



## Memorandum

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<b>From:</b>	Cory Matsui Noise Specialist, ICF  Shilpa Trisal Project Manager, ICF
<b>CC:</b>	
<b>Date:</b>	April 9, 2019
<b>Re:</b>	<b>Noise Technical Memorandum for the Mountain View Transit Center Grade Separation and Access Project</b>

This memorandum describes the environmental setting related to noise in the Mountain View Transit Center Grade Separation and Access Project (proposed project) area. It also describes noise impacts that would result from implementation of the project.

### Project Description

The Mountain View Transit Center (MVTC) is a gateway to Downtown Mountain View, providing access to the regional transportation network for the city's residents and a key transfer point for employees in Mountain View and the greater Silicon Valley area. It accommodates over 10,000 distinct trips per typical weekday, with services that include Caltrain, Santa Clara Valley Transportation Authority (VTA) light rail and bus routes, and private company shuttles. The MVTC Grade Separation and Access Project improvements are identified within the City's Transit Center Master Plan. The project would improve safety, capacity, and multimodal access to the Transit Center and Downtown Mountain View.

The project is focused on the Castro Street/Moffett Boulevard/Central Expressway intersection and the Castro Street crossing of the railroad tracks. This intersection is congested at present and is impacted by frequent railroad gate interruptions, which limits pedestrian, bicycle, and vehicle movements across Central Expressway and the adjacent railroad tracks. Conditions are expected to degrade further with the plans for increased Caltrain and new High-Speed Rail train service, making it more difficult to cross Central Expressway. Over a thousand pedestrians and bicyclists use this location daily. The project would provide pedestrians and cyclists with a safer crossing of Central Expressway and fewer delays.

The proposed project consists of three main components: (1) Castro Street Grade Separation, (2) Caltrain Station Improvements, and (3) Other Supportive Pedestrian and Bicycle Facilities improvements.

## **Castro Street Grade Crossing**

This project component involves redirecting existing Castro Street vehicle traffic and closing the Castro Street leg of the Castro Street/Moffett Boulevard/Central Expressway intersection (including the at-grade rail crossing area) to vehicles. Closing this section of Castro Street includes the following improvements:

- Construct a two-way vehicular ramp from West Evelyn Avenue to Shoreline Boulevard. This ramp would connect from West Evelyn Avenue at Franklin Street to the Shoreline Boulevard overpass that currently crosses over West Evelyn Avenue. The construction of the ramp would create a new half-signalized intersection at Shoreline Boulevard. This component would likely be constructed first to provide access to the downtown area when Castro Street is closed to vehicle traffic at the railroad crossing.
- Construct a pedestrian and bicycle undercrossing(s) across Central Expressway intersection and the rail corridor to connect the Moffett Boulevard neighborhood with the Transit Center and Downtown. The undercrossing(s) will provide access to the area north of Central Expressway, the new shuttle area along Central Expressway, the VTA light rail platform, the Caltrain platforms, and downtown Mountain View. The undercrossing(s) would include both two-way bicycle and pedestrian facilities. Vertical circulation areas will be provided to access the undercrossing(s), including ramps and stairs. The undercrossing(s) would include lighting and artistic elements.
- Redirect vehicular traffic on Castro Street at West Evelyn Avenue and modify the West Evelyn Avenue/Castro Street intersection to allow for left turns from southbound Castro Street to eastbound West Evelyn Avenue and from northbound Castro Street to westbound Evelyn Avenue. Close the existing at-grade crossing of the rail tracks along Castro Street and remove the south leg of the Central Expressway/Moffett Boulevard intersection.
- Construct intersection enhancements to the Moffett Boulevard/Central Expressway intersection associated with the elimination of the south leg and additional bicycle and pedestrian facilities. Intersection improvements on the north side of Central Expressway include curb bulbouts to shorten the pedestrian crossing distance across Moffett Boulevard. Moffett Boulevard would be restriped to include pick-up and drop curb space on both north- and southbound sides of the street near the entrances to the undercrossings. Existing southbound bike lanes would be upgraded to a one-way cycle track, and a new one-way northbound cycle track would be constructed from Central Expressway to Central Avenue. Moffett Boulevard would be reduced to one lane in the northbound direction.
- Improve the special event transit loading area along Central Expressway just east of Castro Street to provide a pull-out area along Central Expressway for public and private shuttles. Enlarge the sidewalk along the south side of Central Expressway within this pull-out area to facilitate shuttle loading and unloading.

The total construction time for this project component would be 24 to 30 months, with construction anticipated to begin as early as 2021. This component would involve the most heavy construction equipment use, associated with the excavation for the undercrossing tunnels and the construction of the Evelyn Avenue vehicle ramp. During portions of this period, construction activity may limit auto connectivity between Central Expressway and Moffett Boulevard. Pedestrian connectivity across Central Expressway and the rail tracks would be preserved during construction.

Construction of the Evelyn Avenue vehicle ramp portion of the project would be expected to take approximately 12 months to complete and would require approximately 10,000 cubic yards of fill material to support the ramp.

Grading and excavation for the undercrossing is anticipated to take approximately 18 months to complete. The total grading quantity for this project component is anticipated to be 24,000 cubic yards. Of this amount 21,000 cubic yards would have to be exported to a legal receiving site off site.

## **Caltrain Station Improvements**

This project component expands the existing Caltrain platforms for train passenger loading and unloading to increase capacity to accommodate projections of increased ridership and longer trainsets. This component includes the following improvements:

- Lengthen the existing northbound and southbound platforms by approximately 200 feet to a total of approximately 800 feet, to meet anticipated Caltrain needs.
- Widen the existing northbound Caltrain platform where feasible, consistent with the current 20-foot platform width standards.
- Shift both Caltrain platforms west towards Castro Street, providing improved connectivity to Downtown and the pedestrian undercrossing beneath Central Expressway and the tracks. This shift would provide a primary access point to the platforms adjacent to the foot of Castro Street.
- Remove the existing at-grade pedestrian crossing at the eastern end of the platform and replace with an undercrossing. The undercrossing would include ramps and stairs at either end to provide vertical circulation to the platforms.

The total construction time for this project component would be approximately 12 months, with construction anticipated to begin in 2021. Construction of the new platforms would likely occur first with demolition of the old platforms to follow. This component would involve the use of heavy construction equipment associated with the excavation for the undercrossing tunnels at the platform.

Grading and excavation for the undercrossing is anticipated to take approximately 6 months to complete. The total grading quantity for this project component is anticipated to be 12,000 cubic yards. Of this amount 10,000 cubic yards would have to be exported to a legal receiving site off site.

## Other Supportive Bicycle and Pedestrian Facilities

Bicycle and pedestrian improvements are proposed to better connect the Transit Center with regional bicycle facilities to provide improved alternatives to access/egress the transit center than private car. This project component includes the following improvements:

- Connect West Evelyn Avenue between Castro Street and the Shoreline Trail via a combination of a bicycle route, sidewalk, and a shared use path.
- Construct a two-way cycle track along the north side of West Evelyn Avenue from the eastern end of the Transit Center to the Stevens Creek Trail. One westbound traffic lane would be converted to construct the cycle track, with enhanced bicycle and pedestrian crossings at the State Route (SR-) 85 ramp intersection (more detail on the crossings below).
- Construct a bicycle and pedestrian corridor between the eastern end of the Caltrain platforms and East Evelyn Avenue along the northern and eastern ends of the transit center site. This would modify the existing Caltrain lot and remove the existing Caltrain bicycle lockers.
- Extend existing Evelyn Avenue on-street bike lanes from Hope Street to Castro Street. This would remove existing on-street parking.
- Construct new bike parking facilities at the transit center depot building. Bike parking facilities may include additional bike-related services, such as staffed and secure valet parking, repair tools, and/or bike-supportive retail space.

## Other Minor Roadway Improvements

Other roadway improvements associated with the project include signalization and turn-lane enhancements at the Easy Street/Central Expressway Intersection (just east of the SR-85 overcrossing). In addition to a new traffic signal, improvements include widening the road to provide a dedicated left-turn lane on eastbound Central Expressway and improving the striping on Easy Street to accommodate the new traffic signal.

Additional striping improvements are proposed along West Evelyn Avenue between Calderon Avenue and the SR-85 southbound off-ramp. These improvements consist of restriping the lanes and providing a raised curb to accommodate the proposed cycle track that extends from the MVTC on the north side of Evelyn Avenue to approximately the SR-85 on-ramps. The sidewalk would be widened along East Evelyn Avenue between the Stevens Creek Trail connector and the SR-85 southbound on-ramp intersection.

Westbound West Evelyn Avenue under the SR-85 overcrossing would be restriped to create protected bike boxes at the traffic signal. Restriping would include a painted median as well as a designated bike left-turn lane and through lane.

## Construction Staging Areas

Construction staging areas for the roadwork and undercrossing portion of the project would be located within existing right-of-way on Central Expressway generally between Elmwood Street and Horizontal Avenue. This segment of Central Expressway would be closed during construction.

Construction staging areas for the Evelyn Avenue Vehicle Ramp would be within existing right-of-way on Evelyn Avenue between Shoreline Boulevard and Franklin Street. This segment of Evelyn Avenue would be closed during construction. An additional staging area would be located within existing right-of-way along the north side of Evelyn Avenue between the road and the Caltrain right-of-way area. This strip of staging area would extend approximately from Franklin Street to Castro Street including a portion of the southwest corner of the existing MVTC.

Construction staging areas for the Caltrain platforms would generally be within the same limits of work area for the planned Caltrain platform improvements (but specifically not including the Caltrain railroad tracks).

## Setting

### Environmental Setting

#### Existing Land Uses

Noise-sensitive land uses are generally defined as locations where people reside or where unwanted sound could adversely affect land use. Noise-sensitive land uses typically include single- and multi-family residential areas, health care facilities, lodging facilities, and schools. Recreational areas where quiet is an important part of the environment can also be considered sensitive to noise. Some commercial areas may be considered noise sensitive as well, such as the outdoor restaurant seating areas. Noise-sensitive land uses in the vicinity of the project site include neighborhoods with single- and multi-family residences, and restaurants with outdoor seating on Castro Street.

In the project area, there are noise-sensitive land uses as close as 50 feet from where project construction would occur. On West Evelyn Avenue, there are single- and multi-family residences throughout the entire project corridor. Additionally, an apartment building at the northwest corner, and a neighborhood of single-family homes at the northeast corner, of the intersection of Central Expressway and Moffett Boulevard/Castro Street could also be located close to construction activity.

#### Existing Noise Levels

The ambient noise environmental in the project area and in the vicinity is characteristic of an urban environment (e.g., local traffic, aircraft overflights, residential and commercial noise sources). Noise from vehicle traffic on Central Expressway and train and light rail noise on the train tracks parallel to Central Expressway are the dominant noise sources in the area. A noise measurement survey consisting of long-term (24-hour) and short-term (15-minute) ambient noise measurements was conducted to quantify existing ambient noise levels in the vicinity of the project area. The noise measurement locations are shown on Figure 1. Tables 1 and 2 summarize the results of the noise measurement survey.

As shown in Table 1, existing long-term noise levels in the project area are between approximately 69 and 76 A-weighted decibels (dBA) day-night levels ( $L_{dn}$ ). As shown in Table 2, the short-term measurements demonstrate quieter noise levels, with 15-minute average noise levels between approximately 58 and 62 dBA equivalent levels ( $L_{eq}$ ).

**Table 1. L<sub>dn</sub> Noise Level Measurements in the Project Area (24-hour Measurements)**

Measurement No.	Measurement Location	Date and Time	Measured L <sub>dn</sub>
Long Term-1a	North side of 108 Bryant Street, on West Evelyn Avenue	Start: 3/13/19, 11:56 a.m. End: 3/14/19, 11:56 a.m.	75.3 dB
Long Term-1b	North side of 135 Franklin Street, on West Evelyn Avenue	Start: 3/13/19, 11:45 a.m. End: 3/14/19, 11:45 a.m.	75.6 dB
Long Term-2a	Horizon Avenue and Willowgate Street	Start: 3/13/19, 12:15 p.m. End: 3/14/19, 12:15 p.m.	70.0 dB
Long Term-2b	Santa Rosa Avenue and Willowgate Street	Start: 3/13/19, 12:14 p.m. End: 3/14/19, 12:14 p.m.	69.4 dB

Notes:

