F. NOISE

This section describes existing acoustic and vibration conditions in the vicinity of the project site, describes criteria for determining the significance of noise and vibration impacts, presents project characteristics related to noise and vibration, and assesses potential noise and vibration impacts that would result from project implementation. This section also analyzes noise impacts associated with the implementation of the project, including a discussion of short-term construction and long-term operational noise sources, and compatibility of surrounding land uses with on-site noise levels.

SETTING

ACOUSTIC FUNDAMENTALS

Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person. Common environmental noise sources and noise levels are presented in **Figure IV.F-1: Common Noise Sources and Levels**, p. IV.F-2.

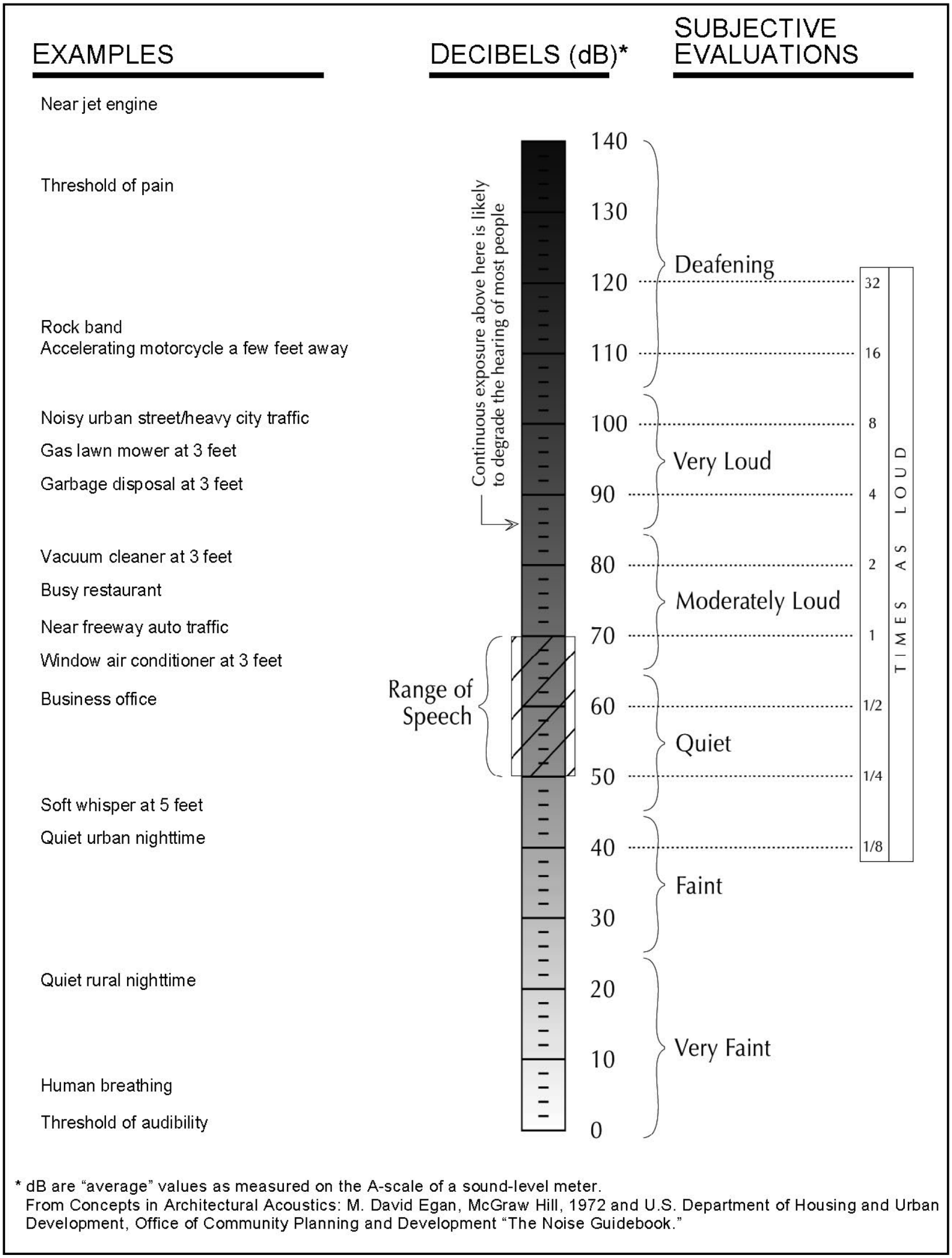
A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, or the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this problem and thus have a more useable numbering system, the decibel scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a reference sound pressure[1]. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. The decibel scale is logarithmic so it does not follow algebraic methods and cannot be added directly. For example, a 65 decibel (dB) source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3

---

[1] For sound pressure in air, the standard reference quantity is generally considered to be 20 micropascals (μPa), which directly corresponds to the threshold of human hearing.

Figure IV.F-1
Common Noise Sources and Levels



Source: Data compiled by EDAW, 2008.

dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100 fold increase in acoustical energy. The loudness of sound perceived by the human ear is dependent primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). For this reason dBA can be used to predict community response to environmental and transportation noise.

Noise can be generated by a number of sources, including mobile sources (transportation noise sources), such as automobiles, trucks and airplanes; and stationary sources (nontransportation noise sources), such as construction sites, machinery, commercial, and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (decrease) dependent on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building facades, berms). Noise generated from mobile sources generally attenuates at a rate of 4.5 dB per doubling of distance (dB/DD). Stationary noise sources spread with more spherical dispersion patterns which attenuate at a rate of 6 to 7.5 dB/DD.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise, and affect levels at a receiver. Furthermore, the presence of a large object (barrier) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction or “shielding” provided by a barrier is primarily dependent on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and manmade features such as buildings and walls may be used as noise barriers.

NOISE DESCRIPTORS

The intensity of environmental noise changes over time and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below:

> L_{max} (Maximum Noise Level): The highest A/B/C weighted integrated noise level occurring during a specific period of time.

L_{min} (Minimum Noise Level): The lowest A/B/C weighted integrated noise level during a specific period of time.

L_n (Statistical Descriptor): The noise level exceeded *n* percent of a specific period of time, generally accepted as an hourly statistic. An L_{10} would be the noise level exceeded 10 percent of the measurement period.

L_{eq} (Equivalent Noise Level): The energy mean (average) noise level. The steady-state sound level which, in a specified period of time, contains the same acoustical energy as a varying sound level over the same time period.

L_{dn} (Day-Night Noise Level): The 24-hour L_{eq} with a 10 dBA “penalty” applied during nighttime noise-sensitive hours, 10:00 PM through 7:00 AM. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.

CNEL (Community Noise Equivalent Level): The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA “penalty” for the noise-sensitive hours between 7:00 PM and 10:00 PM, which are typically reserved for relaxation, conversation, reading, and television. If using the same 24-hour noise data, the CNEL is typically 0.5 dBA higher than the L_{dn}.

EFFECTS OF NOISE ON HUMANS

Excessive and chronic exposure to elevated noise levels can result in auditory and nonauditory effects in humans. Auditory effects of noise on people are those relating to temporary or permanent noise induced hearing loss. Nonauditory effects of exposure to elevated noise levels are those relating to behavioral and physiological effects. The nonauditory behavioral effect of noise on humans is primarily associated with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The nonauditory physiological health effects of noise on humans has been the subject of considerable research efforts attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension, and cardiovascular disease. The majority of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to nonauditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by a number of nonacoustic factors. The number and effect of these nonacoustic environmental and physical factors varies depending on individual characteristics of the noise environment, including sensitivity, level of activity, location, time of day, length of exposure, etc. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater change in noise levels which are attributed to a new noise source, relative to the environment an individual has become accustomed to, the less tolerable the individual will be to the new noise source.

With regard to human perception of increases in sound levels expressed in dBA, a change of 1 dBA is generally not perceivable excluding controlled conditions and pure tones. Outside of controlled laboratory conditions, the average human ear barely perceives a change of 3 dBA. A change of 5 dBA generally fosters a noticeable change in human response and an increase of 10 dBA is subjectively heard as a doubling of loudness.

VIBRATION AND GROUNDBORNE NOISE

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as operating factory machinery, or transient in nature, such as explosions. Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, and acceleration.

Vibration amplitudes are commonly expressed in peak-particle-velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings.[2,3] PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

Groundborne noise is vibration that travels through the ground and building structures and causes the internal surfaces of a room (e.g., the floor) to vibrate, radiating noise into the space. Groundborne noise is

[2] California Department of Transportation (Caltrans), 2004, *Transportation and Construction Induced Vibration Guidance Manual*, Appendix A, p. 6.

[3] Federal Transit Administration (FTA), 2006, *Transit Noise and Vibration Impact Assessment,* p. 12-11.

different from airborne noise because the noise travels to receptors via the ground and building structures, not than through the air as airborne noise does.

Typical outdoor sources of perceptible groundborne noise and vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily cosmetic (e.g., loosening and cracking of plaster or stucco coatings) and rarely damages structural components. The range of vibration important to the proposed project occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general limit where minor damage can occur in fragile buildings.[4]

EXISTING NOISE AND VIBRATION-SENSITIVE LAND USES

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals or places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, places of worship, hotels and motels, libraries, nursing homes, retirement residences, and other places where low interior noise levels are essential, are also considered noise-sensitive land uses.

Similar to noise-sensitive receptors, vibration-sensitive land uses include residential, hospital, office, educational buildings and places of worship because people can experience annoyance from groundborne vibration.

Vibration-sensitive uses also include buildings, in particular those that are considered historical or are used for research and manufacturing operations, as groundborne vibration can result in structural damage and/or interfere with the intended function (e.g., micro-electronics production).[5]

The vibration limits recommended in applicable guideline documents for the avoidance of disruption of vibration sensitive research or manufacturing are below the threshold of human perception. People typically experience annoyance when exposed to vibration levels that exceed specific limits as

---

[4] Ibid, p. 12-13.

