4.10 NOISE

This chapter begins with a discussion of the fundamentals of sound and an examination of federal, State, and local noise guidelines, policies, and standards. The remainder of the chapter provides an evaluation of the potential noise-related, environmental consequences of future development that could occur by adopting and implementing the proposed Specific Plan Update, and approval and development of the proposed Transit-Oriented Developments (TOD) #1 and #2 (together referred to as the "proposed Project").

Temporary (construction) and permanent (traffic) noise impacts resulting from development under the proposed Project are addressed below in Section 4.10.3, Impact Discussion, of this chapter. Additionally, noise/land use compatibility for the proposed land uses are evaluated on relation to the ambient noise environment which includes operation of Bay Area Rapid Transit (BART) and Caltrain, as well as aircraft operations at the San Francisco International Airport (SFO). The supporting analyses consider noise levels at existing receptor locations, evaluate potential noise impacts associated with proposed Project, and provide mitigation where necessary to reduce noise impacts at noise-sensitive locations. Noise calculations on which this analysis is based are included in Appendix F, Noise Data, of this Draft EIR.

4.10.1 ENVIRONMENTAL SETTING

4.10.1.1 OVERVIEW OF NOISE FUNDAMENTALS

Noise Descriptors

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. The following are brief definitions of terminology used in this section:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Intrusive.** Noise which intrudes over and above the existing ambient noise at a given location. Relative intrusiveness depends on amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.
- **Decibel (dB).** A unit-less measure of sound on a logarithmic scale.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- **Ambient Noise Level.** The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
- **Equivalent Continuous Noise Level (L_{eq}).** The mean of the noise level (or energy) averaged over the measurement period.
- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e. near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
- **Community Noise Equivalent Level (CNEL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the sound levels occurring during the period from 10:00 p.m. to 7:00 a.m. Note that for general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB. As a matter of practice then, L_{dn} and CNEL values are considered to be equivalent/interchangeable and are treated as such in this assessment.

Characteristics of Sounds

When an object vibrates, it radiates part of its energy as acoustical pressure in the form of a sound wave. Sound can be described in terms of amplitude (loudness), frequency (pitch), and duration (time). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate the human, frequency-dependent response, the A-weighted filter system is used to adjust measured sound levels. The normal range of human hearing extends from approximately 0 dBA (threshold of detection) to 140 dBA (threshold of pain).

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale to better account for the large variations in pressure amplitude (the above range of human hearing, 0 to 140 dBA, represents a ratio in pressures of one hundred trillion to one). All noise levels in this study are relative to the industry-standard pressure reference value of 20 micropascals.[1]

Since most people do not routinely work with decibels or A-weighted sound levels, it is often difficult to appreciate what a given sound pressure level (SPL) number means. Table 4.10-1 shows typical noise level values from commonly experienced noise sources.

[1] A pascal is the SI unit of pressure. One pascal is equivalent to one newton (SI unit of force, equivalent to 1 kilogram x meters per second square) per square meter. One micropascal is equal to 0.000001pascals, so 20 micropascals are equal to 0.000020 pascals.

TABLE 4.10-1 TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at 3 feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Notes: mph = miles per hour
Source: Bies, David A. and Colin H. Hansen. 2009. Engineering Noise Control: Theory and Practice. 4th ed. New York: Spon Press.

Because of the physical characteristics of noise transmission and perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 4.10-2 presents the subjective effect of changes in sound pressure levels.

TABLE 4.10-2 CHANGE IN APPARENT LOUDNESS

± 3 dBA	Threshold of human perceptibility
± 5 dBA	Clearly noticeable change in noise level
± 10 dBA	Half or twice as loud
± 20 dBA	Much quieter or louder

Source: Bies, David A. and Colin H. Hansen. 2009. Engineering Noise Control: Theory and Practice. 4th ed. New York: Spon Press.

Sound is generated from a source; the decibel level decreases exponentially as the distance from that source increases. This phenomenon is known as spreading loss or distance attenuation. When sound is measured for distinct time intervals, the statistical distribution of the overall sound level during that period can be obtained. For example, L_{50} is the noise level that is exceeded 50 percent of the time. Similarly, the L_{02}, L_{08}, and L_{25} values are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the sum of all the time-varying events. Energy-equivalent sound level (L_{eq}) is the most common parameter associated with community noise measurements. The L_{eq} metric is a single-number noise descriptor of the energy-average sound level over a given period of time. An hour is the most common period of time over which average sound is measured, but it can be measured over any duration. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values are the minimum and maximum root-mean-square (RMS) noise levels obtained over the measurement period.

Since sensitivity to noise increases during the evening and at night, when excessive noise can interfere with relaxation and/or the ability to sleep, 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. Because of this increased sensitivity to unwanted noise intrusion during the evening and nighttime hours, State law requires, for planning purposes, that this increased noise sensitivity be accounted for. The Day/Night Average Sound Level, L_{dn}, is a measure of the cumulative noise exposure in a community, with a 10 dBA addition to nocturnal (10:00 p.m. to 7:00 a.m.) noise levels. The Community Noise Equivalent Level (CNEL) is a similar 24-hour cumulative measure of noise; however it differs slightly from L_{dn} in that 5 dBA is added to the levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dBA added to the sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system; prolonged noise exposure in excess of 75 dBA increases body tensions, thereby affecting blood pressure and functions of the heart and nervous system. Extended periods of noise exposure above 90 dBA would result in permanent cell damage, which is the main driver for employee hearing protection regulations in the workplace. Causes for annoyance include interference with speech, radio, television, and sleep and rest, as well as induced structural vibrations. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. The threshold for annoyance

from vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 8 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the highly-annoyed proportion of the population increases to about 20 to 25 percent. There is, therefore, an increase of about 2 percent per decibel of increased noise between an L_{dn} of 60 to 70 dBA.

The thresholds for speech interference indoors are approximately 45 dBA for continuous noise and approximately 55 dBA for fluctuating noise. Outdoors, the thresholds are roughly 15 dBA higher. Steady noise above 35 dBA and fluctuating noise levels above roughly 45 dBA have been shown to affect sleep. For community environments, the ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

Vibration Fundamentals

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities stemming from operations of railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is the velocity, and the rate of change of the speed is the acceleration. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure. These types of vibration are best measured and described in terms of velocity and acceleration.

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the RMS velocity. PPV is the maximum instantaneous peak of the vibration signal and RMS is the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response.

The units for PPV and RMS velocity are normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order to compress the range of numbers required to describe the vibration. In this study, all PPV and RMS velocity levels are in in/sec and all vibration levels are in dB relative to one micro-inch per second (abbreviated as VdB). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Man-made vibration problems are, therefore, usually confined to relatively short distances (500 to 600 feet or less) from the source.[2]

[2] Federal Transit Administration (FTA), 2006, Transit Noise and Vibration Impact Assessment. United States Department of Transportation (US DOT), FTA-VA-90-1003-06.

Vibration Impacts

As discussed previously, annoyance is a subjective measure and vibrations may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Persons exposed to elevated ambient vibration levels such as people in an urban environment may tolerate a higher vibration level. Table 4.10-3 displays human annoyance and the effects on buildings resulting from continuous vibration.

TABLE 4.10-3 REACTION OF PEOPLE AND DAMAGE TO BUILDINGS FOR CONTINUOUS/FREQUENT INTERMITTENT VIBRATION LEVELS

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.02	Barely perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: California Department of Transportation (Caltrans). 2004, *Transportation- and Construction-Induced Vibration Guidance Manual*. Prepared by ICF International.

Human response to ground vibration has been correlated best with the velocity of the ground. The velocity of the ground is expressed on the decibel scale. The reference velocity is 1 x 10^{-6} inch/second RMS, which equals 0 VdB, and 1 inch/second equals 120 VdB. The abbreviation "VdB" is used in this document for vibration decibels to reduce the potential for confusion with sound decibels. The US DOT, Federal Transit Administration (FTA) has developed rational vibration limits that can be used to evaluate human annoyance to groundborne vibration. These criteria are primarily based on experience with rapid transit and commuter rail systems, and are discussed in greater detail in Section 4.10.1.2, Regulatory Framework, of this chapter.[3]

Railroad and transit operations are potential sources of substantial ground vibration depending on distance, the type and the speed of trains, and the type of track. Trains generate substantial vibration due to their engines, steel wheels, heavy loads, and wheel-rail interactions.

Construction operations generally include a wide range of activities that can generate groundborne vibration, which varies in intensity. In general, blasting and demolition of structures, as well as pile driving and vibratory compaction equipment generate the highest vibrations. Because of the impulsive nature of such activities, the use of the peak particle velocity descriptor (PPV) is used to measure and assess groundborne vibration and assess the potential of vibration to induce structural damage and the degree of annoyance for humans. Vibratory compactors

[3] Federal Transit Administration (FTA), 2006, Transit Noise and Vibration Impact Assessment. United States Department of Transportation, FTA-VA-90-1003-06.

or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at up to 200 feet. Heavy trucks can also generate groundborne vibrations, which can vary, depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration from normal traffic flows on streets and freeways with smooth pavement conditions.[4]

"Architectural" damage can be classified as cosmetic (e.g. minor cracking of building elements), while "structural" damage may threaten the integrity of a building. Construction-induced vibration that can be detrimental to the building is rare and has only been observed where the structure is in a high state of disrepair and the construction activity occurs adjacent to the structure. Table 4.10-4 shows the criteria established by the FTA for the likelihood of structural damage due to vibration.

TABLE 4.10-4 GROUNDBORNE VIBRATION CRITERIA: ARCHITECTURAL DAMAGE

Building Category		PPV (in/sec)	Lv (VdB)a
I.	Reinforced concrete, steel, or timber (no plaster)	0.5	102
II.	Engineered concrete and masonry (no plaster)	0.3	98
III.	Non-engineered timber and masonry buildings	0.2	94
IV.	Buildings extremely susceptible to vibration damage	0.12	90

a. RMS velocity calculated from vibration level (VdB) using the reference of one micro-inch/second.
Source: Federal Transit Administration (FTA). 2006, Transit Noise and Vibration Impact Assessment. United States Department of Transportation. FTA-VA-90-1003-06.

Noise- and Vibration-Sensitive Receptors

Certain land uses are particularly sensitive to noise and vibration, including residential, school, and open space/recreation areas where quiet environments are necessary for enjoyment, public health, and safety. Sensitive receptors within the city include residences, senior housing, schools, places of worship, and recreational areas. These uses are regarded as sensitive because they are where citizens most frequently engage in activities which are likely to be disturbed by noise, such as reading, studying, sleeping, resting, or otherwise engaging in quiet or passive recreation. Commercial and industrial uses are not considered noise- and vibration-sensitive receptors for the purposes of this analysis, since noise- and vibration-sensitive activities are less likely to be undertaken in these areas, and because these uses often themselves generate noise in excess of what they receive from other uses.

4.10.1.2 REGULATORY FRAMEWORK

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have

[4] California Department of Transportation, 2004, *Transportation- and Construction-Induced Vibration Guidance Manual*. Prepared by ICF International.

established standards and ordinances to control noise. This section describes the regulatory framework related to noise and vibration in the vicinity of the Specific Plan Area.

State Regulations

California Code of Regulations

Title 21, Subchapter 6 (Airport Noise Standards)

California Code of Regulations (CCR), Title 21, Subchapter 6 (Airport Noise Standards) establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. Title 21 applies to airports that have been designated "noise problem airports," which includes SFO. Noise-sensitive land uses in locations where the aircraft exterior noise level exceeds 65 dBA CNEL are generally incompatible, unless (1) an avigation easement for aircraft noise has been acquired by the airport proprietor, or (2) the residence is a high-rise apartment or condominium that has an interior CNEL of 45 dBA or less in all habitable rooms despite aircraft noise and an air circulation or air conditioning system, as appropriate. Assembly Bill (AB) 2776 requires any person who intends to sell or lease residential properties within an airport influence area to disclose that fact to the person buying the property.

Title 24 Building Standards Administrative Code

The State of California's noise insulation standards are codified in the CCR, Title 24, Building Standards Administrative Code, Part 2, California Building Code. These noise standards are applied to new construction in California for the purpose of ensuring that the level of exterior noise transmitted to and received within the interior living spaces of buildings is compatible with their comfortable use. For new residential dwellings, hotels, motels, dormitories, and school classrooms, the acceptable interior noise limit for new construction is 45 dBA CNEL or L_{dn}. Title 24 requires acoustical studies for development in areas exposed to more than 60 dBA CNEL to demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. Where exterior noise levels are projected to exceed 60 dBA CNEL or L_{dn} at the façade of a building, a report must be submitted with the building plans describing the noise control measures that have been incorporated into the design of the project to meet the 45 dBA noise limit.

Regional Regulations

San Francisco International Airport Land Use Compatibility Plan

The *Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport,* adopted in 2012, is the Airport Land Use Compatibility Plan (ALUCP) for SFO. The SFO ALUCP establishes planning boundaries around SFO that define noise for policy implementation, and areas within which notification of SFO proximity is required as part of real estate transactions.[5] Noise associated with airport and aircraft operations is

[5] City/County Association of Governments of San Mateo County, 2012. Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport, page 12.

considered one of the main areas of important concern for airport land use commissions, especially in highly-urbanized areas like the Bay Area. The SFO ALUCP aircraft noise contours are shown on Figure 4.10-1. The SFO ALUCP has been prepared to be consistent with the guidance provided by the Department of Transportation, Division of Aeronautics, and the Federal Aviation Administration (FAA).

As discussed in Chapter 3, Project Description, of this Draft EIR, the Specific Plan Area is within Airport Influence Area (AIA) A and B. Generally, Area A contains areas over-flown by aircraft flying to and from SFO at least once per week at altitudes of 10,000 feet or less above mean sea level (MSL). Area B lies within Area A and contains areas exposed to aircraft noise above community noise equivalent level (CNEL) 65 decibel (dB) contour or lying below critical airspace.[6]

The SFO ALUCP focuses on the following two major concerns that are relevant to noise:

1. Aircraft Noise Impact Reduction: To reduce the potential number of future airport area residents who could be exposed to noise impacts from airport and aircraft operations.
2. Over-flight Notification: To establish an area within which aircraft flights to and from the airport occur frequently enough and at a low enough altitude to be noticeable by sensitive residents. Within this area, real estate disclosure notices shall be required, pursuant to State law.

SFO ALUCP Noise Compatibility Policies[7]

The SFO ALUCP includes policies and standards to protect people living in the vicinity of SFO from noise impacts, as outlined in the following sections.

Noise/Land Use Compatibility Zones

The SFO ALUCP designates noise impact areas, Airport Noise Compatibility Zones, based on the patterns of runway use, air traffic, and other information, although noise contours are subject to change due to changes in the numbers of operations (arrivals and departures) and the mix of aircrafts. Policy NP-2 Airport/Land Use Compatibility Criteria establishes criteria to determine the compatibility of proposed land uses located in the Airport Noise Compatibility Zones (reproduced herein as Table 4.10-5). As shown in Table 4.10-5, the following noise-sensitive land uses are considered incompatible when these uses are exposed to aircraft noise above CNEL 65 dBA:

- Residences
- Public and private schools
- Hospitals and convalescent homes
- Places of worship

[6] City/County Association of Governments of San Mateo County, 2012. Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport, page IV-2.

[7] City/County Association of Governments of San Mateo County, 2012. Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport, pp. IV-17 to IV-20.

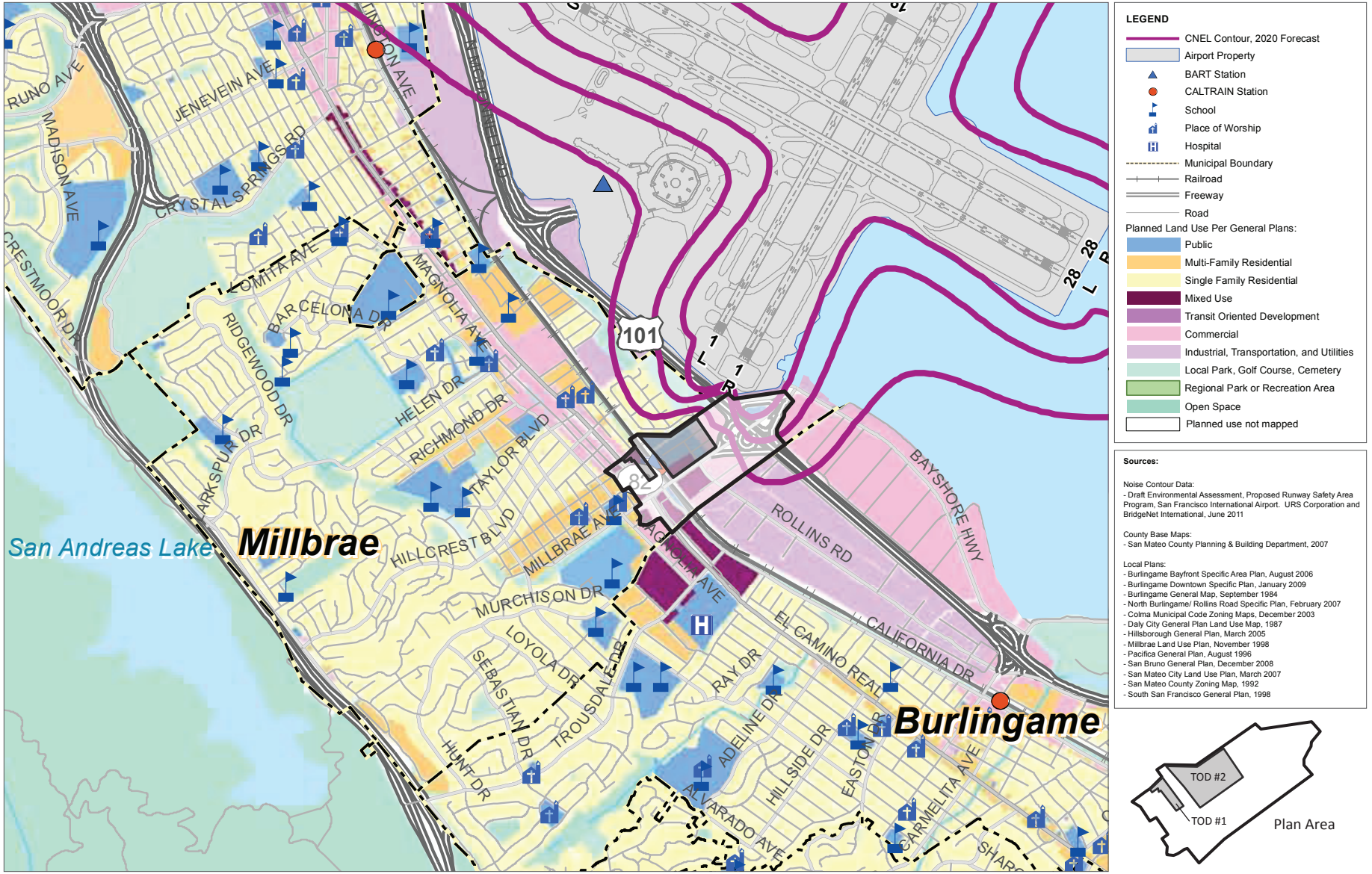


Figure 4.10-1
SFO ALUCP 2014 Aircraft Noise Compatibility

TABLE 4.10-5 NOISE/LAND USE COMPATIBILITY CRITERIA

	Community Noise Equivalent Level (CNEL)			
Land Use	Below 65 dB	65–70 dB	70–75 dB	Over 75 dB
Residential				
Residential, single-family detached	Y	C	N[a]	N
Residential, multi-family and single-family attached	Y	C	N[a]	N
Transient lodgings	Y	C	C	N
Public/Institutional				
Public and private schools	Y	C	N	N
Hospitals and nursing homes	Y	C	N	N
Places of public assembly, including places of worship	Y	C	N	N
Auditoriums, and concert halls	Y	C	C	N
Libraries	Y	C	C	N
Outdoor music shells, amphitheaters	Y	N	N	N
Recreational				
Outdoor sports arenas and spectator sports	Y	Y	Y	N
Nature exhibits and zoos	Y	Y	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N
Golf courses, riding stables, and water recreation	Y	Y	Y	Y
Commercial				
Offices, business and professional, general retail	Y	Y	Y	Y
Wholesale; retail building materials, hardware, farm equipment	Y	Y	Y	Y
Industrial and Production				
Manufacturing	Y	Y	Y	Y
Utilities	Y	Y	Y	Y

TABLE 4.10-5 NOISE/LAND USE COMPATIBILITY CRITERIA

	Community Noise Equivalent Level (CNEL)			
Land Use	Below 65 dB	65–70 dB	70–75 dB	Over 75 dB
Agriculture and forestry	Y	Y[b]	Y[c]	Y[c]
Mining and fishing, resource production and extraction	Y	Y	Y	Y

Notes:
Y = Yes; land use and related structures compatible without restrictions.
C = Conditionally Compatible – Land use and related structures are permitted, provided that sound insulation is provided to reduce interior noise levels from exterior sources to CNEL 45 dB or lower and that an avigation easement is granted to the City and County of San Francisco as operator of SFO.
N = No – Land use and related structures are not compatible.
a. Use is conditionally compatible only on an existing lot of record zoned only for residential use as of the effective date of the ALUCP. Use must be sound-insulated to achieve an indoor noise level of CNEL 45 dB or less from exterior sources. The property owners shall grant an avigation easement to the City and notice by the local permitting authority, SFO shall record a notice of termination of the avigation easement.
b. Residential buildings must be sound-insulated to achieve an indoor noise level of CNEL 45 dB or less from exterior sources.
c. Accessory dwelling units are not compatible.
Source: City/County Association of Governments of San Mateo County, 2012. Comprehensive Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport, page IV-18.