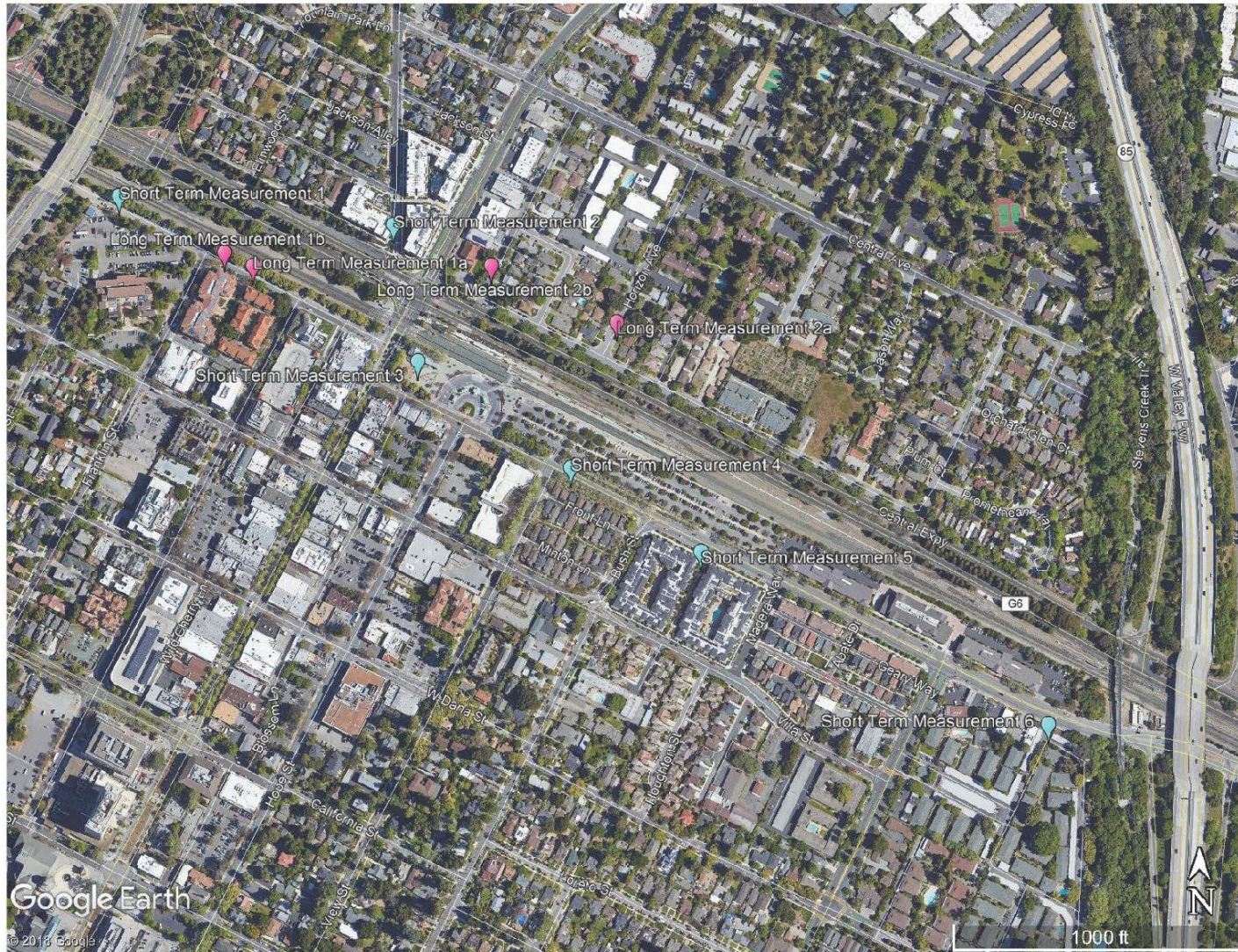
See Figure 1 for exact locations

**Table 2. L<sub>eq</sub> Noise Level Measurements in the Project Area (15-minute Measurements)**

Measurement No.	Measurement Location	Date and Time	Primary Observed Noise Sources	Measured Noise Level (dBA)		
				L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>
Short Term-1	West Evelyn Avenue, west of Franklin Street	3/13/19, 11:53 a.m.	<ul style="list-style-type: none"> <li>Traffic on West Evelyn Avenue and Central Expressway</li> <li>Caltrain pass-bys (horn, engine noise, wheel noise)</li> </ul>	57.6	71.0	48.7
Short Term-2	100 Moffett Boulevard	3/13/19, 11:58 a.m.	<ul style="list-style-type: none"> <li>Traffic on Central Expressway</li> <li>Caltrain pass-bys (horn, engine noise, wheel noise)</li> </ul>	62.1	73.1	48.9
Short Term-3	Mountain View Caltrain Station	3/13/19, 12:43 p.m.	<ul style="list-style-type: none"> <li>Traffic on Castro Street/Moffett Boulevard and Central Expressway</li> </ul>	58.6	70.8	53.8



Figure 1. Noise Measurement Locations



## Regulatory Setting

### Federal

There are no relevant federal regulations for noise and vibration.

### State

#### Title 24 of the California Code of Regulations

Title 24 of the California Code of Regulations, Part 2, California Noise Insulation Standards, establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels that are attributable to exterior noise sources cannot exceed 45  $L_{dn}$  or community noise equivalent level (CNEL) in any habitable room, consistent with the noise element of the local general plan.

### Local

#### Mountain View 2030 General Plan

The following compatibility standards for single-family residential buildings are identified in the *Mountain View 2030 General Plan* (General Plan):

- Normally Acceptable: up to 55 dBA  $L_{dn}$
- Conditionally Unacceptable: 55–70 dBA  $L_{dn}$
- Normally Unacceptable: 70–75 dBA  $L_{dn}$
- Clearly Unacceptable: 75+ dBA  $L_{dn}$

The following compatibility standards for multi-family residential buildings are identified in the General Plan:

- Normally Acceptable: up to 60 dBA  $L_{dn}$
- Conditionally Unacceptable: 60–70 dBA  $L_{dn}$
- Normally Unacceptable: 70–75 dBA  $L_{dn}$
- Clearly Unacceptable: 75+ dBA  $L_{dn}$

Table 7.1 in the General Plan provides the outdoor noise environment guidelines for all land uses in the City.

As described in the General Plan, the “normally acceptable” noise levels are considered satisfactory for residential uses, assuming that “any buildings involved are of normal conventional construction, without any special noise insulation requirements.” In areas where the noise level is “conditionally unacceptable” for residential uses, “new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.” In areas where the noise level is “normally unacceptable,” new



construction or development “should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.” In areas where noise levels are clearly unacceptable, “new construction or development clearly should not be undertaken.”

The General Plan includes the following goals and policies related to noise in Mountain View (City of Mountain View 2012):

**Policy NOI 1.1: Land use compatibility.** Use the Outdoor Noise Environmental Guidelines as a guide for planning and development decisions (Table 7.1 of the City’s General Plan).

**Policy NOI 1.2: Noise-sensitive land uses.** Require new development of noise-sensitive land uses to incorporate measures into the project design to reduce interior and exterior noise levels to the following acceptable levels:

- New single-family developments shall maintain a standard of 65 dBA  $L_{dn}$  for exterior noise in private outdoor active use areas.
- New multi-family residential developments (and hotels, per Table 7.1) shall maintain a standard of 65 dBA  $L_{dn}$  for private and community outdoor recreation use areas. Noise standards do not apply to private decks and balconies in multi-family residential developments.
- Interior noise levels shall not exceed 45 dBA  $L_{dn}$  in all new single-family and multi-family residential units.
- Where new single-family and multi-family residential units would be exposed to intermittent noise from major transportation sources, such as train or airport operations, new construction shall achieve an interior noise level of 65 dBA ( $L_{max}$ ) through measures such as site design or special construction materials. This standard shall apply to areas exposed to four or more major transportation noise events, such as passing trains or aircraft flyovers per day.

**Policy NOI 1.3: Exceeding acceptable noise thresholds.** If noise levels in the area of a proposed project would exceed normally acceptable thresholds, the City shall require a detailed analysis of proposed noise reduction requirements to determine whether the proposed use is compatible. As needed, noise insulation features shall be included in the design of such projects to reduce exterior noise levels and meet acceptable thresholds or, for uses with no active outdoor use areas, ensure acceptable interior noise levels.

**Policy NOI 1.4: Site planning.** Use site planning and project design strategies to achieve the noise level standards in NOI 1.1 (land use compatibility) and in NOI 1.2 (noise-sensitive land uses). The use of noise barriers shall be considered after all practical design-related noise measures have been integrated into the project design.

**Policy NOI 1.5: Major Roadways.** Reduce the noise impacts from major arterials and freeways.

**Policy NOI 1.6: Sensitive uses.** Minimize noise impacts on noise-sensitive land uses, such as residential uses, schools, hospitals, and child-care facilities.

**Policy NOI 1.7: Stationary sources.** Restrict noise levels from stationary sources through enforcement of the Noise Ordinance.

**Policy NOI 1.8: Moffett Federal Airfield.** Support efforts to minimize noise impacts from Moffett Federal Airfield in coordination with Santa Clara County's Comprehensive Land Use Plan.

### **City of Mountain View Municipal Code**

Section 8.70.1 of the City's Municipal Code restricts the hours of construction activity to between 7:00 a.m. and 6:00 p.m. Monday through Friday. No construction activity is permitted on Saturday, Sunday, or holidays without written approval from the City. During these exempt hours, no numerical thresholds apply to construction noise.

The City of Mountain View also identifies limits in Section 21.26 of the Municipal Code on noise from stationary equipment (e.g., heating, ventilation, and air-conditioning [HVAC] systems), idling delivery trucks, loading/unloading activities, recreational activities, and parking lot operations. The maximum allowable noise level is 55 dBA during the day and 50 dBA at night, unless it has been demonstrated that such operations will not be detrimental to the health, safety, peace, comfort, or general welfare of residents who are subjected to such noise and the use has been granted a permit by the Zoning Administrator.

### **Traffic Noise Increase Thresholds**

When assessing traffic noise impacts, the following thresholds are applied to determine the significance of project-related traffic noise increases: (1) An increase of more than 5 dBA is considered a significant traffic noise increase, regardless of the existing ambient noise level, and (2) in places where the existing or resulting noise environment is "conditionally acceptable," "normally unacceptable," or "clearly unacceptable," based on the City of Mountain View Land Use Compatibility Guidelines, any noise increase greater than 3 dBA is considered a significant traffic noise increase.

## **Impact Analysis**

### **Construction Noise Impacts**

**Less than Significant.** Construction of the project would generate noise and temporarily increase noise levels at adjacent uses. The noise levels generated during construction would depend on what construction equipment is used, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive receptors.

The number and types of equipment to be used for project construction were generated within the CalEEMod program used for the air quality analysis. For consistency, the same equipment has been analyzed for noise impacts. Construction would comprise five disparate phases: demolition, grading, construction of structures, paving, and architectural coatings. Table 3 lists the equipment expected to be used for project construction. The  $L_{max}$  and  $L_{eq}$  sound levels at 50 feet, and the typical acoustical use factors are presented in the table. Construction equipment noise data is from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (2006). Average noise, or  $L_{eq}$  values, were calculated from the  $L_{max}$  values and equipment utilization factors from the FHWA model.

**Table 3. Noise Levels at 50 Feet from Project Construction Equipment**

<b>Equipment</b>	<b>Noise Level (L<sub>max</sub>) at 50 Feet (dBA)</b>	<b>Noise Level (L<sub>eq</sub>) at 50 Feet (dBA)</b>	<b>Percent Usage Factor (%)</b>
<b>Demolition</b>			
Concrete/Industrial Saws	90.0	83.0	20%
Rubber Tired Dozers	82.0	78.0	40%
Tractors/Loaders/Backhoes	78.0	74.0	40%
<b>Grading</b>			
Graders	85.0	81.0	40%
Rubber Tired Dozers	82.0	78.0	40%
Tractors/Loaders/Backhoes	78.0	74.0	40%
<b>Structure Construction</b>			
Cranes	81.0	73.0	16%
Forklifts	84.0	80.0	40%
Generator Sets	81.0	78.0	50%
Tractors/Loaders/Backhoes	78.0	74.0	40%
Welders	74.0	70.0	40%
<b>Paving</b>			
Cement and Mortar Mixers	80.0	77.0	50%
Pavers	77.0	74.0	50%
Paving Equipment	90.0	83.0	20%
Rollers	80.0	73.0	20%
Tractors/Loaders/Backhoes	78.0	74.0	40%
<b>Architectural Coating</b>			
Air Compressors	78.0	74.0	40%

**Notes:**

All equipment noise levels and utilization factors based on the best available match to the FHWA's reference data in the Roadway Construction Noise Model User's Guide (Federal Highway Administration 2006).

To provide a conservative construction analysis, modeling for construction noise assumes that the three loudest pieces of equipment expected to be used for project construction would operate simultaneously and close to one another on the project site near the closest noise-sensitive receptor. The combined maximum noise level from operation of the three loudest pieces of equipment was calculated using the noise calculation method from the Federal Highway Administration Roadway Construction Noise Model and the construction equipment data shown in Table 3. Anticipated maximum (L<sub>max</sub>) and average (L<sub>eq</sub>) construction noise levels of the three loudest equipment pieces combined, at increasing distances, are shown in Table 4.

**Table 4. Worst-Case Noise Levels (in dBA) by Distance from Project Construction Activities**

Distance (feet) <sup>1,2</sup>	Demolition		Grading		Structure Construction		Paving		Architectural Coating	
	L <sub>max</sub> <sup>3</sup>	L <sub>eq</sub> <sup>4</sup>	L <sub>max</sub>	L <sub>eq</sub>	L <sub>max</sub>	L <sub>eq</sub>	L <sub>max</sub>	L <sub>eq</sub>	L <sub>max</sub>	L <sub>eq</sub>
50	91	85	87	83	87	83	91	84	78	74
100	83	77	80	76	79	75	83	77	70	66
200	76	70	72	68	72	68	76	69	63	59
250	73	67	70	66	70	65	73	67	61	57
375	69	63	65	61	65	61	69	62	56	52
450	67	61	63	59	63	59	67	60	54	50
500	66	60	62	58	62	58	66	59	53	49
600	64	58	60	56	60	56	64	57	51	47
650	63	57	59	55	59	55	63	56	50	46
700	62	56	59	55	58	54	62	56	49	45
800	61	55	57	53	57	53	61	54	48	44
900	59	53	56	52	56	51	59	53	47	43
1000	58	52	55	51	54	50	58	52	45	41
1200	56	50	53	49	53	48	56	50	43	40
1400	55	48	51	47	51	46	55	48	42	38
1600	53	47	50	46	49	45	53	47	40	36
1800	52	46	48	44	48	44	52	45	39	35
2000	51	45	47	43	47	43	51	44	38	34

Notes:

<sup>1</sup> Noise levels at increasing distances were calculated using geometric attenuation, based on 6 dB per doubling of distance.

<sup>2</sup> These calculations do not include the effects, if any, of local shielding from buildings, fences, trees, etc.

<sup>3</sup> L<sub>max</sub> is the maximum sound level during a specified period

<sup>4</sup> L<sub>eq</sub> is the average sound level over a specified period

The loudest construction phase is estimated to be the demolition phase, with maximum and average noise levels equal to 91 and 85 dBA, respectively, at a distance of 50 feet. In the project area, there are noise-sensitive land uses located as close as 50 feet from where project construction will occur. The residences in the apartment building at the northwest corner of the project site and on West Evelyn Avenue could be exposed to noise as loud as 91 dBA temporarily. In the project area, noise levels range from 69 to 76 dBA  $L_{dn}$ , as documented in the noise survey conducted at the project site. Daytime hourly noise in the project area ranges from 58 to 62 dBA  $L_{eq}$  (refer to Tables 1 and 2 above for the full results of the noise survey).

It should be noted that equipment would not be close to any single noise-sensitive land uses for the entire construction period, because project construction would be linear along West Evelyn Avenue. Additionally, when the worst-case scenario is occurring close to noise-sensitive land uses, it is likely that the equipment would be operating intermittently, and the three loudest equipment items would operate simultaneously for a relatively short period of time in any specific location. Therefore, noise from construction activities would generally be lower than the worst-case noise estimate of 91 dBA  $L_{max}$  and 85 dBA  $L_{eq}$ .

