this section, and (2) a lack of signal synchronization in the SB direction.

This section presents the criteria used to assess traffic impacts and identifies significant impacts and less-than-significant traffic impacts per the impact thresholds described above in Section 3.3.1 and below in Section 3.3.3.1. As described in Chapter 2, Project Description, there are three build alternatives: Build Alternative 2 (Side-Lane BRT with Street Parking), Build Alternative 3 (Center-Lane BRT with Right-Side Boarding and Dual Medians), and Build Alternative 4 (Center-Lane BRT with Left-Side Boarding and Single Median). There is also the LPA (Center-Lane BRT with Right-Side Boarding/Single Median and Limited Left Turns) and the Vallejo Northbound Station Variant.

This section presents traffic impacts for existing conditions, No Build Alternative, Build Alternative 2, Build Alternatives 3 and 4 together, and Build Alternatives 3 and 4 with Design Option B (and the LPA) together. Build Alternatives 3 and 4 have identical vehicular traffic operations, with the exception of right-turn movements at the intersection of Van Ness Avenue and Geary Street; therefore, traffic impacts for Build Alternatives 3 and 4 are presented together. Build Alternatives 3 and 4 may incorporate a design variation – Design Option B. Along Van Ness Avenue, Design Option B for these two build alternatives has only one SB left-turn opportunity (at Broadway) and only one NB left-turn opportunity (at Lombard Street). All of the other left-turn pockets in the NB and SB directions would be removed under Design Option B for Build Alternatives 3 and 4.

The LPA has nearly identical traffic operations as Build Alternatives 3 and 4 with Design Option B, except that the LPA only has right-turn pockets at three intersections on Van Ness Avenue, all in the SB direction, at Mission/Otis/South Van Ness, Market Street, and Pine Street. In addition, the LPA retains the two SB left-turn pockets at Broadway, similar to Build Alternatives 3 and 4. Therefore, traffic impacts for the LPA and Build Alternatives 3 and 4 with Design Option B are presented together with any differences between the alternatives noted in the chapter[43]. The Vallejo Northbound Station Variant would have one fewer (2 versus 3) mixed traffic lane in the SB direction for the block between Vallejo and Green streets versus the LPA. Under the LPA without the variant, this lane would be used to store left-turning traffic onto Broadway. Under the Vallejo Northbound Station Variant, this roadway space would be used by the far side NB station at Vallejo Street. In addition, the Vallejo Northbound Station Variant would require a turning restriction preventing trucks traveling WB on Vallejo Street from turning right onto Van Ness Avenue. Otherwise, the Vallejo Northbound Station Variant would operate identically to the LPA. A full description of each of the alternatives, including the LPA and the Vallejo Northbound Station Variant, can be found in Chapter 2.

3.3.3.1 | SIGNIFICANCE CRITERIA

To assess the environmental significance of traffic impacts for signalized and unsignalized intersections, the Authority uses the same criteria used by the San Francisco Planning Department, presented in the *San Francisco Traffic Impact Analysis Guidelines for Environmental Review*.

[43] A detailed comparison of the traffic operations and the traffic impacts between the LPA and Build Alternatives 3 and 4 with Design Option B is provided under the LPA traffic impacts discussion in the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Project-Specific Impacts

Signalized Intersections

1. If the intersection LOS declines from LOS A, B, C, or D in existing conditions to LOS E or F in the existing plus project scenarios (represented by the 2015 build alternatives), then the project would cause a significant project-specific impact.
2. If the intersection LOS declines from LOS E in existing conditions to LOS F in the existing plus project scenarios (represented by the 2015 build alternatives), then the project would cause a significant project-specific impact.
3. If the intersection performs the same at either LOS E or F in both existing condition and existing plus project scenarios (represented by the 2015 build alternatives), then the project's contribution to significant impacts (i.e., contribution calculations) are performed as follows:
   - If the project does not contribute to critical movements at failing intersections or contributes vehicles to critical movements that operate at LOS D or better in existing plus project scenarios (represented by the 2015 build alternatives), then the project impact is considered less than significant.
   - If the project contributes 5 percent or more of the vehicles to a failing critical movement of a failing intersection in the existing plus project scenarios (represented by the 2015 build alternatives), then the project would cause a significant project-specific impact.

Unsignalized Intersections

1. If the LOS of the worst operating approach declines from LOS A, B, C, or D in existing conditions to LOS E or F in the existing plus project scenarios (represented by the 2015 build alternatives), and the intersection meets the Caltrans signal warrants, then the project would cause a significant project-specific impact.
2. If the worst operating approach performs at LOS E or F in both existing conditions and existing plus project scenarios (represented by the 2015 build alternatives) and the project traffic causes the Caltrans signal warrants to be met, then the project would cause a significant project-specific impact.

DEFINITION

CALTRANS SIGNAL WARRANTS: Caltrans thresholds for determining when a signal should be installed.

Cumulative Impacts

If in the Year 2035 there is a significant project-specific impact, then there is significant cumulative impact.

Significant cumulative impacts for all other signalized and unsignalized intersections are assessed in two steps as follows:

1. Cumulative impacts are assessed by utilizing the same procedure discussed under Project-Specific Impacts, except that the existing conditions scenario is compared with the long-term (2035) with-project scenario instead of the existing plus project scenario to assess cumulative impacts.
2. Significant cumulative impacts are assessed by calculating the project contribution to cumulative impacts for signalized and unsignalized intersections as follows:

Signalized Intersections

1. If the intersection LOS declines from LOS A, B, C, or D in the long-term (2035) No Build Alternative to LOS E or F in the Year 2035 build alternatives, then the project would cause a significant cumulative impact.
2. If the intersection LOS declines from LOS E in the long-term horizon year (2035) No Build Alternative to LOS F in the Year 2035 build alternatives, then the project would cause a significant cumulative impact.
3. If the intersection performs the same, at either LOS E or F, in the long-term horizon year (2035) for both the No Build Alternative and build alternatives, then the same

DEFINITION

CRITICAL MOVEMENTS: Critical movements are movements by vehicles at intersections with LOS E or F that would most greatly contribute to the degradation of LOS at those intersections.

procedure is used as in Criterion #3 under Project-Specific Impacts for signalized intersections to determine the project's contribution to significant cumulative impacts.

Unsignalized Intersections

1. If the LOS of the worst operating approach declines from LOS A, B, C, or D in the long-term horizon year (2035) No Build Alternative to LOS E or F in the Year 2035 build alternatives, and the intersection meets the Caltrans signal warrants, then the project would cause a significant cumulative impact.
2. If the worst approach performs at LOS E or F in the long-term horizon year (2035) for both the No Build Alternative and build alternatives, and the project traffic causes the Caltrans signal warrants to be met, then the project would cause a significant cumulative impact.

3.3.3.2 | NEAR-TERM (2015)

This section reports projected traffic conditions in the near-term (Year 2015) for the No Build Alternative and the build alternatives and the LPA. It presents near-term (Year 2015) traffic volumes and assumptions used in traffic projections, future roadway performance, and summary of the Van Ness Avenue BRT Project impacts.[44]

2015 Alternative 1: No Build Alternative

The 2015 No Build Alternative assumes the roadway network in 2015 would be identical to the 2007 existing conditions, with the exception of Hayes and Fell streets. SFMTA proposes to convert Hayes Street between Gough and Polk streets to two-way streets by converting one of the WB lanes to an EB lane. SFMTA also proposes to convert Fell Street between Van Ness Avenue and Franklin Street to a two-way street by converting one of the EB lanes in this block to WB. Details of the Hayes Street and Fell Street two-way conversions are provided in Section 2.2.

Signal timing and phasing for the 2015 No Build Alternative were initially optimized based on the minimum amount of time needed for pedestrian crossing based on national and City standards, as provided by SFMTA, and future No Build Alternative traffic volumes were estimated using the SF-CHAMP model.

Under the near-term 2015 No Build Alternative, traffic volumes along Van Ness Avenue would increase by approximately 0.5 to 1.9 percent annually from the 2007 levels, based on the SF-CHAMP model forecasts. Traffic along the east-west streets would increase by approximately 0.4 to 2.7 percent annually.

Vehicular Travel Speed. Tables 3.3-3 and 3.3-4 show that vehicular travel speeds would decrease slightly along Van Ness Avenue, Franklin Street, Gough Street, Polk Street (SB) and Hyde Street from the 2007 Existing Conditions. This decrease in travel speeds would be caused by the increases in traffic volumes in the traffic study area. In the 2015 No Build Alternative, vehicular travel speeds would increase from the 2007 existing conditions along two NB streets: NB Polk Street and Larkin Street. This is primarily because synchronization of the traffic signals along these streets can be improved over the current conditions.

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[44] As noted previously, traffic operations for the Year 2015 build alternatives were used to represent the Existing plus Project scenarios for purposes of impact analysis. Conditions for the 2015 build alternatives are equivalent traffic operations or have a lower LOS than Existing plus Project conditions.

Table 3.3-3: 2015 No Build Alternative Southbound Average Speed

STREET	AVERAGE SPEED (MPH)	
	EXISTING CONDITIONS	2015 NO BUILD ALTERNATIVE
Gough	8.4	7.8
Franklin	-	-
Van Ness	7.7	7.0
Polk	8.9	8.5
Larkin	-	-
Hyde	8.5	8.4

Source: SYNCHRO model, CHS Consulting Group, 2013.

Table 3.3-4: 2015 No Build Alternative Northbound Average Speed

STREET	AVERAGE SPEED (MPH)	
	EXISTING CONDITIONS	2015 NO BUILD ALTERNATIVE
Gough	-	-
Franklin	10.1	9.8
Van Ness	10.5	10.1
Polk	9.1	9.8
Larkin	9.5	10.0
Hyde	-	-

Source: SYNCHRO model, CHS Consulting Group, 2013.

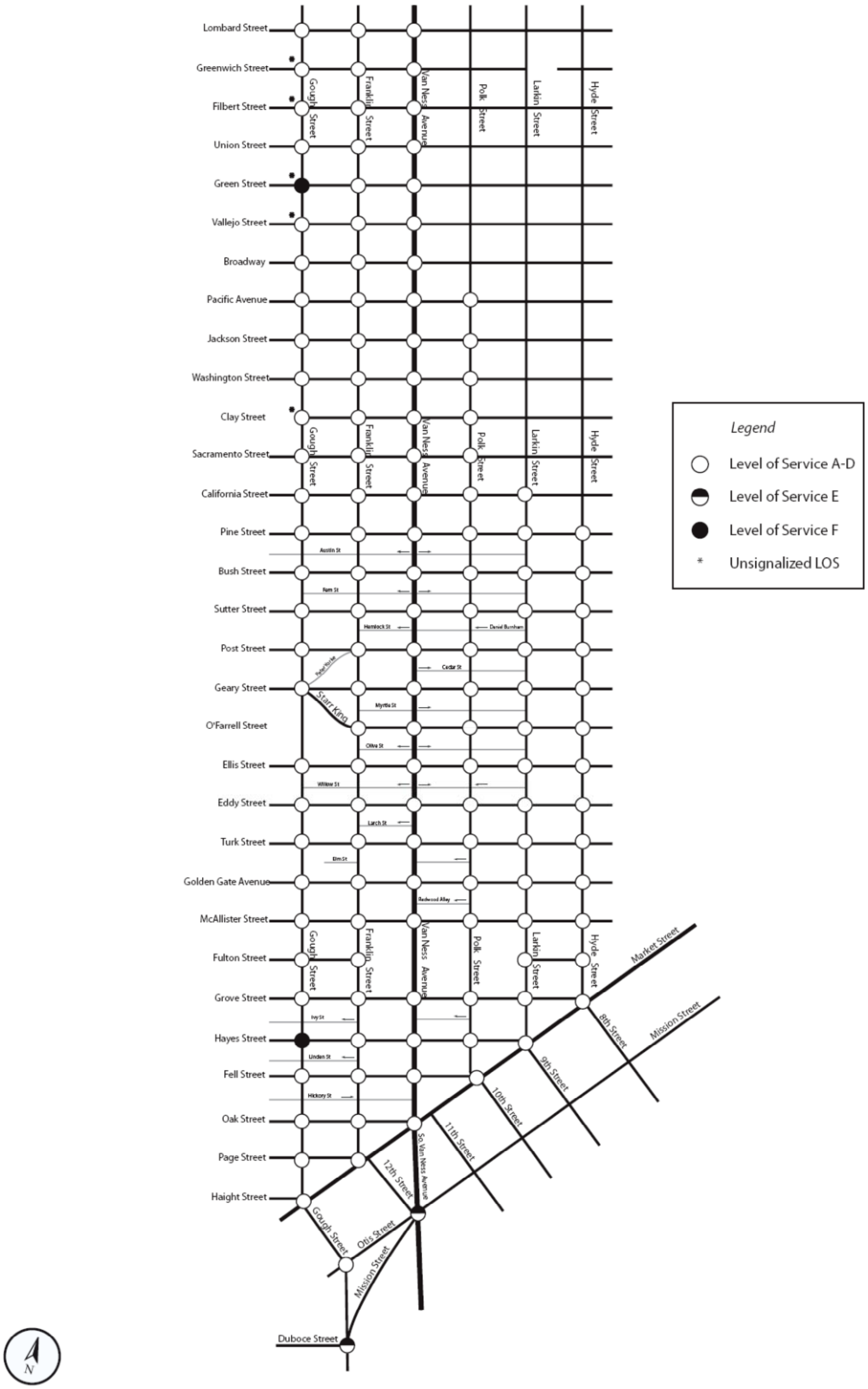
Intersection Levels of Service. In the 2015 No Build Alternative (Alternative 1), all but four intersections would operate at LOS D or better condition during the PM peak hour. Figure 3.3-3 presents the intersection LOS for the 139 study intersections. The traffic study area intersections that would operate at LOS E or F under the 2015 No Build Alternative are described below.

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under both existing conditions and the 2015 No Build Alternative (Alternative 1).
- **Gough/Hayes.** This signalized intersection's operation would decline from LOS D under existing conditions to LOS F under the 2015 No Build Alternative (Alternative 1).
- **Duboce/Mission/Otis/US 101 Off-Ramps.** This signalized intersection's operation would decline from LOS D under existing conditions to LOS E under the 2015 No Build Alternative (Alternative 1).
- **South Van Ness/Mission/Otis.** This signalized intersection's operation would decline from LOS D under existing conditions to LOS E under the 2015 No Build Alternative (Alternative 1).

2015 Build Alternatives

As described in Chapter 2, the build alternatives, including the LPA, would include a full complement of BRT improvements in the project area, including signal priority for buses, new BRT bus stops and level or near level boarding, and dedicated bus lanes along Van Ness Avenue. The Van Ness Avenue BRT Project alternatives, including the LPA, would convert two mixed-travel lanes to bus-only lanes (i.e., one lane each in NB and SB directions) and reduce left-turn opportunities along Van Ness Avenue. The following summarizes the changes in roadway geometry and circulation patterns for the Year 2015 build alternatives and methods used to modify traffic circulation patterns and volumes for the SYNCHRO traffic analysis.

Figure 3.3-3: Near-Term (2015) No Build Alternative Intersection LOS



The decrease in roadway capacity associated with the build alternatives would cause motorists to divert from Van Ness Avenue to avoid increased congestion and delays.

- **Reduction in Roadway Capacity for Mixed Traffic.** The proposed project would reduce the mixed-traffic capacity along Van Ness Avenue by slightly less than one-third.
  - The decrease in roadway capacity would cause motorists to divert from Van Ness Avenue to avoid delays. The traffic analysis indicates that with the implementation of BRT in 2015, an average of 19 to 32 percent of traffic on Van Ness Avenue (depending on the location) would change their travel patterns, including driving on other streets, shifting the trip to other times of day, or shifting to other modes, such as transit, walking, and bicycling.[45] Further discussion of diversions can be found in Section 3.1.
  - The volume of traffic that would divert to the five parallel streets and study intersections in the project area was initially obtained from the SF-CHAMP model and then manually adjusted for reasonableness.
- **Left-Turn Prohibitions.** The build alternatives would include elimination of 13 left-turn bays along Van Ness Avenue in both NB and SB directions. Chapter 2, Project Description, provides a detailed list of prohibited left-turn bays for each of the build alternatives without Design Option B, presented in Table 2-4. Build Alternatives 3 and 4 could incorporate a design variation (Design Option B) where left-turn bays would only be provided at Broadway in the SB direction and at Lombard in the NB direction. The LPA incorporates Design Option B.

  With the reduced number of left-turn opportunities, some motorists wishing to make a left turn along Van Ness Avenue would alter behavior, including using a downstream or upstream left-turn opportunity or circulating around the block to reach their destination.

With the reduced number of left-turn opportunities, some motorists wishing to make a left turn along Van Ness Avenue would alter behavior, including using a downstream or upstream left-turn opportunity or circulate around the block to reach their destination.

- **Left-Turn Lane Reduction.** There are two locations where the number of left-turn bays would be reduced from two to one:
  - Hayes Street in the NB direction for all build alternatives;
  - Mission Street in the EB direction for all build alternatives; and

  Similar to existing conditions and the No Build Alternative (Alternative 1), under Build Alternative 2 Van Ness Avenue would have one exclusive left-turn lane and one shared left-turn/through lane at the SB approach to Broadway. Under Build Alternatives 3 and 4, and the LPA, there would be two exclusive SB left-turn lanes at the Van Ness Avenue SB approach to Broadway.[46] The reason for the difference in design at this approach between Build Alternative 2 and Build Alternatives 3 and 4 is because under Build Alternatives 3 and 4, left-turn movements can only be made during the dedicated left-turn signal phase to not cause potential collisions with SB Muni and GGT buses in the BRT lane. This is different than Build Alternative 2, under which SB left-turn vehicles can make a turn when there is a gap in the traffic stream in the NB direction, resulting in a higher capacity for the exclusive left-turn lane and shared left-turn/through lane under Build Alternative 2, similar to existing conditions.
- **Right-Turn Lane Reduction.** Van Ness Avenue between Geary and O'Farrell streets under Build Alternative 4 (Center-Lane BRT with Left-Side Boarding and Single Median) would have the same geometric design as Build Alternative 3 (Center-Lane BRT with Dual Medians). Due to the transition of Build Alternative 4 from a single-median BRT north of Geary Street to a dual-median BRT for this block, the SB Van Ness Avenue exclusive right-turn lane to Geary Street would not be provided under Build Alternative 4 or its design variation, Build Alternative 4 with Design Option B. This right turn would also be eliminated under the LPA.

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45 For Design Option B and the LPA, the reduction of additional left turns along Van Ness Avenue would cause NB drivers to divert to other parallel streets before they enter South Van Ness and Van Ness avenues. Consequently, the very southern end of the corridor near Market Street would experience a significantly greater reduction in vehicle traffic volumes on Van Ness Avenue, particularly in the NB direction (up to 965 fewer vph than in the No Build Alternative – nearly 50 percent).

46 This additional left-turn lane would require removal of on-street parking spaces on the east and west sides of Van Ness Avenue, north of Broadway.

The process used to develop future-year traffic volumes for the build alternatives is similar to that used for the No Build Alternative. The percentage change in traffic volumes between the 2015 No Build Alternative and each 2015 build alternative was applied. These percentages were provided by the SF-CHAMP model. Subsequent manual adjustments were made based on professional judgment and best practice. See the Vehicular Traffic Analysis Technical Memorandum for more detail (CHS, 2013).

Traffic signal cycle length and phasing for the build alternatives were modeled the same as the No Build Alternative, except at the intersections of Van Ness Avenue with Filbert Street and South Van Ness Avenue with Mission and Otis streets for Build Alternatives 3 and 4, including the LPA. The traffic signal phasing at these intersections was modified to allow buses to transition between a center-running configuration and mixed-flow traffic lanes along Van Ness Avenue, South Van Ness Avenue, Mission Street, and Otis Street. Additionally, traffic signals were optimized and coordinated for each of the build alternatives.

Travel Speed: Build Alternatives

As in the 2015 No Build Alternative, the average travel speed for all of the SB streets and NB Franklin Street and NB Van Ness Avenue in the 2015 build alternatives would decline in comparison to existing conditions. As seen in Tables 3.3-5 and 3.3-6, a comparison of the existing conditions and the 2015 build alternatives and the LPA speed shows the following:

- Speed along SB Gough, SB Polk, and NB Franklin would decrease by approximately 0.5 mph under the Year 2015 build alternatives when compared with the existing conditions. Speed along these corridors would decrease slightly more (up to 0.8 mph) under Year 2015 Build Alternatives 3 and 4 with Design Option B and the LPA due to the diversion of left-turning traffic from Van Ness Avenue to these parallel streets.
- Speed along SB Hyde Street would decrease by 0.2 mph from 8.5 mph in existing conditions to 8.3 mph in all three build alternatives and the LPA in Year 2015.
- Speed along Van Ness Avenue in both directions would decrease between 0.1 and 0.5 mph in Year 2015 Build Alternative 2 and Build Alternatives 3 and 4 with Design Option B and the LPA when compared with the existing conditions. Speed along Van Ness Avenue in both directions would decrease the most (1 to 1.3 mph) under Year 2015 Build Alternatives 3 and 4. This is mainly due to the increase in traffic volumes for NB left turns from Van Ness Avenue and changes in signal timing and phasing for these left turns. Left turns at these intersections can only be made under a protected phase. The LPA and the Northbound Station Variant would have the same speed as Build Alternatives 3 and 4 with Design Option B for all streets except Van Ness Avenue. Under the 2015 LPA and the Northbound Station Variant, the SB Van Ness Avenue speed would be the same as 2015 Build Alternative 4. The NB Van Ness Avenue speed would decrease slightly from 10.2 mph in Design Option B to 10.1 mph in the LPA (0.1 mph decrease). These small changes in speed may be attributed to the increase in right-turn traffic making turns from the shared lane under the LPA and thus slightly decreasing the speed of all movement in the curb lane.
- Speed along NB Polk and Larkin streets would increase between 0.4 and 0.8 mph when compared with the existing conditions. This is primarily because synchronization of the traffic signals along these streets can be improved over the current conditions.
- In many instances, there is almost the same amount of reduction in speed between existing conditions and the 2015 No Build Alternative (Alternative 1) as there is between existing conditions and the 2015 build alternatives. In other words, the Van Ness Avenue BRT Project alternatives do not impact speeds any more than general growth in citywide traffic in the No Build Alternative scenario would affect speeds. In some instances, speed actually increases under the 2015 build alternatives versus the 2015 No Build Alternative. With the exception of NB Franklin Street and Van Ness Avenue, project contributions to speed reductions are 0.3 mph or less.

Table 3.3-5: Private Vehicle 2015 Southbound Average Speed

STREET	AVERAGE SPEED (MPH)				
	EXISTING CONDITIONS	NO BUILD (ALTERNATIVE 1)	SIDE-LANE BRT (ALTERNATIVE 2)	CENTER-LANE BRT (ALTERNATIVES 3 AND4)	CENTER-LANE BRT WITH DESIGN OPTION B (ALTERNATIVES 3 AND 4) AND THE LPA
Gough	8.4	7.8	7.9	8.0	7.6
Franklin	-	-	-	-	-
Van Ness	7.7	7.0	7.2	6.7/6.6*	7.6/7.5*
Polk	8.9	8.5	8.4	8.3	8.2
Larkin	-	-	-	-	-
Hyde	8.5	8.4	8.3	8.3	8.3

*The two speeds shown on Van Ness Avenue represent Build Alternative 3/Build Alternative 4. The difference in speed is due to the lack of a right-turn pocket for SB traveling vehicles at Geary and Van Ness under Build Alternative 4. Speeds are the same between Build Alternatives 3 and 4 for all other streets. The LPA and the Northbound Station Variant would have the same average speed SB as Build Alternative 4 with Design Option B.

Table 3.3-6: Private Vehicle 2015 Northbound Average Speed

STREET	AVERAGE SPEED (MPH)				
	EXISTING CONDITIONS	NO BUILD (ALTERNATIVE 1)	SIDE-LANE BRT (ALTERNATIVE 2)	CENTER-LANE BRT (ALTERNATIVES 3 AND 4)	CENTER-LANE BRT WITH DESIGN OPTION B (ALTERNATIVES 3 AND 4) AND THE LPA
Gough	-	-	-	-	-
Franklin	10.1	9.8	9.5	9.6	9.3
Van Ness	10.5	10.1	10.3	9.2	10.2/ 10.1*
Polk	9.1	9.8	9.5	9.8	9.9
Larkin	9.5	10.0	9.9	10.1	10.1
Hyde	-	-	-	-	-

*The two speeds shown on Van Ness Avenue represent Build Alternatives 3 and 4 with Design Option B and the LPA. The difference in speed is due to the lack of right-turn pockets along NB Van Ness Avenue under the LPA. The LPA and the Northbound Station Variant would have the same average speed as SB Van Ness Avenue.

Traffic Impacts: 2015 Build Alternatives

This section presents the projected vehicular traffic impacts in year 2015 for the build alternatives (including the LPA). Implementation of each of the proposed build alternatives (including the LPA) is anticipated to result in adverse traffic effects, some of which are considered significant impacts based on the impact significance thresholds described in Section 3.3.3. The Van Ness Avenue BRT Project would cause significant traffic impacts only if the LOS for the 2015 build alternatives would be worse than the existing conditions based on the significance criteria presented in Section 3.3.3. Intersections that would continue to operate at LOS E or F in the build alternatives, but which are not impacted by project traffic based on the significance criteria presented in Section 3.3.3, are also identified below as less than significant impacts.

2015 Near-Term Build Alternative 2: Side-Lane BRT with Street Parking[47]

Under Build Alternative 2, three intersections would operate at LOS E or F during the PM peak hour in Year 2015. Table 3.3-7 presents a comparison of the average intersection delay and intersection LOS for the intersections that would operate at LOS E or F conditions under existing conditions, 2015 No Build Alternative or 2015 Build Alternative 2. Figure 3.3-4 presents the 2015 Build Alternative 2 intersection LOS for all study intersections.

Table 3.3-7: Existing Conditions, 2015 Build Alternative 2 (Side-Lane BRT), and No Build Alternative Intersection LOS (Delay) for Intersections that Operate at LOS E or F

INTERSECTION			LOS (DELAY)
	EXISTING CONDITIONS	2015 NO BUILD ALTERNATIVE	2015 BUILD ALTERNATIVE 2
Gough/Green*	F (76.5)	F (80.3)	F (86.3)
Gough/Hayes	D (45.9)	F (86.7)	E (79.0)
Franklin/O'Farrell	D (39.3)	D (43.2)	E (60.6)
Otis/Mission/S. Van Ness	D (46.1)	E (59.3)	D (45.7)
Duboce/Mission/Otis/US 101 Off-Ramp	D (44.4)	E (67.1)	D (51.3)

* Unsignalized intersection.
Table shows worst approach LOS (Delay) for an unsignalized intersection.
Table shows intersection LOS (intersection average vehicular delay) for signalized intersections.

Source: SYNCHRO model, CHS Consulting Group, 2013.

Significant Project-Specific Impacts. The project traffic would cause significant project-specific impacts at two study intersections under the 2015 Build Alternative 2 as follows:

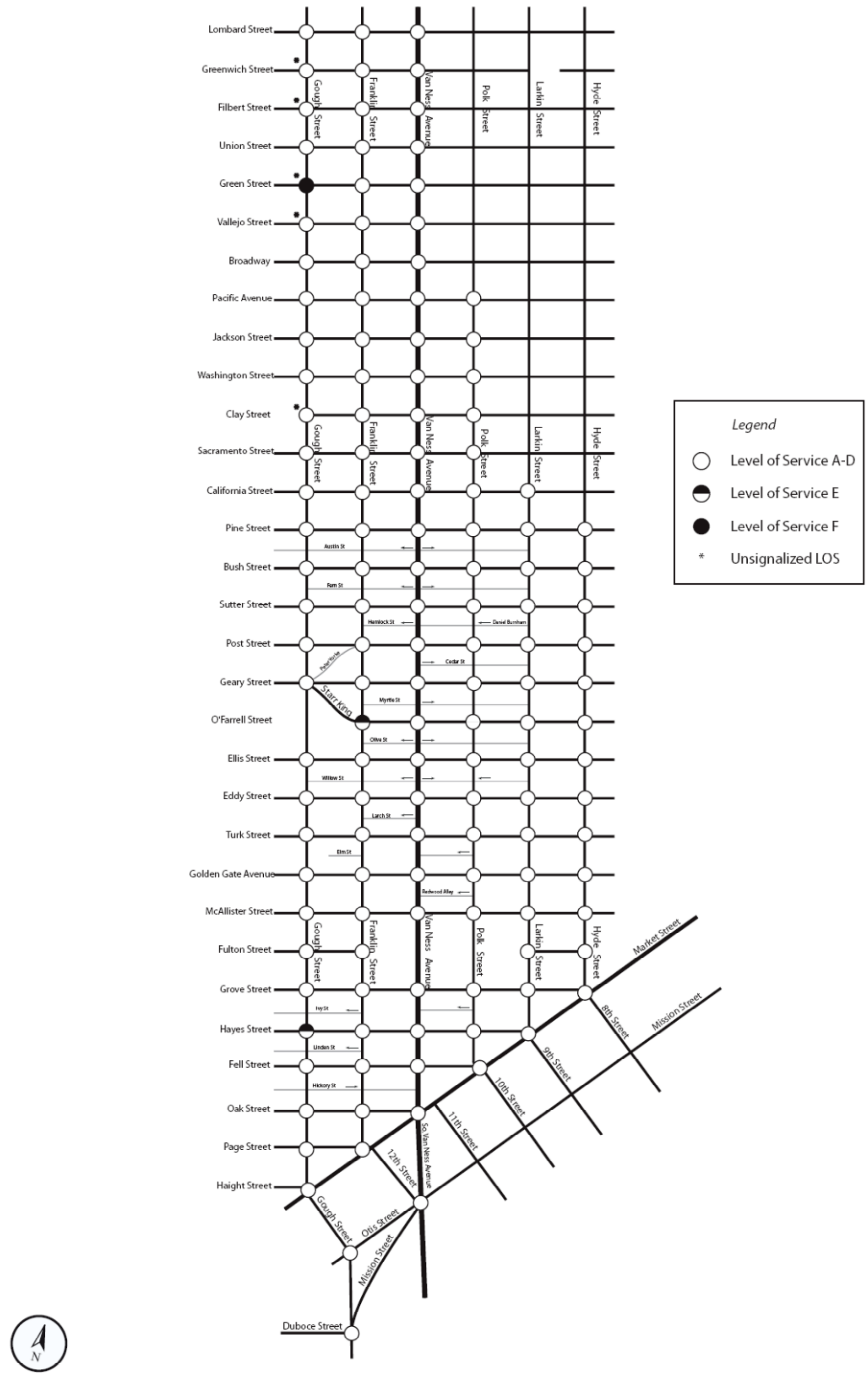
- **Gough/Hayes.** This intersection would decline from LOS D under the existing conditions to LOS E under the 2015 Build Alternative 2 (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS F under the 2015 No Build Alternative.
- **Franklin/O'Farrell.** This signalized intersection would decline from LOS D under the existing conditions to LOS E under the 2015 Build Alternative 2 (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS D under the 2015 No Build Alternative.