Mitigation Programs and Local Policies

C/CAG has developed a range of noise abatement and mitigation programs to reduce noise impacts to noise-sensitive uses in the vicinity of SFO. In particular, State housing law requires sound insulation to be installed to reduce the interior CNEL to 45 dBA or less for existing noise-sensitive uses in areas where noise exposure is greater than CNEL 65 dBA. Homes, schools, and places of worship within the SFO's CNEL 65 dBA contour have been sound-insulated through C/CAG's sound insulation program.

As part of the mitigation program agreement, the members of C/CAG, including Millbrae, also agreed to promote real estate disclosure for all residential properties within the airport's CNEL 65 dBA noise contour, and to prohibit construction of new housing in the SFO's CNEL 70 dBA aircraft noise contour.

In addition to the SFO ALUCP policies, many local jurisdictions have adopted standards to manage noise/land use compatibility. While the majority of Millbrae is outside the SFO's CNEL 65 dBA contour, some portions experience higher noise levels when runway use patterns change due to wind conditions.

Low Frequency Noise

It is important to note that while the SFO ALUCP and California Building Code (CBC) standards deal with the CNEL noise metric (A-weighed decibels), low-frequency noise (LFN) from aircraft operations – particularly from start-of-take-off-roll, acceleration, and thrust-reversal operations – can generate substantial low-frequency sound levels that would not be indicated in the community noise CNEL metric. This LFN energy[8] would propagate farther from the airport environs (than would higher-frequency energy), due to the longer wavelengths and reduced atmospheric absorption of LFN energy. Thus, LFN can annoy people far from the runway; primarily in

[8] LFN is typically taken to be sound energy below 200 Hz.

the form of 'felt' sound energy, a sense of uncomfortableness, and perceptible window/wall vibrations. These LFN annoyances could occur at full-power initial take-off roll and during pull-out (to as much as 7,000 to 8,000 feet in altitude); but, in all cases, these effects would be well outside the 65 CNEL contour line.[9] Further, standard sound insulation construction techniques and materials are not as effective in reducing LFN as they are in controlling aircraft noise energy at mid-band and upper-band frequencies. Therefore, it is recommended that an acoustical analysis for new residential projects (to show compliance with Title 24, Part 2, Section 1207.11, interior environment requirements) include at least discussions on potential LFN effects, including the use of maximum, C-weighted noise level evaluations, estimation of LFN propagation distances, and attention to low-frequency sound insulation upgrades (as appropriate).[10]

San Mateo County Comprehensive Airport Land Use Plan

The City has also adopted the 1996 *San Mateo County Comprehensive Airport Land Use Plan* (CLUP) noise and land use compatibility guidelines. These guidelines set forth aircraft noise and land use compatibility standards for SFO. The purpose of the CLUP is to provide for the orderly growth of SFO in the area surrounding the airport within the jurisdiction of the commission, and to safeguard the general welfare of the inhabitants within the vicinity of the airport and the public in general. The guidelines are provided below in Table 4.10-6.

TABLE 4.10-6 AIRCRAFT NOISE/LAND USE COMPATIBILITY FOR SAN FRANCISCO INTERNATIONAL AIRPORT

Land Use	CNEL Range (dBA)	General Land Use Criteria
Residential, etc. Single-Family Multi-Family Mobile Homes Schools	Less than 65	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	65 to 70	New construction or development should be undertaken only after an analysis of noise reduction requirements is made and needed noise insulation features included in the design.
Libraries Churches Hospitals Nursing Homes Auditoriums	Greater than 70	New construction or development should not be undertaken.
Commercial Retail Restaurants Office Buildings	Less than 70	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	70 to 80	New construction or development should be undertaken only after an analysis of noise reduction requirements is made and needed noise insulation features included in the design.

[9] Reindell, Gene. Presentation on *Low-Frequency Aircraft Noise*. LAX Community Noise Roundtable, September 20, 2010.

[10] For further information, please see: Miller, N., Reindel, G., Senzig, D., and Horonjeff, R., 1998. *Study of Low-Frequency Takeoff Noise at Baltimore-Washington International Airport*. Harris Miller & Hanson, Inc. (HMMH) Report 294730.03/293100.09; Sharp, B., Gurovich, Y., Albee, W., 2001. *Status of Low-Frequency Aircraft Noise Research and Mitigation*. Wyle Acoustics Group for Noise Abatement Office of San Francisco International Airport; and Hodgdon, K., Atchley, A., Bernhard, R., 2007. *Low Frequency Noise Study*. Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) Report PARTNER-COE-2007-001.

TABLE 4.10-6 AIRCRAFT NOISE/LAND USE COMPATIBILITY FOR SAN FRANCISCO INTERNATIONAL AIRPORT

Land Use	CNEL Range (dBA)	General Land Use Criteria
Hotels-Motels Movie Theaters Sports Arenas Playgrounds Cemeteries Golf Courses	Greater than 80	New construction or development should not be undertaken. Conventional construction will generally be inadequate and special noise insulation features should be included in construction.
Industrial Manufacturing Transportation Communications Utilities	Less than 75	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	75 to 85	New construction or development should be undertaken only after an analysis of noise reduction requirements is made and needed noise insulation features included in the design.
	Greater than 85	New construction or development should not be undertaken unless related to airport activities or services. Conventional construction will generally be inadequate and special noise insulation features should be included in construction.
Open Agriculture Mining Fishing	Less than 75	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	Greater than 75	Land use involving concentrations of people (spectator sports and some recreational facilities) or of animals (livestock farming and animal breeding) should generally be avoided.

Source: City of Millbrae General Plan, 1998; Airport Land Use Plan, adopted March 26, 1981 by Airport Land Use Commission/Regional Planning Committee of San Mateo County.

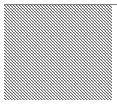
Local Regulations

Millbrae 1998-2015 General Plan

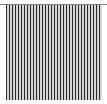
The Noise Element, adopted in 1998, is designed to appraise existing noise problems in the community and to provide guidance to planners and developers for avoiding problems in the future. It also can provide the basis for code enforcement and other regulations, and adoption of a noise ordinance to control nuisances such as off-hour truck unloading, trash pick-up, barking dogs, loud music, and vehicle noise. The City has adopted its own Land Use Compatibility Guidelines for Community Noise Environments, modeled on the State's suggested levels, as shown in Table 4.10-7. The City's aircraft noise contours are shown on Figure 4.10-2.

TABLE 4.10-7 MILLBRAE LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS

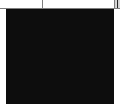
Land Uses	L_{dn} or CNEL (dBA) 55	60	65	70	75	80
Residential, Hotels, and Motels						
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches						
Office Buildings, Businesses, Commercial and Professional Auditoriums, Concert Halls, Amphitheaters, Industrial, Manufacturing, Utilities, and Agriculture						



Normally Acceptable:
Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.



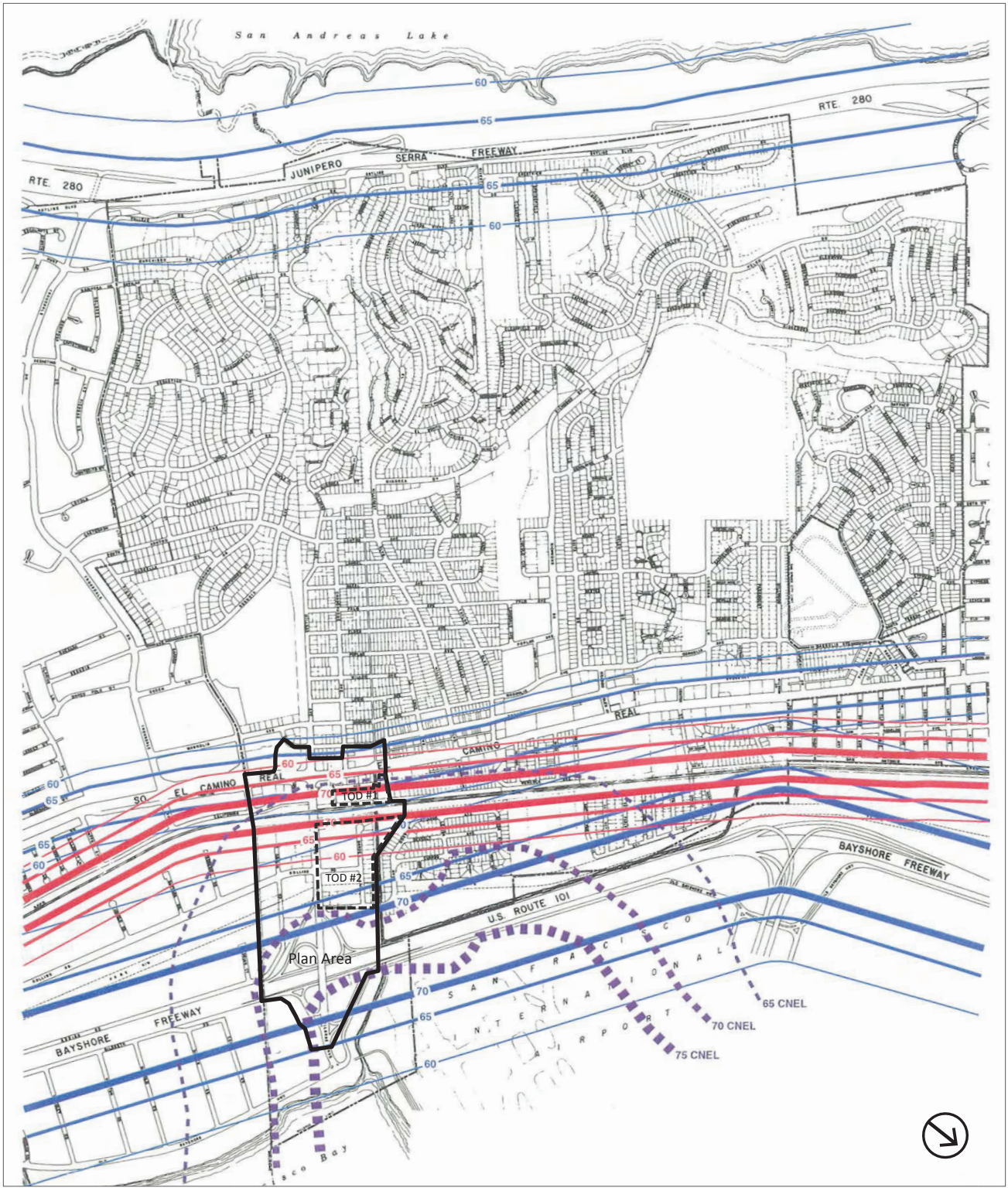
Conditionally Acceptable:
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.



Unacceptable:
New construction or development generally should not be undertaken.

Source: City of Millbrae General Plan 1998-2015 Noise Element; Governor's Office of Planning and Research, General Plan Guidelines 1998, November 2003.

In addition to the above land use compatibility matrix, the Noise Element establishes policies for the evaluation, prevention, attenuation, and mitigation of impacts from noise that are applicable to the proposed Project. These pertinent policies are shown in Table 4.10-8.



Source: City of Millbrae General Plan.

Figure 4.10-2
Millbrae General Plan 1983 Noise Contour Map

TABLE 4.10-8 MILLBRAE GENERAL PLAN POLICIES RELEVANT TO NOISE

Number	Policy
Noise (NS) Element	
NS1.2	Protection of Residential Areas. Protect the noise environment in existing residential areas, requiring the evaluation of mitigation measures for projects under the following circumstances: ▪ The project would cause the L_{dn} to increase 3 dBA or more. ▪ Any increase would result in an L_{dn} greater than 60 dBA. ▪ The L_{dn} already exceeds 60 dBA. ▪ The project has the potential to generate significant adverse community response.
NS1.3	Noise Source Control. Work with property owners to control noise at its source, maintaining existing noise levels and ensuring that noise levels do not exceed acceptable noise standards as established in the Noise and Land Use Compatibility Guidelines.
NS1.4	Construction Noise. Regulate construction activity to reduce noise between 7:00 p.m. and 7:00 a.m.
NS1.5	Vehicle Noise. Strive to reduce traffic noise levels, especially as they impact residential areas, and continue enforcement of vehicle noise standards through noise readings and enforcement actions. In particular, strive to minimize truck traffic in residential areas and ensure enforcement of Vehicle Code provisions which prohibit alteration of vehicular exhaust systems in a way that increases noise emissions.
NS2.1	Land Use Compatibility Standards. New development must meet acceptable exterior noise level standards. The "normally acceptable" noise standards for new land uses are established in the Noise and Land Use Compatibility Guidelines, as modified below: a. The goal for maximum outdoor noise levels in residential areas is an L_{dn} of 60 dB. This level is a requirement to guide the design and location of future development and a goal for the reduction of noise in existing development. However, 60 L_{dn} is a goal which cannot necessarily be reached in all residential areas within the realm of economic or aesthetic feasibility. This goal will be applied where outdoor use is a major consideration (e.g. backyards in single-family housing developments and recreation areas in multi-family housing projects). The outdoor standard will not normally be applied to the small decks associated with apartments and condominiums but these will be evaluated on a case-by-case basis. Where the city determines that providing an L_{dn} of 60 dB or lower outdoors is not feasible, the outdoor goal may be increased to an L_{dn} of 65 dB. If the noise source is a railroad, then the outdoor noise exposure criterion should be 70 L_{dn} for future development, recognizing that train noise is characterized by relatively few loud events. b. The indoor noise level as required by the State of California Noise Insulation Standards must not exceed an L_{dn} of 45 dB in multi-family dwellings. This indoor criterion shall also be the maximum acceptable indoor noise level in new single-family homes. c. Interior noise levels in new single-family and multi-family residential units exposed to an Ldn of 60 dB or greater should be limited to a maximum instantaneous noise level in the bedrooms of 50 dBA. Maximum instantaneous noise levels in other rooms should not exceed 55 dB. d. Appropriate interior noise levels in commercial, industrial, and office buildings are a function of the use of space. For example, the noise level in private offices should generally be quieter than for data processing rooms. Interior noise levels in offices generally should be maintained at 45 Leq (hourly average) or less. e. If an area is below the desired noise standard, an increase in noise up to the maximum should not necessarily be allowed. The impact of a proposed project on an existing land use should be evaluated in terms of the increase in existing noise levels and potential for adverse community impact, regardless of the compatibility guidelines.

TABLE 4.10-8 MILLBRAE GENERAL PLAN POLICIES RELEVANT TO NOISE

Number	Policy
Noise (NS) Element	
NS2.2	Noise Contour Map. The City will review development proposals to assure consistency with noise standards by using the noise contours shown on Map 7-1. (see Figure 4.10-2 of this Draft EIR)
NS2.3	Acoustical Studies. The City will use the noise guidelines and contours to determine if additional noise studies are needed for a proposed new development
NS2.4	Residential and Other Noise Sensitive Uses in Commercial or Industrial Areas. New residential or other noise sensitive development or activities will not be allowed where the noise level due to commercial or industrial noise sources will exceed the noise level standards set forth in the table titled *Land Use Compatibility for Community Noise Environments,* [Table 4.10-6 of this Draft EIR] with the following modifications: a. In the event the measured ambient noise level exceeds the applicable noise level standard in any category expressed in the table, the applicable standard will be adjusted so as to equal the ambient noise level to establish a noise standard capable of being enforced through the City's Noise Ordinance. b. Each of the noise level standards specified in the table above [Table 4.10-7 of this Draft EIR] will be reduced by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises due to the greater annoyance factor associated with these types of noise.
NS2.4.1[a]	Commercial or Industrial Source Noise. Noise created by commercial or industrial sources associated with new projects of developments shall be controlled so as not to exceed the noise level standards set forth in the table below (Maximum Allowable Noise Exposure for Stationary Noise Sources; see Policy NS2.4 in the Millbrae Noise Element), as measured at any affected residential land use.
NS2.5	Noise Sensitive Uses. The City will protect schools, hospitals, libraries, churches, convalescent homes, and other noise sensitive uses from noise levels exceeding those allowed in residential areas. Projects located near noise sensitive uses should be oriented away from noise sources unless mitigation measures are included in development plans and regulation occurs of the activities or uses generating noise that might cause noise disturbances for noise sensitive uses.
NS2.6	Noise Reduction Techniques. As appropriate, based on design, use, site layout and other considerations, require mitigation measures to reduce noise impacts on adjacent properties through the following and other means, as a condition of development approval: a. Screen and control noise sources such as parking, outdoor activities and mechanical equipment. b. Increase setbacks for noise sources from adjacent dwellings. c. Wherever possible do not remove fences, walls or landscaping that serve as noise buffers, although design, safety, and other impacts must be addressed. d. Require soundwalls, earth berms, and/or other landscape features to provide an adequate noise buffer. e. Use soundproofing materials and double glazed windows. f. Control hours of operation, including deliveries and trash pickup to minimize noise impacts.
NS2.7	Compliance with State Noise Insulation Standards. The adopted Noise Element will serve as a guideline for compliance with the State's noise insulation standards. Recognizing the need to provide acceptable habitation environments, State law requires noise insulation of new multi-family dwellings constructed within the 60 dB L_{dn} noise exposure contours. It is a function of the Noise Element to provide noise contour information around all major sources in support of the sound transmission control standards (Chapter 2-35, Part 2, Title 24, California Administrative Code).
NS3.1	BART Extension Noise Impacts. Ensure that BART construction activity and ongoing operations of BART's Millbrae Station and train service do not result in undue noise impacts on adjacent properties and neighborhoods.

TABLE 4.10-8 MILLBRAE GENERAL PLAN POLICIES RELEVANT TO NOISE

Number	Policy
Noise (NS) Element	
NS3.2	Coordination with Other Agencies. Work with the county Airport Land Use Commission (ALUC), State Office of Noise Control (ONC), CalTrans, San Francisco International Airport, Joint Powers Board and other agencies to reduce noise generated from sources outside the City's jurisdiction.
NS3.3	Airport Noise Mitigation. Negotiate with the Airport for implementation of all feasible noise reduction measures and participate in the Airport Community Roundtable to ensure ongoing reduction of Airport Noise.