In addition to the use of heavy-duty equipment, project construction would require the use of on-road vehicles to deliver and haul away materials and move construction workers to and from the site. Construction would last for approximately 3 years. During that time, between 6 and 29 on-road construction worker vehicle trips per weekday would be required, depending on the specific construction phase, while up to 123 and 14 material-hauling truck trips, respectively, per weekday would be required during the demolition and grading phases. Because total number of construction days would have a relatively short overall duration and involve a relatively small number of on-road trips compared with existing traffic volumes, there would be no substantial increase in noise from construction traffic.

Project construction would comply with Section 8.70.1 of the City of Mountain View Municipal Code, which regulates noise from construction activity. The code stipulates that no construction activity will commence prior to 7:00 a.m. or continue later than 6:00 p.m., Monday through Friday. Additionally, no noise-generating work is permitted on Saturdays, Sundays, or holidays, unless prior written approval is granted by the Chief Building Official. During all other non-prohibited hours, however, construction noise is exempt and no numerical thresholds are applicable. The project would also be required to adhere to the Standard City Conditions (effective January 30, 2017). Standard Condition of Approval PL-106 (Construction Noise Reduction) requires noise reduction measures to be incorporated into construction plans and contractor specifications. Specifically, PL-106 requires that all equipment comply with manufacturer's muffler requirements, that all equipment be turned off when not in use, and that stationary equipment be located as far as practical from receiving properties. In addition, PL-106 stipulates that temporary sound barriers or sound curtains be used around loud stationary equipment if other noise reduction methods are not effective or possible. A temporary sound wall can reduce noise from construction by approximately 5 to 10 dB, depending on the height of the noise source, the barrier, and the receiver. Electric-powered construction equipment rather than diesel-powered equipment should also be used when it is feasible to do so.



Additionally, Standard Condition of Approval PL-114 (Disturbance Coordinator) requires a designated “disturbance coordinator” responsible for responding to any local complaints regarding construction noise. This would ensure that excessive noise would be addressed promptly, as PL-114 also requires that reasonable measures warranted to correct the problem be implemented should complaints be received. Because construction would be limited to the allowable daytime hours of 7:00 a.m. to 6:00 p.m. Monday through Friday, project construction would therefore adhere to the applicable local regulations (Section 8.70.1 of the City Municipal Code). Adherence to the municipal code would ensure that potential noise impacts related to construction equipment would be exempt from noise limits, and adherence to Standard Conditions of Approval PL-106 and PL-114 would aid in reducing construction to below the worst-case scenario estimates. This impact would be less than significant, and no mitigation is required.

### Construction Vibration Impacts

**Less than Significant with Mitigation.** The operation of heavy-duty construction equipment can generate localized groundborne vibration and noise at buildings adjacent to the construction areas. Groundborne vibration rarely causes damage to normal buildings, with the occasional exception of blasting or pile-driving during construction. Project construction would require the use of piles inserted into the ground, but all piles would be installed via drilling and would thus not require the use of impact equipment to force the piles into the ground. Even non-impact construction equipment, however, can generate groundborne vibration that may be considered annoying or result in sleep disturbance. Table 5 summarizes typical vibration velocity levels for various types of construction equipment that may be used for the project.

**Table 5. Vibration Source Levels for Construction Equipment**

Equipment	PPV at 25 Feet	PPV at 50 Feet	PPV at 75 Feet	PPV at 100 Feet	PPV at 175 Feet
Large bulldozer	0.089	0.0315	0.0171	0.0111	0.0048
Caisson drilling	0.089	0.0315	0.0171	0.0111	0.0048
Loaded trucks	0.076	0.0269	0.0146	0.0095	0.0041
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0019
Small bulldozer	0.003	0.0011	0.0006	0.0004	0.0002

Source: California Department of Transportation 2013.

Notes: PPV = peak particle velocity

Tables 6 and 7 summarize the guidelines developed by the California Department of Transportation (Caltrans) for damage and annoyance potential from the transient and continuous vibration that is usually associated with construction activity. Activities that typically cause single-impact (transient) or low-rate, repeated impact vibration include drop balls, blasting, and the use of impact pile drivers, “pogo stick” compactors, and crack-and-seat equipment. Activities that typically generate continuous vibration include the use of excavation equipment, static compaction equipment, tracked vehicles, vehicles on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment (California Department of Transportation 2013).

**Table 6. Vibration Damage Potential, Threshold Criteria Guidelines**

<b>Structure and Condition</b>	<b>Maximum PPV (in/sec)</b>	
	<b>Transient Sources</b>	<b>Continuous/Frequent Intermittent Sources</b>
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation 2013.

Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls).

Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = peak particle velocity; in/sec = inches per second

**Table 7. Vibration Annoyance Potential, Criteria Guidelines**

<b>Human Response</b>	<b>Maximum PPV (in/sec)</b>	
	<b>Transient Sources</b>	<b>Continuous/Frequent Intermittent Sources</b>
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2013.

Note: Transient sources create a single, isolated vibration event (e.g., blasting or drop balls).

Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = peak particle velocity; in/sec = inches per second

Based on the values in Table 5, at a distance of 25 feet, vibration levels from a large bulldozer or drilling activities would be 0.089 inch per second. As shown in Table 6, continuous or frequent intermittent sources of vibration, such as vibration from construction activities, could damage older and newer residential structures (such as those currently existing on the project site) if the vibration level is in excess of 0.3 and 0.5 PPV inch per second, respectively, and fragile buildings could be damaged by vibration levels in excess of 0.1 inch per second. Extremely fragile historic buildings could be damaged by vibration levels greater than 0.08 inch per second; however, buildings and structures with these characteristics are not common in urban areas.

The historic Adobe Building, a structure that is best categorized as a fragile building, is located in the project area at 157 Moffett Boulevard. This building is adjacent to a proposed construction area, where construction activity could occur within 15 feet of the building. At that distance, the vibration

level of the bulldozer could be as high as 0.20 inch per second, which would adversely impact the Adobe Building. This is a potentially significant impact.

**Mitigation Measure CUL-1 Vibration Monitoring Plan**, as discussed under the *Cultural Resources* section in the project's Initial Study/Mitigated Negative Declaration, would be required to reduce vibration impacts to a less than significant level. The preparation of a vibration monitoring plan would identify where the historical building is located in relation to the construction activity and use monitoring equipment to measure vibrations during construction. In the event that groundborne vibration levels exceed the limit that is expected to cause damage (0.10 inch per second), construction activity will be halted until alternative methods can be approved. Additionally, the mitigation measure includes a comparison of pre- and post-construction surveys of the sensitive buildings to assess if any structure damage was caused as a result of construction vibration. Because Mitigation Measure CUL-1 requires vibration monitoring and a qualified professional to prepare construction vibration mitigation plans to ensure groundborne vibration does not adversely impact the adjacent historic structure, the potential impact on the Adobe Building is considered less than significant.

As shown in Table 7, continuous or frequent intermittent sources of vibration, such as vibration from construction activities, is considered to be distinctly perceptible if the vibration level is in excess of 0.4 inch per second and strongly perceptible if the vibration level is in excess of 0.1 inch per second. The worst-case project vibration of 0.089 inch per second would be more than distinctly perceptible but less than strongly perceptible. Although vibration levels could be felt by people in the project area, within 100 feet of the largest equipment, distinctly perceptible vibration would only be perceptible during daytime hours because construction would not occur during nighttime hours when people normally sleep. Sensitive receptors near the project site would not be exposed to distinctly perceptible groundborne vibration during nighttime hours, which is when vibration is considered to be the most disruptive. For this reason, the annoyance of vibration impacts on noise-sensitive land uses is considered less than significant.

## Operational Noise Impacts

**Less than significant.** The project would lead to a change in the distribution of vehicles on roadways in the project vicinity. Depending on the roadway, traffic volumes would increase, remain unchanged, or would decrease. Because the project would close the connection between Moffett Boulevard and Castro Street, north- and southbound vehicles that previously used these roadways would instead be diverted onto West Evelyn Avenue. Consequently, traffic volumes on this roadway would increase by nearly seven times in the Existing Plus Project and Near-Term Plus Project scenarios. On Moffett Boulevard, traffic volumes would decrease because some vehicle traffic would be diverted onto Shoreline Boulevard for north-south travel in the project vicinity.

All relevant roadway segments in the project vicinity have been evaluated for potentially significant changes in traffic noise with buildout of the project. Three separate project scenarios have been evaluated: Existing Plus Project, Near-Term Plus Project, and Cumulative Plus Project scenarios. The traffic noise associated with each of these project scenarios are compared to the corresponding No-Project scenario. Traffic noise modeling was conducted using an Excel spreadsheet based-approach with data from the FHWA Traffic Noise Model, version 2.5. The spreadsheet approach

determines the traffic noise level at fixed distances from the centerline of a roadway based on traffic volumes, roadway speeds, and the composition of vehicle types. The traffic noise modeling results are shown in Table 8 for the existing, near-term, and cumulative conditions.

When assessing traffic noise impacts, the following thresholds are applied to determine the significance of project-related traffic noise increases:

- (1) An increase of more than 5 dBA is considered a significant traffic noise increase, regardless of the existing ambient noise level, and
- (2) in places where the existing or resulting noise environment is “conditionally acceptable,” “normally unacceptable,” or “clearly unacceptable,” based on the City of Mountain View Land Use Compatibility Guidelines, any noise increase greater than 3 dBA is considered a significant traffic noise increase.

According to the City of Mountain View’s General Plan Noise Element, a noise level of up to 60 dBA  $L_{dn}$  is considered normally acceptable for multi-family residential land uses, and 55 dBA  $L_{dn}$  is considered normally acceptable for single-family residential land uses. These noise level standards are generally intended to be used as compatibility standards for the construction of new housing, to ensure that newly constructed multi- or single-family housing is not constructed in an area that would cause disturbance or annoyance to future residents. The project would not involve the addition of any new housing but would result in changes to existing traffic noise; as such, the traffic noise increase thresholds of 5 dBA and 3 dBA are more appropriate for evaluating the project’s effects than the compatibility standards.

Based on the results of the traffic noise modeling analysis in Table 8, the maximum increase in noise on any roadway in the project vicinity would be less than 1 dB. For the Existing Plus Project scenario, there would be an increase in noise, of less than 1 dB, from the project’s roadway changes at 22 road segments. Additionally, traffic noise would decrease or remain unchanged from the changes implemented by the project at 23 roadway segments. For the Near-Term Plus Project scenario, the number of roadways that would experience increases and decreases on roadway segments would be similar to the Existing Plus Project scenario.

As discussed above, 24-hour noise levels in the project area range from 69 to 76 dBA  $L_{dn}$ , while hourly noise levels range from 58 to 62 dBA  $L_{eq}$ . These noise measurement values reflect higher noise levels than the values modeled using the traffic data, because there are other sources of noise in the project area in addition to traffic noise. Specifically, engine, wheels-on-track, and horn noise from Caltrain and freight trains and the gate crossing bells contribute to the ambient noise environment in the project area. Light rail vehicles also travel through the project area and have similar types of noise sources as Caltrain. The project would serve to reduce noise associated with the train crossing gate warning bells, because the track crossing with Castro Street and Moffett Boulevard would be removed. Regardless, evaluating the project’s impacts based on traffic volumes only is a conservative analysis, because vehicle increases on certain roadways caused by the project would result in a more noticeable noise increase in a quieter area than if train noise is also considered.

**Table 8. Traffic Noise Modeling Results**

Segment No.	Segment	Bounds	Traffic Noise Levels								
			Existing		Near Term		Cumulative		Project Effect		
			NP	WP	NP	WP	NP	WP	1	2	3
1	Shoreline Boulevard	North of Wright Ave	68	69	68	69	68	69	< 1	< 1	< 1
2	Shoreline Boulevard	Between Wright Ave and Villa St	69	45	69	45	69	45	< 1	< 1	< 1
3	Shoreline Boulevard	Between Villa St and Dana St	68	68	68	68	68	68	< 1	< 1	< 1
4	Shoreline Boulevard	Between Dana St and California St	67	68	68	68	68	68	< 1	< 1	< 1
5	Shoreline Boulevard	South of California St	67	67	67	67	67	67	< 1	< 1	< 1
6	Moffett Boulevard	North of Jackson St	64	62	65	62	65	62	(2)	(2)	(2)
7	Moffett Boulevard	Between Central Expressway and Jackson St	64	62	65	63	65	63	(2)	(2)	(2)
8	Castro Street	Between Central Expressway and Evelyn Ave (north leg)	60	43	60	43	60	43	(17)	(17)	(17)
9	Castro Street	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	60	57	59	57	59	57	(3)	(2)	(2)
10	Castro Street	Between Evelyn Ave (south leg) and Villa St	59	54	59	54	59	54	(5)	(5)	(5)
11	Castro Street	between Villa St and Dana St	57	56	58	56	58	56	(1)	(1)	(1)
12	Castro Street	between Dana St and California St	57	56	58	57	58	57	(1)	(1)	(1)
13	Castro Street	South of California St	57	57	58	58	58	58	(0)	(0)	(0)
14	Central Expressway	East of Easy St	71	71	71	71	72	72	(0)	(0)	(0)
15	Central Expressway	Between Easy St and Moffett Blvd	70	70	71	71	71	71	(0)	(0)	(0)
16	Central Expressway	Between Moffett Blvd and Shoreline Blvd	71	71	71	71	72	72	(0)	(0)	(0)
17	Central Expressway	West of Shoreline Blvd	71	71	71	71	71	71	(0)	< 1	< 1
18	Evelyn Avenue	East of Ferry Morse Way	68	68	68	68	68	68	(0)	(0)	< 1
19	Evelyn Avenue	Between Ferry Morse Way and SR-85 Ramps	68	67	68	68	68	68	(0)	(0)	(0)
20	Evelyn Avenue	Between SR-85 Ramps and Calderon Ave	67	67	68	68	68	68	(0)	(0)	(0)
21	Evelyn Avenue	Between Calderon Ave and Bush St	67	66	67	67	67	67	(0)	(0)	(0)
22	Evelyn Avenue	Between Bush St and View St	64	64	64	64	64	64	(0)	< 1	< 1
23	Evelyn Avenue	Between View St and Hope St	63	63	64	64	64	64	< 1	< 1	< 1
24	Evelyn Avenue	Between Hope St and Castro St	63	63	63	64	63	64	< 1	< 1	< 1
25	Evelyn Avenue	Between Castro St and Bryant St	65	65	65	65	65	65	(0)	< 1	< 1



