3.3 Noise

This section describes the regulatory setting and environmental setting for noise in the City of Menlo Park as it pertains to the Project. The Project site is within the Specific Plan area. Since the Project's site plan and development parameters are consistent with the Specific Plan, the programmatic Specific Plan EIR is applicable to this Project. In accordance with Sections 15128 and 15183.3(d) of the CEQA Guidelines, this section is limited to those effects that have either not been analyzed in the Specific Plan EIR or that are not substantially mitigated by uniformly applicable development policies or standards.

Issues identified in response to the Notice of Preparation (NOP) (Appendix 1) were considered in preparing this analysis. An NOP comment was submitted regarding the placement of proposed sensitive receptors adjacent to noise associated with rail operations on the Caltrain tracks. This issue is addressed in this section.

Existing Conditions

Regulatory Setting

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources closely linked to interstate commerce. These sources include aircraft, locomotives, and trucks. No federal noise standards are directly applicable to the Project. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles intended to guide and influence development plans. State and local noise policies and regulations applicable to the Project are described below.

California Code

Part 2, Title 24 of the California Code of Regulations, "California Noise Insulation Standards," establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels attributable to exterior noise sources cannot exceed 45 average equivalent sound level (L_{DN}) over a 24-hour period in any habitable room. Where such residences are located in an environment in which exterior noise is 60 L_{DN} or greater, an acoustical analysis is required to ensure that interior levels do not exceed the 45 L_{DN} interior standard.

Local

City of Menlo Park General Plan

The California Government Code requires that a noise element be included in the general plan of each county and city in the state. The noise element establishes the local government's goals, objectives, and policies relating to noise control.

According to the City of Menlo Park's General Plan Noise Element, the City "recognizes the issue of noise and has standards to protect the peace, health and safety of residents and the community from unreasonable noise" and "strive(s) to locate uses compatible to the area to minimize escalation of noise from mobile and stationary sources." The Noise Element of the City's General Plan establishes goals and policies to assure that existing and proposed land uses are compatible with their noise environments. To this end, the City has adopted quantitative exterior noise compatibility criteria for various land uses. The purpose of these criteria is to reduce the potential adverse effects of noise on people, including sleep disturbance, interference with speech communication, and the general sense of dissatisfaction that is often associated with high noise exposure. Under the City's Noise Element, noise levels up to 60 A-weighted decibels (dBA) L_{DN} are considered normally acceptable for single-family residential uses, and noise levels up to 65 dBA L_{DN} are normally acceptable for multi-family residential and hotel uses. Noise levels are conditionally acceptable up to 70 dBA L_{DN} for hotel uses and all residential uses, as long as noise reduction features are included in the design to reduce interior noise levels. For playground and neighborhood parks, as well as office uses, schools, and churches, noise levels up to 70 dBA L_{DN} are normally acceptable. For industrial uses, noise levels up to 75 dBA L_{DN} are considered normally acceptable, and 80 dBA L_{DN} are conditionally acceptable.

The following goal and policies from the Noise Element of the City's General Plan pertain to the Project.