Notes:
a. The policy number NS2.4 is applied to two polices in the General Plan; therefore, for this EIR the second Policy NS2.4 has been renumbered to NS2.4.1.
Source: City of Millbrae General Plan 1998-2015, adopted 1998.

Millbrae Municipal Code

The City of Millbrae Municipal Code contains all ordinances for the city. The Municipal Code is organized by Title, Chapter, and Section. The current Municipal Code is up to date through Ordinance 747, passed on May 27, 2014. The provisions of Title 9, Building Regulations, and Title 10, Planning and Zoning, of the Municipal Code that are relevant to noise are shown in Table 4.10-9.

TABLE 4.10-9 MILLBRAE MUNICIPAL CODE SECTIONS RELEVANT TO NOISE

Number	Section
Chapter 9.05 Building Code[a]	
9.05.020	Amendment of Section 1.8.4. Section 1.8.4 of the building code is amended by adding the following subsections: Section 1.8.4.5. Hours of Construction. Construction, alteration, or repair work shall occur only during the following hours: Monday through Friday 7:30 a.m. to 7:00 p.m., Saturday 8:00 a.m. to 6:00 p.m., and Sunday and Holidays 9:00 a.m. to 6:00 p.m. Any work outside these hours is prohibited without prior written permission of the Administrative Authority. Section 1.8.4.6. Protection from Airport Noise. Any residential building located within the 65 CNEL level as determined by the 1983 Noise Contour Map which is either newly constructed or renovated at a cost equal to or greater than 25% of the valuation (as assessed by the County Assessor) shall meet noise insulation standards set by the City of Millbrae Noise Insulation Program and the Federal Aviation Administration….
Chapter 10.25, Condominiums	
10.25.120	Findings. Prior to approval of any tentative or subdivision or parcel map for a condominium, condominium conversion, stock cooperative or community apartment project, the planning commission or city council, as the case may be, shall make findings required by Section 66427.1 and, as applicable, Section 66474 of the Government Code of California, or as hereafter amended, and shall find and determine that project as proposed meets each of the following standards:… D. The structure shall conform to all interior and exterior sound transmission standards of the Uniform Building Code,[b] state laws and/or regulations and city ordinances. The interior noise level shall be less than 45 CNEL. Sound control between units and between units and public areas shall provide an airborne sound insulation equal to that required to meet a Sound Transmission Class (STC) of 43 by field testing. Impact Insulation Class

TABLE 4.10-9 MILLBRAE MUNICIPAL CODE SECTIONS RELEVANT TO NOISE

Number	Section
	(IIC) of 43 by field testing is required. Entrance doors and perimeter seals shall meet a rating of not less than 26 STC. To assure compliance with the above, all units must be field tested and certified by an approved testing agency. In such cases where present standards cannot reasonably be met and if an exception is granted, the planning commission or city council, as the case may be, must require the applicant to notify potential buyers of the noise deficiency currently existing within the units. … O. All permanent mechanical equipment such as motors, compressors, pumps and compactors which is determined by the building official of the city to be a source of structural vibration or structure borne noise shall be shock mounted in inertia blocks or bases and/or vibration isolators in a manner approved by the building official. …
Chapter 10.40, Mandatory Real Estate Transfer Disclosure Regarding Airport Noise	
10.40.020	General disclosures. A. For property located in the City of Millbrae, the following information is required to be disclosed in connection with sales of residential dwellings: 1. The City of Millbrae is immediately adjacent to the San Francisco International Airport. 2. The San Francisco International Airport is the fifth largest airport by volume in the United States and the seventh largest by volume in the world. 3. The property is subject to noise from aircraft. (Ord. 667, Section 1; 1976 Code Section 10-8.02).
10.40.030	Special disclosures for property within the 65 CNEL Noise Footprint. A. For property located within the 65 CNEL Aircraft Noise Footprint based upon the Federal Aviation Administration ("FAA") 1983 CNEL Noise Contour Map (see Figure 4.10-2 of this Draft EIR), the following disclosures shall be made in connection with sales of residential dwellings: 1. The property is located within the 65 CNEL Aircraft Noise Footprint of the 1983 FAA CNEL Noise Exposure Map for Millbrae, California. 2. If the property is constructed after January 1, 1983, or is renovated at a cost equal to twenty-five percent or more of the current market value of the home, it must be insulated against aircraft noise to meet FAA noise insulation program standards. (Ord. 667, Section 1; 1976 Code Section 10-8.03).

Note:
a. Per Section 9.05.010 of the City's Municipal Code the City has adopted the 2013 California Building Code including modifications relevant to Millbrae.
b. The Uniform Building Code was replaced in 2000 by the new International Building Code (IBC) published by the International Code Council (ICC). Per Section 9.05.010 the City has adopted the 2013 California Building Code based on the IBC including modifications relevant to Millbrae.
Source: City of Millbrae Municipal Code.

4.10.1.3 EXISTING CONDITIONS

This section describes the existing noise environment for the Specific Plan Area, including notable sources of noise as well as recent noise monitoring data and illustrative maps. Mobile sources of noise, especially airplanes, trains, cars and trucks, are the most common and significant sources of noise in the area. The Specific Plan Area is affected by a multitude of noise sources, many of them directly connected with major regional thoroughfares that divide the city, as well as from BART and Caltrain operations at the Millbrae Station, and aircraft activity at SFO. Additional sources of noise in the Specific Plan Area include commercial and some light industrial activity.

Sensitive Receptors

Noise-sensitive receptors are generally considered to be those people engaged in activities or utilizing land uses that may be subject to the stress of significant interference from noise. Activities usually associated with sensitive receptors include, but are not limited to, talking, reading, and sleeping. Land uses such as residences, hotels, schools, churches, and hospitals are considered noise sensitive. There are two existing mixed-use residential developments in the Specific Plan Area. In addition, there are duplexes and single- and multiple-family residences off-site in the vicinity of the Specific Plan Area. There are also a number of residences and other noise-sensitive receptors along roads that would serve as access routes to the Specific Plan Area, including Millbrae Avenue, Chadbourne Avenue, and Victoria Avenue.

On-Road Vehicles

On-road vehicles, including cars, trucks, and busses, contribute substantially to the noise environment of Millbrae. Noise from motor vehicles is generated by engine vibrations, the interaction between tires and the road, and vehicle exhaust systems. Reducing average vehicle speed reduces the noise exposure of receptors adjacent to the road, with each 5 miles per hour (mph) reduction decreasing noise by about 1.3 dBA.

The Specific Plan Area receives the greatest amount of vehicle noise from traffic on two major arterials; Millbrae Avenue and El Camino Real. Also, US 101 runs through the northeastern portion of the Specific Plan Area. US 101 carries very high volumes of both passenger and freight traffic,[11] which contribute to background noise in the area. Local roadways primarily accommodate traffic within the city and include major arterials (noted above), as well as smaller collector and neighborhood streets. While these smaller local roadways are not a major source of noise for the city as a whole, they represent a significant source of ambient noise at the neighborhood level.

The following general descriptions highlight the main boundaries of the Specific Plan Area:

- the southwestern boundaries go no farther than Broadway;
- the southeastern boundaries run along Murchison Drive and the canal northeast of the Caltrain tracks (which are part of the City's boundaries with Burlingame) and extends from El Camino Real to the northbound US 101 off-ramp at Millbrae Avenue;
- the northeastern boundaries follow the western property boundary of the Aloft San Francisco Airport Hotel and the northern boundary of McDonnell Road;
- the northwestern boundary runs along Victoria Avenue to the southwest of the train tracks and extends across US 101 and McDonnell Road.

The primary sources of vehicular noise within the Specific Plan Area are US 101 and Millbrae Avenue (northeast of Rollins Road); Millbrae Avenue, El Camino Real, and vehicles in the Millbrae Station Parking Lot (to the southwest of Rollins Road). Traffic on Adrian Road and other minor roads in the vicinity of the Specific Plan Area

[11] The average daily traffic volumes for this section of the US 101 are approximately 240,000 vehicles (per California Department of Transportation (Caltrans) for 2013 at http://traffic-counts.dot.ca.gov/.

also contribute to the ambient noise within the Specific Plan Area. As shown on Figure 4.10-2, under current General Plan buildout conditions, the 60, 65, and 70 dBA CNEL noise contour from US 101 extend well within the Specific Plan Area boundaries. Southwest of US 101, the 60 dBA CNEL noise contour extends past Rollins Road and dissects the Millbrae Station parking lot that will make up the southwestern portion of the TOD #2 project site. Northeast of US 101, the proposed Project boundary does not extend past the 60 dBA CNEL Noise Contour.

Train Noise

Noise from trains is generated by wheel/rail interaction, locomotive engines, exhaust systems, cooling fans, and other mechanical components, as well as by warning horns and crossing bells near at-grade crossings. The interaction of steel wheels and rails generates rolling noise due to continuous contact; impact noise when a wheel encounters a discontinuity, such as a rail joint, turnout, or crossover; and squeals generated by friction on tight curves. Trains are required by the Federal Railroad Administration (FRA) to sound a warning horn beginning at a distance of 0.25-mile from all at-grade crossings. The horn sound level is to have a maximum volume of 110 dBA, as measured at 100 feet. Some areas have established rail 'Quiet Zones' (per FRA protocols) where trains do not sound their horns as they approach at-grade crossings; however, there are no such quiet zones in the city.

Millbrae Station is a terminus for two BART lines and is also a stop for Caltrain. These trains carry passengers to and from other parts of the Bay Area. The frequency at which these trains arrive, depart, and pass through the station are listed in Table 4.10-10.

The Union Pacific railway also operates through Millbrae; utilizing the same tracks as Caltrain, as well as the Millbrae Station. This railway currently carries limited freight traffic. Freight trains do not typically operate on a set schedule and, given their low passage frequency, noise generated by the passage of freight traffic along this railway would not contribute significantly to the amount of noise already generated by Caltrain and BART train movements.

TABLE 4.10-10 TRAIN DEPARTURE INTERVALS AND HOURS OF ACTIVITY – MILLBRAE STATION

Train	Weekday Interval	Weekday Hours of Activity	Saturday Interval	Saturday Hours of Activity	Sunday/Holiday Interval	Sunday/Holiday Hours of Activity
BART – Northbound	15 minutes	4:18 a.m. – 11:49 p.m.	20 minutes	6:01 a.m. – 11:49 p.m.	20 minutes	8:01 a.m. – 11:49 p.m.
BART – Southbound	15 to 20 minutes	5:20 a.m. - 1:05 a.m. (The Next Day)	20 minutes	7:11 a.m. – 1:11 a.m. (Sunday)	20 minutes	9:11 a.m. – 1:11 a.m. (The Next Day)
Caltrain – Northbound	Variable	5:35 a.m. – 11:35 p.m.	1 hour[A]	8:10 a.m. – 11:40 p.m.[B]	1 hour[A]	9:10 a.m. – 10:10 p.m.

TABLE 4.10-10 TRAIN DEPARTURE INTERVALS AND HOURS OF ACTIVITY – MILLBRAE STATION

Train	Weekday Interval	Weekday Hours of Activity	Saturday Interval	Saturday Hours of Activity	Sunday/Holiday Interval	Sunday/Holiday Hours of Activity
Caltrain - Southbound	Variable	5:19 a.m. – 12:25 a.m. (The Next Day)	1 hour[C]	8:39 a.m. – 12:25 a.m. (Sunday)[D]	1 hour[C]	8:39 a.m. – 9:39 p.m.

Notes:
A. Baby Bullet Express trains also depart at 11:23 a.m. and 6:23 p.m.
B. Last two trains depart at 10:10 p.m. and 11:40 p.m.
C. Baby Bullet Express trains also depart at 12:15 p.m. and 7:15 p.m.
D. Last two trains depart at 10:39 p.m. and 12:25 a.m. (Sunday).
Sources: Bay Area Rapid Transit, Millbrae Station Schedule, http://www.bart.gov/stations/mlbr/schedule, accessed on October 13, 2014. Bay Area Rapid Transit, San Bruno Station Schedule, http://www.bart.gov/stations/sbrn/schedule, accessed on October 13, 2014. Bay Area Rapid Transit, San Francisco International Airport Station Schedule, http://www.bart.gov/stations/sfia/schedule, accessed on October 13, 2014. Caltrain, Weekday Timetable, http://www.caltrain.com/schedules/weekdaytimetable.html, accessed October 13, 2014. Caltrain, Weekend Timetable, http://www.caltrain.com/schedules/weekend-timetable.html, accessed October 13, 2014.

Aircraft Noise

The intersection of Millbrae Avenue and Rollins Road, which is near the center of the Specific Plan Area, is approximately 1,600 feet southwest of the southernmost portion of the tarmac at SFO. As stated in Municipal Code Section 10.40.020, SFO is the fifth largest airport by volume in the United States and the seventh largest by volume in the world. As of late 2014, a total of 3,634 domestic and 572 international non-stop flights are served weekly at SFO.[12] As a result, arriving, departing, and idling aircraft contribute heavily to the noise profile of the Specific Plan Area.

The Millbrae General Plan refers to their 1983 noise contour map (see Figure 4.10-2) in several of its policies related to airport, rail, and vehicular noise contours. It is important to note that the City's 1983 aircraft noise contours are significantly larger than the SFO ALUCP's 2014 aircraft noise contours. Thus, on the City's 1983 map, the majority of the Specific Plan Area east of El Camino Real falls within SFO's 65 dBA CNEL noise contour; most of the area east of Aviador Avenue and northeast of the Millbrae Avenue/US 101 southbound on-ramp falls within the 70 dBA CNEL noise contour; and most of the area bound by Millbrae Avenue east of the US 101 northbound off-ramp, and US 101, falls within the 75 dBA CNEL. However, on the more recent 2014 SFO ALUCP's aircraft noise contour map, only a small portion of the Specific Plan Area falls within SFO's 65 dBA CNEL noise contour. A majority of this greater-than-65 dBA CNEL area is located northeast of US 101.[13] Part of the northeastern-most portion of the Specific Plan Area also falls within the airport's 70 dBA CNEL contour.[14]

The Project site is not located within 2 miles of a private airstrip.

[12] San Francisco International Airport, 2014, *Fact Sheet,* San Francisco. (http://media.flysfo.com/SFO-facts.pdf). Accessed on October 14, 2014.

[13] Additionally, there is a small area southwest of US 101, near the southbound on-ramp from Millbrae Avenue, that is within the SFO 65 dBA CNEL contour zone.

[14] San Francisco International Airport, 2014, *2014 Noise Exposure Map,* San Francisco. (http://media.flysfo.com/media/sfo/noise-abatement/2014-sfo-nem-plot.pdf). Accessed on February 23, 2015.

Heliports

The United States Coast Guard and San Francisco Helicopters, a privately owned helicopter tour company, base their helicopter operations at SFO. United States Coast Guard helicopters typically take off from SFO approximately four to five times a day, but this number has been known to increase by up to four additional takeoffs per day in the event of a search and rescue operation. Such operations call for immediate action and can happen at any time of day or night.[15] San Francisco Helicopters has helicopters that typically take off SFO and another helipad in Sausalito. Tours taking off from San Francisco do not operate on a set schedule, but there is usually one take-off and one landing per day on days when tours are booked. These tours can happen on any day of the year except for when the company is closed (i.e. on Thanksgiving Day, Christmas Day, and New Year's Day). The helicopter flight paths are not planned to fly over Millbrae.[16] Use of helipads generates noise during take-offs and landings in the immediate vicinity of the helipad. Unlike fixed-wing aircraft, helicopters produce noise not only from the engine but also from the rotation of the main rotor and helicopter blades; commonly referred to as 'blade slap'. According to the CalTrans 2002 Airport Land Use Compatibility Handbook, for a listener on the ground, helicopter noise is most audible as the aircraft approaches.

Stationary Sources of Noise

Stationary sources of noise include commercial and industrial equipment and activities. Whereas mobile-source noise affects many receptors along an entire length of roadway, stationary noise sources affect only their immediate areas. Stationary sources of noise may occur from all types of land uses. The Specific Plan Area is mostly developed with commercial, open space, public facilities, and some light industrial uses.

Commercial, industrial, and landscaping activities make modest contributions to the Specific Plan Area's noise environment. Commercial uses can generate noise from idling vehicles, car washes, loading trucks, hotel and restaurant guests, heating, ventilation, air conditioning (HVAC) systems, and other sources. Noise generated by commercial uses is generally short and intermittent, as well are relatively localized to the immediate vicinity of the use.

The only open space use in the Specific Plan Area is the area between Aviador Avenue and the southbound US 101 off-ramp at the Millbrae Avenue exit. The land is controlled by SFO (subject to FAA regulations) and is used as a temporary storage and staging area for construction equipment. Recently, this land was used to store concrete during a runway safety upgrade project. The site does not typically experience heavy use, since permission is needed from the FAA in order to use it. As a result, there is typically not much activity on the site.[17]

Public facilities can generate noise from idling trucks, heavy landscaping equipment, and water pollution control equipment. Truck and heavy landscaping equipment usage occurs in the Public Works' storage yard north of the BART parking structure. This storage yard is in close proximity to the single-family residences (which are outside

[15] Lusk, John. Chief, United States Coast Guard – Air Station San Francisco. Personal communication with Alex Lopez, PlaceWorks. October 15, 2014.

[16] McClelland, Terri. Manager, San Francisco Helicopters. Personal communication with Alex Lopez, PlaceWorks. October 15, 2014.

[17] Bergener, John. Planning Director, San Francisco International Airport. Personal communication with Alex Lopez, PlaceWorks. October 21, 2014

of the Specific Plan Area). In general, activities in the storage yard are sporadic and noise generated by these uses is generally short-lived and intermittent. Noise generated by the Water Pollution Control Plant at the Millbrae Avenue/US 101 northbound on-ramp intersection is overshadowed by vehicle noise from US 101, Millbrae Avenue, and by aircraft noise from SFO.

Industrial uses may generate noise from fuel pumps, idling vehicles, loading docks, landscaping, forklifts, HVAC systems, and machinery required for manufacturing processes. Industrial uses may generate noise on a more continual basis, or intermittently, depending on the processes and types of equipment involved. In addition to on-site mechanical equipment, warehousing and industrial land uses generate substantial truck traffic that results in additional sources of noise on local roadways in the vicinity of industrial operations. The Specific Plan Area's industrial areas are found southeast of Millbrae Avenue and northeast of the train tracks; near the Millbrae city boundary with Burlingame. The northern and eastern Millbrae Station parking lots, in addition to the Chevron Gas Station on Millbrae Avenue, are also zoned for industrial purposes.

The operations of the commercial uses to the northwest and south of the Specific Plan Area, as well as to the southeast in neighboring Burlingame, also contribute to the ambient noise environment and include stationary noise sources such as HVAC units, and truck delivery noise. The portions of the Specific Plan Area exposed to the highest levels are near the northwest and southeast ends of El Camino Real, since this major artery continues in both directions and these portions are closest to existing commercial uses.

Schools are considered noise-sensitive because of the necessity for quiet in the classroom to provide an adequate learning environment. However, outdoor activities that occur on school campuses throughout the city can occasionally generate noticeable levels of noise. While it is preferable to have schools in residential areas to support the neighborhood, noise generated on weekdays (by physical education classes and sports programs) and on weekends (by use of the fields by youth organizations) can elevate noise levels in the immediate surroundings. There are no public or private schools located within the Specific Plan Area. The nearest existing school to the Specific Plan Area is Mills High School located at 400 Murchison Drive. The school's main building is located roughly 0.15 mile to the southwest of the nearest Specific Plan Area border, beyond Magnolia Avenue; however the sports fields are located about 0.07 feet away. All other existing schools are located more than 0.25-mile distance from the Specific Plan Area. There are no new schools proposed within the Specific Plan Area or near vicinity.

