Appendix I

Noise Technical Report

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AVION BURBANK PROJECT

Noise and Vibration Technical Report

Prepared for
City of Burbank
275 East Olive Avenue
Burbank, CA 91502

October 2017

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EXECUTIVE SUMMARY

Avion Burbank Project Noise Technical Report

The purpose of this Noise and Vibration Technical Report is to evaluate the potential short- and long-term noise and vibration impacts resulting from implementation of the proposed Avion Burbank Project (project). The project site is located on an approximately 61-acre site in the San Fernando Valley Groundwater Basin in the City of Burbank. A mixture of low- and mid-rise buildings containing a variety of uses including commercial, retail, institutional, and residential are located around and in proximity to the project site. The Bob Hope Airport is also located adjacent to the property boundary to the west. The site is the former location of the Lockheed Plant B6 (60 acres) and PAC Jet Engine Test Facility (0.69 acres). The proposed project would involve the construction of nine office buildings that comprise a total of approximately 142,250 square feet (sf), two retail buildings that comprise a total of approximately 15,475 sf, a 101,230-square-foot hotel, six industrial buildings that comprise 1,014,887 sf, enhancements to onsite landscaping and circulation, and 2,430 surface parking spaces.

Based on the assessment conducted in this report, ambient noise and vibration levels would be generated by the construction and operation of the project. Construction activities generate noise and vibration from the ground disturbances caused by the usage of the equipment, and also by noise emanating from vehicles. Project operational noise generated would result in the increase in ambient noise levels from daily onsite operation of the residential and commercial land uses, as well as, from the vehicle trips associated with residents, employees, and patrons of the project.

The report summarizes the potential for the project to conflict with applicable noise and vibration regulations, standards, and thresholds. The findings of the analyses are as follows:

- The noise levels from construction of the project would exceed the significance threshold of 63.7 dBA at the single-family residential uses north of the project site. With implementation of the proposed mitigation measure, construction noise would be reduced to below to the significance threshold of 63.7 dBA at the receptor locations. Therefore, impacts would be less than significant.

- The offsite roadway traffic noise would increase the ambient noise levels by 5 dBA at one roadway intersection. However, the roadway is distant from sensitive receptors and would be shielded by project buildings. Operation of the project such as rooftop mechanical equipment on the project building, loading dock, parking facilities would not exceed the City's thresholds of significance, and operational noise impacts would be less than significant.

- Construction activities would result in sporadic, temporary vibration effects adjacent to the project area, which would not exceed established thresholds for structural damage. Thus, construction vibration impacts to structures would be less than significant.

- Project operations would not result in a substantial permanent increase in ambient noise levels at the sensitive receptors in the project vicinity, as measured against applicable regulations including BMC standards for daytime ambient noise levels and DHS CNEL standards for normally acceptable noise increase for the residential and commercial land uses. This includes operational noise generated by project-related traffic noise on surrounding roadways under baseline existing and future conditions, impacts from onsite stationary noise sources including hotel pools, fixed mechanical equipment, loading deck areas, refuse collection areas, parking lots, and composite noise level impacts considering all project operational sources combined.

- The project site lies within the City of Burbank's Airport Influence Area and therefore has the potential to be exposed to increased noise levels from airport activities. The only land use exposed to the 65 dBA CNEL noise contour of the airport is industrial land uses that have no noise compatibility standards. Therefore, the effect of airport noise on the project would be less than significant.

SECTION 1
Introduction

This technical report has been prepared to support the City's environmental review process and provide information regarding potential impacts to ambient noise and vibration associated with the approval of the Avion Burbank project. The project consists of the development of a two-story mixed-use building that includes four residential units, four commercial retail spaces, six office spaces, one restaurant, and a subterranean underground parking in the City of Burbank, California.

This report identifies applicable noise and vibration regulations, and evaluates potential short- and long-term noise impacts associated with build-out of the project. Additionally, this report provides background information on vibration and evaluates potential impacts associated with the project's contribution to ambient vibration levels. Where applicable, measures to mitigate or minimize noise and vibration impacts associated with the project are included.

Information used to prepare this analysis was obtained from the City of Burbank General Plan and Noise Ordinance, and the project's traffic study prepared by Fehr and Peers (Fehr and Peers 2017), and other sources identified herein.

1.1 Project Location

The proposed project is located in the western portion of the City of Burbank, at 3001 North Hollywood Way. The Burbank Bob Hope Airport is located adjacent to the west and the south of the project site, North Hollywood Way is immediately east of the project site, and San Fernando Road is north of the project site. The surrounding land uses include the Burbank Bob Hope Airport, airport parking, industrial and storage uses, and vacant land. The project site comprises approximately 61 acres and is relatively flat. The project site is graded and partially developed with surface parking lots used as additional airport parking and the storage of vehicles. The project site is fenced and public access to the site is not permitted. The site is located within the San Fernando Valley Groundwater Basin which has been designated by U.S. Environmental Protection Agency (USEPA) as a Federal Superfund Site due to groundwater contamination associated with historical industrial land uses, described above. The project site lies within the Burbank Operable Unit, where a number of underground storage tank (UST) removals, soil clean ups, and soil investigations have been completed at the project site and adjacent properties over the years. The project site and adjacent properties were investigated as part of the Regional Water Quality Control Board, Los Angeles Region (RWQCB) Well Investigation Program (WIP). Lockheed Martin Corporation (LMC) is the responsible party for the soil and groundwater on the site. LMC continues to monitor the groundwater at the project site with nine onsite wells and associated pipes. An aerial map illustrating the project site and its immediate surrounding uses are presented in **Figure 1** and a project site plan is shown in **Figure 2**. The project's location in relation to the Airport Influence Area and associated noise contour is shown in **Figure 5**.

1.2 Project Description

The project site currently consists of asphalt surfaces and subsurface facilities. The proposed project would demolish the impervious surfaces and require the abandonment and capping of some of the subsurface facilities. The project area would have a number of different land uses including offices, retail, a hotel, industrial buildings, and parking. The different components of the proposed project are described in detail below.

Creative Office Buildings

The creative office component would consist of nine two-story buildings, representing approximately 142,500 sf, with each building ranging between approximately 6,500 to 22,500 sf. The conceptual design for the creative office spaces would incorporate the past aviation history of the project site with an architecturally distinctive design that is clean and modern. The distinctive architectural design of the buildings would be reinforced in the building amenities, which would include two-story atrium lobbies, open truss/ceilings, extensive natural light, open and efficient floor plans, clear story glass on the second floor, concrete floors, roll-up doors to exterior meeting areas and operable windows. The creative office building component of the proposed project would be designed as office condominium units for lease or sale and would provide tenants the opportunity to design their interior space specific to their needs and aesthetic style. With the exception of the 6,500-sf building, all of the office condominium buildings would be divisible to two units. The landscaped exterior public area within the buildings would be designed to accommodate conversation areas, casual meeting and dining areas, exterior seating, and private patios for each of the office condos. Other amenities available in the exterior public areas may include a fireplace, large scale chess set, ping pong table, or similar recreational amenities.

Retail Center

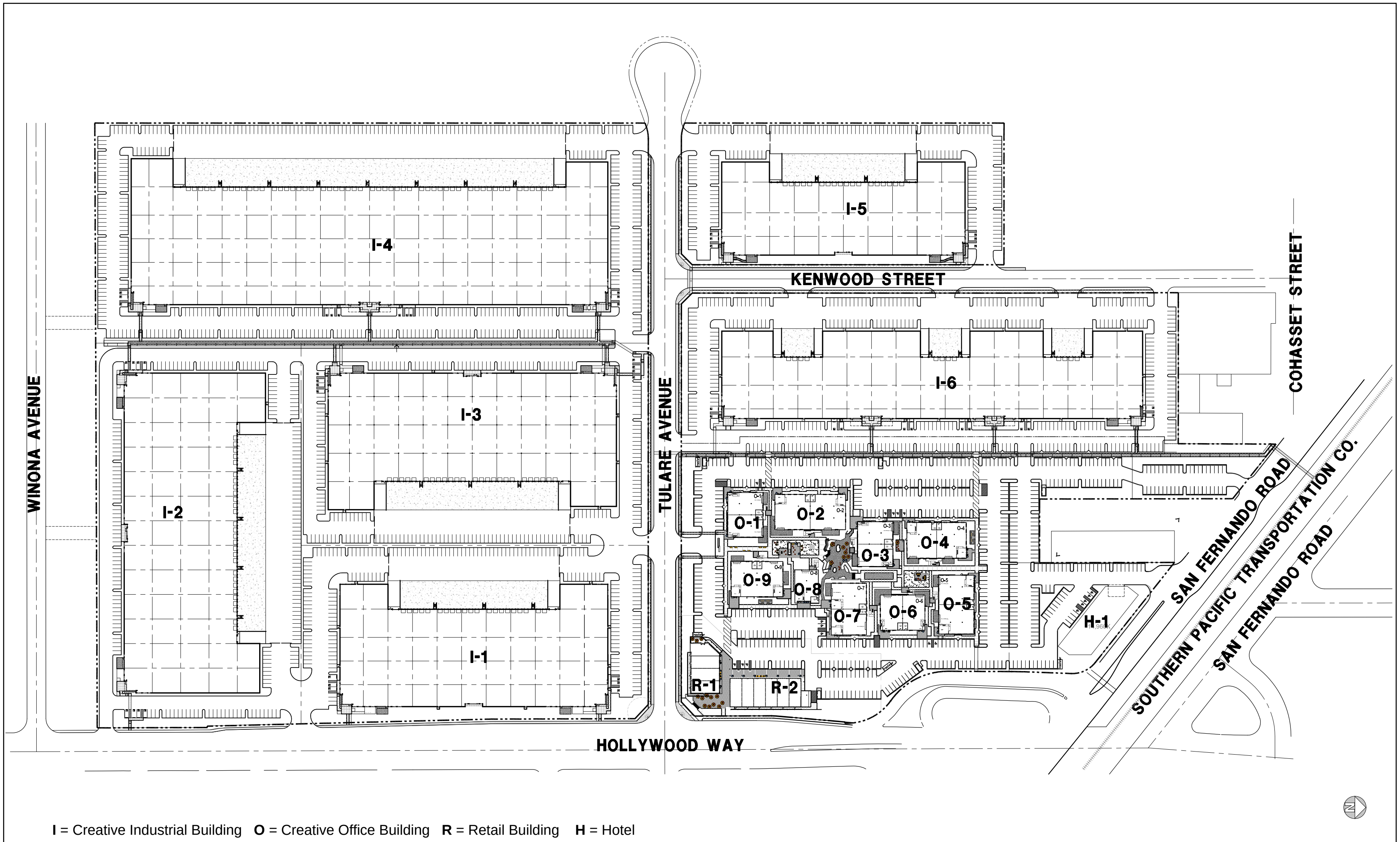
The proposed retail center component of the project would provide a total of 15,475 sf between two retail buildings, 9,175 sf and 6,300 sf, respectively. The two retail buildings would be divisible down to 1,500 sf spaces, and would accommodate business service retail and food and beverage tenants. The architectural design of the retail component would be complementary to the creative office buildings, with unique building shapes, tactile materials, and ample shaded dining patios. As shown on **Figure 2**, the retail component would be located on N. Hollywood Way and would serve people visiting Avion Burbank as well as passing commuters, as the retail component would be visible by the surrounding roadways.

SOURCE: ESRI

Avion Burbank Project . 160935

Figure 1

Regional Location



SOURCE: Avion Burbank

Avion Burbank Project . 160935

Figure 3

Conceptual Site Plan

Hotel

The proposed project would also be entitled to accommodate a six-story, 166-room hotel, which would be a maximum of 69 feet tall and total 101,230 sf. The proposed hotel would be similar to a nationally branded upscale select service hotel. Proposed amenities would include a restaurant, meeting facilities, swimming pool, fitness center, business center and lounge area. The proposed hotel would service the airport, business and tourist industry and would be located adjacent to the new Antelope Valley Line Metrolink station adjacent to the site at San Fernando Road to allow for convenient access to alternative transportation.

Creative Industrial Buildings

The proposed project includes six creative industrial buildings totaling 1,014,887 sf. The building sizes range from 93,582 to 282,466 sf and would be divisible down to 27,220 sf spaces. The proposed creative industrial buildings would provide large expansive spaces that could accommodate different types of businesses and operations, which would allow for flexibility in the types of tenants that could use the creative industrial buildings. Similar to the creative office buildings and retail center components, the creative industrial buildings would also be designed to incorporate aspects of the aviation history of the project site with a modern, clean architecturally style. Two story lanterns of glass would accentuate the office corners of the facility creating a play of solid and void in the massing of the 40-foot-tall facilities. Clearstories of glazing would be installed high on the concrete tilt up panels between the transparent corners providing natural light deep into the building footprint. Metal panel elements would be used as accents in a similar way the creative office buildings and multi-colored paint compositions would be used to break down the scale of the concrete tilt up walls. The office areas would also have an operable garage door that would open to a private patio. Setbacks with landscaping along Hollywood Way and Tulare Avenue would provide a consistent visual theme for Avion Burbank. The surrounding landscaping would consist of varied landscaped tree species and shrubs that are consistent with the remainder of the mixed-use campus. The creative industrial buildings would be approximately 32 feet tall and would include large truck dock yards to allow for interior maneuverability within the truck courts.

Parking

Parking for the proposed project would be provided in surface parking lots, located adjacent to the proposed creative industrial, creative office, retail and hotel buildings. A shared parking demand analysis was conducted for the creative office, retail center and hotel portions of the project. Shared parking is defined as a parking space that can be used to serve two or more individual land uses without conflict or encroachment. Shared parking works based upon variations in the peak demand for each use and the relationship among land use activities that are complimentary. Based upon a total of 1,020,239 sf of creative industrial, 142,250 sf of creative office, 15,000 sf of retail and 125,000 sf of hotel floor area, 1,884 parking spaces would be required. The project would provide 2,390 parking spaces, which would exceed the City's parking requirements. In addition, as an added public benefit, the project would provide 40 parking stalls dedicated for the new Antelope Valley Line Metrolink station adjacent to the site at San Fernando Road.

Construction

The proposed project would be constructed within two phases beginning early 2018 and is anticipated to be completed by the end of 2020. All construction activities would occur during daytime hours, specifically 7:00 a.m. to 7:00 p.m. Monday through Friday and 8:00 a.m. through 5:00 p.m. Saturday. Typical construction equipment is anticipated to be required, such as but not limited to, cranes, trenchers, excavators, pavers, backhoes, graders, off-highway trucks, concrete trucks, and bore/drill rigs. It is anticipated that approximately 352 construction workers would be required on a peak day for construction of the project.

Phase I of construction would begin with the demolition and removal of existing impervious surfaces, which would be recycled onsite such as the surface parking lots. Existing onsite substructures that are to remain would be identified and avoided during grading and construction activities, such as trenching for drainage and underground utilities, especially the City's sewer main within the northern portion of the site. It is anticipated that soil would be balanced onsite for grading and earthwork activities. The remainder of construction during Phase I would construct the building pads and structures and apply the architectural coating for the proposed creative industrial, creative office, and retail uses. Finally, Phase I would be completed with paving and landscaping. Phase I of construction is anticipated to occur from April 2018 through October 2019. Demolition and soil cut and fill material would be balanced and re-used on the project site and would not require export to offsite destinations. Therefore, the project would not generate export haul truck trips. Truck trips to the project site would be required to deliver building materials, concrete and construction supplies to the site. The maximum daily delivery truck trips to and from the project site during Phase I would be approximately 86 one-way trips (approximately 43 inbound and 43 outbound trips). The maximum number of construction worker trips would be approximately 704 one-way trips.

Phase II of construction would be solely focus on the construction of the hotel, including the installation of underground utilities and drainage system, construction of the building pad and structure, application of the architectural coating, paving and landscaping. Phase II of construction is anticipated to occur from September 2018 through August 2020. Similar to Phase I, Phase II soil cut and fill material would be balanced and re-used on the project site and would not require export to offsite destinations. Truck trips to the project site would be required to deliver building materials, concrete and construction supplies to the site. The maximum daily delivery truck trips to and from the project site during Phase II would be approximately 18 one-way trips (approximately 9 inbound and 9 outbound trips). The maximum number of construction worker trips would be approximately 200 one-way trips per day.

Construction activities associated with the offsite improvements to Hollywood Way, existing Kenwood Street, Cohasset Street, San Fernando Road, and the exit to Hollywood Way would include grinding and overlay while new streets would be constructed for the extension of Tulare Avenue and Kenwood Street.

SECTION 2
Environmental Setting

2.1 Noise Principles and Descriptors

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound and the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Acoustics addresses the propagation and control of sound.[1]

Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.[2] Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.[3]

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.[4] Representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in **Figure 3**.