> **Goal N1:** Achieve Acceptable Noise Levels.
>
> *Policy N1.1*, *Compliance with Noise Standards*. Consider the compatibility of proposed land uses with the noise environment when preparing or revising community and/or specific plans. Require new projects to comply with the noise standards of local, regional, and building code regulations, including but not limited to the City's Municipal Code, Title 24 of the California Code of Regulations, and subdivision and zoning codes.
>
> *N1.2, Land Use Compatibility Noise Standards*. Protect people in new development from excessive noise by applying the City's Land Use Compatibility Noise Standards for New Development to the siting and required mitigation for new uses in existing noise environments.
>
> *N1.3, Exterior and Interior Noise Standards for Residential Use Areas*. Strive to achieve acceptable interior noise levels and exterior noise levels for backyards and/or common usable outdoor areas in new residential development, and reduce outdoor noise levels in existing residential areas where economically and aesthetically feasible.
>
> *N1.4, Noise Sensitive Uses*. Protect existing residential neighborhoods and noise sensitive uses from unacceptable noise levels and vibration impacts. Noise sensitive uses include, but are not limited to, hospitals, schools, religious facilities, convalescent homes and businesses with highly sensitive equipment. Discourage the siting of noise-sensitive uses in areas in excess of 65 dBA CNEL without appropriate mitigation and locate noise sensitive uses away from noise sources unless mitigation measures are included in development plans.
>
> *N1.5, Planning and Design of New Development to Reduce Noise Impacts*. Design residential developments to minimize the transportation-related noise impacts to adjacent residential areas and encourage new development to be site planned and architecturally designed to minimize noise impacts on noise sensitive spaces. Proper site planning can be effective in reducing noise impacts.
>
> *N1.6, Noise Reduction Measures*. Encourage the use of construction methods, state-of-the-art noise abating materials and technology and creative site design including, but not limited to, open space, earthen berms, parking, accessory buildings, and landscaping to buffer new and existing development from noise and to reduce potential conflicts between ambient noise levels and noise-sensitive land uses. Use sound walls only when other methods are not practical or when recommended by an acoustical expert.

N1.7, Noise and Vibration from New Non-Residential Development. Design non-residential development to minimize noise impacts on nearby uses. Where vibration impacts may occur, reduce impacts on residences and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration near rail lines and industrial uses.

N1.8, Potential Annoying or Harmful Noise. Preclude the generation of annoying or harmful noise on stationary noise sources, such as construction and property maintenance activity and mechanical equipment.

N1.10, Nuisance Noise. Minimize impacts from noise levels that exceed community sound levels through enforcement of the City's Noise Ordinance. Control unnecessary, excessive and annoying noises within the City where not preempted by Federal and State control through implementation and updating of the Noise Ordinance.

City of Menlo Park Municipal Code

In addition to the General Plan, noise regulations are also contained in the City of Menlo Park Municipal Code (Municipal Code). Chapter 8.06 of the Municipal Code contains noise limitations and exclusions for land uses within the City. The Noise Ordinance addresses noise limits that would constitute a noise disturbance, primarily as measured on residential land uses. The following regulations would be applicable to the Project:

8.06.030 Noise Limitations

a. Except as otherwise permitted in this chapter, any source of sound in excess of the sound level limits set forth in Section 8.06.030 shall constitute a noise disturbance. For purposes of determining sound levels from any source of sound, sound level measurements shall be made at a point on the receiving property nearest where the sound source at issue generates the highest sound level.

    1. For all sources of sound measured from any residential property:

        A. "Nighttime" hours—50 dBA (10:00 p.m. to 7:00 a.m.)

        B. "Daytime" hours—60 dBA (7:00 a.m. to 10:00 p.m.)

8.06.040 Exceptions

a. Construction Activities

    1. Construction activities between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday.

    4. Notwithstanding any other provision set forth above, all powered equipment shall comply with the limits set forth in Section 8.06.040(b).

b. Powered Equipment

    1. Powered equipment used on a temporary, occasional or infrequent basis operated between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday. No piece of equipment shall generate noise in excess of 85 dBA at 50 feet.

c. Deliveries

    1. Deliveries to food retailers and restaurants.

    2. Deliveries to other commercial and industrial businesses between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and 9:00 a.m. to 5:00 p.m. Saturdays, Sundays, and holidays.

8.06.050 Exemptions

a. Sound Generated by Motor Vehicles. Sound generated by motor vehicles, trucks, and buses operated on streets and highways, aircraft, trains, and other public transport.

   1. This exemption shall not apply to the operation of any vehicle including any equipment attached to any vehicle (such as attached refrigeration and/or heating units or any attached auxiliary equipment) for a period in excess of ten (10) minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion.

Town of Atherton

For some of the analyzed roadway segments, part or all of the roadway segment is located in the Town of Atherton. The Town of Atherton has its own municipal code (and associated noise ordinance) and general plan (and associated noise element) that involve guidelines and regulations that differ slightly from the regulations for the City of Menlo Park. The Noise Ordinance for the Town of Atherton has comparable noise regulations:

- 7:00 a.m. to 10:00 p.m. — 60 dBA
- 10:00 p.m. to 7:00 a.m. — 50 dBA

The Noise Element Land Use Compatibility standards for the Town of Atherton are slightly more conservative than those of the City of Menlo Park. For Residential land uses, noise levels up to 55 dBA CNEL are considered normally acceptable; noise levels up to 70 dBA CNEL are conditionally acceptable for these uses.