Noise Measurements

Existing ambient noise levels were measured at eleven locations in the Specific Plan Area to document representative noise levels at a variety of locations. Short-term noise level measurements were taken at eight locations for a minimum period of 15 minutes during the daytime on October 1, 2014, between the hours of 2:00 and 7:00 p.m. Three long-term measurements were taken for a period of 24 hours each. Long-term measurements 1 and 2 (LT-1 and LT-2) began on September 30, 2014, and long-term measurement 3 (LT-3) began on October 1, 2014. These dates were chosen because they represent a typical weekday condition. During the measurement sessions, fair weather conditions prevailed, as is consistent with industry standard practice. These locations are shown on Figure 4.10-3.

The noise levels were measured using a Larson-Davis Model 820 sound level meter, which satisfies the American National Standards Institute for Type 1 general environmental noise measurement instrumentation. The sound level meter and microphone were mounted on a tripod five feet above the ground and equipped with a windscreen during all short-term measurements. For the long-term measurements, the microphone (and associated windscreen) was attached to a parking lot light post, a chain-link fence, or a sturdy tree for security concerns. A detailed description of the noise measurement locations is provided in Appendix F of this Draft EIR.

4.10.2 STANDARDS OF SIGNIFICANCE

The proposed Project would have a significant impact with regard to noise if it would result in any of the following:

1. Exposure of people to or generation of noise levels in excess of standards established in the General Plan or the Municipal Code, and/or the applicable standards of other agencies.
2. Exposure of people to or generation of excessive groundborne vibration or groundborne noise levels.
3. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the Project.
4. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
5. Exposure of people residing or working in the vicinity of the plan area to excessive aircraft noise levels, for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport.
6. Exposure of people residing or working in the project area to excessive noise levels, for a project within the vicinity of a private airstrip.

With regards to Standard of Significance 5, as discussed in Section 4.10.1.3, Existing Conditions, above, there are no private airstrips located within two miles of the Project site; accordingly, there would be no impact related to excessive noise levels from private airstrips. Therefore, no further discussion of noise-related impacts from aviation facilities is warranted in this Draft EIR.

Source: PlaceWorks, ESRI 2014

Figure 4.10-3
Noise Monitoring Sites

4.10.3 IMPACT DISCUSSION

NOISE-1	The proposed Project would not expose people to or generate noise levels in excess of standards established in the General Plan or the Municipal Code, and/or the applicable standards of other agencies.

Specific Plan Update

State of California Code of Regulations

Title 21, Subchapter 6 (Airport Noise Standards)

Future development within the Specific Plan Area would be subject to CCR Title 21, Subchapter 6 (Airport Noise Standards), which establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. According to the Millbrae General Plan Noise Contours Map (see Figure 4.10-2) the Specific Plan Area is within the 65 dBA CNEL 1983 aircraft noise contour. Furthermore, based on the short- and long-term measurements taken in the Specific Plan Area, most of the Specific Plan Area falls within areas that are potentially subject to ambient noise levels in excess of, or near, 65 dBA.

Title 21 applies to airports that have been designated "noise problem airports," which includes SFO. Noise-sensitive land uses in locations where the aircraft exterior noise level exceeds 65 dBA CNEL are generally incompatible, unless (1) an avigation easement for aircraft noise has been acquired by the airport proprietor, or (2) the residence is a high-rise apartment or condominium that has an interior CNEL of 45 dBA or less in all habitable rooms despite aircraft noise and an air circulation or air conditioning system, as appropriate. AB 2776 requires any person who intends to sell or lease residential properties within an AIA to disclose that fact to the person buying the property. Compliance with CCR Title 21, Subchapter 6 (Airport Noise Standards), would ensure noise impacts to sensitive land uses would be *less than significant*.

Title 24 Building Standards Administrative Code

Projects that include residential land uses that would be exposed to more than 60 dBA CNEL, the indoor living spaces of future developments under the Specific Plan Update would be required to comply with the interior noise standards Title 24, Building Standards Administrative Code, Part 2, CBC. Per Section 9.05.010 of the City's Municipal Code the City has adopted the 2013 California Building Code including modifications relevant to Millbrae. As discussed above under Title 21, the Specific Plan Area is within the 65 dBA CNEL Aircraft Noise Contour. Therefore, acoustical studies would be required to be prepared when noise-sensitive structures, such as residential buildings, are located where noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL. Compliance with Title 24 would ensure noise impacts to sensitive land uses would be *less than significant*.

Airport Land Use Plans

As previously discussed, the Specific Plan Area is within the 65 dBA CNEL 2014 aircraft noise contour in the SFO ALUCP; however, this portion of the Specific Plan Area is currently developed with the Millbrae Water Pollution Control Plant and no changes to this land use are proposed under the Specific Plan Update.

Similar to the Title 21, Title 24 and AB 2776 standards that require interior 45 dBA CNEL, preparation of interior acoustical studies and notification to future residents living within an AIA, compliance with these same standards under the SFO ALUCP and the San Mateo County CLUP as discussed in Section 4.10.1.2, Regulatory Setting, would ensure noise impacts to sensitive land uses would be *less than significant*.

Millbrae Noise Element

As described above, the City's General Plan Noise Element includes compatibility guidelines, which specify acceptable ambient noise levels for different land use designations. Adherence to the following General Plan policies would serve to ensure that noise levels would not exceed levels allowed under the Noise Element:

- Policy NS1.2: Future development under the Specific Plan Update would require project-level mitigation measures where the project would cause the L_{dn} to increase 3 dBA or more; any increase would result in an L_{dn} greater than 60 dBA; the L_{dn} already exceeds 60 dBA; and the project has the potential to generate significant adverse community response.
- Policy NS1.3: Future projects under the Specific Plan Update would control noise sources at their source, maintain existing noise levels and ensuring that noise levels do not exceed acceptable noise standards as established in the Noise and Land Use Compatibility Guidelines.
- Policy NS1.4: The construction phase of future development under the Specific Plan Update would occur between Monday through Friday 7:30 a.m. to 7:00 p.m., Saturday 8:00 a.m. to 6:00 p.m., and Sunday and Holidays 9:00 a.m. to 6:00 p.m. Any work outside these hours is prohibited without prior written permission of the Administrative Authority.
- Policy NS1.5: As discussed under NOISE-3 below, on-road vehicular noise impacts as a result of buildout of the Specific Plan Update would be less than significant.
- Policy NS2.1: New development must meet acceptable exterior noise level standards. The "normally acceptable" noise standards for new land uses are established in the Noise and Land Use Compatibility Guidelines. The indoor noise level as required by the State of California Noise Insulation Standards must not exceed an L_{dn} of 45 dB in multi-family dwellings, and noise levels in new single-family and multi-family residential units exposed to an L_{dn} of 60 dB or greater should be limited to a maximum instantaneous noise level in the bedrooms of 50 dBA. Maximum instantaneous noise levels in other rooms should not exceed 55 dB. Interior noise levels in offices generally should be maintained at 45 L_{eq} (hourly average) or less. The impact of future development under the Specific Plan Update would be evaluated in terms of the increase in existing noise levels and potential for adverse community impact, regardless of the compatibility guidelines.

- Policy NS2.2: Future development under the Specific Plan Update will be reviewed for consistency with the City's current noise contour map.
- Policy NS2.3: Future development under the Specific Plan Update will be required to prepare acoustical studies as required by the noise guidelines and contours on the City's current contour map.
- Policy NS2.4: Where sensitive land uses are proposed under the Specific Plan Update and the measured ambient noise level exceeds the applicable noise level standard in any category expressed in the Millbrae Land Use Compatibility for Community Noise Environments table, [Table 4.10-7 of this Draft EIR], the applicable standard will be adjusted so as to equal the ambient noise level to establish a noise standard capable of being enforced through the City's Noise Ordinance, and each of the noise level standards specified in the Millbrae Land Use Compatibility for Community Noise Environments table [Table 4.10-7 of this Draft EIR] will be reduced by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises due to the greater annoyance factor associated with these types of noise.
- Policy NS2.5: Noise created by commercial or industrial sources associated with new projects or developments under the Specific Plan Update shall be controlled so as not to exceed the noise level standards set forth in Table 4.10-5 (Noise/Land Use Compatibility Criteria) of this Draft EIR, as measured at any affected residential land use.
- Policy NS2.6: As appropriate, based on design, use, site layout and other considerations, require mitigation measures to reduce noise impacts associated with future development under the Specific Plan Update.
- Policy NS2.7: Applicants of future projects under the Specific Plan Update would be required to comply with the State's noise insulation standards, which require noise insulation of new multi-family dwellings constructed within the 60 dB L_{dn} noise exposure contours.
- Policies NS3.1, NS3.2, and NS3.3: The City's ongoing efforts to coordinate with BART and SFO would ensure that future projects under the Specific Plan Update would not be exposed to excessive noise from the ongoing improvements and operation of BART and SFO facilities.

Adhering to these policies during buildout of the Specific Plan Update would ensure that sensitive land uses include design features that would serve to attenuate noise to acceptable levels and noise impacts would be *less than significant*.

Millbrae Municipal Code

The Millbrae Municipal Code does not contain any titles or chapters dedicated solely to noise standards. However, as discussed in Section 4.10.1, Regulatory Setting, Title 9, Building Regulations, and Title 10, Planning and Zoning, include noise standards for certain types of development, as well as prohibitions on specific activities with the potential to generate excessive noise. These sections are described below.

- Section 9.05.020: Under sub-section 1.8.4.5, Hours of Construction, future construction under the Specific Plan Update would occur between Monday through Friday 7:30 a.m. to 7:00 p.m., Saturday 8:00 a.m. to 6:00 p.m., and Sunday and Holidays 9:00 a.m. to 6:00 p.m.; thus, reducing noise in the evenings and early mornings between 7:00 p.m. and 7:00 a.m.

- Section 9.05.020: Under sub-section 1.8.4.6, Protection from Airport Noise, any future residential buildings under the Specific Plan Update, located within the 65 CNEL level as shown on the current Millbrae General Plan 1983 Noise Contour Map, which is either newly constructed or renovated at a cost equal to or greater than 25 percent of the valuation (as assessed by the County Assessor) would be required to meet noise insulation standards set by the City of Millbrae Noise Insulation Program and the FAA.
- Section 10.25.120: Future projects under the Specific Plan Update that require a tentative or subdivision or parcel map for a condominium, condominium conversion, stock cooperative, or community apartment project, under Subsection D would be required to conform to all interior and exterior sound transmission standards of the International Building Code, state laws and/or regulations, and city ordinances. Interior noise level would be required to be less than 45 dBA CNEL. Under Subsection O, all permanent mechanical equipment that is determined by the City's building official to be a source of structural vibration or structure-borne noise to be shock mounted in inertia blocks or bases and/or vibration isolators in a manner approved by the building official.

Compliance with Millbrae Municipal Code would ensure noise impacts to sensitive land uses would be *less than significant*.

Summary

Future development under the designations of the Specific Plan Update would be subject to and required to comply with federal, State, regional and local regulations, including those relating to the interface between residential and non-residential land uses. As specific uses are proposed for particular sites, project-level design, permitting, and environmental review would serve to ensure that individual uses would comply with the provisions of this chapter. As the Specific Plan Update does not propose specific projects other than the TOD #1 and TOD #2 projects, and does not include site plans or designs, any assumption of potential non-compliance would be purely speculative. Additionally, by including appropriate buffers, berms, barriers, or other site design features, development of uses under the Specific Plan Update regulations described above. Therefore, the adoption and implementation of the Specific Plan Update would not violate the provisions of the General Plan or Municipal Code, and/or other applicable standards and impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #1 Project

The proposed TOD #1 project will have mixed-use residential uses and would be required to have an interior noise level of less than 45 dBA CNEL. The L_{dn} of Long Term Measurement Site LT-2, which is located on the TOD #1 project site, was determined to be 71.8 dBA. This level is above the maximum outdoor noise level goal of 70 dBA L_{dn} (or CNEL) for areas where a railroad is the noise source as established in General Plan Policy NS2.1. However, the Policy NS2.1 also establishes that this outdoor standard will not normally be applied to the small decks associated with apartments and condominiums, but will be evaluated on a case-by-case basis. Regardless, impacts would be considered *significant*.

Impact NOISE-TOD#1-1: The proposed TOD #1 project would expose people to or generate noise levels in excess of standards established in the General Plan, and/or the applicable standards of other agencies.

Mitigation Measure NOISE-TOD#1-1: Development of residential uses in the TOD #1 project site shall conform to the outdoor noise level goal of 70 dBA L_{dn} (or CNEL) for areas where a railroad is the noise source as established in General Plan Policy NS2.1. Additionally, indoor noise levels for residential uses in the TOD #1 project site shall demonstrate an indoor noise level of 45 dBA CNEL, per Millbrae Municipal Code standards. To achieve this goal, acoustical studies shall be prepared during the project design phase and shall accompany the building plans submitted to the City for approval. These studies must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. With such detailed acoustical studies and the associated appropriate sound insulation design features, indoor and outdoor noise effects for residents living in the TOD #1 project site would be less than significant.

Significance with Mitigation: Less than significant

TOD #2 Project

The proposed TOD #2 project will have mixed-use residential uses and will be required to have an interior noise level of less than 45 dBA CNEL. The L_{dn} of Long Term Measurement Site LT-1, which is located on the TOD #2 project site, was determined to be 67.9 dBA. This level is near the maximum outdoor noise level goal of 70 dBA L_{dn} (or CNEL) for areas where a railroad is the noise source, but does not go over the outdoor noise level goal. Due to the close proximity of several stationary noise sources to the TOD #2 project site, it is likely that variability of ambient noise levels throughout various times of day or night would occasionally result in noise levels exceeding the maximum outdoor noise level goal of 70 dBA L_{dn} (or CNEL). Therefore, impacts would be considered *significant*.

Impact NOISE-TOD#2-1: The proposed TOD #2 project would expose people to or generate noise levels in excess of standards established in the General Plan, and/or the applicable standards of other agencies.

Mitigation Measure NOISE-TOD#2-1: Implement Mitigation Measure NOISE-TOD#1-1.

Significance with Mitigation: Less than significant

NOISE-2	The proposed Project would expose people to or result in generation of excessive groundborne vibration or groundborne noise levels.

CEQA does not specify quantitative thresholds for what is considered "excessive" vibration or ground-borne noise and, as previously discussed, the City does not have specific and/or quantitative regulatory standards for construction or operational vibration sources.

Section 6.25.050(F)(9)(b) of the Municipal Code declares it unlawful and a public nuisance to maintain the condition of property so that the property becomes defective or in a condition of deterioration or disrepair to the point where it emanates vibrations on a continuous and regular basis of such a loud, unusual, unnecessary,

penetrating, lengthy or untimely nature as to unreasonably disturb, annoy, injure or interfere with or endanger the comfort, repose, health, peace, safety or welfare of users of neighboring property. Section 10.25.120(O) of the Municipal Code requires all permanent mechanical equipment that is determined to be a source of structural vibration in a condominium, condominium conversion, stock cooperative, or community apartment project, to be shock mounted on inertia blocks or bases and/or vibration isolators. These regulations acknowledge that light and heavy manufacturing facilities may have the potential to produce vibration.

The following discusses short-term construction and long-term operational impacts from implementation of the proposed Project.

Specific Plan Update

Short-Term Construction Vibration Impacts

Project construction would take place at various times over the course of Specific Plan Update implementation. Therefore, construction vibration would vary temporally and geographically; depending on the specific location and type of construction activity. Construction activities may include demolition of existing structures, site preparation work, foundation work, and framing. Site preparation, excavation, and foundation work for an individual site may last several weeks to months and, at times, may produce substantial vibration. Excavation for any underground levels could potentially also occur on some sites within the Specific Plan Area and vibratory pile driving could be used to stabilize the walls of excavated areas. Driven piles or drilled caissons may also be used to support building foundations.

The effect on buildings in the vicinity of a construction site varies depending on soil type, ground strata, and receptor-building construction. The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures, but groundborne vibration and groundborne noise can reach perceptible and audible levels in buildings that are very close to the construction site (e.g. already-completed structures from previous phases in the project's development).

As shown in Table 4.10-11, which lists vibration levels for construction equipment, pile driving has the potential to generate the highest ground vibration levels and is of primary concern in regard to structural damage; particularly when it occurs within 100 feet of structures. Vibration levels generated by pile driving activities would vary depending on site-specific conditions such as soil characteristics, construction methods, and equipment used. Other Specific Plan Update-related construction activities such as caisson drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and the use of rolling stock equipment (tracked vehicles, compactors, etc.) may also potentially generate substantial vibration in the immediate vicinity.

TABLE 4.10-11 GROUNDBORNE VIBRATION LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Approximate Velocity Level at 25 Feet (VdB)	Approximate RMS[a] Velocity at 25 Feet (inch/sec)
Pile Driver (impact) Upper Range	112	1.518
Pile Driver (impact) Lower Range	104	0.644
Pile Driver (sonic) Upper Range	105	0.734
Pile Driver (sonic) Lower Range	93	0.170
Large Bulldozer	87	0.089
Caisson Drilling	87	0.089
Jackhammer	79	0.035
Small Bulldozer	58	0.003
Loaded Trucks	86	0.076
FTA Criteria – Human Annoyance (Daytime)	78 to 90[b]	—
FTA Criteria – Structural Damage	—	0.2 to 0.5[c]

a. RMS velocity calculated from vibration level (VdB) using the reference of 1 micro-inch/second.
b. Depending on affected land use. 78 VdB for residential, 84 VdB for offices, and 90 VdB for workshops.
c. Depending on affected building structure, for timber and masonry buildings 0.2 in/sec, for reinforced-concrete, steel, or timber 0.5 in/sec.
Source: Federal Transit Administration, Transit Noise, and Vibration Impact Assessment, 2006.

Based on available information, vibration impacts would be as follows. Grading and demolition activities typically generate the highest vibration levels during construction activities. Except for pile driving, maximum vibration levels measured at a distance of 25 feet from an individual piece of typical construction equipment rarely exceed the thresholds for human annoyance for industrial uses (i.e. 84 to 90 VdB) or the thresholds for architectural damage at any type of receptor land use (i.e. 0.2 to 0.5 RMS velocity in inches per second). Additionally, groundborne vibration is almost never annoying to people who are outdoors, so it is usually evaluated in terms of indoor receivers.

In general, construction would be localized, occur intermittently and variably, and only occur for relatively short periods of time. However, it is acknowledged that there are numerous individual project sites that could be developed under the Specific Plan Update, thereby effectively extending the construction period. Methods to reduce vibration during construction could include the use of smaller equipment, use of static rollers instead of vibratory rollers, and employing drilled/augured piles (as opposed to pile driving techniques). However, it is not known as this time the specific types of construction equipment and techniques that would be employed. Also, by use of administrative controls, perceptible vibration could be further reduced. Such administrative controls might include notifying adjacent uses of scheduled construction activities and/or restricting high-vibration construction activities to hours with the least potential to affect nearby residences or businesses. As such, groundborne vibration from construction could result in a significant impact with respect to perception and annoyance.

For architectural damage, this situation would be exacerbated with the potential use of standard pile driving techniques; particularly with respect to pile-driving activities that may be conducted within approximately 50 to 100 feet of a previously built structure. Given the typical groundborne vibration caused by pile driving activities (shown in Table 4.10-11 above), this type of construction process, if performed in close proximity to existing buildings, could result in a significant impact with respect to potential architectural damage.