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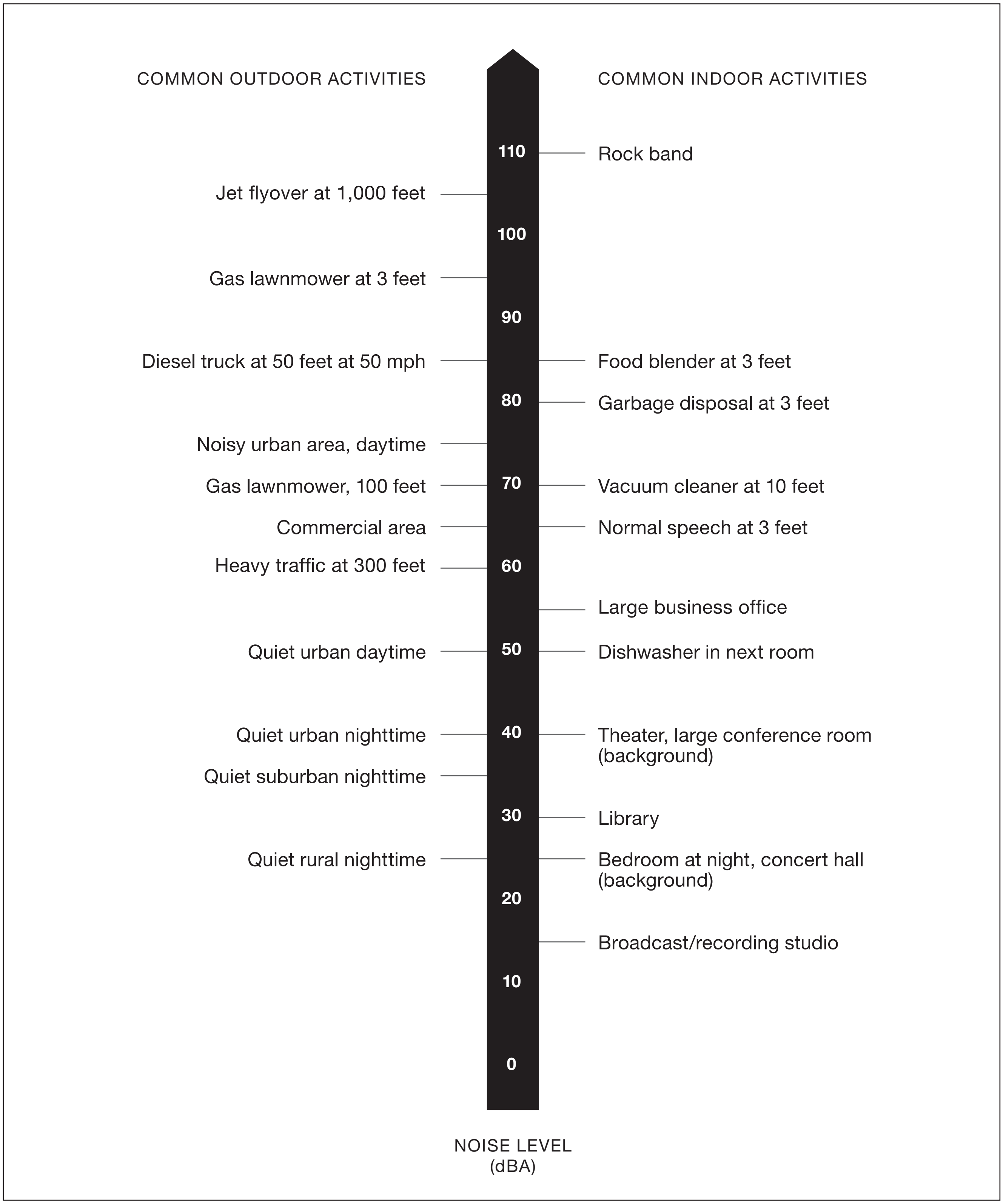
1 M David Egan, *Architectural Acoustics*, Chapter 1, March, 1988.
2 M David Egan, *Architectural Acoustics*, Chapter 1, March, 1988.
3 M David Egan, *Architectural Acoustics*, Chapter 1, March, 1988.
4 M David Egan, *Architectural Acoustics*, Chapter 1, March, 1988.



SOURCE: Caltrans

Avion Burbank Project . 160935

Figure 3
Decibel Scale and Common Noise Sources

2.2 Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in Figure 3 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.[5]

These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:[6]

L_{eq}: The equivalent (or average) sound level used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

L_x: The noise level exceeded for a percentage of a specified time period. For instance, L_{50} and L_{90} represent the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

L_{dn}: the average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dB to measured noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account nighttime noise sensitivity. The L_{dn} is also termed the day-night average noise level (DNL),

CNEL: The Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dB to measured noise levels between the hours of 7:00 a.m. to 10:00 p.m. and after an addition of 10 dB to noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

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5 California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS), Section 2.2.2.1, September, 2013.

6 California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS), Section 2.2.2.2, September, 2013.

2.3 Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance);
- Interference effects (e.g., communication, sleep, and learning interference);
- Physiological effects (e.g., startle response); and
- Physical effects (e.g., hearing loss).

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects of environmental noise refer to those effects that interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep.[7]

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and are influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity. Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships generally occur[8]:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;

[7] California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS), Section 2.2.1, September, 2013.

[8] California Department of Transportation (Caltrans), *Technical Noise Supplement* (TeNS), Section 2.2.1, September, 2013.

- Outside of the laboratory, a 3 dBA change in noise levels is considered to be a barely perceivable difference;
- A change in noise levels of 5 dBA is considered to be a readily perceivable difference; and
- A change in noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel scale. The human ear perceives sound in a non-linear fashion; therefore, the dBA scale was developed. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dB scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source. [9]

2.4 Noise Attenuation

When noise propagates over a distance, the noise level reduces with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (i.e., reduce) at a rate between 6 dBA for acoustically "hard" sites and 7.5 dBA for "soft" sites for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface (e.g., for hard surfaces, 80 dBA at 50 feet attenuates to 74 at 100 feet, 68 dBA at 200 feet, etc.).[10] Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water.[11] No excess ground attenuation is assumed for hard sites and the reduction in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source.[12] Soft sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[13]

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources.[14] Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading."[15]

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9 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.2.1.1, September, 2013.
10 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.2, September, 2013.
11 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.2, September, 2013.
12 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.2, September, 2013.
13 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.2, September, 2013.
14 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.1, September, 2013.
15 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.1, September, 2013.

Line sources (e.g., traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[16] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Additionally, receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels.[17] Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase sound levels at long distances (e.g., more than 500 feet). Other factors such as air temperature, humidity, and turbulence can also have an effect on noise levels.[18]

2.5 Fundamentals of Vibration

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures. These energy waves generally dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As discussed in the California Department of Transportation's (Caltrans) *Transportation and Construction Vibration Guidance Manual,* operation of construction equipment generates ground vibration. Maintenance operations and traffic traveling on roadways can also be a source of such vibration. If the amplitudes are high enough, ground vibration has the potential to damage structures, cause cosmetic damage or disrupt the operation of vibration-sensitive equipment such as electron microscopes and advanced technology production and research equipment. Ground vibration and groundborne noise can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage. However, there have been cases in which heavy trucks traveling over potholes or other discontinuities in the pavement have caused vibration high enough to result in complaints from nearby residents.[19]

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity.[20] The decibel notation acts to compress the range of numbers required to describe vibration. Typically, ground-

16 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.1, September, 2013.
17 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.3, September, 2013.
18 Caltrans, *Technical Noise Supplement* (TeNS), Section 2.1.4.3, September, 2013.
19 Caltrans, *Transportation and Construction Vibration Guidance Manual*. P. 1, September 2013.
20 FTA, 2006. Transit Noise and Vibration Impact Assessment. May.

borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause structural damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and pile-driving during construction. Human annoyance from vibration often occurs when the vibration levels exceed the threshold of human perception by only a small margin. A vibration level that causes annoyance would be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for non-engineered timber and masonry structures is 0.2 inches per second (in/sec) PPV.[21]

In residential areas, the background RMS vibration velocity level is usually around 50 VdB (approximately 0.0013 in/sec PPV). This level is well below the RMS vibration velocity level threshold of perception for humans, which is approximately 65 VdB. An RMS vibration velocity level of 75 VdB is considered to be the approximate dividing line between barely perceptible and distinctly perceptible levels for many people.[22]

2.6 Existing Conditions

The project site is located on a 61-acre site adjacent to the Bob Hope Airport to the west and bound by North San Fernando Boulevard and North Hollywood Way to the northeast and east, respectively. The project site is located within the San Fernando Valley Groundwater Basin. Approximately 42 acres of the site is designated as Golden State Commercial/Industrial while the other 18 acres is designated as Airport. The project site is bounded by retail properties to the east and south, Bob Hope Airport to the west, and retail and residential to the north. The predominant noise source surrounding the project site is airport noise from Bob Hope Airport. Secondary noise sources include traffic along San Fernando Boulevard and North Hollywood Way.

Sensitive Receptors

Noise sensitive land uses are defined as those specific land uses that have associated indoor and/or outdoor human activities that may be subject to stress and/or significant interference from noise produced by community sound sources.

The project site is located along the west side of North Hollywood Way and south side of San Fernando Boulevard. Existing noise sensitive uses within 500 feet of the project site include the following:

- Single-family residences along San Fernando Boulevard approximately 350 feet north of the project site

[21] FTA, 2006. Transit Noise and Vibration Impact Assessment. May.
[22] FTA, 2006. Transit Noise and Vibration Impact Assessment. May.

- Single-family residences along San Fernando Boulevard approximately 550 feet northeast of the project site

These residences represent the nearest sensitive receptors to the project site, and, therefore, illustrate a worst-case scenario for potential construction and operation sound level increases.

To establish conservative ambient noise levels, ambient noise measurements were conducted at four locations, representing the nearby land uses in the vicinity of the project site. The measurement locations, along with existing development, are shown in **Figure 4**.

The ambient noise measurements were conducted using the Larson-Davis 820 and 824 Precision Integrated Sound Level Meter (SLM). The Larson-Davis 820 and 824 SLM is a Type 1 standard instrument as defined in the American National Standard Institute S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. The microphone was placed at a height of 5 feet above the local grade, at the following locations as shown in Figure 4:

- **R1**: represents the existing noise environment of the project site. The SLM was placed on the eastern boundary of the project site, along North Hollywood Way.
- **R2**: represents the existing noise environment of the project site and nearby commercial uses. The SLM was placed on the northwestern boundary of the project site along Kenwood Street.
- **R3**: represents single-family residences along San Fernando Boulevard approximately 350 feet north of the project site.
- **R4**: represents single-family residences along San Fernando Boulevard approximately 550 feet northeast of the project site.

Long-term (24-hour) measurements were conducted at location R1, and short-term (15-minute) noise measurements were conducted at locations R2 through R4. Short-term ambient noise measurements were conducted between 9:20 a.m. to 10:30 a.m. on Monday, April 17, and the long-term ambient sound measurement was conducted from Monday, April 17, through Tuesday, April 18, 2017, to characterize the existing noise environment in the project vicinity. A summary of noise measurement data is provided in **Table 1**. Daytime noise levels ranged from 54 dBA to 73 dBA L_{eq} and nighttime noise levels ranged from 61 dBA to 72 dBA L_{eq} at the project site. Noise levels ranged from 59 dBA to 66 dBA L_{eq} at offsite sensitive receptor locations.

Existing Roadway Noise Levels Offsite

Existing roadway noise levels were calculated for 34 roadway segments located in the vicinity of the project site. The roadway segments selected for analysis are considered to be those that are expected to be most directly impacted by project-related traffic; which, for the purpose of this analysis, includes the roadways that are located near and immediately adjacent to the project site. These roadways, when compared to roadways located further away from the project site, would experience the greatest percentage increase in traffic generated by the project.

Calculation of the existing roadway noise levels was accomplished using the Federal Highway Administration (FHWA) Highway Noise Prediction Model (FHWA-RD-77-108) and traffic volumes at the study intersections analyzed in the project's traffic study prepared by Fehr and Peers.[23] The model calculates the average noise level in CNEL at specific locations based on traffic volumes, average speeds, and site environmental conditions. The calculated CNEL (at a distance of 40 feet from the roadway right-of-way) from existing traffic volumes on the analyzed roadway segments is shown in **Table 2**.

TABLE 1
SUMMARY OF AMBIENT NOISE MEASUREMENTS

	Measured Ambient Noise Levels [a] (dBA)				
Location, Duration, Existing Land Uses and, Date of Measurements	**Daytime (7 A.M. to 10 P.M.) Hourly L_{eq}**	**Daytime Average Hourly L_{eq}**	**Nighttime (10 P.M. to 7 A.M.) Hourly L_{eq}**	**Nighttime Average Hourly Leq**	**dBA CNEL**
R1 4/17/17 (11:00 A.M. to 11:59 P.M.)/Monday 4/18/17 (12:00 A.M. to 11:00 A.M.)/Tuesday	70-73	71	61-72	67	75
R2 4/17/17 (10:12 A.M. to 10:27 A.M.)/Monday	54	N/A	N/A	N/A	N/A
R3 4/17/17 (9:47 A.M. to 10:02 A.M.)/Monday	59	N/A	N/A	N/A	N/A
R4 4/17/17 (9:22 A.M. to 9:37 A.M.)/Monday	66	N/A	N/A	N/A	N/A

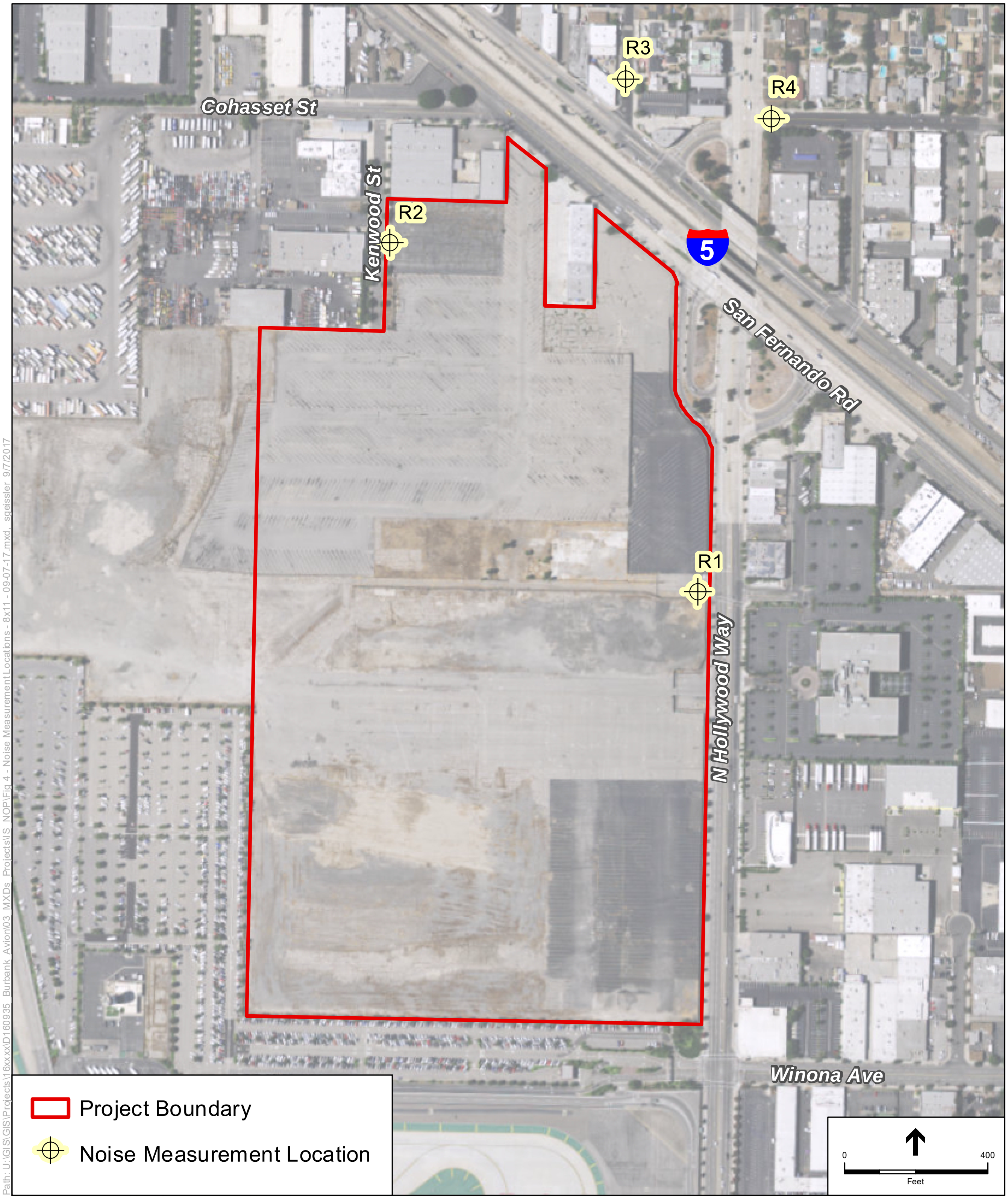
[a] Detailed measured noise data, including hourly Leq levels, are included in Appendix A.

Source: ESA 2017.