Less than Significant Project-Specific Impacts. Build Alternative 2 would cause less than significant traffic impacts at the intersection of Gough and Green streets as presented below:

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under both the existing conditions and the 2015 Build Alternative 2 (representing existing plus project conditions); however, the intersection would not meet the Caltrans peak-hour signal warrant under both the existing conditions and the 2015 Build Alternative 2 scenario, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. The intersection would also operate at LOS F under the 2015 No Build Alternative, as would the SB approach. There are several possibilities to improve traffic operation at this intersection, including adding a traffic signal; removing some on-street parking spaces to create an additional SB approach lane; however, removing parking would worsen pedestrian conditions by eliminating the buffer provided by parked cars separating the sidewalk from the traffic lane, as discussed in Section 3.3.4 (see also Section 3.4, Nonmotorized Transportation), and past public outreach has indicated that the community prefers the stop-sign control of the intersection.

[47] As stated previously, for the purposes of environmental impact analysis, 2015 near-term build alternatives represent existing plus project conditions. Conditions for the 2015 build alternatives are equivalent traffic operations or have a lower LOS than existing plus project conditions.

Figure 3.3-4: Near-Term (2015) Build Alternative 2 Intersection LOS



- **South Van Ness/Mission/Otis and Duboce/Mission/Otis/US 101 Off-Ramp.** The intersections of South Van Ness/Mission/Otis and Duboce/Mission/Otis/US 101 off-ramp would decline from LOS D under the existing conditions to LOS E under 2015 No Build Alternative, and then improve to LOS D under the 2015 Build Alternative 2. This decline in performance between the existing conditions and the 2015 No Build Alternative is due to growth in background traffic. The improved performance between the 2015 No Build Alternative and 2015 Build Alternative 2 is mainly due to traffic diversion from the study area. As discussed in Section 3.1, the SF-CHAMP model estimated that due to the reduction of a mixed-traffic lane in each direction along Van Ness Avenue, approximately 24 to 32 percent of traffic would divert their trips away from Van Ness Avenue in the PM peak period, including diverting to other modes or other times of the day. Traffic diversion to streets outside of the project area could potentially improve the operations of some intersections within the traffic study area, such as the intersections of South Van Ness/Mission/Otis and Duboce/Mission/Otis/US 101 off-ramp.

Sensitivity Analysis at Van Ness Avenue and Geary Street Intersection: In anticipation of expected developments, the San Francisco Planning Department proposes to widen the sidewalk on the west side of Van Ness Avenue between Post and Geary streets. This proposed widening would necessitate the removal of the Van Ness Avenue SB exclusive right-turn lane onto Geary Street. A sensitivity analysis has been performed, assuming the proposed sidewalk widening occurs. With the approved sidewalk widening and removal of exclusive right-turn lane, LOS at this intersection would remain unchanged at LOS B.

2015 Near-Term Build Alternatives 3 and 4: Center-Lane BRT Configuration[48]

Under Build Alternatives 3 and 4, four intersections would operate at LOS E or F during the PM peak hour in Year 2015 (representing existing plus project conditions). Table 3.3-8 provides a comparison of the average intersection delay and intersection LOS for the intersections that would operate at LOS E or F under the existing conditions, the 2015 No Build Alternative, or 2015 Build Alternatives 3 and 4 scenarios. Figure 3.3-5 graphically presents 2015 Build Alternatives 3 and 4 intersection LOS for all intersections.

Table 3.3-8: Existing Conditions, 2015 Build Alternatives 3 and 4 (Center-Lane BRT), and No Build Alternative Intersection LOS (Delay) for Intersections that Operate at LOS E or F

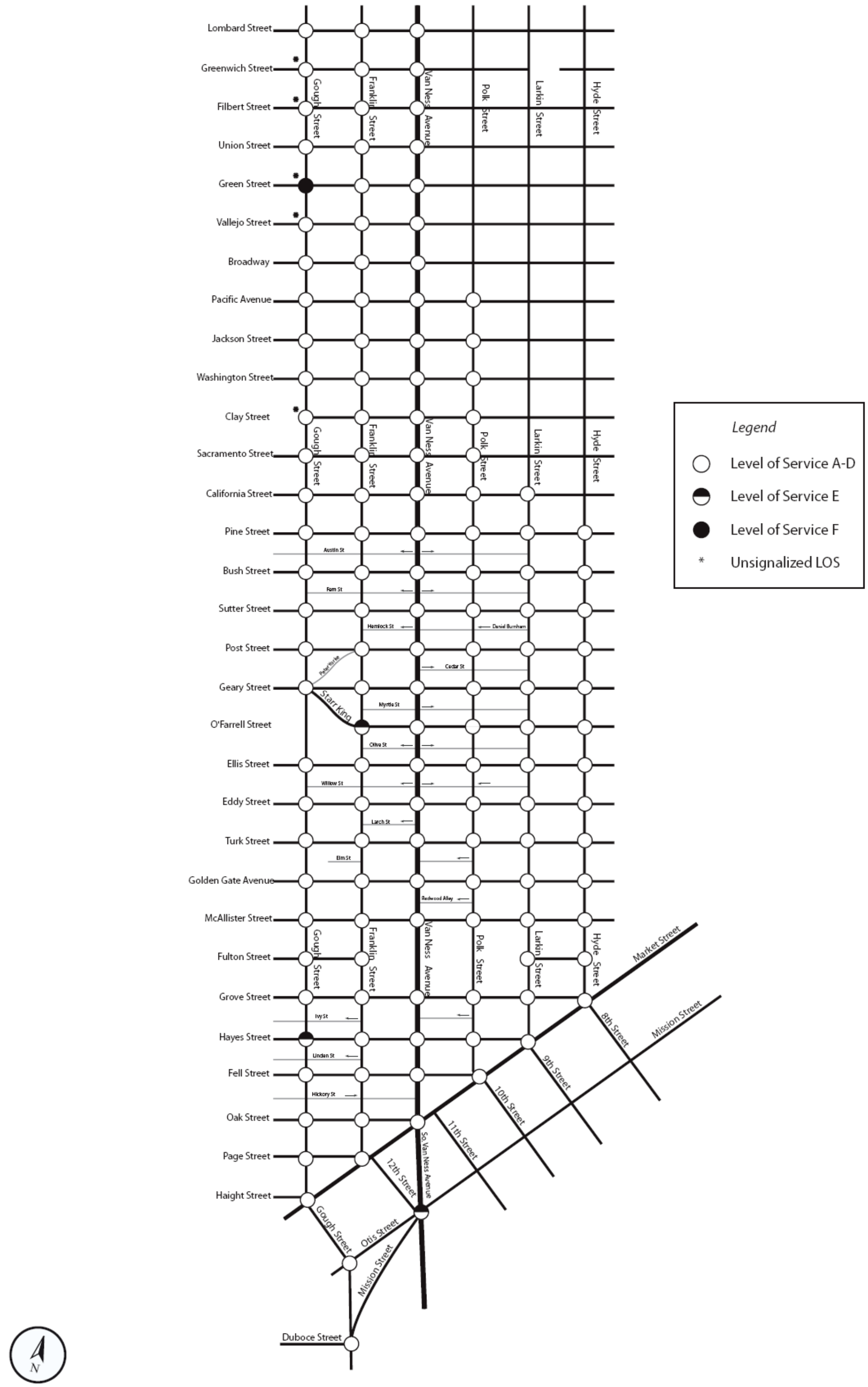
INTERSECTION			LOS (DELAY)
	EXISTING CONDITIONS	2015 NO BUILD ALTERNATIVE	2015 BUILD ALTERNATIVE 3 AND 4
Gough/Green*	F (76.5)	F (80.3)	F (80.7)
Gough/Hayes	D (45.9)	F (86.7)	E (79.7)
Franklin/O'Farrell	D (39.3)	D (43.2)	E (57.2)
Otis/Mission/S. Van Ness	D (46.1)	E (59.3)	E (68.8)
Duboce/Mission/Otis/ US 101 Off-Ramp	D (44.4)	E (67.1)	D (47.2)

* Unsignalized intersection.
Table shows worst approach LOS (Delay) for an unsignalized intersection.
Table shows intersection LOS (intersection average vehicular delay) for signalized intersections.

Source: SYNCHRO model, CHS Consulting Group, 2013.

[48] As stated previously, for the purposes of environmental impact analysis, 2015 near-term build alternatives represent existing plus project conditions. Conditions for the 2015 build alternatives are equivalent traffic operations or have a lower LOS than existing plus project conditions.

Figure 3.3-5: Near-Term (2015) Build Alternatives 3 and 4 Intersection LOS



Significant Project-Specific Impacts. Build Alternatives 3 and 4 would cause significant project-specific impacts at three study intersections in Year 2015.

- **Gough/Hayes.** This intersection would decline from LOS D under existing conditions to LOS E under 2015 Build Alternatives 3 and 4 (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS F under the 2015 No Build Alternative.
- **Franklin/O'Farrell.** This signalized intersection would decline from LOS D under existing conditions to LOS E under 2015 Build Alternatives 3 and 4 (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS D under the 2015 No Build Alternative.
- **South Van Ness/Mission/Otis.** This signalized intersection would decline from LOS D under existing conditions to LOS E under 2015 Build Alternatives 3 and 4 (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS E under the 2015 No Build Alternative.

Less than Significant Project-Specific Impacts. Build Alternatives 3 and 4 would cause less than significant traffic impacts at the intersection of Gough and Green streets, and the intersection of Duboce/Mission/Otis/US 101 off-ramp, as presented below:

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under both the existing conditions and the 2015 Build Alternatives 3 and 4 (representing existing plus project conditions); however, the intersection would not meet the Caltrans peak-hour signal warrant under both existing conditions and 2015 Build Alternatives 3 and 4, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. The intersection would also operate at LOS F under the 2015 No Build Alternative, as would the SB approach. There are several possibilities to improve traffic operations at this intersection, including adding a traffic signal; removing some on-street parking spaces to create an additional SB approach lane; however, past public outreach has indicated that the community prefers the stop-sign control of the intersection.
- **Duboce/Mission/Otis/US 101 Off-Ramp.** Similar to Build Alternative 2, the intersection of Duboce/Mission/Otis/US 101 off-ramp would decline from LOS D under the existing conditions to LOS E under the 2015 No Build Alternative, and then improve to LOS D under Build Alternatives 3 and 4 in Year 2015.
- **Design Variation between Build Alternative 3 and Build Alternative 4 and Sensitivity Analysis at Van Ness Avenue and Geary Street Intersection.** As discussed in Chapter 2, Van Ness Avenue between Geary and O'Farrell streets under Build Alternative 4 would have the same geometric design as Build Alternative 3. Due to this transition from a center-running BRT with a single median north of Geary Street to a right-side loading BRT with two medians for this block, the SB Van Ness Avenue exclusive right-turn lane to Geary Street would not be provided under Build Alternative 4. This intersection operates at LOS B under 2015 Build Alternative 3. Without the exclusive SB right-turn lane, LOS at this intersection would remain at LOS B under 2015 Build Alternative 4. The analysis for Build Alternative 4 also serves as the sensitivity analysis if the San Francisco Planning Department were to approve the proposed widening of the sidewalk under Build Alternative 3, thus requiring the elimination of the exclusive SB right-turn lane onto Geary Street from Van Ness Avenue.

2015 Near-Term Build Alternatives 3 and 4 with Design Option B: Center-Lane BRT (including the LPA)[49]

The LPA (including the Vallejo Northbound Station Variant)[50] would have the same traffic impacts in 2015 as Build Alternatives 3 and 4 with Design Option B. Because the LPA would have 11 fewer right-turn pockets, there are minor differences in approach average delay between the LPA and Build Alternatives 3 and 4 with Design Option B along Van Ness Avenue. However, none of these differences would cause a new significant intersection LOS impact or worsen a significant intersection LOS impact compared to the impacts outlined for Build Alternatives 3 and 4 with Design Option B. For details on LPA performance in 2015, please see the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Under Build Alternatives 3 and 4 with Design Option B and the LPA, four intersections would operate at LOS E or F during the PM peak hour in Year 2015. Table 3.3-9 presents a comparison of the average intersection delay and intersection LOS for the intersections that would operate at LOS E or F under the existing conditions, the 2015 No Build Alternative, or 2015 Build Alternatives 3 and 4 with Design Option B, including the LPA scenarios. Figure 3.3-6 presents 2015 Build Alternatives 3 and 4 with Design Option B, including the LPA, intersection LOS.

Table 3.3-9: Existing Conditions, 2015 Build Alternatives 3 and 4 (Center-Lane BRT) with Design Option B, and No Build Alternative Intersection LOS (Delay) for Intersections that Operate at LOS E or F

INTERSECTION	LOS (DELAY)		
	EXISTING CONDITIONS	2015 NO BUILD ALTERNATIVE	2015 BUILD ALTERNATIVES 3 AND 4 WITH DESIGN OPTION B AND THE LPA
Gough/Green*	F (76.5)	F (80.3)	F (108.1)
Gough/Hayes	D (45.9)	F (86.7)	E (74.6)
Franklin/O'Farrell	D (39.3)	D (43.2)	E (55.9)
Franklin/Market/Page	C (27.2)	C (28.7)	F (103.7)
Otis/Mission/S. Van Ness	D (46.1)	E (59.3)	D (51.4)
Duboce/Mission/Otis/ US 101 Off-Ramp	D (44.4)	E (67.1)	D (46.4)

* Unsignalized intersection.
Table shows worst approach LOS (Delay) for an unsignalized intersection.
Table shows intersection LOS (intersection average vehicular delay) for signalized intersections.

Source: SYNCHRO model, CHS Consulting Group, 2013

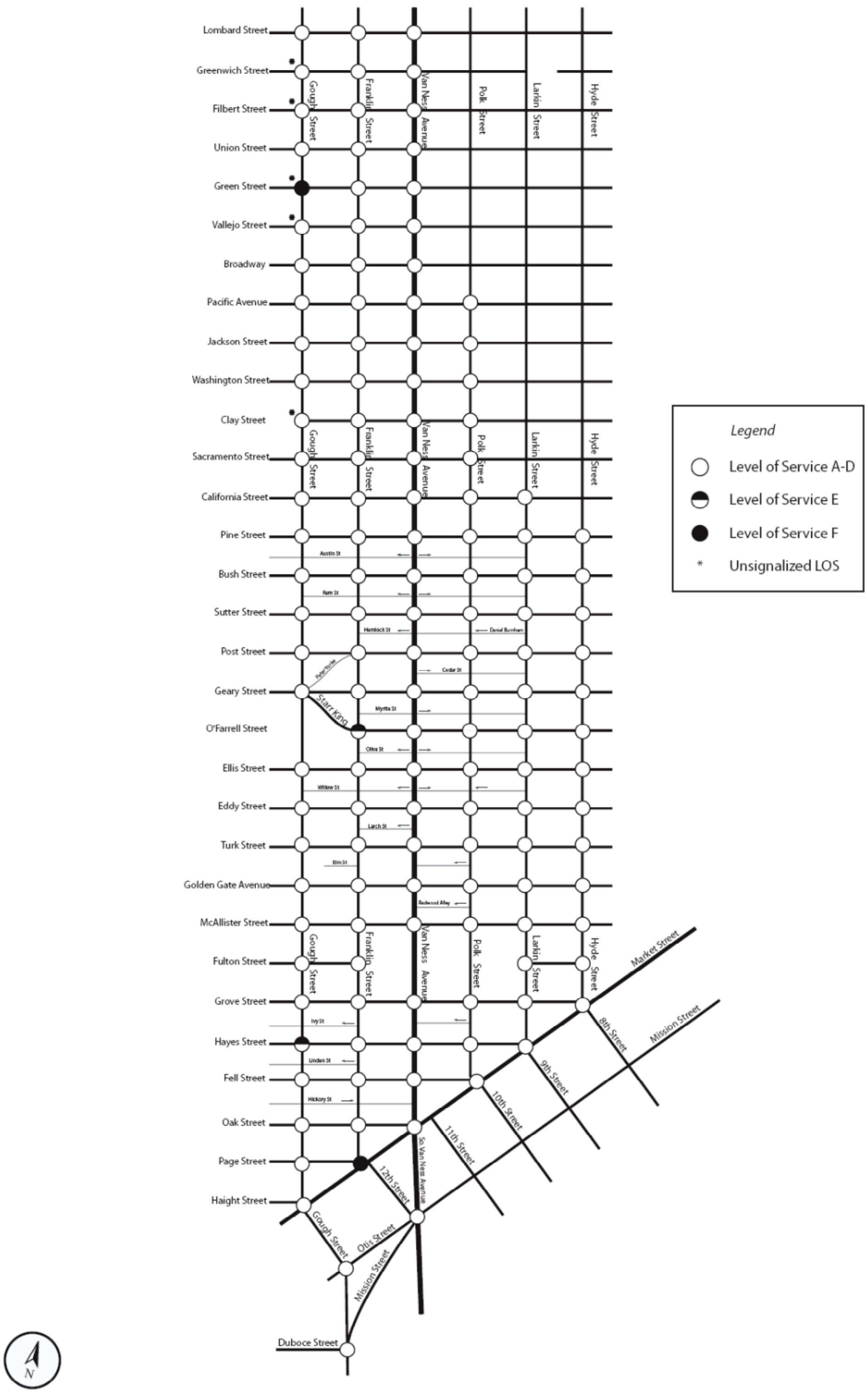
Significant Project- Specific Impacts. Build Alternatives 3 and 4 with Design Option B and the LPA would cause significant project-specific impacts at three intersections in Year 2015 as follows:

- **Gough/Hayes.** This intersection would decline from LOS D under existing conditions to LOS E under 2015 Build Alternatives 3 and 4 with Design Option B and the LPA (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would operate at LOS F under the 2015 No Build Alternative.

[49] As stated previously, for the purposes of environmental impact analysis, 2015 near-term build alternatives represent existing plus project conditions. Conditions for the 2015 build alternatives are equivalent traffic operations or have a lower LOS than existing plus project conditions.

[50] The Vallejo Northbound Station Variant would have one fewer (2 versus. 3) mixed traffic lanes in the SB direction for the block between Vallejo and Green streets versus the LPA. Under the LPA without the variant, this lane would be used to store left-turning traffic onto Broadway. Under the Vallejo Northbound Station Variant, that roadway space would be used for the additional far side NB station at Vallejo Street. In 2015, the Vallejo intersection would operate at LOS A during the PM peak under the LPA and would operate at a similar LOS with implementation of the Vallejo Northbound Station Variant.

Figure 3.3-6: Near-Term (2015) Build Alternatives 3 and 4 with Design Option B (and LPA) Intersection LOS



- **Franklin/O'Farrell.** This signalized intersection would decline from LOS D under existing conditions to LOS E under 2015 Build Alternatives 3 and 4 with Design Option B and the LPA (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS D under the 2015 No Build Alternative.

- **Franklin/Market.** This signalized intersection would degrade from LOS C under the existing conditions to LOS F under 2015 Build Alternatives 3 and 4 with Design Option B and the LPA (representing existing plus project conditions); therefore, the proposed project would cause significant project-specific impacts. This intersection would perform at LOS C under the 2015 No Build Alternative.

Less than Significant Project-Specific Impacts. In Year 2015, Build Alternatives 3 and 4 with Design Option B and the LPA would cause less than significant traffic impacts at the intersection of Gough and Green streets, and at the intersection of South Van Ness/ Mission/Otis and Duboce/Mission/Otis/US 101 off-ramp, as presented below:

Gough/Green. The SB approach, the worst performing approach at this four-way stop-controlled intersection, would perform at LOS F under both existing conditions and 2015 Build Alternatives 3 and 4 with Design Option B and the LPA; however, the intersection would not meet the Caltrans peak-hour signal warrant under both the existing conditions and the 2015 Build Alternatives 3 and 4 with Design Option B and the LPA, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. The intersection would also operate at LOS F under the 2015 No Build Alternative, as would the SB approach. There are several possibilities to improve traffic operation at this intersection, including adding a traffic signal; removing some on-street parking spaces to create an additional SB approach lane; however, past public outreach has indicated that the community prefers the stop-sign control of the intersection.

South Van Ness/Mission/Otis and Duboce/Mission/Otis/US 101 Off-Ramp. Similar to Build Alternative 2, the intersections of South Van Ness/Mission/Otis and Duboce/Mission/ Otis/US 101 off-ramp would decline from LOS D under existing conditions to LOS E under the 2015 No Build Alternative, and then improve to LOS D under Build Alternatives 3 and 4 with Design Option B and the LPA in Year 2015.

Design Variation between Build Alternative 3 and Build Alternative 4 with Design Option B and Sensitivity Analysis at Van Ness Avenue and Geary Street Intersection. As discussed in Chapter 2, Van Ness Avenue between Geary and O'Farrell streets under Build Alternative 4 with Design Option B would have the same geometric design as Build Alternative 3 with Design Option B. Due to this transition from a center-running BRT with a single median north of Geary Street to a right-side loading BRT with two medians for this block, the SB Van Ness Avenue exclusive right-turn lane to Geary Street would not be provided under Build Alternative 4 with Design Option B. This intersection operates at LOS B under 2015 Build Alternative 3 with Design Option B. Without the exclusive SB right-turn lane, LOS at this intersection would remain at LOS B under 2015 Build Alternative 4 with Design Option B. The analysis for Build Alternative 4 with Design Option B also serves as the sensitivity analysis if the San Francisco Planning Department were to widen the sidewalk under Build Alternative 3 with Design Option B, thus requiring the elimination of the exclusive SB right-turn lane onto Geary Street from Van Ness Avenue. The LPA would include removal of the right-turn pocket at this location.

LPA Vallejo Northbound Station Variant. The Vallejo Northbound Station Variant would have one fewer (two versus three) mixed traffic lanes in the SB direction for the block between Vallejo and Green streets versus the LPA. Under the LPA without the variant, this lane would be used to store left-turning traffic onto Broadway. Under the Vallejo Northbound Station Variant, that roadway space would be used for the additional far side NB station at Vallejo Street. In 2015, the Vallejo intersection would operate at LOS A during the PM peak under the LPA and would continue to operate at LOS A with implementation of the Vallejo Northbound Station Variant.

3.3.3.3 LONG-TERM HORIZON YEAR (2035)

This section presents projected traffic conditions in the long-term horizon Year 2035 for the No Build Alternative and three build alternatives and the LPA. It presents long-term horizon year (2035) traffic volumes and assumptions used in traffic projection, future roadway performance, and a summary of the Van Ness Avenue BRT Project impacts.

2035 Alternative 1: No Build

No specific roadway capacity modifications within the traffic study area are known between 2015 and 2035, except the Geary Corridor BRT Project; hence, the 2035 No Build Alternative would have the identical roadway network as the 2015 No Build Alternative, as discussed under Section 3.3.3.1.

Signal timing and phasing for the 2035 No Build Alternative were initially optimized based on the minimum amount of time needed for pedestrian crossings provided by SFMTA and future No Build Alternative traffic volumes estimated using the SF-CHAMP model.

Under the long-term 2035 No Build Alternative, traffic volumes along Van Ness Avenue would increase by approximately 0.42 to 1.12 percent annually from the 2007 levels based on SF-CHAMP model forecasts. Traffic along the east-west streets would increase by approximately 0.35 to 1.49 percent annually. There would be higher increases along collector streets than arterial roads.

Vehicular Travel Speed. Under 2035 No Build Alternative, vehicular travel speeds would decrease along all north-south streets in the traffic study area. Tables 3.3-10 and 3.3-11 show SB and NB average speeds, respectively.

Table 3.3-10: 2035 No Build Alternative Southbound Average Speed

STREET	AVERAGE SPEED (MPH)	
	EXISTING CONDITIONS	2035 NO BUILD ALTERNATIVE
Gough	8.4	7.5
Franklin	-	-
Van Ness	7.7	6.6
Polk	8.9	8.1
Larkin	-	-
Hyde	8.5	7.6

Source: SYNCHRO model, CHS Consulting Group, 2013.

Table 3.3-11: 2035 No Build Alternative Northbound Average Speed

STREET	AVERAGE SPEED (MPH)	
	EXISTING CONDITIONS	2035 NO BUILD ALTERNATIVE
Gough	-	-
Franklin	10.1	9.1
Van Ness	10.5	8.9
Polk	9.1	8.8
Larkin	9.5	9.5
Hyde	-	-

Source: SYNCHRO model, CHS Consulting Group, 2013.

Intersection Levels of Service. Under the long-term 2035 No Build Alternative, all but seven intersections would operate at LOS D or better during the PM peak hour. Figure 3.3-7 presents the intersection LOS for the study intersections for 2035 No Build Alternative. The traffic study area intersections that would operate at LOS E or LOS F conditions are described below.

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under existing conditions and the 2015 and 2035 No Build Alternative.
- **Gough/Hayes.** This signalized intersection would decline from LOS D under existing conditions to LOS F under both the 2015 and 2035 No Build Alternative.
- **Franklin/Pine.** This signalized intersection would slightly improve from LOS D under existing conditions to LOS C under the 2015 No Build Alternative and decline to LOS E under 2035 No Build Alternative.
- **Franklin/O'Farrell.** This signalized intersection would decline from LOS D under existing conditions and the 2015 No Build Alternative to LOS E under 2035 No Build Alternative.
- **Van Ness/Pine.** This signalized intersection would decline from LOS C under existing conditions and the 2015 No Build Alternative to LOS E under 2035 No Build Alternative.
- **South Van Ness/Mission/Otis.** This signalized intersection would decline from LOS D under existing conditions to LOS E under the 2015 and 2035 No Build Alternatives.
- **Duboce/Mission/Otis/US 101 Off-Ramp.** This signalized intersection would decline from LOS D under existing conditions and LOS E under the 2015 No Build Alternative to LOS F under 2035 No Build Alternative.

2035 Build Alternatives

The long-term 2035 build alternatives would have the same BRT configuration as in the near-term Year 2015 build alternatives. The changes in roadway geometry and circulation patterns, the methodology used to develop intersection traffic volumes, and traffic signal operation assumptions for the build alternative SYNCHRO traffic analysis are summarized under Section 3.3.3.1, 2015 Build Alternatives.

The following sections analyze the cumulative traffic impacts of the three build alternatives and the LPA, describing anticipated changes to vehicular travel speed, intersection delay, and LOS.

Travel Speed: Build Alternatives. As seen in 2035 No Build Alternative, the average travel speed for all the NB and SB streets in the 2035 build alternatives would decline in comparison to the existing condition. As seen in Tables 3.3-12 and 3.3-13, a comparison of the existing condition and 2035 build alternatives speed shows the following:

Table 3.3-12: 2035 Horizon Year Southbound Average Speed

STREET	AVERAGE SPEED (MPH)				
	EXISTING CONDITIONS	NO BUILD (ALTERNATIVE 1)	SIDE-LANE BRT (ALTERNATIVE 2)	CENTER-LANE BRT (ALTERNATIVES 3 AND 4)	CENTER-LANE BRT (ALTERNATIVES 3 AND 4) WITH DESIGN OPTION B AND THE LPA
Gough	8.4	7.5	6.1	6.5	5.9
Franklin	-	-	-	-	-
Van Ness	7.7	6.6	6.5	5.6/ 5.6*	6.6/ 6.5*
Polk	8.9	8.1	7.7	7.8	7.6
Larkin	-	-	-	-	-
Hyde	8.5	7.6	7.0	7.2	7.2

*The two speeds shown on Van Ness Avenue represent Build Alternative 3/Build Alternative 4. The difference in speed is due to the lack of a right-turn pocket for SB traveling vehicles at Geary Street and Van Ness Avenue under Build Alternative 4. Speeds are the same between Build Alternatives 3 and 4 for all other streets. The LPA and the Northbound Station Variant would have the same average speed SB as Build Alternative 4 with Design Option B.