The Millbrae General Plan and Municipal Code do not currently contain regulations governing the control of vibration, including construction-related vibration. However, General Plan Policy NS2.3 requires the City to use noise guidelines and contours to determine if additional noise studies (to be conducted by a professional acoustical engineer) are needed for a proposed new development. Under the premise that intent of these noise-related goal and policy statements is to protect public from both noise *and* vibration impacts, they can be broadened, in practical implementation, to encompass vibration effects from on-going operations of commercial/industrials sources. Thus, such technical studies could serve as the basis for designing mitigation measures to reduce operations-related vibration impacts. Accordingly, operations-related vibration would result in a *less-than-significant* impact with respect to both annoyance and architectural damage with compliance with Policy NS2.3.

Vibration Related to On-Road Vehicles

Caltrans has studied the effects of propagation of vehicle vibration on sensitive land uses and notes that "heavy trucks, and, quite frequently, buses, generate the highest earthborn vibrations of normal traffic." Caltrans further notes that the highest traffic-generated vibrations are along freeways and state routes. Their studies have found that "vibrations measured on freeway shoulders (five meters from the centerline of the nearest lane) have never exceeded 0.08 inch per second, with the worst combinations of heavy trucks. This level coincides with the maximum recommended safe level for ruins and ancient monuments (and historic buildings)." Typically, trucks do not generate high levels of vibration because they travel on rubber wheels and do not have vertical movement, which generates ground vibration; however, vibration from trucks may be more noticeable if there are any roadway imperfections such as potholes.

Since new development is expected to take place several hundred feet southwest of the centerline of the nearest land of US 101, vibration-sensitive structures or uses would be sited well beyond the Caltrans demarcation of five meters (approximately 16 feet). Because vibration dissipates rapidly with distance and because vibration-sensitive uses would not be sited adjacent to freeways, any potential for significant vibration impacts from on-road vehicles would not occur. Therefore, implementation of the Specific Plan Update is not expected to result in exposure to excessive transportation-related vibration and this impact would be *less than significant*.

Vibration Related to Railway Transportation Activity

Future development permitted under the Specific Plan Update will result in new mixed-use housing, and may result in other sensitive uses, in relatively close proximity to existing BART, freight, and Caltrain rail corridors within the Specific Plan Area. Railway transportation activities have the potential to generate vibration levels that could result in significant impacts to these sensitive receptors. As listed above in Table 4.10-11, the FTA criteria for human annoyance during the daytime are 78 to 90 VdB depending on the affected land use. For residential uses, this criterion is 78 VdB. Locomotive powered trains traveling at 50 mph reach this threshold when the receptor is located between approximately 100 and 120 feet from the track centerline. Rapid transit or light rail vehicles

travelling at the same speed reach this threshold when the receptor is located less than 20 feet from the track centerline.[18] Any development that occurs within these distances could subject receptors to annoying vibrations. Any such future development in the Specific Plan Area, however, would be subject to individual project-level environmental review and any specific project-level mitigation that may be required under CEQA. Therefore, implementation of the Specific Plan Update would result in a *less-than-significant* impact in regards to railway vibration.

Vibration Related to Operations

As discussed above, the Specific Plan Update proposes a combination of land uses in the Specific Plan Area, including commercial, mixed-use, open space, and public facilities. However, industrial is the only land use which is associated with the potential generation of perceptible and/or potentially damaging levels of vibration primarily through their use of large equipment and machinery. Although specific site or building plans are not part of the Specific Plan Update, the Specific Plan Update proposes to locate non-industrial land uses in close proximity to existing industrial land uses. This proximity of differing land uses may have the potential to result in the exposure of structures and sensitive receptors to vibration levels that could result in annoyance or damage.

The Millbrae General Plan and Municipal Code do not currently contain regulations governing the control of vibration, including construction-related vibration. However, General Plan Policy NS2.3 requires the City to use noise guidelines and contours to determine if additional noise studies (to be conducted by a professional acoustical engineer) are needed for a proposed new development. Under the premise that intent of these noise-related goal and policy statements is to protect public from both noise *and* vibration impacts, they can be broadened, in practical implementation, to encompass vibration affects from on-going operations of commercial/industrials sources. Thus, such technical studies could serve as the basis for designing mitigation measures to reduce operations-related vibration impacts. Through this interpretation of Policy NS2.3, operations-related vibration would result in a *less-than-significant* impact with respect to both annoyance and architectural damage.

Significance Without Mitigation: Less than significant

TOD #1 Project

Short-Term Construction Vibration Impacts

Construction activities at the TOD #1 project site would include the use of pile driving activities, which could occur as close to 40 feet from the Millbrae Station building, 50 feet from the property at 186 El Camino Real, 55 feet from the residential area immediately to the northwest and 65 feet from the closest buildings across Serra Avenue to the southwest. At these distances, the upper range of an impact pile driver, which produces the highest levels of vibration, can reach RMS velocities of 0.188 inches per second, 0.134 inches per second, 0.116 inches per second, and 0.091 inches per second, respectively.

[18] Hanson, Carl E., Towers, David A., and Meister, Lance D., 2006, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, Washington DC: Federal Transit Administration. (www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual)

As shown above in Table 4.10-11, this would not exceed the FTA criteria for structural damage of 0.2 to 0.5 inches per second. However, vibration associated with these pile-driving activities would exceed the FTA Criteria for Human Annoyance (Daytime) of 78 VdB at the residential uses immediately to the northwest. Therefore, construction-related vibration impacts would be *significant*.

Impact NOISE-TOD#1-2.1: The proposed TOD #1 project could result in the exposure of persons to or generation of excessive short-term construction-related groundborne vibration or groundborne noise levels.

> **Mitigation Measure NOISE-TOD#1-2.1:** Impact pile driving shall not be used. Suitable alternative techniques could include (but are not necessarily limited to) Auger Cast Piles (large diameter hollow stem auger with steel rebar and concrete installed prior to/during auger removal); Torque-down Piles (steel pipe pile drilled in place then filled with concrete); Micro-piles (Steel piles sized for corrosion protection with a concrete pile cap); and/or Helical piles (screw piles with concrete cap).
>
> **Significance With Mitigation:** Less than significant.

Vibration Related to Railway Transportation Activity

The TOD #1 project site would be located approximately 60 feet from Caltrain tracks, which is within the screening distance of 200 feet for the evaluation of vibration impacts to sensitive land uses from commuter and freight rail operations. A locomotive-powered passenger or freight train traveling at 50 mph could produce an RMS Velocity level of approximately 83 VdB at this distance.[19] These conditions, as well as the related vibration levels, are expected to occur only infrequently, since Caltrains would slow to a stop, then start up again after passenger drop-off/pick-up. However, trains on this stretch of Caltrain tracks are sometimes known to travel at speeds of up to 70 mph.[20] The level of vibration caused by trains traveling at this speed would exceed the FTA Criteria for Human Annoyance (daytime) of 78 VdB for residential uses. Therefore, development of the proposed TOD #1 project is expected to result in exposure to excessive railway transportation-related vibration and this impact would be *significant*.

Notwithstanding the Millbrae General Plan Goal NS.3[21] and related Policy NS3.1, options for the City regarding mitigating railway vibration from BART, Caltrain, and Union Pacific rail operations are somewhat limited in that these lines and their use by the various rail entities are not under the direct control of the City. That is, since these rail lines are under the jurisdiction and control of federal agencies (including the FTA and the FRA), the City cannot implement mitigation measures, for example, that pertain to railway maintenance procedures,

[19] Hanson, Carl E., Towers, David A., and Meister, Lance D., 2006, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, Washington DC: Federal Transit Administration.
(http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf)

[20] Federal Railroad Administration – Office of Safety Analysis, 2015, *US DOT – Crossing Inventory Information as of 2/24/2015, Crossing No. 754876A,* Washington, D.C.: US Department of Transportation.
(http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Xingqryxing.aspx)

[21] Protect the City from Airport, Vehicular and Rail Corridor Noise to the Greatest Extent Possible and related

design/installation of special trackwork or track support systems,[22] vehicle modifications, upgrades to track support systems, and/or operational changes.

The City can, however, pursue modifications to the vibration propagation pathway and/or receiving building designs, as discussed below in Mitigation Measure NOISE-TOD#1-2.

Impact NOISE-TOD#1-2.2: The proposed TOD #1 project could result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels from vibration related to railway transportation activity.

> **Mitigation Measure NOISE-TOD#1-2.2:** The project applicant shall submit a vibration evaluation study to the satisfaction of the City of Millbrae Community Development Department. Site-specific reports should contain a brief description of the project(s) and the sensitivity of the land use type to vibration effects/impacts, an accurate map describing the setting with surrounding uses and vibration sources identified, and a quantitative description of the vibration environment. For multi-story structures, the report should discuss vibration effects for the upper floors. Field vibration level measurements should be taken over several days and at several locations to adequately establish the in situ conditions from rail operations. If the project is located within the vicinity of previously collected measurements, a measurement should also be duplicated at that point for purposes of updating the database to the then-current conditions. Vibration reports shall be prepared by an acoustical or vibrations engineer holding a degree in engineering, architecture, physics, or allied discipline able to demonstrate a minimum of two years of experience in the following areas: field measurement of vibration levels, transportation vibration forecasting, building acoustics and vibration isolation, and vibration mitigation. The evaluation report shall include design recommendations for external project features or internal project features or both to adequately mitigate rail vibration at the receiver property. External project features could include investigations of buffer zones near rail lines or the use of vibration-reducing trenches between the rail line(s) and the receiving property. Internal design features could include investigations of building designs for whole-building isolation features and/or floor stiffening elements.
>
> **Significance With Mitigation:** Less than significant.

TOD #2 Project

Short-Term Construction Vibration Impacts

Construction activities at the TOD #2 project site would include the use of pile driving activities on Parcels 5B and 6A, which are shown in Figure 3-28 in Chapter 3, Project Description, of this Draft EIR. Pile driving on Parcel 5B could occur as close to 40 feet from the Millbrae Station building and 140 feet from the closest buildings across Millbrae Avenue to the southeast. At these distances, the upper range of an impact pile driver, which produces the highest levels of vibration, can reach RMS velocities of 0.188 inches per second and 0.029 inches per second, respectively. As shown above in Table 4.10-11, this would not exceed the FTA criteria for structural

[22] Such upgrades could include improved turnouts/crossovers, installation of special 'frogs', use of resilient fasteners, use of rubberized ballast mats, upgrading to resiliently supported ties, and/or installing floating slabs.

damage of 0.2 to 0.5 inches per second. Pile driving on Parcel 6A could occur as close as 125 feet from the Millbrae Station parking garage. At this distance, the upper range of an impact pile driver can reach an RMS velocity of 0.034 inches per second. This would also not exceed the FTA criteria for structural damage. In addition, vibration associated with these pile-driving activities are expected to occur at levels comparable to vibration from existing train movements, and therefore would not be considered a significant source of vibration annoyance at the train station by themselves. Therefore, construction-related vibration impacts will be *less than significant*.

Vibration Related to Railway Transportation Activity

The TOD #2 project site would be located approximately 120 feet from Caltrain tracks, which is also within the FTA's screening distance for sensitive land uses. At this distance, a locomotive powered passenger or freight train travelling at 50 mph could produce an RMS Velocity level of 76 to 78 VdB. The TOD #2 project site is also approximately 60 feet from the BART tracks. A rapid transit or light rail vehicle travelling at 50 mph would produce an RMS Velocity level of 72 to 73 VdB.[23] Again, this level is not expected to occur frequently since both Caltrain and BART trains would be slowing down to drop off passengers or starting up after picking up passengers. Regardless, as stated above, trains on this stretch of Caltrain tracks are sometimes known to travel at speeds of up to 70 mph.[24] The level of vibration caused by trains travelling at this speed would exceed the FTA Criteria for Human Annoyance (Daytime) of 78 VdB for residential uses. Therefore, development of the proposed TOD #2 project is expected to result in exposure to excessive railway transportation-related vibration and this impact would be *significant*.

Notwithstanding the Millbrae General Plan Goal NS.3[25] and related Policy NS3.1[26], options for the City regarding mitigating railway vibration from BART, Caltrain, and Union Pacific rail operations are somewhat limited in that these lines and their use by the various rail entities are not under the direct control of the City. That is, since these rail lines are under the jurisdiction and control of federal agencies (including the FTA and the FRA), the City cannot implement mitigation measures, for example, that pertain to railway maintenance procedures, design/installation of special track-work or track support systems,[27] vehicle modifications, upgrades to track support systems, and/or operational changes.

The City can, however, pursue modifications to the vibration propagation pathway and/or receiving building designs, as discussed below in Mitigation Measure NOISE-TOD#2-2.

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[23] Hanson, Carl E., Towers, David A., and Meister, Lance D., 2006, *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, Washington DC: Federal Transit Administration. (http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf)

[24] Federal Railroad Administration – Office of Safety Analysis, 2015, *US DOT – Crossing Inventory Information as of 2/24/2015, Crossing No. 754876A,* Washington, D.C.: US Department of Transportation. (http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Xingqryxing.aspx)

[25] Protect the City from Airport, Vehicular and Rail Corridor Noise to the Greatest Extent Possible and related

[26] As discussed above, under the premise that intent of these noise-related goal and policy statements is to protect public from both noise *and* vibration impacts, they can be broadened, in practical implementation, to encompass vibration affects from on-going operations of rail-based sources.

[27] Such upgrades could include improved turnouts/crossovers, installation of special 'frogs', use of resilient fasteners, use of rubberized ballast mats, upgrading to resiliently supported ties, and/or installing floating slabs.

Impact NOISE-TOD#2-2: The proposed TOD #1 project could result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels from vibration related to railway transportation activity.

Mitigation Measure NOISE-TOD#2-2: Implement Mitigation Measure NOISE-TOD#1-2.

Significance With Mitigation: Less than significant

NOISE-3	The proposed Project would not cause a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

Methodology

With respect to transportation-related noise sources, the General Plan and Municipal Code do not present specific standards to apply to the analysis of a project's effect on existing land uses as a result of increased traffic noise levels for non-residential uses. Therefore, this analysis uses data and guidance provided by the CalTrans, and data and guidance provided by the Federal Interagency Commission on Noise (FICON) to determine the significance of the traffic noise that would be generated by the proposed project.

The 2009 CalTrans Technical Noise Supplement provides guidance that can be used to determine the significance of changes in noise levels caused by a project, finding that a trained ear can detect changes of 2 dBA while in general, healthy adults "can barely perceive noise level changes of 3 dBA." In addition, based on studies of test subjects' reactions to changes in environmental noise levels for similar noise sources, FICON developed recommendations for thresholds to be used in assessing the significance of project-related noise level increases for transportation noise sources.

The FICON recommendations are based upon studies that relate aircraft noise and other transportation noise sources to the percentage of persons who are highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction experienced by people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

In order to evaluate existing with project conditions and the future with project impacts related to transportation-noise, this analysis applies a two-step process based on the maximum "normally acceptable" noise level for the applicable land use as identified in Table 4.10-5 above and the amount by which the project would increase noise levels.

Step One – Will Noise Levels in the Project Vicinity Exceed Applicable Noise Standards?

The first step is to evaluate whether the noise level along a particular roadway segment would exceed the General Plan noise standard for the land uses adjacent to that segment. If the noise level would comply with the applicable General Plan standard, the impact would be less than significant because ambient noise levels would be within the normally acceptable range for the affected land use.

Step Two – Where a Noise Standard is Exceeded, Will the Project Make a Significant Contribution to the Increase?

If the noise level would exceed the applicable General Plan standard, the second step of the process is applied. This entails determining whether the amount by which the project contributes to the increase in noise level exceeds the following thresholds, which are supported by the findings of the FICON study.

Under step two, this analysis considers that the project's effect would make a significant contribution (and would therefore be a significant impact) if the proposed Project would increase ambient noise levels for residential land uses by:

- Any amount where the project's increase causes the General Plan noise standard for Normally Acceptable noise levels of 60 dBA to be exceeded;
- 3.0 dBA or more where the ambient noise level is between 60 and 65 dBA CNEL; or
- 1.5 dBA or more where the ambient noise level is between 65 and 75 dBA CNEL; or
- Any measurable amount where the ambient noise level is greater than 75 dBA (noise levels above 75 dBA are considered "clearly unacceptable" for residential land uses as indicated in General Plan Figure 8.3-1).

With respect to transient lodging, hotels, and motels, this analysis considers that the project's effect would make a significant contribution (and therefore would be a significant impact) if the proposed Project would increase ambient noise levels by:

- Any amount where the project's increase causes the General Plan noise standard for Normally Acceptable noise levels of 65 dBA to be exceeded;
- 3.0 dBA or more where the ambient noise level is between 65 and 70 dBA CNEL; or
- 1.5 dBA or more where the ambient noise level is between 70 and 80 dBA CNEL; or
- Any measurable amount where the ambient noise level is greater than 80 dBA (noise levels above 80 dBA are considered "clearly unacceptable" for transient lodging, hotels, and motels as indicated in General Plan Figure 8.3-1).

With respect to commercial land uses, this analysis considers that the project's effect would make a significant contribution (and would therefore be a significant impact) if the proposed Project would increase ambient noise levels by:

- Any amount where the project's increase causes the General Plan noise standard of 60 dBA to be exceeded;
- 3.0 dBA or more where the ambient noise level is between 60 and 80 dBA CNEL; or
- 1.5 dBA or more where the ambient noise level is between 80 and 85 dBA CNEL; or
- Any measurable amount where the ambient noise level is greater than 85 dBA (while Table 4.10-7 does not indicate a "clearly unacceptable" noise level for commercial land uses, it indicates that the maximum "unacceptable" noise level is 85 dBA).

The proposed Project would result in increased levels of traffic in the project vicinity. As discussed above, any project-related increases that exceed applicable General Plan noise standards or FICON recommendations would automatically constitute a substantial permanent increase to the ambient noise level. The roadway segments in the

Specific Plan Area and vicinity with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway were evaluated for the following scenarios:

- Existing Conditions – Existing traffic demand volumes on roadways segments based on counts collected in 2014 and existing lane configurations.
- Existing Plus Project Conditions – Existing traffic demand volumes plus new traffic from buildout of the proposed Project land uses and its transportation system changes with the existing transportation network (assessed for Specific Plan Update, proposed TOD #1 and TOD #2 projects).
- Near Term No Project Conditions – Projected conditions in 2020, including projected land use changes in the region and planned/funded transportation system improvements, without the proposed TOD #1 and TOD #2 projects.
- Near Term Plus Project Conditions – Projected conditions in 2020 with the proposed TOD #1 and TOD #2 projects.
- Cumulative No Project Conditions – Projected conditions in 2040, including projected land use changes in the region and planned/funded transportation system improvements, without the proposed Project (assessed for Specific Plan Update, proposed TOD #1 and TOD #2 projects).

Specific Plan Update

Transportation-Related Noise Impacts

Railway Noise

As previously discussed, the Millbrae Station is a terminus for two BART lines and is also a Caltrain stop. These trains operate on a frequent, daily basis, and substantially contribute to the Specific Plan Area's noise environment. According to General Plan Map 7-1, Noise Contours, shown on Figure 4.10-2, the 60 dBA railroad noise contours in the Specific Plan Area extend from the southwest of El Camino Real to the southwest of Rollins Road. Noise from these rail lines will be audible in many portions of the Specific Plan Area and may affect future residents in the Specific Plan Area. However, there is no increase in frequency of BART or Caltrain operations; therefore, no increase to community noise from these railroads towards the Specific Plan Area's overall noise environment would occur and current sensitive land uses would not experience changes in rail-related noise conditions. Furthermore, future projects under the Specific Plan Update would be required to adhere to General Plan Policies NS2.1 through NS2.3, NS2.6, NS2.7, and NS3.1, as explained above in Table 4.10-8, would ensure that railway noise levels would not exceed allowable indoor environment levels. Therefore, the impact would be *less than significant.*

Significance Without Mitigation: Less than significant.