[5] California Department of Transportation (Caltrans), 2004, *Transportation and Construction Induced Vibration Guidance Manual*, p. 13.

recommended in applicable guidance documents. These limits are more stringent than the limits recommended in applicable guideline documents for the avoidance of building damage.

Noise- and vibration-sensitive land uses in the vicinity of the project site include mainly hotel and residential uses, the nearest of which are the on-site hotel rooms of the Fairmont Hotel complex. As noted in Chapter III, Project Description, p. III-2, the project site is located in a densely developed urban area surrounded by mid- to high-rise structures. The primary land uses surrounding the project site are high-density hotel and residential uses. Directly south of the project site are the 10-story Stanford Court Hotel and the 19 to 20-story Mark Hopkins Hotel. Directly to the east are the four-story University Club and three residential apartment buildings ranging from three to nine stories in height. The Central High School at 829 Stockton Street is one block to the east of the project site. Northeast of the site are the Oakwood Apartments, other residential apartment buildings and the Gordon Lau Elementary School at 950 Clay Street. Residential apartment buildings continue to the north and northwest of the project site, with the historic 10-story Brocklebank apartment building at the corner of Mason and Sacramento Streets. The Pacific Union Club, Huntington Park, Grace Cathedral and the Grace Cathedral School for Boys are all directly west of the project site. To the southwest along California Street is a seven-story apartment building, a private residence and the 12-story Huntington Hotel.

EXISTING NOISE ENVIRONMENT

The existing noise environment on the project site and in the general vicinity is influenced primarily by transportation noise emanating from vehicular traffic on project area roadways and cable car operations on Powell Street and California Street. Noise from outdoor activities (e.g., people talking) and commercial aircraft over-flights contribute to the existing noise environment to a lesser extent.

An ambient noise survey was conducted in the vicinity of the Fairmont Hotel on September 2, 2009 between 9:00 AM and 10:30 AM. The purpose of the noise survey was to establish baseline ambient noise levels for the existing setting. Three short-term noise measurements were conducted. The dominant noise source identified during the ambient noise survey was noise generated by traffic on nearby roadways and cable cars traveling uphill. Noise from stationary sources (such as rooftop heating, ventilation, and air conditioning [HVAC] equipment) was not audible. No other noise generated activities were noted during the noise survey. Ambient noise survey levels are summarized in **Table IV.F-1: Summary of Measured Ambient Noise Survey Levels** below. During the survey, noise levels within the project area ranged from approximately 62 dBA to 70 dBA L_{eq}, with maximum noise levels ranging from

65 dBA to 88 dBA L_{max}.[6] The measured noise levels (65 to 70 dBA) are similar to the levels shown in the vicinity of the project site on the "San Francisco City-wide Noise Map" prepared by the Department of Public Health.[7]

Table IV.F-1
Summary of Measured Existing Ambient Noise Levels

Location[1]	Measured Noise Levels, dBA		
	Maximum, L_{max}	**Average, L_{eq}**	**Minimum, L_{min}**
California Street	88[2]	70	62
Mason Street	65	62	60
Powell Street	84	67	62

Notes:
dBA = A-weighted decibels; L_{max} = maximum noise level; L_{eq} = the equivalent hourly average noise level; L_{min} = minimum noise level.
1 Noise measurements were not undertaken on Sacramento Street. The existing noise environment on the section of Sacramento Street adjacent to the project site is expected to be similar to that of the Mason Street section
2 The highest noise levels measured on California Street and Powell Street were due to a cable car traveling up hill. Noise from cable cars moving downhill was not distinguishable from other noise sources because downhill speeds are slower than those moving uphill.

Source: Data compiled by AECOM in 2009

EXISTING TRAFFIC NOISE

Existing traffic noise levels were calculated for roadway segments in the project vicinity using the Federal Highway Administration's (FHWA) Highway Noise Prediction Model, FHWA-RD-77-108.[8]

Table IV.F-2: Summary of Modeled Existing Traffic Noise Levels below summarizes the modeled traffic noise level for each affected roadway segment and the distance from the roadway centerline to the 60 dBA, 65 dBA, and 70 dBA L_{dn} traffic noise contours. The traffic noise predictions are based on existing daily peak volumes presented in Section IV.E, Transportation and Circulation, p. IV.E-7. The roadway noise levels presented assume no natural or human-made shielding between the roadway and the noise receptor. The location of the 60 dBA L_{dn} contour ranges from 20 to 416 feet from the centerline of the modeled roadways, as shown in Table IV.F-2. The extent to which existing land uses adjacent to

6 Noise-level measurements were taken in accordance with American National Standards Institute (ANSI) standards using a Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter, which was calibrated before and after use with a LDL Model CAL200 acoustical calibrator to ensure that the measurements would be accurate. The equipment used meets all pertinent specifications of the ANSI for Type 1 sound level meters (ANSI S1.4-1983[R2006]).

7 City and County of San Francisco Department of Public Health, 2006, *San Francisco City-wide Noise Map*

8 Federal Highway Administration (FHWA), 1978, Federal Highway Traffic Noise Prediction Model FHWA RD 77-108

project roadways are affected by existing traffic noise depends on their respective proximity and their individual sensitivity to noise.

Table IV.F-2
Summary of Modeled Existing Traffic Noise Levels

Roadway	Segment		L_{dn} 25 feet from Roadway Centerline	Distance (feet) from Roadway Centerline to L_{dn} Contour		
	From	To		70 dBA	65 dBA	60 dBA
Mason Street	Clay Street	Sacramento Street	59.0	2	6	20
Mason Street	Sacramento Street	California Street	62.0	4	12	39
Mason Street	California Street	Pine Street	62.7	5	15	47
Powell Street	Clay Street	Sacramento Street	69.6	23	72	229
Powell Street	Sacramento Street	California Street	68.5	18	56	176
Powell Street	California Street	Pine Street	68.5	18	57	179
Stockton Street	Clay Street	Sacramento Street	70.8	30	96	303
Stockton Street	Sacramento Street	California Street	71.2	33	104	328
Sacramento Street	Mason Street	Taylor Street	64.6	7	23	72
Sacramento Street	Powell Street	Mason Street	64.9	8	24	77
Sacramento Street	Stockton Street	Powell Street	64.9	8	24	77
Sacramento Street	Grant Street	Stockton Street	65.6	9	29	90
California Street	Mason Street	Taylor Street	72.2	42	131	416
California Street	Powell Street	Mason Street	71.8	38	119	377
California Street	Stockton Street	Powell Street	71.8	38	120	379

Notes:
dBA = A-weighted decibels; L_{dn} = day-night average noise level.

Source: LCW Consulting, 2009, *950 Mason Street Transportation Study*, December 24. This document is available for review at the Planning Department, 1650 Mission Street, Suite 400, as part of Case No. 2008.0081E; Modeled by AECOM in 2009.

Existing Cable Car Noise

The Powell-Mason and Powell-Hyde cable car lines run north-south along Powell Street and the California Street cable car line runs east-west along California Street, directly adjacent to the project site. The highest noise levels measured on California Street and Powell Street were due to a cable car traveling uphill (see Table IV.F-1). Noise from cable cars moving downhill was not distinguishable from other noise sources.

Existing Groundborne Vibration

Perceptible vibration was not observed in the vicinity of the project site. However, it is anticipated that measureable ground vibration at the project site is dominated by traffic (e.g., cars, trucks, cable cars) moving on the roadway segments that surround the project site (i.e., California, Powell, Mason, and Sacramento Streets).

REGULATORY SETTING

Various federal, state and local agencies have established noise guidelines and standards to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise and vibration. Applicable standards and guidelines are discussed below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, the EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health and welfare, and the environment. Administrators of the EPA determined in 1981 that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in the rulings of the EPA in prior years remain upheld by designated federal agencies, allowing more individualized control for specific issues by designated federal, state, and local government agencies.

To address the human response to groundborne vibration, the Federal Transit Administration (FTA) has guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines recommend vibration levels from 72 VdB to 80 VdB for residential uses and buildings where people normally sleep; and 75 VdB to 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices).[9] The higher vibration levels in these ranges apply to infrequent events (less than 30 per day) and the lower levels apply to frequent vibration events (more than 70 per day).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

[9] FTA, 2006, Transit Noise and Vibration Impact Assessment, p. 8-3.

Governor's Office of Planning and Research

The *State of California General Plan Guidelines 2003,*[10] published by the state Governor's Office of Planning and Research (OPR), provides guidance for the compatibility of various land uses with graduated noise exposure levels.

Table IV.F-3
Land Use Noise Compatibility Guidelines

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential-Low Density Single Family, Duplex, Mobile Home	<60	55–70	70–75	75+
Residential-Multiple Family	<65	60–70	70–75	75+
Transient Lodging, Motel, Hotel	<65	60–70	70–80	80+
School, Library, Church, Hospital, Nursing Home	<70	60–70	70–80	80+
Auditorium, Concert Hall, Amphitheater	–	<70	65+	NA
Sports Arenas, Outdoor Spectator Sports	–	<75	70+	NA
Playground, Neighborhood Park	<70	–	67.5–75	72.5+
Golf Courses, Stable, Water Recreation, Cemetery	<75	–	70–80	80+
Office Building, Business Commercial and Professional	<70	67.5–77.5	75+	–
Industrial, Manufacturing, Utilities, Agriculture	<75	70-80	75+	–

Notes:
dBA = A-weighted decibels; L_{dn} = day-night average noise level; CNEL = Community Noise Equivalent Level.
1 Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
2 New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
3 New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.
4 New construction or development should generally not be undertaken.
Source: Governor's Office of Planning and Research (OPR), 2003, *State of California General Plan Guidelines*.