Fundamentals of Environmental Noise and Vibration

Terminology

A brief description of noise and vibration concepts and terminology used in this assessment is provided below.

- **Sound**. A vibratory disturbance transmitted by pressure waves through a medium such as air or water and 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.
- **Decibel (dB).** A unitless measure of sound on a logarithmic scale that indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear. The dBA scale is the most widely used for environmental noise assessments.
- **Maximum Sound Levels (L_{max}).** The maximum sound level measured during the measurement period.
- **Equivalent Sound Level (L_{eq})**. The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy. The 1-hour A-weighted equivalent sound level (L_{eq} 1h) is the energy average of A-weighted sound levels occurring during a 1-hour period.

- **Day-Night Level (L_{DN}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with a 10-dB penalty added to sound levels between 10:00 p.m. and 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 sound 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. L_{DN} and CNEL are typically within 1 dBA of each other and, for all intents and purposes, are interchangeable.
- **Vibration Velocity Level (or Vibration Decibel Level, VdB).** The root mean square velocity amplitude for measured ground motion expressed in dB.
- **Peak Particle Velocity (PPV).** A measurement of ground vibration defined as the maximum speed at which a particle in the ground is moving, expressed in inches per second (in/sec).

Overview of Noise and Sound

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the dB scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process referred to as A-weighted decibels (dBA). Table 3.3-1 summarizes typical A-weighted sound levels for different noise sources.

Human sound perception, in general, is such that a change in sound level of 1 dB cannot typically be perceived by the human ear; a change in sound level of 3 dB is just noticeable; a change of 5 dB is clearly noticeable; and a change of 10 dB is perceived as doubling or halving the sound level. A doubling of actual sound energy is required to result in a 3-dB (i.e., barely noticeable) increase in noise; in practice, for example, this means that the volume of traffic on a roadway would typically need to double to result in a noticeable increase in noise.

The decibel level of a sound decreases (or attenuates) exponentially as the distance from the source of that sound increases. For a point source such as a stationary compressor or construction equipment, sound attenuates at a rate of 6 dB per doubling of distance. For a line source such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance.[1] Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface, such as grass, attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increase in attenuation is typically in the range of 1 to 2 dB per doubling of

[1] California Department of Transportation 2013. *Caltrans Technical Noise Supplement*. September. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed: July 13, 2015.

distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 3.3-1. Typical A-Weighted Sound Levels

Common Outdoor Activities	Sound Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 mph at 50 feet		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower at 100 feet	70	Vacuum cleaner at 3 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban area, daytime	50	Dishwasher in next room
Quiet urban area, nighttime	40	Theater, large conference room (background)
Quiet suburban area, nighttime		
	30	Library
Quiet rural area, nighttime		Bedroom at night, concert hall (background)
Rustling of leaves	20	
		Broadcast/recording studio
	10	
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: California Department of Transportation 2009.

Overview of Groundborne Vibration

Groundborne vibration is an oscillatory motion of the soil with respect to the equilibrium position and can be quantified in terms of velocity or acceleration. Groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, as it can cause buildings to shake and generate rumbling sounds. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile driving, and operating heavy earthmoving equipment.

Groundborne vibration can be quantified by its peak or root-mean-square (RMS) velocity amplitudes. The RMS amplitude is useful for assessing human annoyance; the RMS amplitude is expressed in terms of the velocity level in decibel units (VdB). The peak amplitude is most often used for assessing the potential for damage to building structures; the peak amplitude is typically assessed in terms of peak particle velocity (PPV), measured in inches/second.

In extreme cases, groundborne vibrations can cause damage to buildings. Building damage is not a factor for normal transportation projects, with the occasional exception of blasting and pile driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance is well below the damage threshold for normal buildings.