Figure 3.3-7: Long-Term (2035) No Build Alternative Intersection LOS

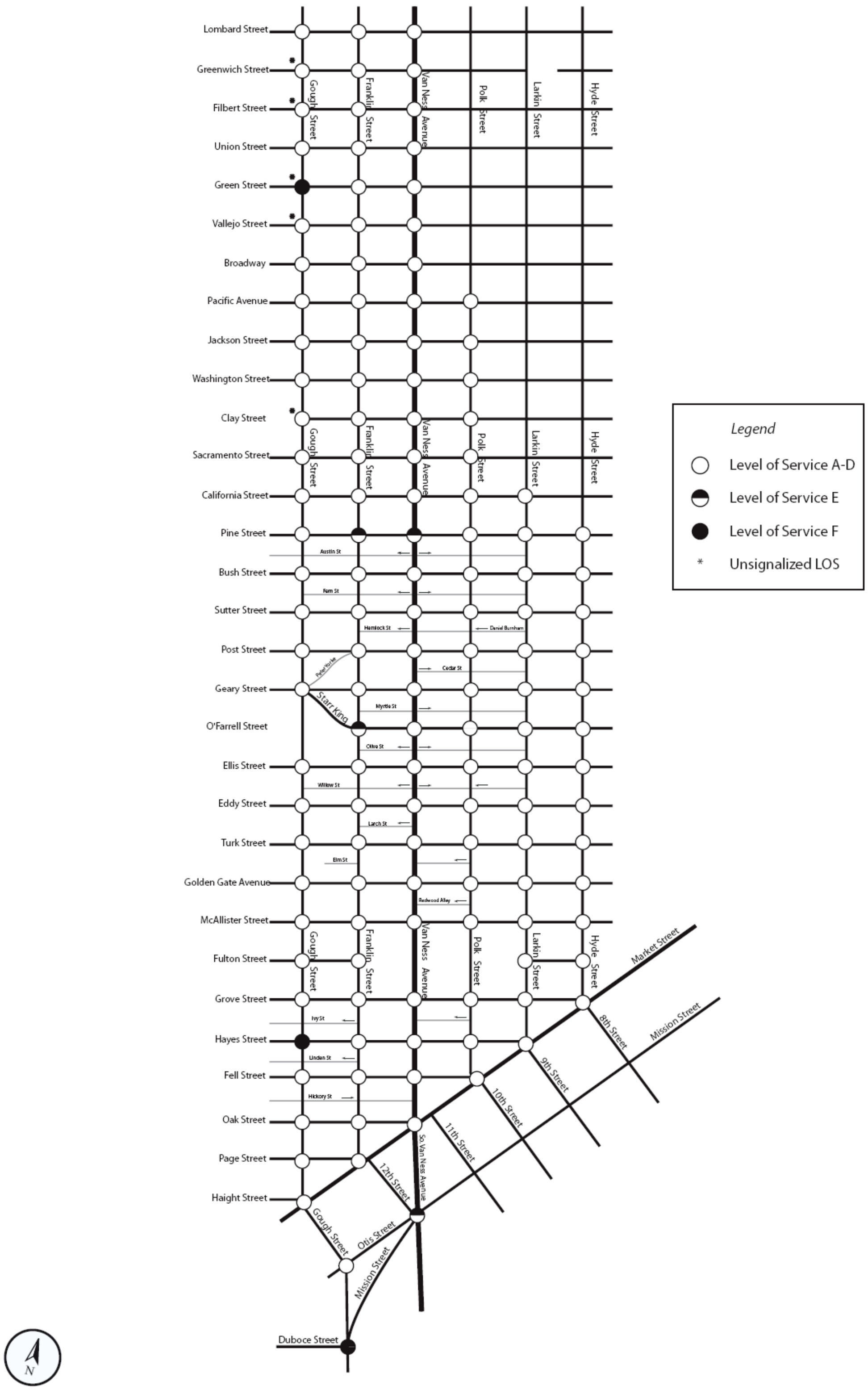


Table 3.3-13: 2035 Horizon Year Northbound Average Speed

STREET	AVERAGE SPEED (MPH)				
	EXISTING CONDITIONS	NO BUILD (ALTERNATIVE 1)	SIDE-LANE BRT (ALTERNATIVE 2)	CENTER-LANE BRT (ALTERNATIVES 3 AND 4)	CENTER-LANE BRT (ALTERNATIVES 3 AND 4) WITH DESIGN OPTION B AND THE LPA
Gough	-	-	-	-	-
Franklin	10.1	9.1	7.1	7.3	6.2
Van Ness	10.5	8.9	8.6	7.5	9.0/8.8*
Polk	9.1	8.8	8.5	8.5	8.5
Larkin	9.5	9.5	9.2	8.8	8.7
Hyde	-	-	-	-	-

*The two speeds shown on Van Ness Avenue represent Build Alternatives 3 and 4 with Design Option B and the LPA. The difference in speed is due to the lack of right-turn pockets along NB Van Ness Avenue under the LPA. The LPA and the Northbound Station Variant would have the same average speed as SB Van Ness Avenue.

- The speed along SB Gough Street would decrease by approximately 2 mph, and the speed along NB Franklin Street would decrease between 2.8 mph and 3 mph under Year 2035 Build Alternative 2 and 2035 Build Alternatives 3 and 4, respectively, when compared to the existing condition. Speed along these corridors would decrease the most (2.5 mph on Gough Street and 3.9 mph on Franklin Street) under Year 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. This would occur due to the diversion of most left-turning traffic from Van Ness Avenue to these parallel streets after the elimination of most left-turn opportunities on Van Ness Avenue under Year 2035 Build Alternatives 3 and 4 with Design Option B with Design Option B.
- Speed along SB Polk and Hyde streets would decrease between 1.1 mph and 1.5 mph in all three build alternatives and the LPA in Year 2035 when compared with the existing conditions.
- Speed along NB Polk and Larkin streets would decrease between 0.3 and 0.8 mph in all three build alternatives and the LPA in Year 2035 when compared with the existing conditions. Speed along NB Polk Street under the build alternatives would be similar to the speed in 2035 No Build Alternative.
- Speed along Van Ness Avenue in both directions would decrease between 1.2 and 1.9 mph in Year 2035 for Build Alternative 2 and Build Alternatives 3 and 4 with Design Option B (including the LPA), respectively, when compared with the existing conditions. This speed along Van Ness Avenue under these two alternatives would be similar to the speed under 2035 No Build Alternative (± 0.3 mph). Speed along Van Ness Avenue in both directions would decrease the most (2.1 to 3 mph) under Year 2035 Build Alternatives 3 and 4. This is mainly due to the increase in traffic volumes for NB left turns from Van Ness Avenue and changes in signal timing and phasing for these left turns. Left turns at these intersections can only be made under a protected phase. The LPA and the Northbound Station Variant would have the same speed as Build Alternatives 3 and 4 with Design Option B for all streets except Van Ness Avenue. Under the 2015 LPA and the Northbound Station Variant, the SB Van Ness Avenue speed would be the same as 2015 Build Alternative 4. The NB Van Ness Avenue speed would decrease slightly from 9.0 mph in Design Option B to 8.8 mph in the LPA (0.2 mph decrease). These small changes in speed may be attributed to the increase in right-turn traffic making turns from the shared lane under the LPA and thus slightly decreasing the speed of all movement in the curb lane.

Traffic Impacts: 2035 Build Alternatives

This section presents the cumulative traffic impacts and the project traffic impacts in year 2035 for the build alternatives. Implementation of each of the proposed build alternatives is anticipated to result in adverse traffic effects, some of which are considered significant impacts based on the impact significance thresholds established in the San Francisco Traffic Impact Analysis Guidelines for Environmental Review (see Section 3.3.3). The cumulative traffic growth due to development projects by year 2035 would cause cumulative significant impacts only if the LOS for the 2035 build alternatives would be worse than the existing conditions. The Van Ness Avenue BRT Project would cause significant project impacts only if the LOS for the 2035 build alternatives would be worse than 2035 No Build Alternative based on the significance criteria presented in Section 3.3.3 or if a project-specific impact was already identified in Year 2015 (representing existing plus project conditions). Other adverse traffic effects considered less than significant per the San Francisco impact significance thresholds that would result from the proposed build alternatives are also identified in the following subsections. Intersections that would continue to operate at LOS E or F in the build alternatives, but are not impacted by project traffic based on the significance criteria, are identified below as less than significant impacts.

2035 Long-Term Horizon Year Build Alternative 2: Side-Lane BRT with Street Parking

Under Build Alternative 2, nine intersections would operate at LOS E or F during the PM peak hour in Horizon Year 2035. Figure 3.3-8 graphically presents 2035 Build Alternative 2 intersection LOS for all intersections. Table 3.3-14 presents a comparison of the average intersection delay and LOS for the intersections that operate at LOS E or F for the existing conditions, 2035 No Build Alternative, and 2035 Build Alternative 2 scenarios.

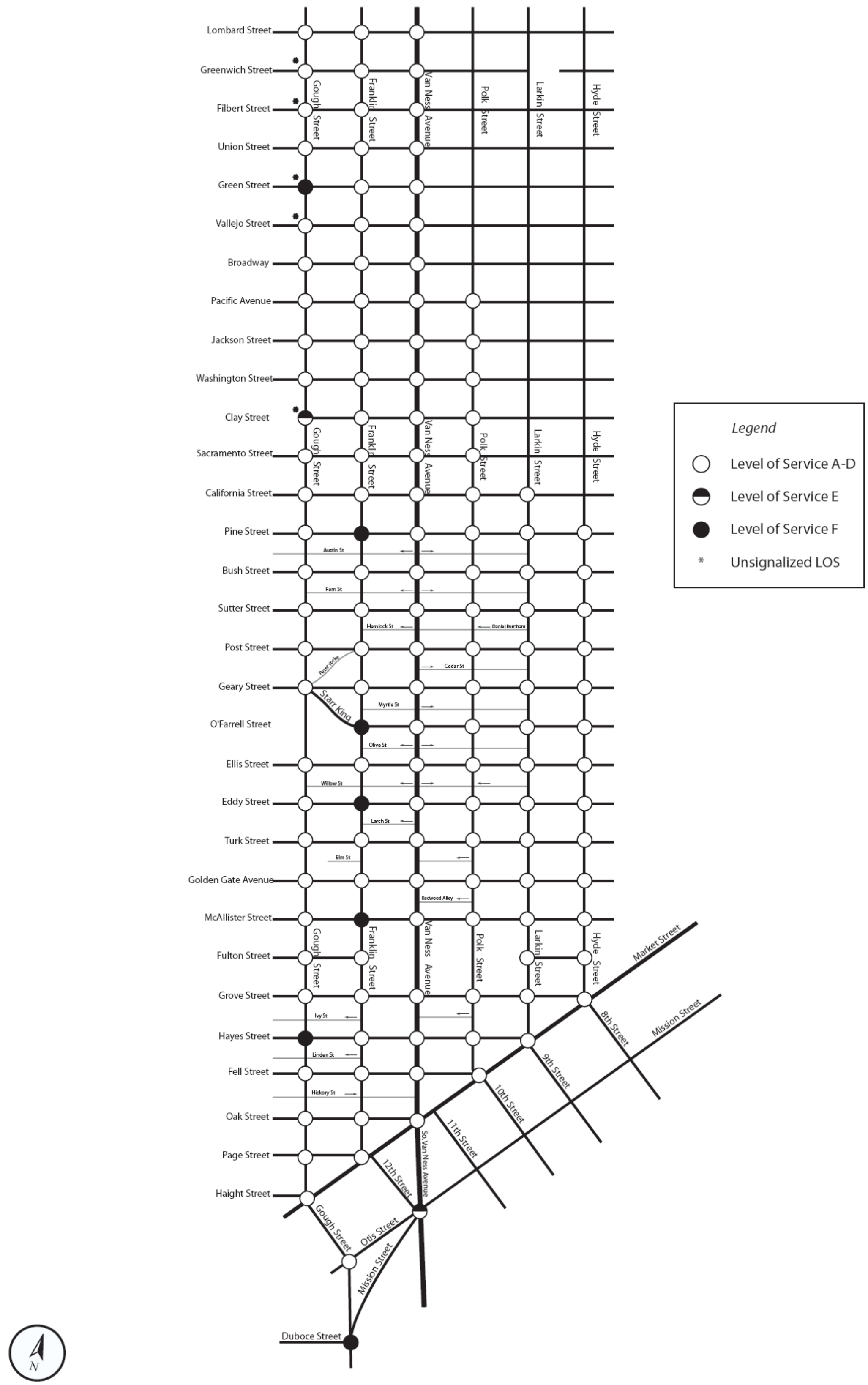
Table 3.3-14: Existing Condition, 2035 Build Alternative 2 (Side-Lane BRT), and No Build Alternative Intersection LOS (Delay) for Intersections that Operate at LOS E or F

INTERSECTION	EXISTING CONDITIONS	2035 NO BUILD ALTERNATIVE	2035BUILD ALTERNATIVE 2
	LOS (DELAY)	LOS (DELAY)	LOS (DELAY)
Gough/Green*	F (76.5)	F (93.6)	F (131.0)
Gough/Clay*	C (23.9)	D (29.8)	E (38.5)
Gough/Hayes	D (45.9)	F (98.1)	F (177.4)
Franklin/Pine	D (39.5)	E (66.7)	F (88.7)
Franklin/O'Farrell	D (39.3)	E (77.5)	F (133.1)
Franklin/Eddy	B (10.7)	C (24.1)	F (105.9)
Franklin/McAllister	B (15.7)	C (29.7)	F (90.2)
Van Ness/Pine	C (26.1)	E (64.9)	D (53.9)
Otis/Mission/S. Van Ness	D (46.1)	E (74.0)	E (65.7)
Duboce/Mission/Otis/US 101 Off-Ramp	D (44.4)	F (115.2)	F (93.5)

* Unsignalized intersection.
Table shows worst approach LOS (Delay) for an unsignalized intersection.
Table shows intersection LOS (intersection average vehicular delay) for signalized intersections.

Source: SYNCHRO model, CHS Consulting Group, 2013.

Figure 3.3-8: Long-Term (2035) Build Alternative 2 Intersection LOS



Significant Cumulative Impacts. Based on the significance criteria, the project traffic under Build Alternative 2 in the 2035 horizon year would cause significant cumulative impacts at five intersections as follows:

- **Gough/Hayes.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternative 2. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.
- **Franklin/Pine.** This signalized intersection would decline from LOS D under existing conditions to LOS F under 2035 Build Alternative 2; therefore, this intersection would have significant cumulative impacts under 2035 Build Alternative 2. Furthermore, this signalized intersection would decline from LOS E under 2035 No Build Alternative to LOS F under 2035 Build Alternative 2; therefore, the proposed project would cause significant cumulative impacts.
- **Franklin/O'Farrell.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternative 2. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.
- **Franklin/Eddy.** This signalized intersection would decline from LOS B under existing conditions to LOS F under 2035 Build Alternative 2; therefore, this intersection would have significant cumulative impacts under 2035 Build Alternative 2. Furthermore, this signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternative 2; therefore, the proposed project would cause significant cumulative impacts.
- **Franklin/McAllister.** This signalized intersection would decline from LOS B under the existing conditions to LOS F under 2035 Build Alternative 2; therefore, this intersection would have cumulative impacts under 2035 Build Alternative 2. Furthermore, this signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternative 2; therefore, the proposed project would cause significant cumulative impacts.

Less than Significant Cumulative Impacts. Five additional intersections would operate at LOS E or F under Build Alternative 2 in the 2035 Horizon Year; however, the contribution of project traffic is not significant based on the significance criteria. The intersections with less than significant project impacts include:

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under both the existing condition and 2035 Build Alternative 2; however, the intersection would not meet the Caltrans peak-hour signal warrant under both the existing conditions and 2035 Build Alternative 2, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. The intersection would also operate at LOS F under 2035 No Build Alternative, as would the SB approach. There are several possibilities to improve traffic operation at this intersection, including adding a traffic signal; removing some on-street parking spaces to create an additional SB approach lane; however, removing parking would worsen pedestrian conditions by eliminating the buffer provided by parked cars separating the sidewalk from the traffic lane, as discussed in Section 3.3.4 (see also Section 3.4, Nonmotorized Transportation), and past public outreach has indicated that the community prefers the stop-sign control of the intersection.
- **Gough/Clay.** The WB Clay Street approach at this unsignalized intersection would perform at LOS C under the existing conditions and would decline to LOS E at the worst approach under 2035 Build Alternative 2; however, the intersection would not meet the Caltrans peak-hour signal warrant under both the existing conditions and 2035 Build Alternative 2, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. Potential options that may be used to improve traffic operations of this intersection include adding a traffic signal, removing some on-street parking spaces on Clay Street to create an additional WB-to-SB approach lane, or widening Gough Street SB to two lanes by removing on-street parking spaces; however,

these improvements would have the adverse effect of parking removal on pedestrian conditions along Clay and/or Gough Streets and are not recommended.

- **South Van Ness/Mission/Otis.** This signalized intersection would perform at LOS D under existing conditions and would decline to LOS E under Build Alternative 2; therefore, this intersection would have cumulative impacts under 2035 Build Alternative 2. Furthermore, this signalized intersection would perform at LOS E under both 2035 No Build Alternative and Build Alternative 2 conditions; however, the contribution of project traffic is less than 5 percent to all critical movements. Thus, based on the significance criteria, the proposed project would cause less than significant cumulative impacts. The LOS cannot be improved because there is no ROW available to add lanes at this intersection, and the traffic signal timings are constrained by the pedestrian minimum timings and cannot be allocated to congested movements.
- **Duboce/Mission/Otis/US 101 Off-Ramps.** This signalized intersection would decline from LOS D under existing conditions to LOS F under Build Alternative 2; therefore, this intersection would have cumulative impacts under 2035 Build Alternative 2. Furthermore, this signalized intersection would perform at LOS F under both 2035 No Build Alternative and Build Alternative 2; however, the project does not contribute traffic to any critical movement that performs at LOS E or F. Thus, based on the significance criteria, the proposed project would cause less than significant cumulative impacts. The LOS cannot be improved because there is no ROW available to add lanes at this intersection, and the traffic signal timings are constrained by the pedestrian minimum timings and cannot be allocated to congested movements.
- **Van Ness/Pine.** The intersections of Van Ness and Pine would decline from LOS C under existing conditions to LOS E under 2035 No Build Alternative, and then improve to LOS D under Build Alternative 2. This decline in performance between the existing conditions and 2035 No Build Alternative is due to growth in background traffic. The improved performance between 2035 No Build Alternative and 2035 Build Alternative 2 is mainly due to traffic diversion away from the intersection.

Sensitivity Analysis at Van Ness Avenue and Geary Street Intersection: In anticipation of expected developments, the San Francisco Planning Department proposes to widen the sidewalk on the west side of Van Ness Avenue between Post and Geary streets. This proposed widening would necessitate removal of the Van Ness Avenue SB exclusive right-turn lane onto Geary Street. A sensitivity analysis has been performed, assuming the proposed sidewalk widening occurs. With the approved sidewalk widening and removal of exclusive right-turn lane, LOS at this intersection would remain unchanged at LOS B.

2035 Long-Term Horizon Year Build Alternatives 3 and 4: Center-Lane BRT Configuration

Under Build Alternatives 3 and 4, 12 intersections would operate at LOS E or F during the PM peak hour in Horizon Year 2035. Table 3.3-15 provides a comparison of the average intersection delay and LOS for the intersections that would operate at LOS E or F under the existing conditions, 2035 No Build Alternative, and 2035 Build Alternatives 3 and 4 scenarios. Figure 3.3-9 presents 2035 Build Alternatives 3 and 4 intersection LOS for all intersections.

Figure 3.3-9: Long-Term (2035) Build Alternatives 3 and 4 Intersection LOS

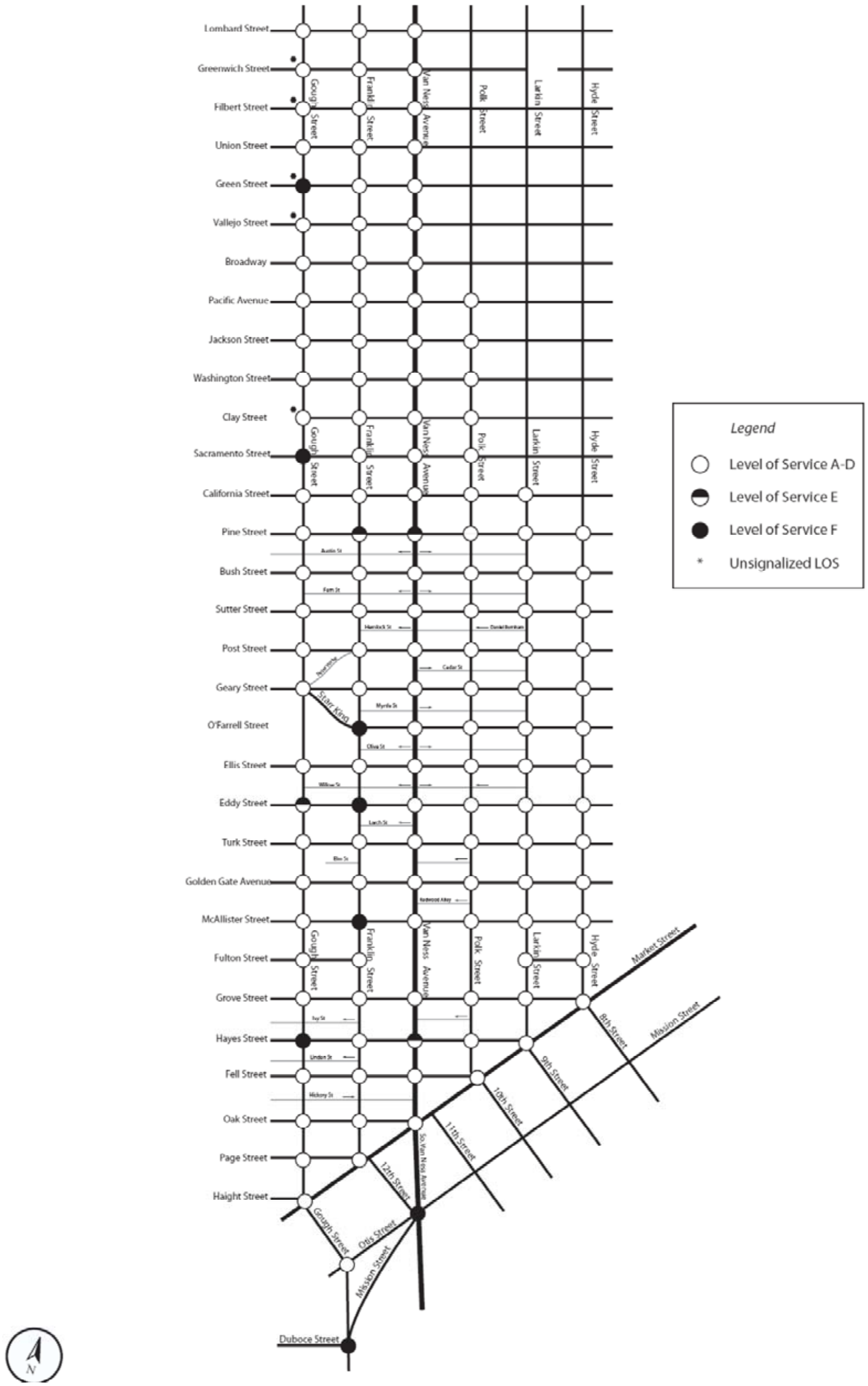


Table 3.3-15: Existing Conditions, 2035 Build Alternatives 3 and 4 (Center-Lane BRT), and No Build Alternative Intersection LOS (Delay) for Intersections that Operate at LOS E or F

INTERSECTION	EXISTING CONDITIONS	2035 NO BUILD ALTERNATIVE	2035 BUILD ALTERNATIVES 3 AND 4
	LOS (DELAY)	LOS (DELAY)	LOS (DELAY)
Gough/Green*	F (76.5)	F (93.6)	F (105.8)
Gough/Sacramento	C (27.1)	C (25.2)	F (81.6)
Gough/Eddy	A (8.9)	B (14.8)	E (55.9)
Gough/Hayes	D (45.9)	F (98.1)	F (122.0)
Franklin/Pine	D (39.5)	E (66.7)	E (77.7)
Franklin/O'Farrell	D (39.3)	E (77.5)	F (125.7)
Franklin/Eddy	B (10.7)	C (24.1)	F (102.0)
Franklin/McAllister	B (15.7)	C (29.7)	F (91.4)
Van Ness/Pine	C (26.1)	E (64.9)	E (59.4)
Van Ness/Hayes	B (17.9)	D (47.7)	E (74.0)
Otis/Mission/S. Van Ness	D (46.1)	E (74.0)	F (128.2)
Duboce/Mission/Otis/US 101 Off-Ramp	D (44.4)	F (115.2)	F (97.9)

* Unsignalized intersection.
Table shows worst approach LOS (Delay) for an unsignalized intersection.
Table shows intersection LOS (intersection average vehicular delay) for signalized intersections.

Source: SYNCHRO model, CHS Consulting Group, 2013.

Significant Cumulative Impacts. The Van Ness Avenue BRT Project would cause significant cumulative impacts at eight study intersections under 2035 Horizon Year Build Alternatives 3 and 4:

- **Gough/Sacramento.** This signalized intersection would decline from LOS C under existing conditions to LOS F under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. Furthermore, this signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4; therefore, the proposed project would cause significant cumulative impacts.
- **Gough/Eddy.** This signalized intersection would decline from LOS A under existing conditions to LOS E under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. This signalized intersection would decline from LOS B under 2035 No Build Alternative to LOS E under 2035 Build Alternatives 3 and 4; therefore, the proposed project would cause significant cumulative impacts.
- **Gough/Hayes.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternatives 3 and 4. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.
- **Franklin/O'Farrell.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternatives 3 and 4. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.
- **Franklin/Eddy.** This signalized intersection would decline from LOS B under existing conditions to LOS F under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. This signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4; therefore, the proposed project would cause significant cumulative impacts.

- **Franklin/McAllister.** This signalized intersection would decline from LOS B under existing conditions to LOS F under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. This signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4; therefore, the proposed project would cause significant cumulative impacts.
- **Van Ness/Hayes.** This signalized intersection would decline from LOS B under existing conditions to LOS E under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. This signalized intersection would decline from LOS D under 2035 No Build Alternative to LOS E under 2035 Build Alternatives 3 and 4; therefore, the proposed project would cause significant cumulative impacts.
- **South Van Ness/Mission/Otis.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternatives 3 and 4. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.

Less than Significant Cumulative Impacts. Four additional intersections would operate at LOS E or F under Build Alternative 2 in the 2035 Horizon Year; however, the contribution of project traffic is not significant based on the significance criteria. The intersections with less than significant project impacts include:

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under both existing conditions and 2035 Build Alternatives 3 and 4; however, the intersection would not meet the Caltrans peak-hour signal warrant under both existing conditions and 2035 Build Alternatives 3 and 4, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. The SB approach would also operate at LOS F under 2035 No Build Alternative. There are several possibilities to improve traffic operations at this intersection, including adding a traffic signal; removing some on-street parking spaces to create an additional SB approach lane; however, removing parking would worsen pedestrian conditions by eliminating the buffer provided by parked cars separating the sidewalk from the traffic lane, as discussed in Section 3.3.4 (see also Section 3.4, Nonmotorized Transportation), and past public outreach has indicated that the community prefers the stop-sign control of the intersection.
- **Franklin/Pine.** This signalized intersection would degrade from LOS D under existing conditions to LOS E under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. Furthermore, this signalized intersection would perform at LOS E under 2035 No Build Alternative and Build Alternatives 3 and 4; however, the project does not contribute traffic to any critical movement that performs at LOS E or F. Thus, based on the significance criteria, the proposed project would cause less than significant cumulative impacts. One potential improvement measure is providing an exclusive WB right-turn lane from Van Ness Avenue to Franklin Street. This can be implemented by instituting a PM peak-hour tow-away zone along the north side of Pine between Van Ness Avenue and Franklin Street; however, this would have the adverse effect of parking removal on pedestrian conditions along Franklin Street.
- **Van Ness/Pine.** This signalized intersection would perform at LOS C under existing conditions and degrade to LOS E under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. Furthermore, this signalized intersection would perform at LOS E under 2035 No Build Alternative and Build Alternatives 3 and 4. The contribution of project traffic to the critical movement is not significant (i.e., no project traffic added to any critical movement); therefore, the proposed project would not cause significant cumulative impacts. One potential improvement measure is providing an exclusive WB right-turn storage lane of 50 feet. This can be implemented by eliminating two parking spaces on

the north side of Pine Street; however, this mitigation measure is not recommended due to the adverse effects of parking removal on pedestrian conditions along Pine Street.

- **Duboce/Mission/Otis/US 101 Off-Ramps.** This signalized intersection would perform at LOS D under existing conditions and degrade to LOS F under 2035 Build Alternatives 3 and 4; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. Furthermore, this signalized intersection would perform at LOS F under 2035 No Build Alternative and Build Alternatives 3 and 4. However, the project does not contribute traffic to any critical movement that performs at LOS E or F; therefore, the proposed project would not cause significant cumulative impacts. The LOS cannot be improved because there is no ROW available to add lanes at this intersection, and the traffic signal timings are constrained by the pedestrian minimum timings and cannot be allocated to congested movements. This intersection would experience a reduction in traffic volumes under Build Alternatives 3 and 4 in 2035 caused by the diversion of traffic volumes from Van Ness Avenue.

Design Variation between Build Alternative 3 and Build Alternative 4 and Sensitivity Analysis at Van Ness Avenue and Geary Street Intersection. As discussed in Chapter 2, Van Ness Avenue between Geary and O'Farrell streets under Build Alternative 4 would have the same geometric design as Build Alternative 3. Due to this transition from a center-running BRT with a single median north of Geary Street to a right-side loading BRT with two medians for this block, the SB Van Ness Avenue exclusive right-turn lane to Geary Street would not be provided under Build Alternative 4. This intersection operates at LOS B under 2035 Build Alternative 3. Without the exclusive SB right-turn lane, LOS at this intersection would operate at LOS C under 2035 Build Alternative 4. The analysis for Build Alternative 4 also serves as the sensitivity analysis if the San Francisco Planning Department were to widen the sidewalk under Build Alternative 3, thus requiring elimination of the exclusive SB right-turn lane onto Geary Street from Van Ness Avenue.

2035 Long-Term Horizon Year Build Alternatives 3 and 4 with Design Option B and the LPA: Center-Lane BRT

The LPA (including the Vallejo Northbound Station Variant)[51] would have the same traffic impacts as Build Alternatives 3 and 4 with Design Option B. Because the LPA would have 11 fewer right-turn pockets, there are minor differences in approach average delay between the LPA and Build Alternatives 3 and 4 with Design Option B along Van Ness Avenue. However, none of these differences would cause a new significant intersection LOS impact or worsen a significant intersection LOS impact compared to the impacts outlined for Build Alternatives 3 and 4 with Design Option B. For details on LPA performance in 2035, please see the Vehicular Traffic Analysis Technical Memorandum (CHS, 2013).

Under Build Alternatives 3 and 4 with Design Option B and the LPA, 12 intersections would operate at LOS E or F during the PM peak hour in Horizon Year 2035, which is the same number of intersections operating at LOS E or F under 2035 Build Alternatives 3 and 4. Table 3.3-16 presents a comparison of the average intersection delay and LOS for the intersections that would operate at LOS E or F under the existing conditions, 2035 No Build Alternative, and 2035 Build Alternatives 3 and 4 with Design Option B and LPA scenarios. Figure 3.3-10 presents 2035 Build Alternatives 3 and 4 with Design Option B intersection LOS for all intersections.

[51] The Vallejo Northbound Station Variant would have one fewer (2 versus 3) mixed traffic lanes in the SB direction for the block between Vallejo and Green streets versus the LPA. Under the LPA without the variant, this lane would be used to store left-turning traffic onto Broadway. Under the Vallejo Northbound Station Variant, that roadway space would be used for the additional far side NB station at Vallejo Street. In 2015, the Vallejo intersection would operate at LOS A during the PM peak under the LPA and would operate at a similar LOS with implementation of the Vallejo Northbound Station Variant.