Existing Groundborne Vibration Levels

Aside from periodic construction work that may occur throughout the City, other sources of groundborne vibration in the project site vicinity may include automobile and bus travel on local roadways. Traffic at a distance of 50 feet typically generate groundborne vibration velocity levels of approximately 63 VdB (approximately 0.006 in/sec PPV).[24]

[23] Fehr and Peers, *Traffic Impact Study for the Avion Mixed Use Development Project*, September 2017.
[24] FTA, *Transit Noise and Vibration Impact Assessment*. May 2006.



SOURCE: ESRI

Avion Burbank Project . 160935

Figure 4

Noise Measurement Locations

TABLE 2
EXISTING ROADWAY NOISE LEVELS

Roadway Segment	Calculated Traffic Noise Levels along the Roadway dBA CNEL
Airport & W Empire Avenue	65.9
Burbank Boulevard & Victory Boulevard	70.6
Clybourn Avenue & Vanowen Street	69.4
I-5 NB Off-Ramp & W Burbank Boulevard	71.0
I-5 SB Off-Ramp/N Front St & E Burbank Boulevard	72.2
Kenwood Street & Cohasset Street	56.3
N Buena Vista Street & N San Fernando Boulevard	70.8
N Buena Vista Street & W Victory Boulevard	72.3
N Buena Vista Street & Winona Avenue	70.5
N Glenoaks Boulevard & Winona Avenue /Irving Drive	69.3
N Hollywood Way & Burbank Boulevard	73.3
N Hollywood Way & I-5 NB Ramps	70.7
N Hollywood Way & I-5 SB Ramps	71.7
N Hollywood Way & Magnolia Boulevard	72.0
N Hollywood Way & N Avon Street	72.9
N Hollywood Way & Riverside Drive	69.9
N Hollywood Way & Thornton Avenue	73.1
N Hollywood Way & Tulare Avenue	72.5
N Hollywood Way & Verdugo Avenue	71.2
N Hollywood Way & W Alameda Avenue	73.8
N Hollywood Way & W Empire Avenue	65.5
N Hollywood Way & W Olive Avenue	72.4
N Hollywood Way & W Victory Boulevard	74.1
N Hollywood Way & Winona Avenue	72.7
N Hollywood Way NB & San Fernando Rd WB Ramps	68.1
N Hollywood Way NB Off-Ramp & N San Fernando Boulevard	67.0
N Hollywood Way SB & N San Fernando Blvd EB Ramps	68.6
N Hollywood Way SB Ramps & N San Fernando Boulevard	66.7
N San Fernando Boulevard & Cohasset Street	66.8
N San Fernando Boulevard & Winona Avenue	65.6
N Victory Place & W Burbank Boulevard	73.2
San Fernando Boulevard & I-5 SB Ramps	66.8
Vineland Avenue & Vanowen Street	72.4
Vineland Avenue & Victory Boulevard	72.2

SOURCE: ESA 2017.

SECTION 3
Regulatory Setting

Detailed below is a discussion of the relevant regulatory setting and noise regulations, plans, and policies.

3.1 Federal

Federal Noise Standards

Under the authority of the Noise Control Act of 1972, USEPA established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations (CFR) that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, the USEPA issued guidance levels for the protection of public health and welfare in residential land use areas[25] of an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA. These guidance levels are not considered as standards or regulations, and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the project.

Under the Occupational Safety and Health Act of 1970 (29 U.S.C. Section1919 et seq.), the Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Federal Vibration Standards

The FTA has published data on vibration levels in its 2006 Transit Noise and Vibration Impact Assessment that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in **Table 3**.

[25] USEPA, *EPA Identifies Noise Levels Affecting Health and Welfare*. April 1974.

TABLE 3
CONSTRUCTION VIBRATION DAMAGE CRITERIA

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

SOURCE: FTA 2006. Transit Noise and Vibration Impact Assessment.

In addition, the FTA has also adopted standards associated with human annoyance for groundborne vibration impacts for the following three land-use categories: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table 4**. No vibration thresholds have been adopted or recommended for commercial and office uses.

TABLE 4
GROUNDBORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	Frequent Events [a]	Occasional Events [b]	Infrequent Events [c]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB [d]	65 VdB [d]	65 VdB [d]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

[a] "Frequent Events" is defined as more than 70 vibration events of the same source per day.
[b] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
[c] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
[d] This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

SOURCE: FTA 2006. Transit Noise and Vibration Impact Assessment.

3.2 State

California Noise Standards

The State of California does not have statewide standards for environmental noise, but the California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise compatibility by different land uses types is categorized into four general levels: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." For instance, a noise environment ranging from 50 dBA CNEL to 65 dBA CNEL is considered to be "normally acceptable" for multi-family residential uses, while a noise environment of 75 dBA CNEL or above for multi-family residential uses is considered to be "clearly unacceptable." In addition, California Government Code Section 65302(f) requires each county and city in the State to prepare and adopt a comprehensive long-range general plan for its physical development, with Section 65302(g) requiring a noise element to be included in the general plan. The noise element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

The state has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of 45 dBA CNEL in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than 60 dBA CNEL. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

California Vibration Standards

There are no state vibration standards. Moreover, according to the California Department of Transportation's (Caltrans) *Transportation and Construction Vibration Guidance Manual*, there are no official Caltrans standards for vibration.[26] However, this manual provides guidelines that can be used as screening tools for assessing the potential for adverse vibration effects related to structural damage and human perception. The manual is meant to provide practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. The vibration criteria established by Caltrans for assessing structural damage and human perception are shown in **Table 5** and **Table 6**, respectively.

[26] Caltrans, *Transportation and Construction Vibration Guidance Manual*. September 2013.

TABLE 5
CALTRANS VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

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

NOTE: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

SOURCE: Caltrans 2013. Transportation and Construction Vibration Guidance Manual. September.

TABLE 6
CALTRANS VIBRATION ANNOYANCE POTENTIAL CRITERIA

	Maximum PPV (in/sec)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

NOTE: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

SOURCE: Caltrans 2013. Transportation and Construction Vibration Guidance Manual. September.

3.3 Local

City of Burbank General Plan Noise Element

The California Government Code Section 65302(g) requires that a noise element be included in the General Plan of each county and city in the state. The Noise Element of the City of Burbank General Plan is intended to identify sources of noise and provide objectives and policies that ensure that noise from various sources does not create an unacceptable noise environment. Overall, the City's Noise Element describes the noise environment (including noise sources) in the City, addresses noise mitigation regulations, strategies, and programs as well as delineating federal, state, and City jurisdiction relative to rail, automotive, aircraft, and nuisance noise.

The City's noise standards are correlated with land use zoning classifications in order to maintain identified ambient noise levels and to limit, mitigate, or eliminate intrusive noise that exceeds the ambient noise levels within a specified zone. The City has adopted local guidelines based, in part, on the community noise compatibility guidelines established by the DHS for use in assessing the compatibility of various land use types with a range of noise levels. The City's noise/land use compatibility guidelines for land uses are shown in **Table 7**. These criteria are the basis for the development of specific Noise Standards.

TABLE 7
CITY OF BURBANK GUIDELINES FOR NOISE COMPATIBLE LAND USE

Categories	Exterior Normally Acceptable (dBA CNEL/L_{dn}) [a]	Exterior Possibly Acceptable (dBA CNEL/L_{dn}) [b]	Exterior Normally Unacceptable (dBA CNEL/L_{dn}) [c]	Interior Acceptable (dBA CNEL/L_{dn} except where noted) [d]
Residential, single family	Up to 60	61-70	71 and higher	45
Residential, multi-family	Up to 65	66-70	71 and higher	45
Residential, multi-family mixed-use	Up to 65	66-70	71 and higher	45
Transient lodging	Up to 65	66-70	71 and higher	45
Hospitals; nursing homes	Up to 60	61-70	71 and higher	45
Theaters; auditoriums; music halls	Up to 60	61-70	71 and higher	35 dBA L_{eq} [e]
Churches; meeting halls	Up to 60	61-70	71 and higher	40 dBA L_{eq}
Playgrounds; neighborhood parks	Up to 70	71-75	75 and higher	--
Schools; libraries; museums [f]	--	--	--	45 dBA L_{eq}
Offices [g]	--	--	--	45 dBA L_{eq}
Retail/Commercial [g]	--	--	--	--
Industrial	--	--	--	--

[a] Normally acceptable means that land uses may be established in areas with the stated ambient noise level, absent any unique noise circumstances.

[b] Possibly acceptable means that land uses should be established in areas with the stated ambient noise level only when exterior areas are omitted from the project or noise levels in exterior areas can be mitigated to the normally acceptable level.

[c] Normally unacceptable means that land uses should generally not be established in areas with the stated ambient noise level. If the benefits of the project in addressing other Burbank2035 goals and policies outweigh concerns about noise, the use should be established only where exterior areas are omitted from the project or where exterior areas are located and shielded from noise sources to mitigate noise to the maximum extent feasible.

[d] Interior acceptable means that the building must be constructed so that interior noise levels do not exceed the stated maximum, regardless of the exterior noise level. Stated maximums are as determined for a typical worst-case hour during periods of use.

[e] dBA Leq is as determine for a typical worst-case hour during periods of use.

[f] Within the Airport Influence Area, these uses are not acceptable above 65 dBA CNEL if subject to the City's discretionary review procedures.

[g] Within the Airport Influence Area, these uses may be acceptable up to 75 dBA CNEL following review for additional noise attenuation; in excess of 75 dBA CNEL these uses are not acceptable

SOURCE: City of Burbank Noise Element 2013.

In addition, the following objectives and policies from the City's General Plan Noise Element are applicable to the proposed project:

Goal 1: Noise Compatible Land Uses: Burbank's diverse land use pattern is compatible with current and future noise levels.

Policy 1.1: Ensure the noise compatibility of land uses when making land use planning decisions.

Policy 1.2: Provide spatial buffers in new development projects to separate excessive noise generating uses from noise-sensitive uses.

Policy 1.3: Incorporate design and construction features into residential and mixed-use projects that shield residents from excessive noise.

Policy 1.4: Maintain acceptable noise levels at existing noise-sensitive land uses.

Policy 1.5: Reduce noise from activity centers located near residential areas, in cases where noise standards are exceeded.

Policy 1.6: Consult with movie studios and residences that experience noise from filming activities to maintain a livable environment.

Goal 2: Noise in Mixed-Use Development: Noise from commercial activity is reduced in residential portions of mixed-use projects.

Policy 2.1: Require the design and construction of buildings to minimize commercial noise within indoor areas of residential components of mixed-use projects.

Policy 2.2: Locate the residential portion of new mixed-use projects away from noise-generating sources such as mechanical equipment, gathering places, loading bays, parking lots, driveways, and trash enclosures.

Goal 3: Vehicular Traffic Noise: Burbank's vehicular transportation network reduces noise levels affecting sensitive land uses.

Policy 3.1: Support noise-compatible land uses along existing and future roadways, highways, and freeways.

Policy 3.2: Encourage coordinated site planning and traffic management that minimize traffic noise affecting noise-sensitive land uses.

Policy 3.3: Advocate the use of alternative transportation modes such as walking, bicycling, mass transit, and non-motorized vehicles to minimize traffic noise.

Policy 3.4: Install, maintain, and renovate freeway and highway right-of-way buffers and sound walls through continued work with Caltrans and Los Angeles County Metropolitan Transportation Authority (MTA).

Policy 3.5: Monitor noise levels in residential neighborhoods and reduce traffic noise exposure through implementation of the neighborhood protection plans.

Policy 3.6: Prohibit heavy trucks from driving through residential neighborhoods.

Policy 3.7: Where feasible, employ noise-cancelling technologies such as rubberized asphalt, fronting homes to the roadway, or sound walls to reduce the effects of roadway noise on sensitive receptors.

Policy 3.8: Within the Airport Influence Area, seek to inform residential property owners of airport generated noise and any land use restrictions associated with high noise exposure. Mixed-use development contributes to a thriving community, but can place sensitive receptors adjacent to noisy businesses.

Goal 4: Train Noise: Burbank's train service network reduces noise levels affecting residential areas and noise-sensitive land uses.

Policy 4.1: Support noise-compatible land uses along rail corridors.

Policy 4.2: Require noise-reducing design features as part of transit-oriented, mixed-use development located near rail corridors.

Policy 4.3: Promote the use of design features, such as directional warning horns or strobe lights, at railroad crossings that reduce noise from train warnings.

Goal 5: Aircraft Noise: Burbank achieves compatibility between airport-generated noise and adjacent land uses and reduces aircraft noise effects on residential areas and noise-sensitive land uses.

Policy 5.1: Prohibit incompatible land uses within the airport noise impact area.

Policy 5.2: Work with regional, state, and federal agencies, including officials at Bob Hope Airport, to implement noise reduction measures and to monitor and reduce noise associated with aircraft.

Policy 5.3: Coordinate with the Federal Aviation Administration and Caltrans Division of Aeronautics regarding the siting and operation of heliports and helistops to minimize excessive helicopter noise.

Policy 5.4: Within the Airport Influence Area, seek to inform residential property owners of airport generated noise and any land use restrictions associated with high noise exposure.

Goal 6: Industrial Noise: Noise generated by industrial activities is reduced in residential areas and at noise-sensitive land uses.

Policy 6.1: Minimize excessive noise from industrial land uses through incorporation of site and building design features.

Policy 6.2: Require industrial land uses to locate vehicular traffic and operations away from adjacent residential areas.

Goal 7: Construction, Maintenance, and Nuisance Noise: Construction, maintenance, and nuisance noise is reduced in residential areas and at noise-sensitive land uses.

Policy 7.1: Avoid scheduling city maintenance and construction projects during evening, nighttime, and early morning hours.

Policy 7.2: Require project applicants and contractors to minimize noise in construction activities and maintenance operations.

Policy 7.3: Limit the allowable hours of construction activities and maintenance operations located adjacent to noise-sensitive land uses.

Policy 7.4: Limit the allowable hours of operation for and deliveries to commercial, mixed-use, and industrial uses located adjacent to residential areas.

Municipal Code

The City's noise standards found in Chapter 9-3-208 and Chapter 9-1-1-105.8 of the City of Burbank Municipal Code (BMC), set forth sound measurement criteria, minimum ambient noise levels for different land use zoning classifications, sound emission levels for specific uses, hours of operation for certain uses, standards for determining when noise is deemed to be a disturbance, and legal remedies for violations.

The City Noise Regulation establishes acceptable ambient sound levels to regulate intrusive noises (e.g., stationary mechanical equipment) within specific land use zones. In accordance with the Noise Regulation, a noise level from any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device in such a manner would exceed 5 dBA over the ambient noise level at an adjacent property line is considered a noise violation. The City's noise standards establish the ambient noise base levels in the zones and during the times as shown in **Table 8**.

TABLE 8
AMBIENT NOISE BASE LEVELS (DBA)

Base Levels, (dBA) L_{eq}	Time	Zone
45	Nighttime [a]	Residential
55	Daytime [b]	Residential
65	Anytime	Commercial
70	Anytime	All other zones

[a] 10:00 P.M. to 7:00 A.M.
[b] 7:00 A.M. to 10:00 P.M.

SOURCE: Burbank Municipal Code, Section 9-3-208, 2008

According to Section 9-3-208, when the ambient noise base level for the property on which the machinery, equipment, pump, fan, air conditioning apparatus or similar mechanical device is located is higher than the ambient noise base level for adjacent property, the ambient noise base levels for the adjacent property shall apply. Properties separated by a street shall be deemed to be adjacent to one another.

Chapter 9-1-1-105.8 of the BMC prohibits construction activity which would create disturbing, excessive, or offensive noise between 7:00 p.m. and 7:00 a.m. Monday through Friday, between 5:00 p.m. and 8:00 a.m. on Saturdays, and at any time on Sundays or national holidays. The Community Development Director, Planning Board, or City Council may grant exceptions pursuant to land use entitlements or wherever there are practical difficulties involved in carrying out the provisions of the above mentioned chapter or other specific onsite activity that warrants unique consideration.

SECTION 4
Methodology

ESA has conducted an acoustical study with respect to potential noise and vibration impacts with construction activities, surface transportation, and other aspects of project operations that are noise and vibration intensive and that have the potential to impact noise sensitive land uses. The objectives of this noise and vibration study are to:

a. Quantify the existing ambient noise environment at the proposed project site;

b. Evaluate the construction and operational noise and vibration impacts to nearby noise sensitive receptors based on applicable City standards and thresholds;

c. Provide, if needed, noise mitigation measures as required to meet applicable noise regulations and standards as specified by the City of Los Angeles.

4.1 Onsite Construction Noise

On-site construction noise impacts were evaluated by determining the noise levels generated by the different types of construction activity anticipated, calculating the construction-related noise level generated by the mix of equipment assumed for all construction activities at nearby sensitive receptor locations, and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise) at those receptors. More, specifically, the following steps were undertaken to assess construction-period noise impacts.