Segment No.	Segment	Bounds	Traffic Noise Levels								
			Existing		Near Term		Cumulative		Project Effect		
			NP	WP	NP	WP	NP	WP	1	2	3
26	Evelyn Avenue	Between Bryant St and Franklin St	65	65	65	65	65	66	< 1	< 1	< 1
27	Evelyn Avenue	West of Franklin St	64	65	65	65	65	66	< 1	< 1	< 1
28	Villa Street	East of Bush St	55	54	55	54	55	54	(1)	(1)	(1)
29	Villa Street	Between Bush St and View St	60	59	60	59	60	59	(1)	(1)	(1)
30	Villa Street	Between View St and Hope St	59	58	59	58	59	58	(1)	(1)	(1)
31	Villa Street	Between Hope St and Castro St	59	58	60	59	60	59	(1)	(1)	(1)
32	Villa Street	Between Castro St and Bryant St	58	59	59	59	59	59	< 1	< 1	< 1
33	Villa Street	Between Bryant St and Franklin St	58	58	58	59	58	59	< 1	< 1	< 1
34	Villa Street	Between Franklin St and Shoreline Blvd	58	59	59	59	59	59	< 1	< 1	< 1
35	Villa Street	West of Shoreline Blvd	60	60	60	60	60	60	< 1	< 1	< 1
36	Dana Street	East of Ferry Morse Way	60	61	60	61	61	61	< 1	< 1	< 1
37	Dana Street	Between Ferry Morse Way and Calderon Ave	60	60	60	60	60	60	< 1	< 1	< 1
38	Dana Street	Between Calderon Ave and Bush St	57	57	57	57	57	57	< 1	< 1	< 1
39	Dana Street	Between Bush St and Castro St	56	56	56	57	56	57	< 1	< 1	< 1
40	Dana Street	Between Castro St and Shoreline Blvd	55	55	56	55	56	55	(0)	(0)	(0)
41	Dana Street	West of Shoreline Blvd	48	48	49	49	49	49	< 1	< 1	< 1
42	California Street	East of Castro St	57	57	57	57	57	57	< 1	< 1	< 1
43	California Street	Between Castro St and Bryant St	58	58	59	58	59	59	< 1	(0)	< 1
44	California Street	Between Bryant St and Franklin St	59	59	59	59	59	59	< 1	< 1	(0)
45	California Street	Between Franklin St and Shoreline Blvd	59	60	60	60	60	60	< 1	< 1	(0)
46	California Street	West of Shoreline Blvd	60	60	61	61	61	61	< 1	< 1	< 1

NP = No Project

WP = With Project

1 = Evaluation of the following scenario: Existing Plus Project relative to Existing Conditions

2 = Evaluation of the following scenario: Near-Term Plus Project relative to Near-Term Conditions without Project

3 = Evaluation of the following scenario: Cumulative Plus Project relative to Cumulative Conditions without Project

Values in parentheses are negative values. (0) indicates that a value is negative and small.

Although nearly all roadway segments were modeled as having existing noise levels in excess of the City's compatibility standard of 55 dBA  $L_{dn}$  standard for single-family land uses, the traffic noise modeling analysis demonstrates that noise levels along all roadway segments would increase by less than 1 dB at any affected roadway. In other words, most roadway segments in the project vicinity are in excess of the City's compatibility threshold for single-family residences in the absence of the project. As discussed previously, a 3 dB increase is considered barely noticeable and would not constitute a significant increase in noise. The project-caused increase in noise, a less than 1 dB increase, would thus not be considered substantial. As such, project traffic noise impacts would be less than significant. No mitigation is required.

### **Aircraft Noise Impacts**

**No Impact.** There are no private airstrips in the vicinity of the project site, and thus people within the project area, such as pedestrians, bicyclists, or Caltrain users, would not be exposed to excessive noise from private airstrip activities. The closest airport to the project site is Moffett Federal Airfield, located 1.75 miles northeast of the site. The project area is outside of the 65 CNEL contour for Moffett Federal Airfield (Santa Clara County Airport Land Use Commission 2016). As such, aircraft activity at the airfield would not be expected to expose persons to excessive noise levels, and the project would not result in any changes in aircraft noise at the airfield. There would be no impact related to excessive aircraft noise from public airports or private airstrips. No mitigation is required.

### **Cumulative Impacts**

With respect to cumulative construction noise, construction noise from the project could temporarily overlap with construction noise from other projects in the vicinity. At this time, there are currently no foreseeable projects in the immediate vicinity of the project area. However, during the approximately 3 years of project construction, it is possible that some noise-sensitive land uses in the project area could be exposed to construction noise from other projects that are not foreseen. The amount of overlap in terms of construction durations is not likely to be substantial given the linear nature of the project. Additionally, other construction activity would also likely occur during daytime hours and be required to implement the City's Standard Conditions of Approval pertaining to noise reduction. Therefore, the combined effect of project construction and other potential construction activities in the project area would not be cumulatively significant.

As discussed above, the project would cause a redistribution in vehicle volumes, which would lead to an increase in volumes on some roadways and a decrease on other roadways. The effect of the traffic redistribution in the existing year was determined to be less than significant; however, a cumulative analysis that also accounts for background growth in traffic volumes unrelated to the project is also necessary. The cumulative analysis of operational impacts has been conducted using the methods described above for the project-level analysis and for the same roadway segments, and the results are shown in Table 8 above. For the Cumulative Plus Project scenario, which is representative of traffic volumes on roadways in the project area in 2030 with the proposed changes, traffic noise would increase by less than 1 dB at any of the affected roadways relative to a scenario in 2030 without the project.

A less than 1 dB increase would not be noticeable, because, as discussed previously, a 3 dB increase is considered barely noticeable. Consequently, the effect of the project's traffic volumes in combination with all background traffic growth in the project area would not cause a noticeable increase in noise. The project's contribution of traffic noise would not be considered cumulatively considerable.

## References

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# Noise Monitoring Survey Results



Figure 1. Noise Measurement Locations





Table 1. L<sub>dn</sub> Noise Level Measurements in the Project Area (24-hour Measurements)

Measurement No.	Measurement Location	Date and Time	Measured L <sub>dn</sub>
Long Term-1a	North side of 108 Bryant Street, on West Evelyn Avenue.	Start: 3/13/19, 11:56 AM End: 3/14/19, 11:56 AM	75.3
Long Term-1b	North side of 135 Franklin Street, on West Evelyn Avenue.	Start: 3/13/19, 11:45 AM End: 3/14/19, 11:45 AM	75.6
Long Term-2a	Horizon Avenue and Willowgate Street	Start: 3/13/19, 12:15 PM End: 3/14/19, 12:15 PM	70.0
Long Term-2b	Santa Rosa Avenue and Willowgate Street	Start: 3/13/19, 12:14 PM End: 3/14/19, 12:14 PM	69.4
Notes: See Figure 1 for exact locations			

Table 2. L<sub>eq</sub> Noise Level Measurements in the Project Area (15-minute Measurements)

Measurement No.	Measurement Location	Date and Time	Primary Observed Noise Sources	Measured Noise Level (dBA)		
				L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>
Short Term-1	West Evelyn Avenue, west of Franklin Street	3/13/19, 11:53 AM	-Traffic on West Evelyn Avenue and Central Expressway -Caltrain pass-bys (horn, engine noise, wheel noise)	57.6	71.0	48.7
Short Term-2	100 Moffett Boulevard	3/13/19, 11:58 AM	-Traffic on Central Expressway -Caltrain pass-bys (horn, engine noise, wheel noise)	62.1	73.1	48.9
Short Term-3	Mountain View Caltrain Station	3/13/19, 12:43 PM	-Traffic on Castro Street/Moffett Boulevard and Central Expressway	58.6	70.8	53.8

Measurement No.	Measurement Location	Date and Time	Primary Observed Noise Sources	Measured Noise Level (dBA)		
				L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>
			-Caltrain pass-bys (horn, engine noise, wheel noise) -Pedestrian voices -Car horns			
Short Term-4	West Evelyn Avenue and View Street	3/13/19, 12:33 PM	-Traffic on West Evelyn Avenue -Caltrain pass-bys (horn, engine noise, wheel noise) -Car horns	58.9	75.0	49.8
Short Term-5	455 West Evelyn Avenue	3/13/19, 2:18 PM	-Traffic on West Evelyn Avenue -Caltrain pass-bys (horn, engine noise, wheel noise) -Pedestrian voices	61.1	71.8	49.5
Short Term-6	North side of 151 Calderon Avenue, on West Evelyn Avenue	3/13/19, 2:13 PM	-Traffic on West Evelyn Avenue -Caltrain pass-bys (horn, engine no	61.1	80.3	49.4
Notes: See Figure 1 for exact locations						

**Construction Equipment Information**

Equipment Name from CalEEMod	FHWA Equipment Name	Acoustical Use Factor <sup>a</sup>	L <sub>max</sub> at 50 feet (dBA) <sup>b</sup>	Equipment Leq @ 50 feet	Leq Rank	L <sub>max</sub> Rank	Impact Device?
Concrete/Industrial Saws	Concrete Saw	20%	90	83	1	1	No
Rubber Tired Dozers	Dozer	40%	82	78	5	5	No
Tractors/Loaders/Backhoes	Backhoe	40%	78	74	8	10	No
Graders	Grader	40%	85	81	3	3	No
Cranes	Crane	16%	81	73	11	6	No
Forklifts	Tractor	40%	84	80	4	4	No
Generator Sets	Generator	50%	81	78	6	6	No
Welders	Welder / Torch	40%	74	70	13	13	No
Cement and Mortar Mixers	Drum Mixer	50%	80	77	7	8	No
Pavers	Paver	50%	77	74	10	12	No
Paving Equipment	Pavement Scarafier	20%	90	83	1	1	No
Rollers	Roller	20%	80	73	12	8	No
Air Compressors	Compressor (air)	40%	78	74	8	10	No

**Equipment Summary Table**

Equipment	Noise Level (L <sub>max</sub> ) at 50 Feet (dBA)	Noise Level (L <sub>eq</sub> ) at 50 Feet (dBA)	Percent Usage Factor (%)
<b>Demolition</b>			
Concrete/Industrial Saws	90.0	83.0	20%
Rubber Tired Dozers	82.0	78.0	40%
Tractors/Loaders/Backhoes	78.0	74.0	40%
<b>Grading</b>			
Graders	85.0	81.0	40%
Rubber Tired Dozers	82.0	78.0	40%
Tractors/Loaders/Backhoes	78.0	74.0	40%
<b>Building Cons</b>			
Cranes	81.0	73.0	16%
Forklifts	84.0	80.0	40%
Generator Sets	81.0	78.0	50%
Tractors/Loaders/Backhoes	78.0	74.0	40%
Welders	74.0	70.0	40%
<b>Paving</b>			
Cement and Mortar Mixers	80.0	77.0	50%
Pavers	77.0	74.0	50%
Paving Equipment	90.0	83.0	20%
Rollers	80.0	73.0	20%
Tractors/Loaders/Backhoes	78.0	74.0	40%
<b>Arch Coating</b>			
Air Compressors	78.0	74.0	40%

**On-Road Vehicles**

	Number of Days of Construction	Hauling Trips Total	Haul Trips per Day	Worker Trips per Day
Demolition	40	4,922	123.05	13
Grading	371	5,125	13.81	8
Building Cons	370	-	0	29
Paving	10	-	0	13
Arch Coating	65	-	0	6

**Equipment Noise Levels by Distance**

	Demolition	Grading	Building Cons	Paving	Arch Coating	
3 Loudest Pieces @ 50 Feet						
L <sub>max</sub>	91		87	87	91	78
L <sub>eq</sub>	85		83	83	84	74
L <sub>max</sub> @ distances (feet):						
50	91		87	87	91	78
100	83		80	79	83	70
200	76		72	72	76	63
250	73		70	70	73	61
375	69		65	65	69	56
450	67		63	63	67	54
500	66		62	62	66	53
600	64		60	60	64	51
650	63		59	59	63	50
700	62		59	58	62	49
800	61		57	57	61	48
900	59		56	56	59	47
1000	58		55	54	58	45
1200	56		53	53	56	43
1400	55		51	51	55	42
1600	53		50	49	53	40
1800	52		48	48	52	39
2000	51		47	47	51	38
L <sub>eq</sub> @ distances (feet):						
50	85		83	83	84	74
100	77		76	75	77	66
200	70		68	68	69	59
250	67		66	65	67	57
375	63		61	61	62	52
450	61		59	59	60	50
500	60		58	58	59	49
600	58		56	56	57	47
650	57		55	55	56	46
700	56		55	54	56	45
800	55		53	53	54	44
900	53		52	51	53	43
1000	52		51	50	52	41
1200	50		49	48	50	40
1400	48		47	46	48	38
1600	47		46	45	47	36
1800	46		44	44	45	35
2000	45		43	43	44	34

# Construction Equipment Noise Level Calculations by Phase

**Demolition**

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)	
Concrete/Industrial Saws	90	20%	83.0	
Rubber Tired Dozers	82	40%	78.0	
Tractors/Loaders/Backhoes	78	40%	74.0	
<b>Calculated Data:</b>				
All Sources Combined - Lmax sound level (dBA) at 50 feet =			91	
All Sources Combined - Leq sound level (dBA) at 50 feet =			85	
Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	91	85
100	-6	-1.5	83	77
200	-12	-3.0	76	70
250	-14	-3.5	73	67
375	-18	-4.4	69	63
450	-19	-4.8	67	61
500	-20	-5.0	66	60
600	-22	-5.4	64	58
650	-22	-5.6	63	57
700	-23	-5.7	62	56
800	-24	-6.0	61	55
900	-25	-6.3	59	53
1000	-26	-6.5	58	52
1200	-28	-6.9	56	50
1400	-29	-7.2	55	48
1600	-30	-7.5	53	47
1800	-31	-7.8	52	46
2000	-32	-8.0	51	45

Geometric attenuation based on 6 dB per doubling of distance.  
 Ground affect attenuation based on 1.5 dB per doubling of distance  
 Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