Figure 3.3-10: Long-Term (2035) Alternatives 3 and 4 with Design Option B and the LPA Intersection LOS

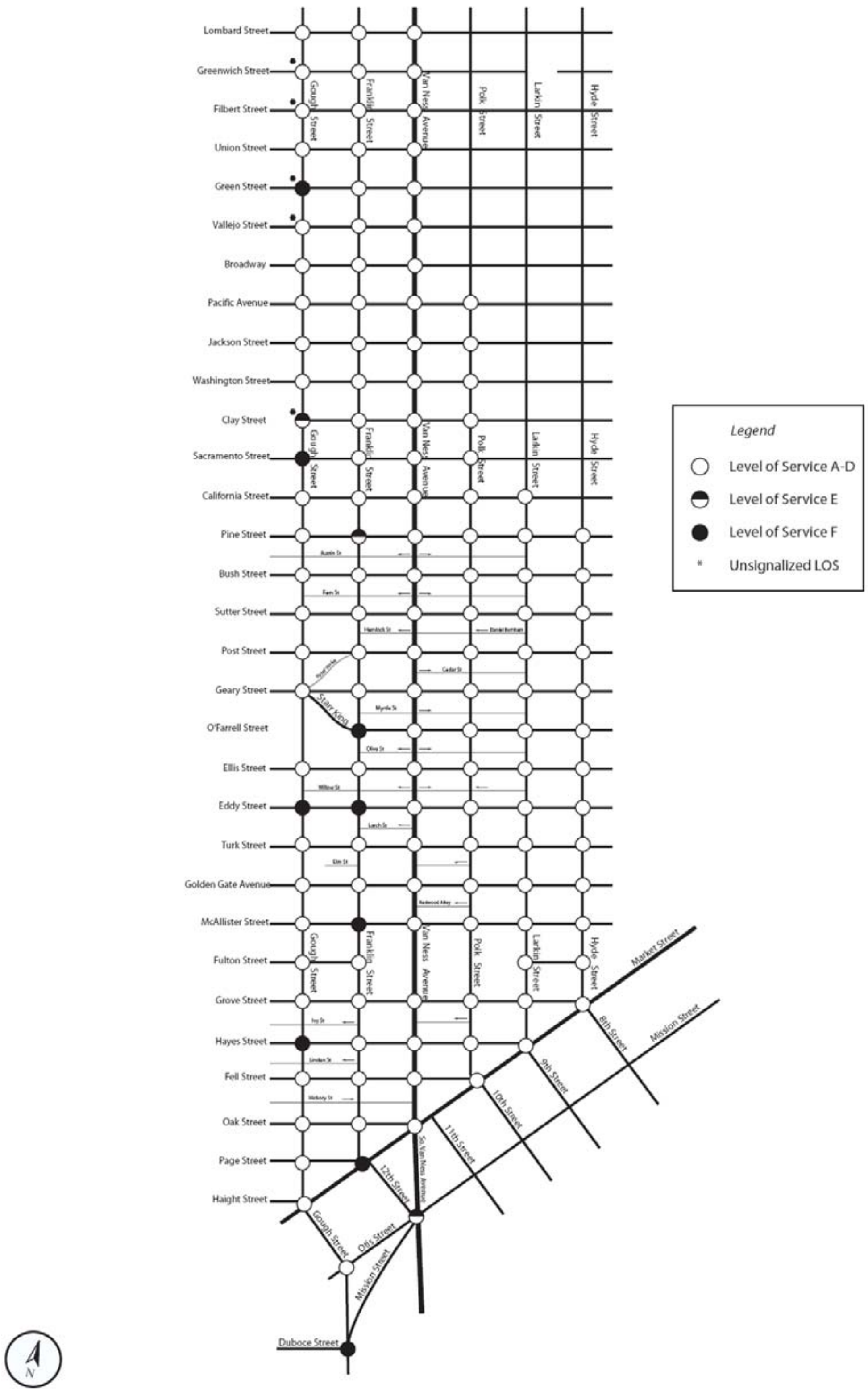


Table 3.3-16: Existing Conditions, 2035 Build Alternatives 3 and 4 (Center-Lane BRT) with Design Option B, and No Build Alternative Intersection LOS (Delay) for Intersections that Operate at LOS E or F

INTERSECTION	EXISTING CONDITIONS	2035 NO BUILD ALTERNATIVE	2035 BUILD ALTERNATIVES 3 AND 4 WITH DESIGN OPTION B AND THE LPA
	LOS (DELAY)	LOS (DELAY)	LOS (DELAY)
Gough/Green*	F (76.5)	F (93.6)	F (142.7)
Gough/Clay*	C (23.9)	D (29.8)	E (44.5)
Gough/Sacramento	C (27.1)	C (25.2)	F (102.2)
Gough/Eddy	A (8.9)	B (14.8)	F (107.3)
Gough/Hayes	D (45.9)	F (98.1)	F (126.2)
Franklin/Pine	D (39.5)	E (66.7)	E (78.8)
Franklin/O'Farrell	D (39.3)	E (77.5)	F (115.3)
Franklin/Eddy	B (10.7)	C (24.1)	F (113.1)
Franklin/McAllister	B (15.7)	C (29.7)	F (143.1)
Franklin/Market	B (17.9)	C (33.1)	F (148.3)
Van Ness/Pine	C (26.1)	E (64.9)	C (21.4)
Otis/Mission/S. Van Ness	D (46.1)	E (74.0)	E (79.0)
Duboce/Mission/Otis/US 101 Off-Ramp	D (44.4)	F (115.2)	F (97.2)

* Unsignalized intersection.
Table shows worst approach LOS (Delay) for an unsignalized intersection.
Table shows intersection LOS (intersection average vehicular delay) for signalized intersections.

Source: SYNCHRO model, CHS Consulting Group, 2013.

Significant Cumulative Impacts. Under Build Alternatives 3 and 4 with Design Option B and the LPA, the Van Ness Avenue BRT Project would cause significant traffic impacts at the following eight intersections in 2035.

- **Gough/Sacramento.** This signalized intersection would decline from LOS C under existing conditions to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. Furthermore, this signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, the proposed project would cause significant cumulative impacts.
- **Gough/Eddy.** This signalized intersection would decline from LOS A under existing conditions to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. Furthermore, this signalized intersection would decline from LOS B under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, the proposed project would cause significant cumulative impacts.
- **Gough/Hayes.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternatives 3 and 4 with Design Option B and the LPA. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.
- **Franklin/O'Farrell.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternatives 3 and 4 with Design Option B and the LPA. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.

- **Franklin/Eddy.** This signalized intersection would decline from LOS B under existing conditions to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4. Furthermore, this signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, the proposed project would cause significant cumulative impacts.
- **Franklin/McAllister.** This signalized intersection would decline from LOS B under existing conditions to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. Furthermore, this signalized intersection would decline from LOS C under 2035 No Build Alternative to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, the proposed project would cause significant traffic impacts.
- **Franklin/Market/Page.** This intersection is assessed to have significant project-specific impacts under 2015 Build Alternatives 3 and 4 with Design Option B and the LPA. Hence, based on the significance criteria (Section 3.3.3), the proposed project would cause significant cumulative impacts.
- **South Van Ness/Mission/Otis.** This signalized intersection would decline from LOS D under existing conditions to LOS E under Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. Furthermore, this signalized intersection would perform at LOS E under 2035 No Build Alternative and Build Alternatives 3 and 4 with Design Option B and the LPA. The contribution of project traffic to the critical movement is significant (i.e., greater than 5 percent). Thus, based on the significance criteria, the proposed project would cause significant cumulative impacts.

Less than Significant Cumulative Impacts. Four additional intersections would have less than significant impacts. These intersections would operate at LOS E or F under Build Alternatives 3 and 4 with Design Option B and the LPA in 2035; however, the contribution of project traffic would not be significant. The intersections with less than significant project impacts are:

- **Gough/Green.** The SB approach, the worst approach at this four-way stop-controlled intersection, would perform at LOS F under both the existing condition and 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; however, the intersection would not meet the Caltrans peak-hour signal warrant under both the existing condition and 2035 Build Alternatives 3 and 4 with Design Option B and the LPA, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. The intersection would also operate at LOS F under 2035 No Build Alternative, as would the SB approach. There are several possibilities to improve traffic operations at this intersection, including adding a traffic signal; removing some on-street parking spaces to create an additional SB approach lane; however, removing parking would worsen pedestrian conditions by eliminating the buffer provided by parked cars separating the sidewalk from the traffic lane, as discussed in Section 3.3.4 (see also Section 3.4, Nonmotorized Transportation), and past public outreach has indicated that the community prefers the stop-sign control of the intersection.
- **Gough/Clay.** The WB Clay Street approach at this unsignalized intersection would perform at LOS C under the existing conditions and would decline to LOS E at the worst approach under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; however, the intersection would not meet the Caltrans peak-hour signal warrant under both the existing condition and 2035 Build Alternative 3 and 4 with Design Option B and the LPA, and would therefore not be significant per the impact significance thresholds described in Section 3.3.3. Potential options that may be used to improve traffic operations of this intersection include adding a traffic signal, removing some on-street parking spaces on Clay Street to create an additional WB-to-SB

approach lane, or widening Gough Street SB to two lanes by removing on-street parking spaces; however, these improvements would have the adverse effect of parking removal on pedestrian conditions along Clay and/or Gough Streets and are not recommended.

- **Franklin/Pine.** This signalized intersection would decline from LOS D under existing conditions to LOS E under Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. Furthermore, this signalized intersection would operate at LOS E under 2035 No Build Alternative and Build Alternatives 3 and 4 with Design Option B and the LPA; however, the contribution of project traffic to the critical movements performing at LOS E or F would not be significant (i.e., less than 5 percent); therefore, the proposed project would cause less than significant cumulative impacts. One potential improvement measure is providing an exclusive WB right-turn lane between Van Ness Avenue and Pine Street. This can be implemented by instituting a PM peak-period tow-away zone along the north side of Pine; however, this improvement would have the adverse effect of parking removal on pedestrian conditions along Pine Street and is not recommended.
- **Duboce/Mission/Otis/US 101 Off-Ramps.** This signalized intersection would perform at LOS D under existing conditions and decline to LOS F under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA; therefore, this intersection would have cumulative impacts under 2035 Build Alternatives 3 and 4 with Design Option B and the LPA. Furthermore, this signalized intersection would perform at LOS F under 2035 No Build Alternative and Build Alternatives 3 and 4 with Design Option B and the LPA; however, the contribution of project traffic to the critical movements would not be significant (i.e., less than 5 percent, or LOS D or better). The LOS cannot be improved because there is no ROW available to add lanes at this intersection and the traffic signal timings are constrained by the pedestrian minimum timings and cannot be allocated to congested movements.
- **Beneficial Impacts.** The intersections of Van Ness and Pine would decline from LOS C under the existing conditions to LOS E under 2035 No Build Alternative, and then improve to LOS C under Build Alternatives 3 and 4 with Design Option B and the LPA. This decline in performance between the existing conditions and 2035 No Build Alternative is due to growth in background traffic. The improved performance between 2035 No Build Alternative and 2035 Build Alternatives 3 and 4 with Design Option B and the LPA is mainly due to traffic diversions away from the intersection.

KEY FINDINGS

Under Build Alternatives 3 and 4 without Design Option B in the near-term Year 2015, traffic conditions at three intersections would be significantly impacted.

Under Build Alternatives 3 and 4 with Design Option B in the near-term Year 2015 (including the LPA), traffic conditions at two intersections would be significantly impacted.

Under Build Alternative 2, in the near-term Year 2015, the project would cause significant traffic impacts at two intersections.

Under the long-term Horizon Year 2035, the project would cause significant traffic impacts at five to eight intersections, depending on the alternative.

Design Variation between Build Alternative 3 and Build Alternative 4 with Design Option B and Sensitivity Analysis at Van Ness Avenue and Geary Street Intersection. As discussed in Chapter 2, Van Ness Avenue between Geary and O'Farrell streets under Build Alternative 4 with Design Option B would have the same geometric design as Build Alternative 3 with Design Option B. Due to this transition from a center-running BRT with a single median north of Geary Street to a right-side loading BRT with two medians for this block, the SB Van Ness Avenue exclusive right-turn lane to Geary Street would not be provided under Build Alternative 4 with Design Option B. This intersection operates at LOS B under 2015 Build Alternative 3 with Design Option B. Without the exclusive SB right-turn lane, LOS at this intersection would operate at LOS C under 2015 Build Alternative 4 with Design Option B. The analysis for Build Alternative 4 with Design Option B also serves as the sensitivity analysis if the San Francisco Planning Department were to widen the sidewalk under Build Alternative 3 with Design Option B, thus requiring elimination of the exclusive SB right-turn lane onto Geary Street from Van Ness Avenue. The LPA would include the removal of the right-turn pocket at this intersection.

LPA Vallejo Northbound Station Variant. The Vallejo Northbound Station Variant would have one fewer (2 versus 3) mixed traffic lanes in the SB direction for the block between Vallejo and Green streets versus the LPA. Under the LPA without the variant, this lane would be used to store left-turning traffic onto Broadway. Under the Vallejo Northbound Station Variant, that roadway space would be used for the additional far side NB station at Vallejo Street. In 2035, the Vallejo intersection would operate at LOS A during the PM peak under the LPA and would deteriorate to LOS B with implementation of the Vallejo Northbound Station Variant.

3.3.3.4 | SUMMARY OF VEHICULAR TRAFFIC IMPACTS

This section provides a summary of the Van Ness Avenue BRT Project's vehicular traffic impacts for the three project alternatives for the near-term 2015 and long-term Horizon Year 2035. Table 3.3-17 provides a summary of traffic impacts at all intersections that would operate at LOS E or F in the existing, No Build, or Build Alternative conditions. Key findings are listed below. As explained in Section 3.3.2.2, the PM peak hour represents the worst-case scenario to assess vehicular traffic impacts of the proposed project and is used for the intersection LOS analysis.

- In the existing conditions, only the intersection of Gough and Green streets would perform at LOS E or F.
- In 2015 No Build Alternative, four intersections would perform at LOS E or LOS F. The intersection of Mission/South Van Ness/Otis is the only intersection on Van Ness Avenue that would perform at LOS E.
- In the near-term 2015 (representing existing plus project conditions), the project would cause significant project-specific impacts at the intersections of Gough/Hayes and Franklin/O'Farrell under all three build alternatives. Under Build Alternatives 3 and 4, the project would also cause significant project-specific impacts at the intersection at the South Van Ness/Mission/Otis intersection. Under Build Alternatives 3 and 4 with Design Option B and the LPA, the project would also cause significant project-specific impacts at the intersection of Franklin and Market streets.
- In 2015, the performance of the Mission/South Van Ness/Otis intersection would improve from LOS E to LOS D under Build Alternative 2, and Build Alternatives 3 and 4 with Design Option B and the LPA versus Alternative 1 (No Build Alternative), and the performance of the Mission/Duboce/Otis/US 101 off-ramps would also improve from LOS E to LOS D under all of the build alternatives versus Alternative 1 (No Build Alternative). This is due to the diversion of traffic using Van Ness Avenue under 2015 No Build Alternative to other modes, other times of the day, and streets outside the traffic study area because of the implementation of BRT.
- Under both near-term 2015 and long-term 2035 horizon years, Build Alternative 2 would have the least traffic impacts because of the availability of higher capacity for vehicles making turns from Van Ness Avenue with protect-permitted left turns, thus reducing diversions to other parallel streets.
- Under the long-term Horizon Year 2035 No Build Alternative (Alternative 1), seven intersections would perform at LOS E or LOS F. This is three more than in the 2015 build alternatives. The intersection of Mission/South Van Ness/Otis is the only intersection on Van Ness Avenue that would perform at LOS E or LOS F under 2035 No Build Alternative.
- In the long-term Horizon Year 2035, the project would cause significant traffic impacts at five to eight locations depending on the alternative.
- The project traffic in 2035 would cause significant cumulative impacts at seven of these same intersections under Build Alternatives 3 and 4 with or without Design Option B, including the LPA. One additional intersection, the Van Ness/Hayes intersection, would be impacted under Build Alternatives 3 and 4 without Design Option B. Under Build Alternatives 3 and 4 with Design Option B and the LPA, one additional intersection, the Franklin/Market intersection, would be impacted by project traffic.

3.3.4 | Avoidance, Minimization, and/or Mitigation Measures

This section describes avoidance, minimization, and mitigation measures that would lessen traffic impacts for each build alternative, including the LPA. Whether to adopt mitigation measures will be decided by the decision makers (i.e., the Authority Board). Decision makers will consider the Final EIS/EIR prior to deciding whether to approve the project. As part of that process, decision makers will make any required findings and, for CEQA purposes, those will include determining whether mitigation measures are feasible or infeasible, considering specific economic, legal, social, technological, or other considerations. If the

Each build alternative, including the LPA, already incorporates features that help avoid or minimize traffic impacts. Nevertheless, the build alternatives are forecast to cause traffic delay impacts at certain locations. Engineering measures could mitigate some of these delay impacts in the near term but are not feasible due to policy conflicts, specifically the need to balance traffic circulation with pedestrian and transit circulation and safety.
In addition, these engineering techniques function by increasing automobile traffic capacity and are unlikely to be effective in the long term due to the risk of induced demand.

Table 3.3-17: Summary of Vehicular Traffic Impacts

INTERSECTION	EXISTING CONDITION	2015 NO BUILD ALTERNATIVE	PROJECT-SPECIFIC IMPACTS			2035 NO BUILD ALTERNATIVE	CUMULATIVE IMPACTS		
			2015 BUILD ALTERNATIVE 2 (SIDE-LANE BRT)	2015 BUILD ALTERNATIVES 3 AND 4 (CENTER-LANE BRT)	2015 BUILD ALTERNATIVES 3 AND 4 (CENTER-LANE BRT WITH DESIGN OPTION B) AND THE LPA		2035 BUILD ALTERNATIVE 2 (SIDE-LANE BRT)	2035 BUILD ALTERNATIVES 3 AND 4 (CENTER-LANE BRT)	2035 ALTERNATIVES 3 AND 4 (CENTER-LANE BRT WITH DESIGN OPTION B) AND THE LPA
Gough/Green	NPI	NPI	LSI	LSI	LSI	NPI	LSI	LSI	LSI
Gough/Clay	--	--	--	--	--	--	LSI	--	LSI
Gough/Sacramento	--	--	--	--	--	--	--	SCI	SCI
Gough/Eddy	--	--	--	--	--	--	--	SCI	SCI
Gough/Hayes	--	NPI	SPI	SPI	SPI	NPI	SCI	SCI	SCI
Franklin/Pine	--	--	--	--	--	NPI	SCI	LSI	LSI
Franklin/O'Farrell	--	--	SPI	SPI	SPI	NPI	SCI	SCI	SCI
Franklin/Eddy	--	--	--	--	--	--	SCI	SCI	SCI
Franklin/McAllister	--	--	--	--	--	--	SCI	SCI	SCI
Franklin/Market	--	--	--	--	SPI	--	--	--	SCI
Van Ness/ Pine	--	--	--	--	--	NPI	BI	LSI	BI
Van Ness/Hayes	--	--	--	--	--	--	--	SCI	--
Mission/South Van Ness/Otis	--	NPI	BI	SPI	BI	NPI	LSI	SCI	SCI
Mission/Duboce/ Otis/US 101 Off-Ramps	--	NPI	BI	BI	BI	NPI	LSI	LSI	LSI

Notes:

This EIS/EIR assumes the 2015 Build Alternatives are equivalent to the existing plus project conditions.

NPI – No Project Impact. The intersection performs at LOS E or LOS F under existing or No Build Alternative conditions.

SPI – Significant Project-Specific Impact. Project traffic would contribute significantly towards the decline of intersection operations from existing condition to existing plus project condition.

LSI – Less than Significant Project-Specific Impact or Cumulative Impact. Project traffic would not contribute significantly to intersections operating at the same LOS E or LOS F under (i) existing and existing plus project condition or (ii) cumulative Build and No Build Alternatives.

BI – No Project Impact. Project results in a change in operations from LOS E or LOS F under existing condition or cumulative No Build Alternative conditions, to LOS D or better under existing plus project condition or cumulative Build Alternatives.

SCI - Significant Cumulative Impact. Project traffic would contribute significantly towards the decline of intersection operations from existing condition to cumulative Build Alternatives.

decision makers determine that mitigation measures or project alternatives that reduce or avoid significant impacts are feasible, they will be adopted and incorporated into the project. If the decision makers determine that mitigation measures are infeasible and that significant and unavoidable impacts will occur, decision makers will need to adopt findings that the project will result in economic, legal, social, technological, or other benefits, notwithstanding the unavoidable environmental risks of the project.

The discussion also identifies engineering mitigation measures, which may ultimately be found by the Authority Board to be infeasible, to document the Authority's effort to consider means of lessening or avoiding the significant traffic impacts anticipated under each proposed build alternative, and to explain in each case some of the policy and engineering challenges. The circulation and public comment period of this Draft EIS/EIR provided an opportunity for input on this approach.

Each build alternative, including the LPA, would incorporate features that help avoid or minimize traffic impacts through project design, in keeping with the project's objective to accommodate traffic circulation. These include area-wide signal timing and optimization; signal priority for BRT on Van Ness Avenue, which also benefits (north/south) mixed traffic; reducing left-turn movements along the project alignment; and right-turn pockets at high-demand locations.

Nevertheless, the build alternatives, including the LPA, are forecast to cause traffic delay impacts at the locations identified in Section 3.3.3. As discussed in more detail below, engineering measures could, at some affected intersections, mitigate these delay impacts in the near term. The engineering mitigation measures primarily include removal of parking tow-away lanes or traffic turn pockets, which increase roadway capacity at the affected intersections.[52] Such mitigation measures were identified and tested for each project scenario.[53]

These types of mitigation measures, while reducing localized traffic delays in the short term, may ultimately be found by the Authority Board to not be feasible due to policy conflicts, specifically the need to balance traffic circulation with pedestrian and transit circulation and safety. In addition, these engineering techniques function by increasing automobile traffic capacity and are unlikely to be effective in the long term due to the risk of induced demand.

Pedestrian Conflicts. The use of tow-away zones and the addition of right-turn pockets would worsen pedestrian conditions by removing on-street parking, which acts as a buffer from moving traffic, increasing the levels of moving traffic itself and the associated conflicts with pedestrians at intersections, and raising exposure of pedestrians to motorized traffic where turn pockets are added. These outcomes would not support the project purpose and need to improve pedestrian comfort and safety (see Section 1.3).

The San Francisco General Plan Transportation Element specifically notes the important role of on-street parking as a buffer between pedestrians and traffic. Policy 18.2 provides that no additional tow-away zones should be instituted if they would worsen pedestrian safety and comfort. The buffer provided by parallel parking is especially important on Franklin and Gough streets, which have narrower sidewalks than the standards recommended in the San Francisco Better Streets Plan, and higher traffic volumes than Van Ness Avenue.

When evaluating this tradeoff between mitigating traffic delays and inducing new automobile trips, or worsening pedestrian conditions through parking removal, the Authority is guided by the Transit First Policy in the City Charter. The Transit First Policy states that "Decisions regarding the use of limited public street and sidewalk space shall encourage the use of public rights-of-way by pedestrians, bicyclists, and public transit" (City Charter Article VIIIA, 115, Transit First Policy).

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[52] Other mitigation measures include conversion of Otis Street to two-way and closing Page Street to vehicular traffic for some project scenarios; these are discussed in detail in this section.
[53] Traffic signal timings and offsets were optimized for all mitigation measures.

Induced Demand. Substantial evidence indicates that expanding roadway capacity induces new vehicle trips and is not an effective way to address congestion over the long term. New roadway capacity generates new automobile trips that were not previously made, returning delays to previous levels. Researchers, including Robert Cervero, Mark Hansen, and Robert Noland, published key findings on this topic starting in 1995.

In 2009, the California Resources Agency adopted revisions to the State CEQA guidelines that recognize the "induced demand" that results from typical traffic mitigation measures. The revisions removed from the Guidelines a suggestion to measure and mitigate traffic impacts with automobile LOS or volume to capacity ratios, citing induced demand as a key rationale for the change (December, 2009 Final Statement of Reasons, http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf).

Even without these engineering mitigation measures, the number of intersections operating at LOS E or LOS F under the build alternatives in Year 2015 is no greater than the number of intersections operating at LOS E or F in the No Build Alternative scenario.

The following sections identify those locations that would experience a significant and unavoidable automobile traffic delay impact by 2015 and/or 2035. Even without the engineering mitigation measures described below, the number of intersections operating at LOS E or LOS F under the build alternatives in Year 2015 is no greater than the number of intersections operating at LOS E or F in the No Build Alternative scenario.

3.3.4.1 NEAR-TERM (2015) BUILD ALTERNATIVES

This section identifies measures to reduce or eliminate Near-Term (2015) intersection impacts under the build alternatives (representing existing plus project conditions); however, the Authority Board may find these mitigation measures to be infeasible as explained below.

2015 Near-Term Build Alternative 2: Side-Lane BRT with Street Parking

As presented in Section 3.3.3.2, two intersections would have a significant and unavoidable traffic impact in 2015 under Build Alternative 2.

- **Gough/Hayes.** Traffic impacts at this intersection would primarily result from the Gough Street SB approach. Provision of a fourth SB through lane on Gough Street through the implementation of PM peak-period tow-away along the east side of Gough Street between Ivy and Linden would further improve the intersection's level of service to LOS D. However, a tow-away lane would worsen pedestrian conditions along the east side of Gough Street by removing parking during the peak period (see Section 3.4).If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2015 under Build Alternative 2.
- **Franklin/O'Farrell.** Traffic impacts at this intersection would primarily result from the approximately 360 vehicles making the EB left turn from O'Farrell Street during the PM peak hour and incurring extensive delays. Adding an exclusive EB left-turn lane would restore the LOS at this intersection to an acceptable level; however, this mitigation measure would cause adverse impacts on Muni bus services. O'Farrell Street has a bus-only lane on the south side of O'Farrell. Providing an EB left-turn lane at Franklin Street would require this bus-only lane to be converted to a general-purpose lane. Losing this bus lane would adversely impact Muni bus speed and cause delays. This is an especially difficult tradeoff given the planned Geary BRT service.. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2015 under Build Alternative 2.

2015 Near-Term Build Alternatives 3 and 4: Center-Lane BRT

As discussed in Section 3.3.3.2, project traffic in Year 2015 under Build Alternatives 3 and 4 would cause a significant impact at three intersections.

- **Gough/Hayes.** Traffic impacts at this intersection would be primarily a result of the Gough Street SB approach.. Provision of a fourth SB through lane on Gough Street through the implementation of a PM peak-period tow-away zone along the east side of Gough Street between Ivy and Linden would improve the intersection's LOS to LOS D. However, a tow-away lane would worsen pedestrian conditions along the east side of Gough Street by removing parking during the peak period (see Section 3.4).If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2015 under Build Alternatives 3 and 4.

- **Franklin/O'Farrell.** Traffic impacts at this intersection would primarily result from the approximately 360 vehicles making the EB left turn from O'Farrell Street during the PM peak hour and incurring extensive delays. Adding an exclusive EB left-turn lane would restore LOS at this intersection to an acceptable level. However, this mitigation measure would cause adverse impacts on Muni bus services. O'Farrell Street has a bus-only lane on the south side. Providing an EB left-turn lane at Franklin Street would require this bus-only lane to be converted to a general-purpose lane. Losing this bus lane would adversely impact Muni bus speed and cause delays. This is an especially difficult tradeoff given the planned Geary Corridor BRT service. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2015 under Build Alternatives 3 and 4.
- **South Van Ness/Mission/Otis.** The LOS at this intersection cannot be improved because there is no ROW available to add lanes. In addition, the traffic signal timings are constrained by the pedestrian minimum timings and cannot be allocated to congested movements. Therefore, this intersection cannot be mitigated, and project traffic would cause a significant and unavoidable impact in 2015 under Build Alternatives 3 and 4.

Year 2015 Near-Term Build Alternatives 3 and 4 with Design Option B and the LPA: Center-Lane BRT

As discussed in Section 3.3.3.1, project traffic in 2015 under Build Alternatives 3 and 4 with Design Option B and the LPA would cause a significant impact at three intersections.

- **Gough/Hayes.** Traffic impacts at this intersection would be primarily a result of the Gough Street SB approach. Provision of a fourth SB through lane on Gough Street through the implementation of a PM peak-period tow-away zone along the east side of Gough Street between Ivy and Linden would restore the intersection to LOS D. However, a tow-away lane would worsen pedestrian conditions along the east side of Gough Street by removing parking during the peak period (see Section 3.4). If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2015 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Franklin/O'Farrell.** Traffic impacts at this intersection would be primarily a result of the approximately 360 vehicles making the EB left turn from O'Farrell Street during the PM peak hour and incurring extensive delays. Adding an exclusive EB left-turn lane as a mitigation measure would restore LOS at this intersection to an acceptable level; however, this mitigation measure would cause adverse impacts on Muni bus services. O'Farrell Street has a bus-only lane on the south side. Providing an EB left-turn lane at Franklin Street would require this bus-only lane to be converted to a general-purpose lane. Losing this bus lane would adversely impact Muni bus speed and cause delays. This is an especially difficult tradeoff given the planned Geary Corridor BRT service. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2015 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Franklin/Market.** Traffic impacts at this intersection would be primarily a result of the delays for the EB left-turn approach from Market Street. This intersection performs poorly due to the additional NB vehicles making a U-turn onto Otis Street from Mission Street NB, turning right onto Gough Street NB, turning right onto EB Market Street, and turning left onto NB Franklin Street. Rerouting Muni buses from EB Page Street to the proposed two-way Haight Street, closing Page Street to vehicular traffic, and split-phase timing for EB Page Street added to the Market Street EB left-turn movement at this signalized intersection This would restore the intersection's performance to an

acceptable LOS; however, it would eliminate the Page Street phase of the traffic signal, which would make it difficult for bicycle users, who heavily utilize Page Street bike lanes, to access Market Street bike lanes. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant and unavoidable impacts at this intersection in 2015 under Build Alternatives 3 and 4 with Design Option B and the LPA.