Table 3.3-2 summarizes the typical groundborne vibration velocity levels and average human response to vibration that may be anticipated when a person is at rest in quiet surroundings. If the person is engaged in any type of physical activity, vibration tolerance increases considerably. The duration of the event has an effect on human response, as does its daily frequency of occurrence. Generally, as the duration and frequency of occurrence increase, the potential for adverse human response increases.

Table 3.3-2. Typical Levels of Groundborne Vibration

Human or Structural Response	Vibration Velocity Level (VdB)	Typical Sources (50 Feet from Source)
Threshold for minor cosmetic damage to fragile buildings	100	Blasting from construction project
		Bulldozer or heavy tracked construction equipment
Difficulty in reading computer screen	90	
		Upper range of commuter rail
Threshold for residential annoyance for occasional events (e.g., commuter rail)	80	Upper range of rapid transit
Threshold for residential annoyance for frequent events (e.g., rapid transit)		Typical commuter rail Bus or truck over bump
	70	Typical rapid transit
Approximate threshold for human perception of vibration Limit for vibration sensitive equipment		Typical bus or truck on public road
	60	
		Typical background vibration
	50	

Source: Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. Office of Planning and Environment.

The background vibration velocity level in residential areas is usually around 50 VdB or lower. The vibration velocity level threshold of perception for humans is approximately 65 VdB. Most perceptible indoor vibration is caused by sources within buildings, such as the operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are heavy construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible.

Groundborne noise is a secondary phenomenon of groundborne vibration. When a building structure vibrates, noise is radiated into the interior of the building. Typically, this is a low frequency sound that would be perceived as a low rumble. The magnitude of the sound depends on the frequency characteristic of the vibration and the manner in which the room surfaces in the building radiate sound. Groundborne noise is quantified by the A-weighted sound level inside the building. The sound level accompanying vibration is generally 25–40 dBA lower than the vibration velocity level in VdB. Groundborne vibration levels of 65 VdB can result in groundborne noise levels up to 40 dBA, which can disturb sleep. Groundborne vibration levels of 85 VdB can result in groundborne noise levels up to 60 dBA, which can be annoying to daytime noise-sensitive land uses, such as schools.[2]

Environmental Setting

Locations where people reside or where the presence of noise could adversely affect the use of the land are generally considered sensitive land uses. Typical sensitive receptors include residents, school children, hospital patients, and the elderly.

The existing Project site is divided into three areas: the Derry Lane Site, the 1300 El Camino Real Site, and the 1258 El Camino Real Site. The Project site is bound by residential and commercial development to the north along Glenwood Avenue, to the east by the Caltrain tracks and the Garwood Way right-of-way, to the south by Oak Grove Avenue, and to the west by El Camino Real.

Surrounding Land Uses

The land uses surrounding the Project consist of a hotel located immediately adjacent to the north of the Project site; single- and multi-family residential units located approximately 80 feet generally east of the Project site and Caltrain tracks; the Menlo Park Caltrain Station located approximately 320 feet south of the site, and the mixed-use development located adjacent to the Caltrain station, the south of Oak Grove Avenue; and the El Camino Real commercial corridor to the west across El Camino Real. The northeast corner of El Camino Real/Oak Grove Avenue (immediately adjacent to the Project site), includes a Chevron gas station and a restaurant/café.

Existing Noise Levels

Onsite noise sources are primarily associated with rail operations on the Caltrain tracks and traffic surrounding the Project site.

Ambient noise levels in the Project area were measured at several sites for the Specific Plan EIR. As discussed in the *Infill Environmental Checklist* (Appendix 1-1), the noise measurement location closest to the Project site is the Willow Road site (located approximately 50 feet northeast of Alma Street), which has a measured L_{eq} value of 57 6 dBA.[3] Noise at this location, which is approximately 0.75 mile southeast of the Project site, was mostly influenced by the moderate vehicle traffic on Alma Street.