## Grading

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)	
Graders	85	40%	81.0	
Rubber Tired Dozers	82	40%	78.0	
Tractors/Loaders/Backhoes	78	40%	74.0	
<b>Calculated Data:</b>				
All Sources Combined - Lmax sound level (dBA) at 50 feet =			87	
All Sources Combined - Leq sound level (dBA) at 50 feet =			83	
Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	87	83
100	-6	-1.5	80	76
200	-12	-3.0	72	68
250	-14	-3.5	70	66
375	-18	-4.4	65	61
450	-19	-4.8	63	59
500	-20	-5.0	62	58
600	-22	-5.4	60	56
650	-22	-5.6	59	55
700	-23	-5.7	59	55
800	-24	-6.0	57	53
900	-25	-6.3	56	52
1000	-26	-6.5	55	51
1200	-28	-6.9	53	49
1400	-29	-7.2	51	47
1600	-30	-7.5	50	46
1800	-31	-7.8	48	44
2000	-32	-8.0	47	43

Geometric attenuation based on 6 dB per doubling of distance.  
Ground affect attenuation based on 1.5 dB per doubling of distance  
Note: This calculation does not include the effects, if any, of local shielding



## Building Cons

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)	
Forklifts	84	40%	80.0	
Generator Sets	81	50%	78.0	
Cranes	81	16%	73.0	
<b>Calculated Data:</b>				
All Sources Combined - Lmax sound level (dBA) at 50 feet =			87	
All Sources Combined - Leq sound level (dBA) at 50 feet =			83	
Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	87	83
100	-6	-1.5	79	75
200	-12	-3.0	72	68
250	-14	-3.5	70	65
375	-18	-4.4	65	61
450	-19	-4.8	63	59
500	-20	-5.0	62	58
600	-22	-5.4	60	56
650	-22	-5.6	59	55
700	-23	-5.7	58	54
800	-24	-6.0	57	53
900	-25	-6.3	56	51
1000	-26	-6.5	54	50
1200	-28	-6.9	53	48
1400	-29	-7.2	51	46
1600	-30	-7.5	49	45
1800	-31	-7.8	48	44
2000	-32	-8.0	47	43

Geometric attenuation based on 6 dB per doubling of distance.  
 Ground affect attenuation based on 1.5 dB per doubling of distance  
 Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

**Paving**

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)	
Paving Equipment	90	20%	83.0	
Cement and Mortar Mixers	80	50%	77.0	
Rollers	80	20%	73.0	
<b>Calculated Data:</b>				
All Sources Combined - Lmax sound level (dBA) at 50 feet =			91	
All Sources Combined - Leq sound level (dBA) at 50 feet =			84	
Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	91	84
100	-6	-1.5	83	77
200	-12	-3.0	76	69
250	-14	-3.5	73	67
375	-18	-4.4	69	62
450	-19	-4.8	67	60
500	-20	-5.0	66	59
600	-22	-5.4	64	57
650	-22	-5.6	63	56
700	-23	-5.7	62	56
800	-24	-6.0	61	54
900	-25	-6.3	59	53
1000	-26	-6.5	58	52
1200	-28	-6.9	56	50
1400	-29	-7.2	55	48
1600	-30	-7.5	53	47
1800	-31	-7.8	52	45
2000	-32	-8.0	51	44

Geometric attenuation based on 6 dB per doubling of distance.  
 Ground affect attenuation based on 1.5 dB per doubling of distance  
 Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

## Arch Coating

Source Data:	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)	
Air Compressors	78	40%	74.0	
<b>Calculated Data:</b>				
All Sources Combined - Lmax sound level (dBA) at 50 feet =			78	
All Sources Combined - Leq sound level (dBA) at 50 feet =			74	
Distance Between Source and Receiver (ft.)	Geometric Attenuation (dB)	Ground Effect Attenuation (dB)	Calculated Lmax Sound Level (dBA)	Calculated Leq Sound Level (dBA)
50	0	0.0	78	74
100	-6	-1.5	70	66
200	-12	-3.0	63	59
250	-14	-3.5	61	57
375	-18	-4.4	56	52
450	-19	-4.8	54	50
500	-20	-5.0	53	49
600	-22	-5.4	51	47
650	-22	-5.6	50	46
700	-23	-5.7	49	45
800	-24	-6.0	48	44
900	-25	-6.3	47	43
1000	-26	-6.5	45	41
1200	-28	-6.9	43	40
1400	-29	-7.2	42	38
1600	-30	-7.5	40	36
1800	-31	-7.8	39	35
2000	-32	-8.0	38	34

Geometric attenuation based on 6 dB per doubling of distance.  
 Ground affect attenuation based on 1.5 dB per doubling of distance  
 Note: This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.

## Average Daily Traffic Volumes

## Existing

		Daily		Daily
1	Shoreline Boulevard (northbound)	N/O Wright Ave	Shoreline Boulevard (southbound)	N/O Wright Ave
2		between Wright Ave and Villa St		between Wright Ave and Villa St
3		between Villa St and Dana St		between Villa St and Dana St
4		between Dana St and California St		between Dana St and California St
5		S/O California St		S/O California St
6	Moffett Boulevard (northbound)	N/O Jackson St	Moffett Boulevard (southbound)	N/O Jackson St
7		Between Central Expwy and Jackson St		Between Central Expwy and Jackson St
8	Castro Street (northbound)	Between Central Expwy and Evelyn Ave (north leg)	Castro Street (southbound)	Between Central Expwy and Evelyn Ave (north leg)
9		Between Evelyn Ave (north leg) and Evelyn Ave (south leg)		Between Evelyn Ave (north leg) and Evelyn Ave (south leg)
10		Between Evelyn Ave (south leg) and Villa St		Between Evelyn Ave (south leg) and Villa St
11		between Villa St and Dana St		between Villa St and Dana St
12		between Dana St and California St		between Dana St and California St
13		S/O California St		S/O California St
14	Central Expressway (eastbound)	E/O Easy St	Central Expressway (westbound)	E/O Easy St
15		Between Easy St and Moffett Blvd		Between Easy St and Moffett Blvd
16		Between Moffett Blvd and Shoreline Blvd		Between Moffett Blvd and Shoreline Blvd
17		W/O Shoreline Blvd		W/O Shoreline Blvd
18	Evelyn Avenue (eastbound)	E/O Ferry Morse Way	Evelyn Avenue (westbound)	E/O Ferry Morse Way
19		Between Ferry Morse Way and SR-85 Ramps		Between Ferry Morse Way and SR-85 Ramps
20		Between SR-85 Ramps and Calderon Ave		Between SR-85 Ramps and Calderon Ave
21		Between Calderon Ave and Bush St		Between Calderon Ave and Bush St
22		Between Bush St and View St		Between Bush St and View St
23		Between View St and Hope St		Between View St and Hope St
24		Between Hope St and Castro St		Between Hope St and Castro St
25		Between Castro St and Bryant St		Between Castro St and Bryant St
26		Between Bryant St and Franklin St		Between Bryant St and Franklin St
27		W/O Franklin St		W/O Franklin St
28	Villa Street (eastbound)	E/O Bush St	Villa Street (westbound)	E/O Bush St
29		Between Bush St and View St		Between Bush St and View St
30		Between View St and Hope St		Between View St and Hope St
31		Between Hope St and Castro St		Between Hope St and Castro St
32		Between Castro St and Bryant St		Between Castro St and Bryant St
33		Between Bryant St and Franklin St		Between Bryant St and Franklin St
34		Between Franklin St and Shoreline Blvd		Between Franklin St and Shoreline Blvd
35		W/O Shoreline Blvd		W/O Shoreline Blvd
36	Dana Street (eastbound)	E/O Ferry Morse Way	Dana Street (westbound)	E/O Ferry Morse Way
37		Between Ferry Morse Way and Calderon Ave		Between Ferry Morse Way and Calderon Ave
38		Between Calderon Ave and Bush St		Between Calderon Ave and Bush St
39		Between Bush St and Castro St		Between Bush St and Castro St
40		Between Castro St and Shoreline Blvd		Between Castro St and Shoreline Blvd
41		W/O Shoreline Blvd		W/O Shoreline Blvd
42	California Street (eastbound)	E/O Castro St	California Street (westbound)	E/O Castro St
43		Between Castro St and Bryant St		Between Castro St and Bryant St
44		Between Bryant St and Franklin St		Between Bryant St and Franklin St
45		Between Franklin St and Shoreline Blvd		Between Franklin St and Shoreline Blvd
46		W/O Shoreline Blvd		W/O Shoreline Blvd

## Existing Plus Project

		Daily		Daily		
1	Shoreline Boulevard (northbound)	N/O Wright Ave	13,500	Shoreline Boulevard (southbound)	N/O Wright Ave	16,500
2a		between Wright Ave and Evelyn Ave	16,700		between Wright Ave and Evelyn Ave	19,400
2b		Between Evelyn Ave and Villa St	16,000		Between Evelyn Ave and Villa St	17,100
3		between Villa St and Dana St	11,600		between Villa St and Dana St	12,900
4		between Dana St and California St	11,000		between Dana St and California St	12,800
5		S/O California St	9,700		S/O California St	10,800
6	Moffett Boulevard (northbound)	N/O Jackson St	1,600	Moffett Boulevard (southbound)	N/O Jackson St	3,900
7		Between Central Expwy and Jackson St	1,800		Between Central Expwy and Jackson St	4,000
8		<del>Between Central Expwy and Evelyn Ave (north leg)</del>	0		<del>Between Central Expwy and Evelyn Ave (north leg)</del>	0
9	Castro Street (northbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	1,900	Castro Street (southbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	1,800
10		Between Evelyn Ave (south leg) and Villa St	1,100		Between Evelyn Ave (south leg) and Villa St	600
11		between Villa St and Dana St	2,200		between Villa St and Dana St	1,100
12		between Dana St and California St	1,900		between Dana St and California St	1,100
13		S/O California St	2,200		S/O California St	1,600
14	Central Expressway (eastbound)	E/O Easy St	10,400	Central Expressway (westbound)	E/O Easy St	14,000
15		Between Easy St and Moffett Blvd	10,600		Between Easy St and Moffett Blvd	10,000
16		Between Moffett Blvd and Shoreline Blvd	10,000		Between Moffett Blvd and Shoreline Blvd	13,900
17		W/O Shoreline Blvd	10,100		W/O Shoreline Blvd	11,800
18	Evelyn Avenue (eastbound)	E/O Ferry Morse Way	10,700	Evelyn Avenue (westbound)	E/O Ferry Morse Way	6,900
19		Between Ferry Morse Way and SR-85 Ramps	6,800		Between Ferry Morse Way and SR-85 Ramps	7,800
20		Between SR-85 Ramps and Calderon Ave	7,500		Between SR-85 Ramps and Calderon Ave	6,500
21		Between Calderon Ave and Bush St	4,900		Between Calderon Ave and Bush St	5,300
22		Between Bush St and View St	2,700		Between Bush St and View St	1,700
23		Between View St and Hope St	2,200		Between View St and Hope St	1,600
24		Between Hope St and Castro St	1,600		Between Hope St and Castro St	1,500
25		Between Castro St and Bryant St	1,900		Between Castro St and Bryant St	1,800
26		Between Bryant St and Franklin St	2,900		Between Bryant St and Franklin St	1,700
27		W/O Franklin St	2,900		W/O Franklin St	1,700
28	Villa Street (eastbound)	E/O Bush St	1,400	Villa Street (westbound)	E/O Bush St	500
29		Between Bush St and View St	3,200		Between Bush St and View St	3,600
30		Between View St and Hope St	2,000		Between View St and Hope St	3,100
31		Between Hope St and Castro St	2,600		Between Hope St and Castro St	3,000
32		Between Castro St and Bryant St	2,800		Between Castro St and Bryant St	3,400
33		Between Bryant St and Franklin St	2,800		Between Bryant St and Franklin St	2,800
34		Between Franklin St and Shoreline Blvd	3,200		Between Franklin St and Shoreline Blvd	2,900
35		W/O Shoreline Blvd	4,000		W/O Shoreline Blvd	3,900
36	Dana Street (eastbound)	E/O Ferry Morse Way	6,700	Dana Street (westbound)	E/O Ferry Morse Way	2,600
37		Between Ferry Morse Way and Calderon Ave	3,600		Between Ferry Morse Way and Calderon Ave	4,500
38		Between Calderon Ave and Bush St	2,100		Between Calderon Ave and Bush St	1,900
39		Between Bush St and Castro St	1,900		Between Bush St and Castro St	1,400
40		Between Castro St and Shoreline Blvd	1,300		Between Castro St and Shoreline Blvd	1,100
41		W/O Shoreline Blvd	200		W/O Shoreline Blvd	100
42	California Street (eastbound)	E/O Castro St	2,700	California Street (westbound)	E/O Castro St	1,500
43		Between Castro St and Bryant St	3,200		Between Castro St and Bryant St	2,100
44		Between Bryant St and Franklin St	3,900		Between Bryant St and Franklin St	2,500
45		Between Franklin St and Shoreline Blvd	4,600		Between Franklin St and Shoreline Blvd	2,600
46		W/O Shoreline Blvd	5,100		W/O Shoreline Blvd	3,900