3.3.4.2 LONG-TERM (2035) BUILD ALTERNATIVES

This section identifies measures to reduce or eliminate Long-Term (2035) intersection impacts under the build alternatives; however, the Authority Board may find these measures to be infeasible, as explained below.

2035 Long-Term Horizon Year Build Alternative 2: Side-Lane BRT with Street Parking

As discussed in Section 3.3.3.2, project traffic in 2035 under Build Alternative 2 would cause a significant impact at five intersections.

- **Gough/Hayes.** Traffic impacts at this intersection would be primarily a result of the delays for the Gough Street SB approach. Provision of a fourth SB through lane on Gough Street through the implementation of a PM peak-period tow-away zone along the east side of Gough Street between Ivy and Linden and a 125-foot exclusive EB right-turn lane created by removing six parking spaces on the south side of Hayes Street would improve the intersection's level of service. However, parking removal would worsen pedestrian conditions along the east side of Gough Street and the south side of Hayes Street (see Section 3.4).If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause a significant and unavoidable impact in 2035 under Build Alternative 2.
- **Franklin/Pine.** Traffic impacts at this intersection would be primarily a result of the delays for the Pine Street approach. The mitigation measure includes providing an exclusive WB right-turn lane from Van Ness Avenue to Franklin Street. This mitigation measure can be implemented by instituting a PM peak-period tow-away zone along the north side of Pine between Van Ness Avenue and Franklin Street. The intersection would operate at LOS D after implementation of the mitigation. However, the removal of parking would have adverse effects on pedestrian conditions. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternative 2.
- **Franklin/O'Farrell.** Traffic impacts at this intersection would be primarily a result of the delays for the O'Farrell Street approach. Adding an exclusive EB left-turn lane is a mitigation measure that would restore LOS at this intersection to an acceptable level; however, it would cause adverse impacts on Muni bus services. O'Farrell Street has a bus-only lane on the south side of O'Farrell. Providing an EB left-turn lane at Franklin Street would require this bus-only lane to be converted to a general-purpose lane. Losing this bus lane would adversely impact Muni bus speed and cause delays. This is an especially difficult trade-off given the planned Geary Corridor BRT service. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant and unavoidable impacts in 2035 under Build Alternative 2.
- **Franklin/Eddy.** Traffic impacts at this intersection would be primarily a result of the delays for the Eddy Street approach. The mitigation would be to provide a 50-foot-long exclusive EB left-turn lane by eliminating two parking spaces on the south side of Eddy. However, the removal of parking would have adverse effects on pedestrian conditions. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035under Build Alternative 2.
- **Franklin/McAllister.** Traffic impacts at this intersection would be primarily a result of the delays for the Franklin Street approach. The mitigation includes adding a fourth NB through lane created by instituting a PM peak-hour tow-away zone along the west side

of Franklin Street between Fulton and McAllister streets. This would extend the existing tow-away zone by one block south. However, the removal of parking would have adverse effects on pedestrian conditions along Franklin Street (see Section 3.4). If the Authority Board chooses not to adopt the mitigation measure, project traffic would cause significant impacts at this intersection in 2035 under Build Alternative 2.

2035 Long-Term Horizon Year Build Alternatives 3 and 4: Center-Lane BRT

As discussed in Section 3.3.3.2, the Van Ness Avenue BRT Project would cause a significant traffic impact at eight intersections in 2035 under Build Alternatives 3 and 4.

- **Gough/Sacramento.** Traffic impacts at this intersection would be primarily a result of the Gough Street approach. One mitigation measure is a second SB through lane along Gough Street. This can be implemented by instituting a PM peak-period tow-away zone on the west side of Gough Street between Clay and Sacramento streets. However, the removal of parking would have adverse effects on pedestrian conditions along Gough Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4.
- **Gough/Eddy.** Traffic impacts at this intersection would be primarily a result of the delays for the Eddy Street approach. The mitigation includes providing a 50-foot-long exclusive EB right-turn lane created by eliminating three parking spaces on the south side of Eddy Street and relocating the bus stop on the near side of Gough to the far side of the intersection. However, this mitigation measure would have the adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Eddy Street in addition to potential transit access impacts. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant and unavoidable impacts at this intersection in 2035 under Build Alternatives 3 and 4.
- **Gough/Hayes.** Traffic impacts at this intersection would be primarily a result of the delays for the Gough Street SB approach. Conditions would be mitigated with provision of a fourth SB through lane on Gough Street through the implementation of a PM peak-period tow-away zone along the east side of Gough Street between Ivy and Linden. In addition, a 100-foot exclusive EB right-turn lane would be provided through the removal of five parking spaces on the south side of Hayes Street. However, this would have the adverse effects of parking removal on pedestrian conditions along Gough Street and Hayes Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant and unavoidable impacts at this intersection in 2035 under Build Alternatives 3 and 4.
- **Franklin/O'Farrell.** Traffic impacts at this intersection would be primarily a result of the delays for the O'Farrell Street approach. The performance of this intersection would be improved by increasing capacity on NB Franklin Street and EB O'Farrell Street through additional lanes; however, there is no ROW available along Franklin Street and the mitigation would impact transit along O'Farrell Street. In addition, adding an exclusive EB left-turn lane would cause adverse impacts on Muni bus services. O'Farrell Street has a bus-only lane on the south side of O'Farrell. Providing an EB left-turn lane at Franklin Street would require this bus-only lane to be converted to a general-purpose lane. Losing this bus lane would adversely impact Muni bus speed and cause delays. This is an especially difficult trade-off given the planned Geary Corridor BRT service. If the Authority Board finds the mitigation measures to be infeasible and does not adopt them, project traffic would cause significant and unavoidable impacts in 2035 under Build Alternatives 3 and 4.
- Franklin/Eddy. Traffic impacts at this intersection would be primarily a result of the delays for the Eddy Street approach. The mitigation measure is providing a 50-foot-long exclusive EB left-turn lane by eliminating two parking spaces on the south side of Eddy Street. However, this mitigation measure would have the adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Eddy Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it,

project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4.

- **Franklin/McAllister.** Traffic impacts at this intersection would be primarily a result of the delays for the Franklin Street approach. The mitigation measure is a fourth NB through lane created by instituting a PM peak-period tow-away zone along the west side of Franklin Street between Fulton and McAllister streets. This would extend the existing tow-away zone by one block south; however, this mitigation measure would have adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Franklin Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4.
- **Van Ness/Hayes.** Traffic impacts at this intersection would be primarily a result of the delays for the Van Ness Avenue left-turn approach. The reduction of two existing NB left-turn bays to one would not accommodate the forecast traffic volumes in 2035. This impact would be mitigated by diverting a portion of the left-turn volumes upstream in the SoMa area. Another mitigation measure would involve signage changes discussed earlier, from the intersection of Duboce/Mission/US 101 off-ramps to Mission and South Van Ness Avenue, and conversion of Otis Street to a two-way street from Duboce/Mission to McCoppin. These changes would divert some of the Van Ness Avenue NB left-turn traffic at Hayes Street to Otis, Gough, Market, and Franklin streets to reach their destinations. However, this mitigation measure would potentially cause secondary private vehicle, transit, and bicycle impacts at the Market and Franklin intersection (would cause the intersection to decline to LOS E) and at the Duboce/Mission intersection (would require the removal of parking on one side of the street between Duboce/Mission and Otis/Gough). If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant and unavoidable impacts in 2035 under Build Alternatives 3 and 4.
- **South Van Ness/Mission/Otis.** No improvement is proposed for this intersection because there is no ROW available to add lanes to this intersection, and the traffic signal timings are constrained by the pedestrian minimum timings and cannot be allocated to congested movements. This intersection cannot be mitigated without significant redesign of the intersection. Therefore, this intersection cannot be mitigated, and project traffic would cause significant and unavoidable impacts in 2035 under Build Alternatives 3 and 4.

2035 Long-Term Horizon Year Build Alternatives 3 and 4 with Design Option B and the LPA: Center-Lane BRT

As discussed in Section 3.3.3.2, project traffic under 2035 Build Alternatives 3 and 4 with Design Option B would cause a significant impact at eight intersections.

- **Gough/Sacramento.** Traffic impacts at this intersection would be primarily a result of the delays for the Gough Street approach. The mitigation measure is a second SB through lane along Gough Street implemented by instituting a PM peak-period tow-away zone on the west side of Gough Street between Clay and Sacramento streets. However, this mitigation measure would have the adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Gough Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Gough/Eddy.** Traffic impacts at this intersection would be primarily a result of the delays for the Eddy Street approach. The mitigation measure is to provide a 50-foot-long exclusive EB right-turn lane implemented by eliminating three parking spaces on the south side of Eddy Street and relocating the bus stop on the near side of Gough to the far side of the intersection. However, this mitigation measure would have the adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Eddy Street in addition to a potential transit access impact. If the Authority Board finds

the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.

- **Gough/Hayes.** Traffic impacts at this intersection would be primarily a result of the delays for the Gough Street SB approach. The mitigation is to provide a fourth SB through lane on Gough Street through the implementation of PM peak-period tow-away along the eastside of Gough Street between Ivy and Linden and a 100-foot exclusive EB right-turn lane created through the removal of five parking spaces on the south side of Hayes Street. However, parking removal would worsen pedestrian conditions along the east side of Gough Street and the south side of Hayes Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Franklin/O'Farrell.** Traffic impacts at this intersection would be primarily a result of the delays for the O'Farrell Street approach. The mitigation is to increase capacity on EB O'Farrell Street through additional lanes; however, ROW is unavailable along Franklin Street. In addition, adding an exclusive EB left-turn lane would cause adverse impacts on Muni bus services. O'Farrell Street has a bus-only lane on the south side of O'Farrell. Providing an EB left-turn lane at Franklin Street would require this bus-only lane to be converted to a general-purpose lane. Losing this bus lane would adversely impact Muni bus speed and cause delays. This is an especially difficult trade-off given the planned Geary Corridor BRT service. If the Authority Board finds the mitigation measures to be infeasible and does not adopt them, project traffic would cause significant and unavoidable impacts in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Franklin/Eddy.** Traffic impacts at this intersection would be primarily a result of the delays for the Eddy Street approach. The mitigation measure is to provide a 50-foot-long exclusive EB left-turn lane by eliminating two parking spaces on the south side of Eddy Street. However, this mitigation measure would have the adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Eddy Street (see Section 3.4). If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Franklin/McAllister.** Traffic impacts at this intersection would be primarily a result of the delays for the Franklin Street approach. The mitigation measure is a fourth NB through lane implemented by instituting a PM peak-period tow-away zone along the west side of Franklin Street between Fulton and McAllister Street. This would extend the existing tow-away zone by one block south; however, this mitigation measure would have the adverse effects of parking removal for auto travel lane purposes on pedestrian conditions along Franklin Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant impacts at this intersection in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **Franklin/Market.** Traffic impacts at this intersection would be primarily a result of the delays for the EB Market left-turn approach. This intersection would perform poorly mainly due to the additional NB vehicles making a U-turn onto Otis Street from Mission Street NB, turning right onto Gough Street, right onto EB Market Street, and left onto NB Franklin Street. Traffic impacts at this intersection would be significant and unavoidable. While traffic operations would be improved by closing Page Street to EB vehicular traffic and adjusting signal timing at this intersection to provide more time for Market Street EB left-turn movements, these changes would adversely affect bicyclists using the Page Street bike lanes to access Market Street. If the Authority Board finds the mitigation measure to be infeasible and does not adopt it, project traffic would cause significant and unavoidable impacts in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.
- **South Van Ness/Mission/Otis.** The LOS at this intersection cannot be improved because there is no ROW available to add lanes, and the traffic signal timings are constrained by

the pedestrian minimum timings and cannot be allocated to congested movements. Therefore, this intersection cannot be mitigated, and project traffic would cause significant and unavoidable impacts in 2035 under Build Alternatives 3 and 4 with Design Option B and the LPA.

Mitigation Measure M – Traffic Management "Toolbox"

Although these mitigations would not mitigate the traffic impacts to less than significant, SFMTA will attempt to manage resulting traffic through a "toolbox" of short-term traffic management strategies to improve traffic management in the study area. The approaches in the toolbox are not associated with any specific intersection delay, but they would assist the transition from no-build to build circulation patterns and support smooth multimodal circulation in the corridor and citywide under a build and cumulative scenario. The toolbox effort includes raising public awareness of circulation changes; advising drivers of alternate routes; and pedestrian improvements. These strategies cannot be readily represented in conventional traffic operations models; therefore, their potential effect on minimizing traffic delay impacts has not been quantified.

- **Driver Wayfinding and Signage.** Driver guidance will especially assist infrequent drivers of the corridor who may not be aware of alternate routes, such as along the Larkin/Hyde and Franklin/Gough corridors. Examples of wayfinding/signage opportunities include guidance from the US 101 off-ramps to 9th Street/Civic Center to the Hyde/Larkin NB corridor, and from NB Mission Street and the Duboce off-ramp to the Otis U-turn with access to NB Franklin Street. For infrequent drivers heading SB from the northern part of the corridor, signage/wayfinding could include use of North Point to access downtown, or right turns off of Van Ness Avenue, such as at Pine, to access Gough. The Authority will work with Caltrans to develop a driver wayfinding and signage strategy as part of mitigation measures M-TR-C2 and M-TR-C5, discussed in Section 4.15.1.2. The SFMTA would continue to monitor traffic after construction and during project operation. If the above-mentioned construction measures prove to be helpful in minimizing traffic delay impacts, the SFMTA may choose to implement similar strategies on an as-needed basis during project operation.
- **Public Awareness Campaign and Transportation Management Plan (TMP) during Project Construction.** The project construction period is an ideal time to raise public awareness of circulation changes resulting from the project and to implement wayfinding/signage, guidance to alternate routes, and use of parking control officers. As discussed as part of mitigation measure M-TR-C7 in Section 4.15.1, a TMP would be developed to implement these concepts during construction. These information channels could also create new patterns, helping inform drivers during project operation. This campaign should be carried out with regional agencies, including Caltrans and GGT. The SFMTA would continue to monitor traffic after construction and during project operation. If the above-mentioned construction measures prove to be helpful in minimizing traffic delay impacts, the SFMTA may choose to implement similar strategies on an as-needed basis during project operation.
- **Pedestrian Amenities at Additional Corridor Locations.** In the long term, pedestrian amenities, such as countdown signals and pedestrian curb bulbs, could help reduce the severity of automobile traffic delays through mode shift (i.e., drivers switching to walking). Recognizing this potential, the City has prioritized pedestrian improvements as part of the Road Repaving and Streets Safety Bond (Proposition B) Projects on Gough, Franklin, and Polk streets (see Section 2.7.1). Ongoing monitoring of travel in the corridor may identify additional locations for pedestrian improvements based on a combination of pedestrian and vehicle volumes, infrastructure capabilities, and collision history. These types of pedestrian improvements cannot be represented in standard traffic or travel demand models to show a reduction in traffic on an individual project/intersection basis. Rather, shifts from driving to walking tend to occur as a network of improvements is implemented. In the near term, they will not worsen traffic conditions.

3.4 Nonmotorized Transportation

This section summarizes the existing pedestrian and bicycle travel conditions, referred to as nonmotorized transportation, along Van Ness Avenue and how these conditions would change with both impacts and benefits by implementation of the BRT build alternatives. This section summarizes the findings of the Van Ness Avenue BRT Environmental Review – Analysis of Nonmotorized Transportation Impacts Technical Report prepared in support of the proposed project (Arup, 2013).

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The environmental consequences related to nonmotorized transportation under the LPA and with the Vallejo Northbound Station Variant are identified as part of the analysis presented for the build alternatives in this chapter. For many of the pedestrian and bicycle conditions described in this section, the LPA has identical environmental consequences to Build Alternatives 3 or 4 with Design Option B, and is so noted.

3.4.1 | Regulatory Setting

Several City policies and plans govern and guide the nonmotorized transportation environment along Van Ness Avenue. A summary of these policies and plans follows.

3.4.1.1 | EXECUTIVE DIRECTIVE 10-03

On December 20, 2010, Mayor Gavin Newsom signed an Executive Directive (10-03) directing San Francisco agencies to work toward a citywide target of a 25 percent reduction in serious and fatal pedestrian injuries by 2016 and a 50 percent reduction by 2021. The directive also states that the injury prevention goals should be linked with a complementary citywide goal of increasing walking as a share of trips in San Francisco.

3.4.1.2 | SAN FRANCISCO BETTER STREETS PLAN

The San Francisco Better streets Plan provides a blueprint for the future of San Francisco's pedestrian environment (San Francisco Planning Department, 2010). This citywide policy document describes the City's vision, provides design guidelines, and identifies next steps toward creating an improved pedestrian environment in San Francisco. The plan sets broad guidelines and does not prioritize policies or street improvement projects or give specific engineering guidance. Major themes and ideas of the San Francisco Better streets Plan guidelines include:

- Distinctive, unified streetscape design;
- Space for public life;
- Enhanced pedestrian safety;
- Improved street ecology;
- Universal design;
- Integrating pedestrians with transit;
- Creative use of parking lanes;
- Traffic calming to reduce speeding and enhance pedestrian safety;
- Pedestrian-priority designs; and
- Extensive greening of street space.

3.4.1.3 | SFGO

As described in Section 2.2.1, the SFgo program is a package of technology-based transportation management system tools being developed by SFMTA. The SFgo Program is comprised of many projects that would be implemented throughout the City, including the Van Ness Avenue corridor. The following infrastructure elements of SFgo that are relevant to nonmotorized transportation are planned for implementation in the Van Ness Avenue corridor by 2015:

- Installation of pedestrian countdown signals on all crosswalk legs at all signalized intersections along Van Ness Avenue. Pedestrian countdown signals increase pedestrian safety by giving clear and accurate information about crossing time so that pedestrians can complete their crossing before cross traffic receives the green light.
- Installation of APS at some additional signalized intersections on Van Ness Avenue. Currently, APS is installed on Van Ness Avenue at the intersections of Market, McAllister, Hayes, Grove, and Fell streets.
- Upgrade of curb ramps to meet current City standards and ADA requirements at all intersections along Van Ness Avenue to provide access to people in wheelchairs and overall improved pedestrian travel.

3.4.1.4 | SAN FRANCISCO BICYCLE PLAN

The San Francisco Bicycle Plan includes policies and goals that reflect the City's commitment to expanding the role and importance of bicycle transportation in San Francisco. The plan presents a framework for the City to provide a safe and attractive environment needed to promote bicycling. The plan includes 81 recommended action items to guide the City in becoming more bicycle friendly and specifies 60 near-term bicycle network improvement projects and other long-term improvement projects. Specific goals of the San Francisco Bicycle Plan include:

- Making bicycling an integral part of daily life in San Francisco;
- Increasing safe bicycle use;
- Refining and expanding the existing bicycle route network;
- Ensuring plentiful, high-quality bicycle parking;
- Expanding bicycle access to transit and bridges;
- Educating the public about bicycle safety;
- Improving bicycle safety through targeted enforcement;
- Promoting and encouraging safe bicycling;
- Adopting bicycle-friendly practices and policies; and
- Prioritizing and increasing bicycle funding.

The extension of bicycle lanes on Polk Street NB between Market and Grove streets is a near-term improvement project proposed near Van Ness Avenue. Improvements to the bike route on Polk Street are planned and are described in Section 5.3, Reasonably Foreseeable Projects.

3.4.1.5 | VAN NESS AVENUE AREA PLAN (JULY 1995)

The City adopted the *Van Ness Avenue Area Plan* in 1986 and created a Van Ness Avenue Special Use District of the Planning Code in 1988 to implement the plan. The plan is intended to promote Van Ness Avenue as the City's most prominent north-south boulevard, lined with high-density mixed-use development and including design features that support a transit-served pedestrian promenade. The *Van Ness Avenue Area Plan* identifies the following objectives and policies relevant to streetscape and nonmotorized transportation:

- Objective 8. Create an attractive street and sidewalk space that contributes to the transformation of Van Ness Avenue into a residential boulevard.
  - Policies 8.1 through 8.4 support landscaping and tree plantings, as well as maintaining existing sidewalk space abutting major renovation or new development projects.
  - Policies 8.5 through 8.7 support maintaining existing sidewalk widths and providing uniform aesthetic sidewalk treatments.
- Objective 9. Provide safe and efficient movement among all users on Van Ness Avenue.
  - Policies 9.1 through 9.4 support transit service, including reducing conflicts between transit vehicles and other moving and parked vehicles.
  - Policies 9.5 through 9.8 aim to reduce conflicts between pedestrians and automobiles by calling for off-street parking access from minor east-west streets and prohibitions on new parking access on Van Ness Avenue.

- Policies 9.10 through 9.12 include measures to enhance pedestrian circulation.
- Policy 9.13 discourages freight-loading facilities on Van Ness Avenue.

3.4.1.6 | MARKET AND OCTAVIA AREA PLAN (OCTOBER 2007)

The Market and Octavia Area Plan guides future development of the Market and Octavia area. The area plan focuses on improving and creating new opportunities for nonmotorized travel through infill redevelopment, dense new housing development, and civic and open spaces that provide attractive outdoor shared places. The plan specifically promotes high-density housing near transit to encourage more transit, pedestrian, and bicycle trips.

The Market and Octavia Area Plan focuses on creating new opportunities for nonmotorized travel through infill development and outdoor shared spaces.

3.4.1.7 | TENDERLOIN – LITTLE SAIGON NEIGHBORHOOD TRANSPORTATION STUDY

The Tenderloin – Little Saigon Neighborhood Transportation Study identifies the community's high-priority transportation needs and develops conceptual designs and strategies for transportation improvements to the Tenderloin and Little Saigon neighborhoods. The community's top priorities for improvement include pedestrian safety, slower traffic, transit reliability and access, and streetscape.

3.4.1.8 | ADA COMPLIANCE

In the past, it was generally accepted that upgrades to meet ADA requirements were made on the basis of "touch it, fix it," and identified deficiencies beyond the construction footprint could be added to a Transition Plan and deferred to a subsequent improvement project; however, following a recent Caltrans court settlement, this approach has been replaced with one wherein all noncompliant features within a project limit should be addressed to the maximum extent feasible. In Caltrans Design Bulletin 83-04, which covers issues of accessibility, Caltrans specifically recognizes that pavement resurfacing and rehabilitation projects now trigger ADA upgrades, even though curbs and sidewalks are not typically modified under such projects. Although preventive maintenance and routine maintenance work are not considered an alteration and are not required to follow the guidance, the San Francisco City Attorney has interpreted that pavement resurfacing work does trigger compliance with ADA requirements.

3.4.2 | Affected Environment

This section describes the existing pedestrian and bicycling conditions or the "affected environment" for nonmotorized transportation in the Van Ness Avenue corridor. Pedestrian trips make up 26 percent of total trips to, from, and within the neighborhoods surrounding Van Ness Avenue on a daily basis, exceeding the citywide average of 18 percent. Neither of these figures accounts for walking to reach transit, which is the primary mode for 20 percent of trips in the neighborhoods that surround Van Ness Avenue and 17 percent citywide. Because every transit trip begins and ends as a pedestrian trip, altogether up to 46 percent of trips to, from, or within the neighborhoods surrounding Van Ness Avenue include a walking or bicycling component, indicating the importance of nonmotorized travel in the area along Van Ness Avenue.

Pedestrian trips make up 26 percent of total trips to, from, and within the neighborhoods surrounding Van Ness Avenue on a daily basis, exceeding the citywide average of 18 percent. Because every transit trip begins and ends as a pedestrian trip, altogether up to 46 percent of trips to, from, or within the neighborhoods surrounding Van Ness Avenue include a walking or bicycling component.

3.4.2.1 | PEDESTRIAN CONDITIONS

The existing pedestrian conditions of Van Ness Avenue in the proposed BRT project area are described in this section.

Pedestrian Volumes and Crowding

Van Ness Avenue is characterized by dense development, mixed uses, short block lengths, gentle grades, short distances between destinations, and frequent transit service, both along Van Ness Avenue and on connecting cross streets (e.g., Market, Geary, O'Farrell, and California streets). These factors combine to generate significant pedestrian traffic throughout the corridor. The highest volumes of pedestrian crossings are in the Civic Center area from Grove Street to Market Street. Moderate activity is observed between California and O'Farrell streets, while lower activity intersections are located north of Sacramento Street, coinciding with largely residential areas. In summary, pedestrian crossing activity largely occurs in three areas: (1) Civic Center near City Hall; (2) Market Street due to numerous transit connections; and (3) major transit cross-corridors such as Geary Boulevard and O'Farrell Street (Arup, 2013).

Pedestrians do not experience crowding in Van Ness Avenue crosswalks.

Pedestrians do not experience crowding in Van Ness Avenue crosswalks. Crosswalk density is a measure of the "maneuvering area" provided for each pedestrian crossing the street, indicating the level of crowding, and it is a function of pedestrian volumes, crosswalk dimensions, green time, and expected walking speeds. Table 3.4-1 shows the HCM pedestrian crowding LOS thresholds. Table 3.4-2 displays the pedestrian crowding LOS calculated using the HCM method for the five intersections along Van Ness Avenue with the highest recorded pedestrian count volumes. There are two key assumptions: (1) that pedestrian volumes counted at each intersection are evenly distributed across all four crossings; and (2) that pedestrians arrive evenly spaced at the intersections rather than in platoons due to upstream traffic signals. In cases where crosswalk dimensions differ, the LOS rating reflects the crossing with the lowest score. Given these assumptions, crosswalk density does not appear to be a significant issue at these intersections. All crossings have an LOS A except at Grove Street, which receives an LOS C due to a relatively long and narrow crosswalk on the south side of the intersection and a shorter pedestrian green time than at other intersections.

Table 3.4-1: Pedestrian Crowding LOS Thresholds

LOS	MANEUVERING AREA PER PERSON (SQUARE FEET)
A	> 60
B	40 - 60
C	24 - 40
D	15 - 24
E	8 - 15
F	≤ 8

Source: Highway Capacity Manual (HCM), Transportation Research Board (TRB).

Table 3.4-2: Pedestrian Crowding LOS at High Pedestrian Count Intersections

INTERSECTION	DENSITY LOS CROSSING VAN NESS	DENSITY LOS CROSSING SIDE STREET
Geary	A	A
O'Farrell	A	A
Golden Gate	A	A
Grove	C	A
Market	A	A

Source: VISSIM simulation, HCM.

Crosswalk Conditions

Marked crosswalks are present on all four sides of every signalized intersection along Van Ness Avenue. Crosswalk width across Van Ness Avenue (i.e., the north and south legs of the intersection) vary considerably, from 10 feet at the Fell, Golden Gate, Post, Bush, Pine, and Lombard street intersections to 22 feet at McAllister Street and 24 feet at Market Street.

Typical crosswalks widths are between 12 and 15 feet across Van Ness Avenue. Crosswalks running parallel to Van Ness Avenue (i.e., on the west and east legs of the intersection) are on average 16 feet wide, which corresponds with adjoining sidewalk widths.

Two types of crosswalks are used along Van Ness Avenue – traditional parallel line crosswalks and high-visibility "ladder" crosswalks. Ladder crosswalks are located at Golden Gate, Turk, Pacific, and Broadway; all other intersections employ traditional parallel line crosswalks. Pedestrians have sufficient maneuvering space in crosswalks, even at the busiest crossings.

Each street corner along Van Ness Avenue has at least one curb ramp, allowing access by people in wheelchairs, as well as providing easier travel for those with strollers, carts, and the like; however, many ramps have not yet been upgraded to current City standards, which include the installation of tactile domes for easy identification by visually impaired pedestrians. Many intersections also have only one ramp, which necessitates more maneuvering of a wheelchair to cross the street, places users closer to moving traffic, and can be disorienting to visually impaired pedestrians.

Sidewalk Conditions

Along most of Van Ness Avenue, the sidewalks are 16 feet wide on both sides of the street. On South Van Ness Avenue between Market and Mission streets, the sidewalk is 22 feet wide on both sides. According to the Better streets Plan, Van Ness Avenue sidewalks should be a minimum of 15 feet wide. The existing sidewalks exceed the City's standard of 15 feet for a sidewalk along a commercial thoroughfare (San Francisco Planning Department, 2010). Effective sidewalk width, however, is sometimes reduced due to various streetscape elements, such as bus shelters and passenger waiting areas, trees and landscaping, parking meters, bicycle racks, newspaper racks, trash receptacles, and OCS support poles/ streetlights. At the same time, these features serve to buffer the sidewalk and pedestrians from vehicular traffic. A buffer, whether landscaping or curbside parking, can significantly improve the sidewalk environment and the perception of safety and comfort by pedestrians (PEDSAFE, 2004). Landscaped planters along the sidewalk between Market and McAllister streets in the Civic Center provide additional buffer between pedestrians and traffic, although these also reduce the effective sidewalk width. Nearly all blocks of Van Ness Avenue between Lombard and Mission streets, in both the NB and SB directions, permit some degree of curbside parking (i.e., with 8-foot-wide parking lanes).[54]

Street lighting along Van Ness Avenue is provided by the OCS support pole/streetlight network and is supplemented by lighting from adjacent properties. The existing streetlight network does not meet Illuminating Engineering Society (IES) RP-08 minimum illumination levels for safe roadway lighting on a major arterial/state highway such as Van Ness Avenue. The Van Ness Avenue BRT Feasibility Study (SFCTA, 2006) found pedestrian-scale lighting to be an important amenity that is currently lacking on Van Ness Avenue. The study explains that Van Ness Avenue has a high level of pedestrian night activities, and there is a need to improve visibility for vehicles in the roadway, as well as for pedestrians on the sidewalk.

Crossing Distance, Nose Cones, and Curb Bulbs

The longer the distance needed to cross an intersection, the longer the signal time is needed and the likelihood increases that pedestrians cannot complete the crossing in one signal cycle. Van Ness Avenue is a wide roadway with six mixed-flow traffic lanes. The average crossing distance on Van Ness Avenue is 90 feet (Arup, 2013). The most common crossing distance across Van Ness Avenue is 93 feet, but curb bulbs located at 17 crossings reduce that distance. In addition, the wide median located on some blocks of Van Ness Avenue

[54] The only block that does not permit parking along one side is the block of Van Ness Avenue between Fell and Hayes streets, where no parking is provided along the east side of the block.

serves as a refuge for pedestrians that are unable to finish crossing the street during one light cycle; however, the medians are not consistently located and range in width from 4 to 14 feet. In addition, many of the medians do not extend across the crosswalk to provide a protective nose cone (Arup, 2013). Nose cones provide a physical barrier from traffic, creating a protected space at the crosswalk median to wait for the next signal cycle to finish crossing the street. They are refuges that extend into the crosswalk with ramps or a level cut-through for ADA access. Fourteen (14) Van Ness Avenue intersections are equipped with at least one nose cone, with 3 intersections having nose cones for both the north and south crosswalks. The intersections with nose cones are listed in Table 3.4-3.