Existing traffic noise levels on roadway segments located in the vicinity of the Project have been characterized with traffic noise modeling using existing traffic volumes presented in Section 3.1, *Transportation*, and the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM)[4] Using these tools, existing traffic noise was modeled along 14 roadway segments in the Project area that were not analyzed in the Specific Plan EIR. Note that a total of 18 roadway segments were previously analyzed in the Specific Plan EIR, and all were determined to have less-than-significant noise impacts related to the Specific Plan; these segments are not further assessed in this Infill EIR. Refer to Table 3.3-3 for the list of 14 segments analyzed in this EIR that were not previously assessed, and for the modeled existing noise levels (based on existing traffic volumes in Section 3.1, *Transportation*) for these roadway segments at a standard distance of 50 feet from the centerline of the roadway segment.

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2 Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. Office of Planning and Environment.

3 City of Menlo Park. 2012. *El Camino Real/Downtown Specific Plan EIR*. June. Table 4.10-1.

4 Federal Highway Administration. 2004. Traffic Noise Model, Version 2.5

Table 3.3-3. Modeled Existing Traffic Noise Levels at 50 Feet

Roadway	Segment	Existing L_{DN} at 50 Feet
1. Middlefield Road	Marsh Road to Glenwood Avenue[a]	65
2. Middlefield Road	Oak Grove Avenue to Ravenswood Avenue	64.4
3. Laurel Street	Encinal Avenue to Glenwood Avenue	57.5
4. Laurel Street	Oak Grove Avenue to Ravenswood Avenue	57.8
5. Ravenswood Avenue	Laurel Street to Middlefield Road	64.9
6. Encinal Avenue	Laurel Street to Middlefield Avenue[a]	58.3
7. Valparaiso Avenue	University Drive to El Camino Real	65.4
8. Glenwood Avenue	El Camino Real to Laurel Street	62
9. Glenwood Avenue	Laurel Street to Middlefield Road[a]	57.9
10. Oak Grove Avenue	El Camino Real to Laurel Street	61.1
11. Oak Grove Avenue	Laurel Street to Middlefield Road[a]	60.7
12. Alma Street	Oak Grove Avenue to Ravenswood Avenue	53.7
13. Garwood Way	Glenwood Avenue to Oak Grove Avenue	46.1
14. Merrill Street	Oak Grove Avenue to Ravenswood Avenue	55.8

Source: ICF International 2015, W-Trans 2015

[a.] Roadway segments located in the Town of Atherton

Noise levels at 50 feet from the station and mainline tracks were estimated in the Specific Plan EIR using the methodology set forth in the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment*. Information on train trip frequencies was derived from Caltrain's timetables. Noise L_{eq} values from Caltrain operations were analyzed in the Specific Plan EIR at a distance of 50 feet from the Caltrain tracks, and were found to be between 65 and 69 dBA during the daytime and 60 and 64 dBA during the nighttime.[5] Additionally, at a distance of 50 feet from the mainline track, noise levels were approximately 71.3 dBA L_{DN}, including associated horn noise and 68.1 dBA L_{DN} not including horn noise.[6]

Existing Groundborne Vibration Levels

Existing groundborne vibration in the Project area is associated with passenger vehicles and heavy-duty trucks along with existing rail operations. Because the rubber tires and suspension systems of passenger vehicles and heavy-duty vehicles provide vibration isolation, it is unusual for passenger vehicles or heavy-duty trucks to cause groundborne noise or vibration problems. Passenger vehicles and heavy-duty trucks cause effects such as rattling of windows; however, the source is almost always airborne noise and not vibration. Most causes of passenger vehicle and heavy-duty truck-related vibration can be directly related to a pothole, bump, expansion joint, or other discontinuity in the road surface. Smoothing the bump or filling the pothole usually solves the problem. For these reasons, vehicular traffic in the Project vicinity does not contribute substantially to existing groundborne vibration levels. The nearby Caltrain tracks also produce groundborne vibration. According to the Federal Transit Authority's (FTA's) groundborne vibration and noise impact criteria, the existing railroad operation is considered frequent because there are more than 70 train events per day. The groundborne vibration

6 City of Menlo Park. 2012. El Camino Real/Downtown Specific Plan EIR. June. Table 4.10-1.

standard for commercial uses subject to frequent train events is 75 VdB.[7] For residential uses the vibration standard is 72 VdB.