## Near-Term

		Daily		Daily
1	Shoreline Boulevard (northbound)	N/O Wright Ave	Shoreline Boulevard (southbound)	N/O Wright Ave
2		between Wright Ave and Villa St		between Wright Ave and Villa St
3		between Villa St and Dana St		between Villa St and Dana St
4		between Dana St and California St		between Dana St and California St
5		S/O California St		S/O California St
6	Moffett Boulevard (northbound)	N/O Jackson St	Moffett Boulevard (southbound)	N/O Jackson St
7		Between Central NTPwy and Jackson St		Between Central NTPwy and Jackson St
8	Castro Street (northbound)	Between Central NTPwy and Evelyn Ave (north leg)	Castro Street (southbound)	Between Central NTPwy and Evelyn Ave (north leg)
9		Between Evelyn Ave (north leg) and Evelyn Ave (south leg)		Between Evelyn Ave (north leg) and Evelyn Ave (south leg)
10		Between Evelyn Ave (south leg) and Villa St		Between Evelyn Ave (south leg) and Villa St
11		between Villa St and Dana St		between Villa St and Dana St
12		between Dana St and California St		between Dana St and California St
13		S/O California St		S/O California St
14	Central NTpressway (eastbound)	E/O Easy St	Central NTpressway (westbound)	E/O Easy St
15		Between Easy St and Moffett Blvd		Between Easy St and Moffett Blvd
16		Between Moffett Blvd and Shoreline Blvd		Between Moffett Blvd and Shoreline Blvd
17		W/O Shoreline Blvd		W/O Shoreline Blvd
18	Evelyn Avenue (eastbound)	E/O Ferry Morse Way	Evelyn Avenue (westbound)	E/O Ferry Morse Way
19		Between Ferry Morse Way and SR-85 Ramps		Between Ferry Morse Way and SR-85 Ramps
20		Between SR-85 Ramps and Calderon Ave		Between SR-85 Ramps and Calderon Ave
21		Between Calderon Ave and Bush St		Between Calderon Ave and Bush St
22		Between Bush St and View St		Between Bush St and View St
23		Between View St and Hope St		Between View St and Hope St
24		Between Hope St and Castro St		Between Hope St and Castro St
25		Between Castro St and Bryant St		Between Castro St and Bryant St
26		Between Bryant St and Franklin St		Between Bryant St and Franklin St
27		W/O Franklin St		W/O Franklin St
28	Villa Street (eastbound)	E/O Bush St	Villa Street (westbound)	E/O Bush St
29		Between Bush St and View St		Between Bush St and View St
30		Between View St and Hope St		Between View St and Hope St
31		Between Hope St and Castro St		Between Hope St and Castro St
32		Between Castro St and Bryant St		Between Castro St and Bryant St
33		Between Bryant St and Franklin St		Between Bryant St and Franklin St
34		Between Franklin St and Shoreline Blvd		Between Franklin St and Shoreline Blvd
35		W/O Shoreline Blvd		W/O Shoreline Blvd
36	Dana Street (eastbound)	E/O Ferry Morse Way	Dana Street (westbound)	E/O Ferry Morse Way
37		Between Ferry Morse Way and Calderon Ave		Between Ferry Morse Way and Calderon Ave
38		Between Calderon Ave and Bush St		Between Calderon Ave and Bush St
39		Between Bush St and Castro St		Between Bush St and Castro St
40		Between Castro St and Shoreline Blvd		Between Castro St and Shoreline Blvd
41	W/O Shoreline Blvd	W/O Shoreline Blvd		
42	California Street (eastbound)	E/O Castro St	California Street (westbound)	E/O Castro St
43		Between Castro St and Bryant St		Between Castro St and Bryant St
44		Between Bryant St and Franklin St		Between Bryant St and Franklin St
45		Between Franklin St and Shoreline Blvd		Between Franklin St and Shoreline Blvd
46		W/O Shoreline Blvd		W/O Shoreline Blvd



Near-Term Plus Project

		Daily		Daily		
1	Shoreline Boulevard (northbound)	N/O Wright Ave	15,000	Shoreline Boulevard (southbound)	N/O Wright Ave	17,000
2a		between Wright Ave and Evelyn Ave	18,400		between Wright Ave and Evelyn Ave	19,700
2b		Between Evelyn Ave and Villa St	16,700		Between Evelyn Ave and Villa St	17,900
3		between Villa St and Dana St	12,200		between Villa St and Dana St	13,500
4		between Dana St and California St	11,700		between Dana St and California St	13,400
5		S/O California St	10,000		S/O California St	11,200
6	Moffett Boulevard (northbound)	N/O Jackson St	2,100	Moffett Boulevard (southbound)	N/O Jackson St	4,000
7		Between Central Expwy and Jackson St	2,300		Between Central Expwy and Jackson St	4,200
8		<del>Between Central Expwy and Evelyn Ave (north leg)</del>	0		<del>Between Central Expwy and Evelyn Ave (north leg)</del>	0
9	Castro Street (northbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	2,100	Castro Street (southbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	1,800
10		Between Evelyn Ave (south leg) and Villa St	1,100		Between Evelyn Ave (south leg) and Villa St	600
11		between Villa St and Dana St	2,100		between Villa St and Dana St	1,200
12		between Dana St and California St	2,300		between Dana St and California St	1,300
13			S/O California St		2,700	
14	Central Expressway (eastbound)	E/O Easy St	11,400	Central Expressway (westbound)	E/O Easy St	14,900
15		Between Easy St and Moffett Blvd	11,600		Between Easy St and Moffett Blvd	10,800
16		Between Moffett Blvd and Shoreline Blvd	10,400		Between Moffett Blvd and Shoreline Blvd	14,600
17			W/O Shoreline Blvd		10,700	
18	Evelyn Avenue (eastbound)	E/O Ferry Morse Way	10,800	Evelyn Avenue (westbound)	E/O Ferry Morse Way	7,600
19		Between Ferry Morse Way and SR-85 Ramps	6,800		Between Ferry Morse Way and SR-85 Ramps	8,500
20		Between SR-85 Ramps and Calderon Ave	7,600		Between SR-85 Ramps and Calderon Ave	7,200
21		Between Calderon Ave and Bush St	5,000		Between Calderon Ave and Bush St	6,100
22		Between Bush St and View St	2,700		Between Bush St and View St	2,100
23		Between View St and Hope St	2,300		Between View St and Hope St	2,000
24		Between Hope St and Castro St	1,700		Between Hope St and Castro St	1,900
25		Between Castro St and Bryant St	1,900		Between Castro St and Bryant St	2,000
26		Between Bryant St and Franklin St	2,900		Between Bryant St and Franklin St	1,800
27			W/O Franklin St		2,900	
28	Villa Street (eastbound)	E/O Bush St	1,400	Villa Street (westbound)	E/O Bush St	600
29		Between Bush St and View St	3,300		Between Bush St and View St	3,700
30		Between View St and Hope St	2,000		Between View St and Hope St	3,200
31		Between Hope St and Castro St	2,600		Between Hope St and Castro St	3,200
32		Between Castro St and Bryant St	2,900		Between Castro St and Bryant St	3,500
33		Between Bryant St and Franklin St	2,900		Between Bryant St and Franklin St	2,800
34		Between Franklin St and Shoreline Blvd	3,300		Between Franklin St and Shoreline Blvd	3,000
35			W/O Shoreline Blvd		4,200	
36	Dana Street (eastbound)	E/O Ferry Morse Way	6,700	Dana Street (westbound)	E/O Ferry Morse Way	2,700
37		Between Ferry Morse Way and Calderon Ave	3,800		Between Ferry Morse Way and Calderon Ave	4,800
38		Between Calderon Ave and Bush St	2,200		Between Calderon Ave and Bush St	2,100
39		Between Bush St and Castro St	2,000		Between Bush St and Castro St	1,500
40		Between Castro St and Shoreline Blvd	1,400		Between Castro St and Shoreline Blvd	1,100
41		W/O Shoreline Blvd	200		W/O Shoreline Blvd	200
42	California Street (eastbound)	E/O Castro St	2,700	California Street (westbound)	E/O Castro St	1,500
43		Between Castro St and Bryant St	3,400		Between Castro St and Bryant St	2,200
44		Between Bryant St and Franklin St	4,100		Between Bryant St and Franklin St	2,600
45		Between Franklin St and Shoreline Blvd	4,900		Between Franklin St and Shoreline Blvd	2,800
46			W/O Shoreline Blvd		5,700	

Cumulative

			Daily			Daily
1	Shoreline Boulevard (northbound)	N/O Wright Ave	13,600	Shoreline Boulevard (southbound)	N/O Wright Ave	14,700
2		between Wright Ave and Villa St	17,300		between Wright Ave and Villa St	16,900
3		between Villa St and Dana St	12,800		between Villa St and Dana St	13,400
4		between Dana St and California St	12,300		between Dana St and California St	13,200
5		S/O California St	10,700		S/O California St	11,500
6	Moffett Boulevard (northbound)	N/O Jackson St	3,900	Moffett Boulevard (southbound)	N/O Jackson St	7,000
7		Between Central Cumpwy and Jackson St	4,200		Between Central Cumpwy and Jackson St	7,100
8	Castro Street (northbound)	Between Central Cumpwy and Evelyn Ave (north leg)	2,500	Castro Street (southbound)	Between Central Cumpwy and Evelyn Ave (north leg)	6,000
9		Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	2,500		Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	4,300
10		Between Evelyn Ave (south leg) and Villa St	1,700		Between Evelyn Ave (south leg) and Villa St	4,300
11		between Villa St and Dana St	2,200		between Villa St and Dana St	2,400
12		between Dana St and California St	2,400		between Dana St and California St	2,300
13		S/O California St	2,700		S/O California St	2,400
14	Central Cumpressway (eastbound)	E/O Easy St	11,900	Central Cumpressway (westbound)	E/O Easy St	16,700
15		Between Easy St and Moffett Blvd	11,900		Between Easy St and Moffett Blvd	13,300
16		Between Moffett Blvd and Shoreline Blvd	13,100		Between Moffett Blvd and Shoreline Blvd	16,100
17		W/O Shoreline Blvd	11,900		W/O Shoreline Blvd	14,200
18	Evelyn Avenue (eastbound)	E/O Ferry Morse Way	11,600	Evelyn Avenue (westbound)	E/O Ferry Morse Way	6,900
19		Between Ferry Morse Way and SR-85 Ramps	7,100		Between Ferry Morse Way and SR-85 Ramps	8,400
20		Between SR-85 Ramps and Calderon Ave	7,900		Between SR-85 Ramps and Calderon Ave	7,000
21		Between Calderon Ave and Bush St	5,200		Between Calderon Ave and Bush St	5,900
22		Between Bush St and View St	2,100		Between Bush St and View St	2,500
23		Between View St and Hope St	1,300		Between View St and Hope St	2,200
24		Between Hope St and Castro St	500		Between Hope St and Castro St	1,500
25		Between Castro St and Bryant St	700		Between Castro St and Bryant St	2,000
26		Between Bryant St and Franklin St	600		Between Bryant St and Franklin St	800
27		W/O Franklin St	400		W/O Franklin St	300
28	Villa Street (eastbound)	E/O Bush St	1,600	Villa Street (westbound)	E/O Bush St	800
29		Between Bush St and View St	4,300		Between Bush St and View St	4,000
30		Between View St and Hope St	3,400		Between View St and Hope St	3,500
31		Between Hope St and Castro St	4,400		Between Hope St and Castro St	3,500
32		Between Castro St and Bryant St	2,900		Between Castro St and Bryant St	3,700
33		Between Bryant St and Franklin St	2,500		Between Bryant St and Franklin St	3,100
34		Between Franklin St and Shoreline Blvd	3,200		Between Franklin St and Shoreline Blvd	3,300
35		W/O Shoreline Blvd	4,200		W/O Shoreline Blvd	3,900
36	Dana Street (eastbound)	E/O Ferry Morse Way	6,500	Dana Street (westbound)	E/O Ferry Morse Way	2,700
37		Between Ferry Morse Way and Calderon Ave	3,800		Between Ferry Morse Way and Calderon Ave	4,200
38		Between Calderon Ave and Bush St	2,100		Between Calderon Ave and Bush St	1,700
39		Between Bush St and Castro St	1,800		Between Bush St and Castro St	1,300
40		Between Castro St and Shoreline Blvd	1,500		Between Castro St and Shoreline Blvd	1,300
41		W/O Shoreline Blvd	200		W/O Shoreline Blvd	200
42	California Street (eastbound)	E/O Castro St	2,800	California Street (westbound)	E/O Castro St	1,500
43		Between Castro St and Bryant St	3,200		Between Castro St and Bryant St	2,500
44		Between Bryant St and Franklin St	4,000		Between Bryant St and Franklin St	2,900
45		Between Franklin St and Shoreline Blvd	4,700		Between Franklin St and Shoreline Blvd	3,100
46		W/O Shoreline Blvd	5,700		W/O Shoreline Blvd	4,300

Cumulative Plus Project

		Daily		Daily
1	Shoreline Boulevard (northbound)	N/O Wright Ave	Shoreline Boulevard (southbound)	N/O Wright Ave
2a		between Wright Ave and Evelyn Ave		between Wright Ave and Evelyn Ave
2b		Between Evelyn Ave and Villa St		Between Evelyn Ave and Villa St
3		between Villa St and Dana St		between Villa St and Dana St
4		between Dana St and California St		between Dana St and California St
5	S/O California St	10,700	S/O California St	11,900
6	Moffett Boulevard (northbound)	N/O Jackson St	Moffett Boulevard (southbound)	N/O Jackson St
7		Between Central Cumpwy and Jackson St		Between Central Cumpwy and Jackson St
8		<del>Between Central Cumpwy and Evelyn Ave (north leg)</del>		<del>Between Central Cumpwy and Evelyn Ave (north leg)</del>
9	Castro Street (northbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	Castro Street (southbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)
10		Between Evelyn Ave (south leg) and Villa St		Between Evelyn Ave (south leg) and Villa St
11		between Villa St and Dana St		between Villa St and Dana St
12		between Dana St and California St		between Dana St and California St
13		S/O California St		2,700
14	Central Cumpressway (eastbound)	E/O Easy St	Central Cumpressway (westbound)	E/O Easy St
15		Between Easy St and Moffett Blvd		Between Easy St and Moffett Blvd
16		Between Moffett Blvd and Shoreline Blvd		Between Moffett Blvd and Shoreline Blvd
17		W/O Shoreline Blvd		11,900
18	Evelyn Avenue (eastbound)	E/O Ferry Morse Way	Evelyn Avenue (westbound)	E/O Ferry Morse Way
19		Between Ferry Morse Way and SR-85 Ramps		Between Ferry Morse Way and SR-85 Ramps
20		Between SR-85 Ramps and Calderon Ave		Between SR-85 Ramps and Calderon Ave
21		Between Calderon Ave and Bush St		Between Calderon Ave and Bush St
22		Between Bush St and View St		Between Bush St and View St
23		Between View St and Hope St		Between View St and Hope St
24		Between Hope St and Castro St		Between Hope St and Castro St
25		Between Castro St and Bryant St		Between Castro St and Bryant St
26		Between Bryant St and Franklin St		Between Bryant St and Franklin St
27		W/O Franklin St		3,000
28	Villa Street (eastbound)	E/O Bush St	Villa Street (westbound)	E/O Bush St
29		Between Bush St and View St		Between Bush St and View St
30		Between View St and Hope St		Between View St and Hope St
31		Between Hope St and Castro St		Between Hope St and Castro St
32		Between Castro St and Bryant St		Between Castro St and Bryant St
33		Between Bryant St and Franklin St		Between Bryant St and Franklin St
34		Between Franklin St and Shoreline Blvd		Between Franklin St and Shoreline Blvd
35		W/O Shoreline Blvd		4,400
36	Dana Street (eastbound)	E/O Ferry Morse Way	Dana Street (westbound)	E/O Ferry Morse Way
37		Between Ferry Morse Way and Calderon Ave		Between Ferry Morse Way and Calderon Ave
38		Between Calderon Ave and Bush St		Between Calderon Ave and Bush St
39		Between Bush St and Castro St		Between Bush St and Castro St
40		Between Castro St and Shoreline Blvd		Between Castro St and Shoreline Blvd
41		W/O Shoreline Blvd		200
42	California Street (eastbound)	E/O Castro St	California Street (westbound)	E/O Castro St
43		Between Castro St and Bryant St		Between Castro St and Bryant St
44		Between Bryant St and Franklin St		Between Bryant St and Franklin St
45		Between Franklin St and Shoreline Blvd		Between Franklin St and Shoreline Blvd
46		W/O Shoreline Blvd		5,700