Table IV.F-3: Land Use Noise Compatibility Guidelines above, presents acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

---

10 Governor's Office of Planning and Research (OPR), 2003, *State of California General Plan Guidelines*, p. 250.

Title 24 of the California Code of Regulations

Title 24 of the California Code of Regulations establishes standards that govern interior noise levels that apply to all new multifamily residential units in California. These standards require that acoustical studies be performed before construction begins, at building locations where the existing noise levels exceed 60 dBA L_{dn}. Acoustical studies are required to establish mitigation measures that will limit maximum levels to 45 dBA L_{dn} in any habitable room. Although no generally applicable interior noise standards are pertinent to all uses, many communities in California, including the City and County of San Francisco (in Section 2902 of the San Francisco Noise Ordinance, summarized below), have adopted 45 dBA L_{dn} as an upper limit for interior noise in all residential units: that is, this is the upper threshold from exterior noise transmitted into the interior of a residence.

California Department of Transportation

For the protection of buildings from groundborne vibration, the California Department of Transportation (Caltrans) recommends a limit of 0.5 in/sec peak particle velocity (PPV) for new residential buildings and 0.25 in/sec PPV for older or historically significant buildings.[11]

To avoid human annoyance, Caltrans recommends that vibration levels at sensitive land uses be limited to 0.04 in/sec PPV for transient vibration and 0.01 in/sec PPV for continuous vibration.[12]

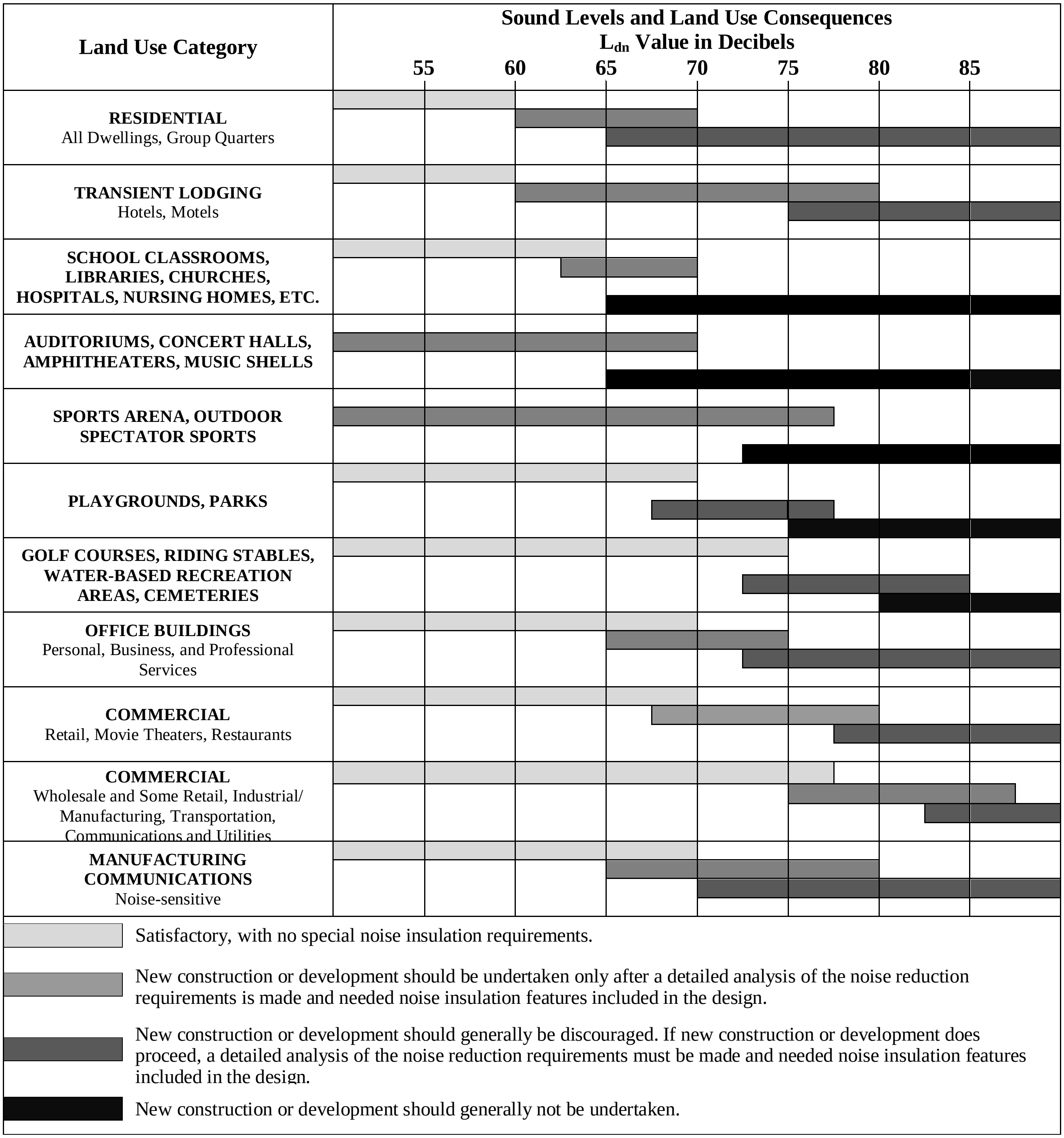
REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

San Francisco General Plan

The *San Francisco General Plan* Transportation Noise Element includes objectives and policies to address noise within San Francisco. The complete Transportation Noise Element can be found in the Environmental Protection Element of the *General Plan* under Objectives 9, 10, and 11. The element establishes noise criteria for determining land use compatibility for land uses affected by transportation noise sources (see **Table IV.F-4: Land Use Compatibility Chart for Community Noise**, p. IV.F-13). In addition, the *General Plan* includes Land Use Compatibility Guidelines that suggest satisfactory noise levels for various land uses, which are based on compatibility guidelines from the California Department of Health, Office of Noise Control. The *General Plan* indicates that the maximum exterior noise level considered satisfactory for residential uses is 60 dBA L_{dn}, 65 dBA L_{dn} for schools, libraries, hospitals, daycare centers and nursing homes, and 70 dBA L_{dn} for office and commercial uses and parks (refer to

[11] Caltrans, 2004, Transportation and Construction-Induced Vibration Guidance Manual, Table 19, p. 27.
[12] Ibid, p. 27.

Table IV.F-4
Land Use Compatibility Chart for Community Noise



Source: *City and County of San* Francisco, 2004, San *Francisco General Plan* Transportation Noise Element (Environmental Protection Section), Policy 11.1.

Table IV.F-4). The *General Plan* states that noise insulation measures should be included in the building design for sites where existing ambient noise levels exceed the applicable recommended standard. The *General Plan* prohibits construction of some building types (e.g., hospitals, schools) if existing ambient noise levels exceed the applicable standard.

San Francisco Noise Ordinance

The San Francisco Noise Control Ordinance regulates both construction noise and stationary source noise within the City and is found in Article 29 of the San Francisco Police Code.[13] The ordinance, entitled "Article 29: Regulation of Noise Sections", addresses construction equipment noise, construction work at night, and noise from stationary mechanical equipment.

The San Francisco Noise Ordinance does not state the noise metric (e.g., L_{dn}, L_{eq}) in which the noise standards in the ordinance are expressed. For the purpose of this analysis, it is assumed that the metric is L_{eq}.

Sections 2907 and 2908 of the Police Code regulates noise from construction equipment to 80 dBA L_{eq} at a distance of 100 feet from construction equipment, during the hours from 7:00 AM to 8:00 PM. Construction work at night, which is from 8:00 PM to 7:00 AM, may not exceed the ambient level by 5 dBA at the nearest property line unless a special permit is granted prior to such work by the Director of Public Works or the Director of Building Inspection.

Section 2909 regulates noise from mechanical equipment installed on commercial and residential property. Mechanical equipment operating on commercial property must not produce a noise level that is greater than 8 dBA above the ambient noise level at the property boundary and equipment operating on residential property must not produce a noise level that is greater than 5 dBA above the ambient noise level at the property boundary.

Section 2909 also states that no fixed noise source may cause the noise level inside any sleeping or living room in any dwelling unit located on residential property to exceed 45 dBA between the hours of 10:00 PM to 7:00 AM or 55 dBA L_{eq} between the hours of 7:00 AM to 10:00 PM with windows open, except where building ventilation is achieved through mechanical systems that allow windows to remain closed.

[13] City and County of San Francisco, 2008, Article 29 of the San Francisco Police Code, Regulation of Noise, November.

Section 2904 “Waste Disposal Services” of the City noise ordinance limits the noise level produced by waste processing activities on garbage trucks to 75 dBA L_{eq} at a distance of 50 feet from the equipment. The maximum noise level does not apply to the noise associated with crushing, impacting, dropping, or moving garbage on the truck, but only to the truck’s mechanical processing system.

Vibration Criteria

CEQA states that the potential for any excessive groundborne noise and vibration levels must be analyzed; however, it does not define the term “excessive”. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration; however, the federal, state, and local governments have yet to establish specific groundborne noise and vibration requirements, e.g., the City of San Francisco’s *General Plan* and Noise Ordinance do not contain vibration standards. The guidelines developed by the FTA and Caltrans, which are discussed under ‘Federal Policies, Regulations, and Laws’ and ‘State Policies, Regulations, and Laws’ respectively are two of the seminal works for the analysis of groundborne noise and vibration relating to transportation- and construction-induced vibration.

IMPACTS

SIGNIFICANCE THRESHOLDS

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State *CEQA Guidelines*, which has been adopted and modified by the San Francisco Planning Department and applicable San Francisco noise standards. For purposes of this analysis, the following applicable thresholds of significance were used to determine whether implementing the project would result in a significant noise impact. The proposed project would have a significant noise impact if it would:

F.a Result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (Based on the ambient noise levels measured at the project site and the standards of the San Francisco Noise Ordinance, this threshold would be 70 dBA L_{eq} at the property boundary);

F.b Result in exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels (e.g., 72VdB / 45 dBA L_{eq} for human comfort, 0.25-0.5 in/sec PPV for building damage);

F.c Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (an increase of 3 to 5 dBA above the existing ambient level);

F.d Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (a temporary or periodic increase of 3 to 5 dBA above the existing ambient level);

F.e Expose people residing or working in the area to excessive 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; or

F.f Expose people residing or working in the project area to excessive noise levels, for a project within the vicinity of a private airstrip.