Environmental Impacts

This section describes the impact analysis relating to noise for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, as necessary.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, the Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies.
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels.
- Result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.
- Result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.
- Be located within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, and expose people residing or working in the Project area to excessive noise levels.
- Be located in the vicinity of a private airstrip and expose people residing or working in the Project area to excessive noise levels.

Methods for Analysis

Traffic noise in the Project vicinity was modeled using segment Average Daily Traffic (ADT) volumes from the Project's transportation analysis (Section 3.1, *Transportation*) and the FHWA TNM.[8] This model consists of a spreadsheet that calculates the traffic noise level at a fixed distance of 50 feet from the centerline of a roadway based on the ADT volume, roadway speed, and vehicle mix that is predicted to occur. Operational traffic noise would be considered a significant impact where with-Project noise levels would exceed local land use noise standards for the affected land use and the Project would increase existing traffic noise levels by 3.0 dBA or more (3 dBA is the threshold level for most people noticing a change in noise).

Impacts related to groundborne vibration, temporary or periodic increases in ambient noise levels, and public airport or private airstrip noise effects were determined to be less than significant with mitigation discussed in the Specific Plan EIR. These noise topics that are discussed in the *Infill Environmental Checklist* (Appendix 1-1 and the Specific Plan EIR and are not discussed further in this Infill EIR.

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[7] Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment*. May.

[8] Federal Highway Administration 2004. Traffic Noise Model, Version 2.5

The following impact areas related to operational traffic noise were determined to require further analysis in the *Infill Environmental Checklist* (Appendix 1-1).

Impacts and Mitigation Measures

Impact NOI-1: Exposure of Offsite Noise-Sensitive Land Uses to Increased Traffic Noise. The Project would not result in a substantial permanent increase in ambient noise levels at existing noise sensitive uses in the project vicinity above levels existing without the project. (LTS)

Operation – Traffic Noise

Operational noise from roadway traffic generated by the Project could increase noise levels along roadway segments in the vicinity of the Project resulting in Project-related traffic noise impacts.

The Specific Plan EIR considered traffic noise on a total of 18 roadway segments. These segments were modeled to determine future noise levels based on buildout assumed in the Specific Plan EIR. The segments modeled in the Specific Plan EIR included segments of Oak Grove Avenue, Santa Cruz Avenue, Menlo Avenue, Ravenswood Avenue, University Avenue, El Camino Real, and Middlefield Road. According to the Specific Plan EIR, traffic noise increases for all of the analyzed segments under buildout conditions were determined to be less than 1 dBA as compared to existing conditions with the exception of one segment (El Camino Real from Menlo College to Valparaiso), where the increase would be 1.1 dBA. As discussed in the *Fundamentals of Noise and Vibration* section, a change in sound level of 1 dB is not perceptible to the human ear, and a change in sound level of 3 dB is just barely noticeable. According to the Specific Plan EIR, as a 3-dB change is barely perceptible to humans, it can be assumed that changes in noise levels of less than 3 dB due to increased roadway traffic would not result in substantial noise level increases that could impact sensitive receptors. Therefore, impacts related to traffic noise were determined to be less than significant for the segments assessed in the Specific Plan EIR.

Section 3.1, *Transportation*, analyzed traffic effects on 14 additional roadway segments not included in the Specific Plan EIR. Analysis of these segments was conducted for the existing, near term 2020, near term 2020 plus Project, cumulative 2040, and cumulative 2040 plus Project conditions. For the purposes of this analysis, impacts associated with increased traffic volumes along these 14 segments generated by the Project were evaluated by determining noise levels under existing conditions as compared to noise levels associated with existing plus Project conditions using the FHWA TNM methodology. This model calculates the traffic noise level at a fixed distance from the centerline of a roadway based on the ADT volume, roadway speed, and vehicle mix that is predicted to occur under each condition. The vehicle mix (i.e., the proportion of automobiles, trucks, buses, and other vehicles) utilized in the analysis was based on information from W-Trans. The percentage of heavy trucks was assumed to be 2 percent for the roadway segments included in the analysis Traffic noise was evaluated in terms of the degree by which Project-related traffic noise increases could combine with existing noise levels and affect existing noise-sensitive land uses along the analyzed segments. Table 3.3-4 summarizes the increase in traffic-related noise at a standard reference distance of 50 feet from the centerline of the roadway segment along identified roadway segments under the existing and existing plus Project condition.