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Table 1)
2. Typical noise levels for each type of construction equipment were obtained from the Federal Highway Administration roadway construction noise model;
3. Distances between construction site locations (noise sources) and surrounding sensitive receptors were measured using project architectural drawings and site plans and Google Earth;
4. The construction noise level was then calculated, in terms of hourly L_{eq}, for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance; and
5. Construction noise levels were then compared to the construction noise significance thresholds identified in Chapter 9-3-208 of the BMC.

4.2 Offsite Roadway Noise (Construction and Operation)

Roadway noise impacts have been evaluated using the Caltrans Technical Noise Supplement (TeNS) method based on the roadway traffic volume data provided in the Traffic Study prepared for the project. This method allows for the definition of roadway configurations, barrier information (if any), and receiver locations. Roadway noise attributable to project development was calculated and compared to baseline noise levels that would occur under the "Without Project" condition.

4.3 Stationary Point-Source Noise (Operations)

Stationary point-source noise impacts were evaluated by identifying the noise levels generated by outdoor stationary noise sources, such as open spaces, outdoor activities, rooftop mechanical equipment, and loading area activity, calculating the hourly L_{eq} noise level from each noise source at sensitive receptor property lines, and comparing such noise levels to existing ambient noise levels. More specifically, the following steps were undertaken to calculate outdoor stationary point-source noise impacts:

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Table 1);
2. Distances between stationary noise sources and surrounding sensitive receptor locations were measured using project architectural drawings, Google Earth, and site plans;
3. Stationary-source noise levels were then calculated for each sensitive receptor location based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance;
4. Noise level increases were compared to the stationary source noise significance thresholds identified under the Impacts from the Stationary Point-Source Noise Section, and;
5. For outdoor mechanical equipment, the maximum allowable noise emissions from any and all outdoor mechanical equipment were specified such that noise levels would not exceed the significance threshold identified under the Impacts from the Stationary Point-Source Noise Section.
6. Parking related noise levels were estimated the methodology recommended by FTA for the general assessment of stationary transit noise source. Using the methodology, the project's peak hourly noise level that would be generated by the onsite parking levels was estimated using the following FTA equations for a parking garage and parking lot:

    $L_{eq}(h) = SEL_{ref} + 10\log(NA/1000) - 35.6$ [Parking Garage]

    $L_{eq}(h) = SEL_{ref} + 10\log(NA/2000) - 35.6$ [Parking Lot]

    Where:

    $L_{eq}(h)$ = hourly L_{eq} noise level at 50 feet

SEL_{ref} = reference noise level for stationary noise source represented in sound exposure level (SEL) at 50 feet

N_A = number of automobiles per hour

7. Combined noise levels from each operational noise source were estimated such that noise levels would not exceed the significance threshold identified below.

4.4 Groundborne Vibration (Construction and Operations)

Ground-borne vibration impacts were evaluated by identifying potential vibration sources, measuring the distance between vibration sources and surrounding structure locations, and making a significance determination based on the significance thresholds described under the Vibration Criteria Section.

4.5 Airport Noise

Airport noise impacts were assessed by identifying areas of the project that lie within the City of Burbank's Airport Influence Area (AIA). Project areas within the AIA were then compared to Bob Hope Airport noise contours based on the land uses' noise compatibility standards set forth in the City of Burbank Noise Element of the General Plan.

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SECTION 5
Thresholds of Significance

5.1 Appendix G of the State CEQA Guidelines

In accordance with Appendix G of the State CEQA Guidelines, the applicable thresholds of significance with regard to noise and vibration are below. The project could have a significant impact if it would 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;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

As discussed in the Initial Study, provided in Appendix A-1 of this Draft EIR, and in Chapter 6, Other CEQA Considerations, the projects not located within the vicinity of a private airstrip; therefore, this issue does not require any further analysis in this noise technical report.

5.2 Noise Criteria

As set forth in the BMC, a project would have a significant noise impact from project construction activities if:

NOISE-1 Construction activities which would create disturbing, excessive, or offensive noise between 7:00 p.m. and 7:00 a.m. Monday through Friday, between 5:00 p.m. and 8:00 a.m. on Saturdays, and at any time on Sundays or national holidays and construction equipment activity exceeds the exterior ambient noise levels in Table 1 by more than 5 dBA.

As set forth in the BMC, a project would have a significant noise impact from project operational activities if:

NOISE-2 Noise from project-related operational noise sources such as project related traffic, building mechanical/electrical equipment, parking facilities, outdoor gathering areas, and loading dock area exceeds the exterior ambient noise levels in Table 1.

A project would have a significant impact if project construction and operation would result in a substantial temporary or permanent increase in ambient noise levels, respectively. A substantial increase is defined as a change in noise levels of 5 dBA is considered to be a readily perceivable difference.

5.3 Vibration Criteria

The CEQA Guidelines do not define the levels at which groundborne vibration or groundborne noises are considered "excessive." The City of Burbank currently does not have a significance threshold to assess vibration impacts during construction. Additionally, there are no federal, state, or local vibration regulations or guidelines directly applicable to the project. However, publications of the FTA and Caltrans are two of the seminal works for the analysis of vibration relating to transportation and construction-induced vibration. The project is not subject to FTA or Caltrans regulations; nonetheless, these guidelines serve as useful tools to evaluate vibration impacts. For the purpose of this analysis, the vibration criteria for structural damage and human annoyance established in the most recent Caltrans' *Transportation and Construction Vibration Guidance Manual*, which are shown previously in Table 5 and Table 6, respectively, are used to evaluate the potential vibration impacts of the project on nearby sensitive receptors.

Given the nature of the project as a creative office/industrial space, retail space, and hotel, any "excessive" groundborne vibration or noises that would occur at the project site would be those generated during project construction. During project operation, the project would not involve the use of heavy machinery that is often associated with heavy-industrial uses. The primary source of vibration generated by project operation would be vehicle circulation within the parking facility and truck deliveries to the project site for the proposed creative office/industrial space, retail, and restaurant uses. However, according to the FTA's *Transit Noise and Vibration Impact Assessment*, it is unusual for vibration from vehicular sources (including buses and trucks) to be perceptible, even in locations close to major roads.[27] As such, no sources of "excessive" groundborne vibration or noise levels are anticipated during project operations. Additionally, the project does not include residential uses; thus, the project would not locate new residential uses in an area that would be impacted by any existing sources of groundborne vibration and noise (e.g., commuter railroad line, rapid transit stations, etc.). Accordingly, the groundborne vibration analysis presented in this report is limited to the project's construction activities.

NOISE-3 Project construction activities cause ground-borne vibration levels to exceed 0.5 in/sec PPV for structural damage or exceed 0.04 in/sec PPV for human annoyance.

[27] FTA, Transit Noise and Vibration Impact. May 2006.

5.4 Airport Noise

The Bob Hope Airport is also located adjacent to the property boundary to the west. The project would result in a significant impact from airport noise if the following would occur:

NOISE-4 Airport noise contours are over the allowable noise compatibility standard for a given land use.

SECTION 6
Environmental Impacts

6.1 Construction Noise

Threshold NOISE-1: Construction activities which would create disturbing, excessive, or offensive noise between 7:00 p.m. and 7:00 a.m. Monday through Friday, between 5:00 p.m. and 8:00 a.m. on Saturdays, and at any time on Sundays or national holidays and construction equipment activity exceeds the exterior ambient noise levels in Table 1 by more than 5 dBA.

Impact Statement NOISE-1: Onsite construction activities would increase noise levels at offsite noise-sensitive receptors in the project area in excess of the applicable thresholds. Impacts due to noise from onsite construction activities would be potentially significant at offsite sensitive use locations. However, with implementation of the identified construction mitigation measure, the noise impact from onsite construction activities would be reduced to less than significant. Offsite haul truck trips would not increase noise levels at noise sensitive receptors in excess of the applicable threshold and would therefore result in a less than significant offsite noise impact.

Onsite Construction Activity and Related Noise

Construction of the project would require the use of heavy equipment during the demolition, grading, and excavation activities at the project site. During each stage of development, there would be a different mix of equipment. As such, construction activity noise levels at and near the project site would fluctuate depending on the particular type, number, and duration of use of the various pieces of construction equipment.

Individual pieces of construction equipment anticipated during project construction could produce maximum noise levels of 70 dBA to 85 dBA L_{max} at a reference distance of 50 feet from the noise source, as shown in **Table 9**. These maximum noise levels would occur when equipment is operating at full power. However, construction equipment operates at full power periodically for relatively short durations such as when actively lifting materials. Construction equipment typically operate and much lower power levels. Acoustical usage factors are used estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. According to the FHWA's RCNM User's Guide, the usage factor term is used for the computation of L_{eq} noise levels. The estimated usage factor for the equipment is also shown in **Table 9**, which are based on the FHWA's RCNM User's Guide.[28]

[28] Federal Highway Administration, Roadway Construction Noise Model User's Guide, 2006.

During project construction, the closest offsite noise sensitive receptors that would be exposed to increased noise levels are:

- Single-family residences along San Fernando Boulevard approximately 350 feet north of the project site
- Single-family residences along San Fernando Boulevard approximately 550 feet northeast of the project site

TABLE 9
CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Equipment	Estimated Usage Factor, %	Noise Level at 50 Feet (dBA, Lmax)
Air Compressors	50%	78
Aerial Lifts	20%	75
Bore/Drill Rig	20%	79
Crane	40%	81
Dump/Haul Trucks	20%	76
Excavator	40%	81
Forklift	10%	75
Generator Sets	50%	81
Grader	40%	85
Paver	50%	77
Pump	50%	81
Roller	20%	80
Rough Terrain Forklift	50%	70
Rubber Tired Dozer	40%	82
Scraper	40%	84
Skid Steer Loader	40%	80
Sweeper	10%	82
Surfacing Equipment	50%	85
Tractor/Loader/Backhoe	25%	80
Trencher	50%	80
Welder	40%	74

SOURCE: FHWA 2006.

Over the course of a construction day, the highest noise levels would be generated when multiple pieces of construction equipment are being operated concurrently. The project's estimated construction noise levels were calculated for a scenario in which all construction equipment for all overlapping phases were assumed to be operating simultaneously. Equipment was assumed to be located at the nearest distance from the sensitive receptor for half of the total equipment, while the other half was assumed to be located at the center of the project site. This assumption is based on the fact that activities would occur throughout the site and not just along the project border.

The estimated noise levels at the offsite sensitive receptors were calculated using the FHWA's RCNM, and were based on a maximum concurrent operation of up to 18 pieces of heavy construction equipment (i.e., aerial lift, auger drill rig, excavator, tractor/loader/backhoe, forklift, etc.), which is considered a worst-case evaluation because the project would typically use less overall equipment on a daily basis, and as such would generate lower noise levels. In addition, the noise levels were estimated assuming construction activities for Phase 1 would overlap with construction activities for Phase 2. **Table 10** shows the estimated construction noise levels that would occur at the nearest offsite sensitive uses during a peak day of construction activity at the project site.

TABLE 10
ESTIMATE OF CONSTRUCTION NOISE LEVELS (L_{EQ}) AT EXISTING OFFSITE SENSITIVE RECEIVER LOCATIONS

Offsite Sensitive Land Uses [a]	Location	Nearest Distance from Construction Activity to Noise Receptor (ft.)[b]	Estimated Maximum Construction Noise Levels (dBA L_{eq}) [c]	Daytime Ambient Noise Levels (dBA L_{eq})	Applicable Standard[d]	Exceed Standard?
R3	North of the project site along San Fernando Boulevard	350	71	59	64	Yes
R4	Northeast of the project site along San Fernando Boulevard	550	70	66	71	No

[a] Construction noise levels at R1 and R2 are not estimated since R1 and R2 represent the noise environment at the project site.
[b] The distance represents the nearest construction area on the project site to the property line of the offsite receptor.
[c] The noise levels were estimated assuming some overlap between Phase 1 and Phase 2 of construction.
[d] The applicable BMC standard is the daytime ambient noise levels plus 5 dBA.

SOURCE: ESA 2017.

As shown in Table 10, construction noise levels are estimated to reach a maximum of 71 dBA at sensitive receptor R3 (single-family residential), which would exceed the maximum allowable BMC increase at this location (the ambient noise level of 59 dBA plus 5 dBA), and a maximum of 70 dBA at sensitive receptor R4 (single-family residential), which would not exceed the maximum allowable BMC increase at this location (the daytime noise level of 66 dBA plus 5 dBA). Therefore, the project would have potentially significant construction noise impact at noise sensitive receptor, R3, if no mitigation was applied.

However, with implementation of mitigation measure MM-NOISE-1, which is discussed the noise levels during construction would be reduced below the applicable noise standards. Therefore, these impacts would be less than significant.

Significance Determination: Less than significant with mitigation incorporated.

Offsite Construction Activity and Related Noise

Construction truck trips would not occur during the construction period. Any soil excavated onsite would be repurposed and used within the site boundaries, so haul trucks would not be used to transport soil or debris offsite.

According to the Federal Highway Administration, the traffic volumes need to be doubled (100 percent increase) in order to increase noise levels by 3 dBA due to the increase of the traffic.[29] An estimated maximum of approximately 86 delivery truck trips and 704 worker's vehicle trips would occur from the project site on a daily basis. The average daily traffic volumes

[29] Federal Highway Administration, *Highway Noise Prediction Model*. December 1978.

for the roadways traveled by vendors and workers are greater than 10,000 vehicles.[30] Construction related traffic volumes of up to 790 trips for delivery trucks and workers vehicle trips would be only an approximately 8 percent increase compared to the existing ADT volumes of 10,000 on the roadways, which would not increase noise levels by 5 dBA over the ambient condition.[31] Therefore, noise impacts from offsite construction traffic would be less than significant and no mitigation measures are required.

Significance Determination: Less than significant.

6.2 Operational Noise

Threshold NOISE-2 Noise from project-related operational noise sources such as project related traffic, building mechanical/electrical equipment, parking facilities, outdoor gathering areas, and loading dock area exceeds the exterior ambient noise levels in Table 1.

Impact Statement NOISE-2: Operation of the project would not increase noise levels at offsite noise-sensitive receptors in the project area in excess of the applicable thresholds. Thus, operational noise impacts would be less than significant and no operational mitigation measures are required.

Impacts Under Existing Traffic Baseline Conditions

Existing roadway noise levels were calculated along various arterial segments adjacent to the project site. Roadway noise attributable to project development was calculated using the traffic noise model previously described and was compared to baseline noise levels in the vicinity.

Project impacts are shown in **Table 11**. As indicated, the maximum increase in project-related traffic noise levels over existing traffic noise levels would be 5.1 dBA, CNEL, which would occur at Kenwood Street and Cohasset Street adjacent to the north of the project site. This increase in sound level would be slightly above the significance threshold of 5 dBA CNEL increase over ambient noise levels for noise-sensitive uses within the “exterior normally acceptable” category (see Table 7). The increase in sound levels would be lower than the 5 dBA CNEL threshold for noise-sensitive uses at all the other roadway segments analyzed. The increase in noise at Kenwood Street and Cohasset Street would occur at an intersection surrounded by parking and warehouse land uses that are not noise-sensitive land uses and for which ambient noise level allowances are not limited based on the data shown in Table 7. Therefore, off traffic related noise impacts from operation of the project would be less than significant, and no mitigation measures would be required.

[30] Fehr and Peers 2017; ESA 2017.

[31] FTA, Transit Noise and Vibration Impact Assessment, Section 5.6, May. 2006.