On-Road Vehicle Noise

Existing (2014) No Project and Plus Project (Specific Plan Update)

Table 4.10-12 shows the Specific Plan Update's contributions to the existing ambient conditions and significance of impacts on each roadway segment. As shown in Table 4.10-12, no roadway segments are predicted to have significant noise level increases due to implementation of the Specific Plan Update in the Existing (2014) No

Project (Specific Plan Update) conditions compared to the Existing (2014) Plus Project (Specific Plan Update) conditions, and impacts would be *less than significant*.

TABLE 4.10-12 EXISTING (2014) NO PROJECT AND PLUS PROJECT (SPECIFIC PLAN UPDATE) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2014 No Project (dBA CNEL)	Ambient Noise Level[a] 2014 Plus Project (dBA CNEL)	Project Contribution To 2014 Noise Environments	Significant Impact?
Millbrae Ave.	East of US 101	67.1	67.2	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.7	0.7	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.9	0.9	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	76.0	1.1	no
Millbrae Ave.	West of El Camino Real	64.8	65.3	0.5	no
El Camino Real	North of Hillcrest Blvd.	74.3	74.7	0.4	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	75.0	0.5	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	75.1	0.4	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	75.6	0.8	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	74.9	0.5	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	73.0	0.7	no
El Camino Real	South of Trousdale Dr.	72.3	72.9	0.6	no
Hillcrest	West of El Camino Real	59.2	59.8	0.6	no
Murchison	West of El Camino Real	61.5	61.6	0.1	no
Trousdale	West of El Camino Real	66.6	66.9	0.3	no
California Dr.	South of Murchison Dr.	63.4	64.0	0.6	no
California Dr.	North of Murchison Dr.	61.8	64.0	2.2	no
Rollins Rd.	North of Millbrae Ave.	68.1	70.1	2.0	no
Rollins Rd.	South of Millbrae Ave.	67.9	68.9	1.0	no

a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Cumulative (2040) No Project and Plus Project (Specific Plan Update)

Table 4.10-13 identifies the projected Cumulative (2040) No Project (Specific Plan Update) and Cumulative (2040) Plus Project (Specific Plan Update) noise levels. Table 4.10-13 also shows the Specific Plan Update's contributions to the future ambient conditions and significance of impacts on each segment. As shown on Table 4.10-13, no roadway segments are predicted to have significant noise level increases due to implementation of the Specific Plan Update in the Cumulative (2040) No Project (Specific Plan Update) conditions compared to the Cumulative (2040) Plus Project (Specific Plan Update) conditions, and impacts would be *less than significant*.

TABLE 4.10-13 CUMULATIVE (2040) NO PROJECT AND PLUS PROJECT (SPECIFIC PLAN UPDATE) NOISE IMPACTS

		Ambient Noise Level[a]			
Roadway	Segment	2040 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)	Project Contribution To 2040 Noise Environments	Significant Impact?
Millbrae Ave.	East of US 101	68.0	68.1	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.7	72.3	0.6	no
Millbrae Ave.	Rollins Road to Southbound Ramps	79.6	80.4	0.8	no
Millbrae Ave.	El Camino Real to Rollins Road	75.4	76.4	1.0	no
Millbrae Ave.	West of El Camino Real	66.0	66.4	0.4	no
El Camino Real	North of Hillcrest Blvd	75.0	75.3	0.3	no
El Camino Real	Hillcrest Blvd.to La Cruz Ave.	75.2	75.6	0.4	no
El Camino Real	La Cruz Ave.to Victoria Ave.	75.3	75.7	0.4	no
El Camino Real	Victoria Ave.to Millbrae Ave.	75.7	76.3	0.6	no
El Camino Real	Millbrae Ave.to Murchison Dr.	75.6	76.0	0.4	no
El Camino Real	Murchison Dr. to Trousdale Dr.	74.1	74.6	0.5	no
El Camino Real	South of Trousdale Dr.	73.5	74.0	0.5	no
Hillcrest	West of El Camino Real	61.2	61.5	0.3	no
Murchison	West of El Camino Real	63.0	63.1	0.1	no
Trousdale	West of El Camino Real	68.2	68.4	0.2	no
California Dr.	South of Murchison Dr.	64.9	65.3	0.4	no

TABLE 4.10-13 CUMULATIVE (2040) NO PROJECT AND PLUS PROJECT (SPECIFIC PLAN UPDATE) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2040 No Project (dBA CNEL)	Ambient Noise Level[a] 2040 Plus Project (dBA CNEL)	Project Contribution To 2040 Noise Environments	Significant Impact?
California Dr.	North of Murchison Dr.	64.4	65.7	1.3	no
Rollins Rd.	North of Millbrae Ave	69.1	70.7	1.6	no
Rollins Rd.	South of Millbrae Ave	69.3	70.0	0.7	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Existing (2014) No Project and Cumulative (2040) Plus Project (Specific Plan Update)

Table 4.10-14 compares noise levels for the Existing (2014) No Project (Specific Plan Update) and Cumulative (2040) Plus Project (Specific Plan Update) scenarios. Table 4.10-14 shows the overall increase between the Existing (2014) No Project (Specific Plan Update) scenario and the Specific Plan Update's contribution to the increase in noise levels in the Cumulative (2040) Plus Project (Specific Plan Update) scenario. An increase is considered significant if the overall increase is greater than 5 dBA and the project's contribution is greater than 3 dBA.

TABLE 4.10-14 EXISTING (2014) NO PROJECT AND CUMULATIVE (2040) PLUS PROJECT (SPECIFIC PLAN UPDATE) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2014 No Project (dBA CNEL)	Ambient Noise Level[a] 2040 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
Millbrae Ave.	East of US 101	67.1	68.1	1.0	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	72.3	1.3	0.7	no
Millbrae Ave.	Rollins Road to Southbound ramps	79.0	80.4	1.4	0.9	no
Millbrae Ave.	El Camino Real to Rollins Road	74.9	76.4	1.4	1.1	no
Millbrae Ave.	West of El Camino Real	64.8	66.4	1.5	0.5	no
El Camino Real	North of Hillcrest Blvd	74.3	75.3	1.0	0.4	no
El Camino Real	Hillcrest Blvd.to La Cruz Ave.	74.5	75.6	1.1	0.5	no

TABLE 4.10-14 EXISTING (2014) NO PROJECT AND CUMULATIVE (2040) PLUS PROJECT (SPECIFIC PLAN UPDATE) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
El Camino Real	La Cruz Ave.to Victoria Ave.	74.7	75.7	1.0	0.4	no
El Camino Real	Victoria Ave.to Millbrae Ave.	74.8	76.3	1.5	0.8	no
El Camino Real	Millbrae Ave.to Murchison Dr.	74.4	76.0	1.6	0.5	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	74.6	2.2	0.7	no
El Camino Real	South of Trousdale Dr.	72.3	74.0	1.7	0.6	no
Hillcrest Blvd	West of El Camino Real	59.2	61.5	2.3	0.6	no
Murchison Dr.	West of El Camino Real	61.5	63.1	1.6	0.1	no
Trousdale Dr.	West of El Camino Real	66.6	68.4	1.8	0.3	no
California Dr.	South of Murchison Dr.	63.4	65.3	1.9	0.6	no
California Dr.	North of Murchison Dr.	61.8	65.7	3.9	2.2	no
Rollins Rd.	North of Millbrae Ave.	68.1	70.7	2.6	2.0	no
Rollins Rd.	South of Millbrae Ave.	67.9	70.0	2.1	1.0	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

As indicated in the 4.10-14 above, the addition of traffic from buildout of the Specific Plan Update would not result in significant impacts to ambient noise levels along any roadway segments. Additionally, it should be noted that development under the Specific Plan Update would occur over several years and the traffic generated by future development under the proposed Specific Plan Update would increase over time as development occurs. Therefore, the Specific Plan Update's impacts along all of the studied roadway segments are considered *less than significant*.

Significance Without Mitigation: Less than significant.

Stationary Noise

Noise is regulated by numerous codes and ordinances across federal, State, and local agencies. In addition, the City regulates stationary-source noise through the Municipal Code. Implementation of the proposed Specific Plan Update would result in new office, retail, hotel, and residential development within the city. The primary stationary

noise sources from these land uses are landscaping, maintenance activities, and HVAC systems. Noise generated by residential or small commercial uses is generally short and intermittent, and these uses are not a substantial source of noise.

Future projects within the Specific Plan Area would be subject to project-level design and environmental review to ensure that any stationary noise sources would comply with the applicable policies from the Noise Element, as well as the Noise Ordinance and zoning performance standards.

Together, implementation of General Plan Policies NS1.2 through NS1.4 and NS2.1 through NS2.7 shown in Table 4.10-8, as well as Municipal Code Sections 6.25.050 and 10.25.070, as listed above in Section 4.10.1.2, Regulatory Framework, would serve to ensure that stationary noise sources associated with development of future projects under the Specific Plan Update would not result in significant permanent increases in the ambient noise level in the Specific Plan Area. Therefore, the impact in regards to stationary noise sources would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #1 Project

Transportation-Related Noise Impacts

Railway Noise

The discussion under the Specific Plan Update would apply to the TOD #1 project and impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

On-Road Vehicle Noise

Existing (2014) No Project and Plus Project (TOD #1)

Table 4.10-15, below, shows major roadway segments in the project vicinity with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway. Table 4.10-15 identifies the Existing (2014) No Project (TOD #1) conditions and the Existing (2014) Plus Project (TOD #1) conditions. Table 4.10-15 also shows the TOD #1 project's contributions to the existing ambient conditions and significance of impacts on each roadway segment. The significance determinations reflect application of the two-step process described above.

No roadway segments are predicted to have significant noise level increases due to the TOD #1 project in the Existing (2014) No Project (TOD #1) conditions compared to the Existing (2014) Plus Project (TOD #1) conditions, and impacts would be *less than significant*.

TABLE 4.10-15 EXISTING (2014) NO PROJECT AND PLUS PROJECT (TOD #1) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a]		Project Contribution To 2014 Noise Environments	Significant Impact?
		2014 No Project (dBA CNEL)	2014 Plus Project (dBA CNEL)		
Millbrae Ave.	East of US 101	67.1	67.1	0.0	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.2	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.3	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	75.3	0.4	no
Millbrae Ave.	West of El Camino Real	64.8	64.9	0.1	no
El Camino Real	North of Hillcrest Blvd.	74.3	74.4	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	74.7	0.2	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	74.8	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	75.1	0.3	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	74.6	0.2	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	72.5	0.2	no
El Camino Real	South of Trousdale Dr.	72.3	72.5	0.2	no
Hillcrest Blvd	West of El Camino Real	59.2	59.5	0.3	no
Murchison Dr.	West of El Camino Real	61.5	61.5	0.0	no
Trousdale Dr.	West of El Camino Real	66.6	66.7	0.1	no
California Dr.	South of Murchison Dr.	63.4	63.7	0.3	no
California Dr.	North of Murchison Dr.	61.8	63.1	1.3	no
Rollins Rd.	North of Millbrae Ave.	68.1	68.1	0.0	no
Rollins Rd.	South of Millbrae Ave.	67.9	68.0	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Near Term (2020) No Project and Plus Project (TOD #1)

Table 4.10-16, below, shows major roadway segments in the TOD #1 project area with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway. Table 4.10-16 identifies the projected Near Term (2020) No Project (TOD #1) and Near Term (2020) Plus Project (TOD #1) noise levels. Table 4.10-16 also shows the TOD #1 project's contributions to the future 2020 ambient conditions and significance of impacts on each segment.

No roadway segments are predicted to have significant noise level increases due the proposed TOD #1 project in the Near Term (2020) No Project (TOD #1) conditions compared to the Near Term (2020) Plus Project (TOD #1) conditions, and impacts would be *less than significant*.

TABLE 4.10-16 NEAR TERM (2020) NO PROJECT AND PLUS PROJECT (TOD #1) NOISE IMPACTS

		Ambient Noise Level[a]			
Roadway	Segment	2020 No Project (dBA CNEL)	2020 Plus Project (dBA CNEL)	Project Contribution To 2020 Noise Environments	Significant Impact?
Millbrae Ave.	East of US 101	67.3	67.4	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.1	71.4	0.3	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.1	79.4	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	75.1	75.5	0.4	no
Millbrae Ave.	West of El Camino Real	65.2	65.3	0.1	no
El Camino Real	North of Hillcrest Blvd.	74.6	74.7	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.8	74.9	0.1	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.9	75.1	0.2	no
El Camino Real	Victoria Ave. to Millbrae Ave.	75.0	75.4	0.4	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.8	74.9	0.1	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.8	73.0	0.2	no
El Camino Real	South of Trousdale Dr.	72.6	72.8	0.2	no
Hillcrest Blvd	West of El Camino Real	59.9	60.2	0.3	no
Murchison Dr.	West of El Camino Real	62.0	62.0	0.0	no
Trousdale Dr.	West of El Camino Real	67.1	67.2	0.1	no

TABLE 4.10-16 NEAR TERM (2020) NO PROJECT AND PLUS PROJECT (TOD #1) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2020 No Project (dBA CNEL)	Ambient Noise Level[a] 2020 Plus Project (dBA CNEL)	Project Contribution To 2020 Noise Environments	Significant Impact?
California Dr.	South of Murchison Dr.	64.0	64.2	0.2	no
California Dr.	North of Murchison Dr.	62.8	63.8	1.0	no
Rollins Rd.	North of Millbrae Ave.	68.4	68.4	0.0	no
Rollins Rd.	South of Millbrae Ave.	68.3	68.4	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Cumulative (2040) No Project and Plus Project (TOD #1)

Table 4.10-17, below, shows major roadway segments in the TOD #1 project area with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway. Table 4.10-17 identifies the projected Cumulative (2040) No Project (TOD #1) and Cumulative (2040) Plus Project (TOD #1) noise levels. Table 4.10-17 also shows the proposed TOD #1 project's contributions to the future ambient conditions and significance of impacts on each segment.

No roadway segments are predicted to have significant noise level increases due the proposed TOD #1 project in the Cumulative (2040) No Project (TOD #1) conditions compared to the Cumulative (2040) Plus Project (TOD #1) conditions, and impacts would be *less than significant*.

TABLE 4.10-17 CUMULATIVE (2040) NO PROJECT AND PLUS PROJECT (TOD #1) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2040 No Project (dBA CNEL)	Ambient Noise Level[a] 2040 Plus Project (dBA CNEL)	Project Contribution To 2040 Noise Environments	Significant Impact?
Millbrae Ave.	East of US 101	68.0	68.1	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.7	71.9	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.6	79.9	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	75.4	75.8	0.4	no
Millbrae Ave.	West of El Camino Real	66.0	66.1	0.1	no
El Camino Real	North of Hillcrest Blvd.	75.0	75.1	0.1	no

TABLE 4.10-17 CUMULATIVE (2040) NO PROJECT AND PLUS PROJECT (TOD #1) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2040 No Project (dBA CNEL)	Ambient Noise Level[a] 2040 Plus Project (dBA CNEL)	Project Contribution To 2040 Noise Environments	Significant Impact?
El Camino Real	Hillcrest Blvd.to La Cruz Ave.	75.2	75.3	0.1	no
El Camino Real	La Cruz Ave. to Victoria Ave.	75.3	75.4	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	75.7	76.0	0.3	no
El Camino Real	Millbrae Ave. to Murchison Dr.	75.6	75.7	0.1	no
El Camino Real	Murchison Dr. to Trousdale Dr.	74.1	74.3	0.2	no
El Camino Real	South of Trousdale Dr.	73.5	73.7	0.2	no
Hillcrest	West of El Camino Real	61.2	61.3	0.1	no
Murchison	West of El Camino Real	63.0	63.0	0.0	no
Trousdale	West of El Camino Real	68.2	68.3	0.1	no
California Dr.	South of Murchison Dr.	64.9	65.1	0.2	no
California Dr.	North of Murchison Dr.	64.4	65.1	0.7	no
Rollins Rd.	North of Millbrae Ave.	69.1	69.1	0.0	no
Rollins Rd.	South of Millbrae Ave.	69.3	69.3	0.0	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Existing (2014) No Project and Near Term (2020) Plus Project (TOD #1)

Table 4.10-18 compares noise levels for the Existing (2014) No Project (TOD #1) and Near Term (2020) Plus Project (TOD #1) scenarios. Table 4.10-18 shows the overall increase between the Existing (2014) No Project (TOD #1) scenario and the proposed TOD #1 project's contribution to the increase in noise levels in the Near Term (2020) Plus Project (TOD #1) scenario. An increase is considered significant if the overall increase is greater than 5 dBA and the project's contribution is greater than 3 dBA.

TABLE 4.10-18 EXISTING (2014) NO PROJECT AND NEAR TERM (2020) PLUS PROJECT (TOD #1) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2020 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
Millbrae Ave.	East of US 101	67.1	67.4	0.3	0.0	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.4	0.4	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.4	0.5	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	75.5	0.6	0.4	no
Millbrae Ave.	West of El Camino Real	64.8	65.3	0.4	0.1	no
El Camino Real	North of Hillcrest Blvd	74.3	74.7	0.4	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	74.9	0.5	0.2	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	75.1	0.5	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	75.4	0.6	0.3	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	74.9	0.5	0.2	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	73.0	0.7	0.2	no
El Camino Real	South of Trousdale Dr.	72.3	72.8	0.6	0.2	no
Hillcrest Blvd.	West of El Camino Real	59.2	60.2	0.9	0.3	no
Murchison Dr.	West of El Camino Real	61.5	62.0	0.5	0.0	no
Trousdale Dr.	West of El Camino Real	66.6	67.2	0.6	0.1	no
California Dr.	South of Murchison Dr.	63.4	64.2	0.8	0.3	no
California Dr.	North of Murchison Dr.	61.8	63.8	2.0	1.3	no
Rollins Rd.	North of Millbrae Ave.	68.1	68.4	0.3	0.0	no
Rollins Rd.	South of Millbrae Ave.	67.9	68.4	0.5	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

As indicated in Table 4.10-18 above, the addition of traffic from the proposed TOD #1 project would not result in significant impacts to ambient noise levels along any roadway segments. Therefore, the proposed TOD #1 project's impacts along all of the studied roadway segments are considered *less than significant*.

Significance Without Mitigation: Less than significant.

Existing (2014) No Project and Cumulative (2040) Plus Project (TOD #1)

Table 4.10-19 compares noise levels for the Existing (2014) No Project (TOD #1) and Cumulative (2040) Plus Project (TOD #1) scenarios. Table 4.10-19 shows the overall increase between the Existing (2014) No Project (TOD #1) scenario and the proposed TOD #1 project's contribution to the increase in noise levels in the Cumulative (2040) Plus Project (TOD #1) scenario. An increase is considered significant if the overall increase is greater than 5 dBA and the project's contribution is greater than 3 dBA.

TABLE 4.10-19 EXISTING (2014) NO PROJECT AND CUMULATIVE (2040) PLUS PROJECT (TOD #1) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
Millbrae Ave.	East of US 101	67.1	68.1	1.0	0.0	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.9	0.9	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.9	0.9	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	75.8	0.8	0.4	no
Millbrae Ave.	West of El Camino Real	64.8	66.1	1.3	0.1	no
El Camino Real	North of Hillcrest Blvd	74.3	75.1	0.8	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	75.3	0.8	0.2	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	75.4	0.7	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	76.0	1.2	0.3	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	75.7	1.3	0.2	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	74.3	1.9	0.2	no
El Camino Real	South of Trousdale Dr.	72.3	73.7	1.4	0.2	no
Hillcrest Blvd.	West of El Camino Real	59.2	61.3	2.1	0.3	no
Murchison Dr.	West of El Camino Real	61.5	63.0	1.5	0.0	no

TABLE 4.10-19 EXISTING (2014) NO PROJECT AND CUMULATIVE (2040) PLUS PROJECT (TOD #1) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
Trousdale Dr.	West of El Camino Real	66.6	68.3	1.7	0.1	no
California Dr.	South of Murchison Dr.	63.4	65.1	1.7	0.3	no
California Dr.	North of Murchison Dr.	61.8	65.1	3.3	1.3	no
Rollins Rd.	North of Millbrae Ave.	68.1	69.1	1.0	0.0	no
Rollins Rd.	South of Millbrae Ave.	67.9	69.3	1.4	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

As indicated in Table 4.10-19 above, the addition of traffic from the proposed TOD #1 project would not result in significant impacts to ambient noise levels along any roadway segments. Therefore, the proposed TOD #1 project's impacts along all of the studied roadway segments are considered *less than significant*.