Table 3.3-4. Existing and Existing Plus Project Traffic Noise Levels at 50 Feet

Roadway	Segment	Existing L_{DN} at 50 Feet	Existing plus Project L_{DN} at 50 Feet	Project Contribution to Noise Level at 50 Feet (dB)	Greater than or Equal to 60 L_{DN}?	> 3 dB Change at 50 Feet?	Significant Impact?
1. Middlefield Road	Marsh Road to Glenwood Avenue*	65.0	65.0	0.0	Yes	No	No
2. Middlefield Road	Oak Grove Avenue to Ravenswood Avenue	64.4	64.5	0.1	Yes	No	No
3. Laurel Street	Encinal Avenue to Glenwood Avenue	57.5	57.6	0.1	No	No	No
4. Laurel Street	Oak Grove Avenue to Ravenswood Avenue	57.8	58.1	0.3	No	No	No
5. Ravenswood Avenue	Laurel St to Middlefield Road	64.9	64.9	0.1	Yes	No	No
6. Encinal Avenue	Laurel Street to Middlefield Avenue*	58.3	58.3	0.1	No	No	No
7. Valparaiso Avenue	University Drive to El Camino Real	65.4	65.4	0.1	Yes	No	No
8. Glenwood Avenue	El Camino Real to Laurel Street	62.0	62.1	0.1	Yes	No	No
9. Glenwood Avenue	Laurel Street to Middlefield Road*	57.9	58.0	0.0	No	No	No
10. Oak Grove Avenue	El Camino Real to Laurel Street	61.1	61.4	0.3	Yes	No	No
11. Oak Grove Avenue	Laurel Street to Middlefield Road*	60.7	60.9	0.2	Yes	No	No
12. Alma Street	Oak Grove Avenue to Ravenswood Avenue	53.7	53.7	0.0	No	No	No
13. Garwood Way	Glenwood Avenue to Oak Grove Avenue	46.1	53.9	7.8	No	Yes	No
14. Merrill Street	Oak Grove Avenue to Ravenswood Avenue	55.8	55.8	0.0	No	No	No

Notes:
- Traffic noise was modeled using ADT segment volumes from the transportation impact assessment (W-Trans, Appendix 3.1).
- City regulations limit noise levels to 60 dBA L_{DN} residential uses

*Roadway segments located in the Town of Atherton

Under existing plus Project conditions, traffic noise levels at seven of the analyzed roadway segments could exceed the City's thresholds of 60 dBA L_{DN} for residential land uses. Because Project noise levels would exceed local land use noise standards in some areas, impacts would result if the Project would increase existing traffic noise levels by 3.0 dBA or more. Under existing conditions, Project-generated traffic noise increases were found to add between 0.1 and 0.3 dBA at a standard reference distance of 50 feet from the roadway centerline to the existing L_{DN} for the seven roadway segments where noise levels would exceed thresholds under existing plus Project conditions. Project traffic would only increase noise levels by more than 3 dBA along one analyzed roadway segment, Garwood Way from Glenwood Avenue to Oak Grove Avenue; however, for this roadway segment, the existing plus Project traffic noise level is below 60 L_{DN}, and no significant impact would result. Because there are no roadway segments where the Project would cause existing plus Project noise levels to exceed 60 L_{DN} and increase noise by 3 dB, noise impacts from Project-generated traffic would be ***less than significant***.

Cumulative Impacts

For cumulative operational noise impacts, specifically from traffic, the overall growth of a city or jurisdiction is considered; future regional growth in the Project vicinity would result in increases in traffic that would cumulatively increase traffic noise.