TABLE 11
OFFSITE TRAFFIC NOISE IMPACTS – EXISTING WITH PROJECT CONDITIONS

	Calculated Traffic Noise Levels along the Roadway dBA CNEL				
Roadway Segment	**Existing (A)**	**Existing with Project (B)**	**Project Increment (B-A)**	**Significance Threshold**	**Exceed Threshold?**
Airport & W Empire Avenue	65.9	66.1	0.2	5	No
Burbank Boulevard & Victory Boulevard	70.6	70.7	0.1	5	No
Clybourn Avenue & Vanowen Street	69.4	69.5	0.1	5	No
I-5 NB Off-Ramp & W Burbank Boulevard	71.0	71.1	0.1	5	No
I-5 SB Off-Ramp/N Front St & E Burbank Boulevard	72.2	72.3	0.1	5	No
Kenwood Street & Cohasset Street	**56.3**	**61.4**	**5.1**	**N/A [a]**	**No**
N Buena Vista Street & N San Fernando Boulevard	70.8	70.9	0.1	5	No
N Buena Vista Street & W Victory Boulevard	72.3	72.4	0.1	5	No
N Buena Vista Street & Winona Avenue	70.5	70.5	0.1	5	No
N Glenoaks Boulevard & Winona Avenue /Irving Drive	69.3	69.4	0.1	5	No
N Hollywood Way & Burbank Boulevard	73.3	73.5	0.2	5	No
N Hollywood Way & I-5 NB Ramps	70.7	70.9	0.3	5	No
N Hollywood Way & I-5 SB Ramps	71.7	72.0	0.3	5	No
N Hollywood Way & Magnolia Boulevard	72.0	72.1	0.1	5	No
N Hollywood Way & N Avon Street	72.9	73.3	0.4	5	No
N Hollywood Way & Riverside Drive	69.9	70.0	0.1	5	No
N Hollywood Way & Thornton Avenue	73.1	73.5	0.4	5	No
N Hollywood Way & Tulare Avenue	72.5	73.2	0.7	5	No
N Hollywood Way & Verdugo Avenue	71.2	71.4	0.1	5	No
N Hollywood Way & W Alameda Avenue	73.8	73.9	0.1	5	No
N Hollywood Way & W Empire Avenue	65.5	65.7	0.2	5	No
N Hollywood Way & W Olive Avenue	72.4	72.5	0.1	5	No
N Hollywood Way & W Victory Boulevard	74.1	74.4	0.3	5	No
N Hollywood Way & Winona Avenue	72.7	73.1	0.4	5	No
N Hollywood Way NB & San Fernando Rd WB Ramps	68.1	68.6	0.5	5	No
N Hollywood Way NB Off-Ramp & N San Fernando Boulevard	67.0	67.5	0.6	5	No
N Hollywood Way SB & N San Fernando Blvd EB Ramps	68.6	69.1	0.5	5	No
N Hollywood Way SB Ramps & N San Fernando Boulevard	66.7	67.4	0.8	5	No
N San Fernando Boulevard & Cohasset Street	66.8	67.9	1.1	5	No
N San Fernando Boulevard & Winona Avenue	65.6	66.1	0.4	5	No
N Victory Place & W Burbank Boulevard	73.2	73.3	0.1	5	No
San Fernando Boulevard & I-5 SB Ramps	66.8	67.1	0.2	5	No
Vineland Avenue & Vanowen Street	72.4	72.4	0.0	5	No
Vineland Avenue & Victory Boulevard	72.2	72.2	0.0	5	No

[a] Kenwood Street and Cohasset Street would occur at an intersection surrounded by parking and warehouse land uses that are not noise-sensitive land uses and for which ambient noise level allowances are not limited based on the data shown in **Table 7**. Therefore, the 5 dBA CNEL threshold for noise-sensitive land uses does not apply.

SOURCE: ESA 2017, Fehr and Peers 2017.

Impacts Under Future (2019) Traffic Conditions

Future roadway noise levels were also calculated along various arterial segments adjacent to the project as compared to 2019 traffic noise levels that would occur with implementation of the project. Project impacts are shown in **Table 12**, the maximum increase in project-related traffic noise levels over the future traffic noise levels would be 5.1 dBA, CNEL, which would occur Kenwood Street and Cohasset Street, adjacent to the north of the Project Site. This increase in sound level would be above the significance threshold of 5 dBA CNEL increase for noise-sensitive land uses within the "exterior normally acceptable" category (see Table 7). The increase in sound level would be lower at all other roadway segments analyzed. The increase in noise at Kenwood Street and Cohasset Street would occur at an intersection surrounded by parking and warehouse land uses that are not noise-sensitive land uses and for which ambient noise level allowances are not limited based on the data shown in Table 7. Therefore, project-related noise increases would be less than significant, and no mitigation measures are required.

TABLE 12
OFFSITE TRAFFIC NOISE IMPACTS – FUTURE (2019) WITH PROJECT CONDITIONS

Roadway Segment	Calculated Traffic Noise Levels along the Roadway dBA CNEL				
	Existing (A)	Future with Project (B)	Project Increment (B-A)	Significance Threshold	Exceed Threshold?
Airport & W Empire Avenue	66.5	66.7	0.2	5	No
Burbank Boulevard & Victory Boulevard	71.1	71.1	0.0	5	No
Clybourn Avenue & Vanowen Street	69.7	69.8	0.1	5	No
I-5 NB Off-Ramp & W Burbank Boulevard	72.6	72.6	0.0	5	No
I-5 SB Off-Ramp/N Front St & E Burbank Boulevard	73.0	73.0	0.0	5	No
Kenwood Street & Cohasset Street	**56.6**	**61.6**	**5.1**	**N/A [a]**	**No**
N Buena Vista Street & N San Fernando Boulevard	71.6	71.7	0.1	5	No
N Buena Vista Street & W Victory Boulevard	72.7	72.7	0.0	5	No
N Buena Vista Street & Winona Avenue	70.1	70.2	0.0	5	No
N Glenoaks Boulevard & Winona Avenue /Irving Drive	69.4	69.5	0.1	5	No
N Hollywood Way & Burbank Boulevard	73.9	74.0	0.2	5	No
N Hollywood Way & I-5 NB Ramps	71.3	71.5	0.2	5	No
N Hollywood Way & I-5 SB Ramps	72.3	72.6	0.2	5	No
N Hollywood Way & Magnolia Boulevard	72.6	72.7	0.1	5	No
N Hollywood Way & N Avon Street	73.5	73.8	0.4	5	No
N Hollywood Way & Riverside Drive	71.1	71.2	0.1	5	No
N Hollywood Way & Thornton Avenue	73.6	74.0	0.4	5	No
N Hollywood Way & Tulare Avenue	73.1	73.7	0.7	5	No
N Hollywood Way & Verdugo Avenue	71.9	72.1	0.1	5	No
N Hollywood Way & W Alameda Avenue	74.8	74.9	0.1	5	No
N Hollywood Way & W Empire Avenue	66.2	66.5	0.3	5	No
N Hollywood Way & W Olive Avenue	74.1	74.1	0.0	5	No
N Hollywood Way & W Victory Boulevard	74.6	74.8	0.2	5	No
N Hollywood Way & Winona Avenue	73.3	73.7	0.4	5	No
N Hollywood Way NB & San Fernando Rd WB Ramps	68.7	69.2	0.5	5	No

Roadway Segment	Calculated Traffic Noise Levels along the Roadway dBA CNEL				
	Existing (A)	Future with Project (B)	Project Increment (B-A)	Significance Threshold	Exceed Threshold?
N Hollywood Way NB Off-Ramp & N San Fernando Boulevard	67.8	68.3	0.5	5	No
N Hollywood Way SB & N San Fernando Blvd EB Ramps	69.2	69.6	0.4	5	No
N Hollywood Way SB Ramps & N San Fernando Boulevard	67.7	68.3	0.6	5	No
N San Fernando Boulevard & Cohasset Street	67.6	68.5	0.9	5	No
N San Fernando Boulevard & Winona Avenue	66.2	66.7	0.4	5	No
N Victory Place & W Burbank Boulevard	73.5	73.6	0.0	5	No
San Fernando Boulevard & I-5 SB Ramps	67.1	67.2	0.1	5	No
Vineland Avenue & Vanowen Street	72.7	72.7	0.0	5	No
Vineland Avenue & Victory Boulevard	72.4	72.5	0.0	5	No

[a] Kenwood Street and Cohasset Street would occur at an intersection surrounded by parking and warehouse land uses that are not noise-sensitive land uses and for which ambient noise level allowances are not limited based on the data shown in **Table 7**. Therefore, the 5 dBA CNEL threshold for noise-sensitive land uses does not apply.

SOURCE: ESA 2017; Fehr and Peers 2017.

Significance Determination: Less than significant.

Impacts from Onsite Stationary Noise Sources

Fixed Mechanical Equipment

The operation of mechanical equipment typical for developments like the project, such as air conditioners, fans, generators, and related equipment, may generate audible noise levels. Project mechanical equipment would be located on rooftops or within buildings, and would be shielded from nearby land uses to attenuate noise and avoid conflicts with adjacent uses. Mitigation measure MM-NOISE-2 is prescribed to comply with noise limitation requirements provided in Chapter 9-3-208 of the BMC. With implementation of MM-NOISE-2, all mechanical equipment would be designed with appropriate noise control devices, such as sound attenuators, acoustics louvers, or sound screen/parapet walls, which prohibit the noise from such equipment causing an increase in the ambient noise level by more than 5 dBA. Therefore, operation of mechanical equipment would not exceed the City's thresholds of significance of 5 dBA or greater noise increase and impacts would be less than significant with implementation of mitigation measures.

Loading Dock Areas

Loading dock activities such as truck movements/idling and loading/unloading operations generate noise levels that have the potential to adversely impact adjacent land uses during long-term project operations. However, the loading area would be screened from public view and shielded from surrounding offsite development by the project buildings. Based on a noise survey conducted at a loading dock facility, loading dock activity (namely idling semi-trucks and backup alarm beeps) would generate noise levels of approximately 70 dBA L_{eq} at a reference distance of

50 feet from the noisiest portion of the truck (i.e., to the side behind the cab and in line with the engine and exhaust stacks). The nearest sensitive receptor, single-family residential homes (receptor R3), conservatively estimated at 350 feet from the loading dock area shown in Figure 2, above. Based on a noise level source strength of 70 dBA L_{eq} at a reference distance of 50 feet, and accounting for barrier-insertion loss by the project buildings (minimum 10 dBA insertion loss) and distance attenuation (minimum 17 dBA loss by 350 feet distance at a rate of 6 dBA for hard site for each doubling of distance from the reference distance), loading dock noise would be 43 dBA L_{eq} and would not increase the ambient noise level of 59 dBA L_{eq} at sensitive receptor R3 by 5 dBA. As such, impacts would be less than significant, no mitigation measures are required.

Refuse Collection Areas

Refuse collection areas would be located in the loading areas of the creative industrial and office buildings shown in Figure 2, above. Refuse collection activities such as truck movements/idling and trash compactor operations would generate noise levels that have the potential to adversely impact adjacent land uses during long-term project operations. Based on measured noise levels, refuse collection trucks and trash compactors would generate noise levels of approximately 70 dBA (L_{eq}) and 66 dBA (L_{eq}) at a 50-foot distance, respectively.

Sensitive receptor R3, single-family residential homes, would be located at a conservatively estimated 350 feet from the proposed refuse collection area. Based on a noise level source strength of 70 dBA L_{eq} and 66 dBA L_{eq} at a reference distance of 50 feet, and accounting for barrier-insertion loss by the project buildings (minimum 10 dBA insertion loss) and distance attenuation (minimum 17 dBA loss by 350 feet distance at a rate of 6 dBA for hard site for each doubling of distance from the reference distance), truck idling and trash compactor noise would be 43 dBA and 39 dBA L_{eq}, respectively, and would not increase the ambient noise level of 59 dBA L_{eq} at this location by 5 dBA. As such, impacts would be less than significant, no mitigation measures are required.

Significance Determination: Less than significant.

Parking Lots

The primary entrance would be the proposed driveway off the southwest corner of Tulare Avenue and Hollywood Way, which would provide access to shared surface-level parking for creative industrial, office, retail, and hotel locations.

Sources of noise associated with parking facilities typically include engines accelerating, doors slamming, car alarms, and people talking. Noise levels at these facilities would fluctuate throughout the day with the amount of vehicle and human activity. Noise levels would generally be the highest in the morning and afternoon hours when the largest number of people would enter and exit the parking facility.

For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from vehicles entering and exiting the project's parking structure, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used.

Based on the project's traffic study, the projects forecasted to generate 8,984 total daily vehicle trips with an anticipated 897 trips and 1,128 trips during the AM and PM peak hours, respectively.[32] Using the FTA's reference noise level of 101 dBA SEL[33] at 50 feet from the noise source for a parking lot, it was determined that the project's highest peak hour vehicle trips, which would be 1,128 trips during the PM peak hour, would generate noise levels of approximately 57 dBA, L_{eq} at 50 feet from the project's parking entrance. The closest sensitive receptor (R3) is approximately 350 feet from the access driveway to the parking lot. Based on this distance, the vehicle-related noise levels would be reduced to approximately 40 dBA L_{eq} at R3, which would not exceed the ambient base level of 59 dBA in Table 1 by 5 dBA. During other hours of the day when less overall vehicles arrive and depart from the project site, the noise levels at the nearest offsite sensitive land uses would be even lower. Thus, this impact would be less than significant.

Significance Determination: Less than significant.

Composite Noise Level Impacts from Project Operations

An evaluation of the combined noise levels from the project's various operational noise sources (i.e., composite noise level) was conducted to conservatively ascertain the potential maximum project-related noise level increase that may occur at the noise-sensitive receptors considered in this analysis. Noise sources associated with the project include loading area activities, refuse collection areas, parking lots, and onsite mechanical equipment. Although traffic noise levels would increase over the 5 dBA threshold at one analyzed intersection. The intersection is not nearby any sensitive receptors. The nearest intersection of N. San Fernando Boulevard and Cohasset Street is applied to composite noise level analysis.

Based on a review of the noise-sensitive receptors and project noise sources, the only existing noise-sensitive locations at which composite noise impacts could occur are the single-family residences to the north (R3), approximately 350 feet north of the project site. For the reasons discussed above, the predominant project noise source that could potentially affect these receptors would be traffic noise, loading area activities, refuse collection activities, parking lots, and onsite mechanical equipment.

Noise associated with activities in the loading dock areas and refuse collection areas would not increase the overall ambient noise levels in the project vicinity. As shown in **Table 13**, based on the existing traffic noise level of 66.8 dBA at N San Fernando Boulevard & Cohasset Street in the vicinity of R3, project-related traffic would contribute 61.4 dBA of sound energy, which would increase the existing roadway noise levels by 1.1 dBA. Loading dock and refuse collection areas would contribute a maximum of 43 dBA of sound energy each at R3. The parking lot would contribute a maximum of 40 dBA of sound energy at R3. Mechanical equipment would contribute a maximum of 49 dBA of sound energy at R3. Overall, relative to the existing noise environment, the project would be estimated to increase the ambient noise level by approximately 4.6 dBA at the single-family residences to the north (R3) which is less than the significance

32 Fehr and Peers, Traffic Impact Study for the Avion Mixed Use Development Project, September 2017.

33 FTA, Transit Noise and Vibration Impact Assessment. May 2006.

threshold of a 5 dBA increase. This analysis conservatively assumes that the project's operational noise sources would generate maximum noise levels simultaneously. Composite noise level increases at all other receptor locations are expected to be less than significant as well, given their distance from the project site and the presence of intervening structures. As such, the composite noise level impact on the nearest sensitive receptors due to the project's future operations would be less than significant, and no mitigation would be required.

TABLE 13
COMPOSITE NOISE LEVELS AT SENSITIVE RECEPTOR LOCATION R3 FROM PROJECT OPERATIONS

	Noise Levels, dBA [a]
Operational Noise Sources	**Location R3**
Existing (Ambient) Noise Level at Location (A)	**59**
Project Composite Noise Sources	
Loading dock areas	43
Refuse collection areas	43
Parking lots	40
Mechanical equipment	49
Offsite traffic (N San Fernando Boulevard & Cohasset Street)	
Existing traffic noise level	*66.8*
Existing plus Project traffic noise level	*67.9*
Estimated Project-only traffic noise level	61.4
Project Composite Noise Level (B)	**61.8**
Existing Plus Project Composite Noise Level (C)	**63.6**
Project Increment (C-A)	4.6
Exceeds Threshold?	No

SOURCE: ESA 2017.

Significance Determination: Less than significant

6.3 Groundborne Vibration

Threshold NOISE-3: Project construction activities cause ground-borne vibration levels to exceed 0.5 in/sec PPV for structural damage or exceed 0.04 in/sec PPV for human annoyance.

Impact Statement NOISE-3: Construction activities would result in sporadic, temporary vibration effects adjacent to the project site, which would not reach excessive vibration levels. Operational activities would not result in vibration effects adjacent to the project site that would reach excessive vibration levels. Thus, construction and operational vibration impacts would be less than significant. No mitigation measures are required.

Construction

Construction activities at the project site have the potential to generate low levels of groundborne vibration as the operation of heavy equipment (i.e., backhoe, dozer, excavators, grader, loader, scraper, and haul trucks, etc.) generates vibrations that propagate though the ground and diminish in intensity with distance from the source. No high-impact activities, such as pile-driving or blasting, would be used during project construction. The nearest offsite receptors to the project site that could be exposed to vibration levels generated from project construction include the residences north (R3) of the project site. Groundborne vibrations from construction activities very rarely reach the levels that can damage structures, but they may be perceptible in buildings very close to a construction site.

The PPV vibration velocities for several types of construction equipment that can generate perceptible vibration levels are identified in **Table 13**. Based on the information presented in Table 13, vibration velocities could range from 0.003 to 0.089 inch-second PPV at 25 feet from the source of activity.

TABLE 13
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

	Approximate PPV (in/sec)					
Equipment	**12 Feet**	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**
Large Bulldozer	0.200	0.089	0.031	0.024	0.017	0.011
Caisson Drilling	0.200	0.089	0.031	0.024	0.017	0.011
Loaded Trucks	0.170	0.076	0.027	0.020	0.015	0.010
Jackhammer	0.079	0.035	0.012	0.009	0.007	0.004
Small Bulldozer	0.007	0.003	0.001	0.0008	0.0006	0.0004

SOURCE: FTA, Transit Noise and Vibration Impact Assessment, May 2006; ESA 2017.

Table 14 shows the estimated construction-related groundborne vibration levels that could occur at the nearest offsite residential structures during construction at the project site and a comparison to the identified significance threshold.