Table 3.4-3: Van Ness Avenue Intersections with Nose Cones – Existing Condition

VAN NESS AVENUE INTERSECTION	SOUTH LEG	NORTH LEG
Hayes Street		X
McAllister Street	X	
Golden Gate Avenue	X	
Turk Street		X
Ellis Street		X
O'Farrell Street	X	
Geary Street		X
Post Street	X	X
Sutter Street	X	X
Bush Street	X	
Pine Street		X
California Street	X	X
Sacramento Street		X
Clay Street	X	
Total	8	9

Source: SFMTA Striping Plans, 3/2004 and Topographic Maps 2009.

Crossing distances of side streets along the corridor (i.e., the east and west legs of Van Ness Avenue intersections) are between 38 and 50 feet. The crossing distance is significantly longer in locations with multiple legs, such as the west leg of the Mission Street crossing, which includes the Duboce and Otis streets legs. Crossings along the east and west legs at Market Street, Broadway, and Lombard are longer than normal.

Curb bulbs, also known as corner bulbouts or curb extensions, extend the sidewalk into the intersection and reduce effective curb-to-curb crossing width. Curb bulbs help slower-moving pedestrians finish crossing within one phase of the traffic light cycle. Additionally, curb bulbs increase pedestrian visibility, create a larger pedestrian queuing area, provide additional space for curb ramps (discussed below), produce traffic calming impacts by visually and physically narrowing the roadway, and can provide streetscape and landscaping opportunities. The existing, typical curb bulbs on Van Ness Avenue extend 7 feet into the street and reduce the crossing distance to 86 feet at 17 locations.

Pedestrian Signals

Pedestrian countdown signals visually display the remaining seconds to cross the street, reducing risk for crossing pedestrians. This is especially important on Van Ness Avenue due to the relatively long crossing distances. At crossings without a pedestrian countdown signal, pedestrians can be caught mid-crossing when the light turns yellow with as little as 4 seconds to reach a curb or median refuge, indicating the strong need for pedestrian signals at these intersections. Of the 29 signalized intersections along Van Ness Avenue between Lombard and Mission streets, 15 intersections have pedestrian countdown signals on all crossing legs, 3 intersections have them on some legs, while 11 intersections have no pedestrian signals of any kind (Arup, 2013). Under SFgo, plans call for the installation of pedestrian countdown signals on all legs of every intersection in the Van Ness Avenue corridor by 2015, as noted in the description for the No Build Alternative in Section 2.2.2.

Another type of pedestrian signal is the Accessible Pedestrian Signal (APS). APS is a pedestrian pushbutton that communicates when to cross the street in a nonvisual manner, such as audible tones, speech messages, and vibrating surfaces. According to SFMTA's APS inventory, the following five intersections along Van Ness Avenue are equipped with APS on some or all crossing legs: Market, Fell, Hayes, Grove, and McAllister streets. Under SFgo, plans call for the installation of additional APS on Van Ness Avenue signalized intersections.

Signal Timing

The adequacy of pedestrian crossing time is assessed in several ways. First, traffic signals must be timed so that pedestrians can cross the entire street in the time provided by the "walk" signal time combined with the "flashing don't walk" signal, yellow, and any all-red time before the green signal for opposing traffic begins; this time is referred to as the "walk split". The Federal Highway Administration's (FHWA) MUTCD recommends that pedestrian signals be timed so that the amount of crossing time is adequate for a pedestrian or wheelchair user starting 6 feet back from the curb face to complete the crossing at 3 feet per second (fps). The City of San Francisco seeks to provide enough time for a pedestrian moving at 2.5 fps, where possible.

In addition, guidelines call for pedestrian timing to allow any pedestrian who begins crossing during the "walk" signal to be able to complete the crossing within the combined "flashing don't walk," yellow, and all-red time; this is referred to as the "pedestrian clearance time." The MUTCD recommends that pedestrian signals be timed so that a pedestrian leaving the curb at the end of the "walk" signal and traveling at 3.5 fps reaches the opposite curb before a green signal is given to opposing traffic. Only one crossing along Van Ness Avenue meets the City standard for pedestrian clearance; however, most crossings exceed the minimum "walk" phase interval of 7.0 seconds, so pedestrian clearance guidelines likely could be met for some crossings by simply reducing the "walk" phase length and increasing the "flashing don't walk" phase length. Overall, pedestrian clearance times hover slightly above the 3.5 fps standard, ranging from 3.5 to 5.0 fps.

Pedestrian signal timing on Van Ness Avenue is slightly below City and national standards for crossing speeds at all but one intersection with a pedestrian signal, and at 40 percent of intersections without a pedestrian signal. At crossings with no pedestrian signal, the vehicular yellow light phase is the only indication that the crossing phase is about to end. The clearance time for pedestrians is effectively only 3.5 to 4.5 seconds. Walking speeds to finish this crossing before opposing traffic receives a green signal are up to 21.8 fps, more than six times the FHWA guideline speed for a pedestrian signal clearance phase. This reinforces the importance of a pedestrian signal to provide information to pedestrians on the amount of time remaining to safely cross the street.

Pedestrian Delay

Pedestrian delay reflects the average amount of time an approaching pedestrian must wait before crossing the street. Delay represents one way to evaluate LOS for pedestrians. As wait times increase, pedestrians are also more likely to disregard a traffic signal, potentially increasing the probability of collisions. In addition, pedestrian delay reduces the efficiency of walking as a travel mode. Table 3.4-4 shows the pedestrian delay LOS thresholds, as well as the likelihood of pedestrian noncompliance provided in the Transportation Research Board's (TRB) 2000 HCM.

Table 3.4-4: Pedestrian Delay LOS Thresholds for Signalized Intersections

LOS	AVERAGE DELAY (SECONDS)	LIKELIHOOD OF NONCOMPLIANCE
A	≤ 10.0	Low
B	10.1 - 20.0	
C	20.1 - 30.0	Moderate
D	30.1 - 40.0	
E	40.1 - 60.0	High
F	> 60.0	Very High

Source: Highway Capacity Manual (HCM), Transportation Research Board (TRB).

Using these thresholds, the average delay at all intersections along Van Ness Avenue, shown in Table 3.4-5, is LOS C. Pedestrian delay was simulated using VISSIM. Delay for pedestrians crossing Van Ness Avenue averages LOS D, with between 30 to 40 seconds of delay and a moderate to high likelihood of noncompliance with signals. Pedestrians crossing Mission Street at South Van Ness Avenue fare even worse, with delays between 40 and 60 seconds and a high probability of noncompliance. Pedestrians experience less delay traversing north-south across cross streets along the proposed BRT segment, where delays average 21 seconds.

Pedestrians typically experience twice as much delay at traffic signals along Van Ness Avenue than do vehicle occupants. In general, as wait times increase, pedestrians are less likely to comply with the traffic signal, potentially increasing the probability of collisions.

Table 3.4-5: Pedestrian Delay LOS at Van Ness Avenue Intersections

INTERSECTION	DELAY LOS CROSSING VAN NESS	DELAY LOS CROSSING SIDE STREET	AVERAGE DELAY LOS
Clay	C	B	C
Sacramento	C	B	C
California	C	B	C
Pine	D	C	C
Bush	D	C	C
Sutter	D	B	C
Post	C	B	C
Geary	D	B	C
O'Farrell	D	B	C
Ellis	C	B	C
Eddy	C	B	C
Turk	D	B	C
Golden Gate	D	B	C
McAllister	D	B	C
Grove	D	B	C
Hayes	D	C	C
Fell	D	B	C
Market	D	C	C
Mission	D	E	E
Average	D	C	C

Source: VISSIM simulation, Highway Capacity Manual (HCM).

Pedestrians typically experience twice as much delay at traffic signals along Van Ness Avenue than do vehicle occupants. Pedestrians must typically wait longer to proceed across Van Ness Avenue, with delays averaging 33 seconds. Delays at some crossings are much greater than average; the longest mean wait time is 52 seconds crossing Mission Street at South Van Ness Avenue. By comparison, the longest delay for vehicles at a single intersection approach is 35 seconds, which is also at Mission Street and South Van Ness Avenue.

Major Collision Locations and Vehicle Right-Turn Volumes

Collision information is collected in the California Statewide Integrated Traffic Records System (SWITRS) database. According to SWITRS data from 2003 to 2008, major collision locations coincide with heavy pedestrian volumes at Market Street, in the Civic Center area, and major transit cross-corridors. Of intersections where pedestrian counts were conducted, the Broadway, Geary, and O'Farrell intersections had the highest number of collisions per peak-hour crossing, indicating the highest risk.

Assessing the number of pedestrian collisions by the volume of pedestrians highlights intersections that are high risk. Peak-hour pedestrian crossings at selected intersections are used as a level of exposure in Table 3.4-6. Of locations where counts were conducted, pedestrians crossing at the intersections of Broadway, O'Farrell, Geary, and California streets had the highest risk of collision (note: SWITRS data do not collect time of day; therefore, pedestrian collisions at all times are compared to peak-hour crossings).

The intersections of Broadway, O'Farrell, Geary, and California streets have the highest risk of collisions involving pedestrians within the study area.

Table 3.4-6: Pedestrian Collisions by Location (2003-2008)

VAN NESS AVENUE INTERSECTION	NUMBER OF PEDESTRIAN COLLISIONS	NUMBER OF PEDESTRIAN COLLISIONS INVOLVING SERIOUS INJURY	NUMBER PEDESTRIAN COLLISIONS PER 1,000 PEAK-HOUR CROSSINGS
Mission	2		2.4
Market	2		1.1
Fell	4		
Hayes	2	1	
Grove	4	1	2.7
McAllister	2		
Golden Gate	2		2.1
Turk	3		
Eddy	1		
Ellis			
O'Farrell	4	3	3.9
Geary	4		3.5
Post	3		
Sutter	1		
Bush	1		
Pine	2	1	
California	3		3.3
Sacramento	1		1.6
Clay	1		
Washington			
Jackson	2	1	
Pacific	2	1	
Broadway	2	1	7.1
Vallejo	1	1	
Green	2	1	
Union	1		2.3
Filbert			

Table 3.4-6: Pedestrian Collisions by Location (2003-2008)

VAN NESS AVENUE INTERSECTION	NUMBER OF PEDESTRIAN COLLISIONS	NUMBER OF PEDESTRIAN COLLISIONS INVOLVING SERIOUS INJURY	NUMBER PEDESTRIAN COLLISIONS PER 1,000 PEAK-HOUR CROSSINGS
Greenwich			
Lombard			
Total	52	11	

Source: SWITRS, 2003-08 and pedestrian counts. Risk measures only shown where pedestrian counts collected.

The cause of many pedestrian-vehicle collisions is difficult to determine from SWITRS data because pedestrians were assigned fault in nearly half of all cases, and the most common infraction was an unspecified "pedestrian violation." Drivers were at fault in 40 percent of the collisions, most commonly for failing to yield ROW to pedestrians while executing a left turn. Drivers and pedestrians were also each cited in several cases for failing to obey traffic signs and signals.

The number of vehicular right turns is another factor in pedestrian safety at intersections that affects pedestrians crossing side streets, north or south along Van Ness Avenue. Locations with heavy right-turn volumes generally have more conflicts between vehicles and pedestrians or bicyclists, possibly increasing the number of collisions (Arup, 2013). See Table 3.4-12 for right-turn volumes at each intersection (existing conditions are assumed to be similar to the No Build Alternative).

This analysis using SWITRS data does come with a few caveats. First, there are a range of known factors for pedestrian and vehicle injuries beyond what is provided in SWITRS data. These include environmental factors such as traffic volumes and free-flow speeds, vehicle factors such as size and mass, institutional enforcement of safety laws, roadway design and geometry, and factors related to physical function such as age and disability. Second, pedestrian injuries are undercounted in San Francisco by 20 to 25 percent, resulting in underestimation of risk.[55] Finally, because the number of pedestrian injuries is small, it is possible that the differences in pedestrian injuries may not be fully representative of the difference in risk between those intersections.

Evaluation of Van Ness Avenue According to Universal Design Principles

Universal Design is the design of facilities and environments that are broadly and easily accessible to all people and do not require separated or specialized facilities. Using the Universal Design Principles developed by Ron Mace *et al.* at North Carolina State University, existing pedestrian conditions and access to transit along Van Ness Avenue was also evaluated in terms of its adherence to these principles (The Center for Universal Design, 1997).

Principle #1: Equitable Use. This principle refers to a design that is useful and marketable to people with diverse abilities. Pedestrians on Van Ness Avenue are not segregated either in their use of the sidewalk and street crossings or in their access to transit stops. Locations with curb ramps at all corners allow universal access to the sidewalk and to crosswalks, although access is more difficult at corners with only one ramp and not all ramps meet current City and ADA standards. Median refuges with protective nose cones, where provided (see Table 3.4-3), include a level cut-through in the crosswalk for wheelchair access. Most traffic signals along Van Ness Avenue do not provide equitable use by people with visual impairments because they do not feature APS. Bus stops are located on the sidewalk with no grade change and are accessed in the same manner by all transit users. There is no separate waiting area for passengers with disabilities. All users of buses currently enter through the front door; however, wheelchair users must use a ramp as opposed to

DEFINITION

Universal Design is the design of facilities and environments that are broadly and easily accessible to all people and do not require separated or specialized facilities. For more information, visit: www.ncsu.edu/www/ncsu/design/sod5/cud.

[55] http://www.ncbi.nlm.nih.gov/pubmet/16084782

ambulatory riders that use the steps. In addition, passengers that require a ramp must use the front door to exit the bus versus other users that are able to exit from either the back or the front door. This can limit boarding and exit opportunities for wheelchair users if there are obstacles at bus stops such as street furniture or parked cars.

Principle #2: Flexibility in Use. This principle refers to a design that accommodates a wide range of individual preferences and abilities. Sidewalks along Van Ness Avenue accommodate a range of physical abilities and speeds, but street crossings do not provide as much flexibility. Crossings are long, especially when crossing Van Ness Avenue. Several crosswalks do not have a median refuge, and signal timing typically does not allow for the slower walking speed of 2.5 fps suggested by City guidelines. Median refuges with railings, which are provided on some intersection crossings, allow slower pedestrians to rest before completing the street crossing during the following light cycle. Bus stops are not designed for activities other than waiting; therefore, they are inflexible in use.

Principle #3: Simple and Intuitive Use. This principle describes a design that is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. The arrangement of pedestrian facilities along Van Ness Avenue is generally standard and intuitive, but locations where a single curb ramp angles toward the middle of the intersection are more disorienting to pedestrians with visual impairments, for whom curb ramps help provide orientation for a street crossing. Bus stops are in typical locations along the curb at street corners and are arranged in a conventional format; therefore, they are consistent with user expectations. Passengers know to wait on the sidewalk near the bus stop sign or bus shelter.

Principle #4: Perceptible Information. This principle refers to a design that communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. Crosswalks on Van Ness Avenue use traditional and high-visibility markings; however, most traffic signals along Van Ness Avenue do not feature APS and do not provide perceptible information for people with visual impairments. In addition, tactile domes are not provided on all crosswalks for easy identification for people with visual impairments, and the single curb ramps that angle toward the middle of the intersection are disorienting. Bus stop signage and line information is provided only in a visual format and is not accessible to people with limited sight.

Principle #5: Tolerance for Error. This principle refers to design that minimizes hazards and the adverse consequences of accidental or unintended actions. Sidewalks are wide along Van Ness Avenue and generally buffered from moving traffic by street parking, providing significant tolerance for error. Street crossings provide less tolerance because of heavy traffic volumes, especially where crossings are long and refuges are not provided. A bus stop from the sidewalk requires minimal risk if the passenger is on the same side of the street as the stop, but reaching a bus stop on the other side requires crossing six lanes of traffic on Van Ness Avenue, entailing more risk. There is a significant tolerance for error while at a bus stop because the average sidewalk width is 16 feet, and there is traffic only on one side of the bus stop waiting area.

Principle #6: Low Physical Effort. This principle refers to design that can be used efficiently and comfortably with a minimum of fatigue. Van Ness Avenue has few hills, with no grades above 10 percent, and bus stops are located approximately every 700 feet, necessitating relatively low levels of physical effort to reach a transit stop. No significant effort is required to access a bus stop because they are level with the sidewalk. Some bus stops are also equipped with benches, allowing riders to sit and rest when they arrive.

Principle #7: Size and Space for Approach and Use. This principle refers to provision of appropriate size and space in design for approach, reach, manipulation, and use regardless of a user's body size, posture, or mobility. The 16-foot-wide sidewalks and bus stops along Van Ness Avenue provide adequate space to maneuver wheelchairs and other assistive devices. Visually locating a bus stop along Van Ness Avenue may be challenging because streetscape elements often obstruct a clear line of sight to bus stop shelters and signs, and these features are small relative to other structures on the street.

3.4.2.2 | BICYCLE CONDITIONS

Bicyclists using Van Ness Avenue must share travel lanes with automobiles because there are no designated bicycle lanes. Van Ness Avenue is not a popular cycling route due to heavy vehicle volumes and the absence of a bicycle lane. Although some bicyclists choose to use Van Ness Avenue, there is no accurate accounting of the bicycle trip volumes on the street. The San Francisco 2009 Bicycle Count Report does not include any data for Van Ness Avenue locations or intersections. Bicyclists typically use the right-most travel lane adjacent to curbside parking (or adjacent to the curb where parking is not permitted), or ride on the sidewalks. Van Ness Avenue has some U-shaped bicycle parking facilities, and field surveys indicate informal use of trees, posts, and news racks for bicycle parking.

The corridor's designated bicycle route is a Class II/III dedicated facility on Polk Street, which runs parallel to Van Ness Avenue one block east. This facility includes segments of dedicated bicycle lanes (between Market and Post and between Union and Lombard), as well as segments where vehicles and cyclists must share travel lanes (from Union to Post).

Bicycle-related collisions are much less common than pedestrian-related ones on Van Ness Avenue due to the lower volume of bicycle trips. Bicycle-related collisions have typically occurred in the southern end of the proposed BRT segment between Mission Street and Civic Center, which is an area where several designated bicycle routes cross Van Ness Avenue.

3.4.3 | Environmental Consequences

The following analysis identifies potential impacts and benefits for nonmotorized transportation: pedestrians and bicyclists. The analysis compares each build alternative, including the LPA, relative to the No Build Alternative. The build alternatives, including the LPA, are evaluated against applicable standards and, where no quantified standards apply, against the guidance and policies presented in Section 3.4.1.

A build alternative is considered to have an adverse impact on pedestrians or bicyclists if it performs worse than the No Build Alternative. As stated in the project purpose and need, Chapter 1, the intent of the build alternatives is to improve conditions for pedestrians compared to the No Build Alternative, in which case a beneficial impact is identified. If a build alternative performs the same as the No Build Alternative, it is considered to have no impact. The impact and benefit evaluation for nonmotorized transportation follows, presented separately for pedestrian and bicycle modes.

3.4.3.1 | PEDESTRIAN IMPACTS

Potential impacts to pedestrians on Van Ness Avenue are identified by evaluating crossing safety, sidewalk safety, and accessibility for each build alternative.

Pedestrian Crossing Safety

Implementation of any of the build alternatives would not increase pedestrian crossing volumes or cause crosswalk crowding.

Pedestrian Volumes. Table 3.4-7 provides the pedestrian crossing volume forecast for the project alternatives. At a minimum, as shown in Table 3.4-7, the No Build Alternative and Build Alternatives 2, 3, and 4 would have the same pedestrian crossing volumes, with or without incorporation of Design Option B, as would the LPA. Pedestrian volumes would be heaviest in the segment between Market and Grove streets, which also has the heaviest current crossing volumes. Table 3.4-7 shows that implementation of any of the build alternatives would not increase pedestrian crossing volumes or cause crosswalk crowding.[56]

[56] This does not account for the increased pedestrian volumes associated with the increased transit ridership discussed in Chapter 3.2.

Table 3.4-7: Forecast Hourly Pedestrian Crossing Volumes

VAN NESS AVENUE INTERSECTION	ALL PROJECT ALTERNATIVES (1-4)*
Union	440
Clay	950
Broadway	280
Sacramento	640
California	920
Pine	560
Bush	560
Sutter	580
Post	600
Geary	1,140
O'Farrell	1,020
Ellis	1,120
Eddy	1,120
Turk	1,120
Golden Gate	1,160
McAllister	1,200
Grove	1,870
Hayes	670
Fell	1,350
Oak	870
Market	2,280
Mission	880
Duboce	1060

*Approximate forecasted pedestrian crossing volumes for the build alternatives are the same as for the No Build Alternative.

Source: SFCTA, 2012.

Crosswalk Conditions and Crossing Experience. The crossing distances and crosswalk width would not change from existing conditions under the No Build Alternative.

Under the build alternatives, including the LPA, crosswalks would be restriped to meet City standards for crosswalk widths and reduce pedestrian crowding. Crossing distances would vary by build alternative due to geometric design differences in lane configuration and median location. Table 3.4-8 shows the average median refuge width and curb-to-curb pedestrian crossing distances for each build alternative. The average median refuge width for the LPA (not shown in the table) would be 9.5 feet, or 9.6 feet with the Vallejo Northbound Station Variant, which is greater than the No Build Alternative and Build Alternative 3 but less than Build Alternatives 2 and 4.

Table 3.4-8: Average Median Refuge Width and Crossing Distances

ALTERNATIVE	AVERAGE MEDIAN REFUGE WIDTH (FEET)	AVERAGE CROSSING DISTANCE (CURB-TO-CURB) (FEET)
No Build Alternative	9.0	91.1
Build Alternative 2	11.8	86.4
Build Alternative 3	6.0	89.5
Build Alternative 3 with Design Option B	6.4	88.7
Build Alternative 4	12.8	88.8
Build Alternative 4 with Design Option B	13.4	87.6

Note: The average median refuge width for Build Alternative 3 (with or without Design Option B) includes both medians, which are approximately 4 and 9 feet wide.

Source: SFCTA, 2012.

The north-south crossing distance at side streets would not change from existing conditions under the No Build Alternative and build alternatives, including the LPA.

Under the build alternatives, the east-west crossing distances across Van Ness Avenue would be reduced due to the addition of curb bulbs. In addition, each of the build alternatives, including Design Option B and the LPA, would incorporate median refuges with nose cones at all signalized intersections.

The distance to cross Van Ness Avenue itself (east-west) would not change from existing conditions under the No Build Alternative. Under the build alternatives, including the LPA, the east-west crossing distances across Van Ness Avenue would be reduced due to the addition of curb bulbs. The crossing distance for the LPA would be 89.4 feet, which on average is 1.7 feet less than existing conditions and the No Build Alternative. The crossing distance for the LPA would be longer by 0.6-foot to 2.9 feet compared to the other build alternatives, with the exception of Build Alternative 3 without Design Option B, which is longer than the LPA by 0.1-foot. Notably, the pedestrian conditions analysis for the LPA reflects Caltrans' new guidance in the 2012 Highway Design Manual, which effectively results in a narrower 5-foot-wide dimension for curb bulbs on Van Ness Avenue[57] compared to the 66-foot-dimension assumed for the other build alternatives. Thus, Build Alternatives 2 through 4, with or without Design Option B, would have a slightly greater crossing distance if the new Caltrans standard were to be applied in a similar manner as it was applied to the LPA.

In addition, each of the build alternatives, including Design Option B and the LPA, would incorporate median refuges with nose cones at all signalized intersections, which would substantially improve pedestrian crossing conditions. On average, Build Alternatives 2 and 4 would provide median refuges wider than under the No Build Alternative. Build Alternative 3 would result in a higher number of narrow median refuges than under the No Build Alternative, as indicated in Table 3.4-8. The LPA, with or without the Vallejo Northbound Station Variant, would provide median refuges consistently 6 feet or wider (only one refuge would be narrower than 6 feet, at Mission/South Van Ness Avenue – a result of an existing condition) compared to the No Build Alternative, which has 27 median refuges that are less than 6 feet wide.

The proposed build alternatives, including Design Option B, would improve signal and timing conditions and meet required crossing speeds for pedestrians at nearly all intersections.

Under the No Build Alternative, the SFgo Program would install pedestrian countdown signals on all crosswalk legs and curb ramps with tactile domes that meet current City standards and ADA requirements at all signalized intersections along Van Ness Avenue, as well as APS at some additional signalized intersections by 2015. The build alternatives, including the LPA, would provide pedestrian countdown signals, curb ramp upgrades, and APS at all signalized intersections on Van Ness Avenue, resulting in improved pedestrian crossing safety.

57 Caltrans. 2012. Highway Design Manual. May 7. (http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm#hdm). Note the standard is for a 3-foot-wide buffer between the edge of the travelway and a curb bulb. Given the design constraints along Van Ness Avenue, the standard results in a 5-foot-wide curb bulb.

Pedestrian Signals and Timing. To evaluate signal timing, a crossing speed analysis was undertaken to estimate how quickly pedestrians would have to cross an intersection given the allotted signal time, also known as the full walk split (Arup, 2013). To compare average crossing speed performance among project alternatives, the number of intersections meeting FHWA (3.0 fps for full walk split) and City (2.5 fps for full walk split) targets is identified and compared to the No Build Alternative condition. The number of intersections meeting these walking speed targets for side street crossings is presented for each build alternative in Table 3.4-9. All of the build alternatives, including the LPA, would have the same number of side street crossings meeting the City and FHWA targets as the No Build Alternative and thus the same number of crossings (i.e., one, at Mission Street) that do not meet the FHWA target of 3.0 fps or slower.

Table 3.4-9: Side Street Crossings Meeting City and FHWA Walking Speed Targets during Full Walk Split

MEASURE	NO BUILD ALT.	BUILD ALT. 2	BUILD ALT. 3	BUILD ALT. 3 WITH DESIGN OPTION B	BUILD ALT. 4	ALT. 4 WITH DESIGN OPTION B
Number of crossings meeting City target of 2.5 fps for full walk split	27	27	27	27	27	27
Number of crossings meeting FHWA guideline of 3.0 fps for full walk split	28	28	28	28	28	28
Number of crossings exceeding FHWA guideline of 3.0 fps for full walk split[1]	1	1	1	1	1	1

1 The Mission Street crossing exceeds the FHWA target of 3.0 fps.

Source: SFCTA, 2012.

The number of intersections meeting the FHWA and City targets for east-west Van Ness Avenue crossings is presented in Table 3.4-10. Under the LPA (not shown in the table), 6 intersections would meet the City target and 24 intersections would meet the FHWA target, with 5 not meeting the FHWA standard. All of the build alternatives, including the LPA, would have more east-west Van Ness Avenue crossings that meet the City and FHWA targets than the No Build Alternative and, conversely, fewer crossings exceeding FHWA targets; therefore, the build alternatives, including the LPA, would improve conditions and meet required crossing speeds for pedestrians at nearly all intersections.

Table 3.4-10: Van Ness Crossings Meeting City and FHWA Walking Speed Targets during Full Walk Split

MEASURE	NO BUILD ALT.	BUILD ALT. 2	BUILD ALT. 3	BUILD ALT. 3 WITH DESIGN OPTION B	BUILD ALT. 4	ALT. 4 WITH DESIGN OPTION B
Number of crossings meeting City target of 2.5 fps for full walk split	3	14	8	8	8	8
Number of crossings meeting FHWA guideline of 3.0 fps for full walk split	21	27	25	25	25	25
Number of crossings exceeding FHWA guideline of 3.0 fps for full walk split	8	2	4	4	4	4

Source: SFCTA, 2012.

The build alternatives would not increase pedestrian delay at any intersection to LOS E or F and would not increase pedestrian delay at Mission Street, which already operates at LOS E, by more than 5 percent.

Pedestrian Delay. TRB's HCM provides thresholds for evaluating pedestrian delay, as described in Section 3.4.2.1. A build alternative would be considered to have an impact if it would cause an intersection that performs at LOS A through D under the No Build Alternative to perform with a pedestrian delay LOS of E or F or worsens pedestrian delay by more than 5 percent at an intersection that is already operating at pedestrian delay LOS E or F. Table 3.4-11 shows how the build alternatives would compare to the No Build Alternative in terms of average pedestrian delay and resulting LOS. The LPA (not shown in the table) would perform the same as Build Alternatives 3 and 4 with Design Option B. Pedestrian delay calculations are not available for the ten northernmost intersections in the study corridor. Of the intersections where data is available, only one intersection – Mission Street – currently operates at pedestrian LOS E. Based on these criteria, the build alternatives, including Design Option B and the LPA, would not have an impact because they would not increase pedestrian delay at any intersection currently operating at LOS A through D to operate at LOS E or F and would not increase pedestrian delay at Mission Street by more than 5 percent.

