APPENDIX I:
NOISE REPORT

Acoustical Assessment

Riverside Community Hospital Parking Structure

Prepared for:

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LIST OF ABBREVIATED TERMS

ADT	Average daily traffic
db	Decibel
dBA	A-weighted sound level
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community equivalent noise level
HVAC	Heating, ventilation, and air conditioning
Hz	Hertz
In/sec	Inches per second
L_{dn}	Day-night noise level
L_{eq}	Equivalent noise level
FEIR	Final Environmental Impact Report
FTA	Federal Transit Administration
HVAC	Heating ventilation and air conditioning
Hz	Hertz
in/sec	Inches per second
L_{max}	Maximum noise level
μPa	Micropascals
L_{min}	Minimum noise level
PPV	Peak particle velocity
RCH	Riverside Community Hospital
RCHSP	Riverside Community Hospital Specific Plan
RCNM	Roadway Construction Noise Model
RMS	Root mean square
STC	Sound transmission class
VdB	Vibration velocity level

1.0 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Riverside Community Hospital Parking Structure Project ("Project" or "proposed Project"). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration impacts associated with the proposed Project as part of the *Riverside Community Hospital Specific Plan Expansion Project Final EIR* (2014 Final EIR) Addendum. The construction of new parking structures was contemplated as future discretionary projects for Phase IIc of the expansion project. This comparative analysis has been undertaken to analyze whether the proposed Project would result in any new or substantially more severe significant environmental impacts as compared to the conclusions discussed in the 2014 Final EIR.

1.1 Project Background

The Riverside Community Hospital Specific Plan (RCHSP) was adopted (Resolution No. 26690), and the 2014 Final EIR was certified by the Riverside City Council in May 2014 (Resolution No. 22689). The 2014 Final EIR was previously prepared to evaluate the potential environmental impacts associated with the RCHSP, which provides a roadmap to guide future expansion plans and address compliance with the Alfred E. Alquist Hospital Seismic Safety Act (Alquist Act) of 1973, Senate Bill (SB) 1953. The RCHSP includes a two-phased campus master plan for the future expansion of RCH on approximately 22.5 acres over a 30-year period. The primary focus of Phase I is to construct a new hospital bed tower to alleviate seismic concerns associated with existing buildings and to meet seismic retrofit requirements as required by SB 1953. Phase II also addresses seismic concerns and includes potential future long-range development broken down into Phase IIA, Phase IIB, and Phase IIC.

As described in the 2014 Final EIR, Phase I would involve the construction of a new 251,000-square-foot, seven-story hospital bed tower. Phase IIA would entail the demolition of Building A to allow the construction of an approximately 100,000-square-foot mixed-use building and additional surface or structure parking. Phase IIB would consist the demolition of two parking structures to allow for the construction of a second new, estimated nine-story, 600,000+ square foot replacement bed tower. Phase IIB also includes additional convenience parking during this phase. The final phase of long-range improvements planned for 2030 or later would involve the addition of 38 licensed beds, to take the campus-wide total to 600 licensed beds (this could occur in Phase IIB if need is demonstrated prior to 2030), construction of ancillary services as necessary, and construction of surface or structured parking as needed to support growth.

The Approved Project would increase patient and support services, add several new buildings, renovate and demolish a number of existing buildings or structures onsite. One or two standalone parking structures may also be included in the master planned changes to the site. These and other possible changes on the site would be phased over a period of many years as funding becomes available and services are needed. The hospital may expand services into the community and may add new services as medical practices change over time and needs arise.

The discussion in the 2014 Final EIR noted that the phasing plan proposed was only an estimate based on plans and conditions at that time. It was identified that many factors would affect the timing and funding of the planned improvements, so the indicated phasing was merely suggestive of what may occur in the future, but the actual phasing and locations of the various improvements may occur at times different than those identified in the 2014 Final EIR, due to unanticipated delays or conditions. Some phases may even be implemented prior to previous phases.