As shown in Table 14, the vibration velocities forecasted to occur at the offsite sensitive receptors could potentially be up to 0.002 inch-second PPV at the nearest residential use, located approximately 350 feet to the north of the project site. All other residential uses are located farther away and vibration velocities would be substantially lower at all those locations.

TABLE 14
GROUNDBORNE CONSTRUCTION VIBRATION LEVELS AT OFFSITE SENSITIVE USES COMPARED TO FTA VIBRATION DAMAGE POTENTIAL THRESHOLD

Offsite Sensitive Land Use [b]	Approximate Distance to Project Site (feet) [a]	Estimated in/sec PPV	Caltrans Vibration Damage Potential Threshold in/sec PPV [b]	Exceed Caltrans Vibration Threshold? in/sec PPV
R3 – Single-family residential to the north	350	0.002	0.5	No
R4 – Single-family residential to the northeast	550	0.0009	0.5	No

[a] Approximate distances are measured from the nearest construction area within the project site where vibration levels would be generated to the nearest offsite structure.
[b] Caltrans Vibration Damage Potential Thresholds were taken from Table 5.

SOURCE: ESA 2017.

In terms of groundborne vibration impacts associated with structural damage, this analysis uses the Caltrans's vibration impact threshold of 0.5 inch-per second PPV for new residential structures. The vibration levels at both sensitive receptors would be less than significant.

With respect to human annoyance, under the Caltrans vibration annoyance potential criteria (refer to Table 6), vibration levels exceeding 0.04 inches per second PPV would be considered distinctly perceptible. This criterion provides for a conservative analysis of vibration impacts because construction activities do not result in continuous/frequent intermittent vibration events, but rather transient vibration events.

As shown in Table 14, the vibration velocities forecasted to occur at the offsite sensitive receptors could potentially be up to 0.002 inch-second PPV at the nearest residential use, which is well below the Caltrans' 0.04 inches per second PPV distinctly perceptible criterion. Thus, vibration impacts related to human annoyance would be less than significant, and no mitigation measures would be required.

Operational Vibration

The project's day-to-day operations would include typical commercial-grade stationary mechanical and electrical equipment, such as air handling units, condenser units, and exhaust fans, which would produce vibration. In addition, the primary sources of transient vibration would include passenger vehicle circulation within the proposed parking area. Ground-borne vibration generated by each of the above-mentioned equipment and activities would generate approximately up to 0.0039 inches per second PPV at locations adjacent (within 50 feet) to the project site.[34] The potential vibration levels from all project operational sources at the closest existing building and human annoyance receptor locations would be less than the significance criteria for building damage and human annoyance of 0.5 inches per second PPV and 0.04 inches per second PPV, respectively. As such, vibration impacts associated with operation of the project would be below the significance threshold and impacts would be less than significant, no mitigation measures are required.

Significance Determination: Less than significant.

6.4 Airport Noise

Threshold NOISE-4: Airport noise contours are over the allowable noise compatibility standard for a given land use.

Impact Statement NOISE-4: The project would not result in the exposure of persons to or generation of excessive noise levels caused by nearby airport noise. Impacts are less than significant.

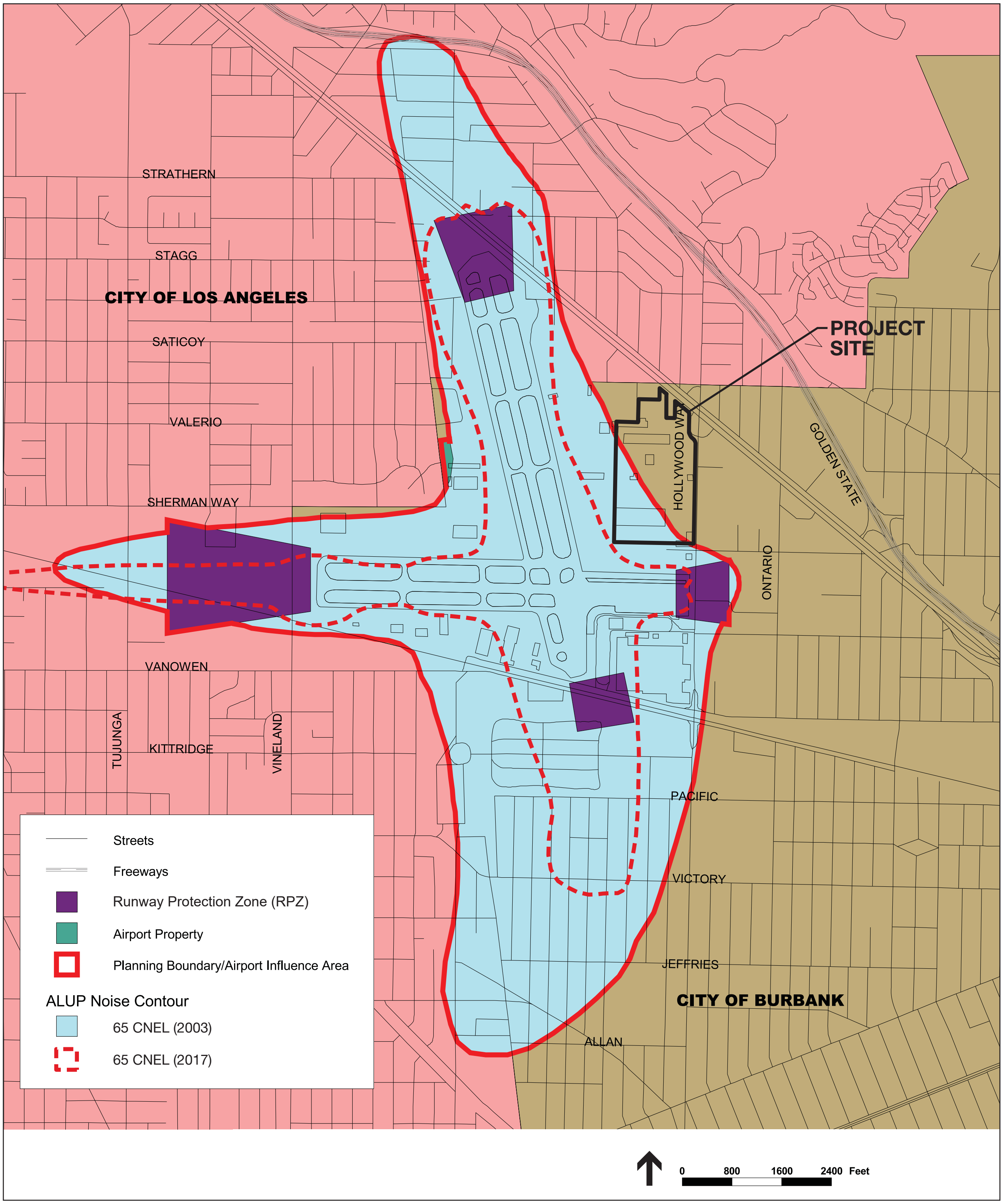
The project's location in the City of Burbank's Airport Influence Area (AIA) may expose people working in the project area to potentially significant noise levels. As shown in **Figure 5**, the affected land uses on the project site are industrial uses.

The southernmost industrial land uses of the proposed project lies within the 65 CNEL noise contour for the Bob Hope Airport.[35] As shown in Table 7, above, industrial uses do not have designated land use noise thresholds under the Burbank Noise Element. Therefore, noise exposure from airport activities would be less than significant.

In addition, there are no private airstrips located within the city or in the vicinity of the project site. Implementation of the proposed project would not expose people to excessive noise levels related to a private airstrip. No impact would occur.

[34] FTA, Transit Noise and Vibration Impact Assessment, Section 7.2.1, May. 2006. VdB can be converted to inches per second PPV using the formula provided in Section 12.2.1.

[35] Acoustical Analysis Associates, Incorporated, *Quarterly Noise Monitoring at Hollywood Burbank Airport Second Quarter 2017*, August 2017. Accessed at: http://hollywoodburbankairport.com/wp-content/uploads/2Q-2017-Quarterly-Noise-Report.pdf



SOURCE: Los Angeles County, 2003

Avion Burbank Project . 160935

Figure 5

Airport Influence Area, Noise Contour, and Project Area

6.5 Cumulative Impacts

The geographic context for the analysis of cumulative impacts for noise depends on the impact being analyzed. For example, the project's contribution to localized impacts, such as those associated with project construction and project operation/traffic noise, could affect the local neighborhood and project's traffic study area. This cumulative impacts section provides a cumulative impact analysis of the project, but separately for project construction and project operation given the variation of timing of construction and operational activities.

Construction

The construction includes the near-term and future construction of the project. Since the timing or sequencing of individual projects cannot be ascertained with any certainty, any quantitative analysis to ascertain the daily construction noise levels of multiple, concurrent construction would be speculative.

The geographic scope for the consideration of cumulative project construction noise impacts would be primarily the areas immediately surrounding the future potential project sites occurring within the boundary, and to a lesser degree, along designated haul routes where heavy construction truck traffic would travel during project construction periods. Generally, noise impacts are limited to the area directly surrounding the noise source, as noise attenuates with distance at a higher rate in proximity to the source, and only has the potential to combine with other noise sources occurring simultaneously in the immediate vicinity within 500 feet from the construction site.

The proposed project's noise impacts, when viewed together with the environmental impacts from future projects, could be cumulatively considerable if ambient noise increases above the increase threshold of 5 dBA. Project construction noise was determined to not expose persons to, or generate, noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies. However, due primarily to the development of the project area, project construction noise would be in proximity to receptors, likely resulting in a potential substantial temporary increase in ambient noise. Therefore, these impacts would be considered significant. However, implementation of the proposed mitigation measure would reduce the construction noise impacts to less than a substantial increase in ambient noise levels at residences north of the project site. Therefore, impacts would be potentially less than significant with regard to a temporary substantial increase in ambient noise levels. Therefore, project construction noise would not be cumulatively considerable and would not potentially combine with other construction projects in immediate proximity to the project site where cumulative construction noise could combine to cause a substantial temporary increase in the ambient noise environment. Therefore, project construction would not be a cumulatively considerable noise impact.

As previously discussed for vibration, construction activities would not result in temporary significant ground-borne vibration impacts. Due to the rapid attenuation characteristics of groundborne vibration, and distance separating construction associated with the project and any other cumulative projects, there is not a likely potential for cumulative vibration impacts. Therefore, cumulative vibration impacts would be less than significant.

Operation

The operation of the project at buildout would include stationary sources (e.g., air conditioners) and/or mobile sources (e.g., vehicle trips). The stationary sources associated with the project would generate operational noise from stationary equipment on each potential future development site. Because noise attenuates with distance from its source, noise impacts from stationary sources would be limited to each of their respective sites and their vicinities. For this reason, the noise associated with stationary noise sources resulting from development would not contribute to a cumulative stationary noise impact. Future roadway noise levels were calculated along various arterial segments adjacent to the project as compared to future 2019 traffic noise levels that would occur with implementation of the project. As discussed previous and as shown in Table 12, the maximum increase in project-related traffic noise levels over the future traffic noise levels would be less than significant.

As previously discussed for operation vibration, ground-borne vibration generated by the project would be similar to the existing vibration generated by existing operational sources (i.e., similar to traffic vibration on adjacent roadways) in the vicinity. The potential vibration impacts from all operational activities at the closest vibration-sensitive structure locations would be less than the significance threshold of human perception and structural damage. As such, vibration impacts associated with operation of the project would be below the significance threshold, and operation impacts would be less than significant. Due to the rapid attenuation characteristics of ground-borne vibration, vibration levels similar to ambient levels, and distance separating development associated with the project and any other cumulative projects, there is no potential for cumulative vibration impacts. Therefore, cumulative vibration impacts would be less than significant.

6.6 Mitigation Measures

Construction Noise and Vibration

Construction-related noise has the potential to result in potential significant noise impacts at the sensitive receptors. Thus, the following mitigation measures are required to minimize construction-related noise and vibration impacts:

MM-NOISE-1: The project shall provide a temporary 10-foot-tall construction fence equipped with noise blankets rated to achieve sound level reductions of at least 10 dBA between the project site and single-family residential uses north of the project site. Temporary noise barriers shall be used to block the line-of-sight between the construction equipment and the noise-sensitive receptor during project phases when the use of heavy equipment is prevalent.

Operational Noise and Vibration

No significant impacts to off-site noise sensitive receptors were identified related to long-term project operations. The following mitigation measure is recommended to ensure that all mechanical equipment would be designed not to exceed the City's thresholds of significance.

MM-NOISE-2: All building outdoor mounted mechanical and electrical equipment would be designed to comply with the Noise Regulations, which prohibits noise from any heating, ventilation, and air conditioning (HVAC) system from exceeding the ambient noise levels on the premises of other occupied properties by more than 5 dBA L_{eq}.

As shown above, the project would not result in significant impacts associated with operational vibration. Therefore, no operational vibration mitigation measures are required.

SECTION 7
Conclusion

In summary, implementation of the proposed project would not result in potentially significant noise impacts during construction. However, impacts would be less than significant with implementation of mitigation measures.

Mitigation Measure NOISE-1 would provide at least 10 dBA noise reduction at the R3 noise receptor location and at the R4 noise receptor location. Therefore, implementation of Mitigation Measure NOISE-1 would reduce construction noise levels of up to 71 dBA L_{eq} to 61dBA L_{eq}, which below the significance thresholds at the nearby receptor location (R3). Thus, potentially significant construction noise impacts would be reduced to a less than significant level.

Project-related noise and vibration resulting from future onsite development, including noise and vibration from stationary and mobile sources, would not exceed established thresholds at nearby offsite sensitive receptors with implementation of MM-NOISE-2. As such, impacts would be less than significant.

APPENDIX A

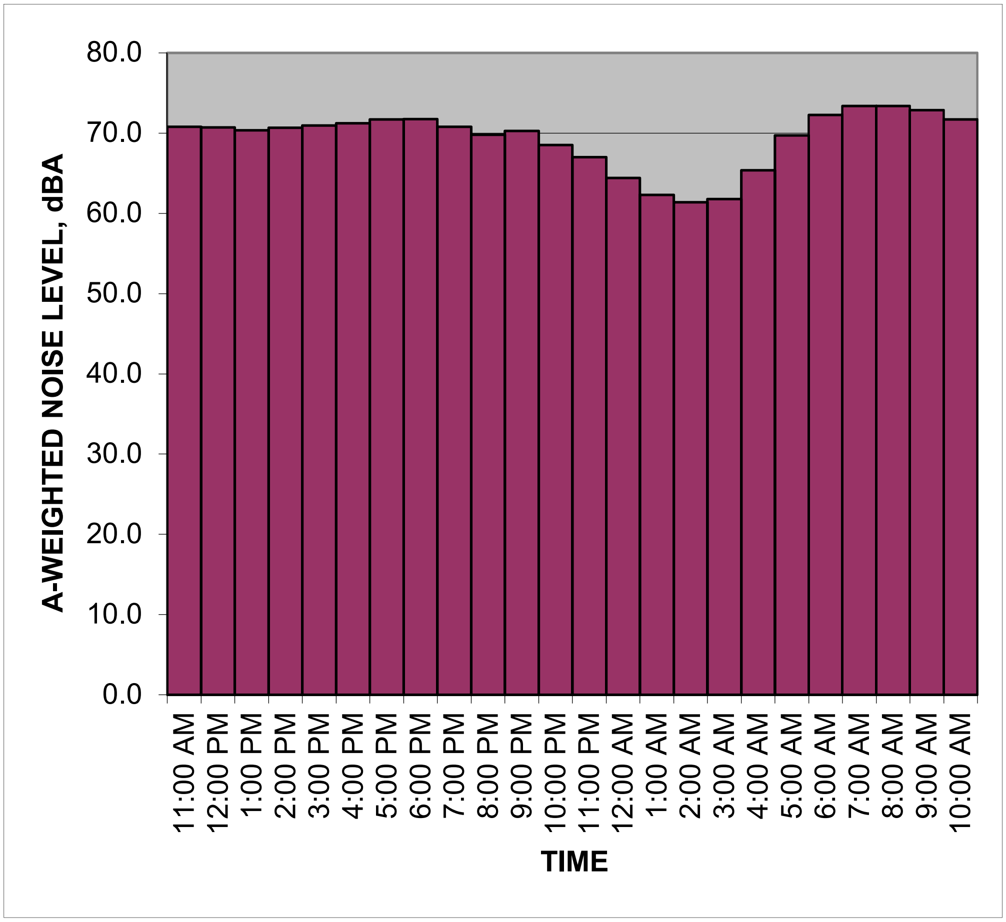
Ambient Noise Data

Measured Ambient Noise Levels

Project: Avion Burbank
Location: R1: Eastern Boundary of the Project Site
Sources: Ambient

Date: April 17-18, 2017

TIME	HNL, dB(A)
11:00 AM	70.8
12:00 PM	70.7
1:00 PM	70.4
2:00 PM	70.6
3:00 PM	70.9
4:00 PM	71.2
5:00 PM	71.7
6:00 PM	71.7
7:00 PM	70.8
8:00 PM	69.8
9:00 PM	70.2
10:00 PM	68.5
11:00 PM	67.0
12:00 AM	64.4
1:00 AM	62.3
2:00 AM	61.4
3:00 AM	61.8
4:00 AM	65.3
5:00 AM	69.7
6:00 AM	72.3
7:00 AM	73.4
8:00 AM	73.4
9:00 AM	72.8
10:00 AM	71.7
CNEL, dB(A):	**75.1**