**Average Daily Traffic Summary Tables**

Combined			Average Daily Traffic Volumes							Posted Speed (mph)
			Existing	Existing plus Project	Near Term	Near Term + Project	Cumulative	Cumulative + Project		
1	Shoreline Boulevard	N/O Wright Ave	25,700	30,000	26,500	32,000	28,300	33,900	35	
2	Shoreline Boulevard	between Wright Ave and Villa St	30,100	-	32,100	-	34,200	-	35	
2a	Shoreline Boulevard	between Wright Ave and Evelyn Ave	-	36,100	-	38,100	-	39,300	35	
2b	Shoreline Boulevard	Between Evelyn Ave and Villa St	-	33,100	-	34,600	-	36,700	35	
3	Shoreline Boulevard	between Villa St and Dana St	23,400	24,500	24,600	25,700	26,200	27,300	35	
4	Shoreline Boulevard	between Dana St and California St	23,000	23,800	24,000	25,100	25,500	26,500	35	
5	Shoreline Boulevard	S/O California St	20,200	20,500	20,800	21,200	22,200	22,600	35	
6	Moffett Boulevard	N/O Jackson St	9,800	5,500	10,600	6,100	10,900	6,200	35	
7	Moffett Boulevard	Between Central Expwy and Jackson St	10,100	5,800	11,000	6,500	11,300	6,700	35	
8	Castro Street	Between Central Expwy and Evelyn Ave (north leg)	8,900	-	8,100	-	8,500	-	25	
9	Castro Street	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	7,300	3,700	6,600	3,900	6,800	4,100	25	
10	Castro Street	Between Evelyn Ave (south leg) and Villa St	6,100	1,700	5,800	1,700	6,000	1,800	25	
11	Castro Street	between Villa St and Dana St	4,300	3,300	4,600	3,300	4,600	3,400	25	
12	Castro Street	between Dana St and California St	4,300	3,000	4,700	3,600	4,700	3,600	25	
13	Castro Street	S/O California St	4,200	3,800	5,100	4,700	5,100	4,700	25	
14	Central Expressway	E/O Easy St	24,800	24,400	26,800	26,300	28,600	28,100	45	
15	Central Expressway	Between Easy St and Moffett Blvd	21,400	20,600	23,200	22,400	25,200	24,200	45	
16	Central Expressway	Between Moffett Blvd and Shoreline Blvd	25,800	23,900	25,900	25,000	29,200	28,400	45	
17	Central Expressway	W/O Shoreline Blvd	23,000	21,900	23,500	23,500	26,100	26,200	45	
18	Evelyn Avenue	E/O Ferry Morse Way	17,900	17,600	18,200	18,400	18,500	18,800	35	
19	Evelyn Avenue	Between Ferry Morse Way and SR-85 Ramps	15,000	14,600	15,100	15,300	15,500	15,600	35	
20	Evelyn Avenue	Between SR-85 Ramps and Calderon Ave	14,500	14,000	14,600	14,800	14,900	15,100	35	
21	Evelyn Avenue	Between Calderon Ave and Bush St	10,700	10,200	10,900	11,100	11,100	11,200	35	
22	Evelyn Avenue	Between Bush St and View St	4,100	4,400	4,000	4,800	4,600	5,300	30	
23	Evelyn Avenue	Between View St and Hope St	3,300	3,800	3,000	4,300	3,500	4,600	30	
24	Evelyn Avenue	Between Hope St and Castro St	2,400	3,100	2,000	3,600	2,000	3,600	30	
25	Evelyn Avenue	Between Castro St and Bryant St	2,600	3,700	2,600	3,900	2,700	4,100	25	
26	Evelyn Avenue	Between Bryant St and Franklin St	1,300	4,600	1,300	4,700	1,400	4,900	25	
27	Evelyn Avenue	W/O Franklin St	700	4,600	700	4,700	700	4,900	25	
28	Villa Street	E/O Bush St	2,400	1,900	2,400	2,000	2,400	2,100	25	
29	Villa Street	Between Bush St and View St	7,800	6,800	8,200	7,000	8,300	7,100	25	
30	Villa Street	Between View St and Hope St	6,200	5,100	6,700	5,200	6,900	5,300	25	
31	Villa Street	Between Hope St and Castro St	7,000	5,600	7,600	5,800	7,900	6,000	25	
32	Villa Street	Between Castro St and Bryant St	5,300	6,200	6,400	6,400	6,600	6,600	25	
33	Villa Street	Between Bryant St and Franklin St	4,500	5,600	5,600	5,700	5,600	5,800	25	
34	Villa Street	Between Franklin St and Shoreline Blvd	5,200	6,100	6,300	6,300	6,500	6,700	25	
35	Villa Street	W/O Shoreline Blvd	7,200	7,900	7,700	8,200	8,100	8,700	25	
36	Dana Street	E/O Ferry Morse Way	8,900	9,300	9,000	9,400	9,200	9,600	25	
37	Dana Street	Between Ferry Morse Way and Calderon Ave	7,400	8,100	8,000	8,600	8,000	8,700	25	
38	Dana Street	Between Calderon Ave and Bush St	3,500	4,000	3,800	4,300	3,800	4,400	25	
39	Dana Street	Between Bush St and Castro St	2,900	3,300	3,100	3,500	3,100	3,500	25	
40	Dana Street	Between Castro St and Shoreline Blvd	2,600	2,400	2,800	2,500	2,800	2,500	25	
41	Dana Street	W/O Shoreline Blvd	300	300	400	400	400	400	25	
42	California Street	E/O Castro St	4,200	4,200	4,200	4,200	4,300	4,300	25	
43	California Street	Between Castro St and Bryant St	5,200	5,300	5,700	5,600	5,700	5,700	25	
44	California Street	Between Bryant St and Franklin St	6,300	6,400	6,700	6,700	6,900	6,800	25	
45	California Street	Between Franklin St and Shoreline Blvd	7,100	7,200	7,700	7,700	7,800	7,700	25	
46	California Street	W/O Shoreline Blvd	8,800	9,000	9,900	9,900	10,000	10,000	25	

**North- & Eastbound**

			Existing	Existing plus Project	Near Term	Near Term + Project	Cumulative	Cumulative + Project	Posted Speed (mph)
1	Shoreline Boulevard (southbound)	N/O Wright Ave	12,300	13,500	12,700	15,000	13,600	16,000	35
2	Shoreline Boulevard (northbound)	between Wright Ave and Villa St	14,900	-	16,400	-	17,300	-	35
2a	Shoreline Boulevard (southbound)	between Wright Ave and Evelyn Ave	-	16,700	-	18,400	-	19,500	35
2b	Shoreline Boulevard (southbound)	Between Evelyn Ave and Villa St	-	16,000	-	16,700	-	17,600	35
3	Shoreline Boulevard (southbound)	between Villa St and Dana St	11,300	11,600	12,100	12,200	12,800	12,900	35
4	Shoreline Boulevard (southbound)	between Dana St and California St	11,000	11,000	11,600	11,700	12,300	12,300	35
5	Shoreline Boulevard (southbound)	S/O California St	9,700	9,700	10,000	10,000	10,700	10,700	35
6	Moffett Boulevard (southbound)	N/O Jackson St	3,200	1,600	3,700	2,100	3,900	2,100	35
7	Moffett Boulevard (southbound)	Between Central Expwy and Jackson St	3,400	1,800	4,000	2,300	4,200	2,400	35

8	Castro Street (southbound)	Between Central Expwy and Evelyn Ave (north leg)	3,500	-	2,400	-	2,500	-	25
9	Castro Street (southbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	3,500	1,900	2,400	2,100	2,500	2,200	25
10	Castro Street (southbound)	Between Evelyn Ave (south leg) and Villa St	2,300	1,100	1,600	1,100	1,700	1,100	25
11	Castro Street (southbound)	between Villa St and Dana St	2,300	2,200	2,200	2,100	2,200	2,200	25
12	Castro Street (southbound)	between Dana St and California St	2,400	1,900	2,400	2,300	2,400	2,300	25
13	Castro Street (southbound)	S/O California St	2,300	2,200	2,700	2,700	2,700	2,700	25
14	Central Expressway (westbound)	E/O Easy St	10,300	10,400	11,300	11,400	11,900	12,000	45
15	Central Expressway (westbound)	Between Easy St and Moffett Blvd	10,300	10,600	11,300	11,600	11,900	12,200	45
16	Central Expressway (westbound)	Between Moffett Blvd and Shoreline Blvd	11,400	10,000	11,900	10,400	13,100	11,500	45
17	Central Expressway (westbound)	W/O Shoreline Blvd	10,100	10,100	10,700	10,700	11,900	11,900	45
18	Evelyn Avenue (westbound)	E/O Ferry Morse Way	11,200	10,700	11,300	10,800	11,600	11,100	35
19	Evelyn Avenue (westbound)	Between Ferry Morse Way and SR-85 Ramps	6,900	6,800	6,900	6,800	7,100	7,000	35
20	Evelyn Avenue (westbound)	Between SR-85 Ramps and Calderon Ave	7,600	7,500	7,700	7,600	7,900	7,800	35
21	Evelyn Avenue (westbound)	Between Calderon Ave and Bush St	5,000	4,900	5,100	5,000	5,200	5,100	35
22	Evelyn Avenue (westbound)	Between Bush St and View St	2,000	2,700	2,100	2,700	2,100	2,800	30
23	Evelyn Avenue (westbound)	Between View St and Hope St	1,200	2,200	1,300	2,300	1,300	2,300	30
24	Evelyn Avenue (westbound)	Between Hope St and Castro St	400	1,600	500	1,700	500	1,700	30
25	Evelyn Avenue (westbound)	Between Castro St and Bryant St	700	1,900	700	1,900	700	2,000	25
26	Evelyn Avenue (westbound)	Between Bryant St and Franklin St	600	2,900	600	2,900	600	3,000	25
27	Evelyn Avenue (westbound)	W/O Franklin St	400	2,900	400	2,900	400	3,000	25
28	Villa Street (westbound)	E/O Bush St	1,600	1,400	1,600	1,400	1,600	1,500	25
29	Villa Street (westbound)	Between Bush St and View St	4,200	3,200	4,200	3,300	4,300	3,300	25
30	Villa Street (westbound)	Between View St and Hope St	3,300	2,000	3,300	2,000	3,400	2,100	25
31	Villa Street (westbound)	Between Hope St and Castro St	4,200	2,600	4,200	2,600	4,400	2,700	25
32	Villa Street (westbound)	Between Castro St and Bryant St	2,800	2,800	2,800	2,900	2,900	3,000	25
33	Villa Street (westbound)	Between Bryant St and Franklin St	2,400	2,800	2,500	2,900	2,500	2,900	25
34	Villa Street (westbound)	Between Franklin St and Shoreline Blvd	2,900	3,200	3,000	3,300	3,200	3,600	25
35	Villa Street (westbound)	W/O Shoreline Blvd	4,000	4,000	4,100	4,200	4,200	4,400	25
36	Dana Street (westbound)	E/O Ferry Morse Way	6,300	6,700	6,300	6,700	6,500	6,900	25
37	Dana Street (westbound)	Between Ferry Morse Way and Calderon Ave	3,600	3,600	3,800	3,800	3,800	3,800	25
38	Dana Street (westbound)	Between Calderon Ave and Bush St	2,000	2,100	2,100	2,200	2,100	2,200	25
39	Dana Street (westbound)	Between Bush St and Castro St	1,700	1,900	1,800	2,000	1,800	2,000	25
40	Dana Street (westbound)	Between Castro St and Shoreline Blvd	1,500	1,300	1,500	1,400	1,500	1,400	25
41	Dana Street (westbound)	W/O Shoreline Blvd	200	200	200	200	200	200	25
42	California Street (westbound)	E/O Castro St	2,700	2,700	2,700	2,700	2,800	2,800	25
43	California Street (westbound)	Between Castro St and Bryant St	3,100	3,200	3,200	3,400	3,200	3,500	25
44	California Street (westbound)	Between Bryant St and Franklin St	3,800	3,900	3,900	4,100	4,000	4,200	25
45	California Street (westbound)	Between Franklin St and Shoreline Blvd	4,500	4,600	4,600	4,900	4,700	4,900	25
46	California Street (westbound)	W/O Shoreline Blvd	5,100	5,100	5,700	5,700	5,700	5,700	25

**South- & Westbound**

			Existing	Existing plus Project	Near Term	Near Term + Project	Cumulative	Cumulative + Project	Posted Speed (mph)
1	Shoreline Boulevard (southbound)	N/O Wright Ave	13,400	16,500	13,800	17,000	14,700	17,900	35
2	Shoreline Boulevard (northbound)	between Wright Ave and Villa St	15,200	-	15,700	-	16,900	-	35
2a	Shoreline Boulevard (southbound)	between Wright Ave and Evelyn Ave	-	19,400	-	19,700	-	19,800	35
2b	Shoreline Boulevard (southbound)	Between Evelyn Ave and Villa St	-	17,100	-	17,900	-	19,100	35
3	Shoreline Boulevard (southbound)	between Villa St and Dana St	12,100	12,900	12,500	13,500	13,400	14,400	35
4	Shoreline Boulevard (southbound)	between Dana St and California St	12,000	12,800	12,400	13,400	13,200	14,200	35
5	Shoreline Boulevard (southbound)	S/O California St	10,500	10,800	10,800	11,200	11,500	11,900	35
6	Moffett Boulevard (southbound)	N/O Jackson St	6,600	3,900	6,900	4,000	7,000	4,100	35
7	Moffett Boulevard (southbound)	Between Central Expwy and Jackson St	6,700	4,000	7,000	4,200	7,100	4,300	35
8	Castro Street (southbound)	Between Central Expwy and Evelyn Ave (north leg)	5,400	-	5,700	-	6,000	-	25
9	Castro Street (southbound)	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	3,800	1,800	4,200	1,800	4,300	1,900	25
10	Castro Street (southbound)	Between Evelyn Ave (south leg) and Villa St	3,800	600	4,200	600	4,300	700	25
11	Castro Street (southbound)	between Villa St and Dana St	2,000	1,100	2,400	1,200	2,400	1,200	25
12	Castro Street (southbound)	between Dana St and California St	1,900	1,100	2,300	1,300	2,300	1,300	25
13	Castro Street (southbound)	S/O California St	1,900	1,600	2,400	2,000	2,400	2,000	25
14	Central Expressway (westbound)	E/O Easy St	14,500	14,000	15,500	14,900	16,700	16,100	45
15	Central Expressway (westbound)	Between Easy St and Moffett Blvd	11,100	10,000	11,900	10,800	13,300	12,000	45
16	Central Expressway (westbound)	Between Moffett Blvd and Shoreline Blvd	14,400	13,900	14,000	14,600	16,100	16,900	45
17	Central Expressway (westbound)	W/O Shoreline Blvd	12,900	11,800	12,800	12,800	14,200	14,300	45
18	Evelyn Avenue (westbound)	E/O Ferry Morse Way	6,700	6,900	6,900	7,600	6,900	7,700	35