Significance Without Mitigation: Less than significant.

Stationary Noise

The discussion under the Specific Plan Update would apply to the TOD #1 project and impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #2 Project

Transportation-Related Noise Impacts

Railway Noise

The discussion under the Specific Plan Update would apply to the TOD #1 project and impacts would be *less than significant.*

Significance Without Mitigation: Less than significant.

On-Road Vehicle Noise

Existing (2014) No Project and Plus Project (TOD #2)

Table 4.10-20, below, shows major roadway segments in the project vicinity with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway. Table 4.10-20 identifies the Existing (2014) No Project (TOD #2) conditions and the Existing (2014) Plus Project (TOD #2) conditions. Table 4.10-20 also shows the TOD #2 project's contributions to the existing ambient conditions and significance of impacts on each roadway segment. The significance determinations reflect application of the two-step process described above.

No roadway segments are predicted to have significant noise level increases due to the TOD #2 project in the Existing (2014) No Project (TOD #2) conditions compared to the Existing (2014) Plus Project (TOD #2) conditions, and impacts would be *less than significant*.

TABLE 4.10-20 EXISTING (2014) NO PROJECT AND PLUS PROJECT (TOD #2) NOISE IMPACTS

		Ambient Noise Level[a]			
Roadway	Segment	2014 No Project (dBA CNEL)	2014 Plus Project (dBA CNEL)	Project Contribution To 2014 Noise Environments	Significant Impact?
Millbrae Ave.	East of US 101	67.1	67.1	0.0	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.2	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.3	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	75.3	0.4	no
Millbrae Ave.	west of El Camino Real	64.8	65.1	0.3	no
El Camino Real	North of Hillcrest Blvd.	74.3	74.4	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	74.6	0.1	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	74.8	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	74.9	0.1	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	74.6	0.2	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	72.6	0.3	no
El Camino Real	South of Trousdale Dr.	72.3	72.5	0.2	no
Hillcrest	West of El Camino Real	59.2	59.2	0.0	no
Murchison	West of El Camino Real	61.5	61.5	0.0	no

TABLE 4.10-20 EXISTING (2014) NO PROJECT AND PLUS PROJECT (TOD #2) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2014 No Project (dBA CNEL)	Ambient Noise Level[a] 2014 Plus Project (dBA CNEL)	Project Contribution To 2014 Noise Environments	Significant Impact?
Trousdale	West of El Camino Real	66.6	66.7	0.1	no
California Dr.	South of Murchison Dr.	63.4	63.4	0.0	no
California Dr.	North of Murchison Dr.	61.8	61.8	0.0	no
Rollins Rd.	North of Millbrae Ave.	68.1	70.3	2.2	no
Rollins Rd.	South of Millbrae Ave.	67.9	68.0	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Near Term (2020) No Project and Plus Project (TOD #2)

Table 4.10-21, below, shows major roadway segments in the TOD #2 project area with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway. Table 4.10-21 identifies the projected Near Term (2020) No Project (TOD #2) and Near Term (2020) Plus Project (TOD #2) noise levels. Table 4.10-21also shows the TOD #2 project's contributions to the future 2020 ambient conditions and significance of impacts on each segment.

No roadway segments are predicted to have significant noise level increases due the proposed TOD #2 project in the Near Term (2020) No Project (TOD #2) conditions compared to the Near Term (2020) Plus Project (TOD #2) conditions, and impacts would be *less than significant*.

TABLE 4.10-21 NEAR TERM (2020) NO PROJECT AND PLUS PROJECT (TOD #2) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2020 No Project (dBA CNEL)	Ambient Noise Level[a] 2020 Plus Project (dBA CNEL)	Project Contribution To 2020 Noise Environments	Significant Impact?
Millbrae Ave.	East of US 101	67.3	67.4	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.1	71.4	0.3	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.1	79.4	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	75.1	75.4	0.3	no

TABLE 4.10-21 NEAR TERM (2020) NO PROJECT AND PLUS PROJECT (TOD #2) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a] 2020 No Project (dBA CNEL)	Ambient Noise Level[a] 2020 Plus Project (dBA CNEL)	Project Contribution To 2020 Noise Environments	Significant Impact?
Millbrae Ave.	west of El Camino Real	65.2	65.4	0.2	no
El Camino Real	North of Hillcrest Blvd.	74.6	74.7	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.8	74.9	0.1	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.9	75.1	0.2	no
El Camino Real	Victoria Ave. to Millbrae Ave.	75.0	75.2	0.2	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.8	74.9	0.1	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.8	73.1	0.3	no
El Camino Real	South of Trousdale Dr.	72.6	72.8	0.2	no
Hillcrest	West of El Camino Real	59.9	59.9	0.0	no
Murchison	West of El Camino Real	62.0	62.0	0.0	no
Trousdale	West of El Camino Real	67.1	67.2	0.1	no
California Dr.	South of Murchison Dr.	64.0	64.0	0.0	no
California Dr.	North of Murchison Dr.	62.8	62.8	0.0	no
Rollins Rd.	North of Millbrae Ave.	68.4	70.4	2.0	no
Rollins Rd.	South of Millbrae Ave.	68.3	68.4	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Cumulative (2040) No Project and Plus Project (TOD #2)

Table 4.10-22, below, shows major roadway segments in the TOD #2 project area with estimated increases in the ambient noise level at a distance of 50 feet from the centerline of the roadway. Table 4.10-22 identifies the projected Cumulative (2040) No Project (TOD #2) and Cumulative (2040) Plus Project (TOD #2) noise levels. Table 4.10-22 also shows the proposed TOD #2 project's contributions to the future ambient conditions and significance of impacts on each segment. No roadway segments are predicted to have significant noise level increases due the proposed TOD #2 project in the Cumulative (2040) No Project (TOD #2) conditions compared to the Cumulative (2040) Plus Project (TOD #2) conditions, and impacts would be *less than significant*.

TABLE 4.10-22 CUMULATIVE (2040) NO PROJECT AND PLUS PROJECT (TOD #2) NOISE IMPACTS

Roadway	Segment	Ambient Noise Level[a]		Project Contribution To 2040 Noise Environments	Significant Impact?
		2040 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)		
Millbrae Ave.	East of US 101	68.0	68.1	0.1	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.7	71.9	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.6	79.8	0.2	no
Millbrae Ave.	El Camino Real to Rollins Rd.	75.4	75.7	0.3	no
Millbrae Ave.	West of El Camino Real	66.0	66.2	0.2	no
El Camino Real	North of Hillcrest Blvd	75.0	75.1	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	75.2	75.3	0.1	no
El Camino Real	La Cruz Ave. to Victoria Ave.	75.3	75.4	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	75.7	75.8	0.1	no
El Camino Real	Millbrae Ave.to Murchison Dr.	75.6	75.7	0.1	no
El Camino Real	Murchison Dr. to Trousdale Dr.	74.1	74.3	0.2	no
El Camino Real	South of Trousdale Dr.	73.5	73.7	0.2	no
Hillcrest	West of El Camino Real	61.2	61.2	0.0	no
Murchison	West of El Camino Real	63.0	63.0	0.0	no
Trousdale	West of El Camino Real	68.2	68.3	0.1	no
California Dr.	South of Murchison Dr.	64.9	64.9	0.0	no
California Dr.	North of Murchison Dr.	64.4	64.4	0.0	no
Rollins Rd.	North of Millbrae Ave.	69.1	70.8	1.7	no
Rollins Rd.	South of Millbrae Ave.	69.3	69.3	0.0	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

Existing (2014) No Project and Near Term (2020) Plus Project (TOD #1)

Table 4.10-23 compares noise levels for the Existing (2014) No Project (TOD #1) and Near Term (2020) Plus Project (TOD #1) scenarios. Table 4.10-23 shows the overall increase between the Existing (2014) No Project (TOD #1) scenario and the proposed TOD #1 project's contribution to the increase in noise levels in the Near Term (2020) Plus Project (TOD #1) scenario. An increase is considered significant if the overall increase is greater than 5 dBA and the project's contribution is greater than 3 dBA.

TABLE 4.10-23 EXISTING (2014) NO PROJECT AND NEAR TERM (2020) PLUS PROJECT (TOD #2) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2020 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
Millbrae Ave.	East of US 101	67.1	67.4	0.3	0.0	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.4	0.4	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.4	0.5	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	75.4	0.5	0.4	no
Millbrae Ave.	West of El Camino Real	64.8	65.4	0.6	0.1	no
El Camino Real	North of Hillcrest Blvd.	74.3	74.7	0.4	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	74.9	0.4	0.2	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	75.1	0.4	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	75.2	0.4	0.3	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	74.9	0.5	0.2	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	73.1	0.7	0.2	no
El Camino Real	South of Trousdale Dr.	72.3	72.8	0.6	0.2	no
Hillcrest Blvd.	West of El Camino Real	59.2	59.9	0.7	0.3	no
Murchison Dr.	West of El Camino Real	61.5	62.0	0.5	0.0	no
Trousdale Dr.	West of El Camino Real	66.6	67.2	0.6	0.1	no
California Dr.	South of Murchison Dr.	63.4	64.0	0.6	0.3	no

TABLE 4.10-23 EXISTING (2014) NO PROJECT AND NEAR TERM (2020) PLUS PROJECT (TOD #2) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2020 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
California Dr.	North of Murchison Dr.	61.8	62.8	1.0	1.3	no
Rollins Rd.	North of Millbrae Ave.	68.1	70.4	2.4	0.0	no
Rollins Rd.	South of Millbrae Ave.	67.9	68.4	0.5	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

As indicated in Table 4.10-23 above, the addition of traffic from the proposed TOD #2 project would not result in significant impacts to ambient noise levels along any roadway segments. Therefore, the proposed TOD #2 project's impacts along all of the studied roadway segments are considered *less than significant*.

Existing (2014) No Project and Cumulative (2040) Plus Project (TOD #1)

Table 4.10-24 compares noise levels for the Existing (2014) No Project (TOD #1) and Cumulative (2040) Plus Project (TOD #1) scenarios. Table 4.10-24 shows the overall increase between the Existing (2014) No Project (TOD #1) scenario and the proposed TOD #1 project's contribution to the increase in noise levels in the Cumulative (2040) Plus Project (TOD #1) scenario. An increase is considered significant if the overall increase is greater than 5 dBA and the project's contribution is greater than 3 dBA.

TABLE 4.10-24 EXISTING (2014) NO PROJECT AND CUMULATIVE (2040) PLUS PROJECT (TOD #2) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
Millbrae Ave.	East of US 101	67.1	68.1	1.0	0.0	no
Millbrae Ave.	Southbound Ramps to Northbound Ramps	71.0	71.9	0.9	0.2	no
Millbrae Ave.	Rollins Rd. to Southbound Ramps	79.0	79.8	0.9	0.3	no
Millbrae Ave.	El Camino Real to Rollins Rd.	74.9	75.7	0.8	0.4	no
Millbrae Ave.	West of El Camino Real	64.8	66.2	1.4	0.3	no

TABLE 4.10-24 EXISTING (2014) NO PROJECT AND CUMULATIVE (2040) PLUS PROJECT (TOD #2) NOISE IMPACTS

		Ambient Noise Level[a]				
Roadway	Segment	2014 No Project (dBA CNEL)	2040 Plus Project (dBA CNEL)	Overall Increase	Project Contribution	Significant Impact?
El Camino Real	North of Hillcrest Blvd.	74.3	75.1	0.8	0.1	no
El Camino Real	Hillcrest Blvd. to La Cruz Ave.	74.5	75.3	0.8	0.1	no
El Camino Real	La Cruz Ave. to Victoria Ave.	74.7	75.4	0.7	0.1	no
El Camino Real	Victoria Ave. to Millbrae Ave.	74.8	75.8	1.0	0.1	no
El Camino Real	Millbrae Ave. to Murchison Dr.	74.4	75.7	1.3	0.2	no
El Camino Real	Murchison Dr. to Trousdale Dr.	72.3	74.3	2.0	0.3	no
El Camino Real	South of Trousdale Dr.	72.3	73.7	1.4	0.2	no
Hillcrest Blvd.	West of El Camino Real	59.2	61.2	1.9	0.0	no
Murchison Dr.	West of El Camino Real	61.5	63.0	1.5	0.0	no
Trousdale Dr.	West of El Camino Real	66.6	68.3	1.7	0.1	no
California Dr.	South of Murchison Dr.	63.4	64.9	1.5	0.0	no
California Dr.	North of Murchison Dr.	61.8	64.4	2.6	0.0	no
Rollins Rd.	North of Millbrae Ave.	68.1	70.8	2.7	2.2	no
Rollins Rd.	South of Millbrae Ave.	67.9	69.3	1.4	0.1	no

Notes:
a. All ambient noise levels presented in this table are for a distance of 50 feet from the roadway centerline.
Source: Fehr & Peers, 2014.

As indicated in Table 4.10-24 above, the addition of traffic from the proposed TOD #2 project would not result in significant impacts to ambient noise levels along any roadway segments. Therefore, the proposed TOD #2 project's impacts along all of the studied roadway segments are considered *less than significant*.

Stationary Noise

The discussion under the Specific Plan Update would apply to the TOD #2 project and impacts would be *less than significant*.

Significance Without Mitigation: Less than significant.

NOISE-4	The proposed Project would not cause a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

This analysis considers that the noise generated by construction activities associated with the proposed Project would be significant if they would exceed the standards listed in General Plan Policy NS1.2, as explained above in Section 4.10.1.2, Regulatory Framework, of this chapter.

Noise from construction equipment and various construction-related activities is frequently a cause of temporary or periodic increases in ambient noise levels. Table 4.10-25 below shows typical noise levels generated by commonly used pieces of construction equipment.

TABLE 4.10-25 CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Equipment	Typical Noise Level (dBA) at 50 Feet	Construction Equipment	Typical Noise Level (dBA) at 50 Feet
Air Compressor	81	Pile-Driver (Impact)	101
Backhoe	80	Pile-Driver (Sonic)	96
Ballast Equalizer	82	Pneumatic Tool	85
Ballast Tamper	83	Pump	76
Compactor	82	Rail Saw	90
Concrete Mixer	85	Rock Drill	98
Concrete Pump	71	Roller	74
Concrete Vibrator	76	Saw	76
Crane, Derrick	88	Scarifier	83
Crane, Mobile	83	Scraper	89
Dozer	85	Shovel	82
Generator	81	Spike Driver	77
Grader	85	Tie Cutter	84
Impact Wrench	85	Tie Handler	80
Jack Hammer	88	Tie Inserter	85
Loader	85	Truck	88
Paver	89		

Source: Federal Transit Administration, Transit Noise, and Vibration Impact Assessment, 2006.

Specific Plan Update

Temporary or periodic increases in ambient noise levels under the proposed Specific Plan Update would chiefly result from construction activities associated with development activity under the proposed Specific Plan Update. Construction would result in increased noise levels in the short-term. The duration of elevated noise levels is relatively short and finite. While Specific Plan Update buildout is anticipated to occur over a 25-year horizon, construction would occur in localized areas during each construction season. Thus, the temporarily increased noise levels would not affect the same sensitive-receptors throughout the entire buildout period. The addition of future project construction noises to the existing and future ambient noise levels discussed in NOISE-3 above could result in substantial temporary or periodic increases in noise levels.

The timing of the Specific Plan Update t's development in terms of which individual projects will be constructed and in what order, including the order of both proposed TOD projects, is unknown at this time. Also unknown is the exact equipment mix (i.e. number of each of the above equipment items), spatial distribution, phasing, and overall durations of the construction activities for each individual project within the Specific Plan Area. Thus, assessing the specific temporary (and periodic) noise increases from construction of future projects under the Specific Plan Update is not feasible at this time.

Future development projects under the Specific Plan Update would be required to comply with Title 9, Building Regulations, of the City's Municipal Code, including the following construction-focused sections:

- Section 9.05.020: Under sub-section 1.8.4.5, Hours of Construction, construction, alteration or repair work shall occur only during the following hours: Monday through Friday 7:30 a.m. to 7:00 p.m., Saturday 8:00 a.m. to 6:00 p.m., and Sunday and Holidays 9:00 a.m. to 6:00 p.m. Any work outside these hours is prohibited without prior written permission of the Administrative Authority.

By restricting the hours of construction per Municipal Code Section 9.05.020, temporary or periodic increases to ambient noise from construction activities within the Specific Plan Area would only occur during daytime hours. Therefore, reducing noise in the evenings and early mornings between 7:00 p.m. and 7:00 a.m. consistent with General Plan Policy NS1.4. Through the implementation of these regulations, temporary or periodic impacts to ambient noise levels from construction activities related to future construction under the Specific Plan Update would be minimized to the maximum extent feasible. In addition, subsequent projects would be subject to separate, project-level review to identify and mitigate potential impacts. Therefore, the impact would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #1 Project

Short-term construction activities would periodically increase ambient noise levels in the TOD #1 project site and vicinity, and would subside once construction of the proposed TOD #1 project is completed. Construction activities associated with the proposed TOD #1 project are estimated to occur in four phases over an approximate nine-year period. As shown in Table 4.10-25, the noisiest activities, which are associated with paving, would occur over an approximate one-month period throughout each of four construction phases.

Construction Vehicles

The transportation of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there would be a relatively high single-event noise exposure potential with passing trucks (a maximum noise level of 86 dBA at 50 feet),[28] the expected number of workers and trucks is minimal relative to the existing traffic flows on streets adjacent to the TOD #1 project site. The primary construction traffic access roadway is expected to be El Camino Real. The truck trips would be spread throughout the workday and would primarily occur during non-peak traffic periods. Estimated traffic flows on the segment of El Camino Real between Victoria Avenue and Millbrae Avenue are approximately 35,000 vehicles per day.[29] From Applicant projections for construction activities, demolition activities during grading would result in 50 one-way haul truck trips per day. Vehicle trips for workers are anticipated to be below 50 daily trips per day. These levels of haul truck and worker vehicle traffic flows would be negligible compared to the volumes of traffic currently generated on this roadway segment. Therefore, these impacts are *less than significant* at noise receptors along the construction routes.

Construction Equipment

Noise generated during construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Noise levels are the average noise levels for each construction phase. Each stage involves the use of different kinds of construction equipment and, therefore, has its own distinct noise characteristics.

Noise levels from construction activities are usually dominated by the loudest piece of construction equipment. Noise levels from construction activities associated with the proposed TOD #1 project were calculated assuming the use of all applicable construction equipment at the same time at average distances (center of construction site to nearest property line of nearest noise-sensitive receptor off-site) and at the locations of the closest building that would be part of the proposed TOD #1 project, and are shown in Table 4.10-26.

[28] California Department of Transportation, 2009, Technical Noise Supplement. Prepared by ICF International.
[29] Fehr & Peers, 2014.