Substantial Increases in the Ambient Noise Environment

In community noise assessments, increases in the level of the ambient noise environment are "generally not significant" if no noise-sensitive sites are located within the project area, or if increases in community noise levels associated with implementation of the project would not exceed +3 dBA at noise-sensitive locations in the project vicinity.[14] Using a single value to evaluate an impact relating to a noise level increase does not account for the pre-existing ambient noise environment a person has become accustomed to. Studies assessing the percentage of people who are highly annoyed by changes in ambient noise levels indicate that when ambient noise levels are low, a greater change is needed to cause a response. As ambient noise levels increase, less change in noise levels is required to elicit significant annoyance. The significance criteria outlined in **Table IV.F-5: Significant Change in Ambient Noise Levels** below correlate well with human response to changes in ambient noise levels and assess degradation of the ambient community noise environment.

Table IV.F-5
Significant Change in Ambient Noise Levels

Existing Ambient Noise Level, L_{dn}/CNEL	Significant Increase
<60 dBA	+ 5 dBA or greater
>60 dBA	+ 3 dBA or greater

Notes:
CNEL = Community Noise Equivalent Level; dBA = A-weighted decibels; L_{dn} = day-night average noise level.

Source: Federal Interagency Committee on Aviation Noise, 1992, *Federal Agency Review of Selected Airport Noise Analysis Issues*, pp. 3-5.

ANALYSIS METHODOLOGY

Information included in Chapter III, Project Description, and data obtained during a site visit conducted on September 2, 2009 were used to determine potential locations of sensitive receptors and potential noise- and vibration-generating land uses on the project site.

[14] Caltrans, 2009, *Technical Noise Supplement*, November, p. 4-2.

To assess the impacts of potential short-term construction noise, nearby sensitive receptors and their relative exposure (considering intervening building facades and distance) were identified. Project-generated construction noise levels were predicted using the FHWA's Roadway Construction Noise Model.[15] Reference emission noise levels and usage factors were based on information contained in the *FHWA's Roadway Construction Noise Model User's Guide*.[16] The methodology used to model project-related demolition- and construction-generated noise levels also included assumptions regarding the location and operating time of the construction equipment. The noise level produced by the dominant sources that would be anticipated to operate on the project site was modeled by representing the combination of the sources using a single stationary noise source located at the centre of the project site. In addition, typical usage weightings obtained from the *Federal Highway Administration Roadway Construction Noise Model User's Guide*[17] were used to account for operational characteristics of heavy construction equipment, which typically involve short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

Traffic noise modeling was conducted based on peak-traffic volumes obtained from the traffic study prepared by LCW Consulting for this project as discussed in Section IV.E, Transportation and Circulation. The FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108)[18] was used to calculate traffic noise levels along affected roadways, based on the trip distribution estimates, as discussed in Section IV.E, Transportation and Circulation. The project's contribution to the existing traffic noise levels along area roadways was determined by comparing the predicted noise levels at a reference distance of 25 feet from the roadway centerline with, and without, project-generated traffic for the existing condition.

Potential long-term (operation-related) stationary source noise impacts were assessed based on existing documentation (e.g., equipment noise levels) and site reconnaissance data. This analysis also included an evaluation of the proposed noise-generating uses that could affect noise-sensitive receptors near the project site.

To assess the land use compatibility of the proposed project with on-site noise levels, predicted traffic noise contours were used to determine if development of the proposed land uses would exceed the applicable noise criteria for those land uses.

---

[15] FHWA, 2006b, Federal Highway Administration Roadway Construction Noise Model User's Guide.
[16] Ibid.
[17] Ibid.
[18] Ibid.

Groundborne vibration impacts were quantitatively assessed based on existing reference documentation (e.g., vibration levels produced by specific construction equipment operation) and the distance of sensitive receptors from the given source.

PROPOSED PROJECT

The project sponsor proposes to demolish the existing Fairmont Hotel tower and podium, and construct a 26-story residential tower and a five-story mid-rise residential component, both above a five-story podium structure. The residential tower and podium structure would have a total height of approximately 317 feet. The proposed five-story podium would be 50 feet tall and the proposed mid-rise residential component (above the five-story podium) would measure 55 feet tall. The mid-rise residential component and podium would therefore measure 10 stories or a total of 105 feet in height from street grade. The new 26-story residential tower would be located on the northeastern corner of the site above the five-story podium.

Project implementation would result in the removal of existing HVAC equipment located on the roof of the historic 1906 Fairmont Hotel building, on the roof of the podium structure and in the light-well and basement of the existing structure. Additionally, new HVAC equipment would be installed in the proposed development on Level B3 below the Grand Ballroom and on Levels B4 and B5 between the residential tower and the historic 1906 Fairmont Hotel. An existing cooling tower on the roof of the hotel tower would be removed as part of the demolition. A cooling tower would be located within the 11-foot tall enclosed mechanical equipment penthouse on the roof of the proposed residential tower.

IMPACT EVALUATION

The project site is not located within the 60 dBA CNEL contour (the typical criterion for residential land use, the most noise sensitive land use in the project area) of an airport land use plan or within two miles of any nearby airports that have not adopted a land use plan, or in the vicinity of any private airstrips. Consequently, implementation of the project would not expose any noise sensitive receptors to excessive aircraft noise. Thus, the impacts of aircraft noise are not addressed further in this Draft EIR (Criteria F.e and F.f).

Impact NO-1 Implementation of the proposed project would result in short-term on-site construction activities associated with demolition of existing structures and construction of the proposed structures. These demolition and construction activities could temporarily expose nearby noise sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels. (Less than Significant) *[Criterion F.a]*

Noise sources associated with demolition and construction include rumbling from heavy-duty diesel engines; hammering and banging from demolition equipment (e.g., impact hammers); beeping from reversing beepers; and noise from the operation of hydraulically driven systems (e.g., excavator arms). The impacts of construction noise depend on the type of activities occurring on any given day, the noise levels generated by those activities, the distances to nearby noise sensitive receptors, and the existing ambient noise environment in the vicinity of the sensitive receptors. Construction generally occurs in several phases, each of which requires a specific complement of equipment with varying type, quantity, and intensity of use. These variations in construction activity change the impact that construction-generated noise has on the ambient noise conditions at the project site and in the surrounding community.

As stated in Chapter III, Project Description, pp. III-32 to III-34 the project would be constructed in four phases: Demolition (approximately 11 months in duration), Excavation, Shoring and Foundation Construction (approximately five months in duration), Building Shell Construction (approximately 15 months in duration) and Interior Construction, Systems and Finishing (approximately 12 months in duration). The total duration of project construction is expected to be approximately three years.

The demolition phase would be anticipated to generate the highest construction noise levels because the equipment used for demolition produces the highest noise levels of equipment used on construction sites and the majority of the activity is undertaken in the exterior environment. The noise levels produced by the loudest equipment used for demolition are presented in **Table IV.F-6: Typical Noise Emission Levels from Equipment Used for Demolition** below. Substantial noise levels could also be generated during the excavation, shoring and foundation construction phase and the building construction phase. The noise levels produced by the loudest equipment typically used for these phases are presented in **Table IV.F-7: Noise Emission Levels from Equipment Used for Excavation, Shoring and Foundation Construction**, p. IV.F-21 and **Table IV.F-8: Noise Emission Levels from Equipment Used for Building Shell Construction**, p. IV.F-22. Impact driven piles, often a generator of high construction noise levels, would not be used for project construction.

Table IV.F-6
Typical Noise Emission Levels from Equipment Used for Demolition

Equipment Type	Typical Noise Level (L_{max}, dBA) at 50 feet
Pneumatic Tools	85
Hydra Break Ram	90
Jackhammer	85
Backhoe	80
Man Lift	85
Crane	85
Dump Truck	84
Compressor (air)	80
Flat Bed Truck	84
Generator	82
Mounted Impact Hammer (hoe ram)	90
Rivet Buster / chipping gun	85

Notes:
dBA = A-weighted decibels.
All equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture specified noise levels for each piece of heavy construction equipment.

Source: FHWA, 2006b, *Federal Highway Administration Roadway Construction Noise Model User's Guide*, p. 3.

Table IV.F-7
Noise Emission Levels from Equipment used for Excavation, Shoring and Foundation Construction

Equipment Type	Typical Maximum Noise Level (L_{max}, dBA) at 50 feet
Auger Drill Rig	85
Drill Rig Truck	84
Backhoe	80
Compressor (air)	80
Concrete Mixer Truck	85
Concrete Pump Truck	82
Crane	85
Dump Truck	84
Dozer	85
Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator	82
Jackhammer	85
Man Lift	85
Pickup Truck	55
Pneumatic Tools	85
Rock Drill	85

Notes:
dBA = A-weighted decibels.
All equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture specified noise levels for each piece of heavy construction equipment.

Source: FHWA, 2006b, *Federal Highway Administration Roadway Construction Noise Model User's Guide,* p. 3.

Table IV.F-8
Noise Emission Levels from Equipment used for Building Shell Construction

Equipment Type	Typical Noise Level (L_{max}, dBA) at 50 feet
Compressor (air)	80
Concrete Mixer Truck	85
Concrete Pump Truck	82
Crane	85
Flat Bed Truck	84
Generator	82
Jackhammer	85
Man Lift	85
Pick-up Truck	55
Pneumatic Tools	85
Welder / Torch	73

Notes:
dBA = A-weighted decibels.
All equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture specified noise levels for each piece of heavy construction equipment.

Source: FHWA, 2006b, *Federal Highway Administration Roadway Construction Noise Model User's Guide*, p. 3.