Table 3.4-11: Pedestrian Delay on Van Ness Avenue (seconds)

VAN NESS AVENUE INTERSECTION	EXISTING CONDITION (2007)		NO BUILD ALTERNATIVE		BUILD ALTERNATIVE 2		BUILD ALTERNATIVES 3 AND 4		BUILD ALTERNATIVES 3 AND 4 WITH DESIGN OPTION B	
	AVG. PED. DELAY[1]	LOS	AVG. PED. DELAY	LOS	AVG. PED. DELAY	LOS	AVG. PED. DELAY	LOS	AVG. PED. DELAY	LOS
Duboce (on Mission)	25	C	36	D	26	C	27	C	27	C
Mission	45	E	45	E	47	E	46	E	44	E
Market	29	C	33	D	35	D	35	D	35	D
Fell	25	C	24	C	28	C	30	C	28	C
Hayes	25	C	29	C	30	D	30	C	30	D
Grove	28	C	32	D	34	D	31	D	30	D
McAllister	24	C	26	C	27	C	29	C	27	C
Golden Gate	23	C	24	C	32	D	30	C	27	C
Turk	23	C	24	C	26	C	24	C	26	C
Eddy	22	C	22	C	27	C	27	C	25	C
Ellis	22	C	21	C	22	C	22	C	23	C
O'Farrell	22	C	24	C	26	C	24	C	24	C
Geary	22	C	24	C	26	C	26	C	26	C
Post	22	C	26	C	27	C	29	C	26	C
Sutter	23	C	26	C	27	C	27	C	26	C
Bush	26	C	30	C	35	D	30	C	36	D
Pine	29	C	33	D	32	D	28	C	33	D
California	22	C	255	C	27	C	27	C	26	C
Sacramento	23	C	25	C	27	C	28	C	30	D
Clay	22	C	23	C	26	C	26	C	24	C
Washington – Lombard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 3.4-11: Pedestrian Delay on Van Ness Avenue (seconds)

VAN NESS AVENUE INTERSECTION	EXISTING CONDITION (2007)		NO BUILD ALTERNATIVE		BUILD ALTERNATIVE 2		BUILD ALTERNATIVES 3 AND 4		BUILD ALTERNATIVES 3 AND 4 WITH DESIGN OPTION B	
	AVG. PED. DELAY[1]	LOS	AVG. PED. DELAY	LOS	AVG. PED. DELAY	LOS	AVG. PED. DELAY	LOS	AVG. PED. DELAY	LOS
TOTAL INTERSECTIONS BY PEDESTRIAN DELAY LOS										
LOS A		0		0		0		0		0
LOS B		0		0		0		0		0
LOS C		19		15		13		13		17
LOS D		0		4		6		6		2
LOS E		1		1		1		1		1
LOS F		0		0		0		0		0

*Note: Pedestrian delay is provided in seconds. The delay seconds are approximate and could vary by ±3.0 seconds. This variation would not affect impact findings.

Major Collision Locations, Vehicle Right-Turn Volumes, and Left-Turn Opportunities. By reducing pedestrian crossing risk, as discussed above, all BRT alternatives would help to reduce the likelihood of collisions with pedestrians, including at those locations identified in Section 3.4.2.1. In addition, vehicle right-turn volumes were projected to determine areas with higher right-turn volumes; higher right-turn volumes are associated with more conflicts between vehicles and pedestrians or bicyclists. Table 3.4-12 shows the number of locations with right turns, grouped by hourly right-turn volume for each project alternative. The LPA (not shown in the table), with or without the Vallejo Northbound Station Variant, would perform similarly to Build Alternatives 3 and 4 with Design Option B. Right turns, in this case, include vehicles turning from side streets onto Van Ness Avenue and vehicles turning from Van Ness Avenue onto side streets. Project alternatives with fewer high-volume turning locations and more low-volume locations are considered safer for pedestrian crossings, as well as bicycle travel. The table indicates an improvement in pedestrian conditions: under all of the build alternatives and the LPA, there would be fewer locations with 151 or greater right turns per hour and more locations with 50 or fewer right turns per hour compared to the No Build Alternative.

Table 3.4-12: Right-Turn Locations by Hourly Volume

ALTERNATIVE	NUMBER OF RIGHT-TURN LOCATIONS BY HOURLY VOLUME				
	0-50 RIGHT TURNS/ HOUR	51-100 RIGHT TURNS/ HOUR	101-150 RIGHT TURNS/ HOUR	151-200 RIGHT TURNS/ HOUR	200 + RIGHT TURNS/ HOUR
No Build Alternative	13	23	11	11	5
Build Alternative 2	16	23	14	6	4
Build Alternatives 3 and 4	16	23	14	6	4
Build Alternatives 3 and 4 with Design Option B	16	21	16	6	4

Note: Total number of right-turn locations varies slightly by project alternative as simulated by the traffic operations models.

Source: SFCTA, 2010.

Finally, the build alternatives, including the LPA, would reduce the number of left-turn movements and allow left-turn movements only during a dedicated left-turn signal phase at the remaining left-turn pockets. This would also reduce conflicts between pedestrians and turning vehicles. In existing conditions, the most common reason cited for auto-pedestrian collisions on Van Ness Avenue, when drivers are at fault, is that of auto drivers failing to yield ROW to pedestrians when making left turns.

Overall, all of the build alternatives (including Design Option B) and the LPA would perform better than the No Build Alternative for collision reduction on Van Ness Avenue. In addition to incorporating crossing safety features as discussed in previous sections, the build alternatives would generally have fewer locations with high volumes of right-turning vehicles (with more than 150 right-turn movements per hour), more lower-volume right-turn locations (with 150 or fewer right-turn movements per hour), and fewer left-turn locations with vehicles only making left turns during a dedicated left-turn signal phase for Build Alternatives 3 and 4, with or without Design Option B. In addition to the above, the Van Ness Avenue corridor study area, which encompasses streets parallel to Van Ness Avenue from Gough to Hyde streets (see Chapter 3.3), would have an overall reduction in private vehicle volumes with the implementation of BRT. As noted in Section 3.4.2, a reduction in traffic volumes is associated with a reduction in pedestrian collisions.

It should be noted that Build Alternatives 3 and 4, and the LPA, would require all passengers to cross a portion of the street with every boarding and alighting to access the center platforms. Under Build Alternatives 3 and 4, and the LPA, passengers with a one-way trip could be exposed to additional traffic that they would not be exposed to under the side platforms of Build Alternative 2 and the No Build Alternative; however, most trips are round-trip, and passengers' exposure on the return trip in the opposite direction would be reduced by the same amount (because the person would only need to cross from the center median to the side of Van Ness Avenue instead of all the way across the road as under Build Alternative 2 and the No Build Alternative). Thus, the net amount of pedestrian exposure would be the same for all build alternatives, including the LPA, and the No Build Alternative.

Sidewalk Safety

This section evaluates pedestrian sidewalk safety along Van Ness Avenue. Standards and thresholds have not been established by the City or other regulatory bodies to measure how various factors influence sidewalk safety, so a qualitative assessment of sidewalk safety is presented drawing upon City policies and plans presented in Section 3.4.1.

Pedestrian sidewalk safety, or the perception of safety, is influenced by many factors, including the width of the sidewalk, the level of pedestrian activity on the sidewalk, the amount of space between moving traffic on the roadway and pedestrians, and the presence of objects that help buffer roadway activity from pedestrians on the sidewalk (i.e., parked cars, grade separations, fences, trees, and landscaping).

Under the No Build Alternative, sidewalk conditions along Van Ness Avenue would not change from what they are now, with the exception of improved sidewalk lighting that would occur with replacement of the OCS support pole/streetlight network. New lighting would meet current lighting requirements for safety and would improve the pedestrian environment. Street furniture, sidewalk width, and street parking spaces would remain.

Each of the build alternatives would result in improvements to sidewalk safety and comfort through the creation of curb bulbs, removal of existing bus shelters from sidewalks, and improved sidewalk lighting.

Under the build alternatives, including the LPA, the average sidewalk width of 16 feet would remain the same throughout Van Ness Avenue. Replacement of the OCS support pole/streetlight network under the build alternatives, including the LPA, would result in improved pedestrian lighting, which would improve sidewalk safety. Existing bus stop shelters and signage would be removed from the sidewalk because proposed BRT stations would be located on curb extensions or in the median, and they would not take up sidewalk space as do existing bus shelters. This would open up sidewalk space over conditions in the No Build Alternative. Moreover, curb bulbs proposed under the build alternatives, including the LPA, would create additional sidewalk space available to pedestrians compared to the No Build Alternative condition.

Streetscape features, such as curbside parking, sidewalk trees, landscaped planters, newspaper racks, and bicycle racks, would continue to serve as a buffer between the sidewalk and vehicular traffic throughout most of the corridor; however, each build alternative, including the LPA, would result in the removal of curbside parking along some blocks of Van Ness Avenue, as described in Section 3.5, Parking. Table 4.2-11 in Section 4.2, Community Impacts, lists the locations where a substantial reduction in parking would occur under each build alternative compared with the existing condition. As noted in detail in Table 4.2-10, parking would be completely removed, or nearly completely removed along both sides of the block on the following blocks of Van Ness Avenue:

- Between Sutter and Bush streets under the LPA;
- Between Bush and Pine streets under Build Alternative 4 without Design Option B;
- Between Sacramento and Clay streets under the LPA;
- Between Jackson and Pacific streets under the LPA;
- Between Broadway and Vallejo Street under Build Alternatives 3 and 4, with or without Design Option B, and the LPA; and
- Between Vallejo and Green streets under the LPA, including with the Vallejo Northbound Station Variant.

The following blocks are the only two locations where parking would be removed on the same side of the street for two consecutive blocks. For these blocks in the Civic Center, curbside planters are located between the sidewalk and street, serving as a buffer between the sidewalk and vehicular traffic. Under the LPA, the project proposes to implement an approximate 2-foot-wide buffer, possibly in the form of planters, on the blocks between Geary and O'Farrell streets and Broadway and Green Street on both sides of the street due to the lack of a buffer provided by a parking lane or planters on those blocks.

- Between Market and Fell streets under Build Alternative 3 with or without Design Option B (west side);
- Between Fell and Hayes streets under Build Alternative 3 without Design Option B, and under Build Alternative 4 without Design Option B (west side);
- Between Broadway and Vallejo Street under Build Alternatives 3 (east and west sides) and 4 (east and west sides), with or without Design Option B, and the LPA (east and west sides);[58] and
- Between Vallejo and Green streets under the LPA (east and west sides).[59]

Thus, the Van Ness Avenue corridor would retain a fairly even distribution of most curbside parking throughout the corridor under all of the build alternatives, including the LPA, and the loss of the street parking buffer on limited blocks under the build alternatives, including the LPA, would not substantially change overall sidewalk safety and comfort along Van Ness Avenue. The LPA would also include guardrails along the sidewalk side of the platform, except at station entrances next to crosswalks, as described for Alternative 3 in the Draft EIS/EIR. This design would reduce the amount of transit riders crossing outside of crosswalks to reach the station. In summary, each of the build alternatives (including Design Option B) and the LPA would result in improvements to sidewalk safety through the creation of curb bulbs, removal of existing bus shelters from sidewalks, and improved sidewalk lighting. Removal of a street parking buffer would occur in limited locations under the build alternatives, including the LPA; however, most street blocks would retain a street parking buffer.

Pedestrian Accessibility

All of the proposed build alternatives would result in overall improvements on the Universal Design principle of Equitable Use on Van Ness Avenue in comparison to the No Build Alternative.

Pedestrian accessibility is evaluated by application of the Universal Design principles. The seven principles of Universal Design described in Section 3.4.2.1 are used to evaluate the

58 Parking would be removed on both sides of the street for the LPA with the Vallejo Northbound Station Design Variant.

59 Ibid.

project alternatives. This analysis reviews the extent to which each alternative meets the needs of all users, while recognizing that different users may have different concerns. Some may be more interested in faster transit service through the corridor, while others prefer more frequent transit stops; therefore, the performance of each alternative is evaluated qualitatively with a description of the advantages and disadvantages if offers to users of different preferences.

Equitable Use. Each of the build alternatives, including the LPA, would benefit wheelchair users by installing raised station platforms to allow level or near level boarding. Wheelchair users would be able to roll directly onto the bus, entering just as other riders do, with all of the build alternatives, including the LPA. Under the No Build Alternative, new buses planned for the corridor by 2015 would ease vehicle access for most passengers by providing low-floor boarding; however, these buses would not provide level or near level boarding so wheelchair users would continue to use a separate wheelchair lift or ramp to enter and exit buses.

Transit stations under the No Build Alternative would be accessed in the same manner by all persons, as bus stops would remain as they currently exist. Under Build Alternative 2, BRT stations would be located on sidewalk extensions that would be accessed by a short ramp from the sidewalk and would be accessible to all persons. Steps would provide an additional means for ambulatory customers to reach the platform, resulting in differing platform access routes. Under Build Alternatives 3 and 4 and the LPA, center-lane BRT stations would be located on raised platforms accessed by a short ramp from the crosswalk. Transit waiting areas are shared between all users under each build alternative, including the LPA.

Sidewalk accessibility under the No Build Alternative would improve through implementation of the following SFgo initiatives: upgrade of curb ramps at all intersections along Van Ness Avenue to allow universal access to the sidewalk and to crosswalks, including access by people in wheelchairs and those with visual impairments through tactile domes; installation of APS at some signalized intersections to ease street crossings and transit access for pedestrians with limited vision; and installation of pedestrian countdown signals on all crosswalk legs at all signalized intersections along Van Ness Avenue. The build alternatives, including the LPA, would include the same aforementioned improvements to sidewalk accessibility, but to a greater extent than under the No Build Alternative because APS would be installed at all signalized intersections and curb bulbs would be installed at most signalized intersections to improve visibility between motorists and pedestrians, shorten the crossing distance across Van Ness Avenue, and reduce the speed of right-turning traffic. In addition, the removal of existing bus stops from the sidewalk, as proposed under the build alternatives, would open up additional sidewalk space.

In summary, all of the build alternatives, including the LPA, would result in overall improvements to Equitable Use on Van Ness Avenue in comparison to the No Build Alternative.

The BRT build alternatives improve pedestrian street crossings along Van Ness Avenue to accommodate a greater range of physical abilities. All of the proposed build alternatives would improve on the Universal Design principle of Flexibility in Use relative to the No Build Alternative.

Flexibility in Use. The No Build Alternative would not change Flexibility in Use characteristics of Van Ness Avenue. There would be no significant difference in Flexibility in Use of the BRT system between the build alternatives; however, the BRT build alternatives, including the LPA, improve pedestrian street crossings along Van Ness Avenue to accommodate a greater range of physical abilities. Under the No Build Alternative, the average crossing distance of Van Ness Avenue would remain approximately 91 feet, as summarized in Table 3.4-8. This distance is reduced by an average of nearly 5 feet under Build Alternative 2, an average of approximately 1-foot under Build Alternative 3, an average of approximately 2 feet under Build Alternative 4 with incorporation of corner bulbs, and an average of 1.7 feet under the LPA. All of the build alternatives, including the LPA, would reduce the crossing distances to median refuges through construction of corner bulbs, making it easier for slower pedestrians to reach a resting area if they are unable to cross the street during one light cycle. Table 3.4-13 provides the number of corner bulbs to be provided under all of the build alternatives. The LPA would provide 30 corner bulbs in the SB direction and 34 corner bulbs in the NB direction for a total of 64 corner bulbs. The average distance to a refuge would remain 41 feet under the No Build Alternative and decrease to between 37 and 38 feet under Build Alternatives 2 and 4 (39 feet with the LPA). Build Alternative 3 (including Design Option B) has two narrower medians at each intersection rather than a single wide median under other build alternatives; as a result, distances to the nearest median are shorter, averaging 27 to 28 feet, but there is less refuge space at each median. If the 4-foot medians in Build Alternative 3 are considered less than standard from a Universal Design standpoint, then the average distance to the larger, 9-foot refuge in Build Alternative 3 (and the stations in the LPA) would be similar to the distance under Build Alternatives 2 and 4; however, the distance to the 9-foot refuge (or station location for the LPA) from the curb would be different depending on the direction of crossing, because the median (or station location) configuration changes throughout the alignment. For example, the 9-foot refuge is located closer to the east curb when it provides a NB station and closer to the west curb when it provides a SB station. Thus, under Build Alternative 3 (and at station locations under the LPA), people would need to travel a longer distance to reach a refuge at some intersections in comparison to Build Alternatives 3 and 4 and the No Build Alternative.

All of the build alternatives, including the LPA, would include the installation of median nose cones at intersections, providing refuge space for slower pedestrians to rest if they are unable to cross the street during one light cycle. As detailed in Table 3.4-14, the build alternatives would provide between 52 and 55 median nose cones (56 for the LPA), with one at nearly every crossing, compared with 17 under the No Build Alternative. The LPA would provide median nose cones at all 29 intersections, with 28 median nose cones on a south leg of an intersection and 28 median nose cones on a north leg of an intersection for a total of 56 median nose cones.

Table 3.4-13: Number of Corner Bulbs by Alternative along Van Ness Avenue

ALTERNATIVE	CORNER BULBS IN SB DIRECTION	CORNER BULBS IN NB DIRECTION	TOTAL CORNER BULBS
No Build Alternative	14	15	29
Build Alternative 2	39	34	73
Build Alternative 3	25	26	51
Build Alternative 3 with Design Option B	31	28	59
Build Alternative 4	29	30	59
Build Alternative 4 with Design Option B	35	35	70

Source: SFCTA, 2010.

Table 3.4-14: Number of Nose Cones along Van Ness Avenue

ALTERNATIVE	INTERSECTIONS WITH NOSE CONES	NOSE CONES ON SOUTH LEG INTERSECTION	NOSE CONES ON NORTH LEG INTERSECTION	TOTAL NOSE CONES
No Build Alternative	14	8	9	17
Build Alternative 2	29	28	27	55
Build Alternative 3	26	26	26	52
Build Alternative 3 with Design Option B	26	26	26	52
Build Alternative 4	28	27	27	54
Build Alternative with Design Option B	28	27	27	54

Source: SFCTA, 2010.

Under Build Alternative 2 an additional 11 Van Ness Avenue intersections would meet the City's standard for walking speed of 2.5 fps at a crossing, while an additional 5 intersections would meet this standard under Build Alternatives 3 and 4 (including Design Option B). Under the LPA, an additional 3 intersections would meet this standard compared to the No Build Alternative. Under each build alternative, all of the intersections would meet the FHWA guidelines for a walking speed of 3 fps or less, with the exception of crossing Van Ness Avenue at Lombard and Mission streets, and crossing Mission Street at South Van Ness Avenue. For Build Alternatives 3 and 4 (including Design Option B and the LPA), crossing Van Ness Avenue at Jackson Street and Broadway would also require speeds slightly above this threshold (3.1 and 3.2 fps, respectively). The build alternatives, including the LPA, would also require a 3.2-fps speed crossing Van Ness Avenue at Filbert Street. Overall, the build alternatives would provide a significant improvement over the No Build Alternative, which has 9 intersections in the study that exceed the FHWA guidelines.

All of the build alternatives (including Design Option B and the LPA) would improve Flexibility in Use relative to the No Build Alternative.

Under Build Alternatives 3 and 4, locating and accessing transit stops may be more difficult for some users than under Build Alternative 2 and the No Build Alternative (Alternative 1) because the center-lane BRT stations would not be typical. Passengers would need to perceive that these BRT stations are located in the center of the street.

Simple and Intuitive Use. Under the No Build Alternative, the arrangement of pedestrian facilities on Van Ness Avenue would continue to be generally simple and intuitive, and it would improve through the provision of SFgo initiatives, including upgrade of curb ramps to remove ramps that point toward the middle of the intersection and installation of tactile domes, installation of APS at some signalized intersections, and installation of pedestrian countdown signals on all crosswalk legs at all signalized intersections.

Another change in Simple and Intuitive Use that would occur under the build alternatives is clear differentiation of space between pedestrian areas and transit waiting areas. This arrangement is likely to be more intuitive than under the No Build Alternative, where passengers would continue to wait on the sidewalk near the bus stop. Under Build Alternatives 3 and 4 and the LPA, locating and accessing transit stops may be more difficult for some users than under Build Alternative 2 and the No Build Alternative because the center-lane BRT stations would not be typical. Passengers would need to perceive that these BRT stations are located in the center of the street. Build Alternative 4 may be particularly challenging because users would need to determine the direction the bus platform serves because similar looking platforms would serve NB only, SB only, or both NB and SB bus service at different locations. Under Build Alternatives 3 and 4 and the LPA, passengers would also disembark buses on a platform with traffic on both sides, which may be disorienting. Build Alternative 3 and the LPA may be particularly challenging because the platform is relatively narrow. These challenges could also be mitigated or minimized with a comprehensive wayfinding system that would allow all users to navigate to and from the correct platform. Moreover, median transit stops are not without precedent. Many existing Muni light rail and bus stops are located at center islands, including the light rail stations on the T-Third, Market Street, 19th Avenue, and the Embarcadero.

Build Alternatives 3 and 4 may provide slightly less intuitive transit access than Build Alternative 2 and the No Build Alternative, but the Universal Design principle of Simple and Intuitive Use could be optimized through design measures.

The low-floor buses and raised platforms to be used in all of the build alternatives would allow wheelchairs to roll directly on and off the bus at BRT stations along Van Ness Avenue, providing easier access to most patrons at all stops within the BRT corridor. Outside the BRT corridor, wheelchair users would board and exit through the front right door, which would deploy a ramp. Wheelchair users would be able to board and exit through the same door under Build Alternatives 2 and 3 (including Design Option B) and the LPA. Under Build Alternative 4, all passengers, including wheelchair users, would board and exit from the left-side doors within the BRT corridor; these doors are located behind the driver. Under Build Alternative 4 (including Design Option B), wheelchair users that board within the BRT corridor to travel to a destination outside the corridor would need to negotiate to the opposite side of the bus (and vice-versa). Moreover, they would also need to make their way to the front of the bus to exit from the right-side front door outside the BRT corridor (and vice-versa). For Build Alternative 4, bus design should incorporate an intuitive seating space for users requiring level or near level boarding that is easily accessible to both the front door on the right side and the door behind the operator on the left side. In addition, stop announcements of which door will open could be used to help clarify confusion for passengers. As part of project implementation, sufficient information would be provided to inform ambulatory passengers that board at BRT stations that they would need to exit through the front, right doors for stops outside the Van Ness Avenue corridor.

In summary, the arrangement of pedestrian facilities along Van Ness Avenue would remain generally standard and intuitive under all of the build alternatives (including Design Option B) and the LPA. Build Alternatives 3 and 4 and the LPA may provide slightly less intuitive transit access than Build Alternative 2 and the No Build Alternative. Simple and Intuitive Use could be optimized through the following design measures:

- Comprehensive wayfinding system allowing all users to navigate to and from the correct platform;
- For Build Alternative 4, bus vehicle design should incorporate an intuitive seating space for users requiring level or near level boarding that is easily accessible to both the front door on the right side and the door behind the operator on the left side;
- For Build Alternative 4, stop announcements of which door will open could be used to help clarify any confusion for passengers.
- Sufficient information should be provided to inform less ambulatory passengers that board at BRT stations that they would need to exit through the front, right doors for stops outside the Van Ness Avenue corridor.

Perceptible Information. Under the No Build Alternative, the arrangement of pedestrian facilities would remain generally standard and intuitive, and improvements with the SFgo initiatives would include upgrade of curb ramps to remove all existing, disorienting curb ramps that angle toward the middle of intersections and replace them with curb ramps angled toward crosswalks at all intersections; installation of APS at some signalized intersections to ease street crossings and transit access for pedestrians with limited vision; and installation of pedestrian countdown signals on all crosswalk legs at all signalized intersections along Van Ness Avenue. The build alternatives, including the LPA, would include the same improvements, but to a greater extent than under the No Build Alternative because APS would be installed at all signalized intersections, and curb bulbs would be installed at most signalized intersections.

Under the center-lane configured BRT alternatives (Build Alternatives 3 and 4, including Design Option B, and the LPA), it may be more difficult for some users to perceive how to access the BRT stations, because the route from the sidewalk to the platform is less clear and direct than to a platform that is on the sidewalk or on a curb extension. Center-lane located BRT stations may be more difficult for some users to reach because they would require crossing a portion of the street, then turning up a ramp to enter the platform. To maximize perceptible information, all proposed BRT platforms should include ample wayfinding and nonvisual detection. Nonvisual detections, such as audible sounds or changes in pavement feel, could help improve nonvisual perception of the station location for center-lane configured alternatives.

Center-lane located BRT stations may be more difficult for some users to reach because they would require crossing a portion of the street, then turning up a ramp to enter the platform. To maximize perceptible information, all proposed BRT platforms should include ample wayfinding and detection.

Visual identification of transit stops would improve under the proposed project due to upgraded shelters, platforms, lighting, and signage. BRT alternatives with center-lane located stations (Build Alternatives 3 and 4 and the LPA) would likely be the easiest to identify because their location in the center of the street improves the line of sight to stations and lends additional visual prominence relative to stations on the side of the street; however, as noted in the "Simple and Intuitive" section above, under Build Alternative 4, the direction of bus travel at a given platform could be more difficult to perceive for some users.

In summary, Build Alternatives 3 and 4 (including Design Option B), and the LPA, may provide less perceptible information for transit station access than the No Build Alternative. Build Alternative 2 would provide more perceptible information than the No Build Alternative.

Tolerance for Error. Under the No Build Alternative, sidewalks would remain buffered from moving traffic by street parking, which provides significant tolerance for error, and street crossings would remain long, providing less tolerance. Bus patrons would continue to access bus stops from the sidewalk, which requires minimal risk.

Bus patrons would continue to access the BRT stations from the sidewalk under Build Alternative 2, offering minimal risk. Sidewalks would generally remain buffered from moving traffic by street parking, although some parking spaces would be removed in comparison to the No Build Alternative, as discussed in the sidewalk safety section, above. Under Build Alternative 2, street crossing distances would be shortened through provision of curb bulbs, and median refuges would be improved with protective nose cones and level cut-through for wheelchair access. These two aforementioned features would increase Tolerance for Error over the No Build Alternative.

Build Alternatives 2 and 4 would improve on the Universal Design principle of Tolerance for Error relative to the No Build Alternative with improved street crossings, but Build Alternative 3 and the LPA would decrease tolerance for error because of its narrower platforms located between traffic lanes.

The Tolerance for Error is less for accessing the BRT stations in the center-lane alternatives, including the LPA, relative to the No Build Alternative and Build Alternative 2 because users must cross a portion of the street before accessing the platform. Under Build Alternative 3 and the LPA, stations have the least Tolerance for Error because the platforms are the most narrow (approximately 9 feet in width) and because they have moving traffic on both sides: mixed-flow traffic on one side and bus lane traffic on the other side. Build Alternative 4 offers a greater Tolerance for Error for waiting passengers because the platforms are wider (approximately 14 feet), allowing passengers to wait farther from moving traffic. Under Build Alternatives 3 and 4 and the LPA, sidewalks would generally remain buffered from moving traffic by street parking; however, some additional parking spaces would be removed in comparison to the No Build Alternative, including cases where an entire street block or one side of a street block would lose street parking (see the sidewalk safety section, above). Under Build Alternatives 3 and 4 and the LPA, street crossing distances would be shortened through provision of curb bulbs (see Table 3.4-12), and median refuges would be improved with protective nose cones and level cut-through for wheelchair access, which would increase Tolerance for Error.

In summary Build Alternatives 2 and 4 (including Design Option B) would increase Tolerance for Error relative to the No Build Alternative with improved street crossings, but Build Alternative 3 (including Design Option B) and the LPA would decrease tolerance for error because of its narrower platforms located between traffic lanes.

Due to the increased distance between stops, none of the build alternatives would improve on the Universal Design principle of Physical Effort required to reach transit relative to the No Build Alternative and may pose a burden on some passengers.

Low Physical Effort. The physical effort required to reach bus stops would not change under the No Build Alternative. The build alternatives, including the LPA, would all require increased physical effort for some passengers to reach BRT stations because the number of bus stops in each direction between Mission and Lombard streets would be reduced from 15 NB and 8 SB in the No Build Alternative to 9 NB (8 for the LPA, and 9 for the LPA with the Vallejo Northbound Station Variant) and 8 SB (9 for the LPA and also with the Vallejo Northbound Station Variant) in the build alternatives; therefore, the average distance between bus stations would increase from approximately 700 feet under the No Build Alternative to 1,170 feet in each of the build alternatives (1,150 feet under the LPA and 1,080 feet under the LPA with the Vallejo Northbound Station Variant). In addition, some GGT passengers would need to walk farther under the build alternatives due to stop elimination. As a result, the average maximum distance from a location halfway between two stops would increase from 350 feet to 590 feet (570 feet under the LPA and 540 feet under the Vallejo Northbound Station Design Variant scenario). In addition, some GGT passengers would need to walk farther under the build alternatives due to stop elimination. Van Ness Avenue has few hills and only one block with an average slope steeper than 8 percent (Pacific Avenue to Broadway), which is the maximum permitted slope for an ADA-compliant ramp, although there may be some portions of other blocks that exceed this slope. Nevertheless, the increased distance between stops may be difficult to traverse for some passengers, such as elderly or disabled patrons. Under the LPA, the only stop spacing greater than 4 blocks occurs between Market and McAllister streets. In this area, grades are less than 1.5 percent. In all of the project alternatives, low-floor buses would decrease the physical effort required to board a transit vehicle, although their interior configurations may require stepping up to reach some seats once onboard.

In summary, due to the increased distance between stops, all of the build alternatives (including Design Option B) and the LPA would increase the physical effort required to reach transit relative to the No Build Alternative and may pose a burden on some passengers.

Size and Space for Approach and Use. Transit platforms under all of the build alternatives, including the LPA, are designed to provide adequate space for wheelchairs and other assistive devices. The existing sidewalks under the No Build Alternative and the approximate 14-foot-wide BRT station platforms under Build Alternative 4 would provide the largest space for approach and use. Build Alternatives 2 and 3 and the LPA would provide somewhat narrower station platforms (approximately 9 feet wide) that would slightly reduce Size and Space for Approach and Use compared with the No Build Alternative, although Build Alternative 2 would allow for the patron waiting area to spill onto the adjacent sidewalk.

As noted under Perceptible Information, BRT alternatives with center-lane-located stations (Build Alternatives 3 and 4) improve the line of sight to stations.

In summary, Build Alternative 4 (including Design Option B) would improve Size and Space for Approach and Use in comparison to the No Build Alternative due to the large platform size. Build Alternatives 2 and 3 (including Design Option B) and the LPA would reduce Size and Space for Approach and Use in comparison to the No Build Alternative because the 9-foot platforms would provide less room than the No Build Alternative condition.

Build Alternative 4 would improve the Universal Design area of Size and Space for Approach and Use in comparison to the No Build Alternative due to the large platform size. Build Alternatives 2, 3, and the LPA would reduce Size and Space for Approach and Use in comparison to the No Build Alternative.

Bicycle Impacts

The bicycle impact analysis considers the speed of adjacent traffic (i.e., in the right-most travel lane and other travel lanes), bicycle volumes, the width of the right-most travel lane adjacent to parking or the curb, volume of right turning motorized vehicles, bicycle safety, and comfort, as well as bicycle delay. Potential impacts resulting from the build alternatives are discussed relative to the No Build Alternative.