TABLE 4.10-26 AVERAGE CONSTRUCTION NOISE LEVELS (TOD #1 PROJECT)

		Average Construction Noise Levels (dBA L_{eq})					
Noise-Sensitive Land Use	Distance	Demolition	Grading	Trenching	Building	Paving	Painting
Homes to Northwest	Average – 385 feet[a]	68.9	69.0	66.3	69.5	69.6	56.0
	At Closest Building – 30 feet	91.1	91.1	88.5	91.6	91.8	78.1
Homes to North	Average – 655 feet[a]	64.3	64.3	61.7	64.8	65.0	51.3
	At Closest Building – 315 feet	70.7	70.7	68.0	71.2	71.4	57.7
Mixed Use Development to Southwest across El Camino Real	Average – 335 feet[a]	70.1	70.2	67.5	70.7	70.8	57.2
	At Closest Building – 310 feet	70.8	70.8	68.2	71.3	71.5	57.8

Notes:
a. Average distance is defined as the approximate distance from the receiving property line to the center of construction activities.
Source: Roadway Construction Noise Model (RCNM), 2015; Millbrae Serra Station LLC, 2015.

Average noise levels at the closest residential land uses to the northwest of the TOD #1 project site could potentially be in the range of 88.5 to 91.8 dBA L_{eq} for periods during the highest levels of construction activity while the building closest to the residential area is being constructed. While the magnitude of the average noise levels would be higher than the ambient noise environment at noise-sensitive land uses, construction activities would fluctuate throughout the workday as equipment would not be in use at the same time at one location, nor for an extended period of time on any given workday. Furthermore, construction activities would comply with Municipal Code Section 9.05.020 and General Plan Policy NS1.4, which are listed above under NOISE-4 for the Specific Plan Update. This would ensure that construction work would be limited to the permitted daytime hours. Overall, construction activities would generally be restricted to the least noise-sensitive portions of the day, and maximum noise levels would be infrequent throughout the workday for the approximate nine-year duration. However, as stated above in Noise Measurements under Section 4.10.1.3, Existing Conditions, of this chapter, the L_{dn} of long-term noise monitoring location LT-2, which is located near the southern edge of the TOD #1 project site, is 71.8 dBA. Since the L_{dn} in the TOD #1 project site is above 60 dBA, construction associated with the proposed TOD #1 project would require the evaluation of mitigation measures in accordance with General Plan Policy NS1.2, as explained above in Section 4.10.1.2, Regulatory Framework, of this chapter. Therefore, temporary construction noise impacts from the proposed TOD #1 project would be *significant*.

Impact NOISE-TOD#1-4: Construction activities associated with the proposed TOD #1 project would result in substantial temporary or periodic increases in ambient noise levels in the vicinity of the TOD #1 project site above existing levels.

Mitigation Measure NOISE-TOD#1-4: The project Applicant shall implement the following measures, which shall be identified in construction contracts and acknowledged by the contractor:

- Construction equipment shall be well maintained and used judiciously to be as quiet as practical. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g. improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible;
- Utilize "quiet" models of air compressors and other stationary noise sources where such technology exists. Select hydraulically or electrically powered equipment and avoid pneumatically powered equipment where feasible. Impact tools (e.g. jack hammers, pavement breakers, and rock drills) used for project demolition or construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures;
- Locate stationary noise-generating equipment as far as possible from sensitive receptors that adjoin construction sites. Construct temporary noise barriers or partial enclosures to acoustically shield such equipment where feasible;
- Prohibit unnecessary idling of internal combustion engines;
- Prior to initiation of on-site construction-related demolition or earthwork activities, a minimum 8-foot-high temporary sound barrier shall be erected along the project property line abutting adjacent operational businesses, residences or other noise-sensitive land uses. These temporary sound barriers shall be constructed with a minimum surface weight of 4 pounds per square foot and shall be constructed so that vertical or horizontal gaps are eliminated. These temporary barriers shall remain in place through the construction phase in which heavy construction equipment, such as excavators, dozers, scrapers, loaders, rollers, pavers, and dump trucks, are operating within 50 feet of the edge of the construction site by adjacent sensitive land uses. This measure could lower construction noise levels at adjacent, ground-floor residential units by up to 8 dBA, depending on topography and site conditions;
- To the maximum extent feasible, route construction-related traffic along major roadways and away from sensitive receptors;
- Notify all businesses, residences or other noise-sensitive land uses within 500 feet of the perimeter of the construction site of the construction schedule in writing prior to the beginning of construction and prior to each construction phase change that could potentially result in a temporary increase in ambient noise levels in the project vicinity;
- Signs shall be posted at the construction site that include permitted construction days and hours, a day and evening contact number for the job site, and a day and evening contact number for the on-site complaint and enforcement manager, and the City's Building Division, in the event of problems;
- An on-site complaint and enforcement manager shall be available to respond to and track complaints. The manager will be responsible for responding to any complaints regarding construction noise and for coordinating with the adjacent land uses. The manager will determine the cause of any complaints (e.g. starting too early, bad muffler, etc.) and coordinate with the construction team to implement effective measures (considered technically and economically feasible) to correct the problem. The telephone

number of the coordinator shall be posted at the construction site and provided to neighbors in a notification letter. The manager shall notify the City's Building Division of all complaints within 24 hours. The manager will be trained to use a sound level meter and should be available during all construction hours to respond to complaints; and

- A pre-construction meeting shall be held with Building Division Staff and the general contractor/on-site project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are fully operational.

Significance With Mitigation: Less than significant.

TOD #2 Project

Short-term construction activities would periodically increase ambient noise levels in the TOD #2 project site vicinity and would subside once construction of the proposed TOD #2 project is completed. Construction activities associated with the proposed TOD #1 project are estimated to occur in four phases over an approximate five-year period. As shown in Table 4.10-26, the noisiest activities, which are associated with grading, would occur over two months in Phase 1 and over four months in Phases 2, 3, and 4.

Construction Vehicles

The transportation of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there would be a relatively high single-event noise exposure potential with passing trucks (a maximum noise level of 86 dBA at 50 feet),[30] the expected number of workers and trucks is minimal relative to the existing traffic flows on streets adjacent to the TOD #2 project site. The primary construction traffic access roadway is expected to be Millbrae Avenue via Rollins Road. The truck trips would be spread throughout the workday and would primarily occur during non-peak traffic periods. Estimated traffic flows on the segment of Millbrae Avenue between El Camino Real and U.S. 101 are approximately 36,000 to 40,000 vehicles per day.[31] From Project Applicant projections for construction activities, demolition activities during Phases 1 and 2 would result in 111 and 57 one-way haul truck trips, respectively. Vehicle trips for workers are anticipated to be below 50 daily trips per day. These levels of haul truck and worker vehicle traffic flows would be negligible compared to the volumes of traffic currently generated on this roadway segment. Therefore, these impacts are *less than significant* at noise receptors along the construction routes.

Construction Equipment

Noise generated during construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Noise levels are the average noise levels for each construction phase. Each stage involves the use of different kinds of construction equipment and, therefore, has its own distinct noise characteristics.

[30] California Department of Transportation, 2009, Technical Noise Supplement. Prepared by ICF International.
[31] Fehr & Peers, 2014.

Noise levels from construction activities are usually dominated by the loudest piece of construction equipment. Noise levels from construction activities associated with the proposed TOD #2 project were calculated assuming the use of all applicable construction equipment at the same time at average distances (center of construction site to nearest property line of nearest noise-sensitive receptor off-site) and at the locations of the closest building that would be part of the proposed TOD #2 project, and are shown in Table 4.10-27.

TABLE 4.10-27 AVERAGE CONSTRUCTION NOISE LEVELS (TOD #2 PROJECT)

		Average Construction Noise Levels (dBA L_{eq})					
Noise-Sensitive Land Use	Distance	Demolition	Grading	Trenching	Building	Paving	Painting
Homes to Northwest	Average – 465 feet[a]	69.1	69.3	65.1	67.3	67.8	54.3
	At Closest Building – 245 feet	74.6	74.9	70.7	74.9	73.3	70.7
Homes to West	Average – 1050 feet[a]	62.0	62.3	58.0	62.3	60.7	58.0
	At Closest Building – 810 feet	64.3	64.5	60.3	64.5	62.9	60.3
Mixed Use Development to Southwest across El Camino Real	Average – 1270 feet[a]	60.4	60.6	56.4	58.6	59.0	56.4
	At Closest Building – 865 feet	63.7	64.0	59.7	64.0	62.4	59.7

Notes:
a. Average distance is defined as the approximate distance from the receiving property line to the center of construction activities.
Source: Roadway Construction Noise Model (RCNM), 2015; Republic Millbrae, 2015.

Average noise levels at the closest residential land uses to the northwest of the TOD #2 project site could be in the range of 70.7 to 74.9 dBA L_{eq} for periods during the highest levels of construction activity. While the magnitude of the average noise levels would be higher than the ambient noise environment at noise-sensitive land uses, construction activities would fluctuate throughout the workday as equipment would not be in use at the same time at one location, nor for an extended period of time on any given workday. Furthermore, construction activities would comply with Municipal Code Section 9.05.020 and General Plan Policy NS1.4, which are listed above under NOISE-4 for the Specific Plan Update. This would ensure that construction work would be limited to the permitted daytime hours. Overall, construction activities would generally be restricted to the least noise-sensitive portions of the day, and maximum noise levels would be infrequent throughout the workday for the approximate five-year duration. However, as stated above in Noise Measurements under Section 4.10.1.3, Existing Conditions, of this chapter, the L_{dn} of long-term noise monitoring location LT-1 which is located near the center of the TOD #2 project site, is 67.9 dBA. Since the L_{dn} in the TOD #2 project site is above 60 dBA, construction associated with the proposed TOD #2 project would require the evaluation of mitigation measures in accordance with General Plan Policy NS1.2, as explained above in Section 4.10.1.2, Regulatory Framework, of this chapter. Therefore, temporary construction noise impacts from the proposed TOD #2 project would be *significant*.

Impact NOISE-TOD#2-4: Construction activities associated with the proposed TOD #2 project would result in substantial temporary or periodic increases in ambient noise levels in the vicinity of the TOD #2 project site above existing levels.

Mitigation Measure NOISE-TOD#2-4: Implement Mitigation Measure NOISE-TOD#1-4.

Significance With Mitigation: Less than significant.

NOISE-5	The proposed Project would cause exposure of people residing or working in the vicinity of the plan area to excessive aircraft noise levels, for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport.

Millbrae is located adjacent to SFO and aircraft can be heard throughout most of the city. The Specific Plan Area and both TOD project sites are within the SFO ALUCP area. With the exception of the area southwest of El Camino Real, the Specific Plan Area is within at least the 65 dBA CNEL Aircraft Noise Contours, according to General Plan 1983 Noise Contour Map shown on Figure 4.10-2. Much of the Specific Plan Area that falls within at least the 70 dBA CNEL aircraft noise contour is either open space that is owned by the airport for occasional staging and storage purposes, land occupied by US 101, or land zoned for public facility use. As stated above under NOISE-1, this figure is based on the Millbrae 1983 Noise Contour Map.

The 1983 contour are significantly larger than the current 2014 SFO ALUCP aircraft noise contours. As determined by the current 2014 contours, the only portions of the Specific Plan Area that fall within at least the 65 dBA CNEL Airport Noise Contour are the area northeast of US 101, which is also partly within the SFO's 70 dBA CNEL Noise Contour, and a small portion of the area immediately south of where the southbound US 101 on-ramp meets the highway. The land northeast of US 101 currently contains the City of Millbrae's Public Works Operations Center; Corporation Yard and Garage; and Water Pollution Control Plant. This area is zoned for public facility use. The portion south of the southbound US 101 on-ramp is used as a parking lot for the industrial land uses sections in the area. These land uses are not considered sensitive receptors and new development within these areas is highly unlikely. People living and working in the rest of the Specific Plan Area are not expected to be regularly exposed to high levels of noise from the airport.[32]

Specific Plan Update

Future development projects under the Specific Plan Update would be required to comply with the City's Municipal Code, including the following airport-focused sections:

- Section 9.05.020: Under sub-section 1.8.4.6, Protection from Airport Noise, any future residential buildings under the Specific Plan Update, located within the 65 CNEL level as shown on the current Millbrae General Plan 1983 Noise Contour Map, which is either newly constructed or renovated at a cost equal to or greater

[32] San Francisco International Airport, 2014, *2014 Noise Exposure Map,* San Francisco. (http://media.flysfo.com/media/sfo/noise-abatement/2014-sfo-nem-plot.pdf). Accessed on February 23, 2015

than 25 percent of the valuation (as assessed by the County Assessor) would be required to meet noise insulation standards set by the City of Millbrae Noise Insulation Program and the FAA.

- Section 10.40.020 General Disclosures: A. For property located in the city of Millbrae, the following information is required to be disclosed in connection with sales of residential dwellings:
  1. The city of Millbrae is immediately adjacent to SFO.
  2. SFO is the fifth largest airport by volume in the United States and the seventh largest by volume in the world.
  3. The property is subject to noise from aircraft. (Ord. 667, Section 1; 1976 Code Section 10-8.02).
- Section 10.40.030 Special Disclosures for Property Within the 65 CNEL Noise Footprint: A. For property located within the 65 CNEL Aircraft Noise Footprint based upon the Federal Aviation Administration ("FAA") 1983 CNEL Noise Contour Map set forth in Appendix A hereto, the following disclosures shall be made in connection with sales of residential dwellings:
  1. The property is located within the 65 CNEL Aircraft Noise Footprint of the 1983 FAA CNEL Noise Contour Map for Millbrae, California.
  2. If the property is constructed after January 1, 1983, or is renovated at a cost equal to twenty-five percent or more of the current market value of the home, it must be insulated against aircraft noise to meet FAA noise insulation program standards (Ordinance 667, Section 1; 1976 Code Section 10-8.03).

By meeting noise insulation standards and disclosing to future residential and business tenants of the property being subject to aircraft noise per the aforementioned Municipal Code Sections, aircraft noise within the Specific Plan Area would be adequately insulated to appropriate indoor levels. However, these noise regulations would be insufficient to prevent exposure to aircraft noise from workers and residents when they are outdoors. Therefore, the following General Plan Policies in the City's Noise Element would aim reduce airport noise impacts:

- Policy NS3.2 Coordination with Other Agencies: Work with the county Airport Land Use Commission (ALUC), State Office of Noise Control (ONC), CalTrans, SFO, Joint Powers Board and other agencies to reduce noise generated from sources outside the City's jurisdiction.
- Policy NS3.3 Airport Noise Mitigation. Negotiate with the Airport for implementation of all feasible noise reduction measures and participate in the Airport Community Roundtable to ensure ongoing reduction of Airport Noise.
- Policy NS3.4 Noise Insulation Funding. Seek additional noise insulation funding from all possible sources.

In addition, future development will have to comply with the CLUP noise and land use compatibility guidelines provided above in Table 4.10-6, using the aircraft noise contours on General Plan Map 7-1, Noise Contours, shown on Figure 4.10-2, to establish CNEL range.

Through the implementation of these policies, the Specific Plan Update would seek to minimize aircraft noise levels to the maximum extent feasible. In addition, subsequent projects would be subject to separate, project-level review to identify and mitigate potential impacts.[33] Therefore, the impact would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #1 Project

In general, it is likely that residents living in the Specific Plan Area (or in the TOD #1 project site) would be exposed to noise from aircraft activity at SFO, but that this noise would be generally short and intermittent.

The TOD #1 project site is not located within the 2014 65 dBA CNEL Aircraft Noise Contour for SFO;[34] however, it is located within the 1983 65 dBA CNEL Aircraft Noise Contour for SFO under the Millbrae General Plan. Since the proposed TOD #1 project will contain residential uses, the CLUP determines that development should be undertaken only after an analysis of noise reduction requirements is made and needed insulation features are included in the design. Therefore, impacts to the TOD #1 project site would be considered *significant*.

Impact NOISE-TOD#1-5: The TOD #1 project would cause exposure of people residing or working in the vicinity of the TOD #1 project site to excessive aircraft noise levels.

Mitigation Measure NOISE-TOD#1-5: Implement Mitigation Measure NOISE-TOD#1-1.

Significance With Mitigation: Less than significant.

TOD #2 Project

The discussion under TOD #1 project applies to the TOD #2 project.

Impact NOISE-TOD#2-5: The proposed TOD #2 project would cause exposure of people residing or working in the vicinity of the TOD #2 project site to excessive aircraft noise levels

Mitigation Measure NOISE-TOD#2-5: Implement Mitigation Measure NOISE-TOD#1-1.

Significance With Mitigation: Less than significant.

[33] These project-level assessments should take into consideration moderating or feasibility constraints including, but not limited to aesthetic concerns, physical constraints, reduction in pedestrian/vehicle connectivity, and/or approached which might contravene other policies of the General Plan.

[34] San Francisco International Airport, 2014, *2014 Noise Exposure Map,* San Francisco. (http://media.flysfo.com/media/sfo/noise-abatement/2014-sfo-nem-plot.pdf). Accessed on February 23, 2015.

4.10.4 CUMULATIVE IMPACTS

NOISE-6	Implementation of the proposed Project, in combination with past, present, and reasonably foreseeable projects, would/ would not result in additional cumulatively considerable noise, or ground-borne noise and vibration impacts.

The above analysis of the Specific Plan Update addresses cumulative impacts in regard to noise from stationary sources, transportation related noise, and groundborne noise and vibration in the Project vicinity. Although multiple nearby noise sources may simultaneously create higher overall noise levels, the effect is captured and accounted for by the ambient noise level metrics which form the basis of the standards of significance for noise analysis. Any measurement of sound or ambient noise, whether for the purpose of evaluating land use compatibility, establishing compliance with exterior and interior noise standards, or determining point-source violations of a noise ordinance, necessarily will incorporate noise from all other nearby, perceptible sources. In addition, the noise analysis for on-road vehicles incorporated overall traffic volumes, which also inherently included all vehicle trips on roadways in the project vicinity, irrespective of whether that trip was generated on or by the project itself, as shown in Tables 4.10-12 through 4.10-14. Thus the analysis presented in NOISE-1 through NOISE-4 above is inherently cumulative.[35]

The analysis presented above demonstrates that while there would be significant noise impacts in the Project vicinity in the cumulative condition, the proposed Project would not make a cumulatively considerable contribution to any of those impacts. Therefore, the cumulative impacts for the proposed Project would be *less than significant*.

Significance Without Mitigation: Less than significant.

TOD #1 Project

Most of the potential for noise impacts is area- and site-specific, not cumulative, with the possible exception of traffic-related noise (discussed below). For non-traffic sources, there are no additional nearby off-site construction projects planned other than the TOD #2 project that would occur concurrently with the proposed TOD #1 project in close proximity that, combined with project construction, would result in substantial impacts greater than those discussed above in NOISE-4. Thus, overall cumulative noise impacts with respect to future, nearby projects would be considered *less than significant*.

Adherence to the applicable General Plan Policies and the Municipal Code standards would reduce impacts related to exposure to excess levels of noise. Technical studies could serve as the basis for designing mitigation measures to reduce vibration impacts related to operations, short-term construction, and railway activity. These studies would address impacts with respect to both annoyance and architectural damage. Adherence to the applicable policies established in the General Plan and Municipal Code, as well as the recommended mitigation measures specified under NOISE-1, NOISE-2, NOISE- 4 and NOISE-5, would reduce impacts related to temporary

[35] With the exception of the existing-with-project analysis, which does not consider cumulative conditions.

construction noise. Adherence to the applicable policies established in the General Plan, Municipal Code, and California Code of Regulations would minimize impacts related to aircraft noise levels.

For traffic-related noise, the analysis to evaluate potential traffic noise impacts, as presented in NOISE-3 above, addresses both project-level and cumulative impacts because it is based on traffic modeling that accounts for traffic related to the project and cumulative projects.

The proposed TOD #1 project would, therefore, not contribute to cumulatively considerable noise and vibration for construction, operations, and/or traffic. Thus, the cumulative impacts would be *less than significant*.

Significance With Mitigation: Less than significant.

TOD #2 Project

The discussion under the TOD #1 project applies to the TOD #2 project.

Significance With Mitigation: Less than significant.

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