Predicted on-site project-generated demolition- and construction-related noise levels at nearby off-site noise sensitive receptors are shown in **Table IV.F-9: Summary of Predicted Project-Generated Demolition- and Construction-Related Noise Levels**, p. IV.F-23. As shown in this table, noise levels as high as 86 dBA L_{eq} are predicted at the nearest off-site sensitive receptor (three residential buildings on Sacramento Street directly opposite the existing 1961 Fairmont hotel tower, and the University Club) during the demolition phase (approximately 11 months in duration); 86 dBA L_{eq} during the excavation, shoring and foundation construction phase (approximately five months in duration); and 84 dBA L_{eq} during building shell construction (15 months in duration). Based on Table IV.F-1, these noise levels are substantially greater than the existing ambient daytime noise levels in the project vicinity, which range from 62 to 70 dBA L_{eq}. Thus, the predicted construction noise levels, shown in Table IV.F-9, would temporarily and intermittently over a period of approximately 31 months, cause a substantial increase in the noise level at on- and off-site noise sensitive receptors (e.g., the nearby residential buildings on Sacramento and Powell Streets).

Table IV.F-9
Summary of Predicted Project-Generated Demolition- and Construction-Related Noise Levels

Receptor	Approximate distance from center of project site	Combined Predicted Noise Level Exposure over a Typical Construction Work Day (L_{eq}, dBA)		
		Demolition	Excavation, Shoring and Foundation Construction	Building Shell Construction
Residential buildings on Sacramento Street directly opposite the existing 1961 hotel tower (three buildings)	75	86	86	84
Residential buildings on Powell Street directly opposite the existing 1961 hotel tower (three buildings including the Oakwood apartments at 900 Powell Street)	100	83	83	81
Stanford Court Hotel	200	77	77	75
Mark Hopkins Hotel [1]	290	71	71	69
University Club	75	86	86	84
Residential buildings on California Street to the southeast of the project site (two buildings)	260	75	75	73
Central High School, 829 Stockton Street [1]	660	57	57	55
Brocklebank Apartment Building	300	75	75	73
Pacific Union Club [1]	450	60	60	58
Huntington Park [1]	575	58	58	56
Grace Cathedral [1]	900	61	61	59
Grace Cathedral School for Boys[1]	900	61	61	59
Huntington Hotel[1]	780	55	53	53
Residential buildings on California Street to the southwest of the project site (three buildings)[1]	490	59	59	57
Rooms in the existing 1906 Fairmont Hotel[2]	75	71	71	69

Notes:
dBA = A-weighted decibels.
All equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture specified noise levels for each piece of heavy construction equipment.
[1] 10 dBA offset applied to account for the acoustic shielding provided by existing buildings between the project site and receptor.
[2] 25 dBA offset applied to account for the exterior-to-interior noise reduction provided by the façade of the existing Fairmont Hotel.

Source: FHWA, 2006b, *Federal Highway Administration Roadway Construction Noise Model User's Guide*, p. 3; Data modeled by AECOM in 2009.

Noise generated by construction activity in San Francisco is regulated by the San Francisco Noise Ordinance. The Noise Ordinance is enforced by the Department of Building Inspection (DBI) during normal business hours and the Police Department (SFPD) during all other hours. The Noise Ordinance requires that:

1) Noise levels from individual pieces of construction equipment, other than impact tools, not exceed 80 dBA at a distance of 100 feet from the source (the equipment generating the noise), which is equivalent to 86 dBA at 50 feet;

2) Impact tools, such as jackhammers, must have both the intake and exhaust muffled to the satisfaction of the Director of the Department of Public Works (DPW); and,

3) If the noise from the construction work would exceed the ambient noise levels at the property line of the site by five dBA, the work must not be conducted between 8:00 p.m. and 7:00 a.m., unless the Director of DPW authorizes a special permit for conducting the work during that period.

It is anticipated that the noise produced by individual pieces of construction equipment (other than equipment classified as 'impact equipment' in the San Francisco Noise Ordinance[19], e.g., jackhammers) used to undertake project-generated construction activities would not exceed 80 dBA at 100 feet (86 dBA at 50 feet). Anticipated construction equipment (shown in Tables IV.F-7, IV.F-8, and IV.F-9), other than the equipment that would be classified as impact equipment by the San Francisco Noise Ordinance, would be anticipated to produce noise that exceeds this level when accounting for usage factors during construction activity. Furthermore, it is anticipated that enforcement by the DBI and the SFPD would require the building contractor to comply with this requirement. As stated in the project's Construction Management Plan,[20] the project contractor would provide intake and exhaust mufflers for impact tools.

As stated in Section IV-E, Transportation and Circulation, p. IV.E-37, project construction would be undertaken only during the time periods for which the San Francisco Noise Ordinance provides exemptions for noise generated by construction activities (7:00 AM to 8:00 PM). The sensitive receptors in the vicinity of the project site are considered less noise sensitive during these hours because the receptors are predominantly multi-family residences, short-stay accommodation or private club facilities, where the most noise sensitive activities (e.g., sleeping, recreational use) typically occur mostly during the evening and nighttimes on weekdays and all day and night on weekends There are no noise sensitive receptors that are primarily occupied and operational only during the weekday daytime (e.g., schools) that

[19] 'Impact equipment' is equipment that employs repeated striking of hard surfaces (e.g., concrete) using a hammer- or drill-type tool as part of normal operation.

[20] Conversion Management Associates, 2009, *Construction Management Plan*. This document is available for review at the Planning Department, 1650 Mission Street, Suite 400, as part of Case No. 2008.0081E.

would be exposed to a substantial increase in noise level as a result of project-generated construction activity (Refer to Table IV.F-9 above). Furthermore, ambient noise levels are typically higher during the daytime than during the nighttime, which means that increase in noise level due to project-generated construction activity would be lower during daytime hours.

Therefore, it is anticipated that the project-generated construction noise would be limited to less noise sensitive hours (7:00 AM to 8:00 PM), would be temporary (approximately 31 months), and would be restricted in noise level due to the inclusion of muffling on construction equipment and enforcement of the San Francisco Noise Ordinance by the DBI and SFPD. Thus, the impact of noise due to project-generated construction activity would be less than significant.

Impact NO-2 Implementation of the proposed project would result in operational stationary noise sources including parking structures, HVAC equipment, truck loading/unloading activities, and garbage compaction and collection on the project site. Project-generated noise levels associated with on-site equipment noise sources could exceed applicable standards and/or result in a substantial increase in ambient noise levels at nearby noise sensitive receptors. (Less than Significant with Mitigation) ***[Criteria F.c and F.d]***

Implementation of the proposed project would result in operational on-site stationary noise sources that are similar to those currently occurring on the project site under existing conditions. Thus, the net change in noise levels with implementation of the proposed project for each noise source type is discussed separately below.

Parking Structure

Noise from vehicles operating in parking structures typically includes horns, tire squeal, reversing beepers, and slamming vehicle doors. Noise from the parking structure associated with the proposed project would not be anticipated to exceed applicable noise standards or result in a substantial increase in noise levels because the parking structure would be fully enclosed, which would minimize transmission of noise to nearby noise sensitive receptors. Additionally, there is an existing enclosed parking structure in operation on the site in a similar location to the proposed parking structure, which means that a substantial net increase in the noise level created by this source would not be expected to occur.

HVAC Equipment

Noise associated with HVAC equipment includes whining noise from compressors and fan noise. Under existing conditions, HVAC equipment is located on the roof of the historic Fairmont Hotel (e.g., cooling towers) and the mechanical area on the roof of the podium structure adjacent to the Venetian Room (e.g., air handling units) and in the light-well and basement of the existing structure. Project implementation would result in the removal of the existing HVAC equipment on the hotel tower. As proposed by the project sponsor [21]HVAC equipment associated with the proposed project would be located on Level B3 below the new Grand Ballroom and on Levels B4 and B5 between the residential tower and the historic 1906 Fairmont Hotel. A new cooling tower, which would create noise due to the operation of fans and pumps that form part of the equipment, would be located in an enclosed 11-foot tall mechanical equipment penthouse on the roof of the proposed 26-story residential tower.

The HVAC equipment that would be removed from the project site would be replaced by similar equipment that is anticipated to produce similar noise levels to that of the existing equipment. However, the locations of the proposed replacement equipment would be different from those of the existing equipment to be removed. Thus, HVAC equipment at the new locations could potentially result in exceedances of the applicable standards of the San Francisco Noise Ordinance at locations where there is not currently an exceedance under existing conditions and result in a substantial increase in the noise level at nearby noise sensitive receptors.

Generally, noise levels from HVAC equipment range from 45 dBA to 70 dBA L_{eq} at a distance of 50 feet.[22] While the noise level produced by newer HVAC equipment is generally lower than that produced by older equipment of the same type and capacity because of improvements in design, the capacity of the HVAC equipment that would be installed due to project implementation is not known at this time. Therefore, it cannot be determined at the time of this DEIR publication whether or not noise levels produced by the project-related HVAC equipment would be lower than those of the equipment that would be removed. Thus, as a conservative assessment, the modeling of HVAC equipment noise for the project assumed that all equipment would produce a noise level of 70 dBA L_{eq}, at 50 feet.

The highest noise levels generated by the new HVAC equipment at noise sensitive receptors would be due to the new ventilation equipment, because noise generated by this equipment would be transmitted to the building exterior through sheet metal ductwork connected to openings along the building frontage that allow air to be drawn in and exhausted from the building. Other HVAC equipment would be separated from off- and on-site noise sensitive receptors by solid building structures, and as a result the noise levels generated by this equipment at sensitive receptors would be lower than that generated by the new

[21] Isaacson, Glenn, 2010. Conversion Management Associates, Personal Communication with AECOM on November 17, 2009.

[22] U.S. Environmental Protection Agency, 1971, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, NIDT 300-1.*

ventilation equipment. However, the new ventilation openings along the building frontage would be in the same general location as the existing openings, which are on the Sacramento Street frontage above the loading dock area. Similar to existing conditions, the proposed new ventilation openings would conform to City requirements. As a result, noise generated by the new HVAC equipment would not be substantially different from the existing condition. Therefore, it would not exceed the standards of the San Francisco Noise Ordinance or generate a substantial increase in the noise level at any nearby sensitive receptors.