19	Evelyn Avenue (westbound)	Between Ferry Morse Way and SR-85 Ramps	8,100	7,800	8,200	8,500	8,400	8,600	35
20	Evelyn Avenue (westbound)	Between SR-85 Ramps and Calderon Ave	6,900	6,500	6,900	7,200	7,000	7,300	35
21	Evelyn Avenue (westbound)	Between Calderon Ave and Bush St	5,700	5,300	5,800	6,100	5,900	6,100	35
22	Evelyn Avenue (westbound)	Between Bush St and View St	2,100	1,700	1,900	2,100	2,500	2,500	30
23	Evelyn Avenue (westbound)	Between View St and Hope St	2,100	1,600	1,700	2,000	2,200	2,300	30
24	Evelyn Avenue (westbound)	Between Hope St and Castro St	2,000	1,500	1,500	1,900	1,500	1,900	30
25	Evelyn Avenue (westbound)	Between Castro St and Bryant St	1,900	1,800	1,900	2,000	2,000	2,100	25
26	Evelyn Avenue (westbound)	Between Bryant St and Franklin St	700	1,700	700	1,800	800	1,900	25
27	Evelyn Avenue (westbound)	W/O Franklin St	300	1,700	300	1,800	300	1,900	25
28	Villa Street (westbound)	E/O Bush St	800	500	800	600	800	600	25
29	Villa Street (westbound)	Between Bush St and View St	3,600	3,600	4,000	3,700	4,000	3,800	25
30	Villa Street (westbound)	Between View St and Hope St	2,900	3,100	3,400	3,200	3,500	3,200	25
31	Villa Street (westbound)	Between Hope St and Castro St	2,800	3,000	3,400	3,200	3,500	3,300	25
32	Villa Street (westbound)	Between Castro St and Bryant St	2,500	3,400	3,600	3,500	3,700	3,600	25
33	Villa Street (westbound)	Between Bryant St and Franklin St	2,100	2,800	3,100	2,800	3,100	2,900	25
34	Villa Street (westbound)	Between Franklin St and Shoreline Blvd	2,300	2,900	3,300	3,000	3,300	3,100	25
35	Villa Street (westbound)	W/O Shoreline Blvd	3,200	3,900	3,600	4,000	3,900	4,300	25
36	Dana Street (westbound)	E/O Ferry Morse Way	2,600	2,600	2,700	2,700	2,700	2,700	25
37	Dana Street (westbound)	Between Ferry Morse Way and Calderon Ave	3,800	4,500	4,200	4,800	4,200	4,900	25
38	Dana Street (westbound)	Between Calderon Ave and Bush St	1,500	1,900	1,700	2,100	1,700	2,200	25
39	Dana Street (westbound)	Between Bush St and Castro St	1,200	1,400	1,300	1,500	1,300	1,500	25
40	Dana Street (westbound)	Between Castro St and Shoreline Blvd	1,100	1,100	1,300	1,100	1,300	1,100	25
41	Dana Street (westbound)	W/O Shoreline Blvd	100	100	200	200	200	200	25
42	California Street (westbound)	E/O Castro St	1,500	1,500	1,500	1,500	1,500	1,500	25
43	California Street (westbound)	Between Castro St and Bryant St	2,100	2,100	2,500	2,200	2,500	2,200	25
44	California Street (westbound)	Between Bryant St and Franklin St	2,500	2,500	2,800	2,600	2,900	2,600	25
45	California Street (westbound)	Between Franklin St and Shoreline Blvd	2,600	2,600	3,100	2,800	3,100	2,800	25
46	California Street (westbound)	W/O Shoreline Blvd	3,700	3,900	4,200	4,200	4,300	4,300	25

## **Operational Noise Modeling Results**



Ldn Noise - Multi-Roadway Analysis

dB Ldn	Segment	Bounds	Existing	Existing plus Project	Near Term	Near Term + Project	Cumulative	Cumulative + Project	Posted Speed (mph)
1	Shoreline Boulevard	N/O Wright Ave	69	69	68	69	69	69	35
2	Shoreline Boulevard	between Wright Ave and Villa St	69	45	45	69	45	45	35
2a	Shoreline Boulevard	between Wright Ave and Evelyn Ave	45	69	45	70	45	70	35
2b	Shoreline Boulevard	Between Evelyn Ave and Villa St	45	69	45	69	45	69	35
3	Shoreline Boulevard	between Villa St and Dana St	68	68	68	68	68	68	35
4	Shoreline Boulevard	between Dana St and California St	67	68	68	68	68	68	35
5	Shoreline Boulevard	S/O California St	67	67	67	67	67	67	35
6	Moffett Boulevard	N/O Jackson St	64	62	62	62	62	62	35
7	Moffett Boulevard	Between Central Expwy and Jackson St	64	62	65	63	65	63	35
8	Castro Street	Between Central Expwy and Evelyn Ave (north leg)	60	43	60	43	60	43	25
9	Castro Street	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	60	57	59	57	59	57	25
10	Castro Street	Between Evelyn Ave (south leg) and Villa St	59	54	59	54	59	54	25
11	Castro Street	between Villa St and Dana St	57	56	58	56	58	56	25
12	Castro Street	between Dana St and California St	57	56	58	57	58	57	25
13	Castro Street	S/O California St	57	57	58	58	58	58	25
14	Central Expressway	E/O Easy St	71	71	71	71	72	72	45
15	Central Expressway	Between Easy St and Moffett Blvc	70	70	71	71	71	71	45
16	Central Expressway	Between Moffett Blvd and Shoreline Blvd	71	71	71	71	72	72	45
17	Central Expressway	W/O Shoreline Blvd	71	71	71	71	71	71	45
18	Evelyn Avenue	E/O Ferry Morse Way	68	68	68	68	68	68	35
19	Evelyn Avenue	Between Ferry Morse Way and SR-85 Ramps	68	67	68	68	68	68	35
20	Evelyn Avenue	Between SR-85 Ramps and Calderon Ave	67	67	68	68	68	68	35
21	Evelyn Avenue	Between Calderon Ave and Bush St	67	66	67	67	67	67	35
22	Evelyn Avenue	Between Bush St and View St	64	64	64	64	64	64	30
23	Evelyn Avenue	Between View St and Hope St	63	63	64	64	64	64	30
24	Evelyn Avenue	Between Hope St and Castro St	63	63	63	64	63	64	30
25	Evelyn Avenue	Between Castro St and Bryant St	65	65	65	65	65	65	25
26	Evelyn Avenue	Between Bryant St and Franklin St	65	65	65	65	65	66	25
27	Evelyn Avenue	W/O Franklin St	64	65	65	65	65	66	25
28	Villa Street	E/O Bush St	55	54	55	54	55	54	25
29	Villa Street	Between Bush St and View St	59	59	60	59	60	59	25
30	Villa Street	Between View St and Hope St	59	58	59	58	59	58	25
31	Villa Street	Between Hope St and Castro St	59	58	60	59	60	59	25
32	Villa Street	Between Castro St and Bryant St	58	59	59	59	59	59	25
33	Villa Street	Between Bryant St and Franklin St	58	58	58	59	58	59	25
34	Villa Street	Between Franklin St and Shoreline Blvd	58	59	59	59	59	59	25
35	Villa Street	W/O Shoreline Blvd	60	60	60	60	60	60	25
36	Dana Street	E/O Ferry Morse Way	60	61	60	61	61	61	25
37	Dana Street	Between Ferry Morse Way and Calderon Ave	60	60	60	60	60	60	25
38	Dana Street	Between Calderon Ave and Bush St	57	57	57	57	57	57	25
39	Dana Street	Between Bush St and Castro St	56	56	56	57	56	57	25
40	Dana Street	Between Castro St and Shoreline Blvd	55	55	56	55	56	55	25
41	Dana Street	W/O Shoreline Blvd	48	48	49	49	49	49	25
42	California Street	E/O Castro St	57	57	57	57	57	57	25
43	California Street	Between Castro St and Bryant St	58	58	58	58	59	59	25
44	California Street	Between Bryant St and Franklin St	59	59	59	59	59	59	25
45	California Street	Between Franklin St and Shoreline Blvd	59	60	60	60	60	60	25
46	California Street	W/O Shoreline Blvd	60	60	61	61	61	61	25

Change in Noise - Multi-Roadway Analysis					
dB			Existing plus Project: Existing	Near Term + Project: Near Term	Cumulative + Project: Cumulative
Ldn					
1	Shoreline Boulevard	N/O Wright Ave	0.7	0.8	0.8
2	Shoreline Boulevard	between Wright Ave and Villa St	0.8	0.7	0.6
2a	Shoreline Boulevard	between Wright Ave and Evelyn Ave			
2b	Shoreline Boulevard	Between Evelyn Ave and Villa St			
3	Shoreline Boulevard	between Villa St and Dana St	0.2	0.2	0.2
4	Shoreline Boulevard	between Dana St and California St	0.1	0.2	0.2
5	Shoreline Boulevard	S/O California St	0.1	0.1	0.1
6	Moffett Boulevard	N/O Jackson St	(2.5)	(2.4)	(2.4)
7	Moffett Boulevard	Between Central Expwy and Jackson St	(2.4)	(2.3)	(2.2)
8	Castro Street	Between Central Expwy and Evelyn Ave (north leg)	(16.9)	(16.5)	(16.7)
9	Castro Street	Between Evelyn Ave (north leg) and Evelyn Ave (south leg)	(2.8)	(2.2)	(2.3)
10	Castro Street	Between Evelyn Ave (south leg) and Villa St	(5.2)	(5.0)	(4.9)
11	Castro Street	between Villa St and Dana St	(1.1)	(1.4)	(1.3)
12	Castro Street	between Dana St and California St	(1.5)	(1.1)	(1.1)
13	Castro Street	S/O California St	(0.4)	(0.3)	(0.3)
14	Central Expressway	E/O Easy St	(0.1)	(0.1)	(0.1)
15	Central Expressway	Between Easy St and Moffett Blvd	(0.2)	(0.2)	(0.2)
16	Central Expressway	Between Moffett Blvd and Shoreline Blvd	(0.3)	(0.2)	(0.1)
17	Central Expressway	W/O Shoreline Blvd	(0.2)	-	0.0
18	Evelyn Avenue	E/O Ferry Morse Way	(0.1)	(0.0)	0.0
19	Evelyn Avenue	Between Ferry Morse Way and SR-85 Ramps	(0.1)	(0.0)	(0.0)
20	Evelyn Avenue	Between SR-85 Ramps and Calderon Ave	(0.2)	(0.0)	(0.0)
21	Evelyn Avenue	Between Calderon Ave and Bush St	(0.2)	(0.0)	(0.0)
22	Evelyn Avenue	Between Bush St and View St	(0.0)	0.1	0.1
23	Evelyn Avenue	Between View St and Hope St	0.1	0.3	0.2
24	Evelyn Avenue	Between Hope St and Castro St	0.1	0.5	0.4
25	Evelyn Avenue	Between Castro St and Bryant St	(0.1)	0.1	0.1
26	Evelyn Avenue	Between Bryant St and Franklin St	0.3	0.5	0.4
27	Evelyn Avenue	W/O Franklin St	0.4	0.6	0.5
28	Villa Street	E/O Bush St	(0.9)	(0.7)	(0.5)
29	Villa Street	Between Bush St and View St	(0.6)	(0.7)	(0.7)
30	Villa Street	Between View St and Hope St	(0.8)	(1.1)	(1.1)
31	Villa Street	Between Hope St and Castro St	(0.9)	(1.1)	(1.2)
32	Villa Street	Between Castro St and Bryant St	0.7	-	-
33	Villa Street	Between Bryant St and Franklin St	0.9	0.1	0.1
34	Villa Street	Between Franklin St and Shoreline Blvd	0.7	-	0.1
35	Villa Street	W/O Shoreline Blvd	0.4	0.3	0.3
36	Dana Street	E/O Ferry Morse Way	0.2	0.2	0.2
37	Dana Street	Between Ferry Morse Way and Calderon Ave	0.4	0.3	0.4
38	Dana Street	Between Calderon Ave and Bush St	0.6	0.5	0.6
39	Dana Street	Between Bush St and Castro St	0.5	0.5	0.5
40	Dana Street	Between Castro St and Shoreline Blvd	(0.3)	(0.5)	(0.5)
41	Dana Street	W/O Shoreline Blvd	-	-	-
42	California Street	E/O Castro St	-	-	-
43	California Street	Between Castro St and Bryant St	0.1	(0.1)	-
44	California Street	Between Bryant St and Franklin St	0.1	-	(0.1)
45	California Street	Between Franklin St and Shoreline Blvd	0.1	-	(0.1)
46	California Street	W/O Shoreline Blvd	0.1	-	-

\*These segments were not modeled in isolation, because of the presence of Central Expressway. Central Expressway contributes to the ambient noise environment at these segments, so noise levels from the expressway have been summed with the noise level from these segments

Max Increase	0.9	0.8	0.8
Number of Segments with Decreases	22.0	20.0	20.0
Number of Segments with Increases	21.0	17.0	20.0
Number of Segments with No Change	2.0	8.0	5.0
Number above single family dba Ldn	44	42	44
Number above multi-family dba Ldn	4	6	4