Speed of Adjacent Traffic. Speed of adjacent, motorized traffic can affect the safety and comfort of bicycle users along Van Ness Avenue. As demonstrated in Chapter 3.3, automobile speed along Van Ness Avenue would be similar under the No Build Alternative and the build alternatives. In addition, the speed limit would remain the same (25 mph) for all of the alternatives, including the No Build Alternative, meaning that there would be no regulatory change that would impact vehicle speeds. Finally, the coordination of signal timing along Van Ness Avenue with the implementation of TSP would mean that vehicles would travel at a more consistent speed, leading to less accelerating and braking. For these reasons, there would be no impact on bicyclists with the implementation of BRT with respect to the speed of adjacent vehicles.

Bicycle Volumes. At present, relatively few bicyclists use Van Ness Avenue for travel because a dedicated bicycle facility is on Polk Street, which is located one block to the east. Bicycle volumes on Van Ness Avenue would likely continue at a similar level in the future when compared with the rest of the bicycling network, whether or not one of the BRT build alternatives is implemented.

Bicycle volumes on Van Ness Avenue would likely continue at a similar level in the future when compared with the rest of the bicycling network, whether or not one of the proposed BRT build alternatives is implemented.

Width of Travel Lane Used by Cyclists. It is assumed that under the No Build Alternative bicyclists using Van Ness Avenue would continue to ride with vehicles in the right-most, mixed-flow, travel lane. The narrower the travel lane, the more likely conflicts could occur (Arup, 2013). Table 3.4-15 shows the width of the right-most, mixed-flow travel lane. The right-most, mixed-flow travel lane would remain approximately 11 feet wide throughout the Van Ness Avenue corridor under the No Build Alternative and under Build Alternatives 3 and 4; under the LPA, the typical width for the right-most, mixed-flow travel lane would be

11 feet in both SB and NB directions. Build Alternative 2 would have the narrowest lanes for cyclists since they would use the center mixed traffic lane, approximately 1-foot narrower than under the No Build Alternative.

Table 3.4-15: Width of Travel Lane Used by Bicycles

ALTERNATIVE	SB LANE (FT)	NB LANE (FT)	AVERAGE LANE WIDTH (FT)*
No Build Alternative	11	11	11
Build Alternative 2	10	10	10
Build Alternative 3	11	11	11
Build Alternative 3 with Design Option B	11	11	11
Build Alternative 4	11	11	11
Build Alternative 4 with Design Option B	11	11	11

*Refers to right-most, mixed-flow travel lane.

Source: SFCTA, 2010.

A wider travel lane could increase cyclists' perception of comfort and safety. On the other hand, with any of the average lane widths under consideration, it can also be argued that there is insufficient width to expect bicyclists to create their own safe travel zone; bicyclists riding along with moving traffic in a narrow lane would be expected to "take the lane" as allowed by the California Vehicle Code whenever they feel it is warranted for safety, particularly when riding adjacent to a parking lane to avoid being hit by opening car doors. This would effectively remove bicyclists from the zone of opening car doors; however, under Build Alternative 2, it would place bicyclists between auto and bus traffic. Overall, this situation would not alter the nature of the travel lane and its expected use by bicyclists; bicyclists would still "take the lane," whether to avoid parked cars or moving buses. In addition, as described in Section 3.4.2.2, bicyclists are more likely to take the Polk Street bicycle route parallel to Van Ness Avenue when traveling north or south along the Van Ness Avenue corridor.

Bicyclists are more likely to take the Polk Street bicycle route parallel to Van Ness Avenue when traveling north or south along the Van Ness Avenue corridor.

Vehicle Right-Turn Volume. The number of vehicular right turns affects bicyclists. Intersections with heavy right-turn volumes may have increased chances of vehicular incidents with pedestrians or bicyclists. Table 3.4-12 in Section 3.4.3.1 shows the number of locations with right turns, grouped by hourly volume for each build alternative. The LPA would perform similarly to Build Alternatives 3 and 4 with Design Option B. Locations with right turns include vehicles turning from side streets onto Van Ness Avenue and vehicles turning from Van Ness Avenue onto side streets. Alternatives with fewer high-volume turn locations and more low-volume locations are considered safer for bicyclists.

All of the build alternatives would have fewer high-volume right-turn locations compared to the No Build Alternative, helping to reduce conflicts between bicycles and motorized vehicles.

Overall, all of the build alternatives (including Design Option B) and the LPA would have fewer high-volume right-turn locations (i.e., with more than 150 per hour) and more lower-volume locations (i.e., with 150 or fewer per hour); therefore, all of the build alternatives would improve bicycle collision conditions compared to the No Build Alternative.

Bicycle Safety and Comfort. All of the build alternatives, including the LPA, would eliminate buses weaving into and out of traffic lanes, reducing some of the conflicts between bicyclists and buses.

Under Build Alternative 2, bicyclists would be riding between two lanes of moving vehicles. This would also mean that bicyclists would have to cross the bus lane to turn right, something that would not be necessary under the No Build Alternative and Build Alternatives 3 and 4 and the LPA.

The presence of parked cars to the right of bicyclists creates the possibility of bicyclists hitting opening doors. Under the No Build Alternative and center lane alternatives, including the LPA, bicyclists would ride adjacent to parked cars. Under Build Alternative 2, bicyclists are expected to ride in the mixed-flow traffic lane next to the bus lane, so they would not experience the same hazard of hitting parked vehicle doors; however, under Build Alternative 2, bicyclists would be riding between two lanes of moving vehicles, with autos to their left and buses to their right. This would also mean that bicyclists would have to cross the bus lane to turn right, something that would not be necessary under the No Build Alternative, Build Alternatives 3 and 4, and the LPA.

Bicycle Delay. TSP to speed transit along Van Ness Avenue would decrease bicycle signal delay in the north-south direction, while increasing bicycle signal delay crossing Van Ness Avenue in the east-west direction.

3.4.4 Avoidance, Minimization, and/or Mitigation Measures

The proposed project would not result in adverse impacts to non-motorized transportation; therefore, no mitigation measures are required. Nonetheless, the following impact minimization measures, or improvement measures, will be incorporated into project design to enhance use of the BRT system:

KEY FINDING

The proposed project would not result in adverse impacts to nonmotorized transportation.

IM-NMT-1. Include comprehensive wayfinding, allowing all users to navigate to and from the correct platform.

IM-NMT-2. For Build Alternative 4, bus vehicle design should incorporate an intuitive seating space for users requiring level or near level boarding that is easily accessible to both the front door on the right side and the door behind the operator on the left side.

IM-NMT-3. For Build Alternative 4, bus vehicle design should incorporate audible cues, such as stop announcements, of which door will open to avoid any confusion for passengers.

IM-NMT-4. Provide sufficient information to educate less-ambulatory passengers that board at BRT stations that they would need to exit through the front, right doors for stops outside the Van Ness Avenue corridor.

3.5 Parking

This section presents on-street parking supply and demand conditions within the Van Ness Avenue BRT project study area. Off-street parking was not included in this analysis because the proposed project would not affect any existing off-street parking facilities. The parking analysis study area encompasses Van Ness Avenue from Lombard to Market streets and South Van Ness Avenue from Market to Mission streets.

The LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), as described in Chapters 2 and 10. The changes in parking under the LPA are identified as part of the analysis presented for the build alternatives in this chapter; however, because the LPA configuration is a variation of the configurations analyzed for the center-running alternatives (Build Alternatives 3 and 4), the LPA with or without the Vallejo Northbound Station Variant has slightly different results for parking gains and losses. However, the overall impact findings with the LPA are consistent with the findings for Build Alternatives 3 and 4 with Design Option B, as presented in this subsection.

3.5.1 Existing Conditions

Data on existing on-street parking conditions were collected on Wednesday, May 21, 2008, and Wednesday, December 17, 2008, between the hours of 11:00 a.m. and 3:00 p.m. The parking survey documented block by block along Van Ness Avenue and South Van Ness Avenue from Mission Street to Lombard Street the following information:

- Number of parking spaces by type:
  - Metered parking
  - Nonmetered, time-limited parking
  - Short-term parking (green-colored curbs)
  - Truck loading zones (yellow-colored curbs)
  - Passenger loading zones (white-colored curbs)
  - Parking for the disabled (blue-colored curbs)
- Occupancy for each type of space during weekday, midday.

Table 3.5-1 summarizes the total number of on-street parking spaces on Van Ness Avenue and South Van Ness Avenue and their midday occupancy. Parking studies conducted in 2010 and 2011, and reported in the Draft EIS/EIR, identified 442 on-street parking spaces in the study area, with approximately equal numbers of spaces on the east and west sides of the street. Most of the parking spaces identified in the study (74 percent) along Van Ness Avenue and South Van Ness Avenue are metered or nonmetered, time-limited, general parking spaces; 5 percent of the spaces are designated for loading (yellow curbs), 11 percent are for passenger loading (white curbs), 7 percent are for short-term use (green curbs), and 3 percent are for disabled vehicle parking (blue curbs).

Table 3.5-1: Parking Supply along Van Ness and South Van Ness Avenues between Mission and Lombard Streets (2010, 2011)

	GENERAL (METERED AND NONMETERED)	GREEN	YELLOW	WHITE	BLUE	TOTAL SUPPLY
Parking Spaces	326	30	23	50	13	442

Between Mission and Broadway streets, most of the on-street, general parking spaces are metered with a 1-hour time limit. Between Broadway and North Point streets, nonmetered parking spaces have a 2-hour limit, except vehicles with a residential parking permit.

Metered parking spaces are priced at $2.50 per hour from Mission to Eddy streets and $1.50 per hour from Eddy to Broadway streets.

The observed weekday midday parking occupancy rates for the general (i.e., metered and nonmetered) and green parking spaces along Van Ness Avenue and South Van Ness Avenue are fairly consistent along the 2-mile study area, with 66 percent of the occupied spaces on the east side and 64 percent on the west side of the street (see Table 3.5-2).

Table 3.5-2: Parking Occupancy along Van Ness and South Van Ness Avenues between Mission and Lombard Streets (2010)

LOCATION	GENERAL (METERED AND NONMETERED)	GREEN	TOTAL	SPACES OCCUPIED (METERED, NONMETERED, AND GREEN ONLY)	OCCUPANCY RATE (METERED, NONMETERED, AND GREEN ONLY)
East Side	146	20	166	110	66%
West Side	180	10	190	121	64%
Total	326	30	356	231	65%

In general, parking occupancy is slightly higher (i.e., 70 percent) than the average in the middle portion of the corridor between Golden Gate Avenue and Broadway Street, which supports mixed-use commercial and high-density residential uses. Parking occupancy is lower than the average (55 percent) north of Broadway Street, which is more residential in nature. For a detailed, block-by-block breakdown of occupancy, see Appendix B. The occupancy rate for the yellow parking spaces is higher on the west side of the street (80 percent) than on the east side (50 percent). Less than half of the white-colored curb spaces were occupied at the time of survey on both sides of Van Ness and South Van Ness avenues. A limited number of blue disabled parking spaces (13) are available on Van Ness Avenue, most of which are located near the Civic Center area. The occupancy rate for blue parking spaces is approximately 60 percent.

Sensors and new meters in the Civic Center and Hayes Valley area are part of the SFpark pilot text project. Real-time occupancy data will be used to implement demand-responsive pricing, anticipated to improve parking availability. For more information, visit www.sfpark.org

SFCTA surveyed double-parking behavior along Van Ness Avenue between Mission and Clay streets on Tuesday, July 15, 2008, between 5:00 p.m. and 6:00 p.m. In general, no double-parking was observed, except for the segment between Bush and Sutter streets. While double parking may occur occasionally at discrete locations along the Van Ness Avenue corridor, the frequency of double parking and its impacts on traffic is not considered significant.

As described in Section 2.6.1, SFMTA has installed parking sensors and new meters in the Civic Center and Hayes Valley area as part of the SFpark pilot project. The SFpark sensors and meters are located along Van Ness Avenue between Golden Gate Avenue and Hickory Street. In 2011, the real-time occupancy data will begin being used to implement demand-responsive pricing, which is anticipated to improve parking availability in these areas. SFpark will be evaluated by SFMTA through mid-2012 for Citywide expansion.[60]

3.5.2 | Environmental Consequences

The parking analysis assesses the change in total parking supply expected as a result of the Van Ness BRT project, and it highlights significant additions and reductions of parking along the corridor. Appendix B provides detailed information of these expected changes in total parking supply on a block-by-block basis. The expected changes are approximate based on the current project engineering. Exact changes in parking will be determined during project final design. Parking impacts for each project alternative are identical in the near-term (2015) and long-term (2035) horizon years; therefore, impacts are not presented separately for each year. It should be noted that parking demand along Van Ness Avenue

[60] www.sfpark.org

may change in the future as a result of the proposed project and changing land uses, as well as separate efforts to manage parking demand such as variable pricing of parking through the SFpark project.

SFCTA and SFMTA have worked to reduce parking removal through the following project design principles, as feasible:

- Replacement of on-street parking where bus stops are consolidated or moved to the center of the street;
- Addition of street parking made possible by lane restriping; and
- Provision of infill spaces where they do not exist today where feasible.

Thus, the parking figures reported for each project alternative in subsequent sections are the net result of incorporating the aforementioned design principals in project design thus far.

SFCTA and SFMTA have worked to reduce parking removal through the following project design principles, as feasible:

- **Replacement of on-street parking where bus stops are consolidated or moved to the center of the street;**
- **Addition of street parking made possible by lane restriping; and**
- **Provision of infill spaces where they do not exist today where feasible.**

Significance Criteria. The City and County of San Francisco (CCSF) does not consider parking supply as part of the physical environment; parking conditions are deemed to be nonstatic in that parking demand changes from day to day, year to year, and in response to changing land uses and transportation options, among other factors. Hence, the availability of parking spaces is not a permanent physical condition but changes over time as people change their modes and patterns of travel. Therefore, the displacement of existing parking spaces is not considered a significant impact for environmental review purposes.

SFCTA and SFMTA acknowledge, however, that if parking losses caused by a project are great, the secondary effects of drivers circling for parking could trigger traffic impacts. In addition, NEPA guidance encourages a discussion of the human environment and social and economic impacts of a project. Thus, the social impacts from parking removal are discussed in Section 4.2, Community Impacts, and changes in parking under each build alternative, including the LPA, are presented in this chapter for informational purposes to the public and decision makers.

3.5.2.1 | NO BUILD ALTERNATIVE

No changes to the existing parking supply on Van Ness Avenue and South Van Ness are expected under the No Build Alternative in the 2015 and 2035, with one exception associated with the proposed CPMC project. The Draft CPMC Long-Range Development Plan (LRDP) EIR specifies that the CPMC project would remove the following parking spaces on Van Ness Avenue (San Francisco Planning Department, 2010):

- 3 metered parking spaces on the west side of Van Ness Avenue between Post Street and Geary Street; and
- 2 metered loading spaces on the east side of Van Ness Avenue between Cedar Street and Geary Street.

Because the CPMC project has not yet been approved, this parking removal is not included as a baseline condition in the presentation of parking conditions in this chapter and is considered in the cumulative impact analysis presented in Chapter 5.

Another planned project that would affect parking in the project area is SFpark, which is described in Sections 2.6.1 and 3.5.1. SFMTA's SFpark project is anticipated to increase turnover of spaces, increasing the availability of parking along the corridor. The changes in parking supply and demand in the Van Ness Avenue corridor resulting from the SFpark pilot test project are unknown at this time; therefore, they are not considered in the parking analysis, although it is likely that the SFpark pilot test project and subsequent permanent expansion of this parking management program will have beneficial effects on parking in the corridor.

3.5.2.2 | BUILD ALTERNATIVES

Future parking supply was estimated by identifying losses and gains in on-street parking for each block that would result under each build alternative, including consideration of Design

Option B under Build Alternatives 3 and 4, and the LPA. Parking loss can result from new station platforms, the addition of corner bulbs, or new lane striping to accommodate exclusive right- and left-turn pockets. Parking gains can be a result of bus stop consolidation or from moving existing curb bus stop locations, restriping existing curb lanes for parking, or adding additional parking spaces through reallocation of existing parking. When estimating parking losses and gains, 20 linear feet is assumed as the distance required for each parking space, per SFMTA standards. Table 3.5.-3 summarizes the anticipated parking supply changes under the project alternatives. The expected changes are approximate based on the current project engineering. Exact changes in parking will be determined during project final design. When parking spaces are able to be retained on a block, it is assumed that a priority is given to the retention of colored parking spaces.

As explained above under the No Build Alternative, the likely expansion of SFMTA's SFpark project in the Van Ness Avenue corridor is anticipated to increase turnover of spaces and increase the availability of parking in the corridor. This anticipated change in parking would occur under all build alternatives and the LPA.

Table 3.5-3: Parking Supply and Demand along Van Ness Avenue – No Build and Build Alternatives[1]

	PARKING SUPPLY			NET CHANGE +/(-)			
	METERED, NON-METERED, AND GREEN SPACES	COLORED ZONE SPACES	TOTAL SPACES	METERED, NON-METERED, AND GREEN SPACES	COLORED ZONE SPACES	TOTAL SPACES	% SPACES
Alternative 1: No Build	356	86	442	-	-	-	-
Build Alternative 2	328	81	409	-28	-5	-33	-7
Build Alternative 3	304	70	374	-52	-16	-68	-15
Build Alternative 3 (Design Option B)	339	72	411	-17	-14	-31	-7
Build Alternative 4	325	72	397	-31	-14	-45	-10
Build Alternative 4 (Design Option B)	378	77	455	22	-9	13	3

1 The expected changes are approximate based on the current project engineering at the time the 2011 parking study was conducted. Exact changes in parking will be determined during project final design.

Build Alternative 2: Side-Lane BRT with Street Parking

Van Ness Avenue. Build Alternative 2 is expected to cause a net loss of 33 on-street parking spaces (12 on the east side and 21 spaces on the west side) along Van Ness Avenue and South Van Ness Avenue. Most of the net parking loss would occur between Broadway Street and Golden Gate Avenue, with a 17 percent loss of parking in this segment. Appendix B provides the parking gains and losses by block.

Of the 12 spaces that would be displaced on the east side of Van Ness Avenue, 7 spaces would be metered, nonmetered, and green zone spaces, and 5 would be spaces in yellow, white, and blue zones. No block would lose all of its parking under Build Alternative 2, although nearly all parking would be removed on the east side of Van Ness Avenue between Sutter and Bush streets.

On the west side of Van Ness Avenue, 21 parking spaces are expected to be displaced under Build Alternative 2. All of the displaced parking would be general parking.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians

Van Ness Avenue. Build Alternative 3 is expected cause an approximate loss of 68 on-street parking spaces (30 spaces on the east side and 38 spaces on the west side) along both sides of Van Ness Avenue and South Van Ness Avenue.

Of the 30 spaces expected to be displaced on the east side, 22 would be metered, nonmetered, and/or green parking spaces and 8 would be yellow, white, and blue spaces.

Parking would be removed completely on the east side in the following blocks:

- Between Market and Fell streets (6 existing spaces removed, including 5 yellow colored spaces and 1 blue colored space).
- Between Jackson and Pacific streets (5 existing spaces removed) to accommodate dual platforms.
- Between Broadway and Vallejo (8 existing spaces removed) to accommodate dual exclusive SB left-turn lanes.
- Between Green and Union streets (7 existing spaces removed, including 1 white colored parking space) to accommodate the combination of a platform and left-turn pocket.

On the west side of Van Ness Avenue, 38 parking spaces would be displaced with Build Alternative 3. Of the 38 spaces, 30 would be general spaces and 8 would be yellow, white, and blue spaces.

The following blocks would experience the removal of all parking, or nearly all parking, on the west side of Van Ness Avenue under Build Alternative 3:

- Between Geary and O'Farrell streets (8 existing spaces removed, including 5 white colored spaces) to accommodate the dual platforms for the length of the block.
- Between Vallejo and Broadway (8 existing spaces removed, including 2 white parking spaces) to accommodate dual exclusive SB left-turn lanes.
- Between Hayes and Fell streets (8 out of 11 spaces on the west side would be removed).
- Between Golden Gate Avenue and Turk Street (8 out of 10 spaces on the west side would be removed).

For specific, expected parking losses and additions on a block-by-block basis, see Appendix B.

Build Alternative 3: Center-Lane BRT with Right-Side Boarding and Dual Medians (with Design Option B)

Van Ness Avenue. Design Option B results in fewer parking removals because the absence of turn pockets would allow lane restriping to provide additional parking spaces.

Build Alternative 3 with Design Option B would cause a loss of 31 on-street parking spaces (14 spaces on the east side and 17 spaces on the west side) along Van Ness Avenue and South Van Ness Avenue.

Of the 14 spaces that would be displaced on the east side, 7 would be metered, nonmetered, and/or green colored parking spaces and 7 would be yellow, white, and blue spaces.

The following blocks would experience the removal of all parking on the east side of Van Ness Avenue under Build Alternative 3 with Design Option B:

- Between Market and Fell streets (6 existing spaces removed, including 5 yellow colored spaces and 1 blue colored space) to accommodate a right-turn pocket.

- Between Jackson and Pacific (5 existing spaces removed) to accommodate dual platforms.
- Between Broadway and Vallejo (8 existing spaces removed) to accommodate dual dedicated SB left-turn lanes.

On the west side of Van Ness Avenue, 17 net parking spaces would be removed in Build Alternative 3 with Design Option B. Of the 17 spaces, 10 would be general spaces and 7 would be yellow, white, and blue spaces.

The following blocks would experience the removal of all parking on the west side of Van Ness Avenue under Build Alternative 3 with Design Option B:

- Between Geary and O'Farrell streets (8 existing spaces removed, including 5 white colored spaces) to accommodate the dual platforms for the length of the block.
- Between Vallejo and Broadway (8 existing spaces removed, including 2 white parking spaces) to accommodate dual exclusive SB left-turn lanes.

For specific parking losses and additions on a block-by-block basis, see Appendix B.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and Single Median

Van Ness Avenue. Build Alternative 4 is expected to cause a loss of 45 on-street parking spaces (15 spaces on the east side and 30 spaces on the west side) along Van Ness Avenue and South Van Ness Avenue.[61]

Of the 15 spaces that would be displaced on the east side, 13 would be metered, nonmetered, and/or green parking spaces, and 2 spaces would be yellow, blue, or white (between Geary and O'Farrell streets). The following blocks would experience the removal of all, or nearly all, parking on the east side of Van Ness Avenue under Build Alternative 4:

- Between Golden Gate Avenue and Turk Street (9 out of 10 spaces would be removed).
- Between Bush and Pine streets (8 out of 9 spaces would be removed).
- Between Broadway and Vallejo (all 8 existing spaces removed) to accommodate dual-dedicated SB left-turn lanes.
- Between Green and Union streets (7 existing spaces removed, including 1 white colored parking space) to accommodate the combination of a platform and left-turn pocket.

On the west side of Van Ness Avenue, 30 parking spaces would be displaced in Build Alternative 4. Of the 30 spaces, 18 would be general spaces and 12 would be yellow, white, and blue spaces. Parking would be removed on the west side in the following blocks:

- Between Hayes and Fell streets (9 out of 11 spaces on the west side would be removed).
- Between Golden Gate Avenue and Turk Street (9 out of 10 spaces on the west side would be removed).
- Between Geary and O'Farrell streets (8 existing spaces removed, including 5 white colored spaces) to accommodate the dual platforms.
- Between Bush and Pine streets (10 existing spaces removed, including 2 yellow colored spaces and 1 white colored space) to accommodate a left-turn lane.
- Between Broadway and Vallejo streets (8 existing spaces removed, including 2 white spaces) to accommodate a left-turn lane.

For specific, estimated parking losses and additions on a block-by-block basis, see Appendix B.

[61] Up to 5 parking spaces on Chestnut Street may also be removed to lengthen the existing eastbound MUNI bus stop and to create a new westbound bus stop to accommodate GGT vehicles in the event of GGT rerouting as part of Build Alternative 4 described in Section 3.2.2.

Build Alternative 4: Center-Lane BRT with Left-Side Boarding and a Single Median (with Design Option B)

Van Ness Avenue. Design Option B results in fewer parking removals because the absence of turn pockets would allow lane restriping to provide for additional parking spaces. Build Alternative 4 with Design Option B would cause a gain of 13 on-street parking spaces (gain of 12 spaces on the east side and 1 space on the west side) along Van Ness Avenue and South Van Ness Avenue.[62]

Some spaces would be displaced under Build Alternative 4 with Design Option B, including 5 metered, nonmetered, and green parking spaces. The following block would have all of their parking displaced on the west side of Van Ness Avenue in Build Alternative 4 with Design Option B:

- Between Broadway and Vallejo streets (8 existing spaces removed, including 2 white spaces).

The following blocks would have all of their parking displaced on the west side of Van Ness Avenue in Build Alternative 4 with Design Option B:

- Between Geary and O'Farrell streets (8 existing spaces removed, including 5 white colored spaces) to accommodate dual platforms.
- Between Broadway and Vallejo streets (8 existing spaces removed, including 2 white spaces).

Nevertheless, 7 general parking spaces would be added on the west side under Build Alternative 4 with Design Option B; therefore, one parking space overall would be added on the west side in this project alternative.

For specific, estimated parking losses and additions on a block-by-block basis, see Appendix B.

LPA: Center-Running BRT with Right Side Boarding/Single Median and Limited Left Turns

Van Ness Avenue. Because the LPA included in this Final EIS/EIR is a refinement of the center-running alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B), the LPA results in slightly different parking gains and losses, presented in Table 3.5-4. The LPA would cause the loss of approximately 105 on-street parking spaces (49 spaces on the east side and 56 spaces on the west side) along both sides of Van Ness Avenue and South Van Ness Avenue. [63]

Of the 49 spaces that would be displaced on the east side, 42 would be metered, nonmetered, and/or green parking spaces and 7 would be yellow and white spaces.

Parking would be removed completely on the east side in the following blocks:

- Between O'Farrell and Geary streets (5 existing spaces removed, including 2 white spaces).
- Between Broadway and Vallejo Street (9 existing spaces removed).
- Between Vallejo and Green streets (8 existing spaces removed).[64]

On the west side of Van Ness Avenue, 56 net parking spaces would be removed under the LPA. Of the 56 spaces removed, 48 would be general and/or green spaces and 8 would be blue or white spaces.

The following blocks would experience the removal of all parking on the west side of Van Ness Avenue under the LPA:

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[62] Ibid.

[63] The Vallejo Northbound Station Variant would result in the removal of one fewer parking space between Vallejo and Green streets on the east side of the street.

[64] Seven spaces would be removed under the Vallejo Northbound Station Variant.

- Between Market and Mission streets (11 existing spaces removed).
- Between Vallejo and Broadway streets (9 existing spaces removed, including 3 white spaces).
- Between Green and Vallejo streets (9 existing spaces removed, including 1 green space and 3 white spaces).
- Between Lombard and Greenwich streets (8 existing spaces removed, including 1 green space and 4 white spaces).

For estimated parking losses and additions on a block-by-block basis, see Appendix B.

The LPA would provide a net 351 parking spaces, which is fewer spaces than the amounts shown in Table 3.5-3 for the other alternatives. This is due in part to a more refined analysis of parking changes that was conducted for the LPA than the build alternatives. This more refined analysis considered the following factors that were not part of the analysis of the other build alternatives in the Draft EIS/EIR: use of updated existing conditions data; incorporation of longer curb bulbs per the Caltrans Highway Design Manual May 2012 update; inclusion of wider BRT lanes per MTA requirements set forth in 2012; and stricter adherence to ADA design requirements such as provision of curb ramps behind handicapped spaces (which largely are not present in existing conditions). Thus the parking analysis for the LPA is a more refined analysis than that presented for the build alternatives in the Draft EIS/EIR. A sensitivity analysis taking into account the aforementioned factors was performed for Build Alternative 3; this analysis indicated that applying the methodology used for the LPA to the other build alternatives would result in up to 32 more spaces removed for the alternatives than was presented in Table 4.5-3 of the Draft EIS/EIR. This would result in a similar number of on-street parking opportunities for the LPA as Build Alternative 3.

Table 3.5-4: Parking Supply and Demand along Van Ness Avenue – No Build and LPA[1]

	PARKING SUPPLY			NET CHANGE +/(-)			
	METERED, NON-METERED, AND GREEN SPACES	COLORED ZONE SPACES	TOTAL SPACES	METERED, NON-METERED, AND GREEN SPACES	COLORED ZONE SPACES	TOTAL SPACES	% SPACES
Alternative 1: No Build[2]	358	98	456	-	-	-	-
LPA[3, 4]	261	90	351	-97	-8	-105	-23

1 The expected changes are approximate based on the current project engineering. Exact changes in parking will be determined during project final design.

2 The refined analysis conducted in October 2012 (see Appendix B of this Final EIR/EIS), resulted in a higher number of existing parking spaces in the study area than were identified in the 2010 and 2011 parking studies, which are the basis for Tables 3.5-1 through 3.5-3.

3 The LPA is a refinement of the two center-running build alternatives with limited left turns (Build Alternatives 3 and 4 with Design Option B).

3 Existing conditions were revised during the supplemental parking survey for the LPA that was completed in October 2012.

4 The Vallejo Northbound Station Variant would result in removal of one fewer nonmetered space between Vallejo and Green streets on the east side of Van Ness Avenue.

3.5.3 | Avoidance, Minimization, and/or Mitigation Measures: Build Alternatives (2015 and 2035)

As discussed in Section 3.5.2, the City of San Francisco does not consider parking supply as part of the physical environment, and the displacement of existing parking spaces is not considered a significant impact in the City of San Francisco; therefore, no significant environmental impact from changes in parking would occur under any of the project alternatives, including the LPA, and no mitigation is required. Nonetheless, the following design principles intended to reduce parking removal will continue to be incorporated into project design as impact improvement measures applicable to each build alternative:

IM-TR-1: On-street parking will be created where bus stops are consolidated or moved to the center of the street.

IM-TR-2: Additional on-street parking will be provided where feasible by lane striping.

IM-TR-3: Infill on-street parking spaces will be provided where they do not exist today as feasible.

IM-TR-4: SFMTA will give priority to retaining color-painted on-street parking spaces, such as yellow freight loading zones, white passenger loading zones, green short-term parking, and blue disabled parking.

IM-TR-5: Blue handicapped parking spaces will be designed to provide a curb ramp behind each space.

The aforementioned improvement measures would be carried throughout project design to identify any additional areas where parking can be retained.