Property Maintenance Equipment

The equipment that would be used to maintain the proposed project includes garden maintenance equipment (e.g., leaf blowers, hedge trimmers) and building maintenance equipment (e.g., water blasters, electric drills). It is anticipated that the changes to the buildings and outdoor areas on the site that would result from project implementation would not cause an increase in noise generated by property maintenance activities, because the size and location of outdoor areas after project implementation would be similar to existing conditions. Similar to existing conditions, maintenance activities also would largely be restricted to daytime hours. Therefore, implementation of the project and its property maintenance equipment would not expose existing on- or off-site noise sensitive receptors to a substantial increase in the ambient noise environment and/or exceed the standards of the San Francisco Noise Ordinance at locations where there is not an exceedance under the existing condition.

Truck Loading/Unloading Activities

Loading activity occurs at the existing truck-bays on the project site. Implementation of the proposed project would result in the continuation of on-site loading activity albeit at new truck-bays on the project site. The noise produced by trucks approaching the truck-bays on public streets is included in the analysis of Impact NO-6 below. However, the noise level produced by trucks entering and leaving the new truck-bays on the project site, which would be considered to be an on-site stationary noise source, would momentarily cause an increase in the noise environment at nearby sensitive receptors. However, this noise source is currently present in existing on-site operations. As a result, there would not be a substantial increase in the noise level at any noise sensitive receptors due to truck movements.

Loading activity would include the use of forklifts and hydraulic lifts, which could generate a noise level of 66 dBA L_{eq} at a distance of 50 feet.[23] Other noise sources associated with loading activities include reversing beepers, banging of roller panels, horns, and vehicle doors slamming. The nearest noise sensitive receptors are the residential buildings on Sacramento Street, which are approximately 50 feet from the truck-bays. Noise levels from operation of forklifts and hydraulic lifts operating inside the proposed off-street enclosed loading docks on Sacramento Street were calculated (refer to 'Analysis Methodology', p. IV.F-16), taking into account the anticipated acoustic properties of the enclosed truck-bays and assuming a standard reduction of 6 dBA per doubling of distance. Based on the results of the calculations, the noise level produced would be 67 dBA L_{eq} at the nearest noise sensitive receptors, which would not exceed the applicable noise standard (e.g., the 70 dBA L_{eq} standard cited in the San Francisco Noise Ordinance). Additionally, there would not be a substantial increase in the ambient noise environment at nearby noise sensitive receptors, because these activities already occur under existing on-site conditions.

Garbage collection activities would also occur at the proposed off-street enclosed loading docks. Noise associated with garbage collection activities includes air-brake release, engine rumble, operation of hydraulic bin lifts, compression of garbage in the truck bed and reversing beepers. Noise from garbage collection is limited by San Francisco's Noise Ordinance, which mandates that noise produced by vehicles used for garbage collection is less than 75 dBA L_{eq} at 50 feet from the vehicle, and enforced by DPH. It is assumed that enforcement by DPH would ensure that garbage trucks servicing the project would comply with the Noise Ordinance. Thus, noise from garbage trucks servicing the project would not exceed the standards of the San Francisco Noise Ordinance. Also, it is anticipated that garbage truck operations associated with service to the project would not cause a substantial increase in noise levels at any noise sensitive receptor because similar operations occur at the project site and in the same general location under existing conditions.

Air compressors could reach intermittent noise levels of approximately 81 dBA L_{eq} at 50 feet from the source[24] and noise from garbage compactors can reach approximately 80 dBA L_{eq} at 50 feet from the source.[25] It is anticipated that noise from the operation of air compressors and garbage compactors would

[23] University of Washington, 2004, *Construction Industry Noise Exposures Operating Engineers*, University of Washington Department of Environmental and Occupational Health Sciences, School of Public Health and Community Medicine, p. 7.

[24] FTA, 2006, *Transit Noise and Vibration Impact* Assessment, Table 12-2, p. 12-6.

[25] Noise level estimated based on mechanical equipment of similar type and function.

not exceed the standards of the San Francisco Noise Ordinance or cause a substantial increase in noise level at any noise sensitive receptor if operated with the door of the loading dock shut, as proposed.

Conclusion

Noise from on-site operational stationary noise sources due to project implementation would be expected to comply with applicable noise standards (e.g., the San Francisco Noise Ordinances 70 dBA L_{eq} limit) and, thus, would not result in a substantial increase in noise level at any nearby noise sensitive receptors. As a result, this impact would be less than significant.

Impact NO-3 Compatibility of Proposed On-Site Land Uses with the Ambient Noise and Vibration Environment. The project includes development of on-site noise- and vibration-sensitive land uses that could be exposed to noise and/or vibration levels that exceed applicable standards. (Less than Significant with Mitigation) ***[Criteria F.a, F.b, and F.c]***

Implementation of the proposed project would include development of residential uses, which are noise and vibration sensitive. Exposure to ambient noise and/or vibration levels that would exceed applicable standards for residential noise exposure associated with vibration, stationary source noise, and vehicular traffic noise are discussed separately below.

Cable Car Related Groundborne Noise and Vibration

The close proximity of cable car lines on Powell and California Streets to the project site could expose the proposed new on-site sensitive receptors to groundborne noise and vibration levels in excess of the standards recommended by the FTA. The groundborne noise and vibration created by other vibration sources in the vicinity of the project site, e.g., cars, trucks and transit vehicles would be less than that created by the cable car operations[26] because vibration levels generated by these sources are lower than those generated by steel-wheel-on-steel-rail vehicles such as cable cars. Future vibration levels at the project site are anticipated to be the same as those under the existing conditions because no additional vibration sources are anticipated to be developed in the project vicinity.

The potential for the new on-site residential receptors to be exposed to excessive long-term groundborne vibration levels was evaluated using the procedure for ‘General Vibration Assessment’ recommended by the FTA.[27] Because the FTA manual does not have reference vibration data specifically for cable-cars, the vibration produced by the cable cars was assumed to be equal to the FTA base vibration curve for light

[26] FTA, 2006, Figure 10-1, p. 10-3.
[27] Ibid, p. 10-3.

rail vehicles, [28] which is considered to be a conservative assumption because the cable cars used by the San Francisco MUNI are lighter than the typical rail vehicles. Conservative adjustments from the FTA manual [29] were made to the selected base vibration curve for the assumed vehicle speed (20 miles per hour), minimum distance from the nearest track to the project site (i.e., 30 feet), track condition (i.e., +10 VdB to account for the higher vibration level produced by worn track), the building and foundation type, and the number of floors (i.e., one) that the first residential floor is above grade.

It is predicted that the maximum vibration level due to existing cable car operations in the residential uses associated with the proposed project would be 49 VdB, which is less than the FTA's maximum vibration level of 72 VdB for residential receptors exposed to frequent vibration events (more than 70 events per day) from transit facilities.

The groundborne noise level on-site due to cable car operations was predicted using the procedures recommended by the FTA manual. [30] The predicted groundborne noise level inside the residential uses associated with the proposed project is 29 dBA, which is less than the FTA's 35 dBA maximum groundborne noise level limit. [31] Thus, the noise- and vibration-sensitive receptors associated with the project would not be exposed to excessive groundborne noise and vibration levels beyond what is acceptable.

Stationary Noise Sources

As discussed under Impact NO-2, implementation of the proposed project would result in the operation of stationary noise sources including the enclosed parking structure, HVAC equipment, truck loading/unloading activities, and garbage compaction and collection on the project site. Similar noise sources currently operate on the project site under existing conditions and these conform with City noise control requirements. While the transient-occupancy use of the existing hotel tower on the site is a similar use to the proposed residential uses, the permanent residential uses associated with the proposed project are considered by the San Francisco *General Plan* to have a greater noise sensitivity (refer to Table IV.F-4). Therefore, the proposed new on-site sensitive receptors (i.e., the residents) could be exposed to project-related exterior noise in excess of the 60 dBA L_{dn}, the limit specified in the San Francisco *General Plan* (refer to Table IV.F-4).

[28] Ibid, p. 10-3.
[29] FTA, 2006, Table 10-1, p. 10-8.
[30] Ibid, Table 10-1, p. 10-8.
[31] FTA, 2006, Table 8-1, p. 8-3.

The proposed residential uses would be located away from the parking structure truck loading/unloading, and garbage compaction/collection activities that would occur on the project site. As a result, noise levels due to these activities would be anticipated to comply with the required applicable interior noise standard (45 dBA L_{eq}) of the San Francisco Noise Ordinance and *General Plan*.

New HVAC equipment would be located on Level B3 below the new Grand Ballroom and on Levels B4 and B5 between the proposed tower and the historic 1906 Fairmont Hotel. Additionally, a cooling tower (a common component of an HVAC system) would be located in the enclosed 11-foot tall mechanical equipment penthouse on the roof of the residential tower. The HVAC equipment that would be located on Levels B3, B4, and B5 are located away from the on-site residential uses. As a result, noise levels generated by the operation of HVAC equipment located on Levels B3, B4, and B5 would not exceed the noise standards of the San Francisco Noise Ordinance (45 dBA L_{eq} internally) or *General Plan* (60 dBA L_{dn} externally).

The exact location of the cooling tower (within the roof-top mechanical penthouse) on the proposed residential tower is not known at this time, but it would be enclosed and only the fans would have exterior exposure. Noise generated by the cooling tower located in the enclosed mechanical penthouse on the residential tower would exceed the 60 dBA L_{dn} land use compatibility standards of the San Francisco *General Plan* for residential balconies that are within 50 feet of the rooftop equipment. However, interior noise levels would not be expected to exceed the 45 dBA L_{eq} interior noise standard of the San Francisco Noise Ordinance. Due to the distance of the noise source, this impact would be less than significant for off-site sensitive receptors.