In general, a project would result in a significant cumulative traffic noise impact if cumulative plus project noise levels at existing sensitive receivers were greater than the applicable thresholds (60 dBA L_{DN} for single-family residential land uses). A project would have a cumulatively considerable contribution to the overall increase in traffic noise levels if it would increase cumulative traffic noise levels by greater than 1 dB under Cumulative with-Project conditions.

The results of the cumulative year 2040 and the cumulative year 2040 with-Project traffic noise modeling, as well as the cumulative impact determination for the analyzed segments, are shown in Table 3.3-5.

Modeling results for cumulative traffic noise levels indicate that traffic noise would be in excess 60 dBA L_{DN} at a distance of 50 feet for seven of the 14 analyzed roadway segments in the vicinity of the Project site; significant cumulative traffic noise impacts are therefore considered to occur along these seven roadway segments. The Project would only increase cumulative noise levels by more than 1 dBA along one analyzed roadway segment, Garwood Way from Glenwood Avenue to Oak Grove Avenue; however, for this roadway segment, noise levels are below 60 L_{DN} for all analyzed conditions, so no cumulative impact would occur. The Project would not have a cumulatively considerable contribution to any cumulative impacts due to the very minor Project-related noise increases shown in Table 3.3-5. Therefore, the Project would have a ***less-than-significant*** contribution to the seven cumulative impacts identified in the vicinity of the Project site.

Table 3.3-5. Cumulative and Cumulative Plus Project Traffic Noise Levels at 50 Feet

Roadway	Segment	Existing L_{DN} at 50 Feet	Cumulative L_{DN} at 50 Feet	Cumulative plus Project L_{DN} at 50 Feet	Significant Cumulative Impact at 50 Feet? (> 60 L_{DN} Cumulative plus Project)	Project Contribution to Noise Level at 50 Feet (dB)	Cumulatively Considerable Contribution at to Cumulative Impact at 50 Feet? (>1 dB change)
1. Middlefield Road	Marsh Road to Glenwood Avenue[a]	65.0	66.6	66.6	Yes	0.0	No
2. Middlefield Road	Oak Grove Avenue to Ravenswood Avenue	64.4	65.9	66.0	Yes	0.1	No
3. Laurel Street	Encinal Avenue to Glenwood Avenue	57.5	58.6	58.7	No	0.0	No
4. Laurel Street	Oak Grove Avenue to Ravenswood Avenue	57.8	58.8	59.1	No	0.2	No
5. Ravenswood Avenue	Laurel Street to Middlefield Road	64.9	66.2	66.3	Yes	0.1	No
6. Encinal Avenue	Laurel Street to Middlefield Avenue[a]	58.3	59.8	59.8	No	0.0	No
7. Valparaiso Avenue	University Drive to El Camino Real	65.4	66.6	66.6	Yes	0.0	No
8. Glenwood Avenue	El Camino Real to Laurel Street	62.0	63.3	63.4	Yes	0.1	No
9. Glenwood Avenue	Laurel Street to Middlefield Road[a]	57.9	59.2	59.2	No	0.0	No
10. Oak Grove Avenue	El Camino Real to Laurel Street	61.1	62.2	62.5	Yes	0.2	No
11. Oak Grove Avenue	Laurel Street to Middlefield Road[a]	60.7	61.9	62.0	Yes	0.1	No
12. Alma Street	Oak Grove Avenue to Ravenswood Avenue	53.7	54.8	54.8	No	0.0	No
13. Garwood Way	Glenwood Avenue to Oak Grove Avenue	46.1	50.6	55.1	No	4.5	No[b]
14. Merrill Street	Oak Grove Avenue to Ravenswood Avenue	55.8	56.9	56.9	No	0.0	No

Notes:

a. Part or all of the roadway segment is located in the Town of Atherton.

b. Although a > 1-dBA increase occurs, noise levels are still below applicable thresholds for this segment; cumulative impacts are less than significant.

- Traffic noise was modeled using ADT segment volumes from the transportation impact assessment (W-Trans, Appendix 3.1).
- Noise levels up to 60 dBA L_{DN} are normally acceptable for single-family residential uses, and noise levels up to 65 dBA L_{DN} are normally acceptable for multi-family residential and hotel uses.