NOTES:

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APPENDIX B

Construction Noise Calculations

Project: Burbank Avion

Construction Noise Impact on Sensitive Receptors

Tutor Residences to the north

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

Phase 1				**R3**				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Demolition						***61***		
Dump/Haul Trucks	1	76	20%	350	59	52	55	
Dozer	2	82	40%	1500	55	51	54	
Vacuum Street Sweeper	2	82	10%	1500	55	45	48	
Tractor/Loader/Backhoe	2	80	25%	350	66	60	63	
Grading						***71***		
Graders	4	85	40%	1500	61	57	60	
Dump/Haul Trucks	2	76	20%	350	62	55	58	
Dozer	2	82	40%	1500	55	51	54	
Scrapers	6	84	40%	350	75	71	74	
Tractor/Loader/Backhoe	2	80	25%	1500	53	47	50	
Drainage/Utilities/Trenching						***65***		
Cranes	1	81	40%	1500	51	47	50	
Excavator	2	81	40%	350	67	63	66	
Dump/Haul Trucks	1	76	20%	1500	46	39	42	
Tractor/Loader/Backhoe	2	80	25%	350	66	60	63	
Foundation						***67***		
Aerial Lift	3	75	20%	350	63	56	59	
Auger Drill Rig	3	85	20%	1500	60	53	56	
Excavator	3	81	40%	350	69	65	68	
Pumps	3	81	50%	1500	56	53	56	
Rough Terrain Forklifts	3	70	50%	1500	45	42	45	
Tractor/Loader/Backhoe	3	80	25%	350	68	62	65	
Paving						***64***		
Paver	3	77	50%	350	65	62	65	
Other Equipment	5	85	50%	1500	62	59	62	
Building Construction						***62***		
Cranes	2	81	40%	1500	54	50	53	
Forklift	2	75	10%	350	61	51	54	
Generator Sets	4	81	50%	1500	57	54	57	
Dump/Haul Trucks	2	76	20%	350	62	55	58	
Pumps	2	81	50%	1500	54	51	54	
Tractor/Loader/Backhoe	3	80	25%	1500	55	49	52	
Welders	2	74	40%	350	60	56	59	
Architectural Coating						***59***		
Aerial Lift	6	75	20%	350	66	59	62	
Air Compressor	3	78	50%	1500	53	50	53	
Landscaping						***64***		
Skid Steer Loaders	3	80	40%	1500	55	51	54	
Vacuum Street Sweeper	2	82	10%	350	68	58	61	
Tractor/Loader/Backhoe	3	80	25%	350	68	62	65	

Phase 1				R3				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Phase 2				**R3**				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Drainage/Utilities/Trenching						***61***		
Dump/Haul Trucks	1	76	20%	350	59	52	55	
Excavator	1	81	40%	1500	51	47	50	
Trenching Machine	1	80	50%	1500	50	47	50	
Tractor/Loader/Backhoe	2	80	25%	350	66	60	63	
Foundation						***68***		
Aerial Lift	2	75	20%	350	61	54	57	
Auger Drill Rig	2	85	20%	1500	58	51	54	
Cranes	1	81	40%	1500	51	47	50	
Excavator	2	81	40%	1500	54	50	53	
Pumps	3	81	50%	350	69	66	69	
Rough Terrain Forklifts	2	70	50%	350	56	53	56	
Tractor/Loader/Backhoe	2	80	25%	350	66	60	63	
Paving						***62***		
Paver	1	77	50%	350	60	57	60	
Roller	2	80	20%	350	66	59	62	
Surfacing Equipment	1	85	50%	1500	55	52	55	
Other Equipment	1	85	50%	1500	55	52	55	
Building Construction						***65***		
Cranes	1	81	40%	1500	51	47	50	
Air Compressor	3	78	50%	350	66	63	66	
Forklift	2	75	10%	1500	48	38	41	
Generator Sets	2	81	50%	1500	54	51	54	
Dump/Haul Trucks	1	76	20%	1500	46	39	42	
Pumps	1	81	50%	1500	51	48	51	
Tractor/Loader/Backhoe	1	80	25%	1500	50	44	47	
Welders	3	74	40%	350	62	58	61	
Architectural Coating						***57***		
Aerial Lift	3	75	20%	350	63	56	59	
Air Compressor	3	78	50%	1500	53	50	53	
Landscaping						***61***		
Skid Steer Loaders	1	80	40%	350	63	59	62	
Vacuum Street Sweeper	1	82	10%	1500	52	42	45	
Tractor/Loader/Backhoe	1	80	25%	350	63	57	60	
Maximum (overlapping phases)						***69***		

Project: Burbank Avion

Construction Noise Impact on Sensitive Receptors

Residences to the northeast

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

Phase 1				**R4**				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Demolition						***58***		
Dump/Haul Trucks	1	76	20%	550	55	48	51	
Dozer	2	82	40%	1500	55	51	54	
Vacuum Street Sweeper	2	82	10%	1500	55	45	48	
Tractor/Loader/Backhoe	2	80	25%	550	62	56	59	
Grading						***70***		
Graders	4	85	40%	550	70	66	69	
Dump/Haul Trucks	2	76	20%	1500	49	42	45	
Dozer	2	82	40%	1500	55	51	54	
Scrapers	6	84	40%	550	71	67	70	
Tractor/Loader/Backhoe	2	80	25%	1500	53	47	50	
Drainage/Utilities/Trenching						***60***		
Cranes	1	81	40%	550	60	56	59	
Excavator	2	81	40%	1500	54	50	53	
Dump/Haul Trucks	1	76	20%	1500	46	39	42	
Tractor/Loader/Backhoe	2	80	25%	550	62	56	59	
Foundation						***63***		
Aerial Lift	3	75	20%	550	59	52	55	
Auger Drill Rig	3	85	20%	1500	60	53	56	
Excavator	3	81	40%	550	65	61	64	
Pumps	3	81	50%	1500	56	53	56	
Rough Terrain Forklifts	3	70	50%	550	54	51	54	
Tractor/Loader/Backhoe	3	80	25%	1500	55	49	52	
Paving						***62***		
Paver	3	77	50%	550	61	58	61	
Other Equipment	5	85	50%	1500	62	59	62	
Building Construction						***61***		
Cranes	2	81	40%	1500	54	50	53	
Forklift	2	75	10%	550	57	47	50	
Generator Sets	4	81	50%	1500	57	54	57	
Dump/Haul Trucks	2	76	20%	550	58	51	54	
Pumps	2	81	50%	1500	54	51	54	
Tractor/Loader/Backhoe	3	80	25%	550	64	58	61	
Welders	2	74	40%	1500	47	43	46	
Architectural Coating						***56***		
Aerial Lift	6	75	20%	550	62	55	58	
Air Compressor	3	78	50%	1500	53	50	53	
Landscaping						***62***		
Skid Steer Loaders	3	80	40%	550	64	60	63	
Vacuum Street Sweeper	2	82	10%	1500	55	45	48	
Tractor/Loader/Backhoe	3	80	25%	550	64	58	61	

Phase 1				R4				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Phase 2				**R4**				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Drainage/Utilities/Trenching						***58***		
Dump/Haul Trucks	1	76	20%	550	55	48	51	
Excavator	1	81	40%	1500	51	47	50	
Trenching Machine	1	80	50%	1500	50	47	50	
Tractor/Loader/Backhoe	2	80	25%	550	62	56	59	
Foundation						***60***		
Aerial Lift	2	75	20%	550	57	50	53	
Auger Drill Rig	2	85	20%	1500	58	51	54	
Cranes	1	81	40%	1500	51	47	50	
Excavator	2	81	40%	1500	54	50	53	
Pumps	3	81	50%	1500	56	53	56	
Rough Terrain Forklifts	2	70	50%	550	52	49	52	
Tractor/Loader/Backhoe	2	80	25%	550	62	56	59	
Paving						***59***		
Paver	1	77	50%	550	56	53	56	
Roller	2	80	20%	550	62	55	58	
Surfacing Equipment	1	85	50%	1500	55	52	55	
Other Equipment	1	85	50%	1500	55	52	55	
Building Construction						***61***		
Cranes	1	81	40%	1500	51	47	50	
Air Compressor	3	78	50%	550	62	59	62	
Forklift	2	75	10%	1500	48	38	41	
Generator Sets	2	81	50%	1500	54	51	54	
Dump/Haul Trucks	1	76	20%	1500	46	39	42	
Pumps	1	81	50%	1500	51	48	51	
Tractor/Loader/Backhoe	1	80	25%	1500	50	44	47	
Welders	3	74	40%	550	58	54	57	
Architectural Coating						***54***		
Aerial Lift	3	75	20%	550	59	52	55	
Air Compressor	3	78	50%	1500	53	50	53	
Landscaping						***57***		
Skid Steer Loaders	1	80	40%	550	59	55	58	
Vacuum Street Sweeper	1	82	10%	1500	52	42	45	
Tractor/Loader/Backhoe	1	80	25%	550	59	53	56	
Maximum (overlapping phases)						***67***		

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APPENDIX C

Traffic Noise Calculations

Roadway Segment	Existing (A)	Existing with Project (B)	Project Increment (B-A)	Significance Threshold	Exceed Threshold?
Airport & W Empire Ave	65.9	66.1	0.2	5	No
Burbank Blvd & Victory Blvd	70.6	70.7	0.1	5	No
Clybourn Ave & Vanowen St	69.4	69.5	0.1	5	No
I-5 NB Off-Ramp & W Burbank Blvd	71.0	71.1	0.1	5	No
I-5 SB Off-Ramp/N Front St & E Burbank Blvd	72.2	72.3	0.1	5	No
Kenwood St & Cohasset St	56.3	61.4	5.1	5	Yes
N Buena Vista St & N San Fernando Blvd	70.8	70.9	0.1	5	No
N Buena Vista St & W Victory Blvd	72.3	72.4	0.1	5	No
N Buena Vista St & Winona Ave	70.5	70.5	0.1	5	No
N Glenoaks Blvd & Winona Ave/Irving Dr	69.3	69.4	0.1	5	No
N Hollywood Way & Burbank Blvd	73.3	73.5	0.2	5	No
N Hollywood Way & I-5 NB Ramps	70.7	70.9	0.3	5	No
N Hollywood Way & I-5 SB Ramps	71.7	72.0	0.3	5	No
N Hollywood Way & Magnolia Blvd	72.0	72.1	0.1	5	No
N Hollywood Way & N Avon St	72.9	73.3	0.4	5	No
N Hollywood Way & Riverside Dr	69.9	70.0	0.1	5	No
N Hollywood Way & Thornton Ave	73.1	73.5	0.4	5	No
N Hollywood Way & Tulare Ave	72.5	73.2	0.7	5	No
N Hollywood Way & Verdugo Ave	71.2	71.4	0.1	5	No
N Hollywood Way & W Alameda Ave	73.8	73.9	0.1	5	No
N Hollywood Way & W Empire Ave	65.5	65.7	0.2	5	No
N Hollywood Way & W Olive Ave	72.4	72.5	0.1	5	No
N Hollywood Way & W Victory Blvd	74.1	74.4	0.3	5	No
N Hollywood Way & Winona Ave	72.7	73.1	0.4	5	No
N Hollywood Way NB & San Fernando Rd WB Ramps	68.1	68.6	0.5	5	No
N Hollywood Way NB Off-Ramp & N San Fernando Blvd	67.0	67.5	0.6	5	No
N Hollywood Way SB & N San Fernando Blvd EB Ramps	68.6	69.1	0.5	5	No
N Hollywood Way SB Ramps & N San Fernando Blvd	66.7	67.4	0.8	5	No
N San Fernando Blvd & Cohasset St	66.8	67.9	1.1	5	No
N San Fernando Blvd & Winona Ave	65.6	66.1	0.4	5	No
N Victory Pl & W Burbank Blvd	73.2	73.3	0.1	5	No
San Fernando Blvd & I-5 SB Ramps	66.8	67.1	0.2	5	No
Vineland Ave & Vanowen St	72.4	72.4	0.0	5	No
Vineland Ave & Victory Blvd	72.2	72.2	0.0	5	No

Roadway Segment	Future (A)	Futurewith Project (B)	Project Increment (B-A)	Significance Threshold	Exceed Threshold?
Airport & W Empire Ave	66.5	66.7	0.2	5	No
Burbank Blvd & Victory Blvd	71.1	71.1	0.0	5	No
Clybourn Ave & Vanowen St	69.7	69.8	0.1	5	No
I-5 NB Off-Ramp & W Burbank Blvd	72.6	72.6	0.0	5	No
I-5 SB Off-Ramp/N Front St & E Burbank Blvd	73.0	73.0	0.0	5	No
Kenwood St & Cohasset St	56.6	61.6	5.1	5	Yes
N Buena Vista St & N San Fernando Blvd	71.6	71.7	0.1	5	No
N Buena Vista St & W Victory Blvd	72.7	72.7	0.0	5	No
N Buena Vista St & Winona Ave	70.1	70.2	0.0	5	No
N Glenoaks Blvd & Winona Ave/Irving Dr	69.4	69.5	0.1	5	No
N Hollywood Way & Burbank Blvd	73.9	74.0	0.2	5	No
N Hollywood Way & I-5 NB Ramps	71.3	71.5	0.2	5	No
N Hollywood Way & I-5 SB Ramps	72.3	72.6	0.2	5	No
N Hollywood Way & Magnolia Blvd	72.6	72.7	0.1	5	No
N Hollywood Way & N Avon St	73.5	73.8	0.4	5	No
N Hollywood Way & Riverside Dr	71.1	71.2	0.1	5	No
N Hollywood Way & Thornton Ave	73.6	74.0	0.4	5	No
N Hollywood Way & Tulare Ave	73.1	73.7	0.7	5	No
N Hollywood Way & Verdugo Ave	71.9	72.1	0.1	5	No
N Hollywood Way & W Alameda Ave	74.8	74.9	0.1	5	No
N Hollywood Way & W Empire Ave	66.2	66.5	0.3	5	No
N Hollywood Way & W Olive Ave	74.1	74.1	0.0	5	No
N Hollywood Way & W Victory Blvd	74.6	74.8	0.2	5	No
N Hollywood Way & Winona Ave	73.3	73.7	0.4	5	No
N Hollywood Way NB & San Fernando Rd WB Ramps	68.7	69.2	0.5	5	No
N Hollywood Way NB Off-Ramp & N San Fernando Blvd	67.8	68.3	0.5	5	No
N Hollywood Way SB & N San Fernando Blvd EB Ramps	69.2	69.6	0.4	5	No
N Hollywood Way SB Ramps & N San Fernando Blvd	67.7	68.3	0.6	5	No
N San Fernando Blvd & Cohasset St	67.6	68.5	0.9	5	No
N San Fernando Blvd & Winona Ave	66.2	66.7	0.4	5	No
N Victory Pl & W Burbank Blvd	73.5	73.6	0.0	5	No
San Fernando Blvd & I-5 SB Ramps	67.1	67.2	0.1	5	No
Vineland Ave & Vanowen St	72.7	72.7	0.0	5	No
Vineland Ave & Victory Blvd	72.4	72.5	0.0	5	No

ESA

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Burbank Avion
Project Number: D160935.00
Analysis Scenario: Existing
Source of Traffic Volumes: Fehr and Peers, 2017