According to the EPA, noise attributable to property maintenance equipment (e.g., leaf blowers) could result in noise levels that range from approximately 80 dBA to 90 dBA L_{eq} at three feet from the source.[32] Assuming (i) a reduction in noise level of 6 dBA per doubling of distance and a noise source level of 90 dBA at three feet and (ii) that the equipment would operate at the approximate center of the project site, the operation of property maintenance equipment would result in an average noise level of up to 45 dBA at the exterior of the proposed residential uses, which would comply with the 60 dBA L_{dn} land use compatibility standard of the *General Plan*. In addition, due to the noise reduction provided by the building roof and façade, the interior noise level at residences within 50 feet of the new cooling tower would comply with the 45 dBA L_{eq} interior noise standard of the San Francisco Noise Ordinance.

[32] FTA, 2006, Table 8-1, p. 8-3.

Traffic Noise

Table IV.F-10: Summary of Modeled Future Exterior Traffic Noise Levels below shows the predicted future (2030 with project) traffic noise levels at the façades of the residential spaces within the residential uses that would be directly exposed to traffic noise from Powell, California and Sacramento Streets. The predicted exterior noise levels presented in this table show that the façade and exterior of proposed residential uses (i.e., balconies) would be exposed to noise levels that range from 66 to 75 dBA L_{dn}, depending on the location of the balconies relative to the roadway segments that surround the project site. These noise levels are within the L_{dn} range, where the *General Plan* requires detailed noise reduction analysis and inclusion of noise insulation features in the design of residential buildings (refer to Table IV.F-4).

Conclusion

The new on-site noise sensitive receptors could be exposed to traffic noise levels that exceed the land use compatibility standard (60 dBA L_{dn}) of the *General Plan*. As a result, this impact is considered significant.

The *General Plan* states that residential land uses proposed for areas where the ambient noise level exceeds 60 dBA L_{dn} should have ‘noise insulating features’, developed through a detailed analysis of the noise reduction requirements included in the project design.

While the *General Plan* does not provide guidance on the interior noise levels to be achieved by the ‘noise insulating features’, it is considered that the 45 dBA L_{eq} standard that the San Francisco Noise Ordinance requires for mechanical equipment noise inside residential uses would be an appropriate and reasonable performance standard for the residential uses associated with the proposed project. Thus, this potentially significant impact would be reduced to a less-than-significant level with the implementation of **Mitigation Measure M-NO-3**, which is also proposed as part of the project per the project sponsor’s Construction Management Plan. **Mitigation Measure M-NO-3** calls for inclusion of noise insulating features in the design of the residential uses associated with proposed project that would reduce the internal noise levels of these uses below 45 dBA L_{eq}. As a result, Impact NO-3 would be less-than-significant with mitigation.

Table IV.F-10
Summary of Modeled Future Exterior Traffic Noise Levels in 2030

Roadway	Segment Location		Exterior Noise Level, dBA L_{dn} at 25 feet	
	From	To	First-Floor Façade	Elevated Floors Façades[1]
Powell Street	Sacramento Street	California Street	69	72
Sacramento Street	Powell Street	Mason Street	66	69
California Street	Powell Street	Mason Street	72	75

Notes:
dBA = A-weighted decibels; L_{dn} = day-night average noise level [1]+3 dBA offset applied to elevated receptors
[1] 3 dBA offset applied to account for the acoustic reflections from surrounding buildings.
[2] The modeled noise levels shown assume that noise from road traffic would be the dominant long-duration noise source, as it is under the existing condition. The contribution from other noise sources, e.g. cable cars, is not included because including other noise sources would not change the modeled levels.
Source: Modeled by AECOM in 2009

M-NO-3: Implement Measures to Reduce On-site Existing and Future Ambient Noise Levels

To comply with the noise standards of the San Francisco *General Plan* and reduce increases in traffic-generated noise levels inside the noise-sensitive uses associated with the proposed project, the project applicant shall implement the following:

- Obtain the services of a qualified acoustical consultant to develop noise-insulating features for the residential spaces associated with the proposed project that would reduce the ambient noise level inside the residential uses to a level that complies with the 45 dBA L_{eq} standard of the San Francisco Noise Ordinance.

  Residential construction that is consistent with the Uniform Building Code (UBC)[33] typically provides an exterior-to-interior noise level reduction of 25 dBA with external windows and doors closed, and compliance with this Code requirement should be demonstrated by the project sponsor (see below discussion on additional noise reduction). The external doors and windows of the residential uses associated with the proposed project can feasibly be closed at all times (at the discretion of the occupants) because the residences would have mechanical ventilation, which means external windows or doors do not have to be opened in order to provide outside airflow.

The proposed residential uses could be designed to comply with the San Francisco General Plan by including noise insulating features in the design that would reduce interior noise levels below 45 dBA, which would require an exterior-to-interior noise reduction performance of 30 dBA. Compliance with this performance standard is feasible with currently available and commonly used building technology, for example by constructing the façade with 0.5 inch laminated glass, extruded metal window/door frames filled with acoustical insulation and sealed with acoustical seals, and walls filled with acoustical

[33] California Building Standards Commission, California Code of Regulations (CCR) Title 24 - California Building Standards Code, 2007.

insulation, which would be anticipated to reduce internal noise levels by 30 dBA relative to the predicted external noise levels in Table IV.F-10, above. As a result, internal noise levels would be less than the 45 dBA L_{eq} standard of the San Francisco Noise Ordinance. These, or equivalent noise reducing measures could be included in the project design.

Impact NO-4 Implementation of the proposed project could expose noise-sensitive receptors to groundborne noise and vibration levels due to on-site project-related construction activities. (Less than Significant) ***[Criterion F.b]***

Implementation of the proposed project could temporarily expose on- and off-site sensitive receptors to groundborne noise and vibration due to on-site, project-related demolition and construction activities that could exceed thresholds of significance discussed below. Demolition and construction activities may generate intermittent groundborne noise and vibration. Project related groundborne vibration impacts would be significant if levels exceed the Caltrans-recommended standard of 0.25 in/sec PPV for the prevention of structural damage to historic buildings (e.g., the historic 1906 Fairmont Hotel) or the FTA's maximum acceptable vibration standard of 80 VdB regarding human response (i.e., annoyance) at residential land uses.

Project-related construction and demolition activities on the project site would result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. It is anticipated that the highest groundborne noise and vibration levels due to project related construction would be generated during the 11-month demolition phase, because the demolition equipment would generate the highest level of ground vibration of all the equipment typically used on construction sites (refer to **Table IV.F-11: Representative Vibration Source Levels for Construction Equipment** below). It is anticipated that pile driving, often a generator of high groundborne noise and vibration levels, would not be used for project-related construction.

Table IV.F-11
Representative Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 feet (in/sec)	Approximate L_v (VdB) at 25 feet[1]
Large Bulldozer	0.089	87
Truck	0.076	86
Concrete Breaker	0.059	83
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Note:
[1] Where Lv is the RMS velocity expressed in VdB, assuming a crest factor of 4.

Source: Federal Transit Administration, 2006, *Transit Noise and Vibration Impact Assessment*, p. 12-12.

Table IV.F-12: Modeled Vibration Levels due to Project-Related On-Site Demolition Activities below shows the predicted maximum vibration levels anticipated to occur during the demolition phase of project-related construction at nearby on- and off-site receptors. The nearest groundborne noise and vibration-sensitive receptor, due to its historic status and use as short-stay guest accommodation, is the existing historic Fairmont Hotel building. As shown in Table IV.F-12, the predicted groundborne noise and vibration levels could range from 40 to 73 VdB and up to 0.017 in/sec PPV, which complies with the Caltrans maximum vibration level limit for building damage (0.25 in/sec PPV) and the FTA's maximum limit for human annoyance (80 VdB) at on-site or nearby off-site vibration-sensitive land uses. Therefore, this impact would be less than significant.

Table IV.F-12
Modeled Vibration Levels due to Project-Related On-Site Demolition Activities

Location	Distance (feet)	PPV (in/sec)	Approximate L_v (VdB)[1]	Exceeds Threshold?	
				Building Damage	Human Annoyance
Residential buildings on Sacramento Street directly opposite the existing 1961 hotel tower (three buildings)	75	0.017	73	No	No
Residential buildings on Powell Street directly opposite the existing 1961 hotel tower (three buildings including the Oakwood apartments at 900 Powell Street)	100	0.011	69	No	No
Stanford Court Hotel	200	0.004	60	No	No
Mark Hopkins Hotel[1]	290	0.002	55	No	No
University Club	75	0.017	73	No	No
Residential buildings on California Street to the southeast of the project site (two buildings)	260	0.003	56	No	No
Central High School, 829 Stockton Street[1]	660	0.001	44	No	No
Brocklebank Apartment Building	300	0.002	55	No	No
Pacific Union Club[1]	450	0.001	49	No	No
Huntington Park[1]	575	0.001	46	No	No
Grace Cathedral[1]	900	0.000	40	No	No
Grace Cathedral School for Boys[1]	900	0.000	40	No	No
Huntington Hotel[1]	780	0.001	42	No	No
Residential buildings on California Street to the southwest of the project site (three buildings)[1]	490	0.001	48	No	No
Rooms in the existing 1906 Fairmont Hotel[2]	75	0.017	73	No	No

Note:
[1] Where Lv is the RMS velocity expressed in VdB, assuming a crest factor of 4.

Source: Federal Transit Administration, 2006, *Transit Noise and Vibration Impact Assessment*, May, p. 12-7; Modeled by AECOM in 2009

Impact NO-5 Implementation of the proposed project could result in an increase of average daily vehicle trips in the proposed project area. The increased traffic volumes could result in an increase in traffic noise at noise sensitive receptors along streets in the vicinity of the project site. (Less than Significant) ***[Criterion F.c]***

Long-term operation of the proposed project would result in an increase in Average Daily Traffic (ADT) volumes on local roadway segments near the project site (refer to Section IV.E, Transportation and Circulation). To examine the effects of project-generated traffic increases, traffic noise levels due to roadway traffic movements anticipated to be generated by the proposed project were predicted for roadway segments near the project site using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise levels were modeled under existing, existing-plus-project, and 2030 cumulative traffic conditions. Study segment traffic volumes were derived from PM peak intersection turning movements using a K Factor (multiplication factor used to compute ADTs) of 10 to compute the average daily trips on roadway segments. Vehicle speeds and truck volumes on local roadways were determined based on field observations conducted by AECOM on September 2, 2009. Table IV.F-10 summarizes the modeled traffic noise levels at 25 feet from the centerline of roadway segments near the proposed project site.

Based on the modeling conducted, implementation of the proposed project in addition to existing conditions would result in traffic noise level increases ranging from no net change (0.0 dBA) to an increase of 0.5 dBA L_{dn}, compared to noise levels without implementation of the project. Therefore, long-term noise levels from project-generated traffic sources would not result in a substantial increase in ambient traffic noise levels at existing noise-sensitive receptors. As a result, this impact would be less than significant.

CUMULATIVE IMPACTS

Cumulative projects within the project vicinity (defined to be within a two-block radius of the project site) that are proposed or are reasonably foreseeable are listed in Section IV.A, Land Use, IV.A-11. These potential future projects in the vicinity of the project site involve renovation of existing structures and expansion of existing uses.

Impact NO-CU-6 The proposed project would not result in a cumulatively considerable temporary, short-term exposure of sensitive receptors to increased construction noise. (Less than Significant)

Project construction is anticipated to require approximately three years. The highest noise levels generated by project construction are anticipated to occur during the demolition phase, which is expected to require approximately 11 months. Construction of one or more of the cumulative projects could occur within the same time period as project construction, and noise from such construction could combine with noise due to project-generated construction to produce a substantial increase in noise level and/or exceed applicable thresholds at nearby noise sensitive receptors. It is anticipated that most cumulative construction would be undertaken during the less noise sensitive hours of 7:00 AM to 8:00 PM because construction during this time period would be exempt from the noise limits of the San Francisco Noise Ordinance. However, the potential cumulative project construction and the incremental contribution of the project to this impact would not be cumulatively considerable because the impact of construction noise due to project-generated construction activities would be restricted to the construction hours that are stated in the San Francisco Noise Ordinance, and enforcement of the San Francisco Noise Ordinance by DBI and SFPD, Article 29. As a result, the incremental contribution of the project to this potential cumulative impact would not be cumulatively considerable.

Impact NO-CU-7 The proposed project would not result in a cumulatively considerable long-term exposure of sensitive receptors to increased stationary-source noise. (Less than Significant)

Stationary-source noise associated with the aforementioned cumulative projects could exceed the standards of the San Francisco Noise Ordinance and/or cause a substantial increase in the noise environment at nearby noise sensitive receptors. Thus, the aforementioned cumulative projects could generate significant stationary source noise impacts.

Based on the analysis for Impact NO-2 (on p. VI.F-25), noise from the HVAC equipment associated with the proposed project could combine with noise produced by one or more of the aforementioned cumulative projects located within 90 feet of any noise-sensitive receptor that is also within 90 feet of HVAC equipment that would be installed on the project site. For such a cumulative combination of noise to occur, the noise-sensitive receptor would have a direct line-of-sight to both the proposed project site and at least one of the aforementioned cumulative projects. None of the cumulative projects are in such a situation, i.e. within 90 feet of the project site and within a direct line-of-sight. Furthermore, the impact of stationary source noise produced by the project would be less than significant (refer to Impact NO-2, p. VI.F-25). Project implementation would result in the removal of existing HVAC equipment from the project site, which could reduce existing noise levels at some nearby noise sensitive receptors. Therefore, it is anticipated that noise emissions from HVAC equipment associated with the project would not combine with long-term stationary noise sources associated with the aforementioned cumulative projects to exceed applicable noise standards and/or cause a substantial increase in the noise environment at any noise sensitive receptor. As a result, the project's incremental contribution to this potentially significant cumulative impact would not be cumulatively considerable.

Impact NO-CU-8 The proposed project would not result in a cumulatively considerable temporary, short-term exposure of sensitive receptors to groundborne noise and vibration. (Less than Significant)

Because the aforementioned cumulative projects only involve renovation of existing structures, it is anticipated that the projects would not generate construction activity that would require the use of heavy duty construction equipment (refer to Table IV.F-11) that could generate groundborne noise or vibration. Furthermore, vibration is a localized impact that reduces rapidly as distance from the source increases. As demonstrated in Table IV.F-12, even vibration generated by heavy duty construction equipment (e.g., large bulldozers) attenuate to levels that comply with applicable standards (e.g., 0.5 in/sec PPV) at distances greater than 75 feet from the source and none of the cumulative projects are within 75 feet of the project site. As a result, the groundborne noise and vibration levels generated by the cumulative projects would not be cumulatively significant.

The proposed project would result in a less-than-significant project-level impact related to exposure of sensitive receptors to groundborne noise and vibration. The proposed project would also not result in a considerable contribution to impacts associated with groundborne noise and vibration levels.

Impact NO-CU-9 The proposed project would not result in a cumulatively considerable exposure of sensitive land uses to an increased ambient noise environment. (Less than Significant)

The noise environment at the project site could be influenced by stationary source noise and traffic noise generated by the aforementioned cumulative projects. As discussed under Impact NO-CU-7 above, the impact of stationary source noise that could be introduced to the project vicinity by the aforementioned cumulative projects would not be cumulatively significant. Therefore, the cumulative stationary source noise generated by the cumulative projects would not exceed the sensitive receptors land use-noise compatibility standard of the *General Plan*.

As discussed in Impact NO-3 the exterior of the noise-sensitive receptors (proposed residential uses) would be exposed to traffic noise levels that exceed the 60 dBA L_{dn} standard of the San Francisco Noise Ordinance and *General Plan*. Also, the aforementioned cumulative projects could increase traffic volumes on the roadway segments that surround the project site to levels that exceed the land use noise compatibility standards of the *General Plan*. However, the modeled traffic noise levels presented in

Table IV.F-13: Predicted Traffic Noise Levels below show that the increase in traffic noise due to the aforementioned cumulative projects would not be cumulatively significant.

Table IV.F-13
Predicted Traffic Noise Levels

	Segment		L_{dn} at 25 Feet, dBA				
Roadway	**From**	**To**	**Existing**	**Existing Plus Project**	**Net Change**	**2030 Cumulative**	**Net Change (2030 Cumulative – Existing)**
Mason	Clay	Sacramento	59.0	59.4	0.4	59.8	0.8
Mason	Sacramento	California	62.0	62.2	0.2	62.6	0.6
Mason	California	Pine	62.7	62.7	0.0	63.1	0.4
Powell	Clay	Sacramento	69.6	69.8	0.2	70.1	0.5
Powell	Sacramento	California	68.5	68.9	0.5	69.2	0.7
Powell	California	Pine	68.5	68.5	0.0	68.9	0.4
Stockton	Clay	Sacramento	70.8	70.8	0.0	71.1	0.3
Stockton	Sacramento	California	71.2	71.2	0.0	71.5	0.3
Sacramento	Mason	Taylor	64.6	64.6	0.0	65.1	0.5
Sacramento	Powell	Mason	64.9	65.1	0.2	65.6	0.7
Sacramento	Stockton	Powell	64.9	65.1	0.2	65.6	0.7
Sacramento	Grant	Stockton	65.6	65.8	0.2	66.0	0.4
California	Mason	Taylor	72.2	72.2	0.0	72.6	0.4
California	Powell	Mason	71.8	71.8	0.0	72.3	0.5
California	Stockton	Powell	71.8	71.8	0.0	72.3	0.5

Notes:
dBA = A-weighted decibels; CNEL = Community Noise Equivalent Level.
Traffic noise levels are predicted at a standard distance of 25 feet from the roadway centerline and do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

Source: LCW Consulting, 2009, *950 Mason Street Transportation Study*, December 24. This document is available for review at the Planning Department, 1650 Mission Street, Suite 400, as part of Case No. 2008.0081E; Modeled by AECOM in 2009.

Implementation of **Mitigation Measure M-NO-3**, p. IV.F-33, would result in the inclusion of noise insulating measures for the residential uses associated with the project that would ensure compliance with the thresholds in the *General Plan* under the 2030 cumulative noise environment, which includes traffic noise generated by the aforementioned cumulative projects. As a result, the project contribution to this impact would not be cumulatively considerable.

Impact NO-CU-10 The proposed project would not result in a cumulatively considerable exposure of noise-sensitive land uses to groundborne noise and vibration environment. (Less than Significant)

As discussed in Impact NO-3 (on p. IV.F-29), the existing cable car operations on Powell and California Streets are anticipated to be the dominant source of maximum groundborne noise and vibration at the project site. Other sources of groundborne noise and vibration in the vicinity of the project site (e.g., trucks, cars, and buses) would not influence maximum groundborne noise and vibration levels at the project site.

The analysis presented in Impact NO-3 demonstrates that the residential receptors associated with the project would not be exposed to groundborne noise or vibration levels that exceed the threshold levels recommended by the FTA.[34] Because the aforementioned cumulative projects would not lead to changes in cable car operations in the vicinity of the project site, this impact would not be cumulatively significant. Thus, the contribution of the proposed project to this impact would not be cumulatively considerable.

Impact NO-CU-11 The proposed project would not result in a cumulatively considerable long-term exposure of sensitive receptors to increased traffic noise levels. (Less than Significant)

The modeled results presented in Table IV.F-13 show that the 2030 cumulative traffic noise levels from roadway segments in the project vicinity would be imperceptibly greater (less than 1 dBA greater) than the existing road traffic noise levels. Therefore, the impact of the aforementioned cumulative projects on traffic noise levels in the project vicinity would not be cumulatively significant.

Table IV.F-13 above, shows that project implementation would result in an imperceptible increase in exterior traffic noise on roadways near the project site and would not cause the existing or 2030 cumulative traffic noise levels on roadway segments near the project site to increase above San Francisco's land use noise standards for residential uses. Therefore, the contribution of noise from project-generated roadway traffic to cumulative traffic noise levels in the project vicinity would not be cumulatively considerable.

[34] FTA, 2006, Table 8-1, p. 8-3.