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	CNEL Noise Level (dBA)
			Auto	MT	HT	Auto	MT	HT		
N Hollywood Way & I-5 NB Ramps	Hard	40	40	40	40	2060	42	21	70.7	71.7
N Hollywood Way & I-5 SB Ramps	Hard	40	40	40	40	2610	54	27	71.7	72.7
N Hollywood Way & Tulare Ave	Hard	40	40	40	40	3120	64	32	72.5	73.5
N Hollywood Way & Winona Ave	Hard	40	40	40	40	3271	67	34	72.7	73.7
N Hollywood Way & Thornton Ave	Hard	40	40	40	40	3600	74	37	73.1	74.1
N Hollywood Way & N Avon St	Hard	40	40	40	40	3405	70	35	72.9	73.9
N Hollywood Way & W Victory Blvd	Hard	40	40	40	40	4572	94	47	74.1	75.1
N Hollywood Way & Burbank Blvd	Hard	40	40	40	40	3783	78	39	73.3	74.3
N Hollywood Way & Magnolia Blvd	Hard	40	35	35	35	3974	82	41	72.0	73.0
N Hollywood Way & Verdugo Ave	Hard	40	35	35	35	3362	69	35	71.2	72.2
N Hollywood Way & W Alameda Ave	Hard	40	40	40	40	4248	88	44	73.8	74.8
N Hollywood Way & Riverside Dr	Hard	40	35	35	35	2487	51	26	69.9	70.9
N Hollywood Way & W Olive Ave	Hard	40	40	40	40	3066	63	32	72.4	73.4
N Buena Vista St & Winona Ave	Hard	40	35	35	35	2826	58	29	70.5	71.5
N Buena Vista St & N San Fernando Blvd	Hard	40	35	35	35	3047	63	31	70.8	71.8
N Buena Vista St & W Victory Blvd	Hard	40	35	35	35	4344	90	45	72.3	73.3
N Hollywood Way NB Off-Ramp & N San Fernando Blvd	Hard	40	35	35	35	1259	26	13	67.0	68.0
N Hollywood Way NB & San Fernando Rd WB Ramps	Hard	40	35	35	35	1633	34	17	68.1	69.1
N Hollywood Way SB & N San Fernando Blvd EB Ramps	Hard	40	35	35	35	1831	38	19	68.6	69.6
N Hollywood Way SB Ramps & N San Fernando Blvd	Hard	40	35	35	35	1262	13	13	66.7	67.7
N San Fernando Blvd & Cohasset St	Hard	40	35	35	35	1305	13	13	66.8	67.8
Kenwood St & Cohasset St	Hard	40	35	35	35	115	1	1	56.3	57.3
San Fernando Blvd & I-5 SB Ramps	Hard	40	35	35	35	1308	13	13	66.8	67.8
N San Fernando Blvd & Winona Ave	Hard	40	35	35	35	987	10	10	65.6	66.6
N Hollywood Way & W Empire Ave	Hard	40	35	35	35	960	10	10	65.5	66.5
N Victory Pl & W Burbank Blvd	Hard	40	35	35	35	5654	57	57	73.2	74.2
I-5 SB Off-Ramp/N Front St & E Burbank Blvd	Hard	40	35	35	35	4537	46	46	72.2	73.2
I-5 NB Off-Ramp & W Burbank Blvd	Hard	40	35	35	35	3430	35	35	71.0	72.0
Airport & W Empire Ave	Hard	40	35	35	35	1055	11	11	65.9	66.9
Clybourn Ave & Vanowen St	Hard	40	35	35	35	2351	24	24	69.4	70.4
Vineland Ave & Vanowen St	Hard	40	35	35	35	4664	47	47	72.4	73.4
Vineland Ave & Victory Blvd	Hard	40	35	35	35	4453	45	45	72.2	73.2
N Glenoaks Blvd & Winona Ave/Irving Dr	Hard	40	35	35	35	2320	23	23	69.3	70.3
Burbank Blvd & Victory Blvd	Hard	40	35	35	35	3140	32	32	70.6	71.6

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
- For hard ground, the propagation rate is 3 dB per doubling the distance.
- For soft ground, the propagation rate is 4.5 dB per doubling the distance.

Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Burbank Avion
Project Number: D160935.00
Analysis Scenario: Existing with Project
Source of Traffic Volumes: Fehr and Peers, 2017

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	CNEL Noise Level (dBA)
			Auto	MT	HT	Auto	MT	HT		
N Hollywood Way & I-5 NB Ramps	Hard	40	40	40	40	2185	45	23	70.9	71.9
N Hollywood Way & I-5 SB Ramps	Hard	40	40	40	40	2784	57	29	72.0	73.0
N Hollywood Way & Tulare Ave	Hard	40	40	40	40	3699	76	38	73.2	74.2
N Hollywood Way & Winona Ave	Hard	40	40	40	40	3615	75	37	73.1	74.1
N Hollywood Way & Thornton Ave	Hard	40	40	40	40	3934	81	41	73.5	74.5
N Hollywood Way & N Avon St	Hard	40	40	40	40	3739	77	39	73.3	74.3
N Hollywood Way & W Victory Blvd	Hard	40	40	40	40	4857	100	50	74.4	75.4
N Hollywood Way & Burbank Blvd	Hard	40	40	40	40	3950	81	41	73.5	74.5
N Hollywood Way & Magnolia Blvd	Hard	40	35	35	35	4112	85	42	72.1	73.1
N Hollywood Way & Verdugo Ave	Hard	40	35	35	35	3479	72	36	71.4	72.4
N Hollywood Way & W Alameda Ave	Hard	40	40	40	40	4365	90	45	73.9	74.9
N Hollywood Way & Riverside Dr	Hard	40	35	35	35	2546	52	26	70.0	71.0
N Hollywood Way & W Olive Ave	Hard	40	40	40	40	3115	64	32	72.5	73.5
N Buena Vista St & Winona Ave	Hard	40	35	35	35	2870	59	30	70.5	71.5
N Buena Vista St & N San Fernando Blvd	Hard	40	35	35	35	3150	65	32	70.9	71.9
N Buena Vista St & W Victory Blvd	Hard	40	35	35	35	4442	92	46	72.4	73.4
N Hollywood Way NB Off-Ramp & N San Fernando Blvd	Hard	40	35	35	35	1435	30	15	67.5	68.5
N Hollywood Way NB & San Fernando Rd WB Ramps	Hard	40	35	35	35	1850	38	19	68.6	69.6
N Hollywood Way SB & N San Fernando Blvd EB Ramps	Hard	40	35	35	35	2046	42	21	69.1	70.1
N Hollywood Way SB Ramps & N San Fernando Blvd	Hard	40	35	35	35	1503	15	15	67.4	68.4
N San Fernando Blvd & Cohasset St	Hard	40	35	35	35	1676	17	17	67.9	68.9
Kenwood St & Cohasset St	Hard	40	35	35	35	376	4	4	61.4	62.4
San Fernando Blvd & I-5 SB Ramps	Hard	40	35	35	35	1373	14	14	67.1	68.1
N San Fernando Blvd & Winona Ave	Hard	40	35	35	35	1092	11	11	66.1	67.1
N Hollywood Way & W Empire Ave	Hard	40	35	35	35	1010	10	10	65.7	66.7
N Victory Pl & W Burbank Blvd	Hard	40	35	35	35	5805	59	59	73.3	74.3
I-5 SB Off-Ramp/N Front St & E Burbank Blvd	Hard	40	35	35	35	4637	47	47	72.3	73.3
I-5 NB Off-Ramp & W Burbank Blvd	Hard	40	35	35	35	3480	35	35	71.1	72.1
Airport & W Empire Ave	Hard	40	35	35	35	1105	11	11	66.1	67.1
Clybourn Ave & Vanowen St	Hard	40	35	35	35	2402	24	24	69.5	70.5
Vineland Ave & Vanowen St	Hard	40	35	35	35	4714	48	48	72.4	73.4
Vineland Ave & Victory Blvd	Hard	40	35	35	35	4503	45	45	72.2	73.2
N Glenoaks Blvd & Winona Ave/Irving Dr	Hard	40	35	35	35	2365	24	24	69.4	70.4
Burbank Blvd & Victory Blvd	Hard	40	35	35	35	3210	32	32	70.7	71.7

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.

ESA

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Burbank Avion
Project Number: D160935.00
Analysis Scenario: Future Base
Source of Traffic Volumes: Fehr and Peers, 2017

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	CNEL Noise Level (dBA)
			Auto	MT	HT	Auto	MT	HT		
N Hollywood Way & I-5 NB Ramps	Hard	40	40	40	40	2376	49	24	71.3	72.3
N Hollywood Way & I-5 SB Ramps	Hard	40	40	40	40	3023	62	31	72.3	73.3
N Hollywood Way & Tulare Ave	Hard	40	40	40	40	3563	73	37	73.1	74.1
N Hollywood Way & Winona Ave	Hard	40	40	40	40	3752	77	39	73.3	74.3
N Hollywood Way & Thornton Ave	Hard	40	40	40	40	4075	84	42	73.6	74.6
N Hollywood Way & N Avon St	Hard	40	40	40	40	3904	80	40	73.5	74.5
N Hollywood Way & W Victory Blvd	Hard	40	40	40	40	5048	104	52	74.6	75.6
N Hollywood Way & Burbank Blvd	Hard	40	40	40	40	4297	89	44	73.9	74.9
N Hollywood Way & Magnolia Blvd	Hard	40	35	35	35	4608	95	48	72.6	73.6
N Hollywood Way & Verdugo Ave	Hard	40	35	35	35	3949	81	41	71.9	72.9
N Hollywood Way & W Alameda Ave	Hard	40	40	40	40	5354	110	55	74.8	75.8
N Hollywood Way & Riverside Dr	Hard	40	35	35	35	3252	67	34	71.1	72.1
N Hollywood Way & W Olive Ave	Hard	40	40	40	40	4506	93	46	74.1	75.1
N Buena Vista St & Winona Ave	Hard	40	35	35	35	2613	54	27	70.1	71.1
N Buena Vista St & N San Fernando Blvd	Hard	40	35	35	35	3658	75	38	71.6	72.6
N Buena Vista St & W Victory Blvd	Hard	40	35	35	35	4715	97	49	72.7	73.7
N Hollywood Way NB Off-Ramp & N San Fernando Blvd	Hard	40	35	35	35	1524	31	16	67.8	68.8
N Hollywood Way NB & San Fernando Rd WB Ramps	Hard	40	35	35	35	1883	39	19	68.7	69.7
N Hollywood Way SB & N San Fernando Blvd EB Ramps	Hard	40	35	35	35	2112	44	22	69.2	70.2
N Hollywood Way SB Ramps & N San Fernando Blvd	Hard	40	35	35	35	1589	16	16	67.7	68.7
N San Fernando Blvd & Cohasset St	Hard	40	35	35	35	1551	16	16	67.6	68.6
Kenwood St & Cohasset St	Hard	40	35	35	35	123	1	1	56.6	57.6
San Fernando Blvd & I-5 SB Ramps	Hard	40	35	35	35	1390	14	14	67.1	68.1
N San Fernando Blvd & Winona Ave	Hard	40	35	35	35	1141	12	12	66.2	67.2
N Hollywood Way & W Empire Ave	Hard	40	35	35	35	1121	11	11	66.2	67.2
N Victory Pl & W Burbank Blvd	Hard	40	35	35	35	6114	62	62	73.5	74.5
I-5 SB Off-Ramp/N Front St & E Burbank Blvd	Hard	40	35	35	35	5397	55	55	73.0	74.0
I-5 NB Off-Ramp & W Burbank Blvd	Hard	40	35	35	35	4931	50	50	72.6	73.6
Airport & W Empire Ave	Hard	40	35	35	35	1202	12	12	66.5	67.5
Clybourn Ave & Vanowen St	Hard	40	35	35	35	2548	26	26	69.7	70.7
Vineland Ave & Vanowen St	Hard	40	35	35	35	4992	50	50	72.7	73.7
Vineland Ave & Victory Blvd	Hard	40	35	35	35	4737	48	48	72.4	73.4
N Glenoaks Blvd & Winona Ave/Irving Dr	Hard	40	35	35	35	2353	24	24	69.4	70.4
Burbank Blvd & Victory Blvd	Hard	40	35	35	35	3449	35	35	71.1	72.1

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
- For hard ground, the propagation rate is 3 dB per doubling the distance.
- For soft ground, the propagation rate is 4.5 dB per doubling the distance.

Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: Burbank Avion
Project Number: D160935.00
Analysis Scenario: Future with Project
Source of Traffic Volumes: Fehr and Peers, 2017

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	CNEL Noise Level (dBA)
			Auto	MT	HT	Auto	MT	HT		
N Hollywood Way & I-5 NB Ramps	Hard	40	40	40	40	2501	52	26	71.5	72.5
N Hollywood Way & I-5 SB Ramps	Hard	40	40	40	40	3197	66	33	72.6	73.6
N Hollywood Way & Tulare Ave	Hard	40	40	40	40	4147	86	43	73.7	74.7
N Hollywood Way & Winona Ave	Hard	40	40	40	40	4116	85	42	73.7	74.7
N Hollywood Way & Thornton Ave	Hard	40	40	40	40	4428	91	46	74.0	75.0
N Hollywood Way & N Avon St	Hard	40	40	40	40	4258	88	44	73.8	74.8
N Hollywood Way & W Victory Blvd	Hard	40	40	40	40	5274	109	54	74.8	75.8
N Hollywood Way & Burbank Blvd	Hard	40	40	40	40	4464	92	46	74.0	75.0
N Hollywood Way & Magnolia Blvd	Hard	40	35	35	35	4746	98	49	72.7	73.7
N Hollywood Way & Verdugo Ave	Hard	40	35	35	35	4067	84	42	72.1	73.1
N Hollywood Way & W Alameda Ave	Hard	40	40	40	40	5472	113	56	74.9	75.9
N Hollywood Way & Riverside Dr	Hard	40	35	35	35	3311	68	34	71.2	72.2
N Hollywood Way & W Olive Ave	Hard	40	40	40	40	4555	94	47	74.1	75.1
N Buena Vista St & Winona Ave	Hard	40	35	35	35	2642	54	27	70.2	71.2
N Buena Vista St & N San Fernando Blvd	Hard	40	35	35	35	3776	78	39	71.7	72.7
N Buena Vista St & W Victory Blvd	Hard	40	35	35	35	4754	98	49	72.7	73.7
N Hollywood Way NB Off-Ramp & N San Fernando Blvd	Hard	40	35	35	35	1715	35	18	68.3	69.3
N Hollywood Way NB & San Fernando Rd WB Ramps	Hard	40	35	35	35	2090	43	22	69.2	70.2
N Hollywood Way SB & N San Fernando Blvd EB Ramps	Hard	40	35	35	35	2318	48	24	69.6	70.6
N Hollywood Way SB Ramps & N San Fernando Blvd	Hard	40	35	35	35	1845	19	19	68.3	69.3
N San Fernando Blvd & Cohasset St	Hard	40	35	35	35	1922	19	19	68.5	69.5
Kenwood St & Cohasset St	Hard	40	35	35	35	394	4	4	61.6	62.6
San Fernando Blvd & I-5 SB Ramps	Hard	40	35	35	35	1420	14	14	67.2	68.2
N San Fernando Blvd & Winona Ave	Hard	40	35	35	35	1261	13	13	66.7	67.7
N Hollywood Way & W Empire Ave	Hard	40	35	35	35	1211	12	12	66.5	67.5
N Victory Pl & W Burbank Blvd	Hard	40	35	35	35	6174	62	62	73.6	74.6
I-5 SB Off-Ramp/N Front St & E Burbank Blvd	Hard	40	35	35	35	5407	55	55	73.0	74.0
I-5 NB Off-Ramp & W Burbank Blvd	Hard	40	35	35	35	4936	50	50	72.6	73.6
Airport & W Empire Ave	Hard	40	35	35	35	1253	13	13	66.7	67.7
Clybourn Ave & Vanowen St	Hard	40	35	35	35	2598	26	26	69.8	70.8
Vineland Ave & Vanowen St	Hard	40	35	35	35	5042	51	51	72.7	73.7
Vineland Ave & Victory Blvd	Hard	40	35	35	35	4787	48	48	72.5	73.5
N Glenoaks Blvd & Winona Ave/Irving Dr	Hard	40	35	35	35	2398	24	24	69.5	70.5
Burbank Blvd & Victory Blvd	Hard	40	35	35	35	3459	35	35	71.1	72.1

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.

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APPENDIX D

Parking Noise Calculations

Parking Lot Volume Calculation

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
All Others	0.550339	0.0438	0.200255	0.122233	0.016799	0.005871	0.020633	0.029727	0.002027	0.001932	0.004726	0.000704	0.000955
Industrial	0.534825	0.044366769	0.196734	0.119876	0.016223	0.005947	0.018871	0.052041	0.002381	0.002303	0.004887	0.000661	0.000886
Average	0.542582	0.044083385	0.198495	0.121055	0.016511	0.005909	0.019752	0.040884	0.002204	0.002118	0.004807	0.000683	0.00092
Fleet Mix	0.92863418						0.071366809						

Total Trips	Cars	Bus/Trucks
1128	1047.499	80.50176055

Cn 5.886067

Leq 71.28607

Hourly Leq at 50 ft: L eq (h) = SELref + CN − 35.6

Cn = 10log(Na/2000+Nb/24)

APPENDIX E

Vibration Calculations

Vibration Calculations

R3 Receptor				
Equipment	Large Bulldozer/Caisson Drilling	Loaded Trucks	Jackhammer	Small Dozer
Reference Vibration Levels	0.089	0.076	0.035	0.003
Reference Distance	25	25	25	25
Distance to Sensitive Receptor	550	550	550	550
	0.045454545	0.045454545	0.045454545	0.045454545
	0.010	0.010	0.010	0.010
Vibration Levels at Sensitive Receptor	0.0009	0.00074	0.00034	0.00003

R4 Receptor

Vibration Calculations

Equipment	Large Bulldozer/Caisson Drilling	Loaded Trucks	Jackhammer	Small Dozer
Reference Vibration Levels	0.089	0.076	0.035	0.003
Reference Distance	25	25	25	25
Distance to Sensitive Receptor	550	550	550	550
	0.045454545	0.045454545	0.045454545	0.045454545
	0.010	0.010	0.010	0.010
Vibration Levels at Sensitive Receptor	0.0009	0.00074	0.00034	0.00003

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