The 2014 Final EIR was prepared to evaluate the environmental impacts of the Approved Project and address various actions by the City and other agencies to adopt and implement the Approved Project. It was the intent of the 2014 Final EIR to inform the City, other agencies, and interested parties of the potential environmental impacts of the Approved Project. The Phasing Plan described in the 2014 Final EIR included the following:

- Phase I (2014 to 2017) – Completed
- Phase II, divided into three sub-phases:
    - Phase IIA (2017-2024),
    - Phase IIB (2024-2029), and
    - Phase IIC (2030-2043).

1.2 Project Location

The approximately 1.66-acre Project site (Assessor Parcel Numbers [APN] 217060024, 217060026, 217060027, 217060028, 217060020, and 217060009) is located in the City of Riverside, California. The site is approximately 0.42 miles west of State Route 91 (SR-91) and approximately 1.60 miles south of SR-60. Specifically, the Project site is located at the northwest corner of Brockton Avenue and 14^{th} Street. Most of the Project site (APNs 217060024, 217060026, 217060027, and 217060028) is within the Riverside Community Hospital Specific Plan (RCHSP), however, two parcels (APNs 217060020 and 217060009) are within the Downtown Specific Plan. A Specific Plan Amendment is proposed to amend the RCHSP boundary to include the two parcels that are currently within the Downtown Specific Plan (i.e., APNs 217060020 and 217060009), which currently contain a vacant medical office building and auto body shop. See Figure 1: Regional Vicinity Map and Figure 2: Local Vicinity Map.

The Brockton Parking Garage Project (Project) site is currently developed with an auto body shop, Women's Services Building (Building M), Brockton Storage Building (Building L), and medical office building that are also owned by the Project Applicant. Ornamental landscaping is provided along the Project site frontage on Brockton Avenue and 14th Street, as well as throughout the Project site. Pedestrian sidewalk is provided along the Project site frontage on Brockton Avenue and 14th Street. Overhead utility lines and lighting are also provided along the Project site frontage on Brockton Avenue and 14th Street.

1.3 Project Description

Site Development

The Project would include the demolition of 61,500 square feet of existing buildings to construct a new approximately 207,780 square foot parking garage. The parking garage would accommodate 587 parking spaces within a five-level parking garage structure (four levels above ground and one level subterranean).Figure **3**: Conceptual Site Plan depicts the proposed development. The parking garage would support RCH Campus's parking demand, compensating for the loss in parking caused by the anticipated demolition of two parking garages (Buildings I and J) as part of Tower H (Building S) construction which is estimated to start construction in September 2026. Tower H was previously analyzed in the 2014 Final EIR; therefore, the analysis is based only on the development of a parking garage.

The proposed parking garage would be designed to meet the 2022 California Building Code requirements for an "open" parking garage. Stair and elevator cores are proposed on the east side of the building, closest to the hospital. Accessible travel paths are proposed along the garage's east side, connecting the garage with the existing hospital.

Primary vehicular access to the Proposed Project site would be provided via one existing left-out restricted driveway on Brockton Avenue (Driveway 1), one proposed full-movement driveway on Brockton Avenue (Driveway 2), one proposed parking garage egress-only driveway on Brockton Avenue (Driveway 3), and one existing driveway on 14th Street with proposed left-out restricted access (Driveway 4). All driveways would be unsignalized. Parking aisles generally run east to west, with 90-degree parking on both sides and a parkable ramp at the southern bay. Electrical vehicle charging stations and bicycle parking would be located on Level 0. Accessible parking spaces would be located on Level 1 with an accessible pathway connecting the garage to the future Tower H.

1.4 Construction

Project construction is anticipated to begin in April 2025 and finish in July 2026. The Project is anticipated to require approximately 17,000 cubic yards (cy) of cut and 2,000 cy of fill, resulting in a net of 15,000 cy soil export. Construction would be in compliance with Riverside Municipal Code Section 7.35.020, which limits construction between the hours of 7:00AM and 7:00PM on weekdays and between 8:00AM and 5:00PM on Saturdays. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent.

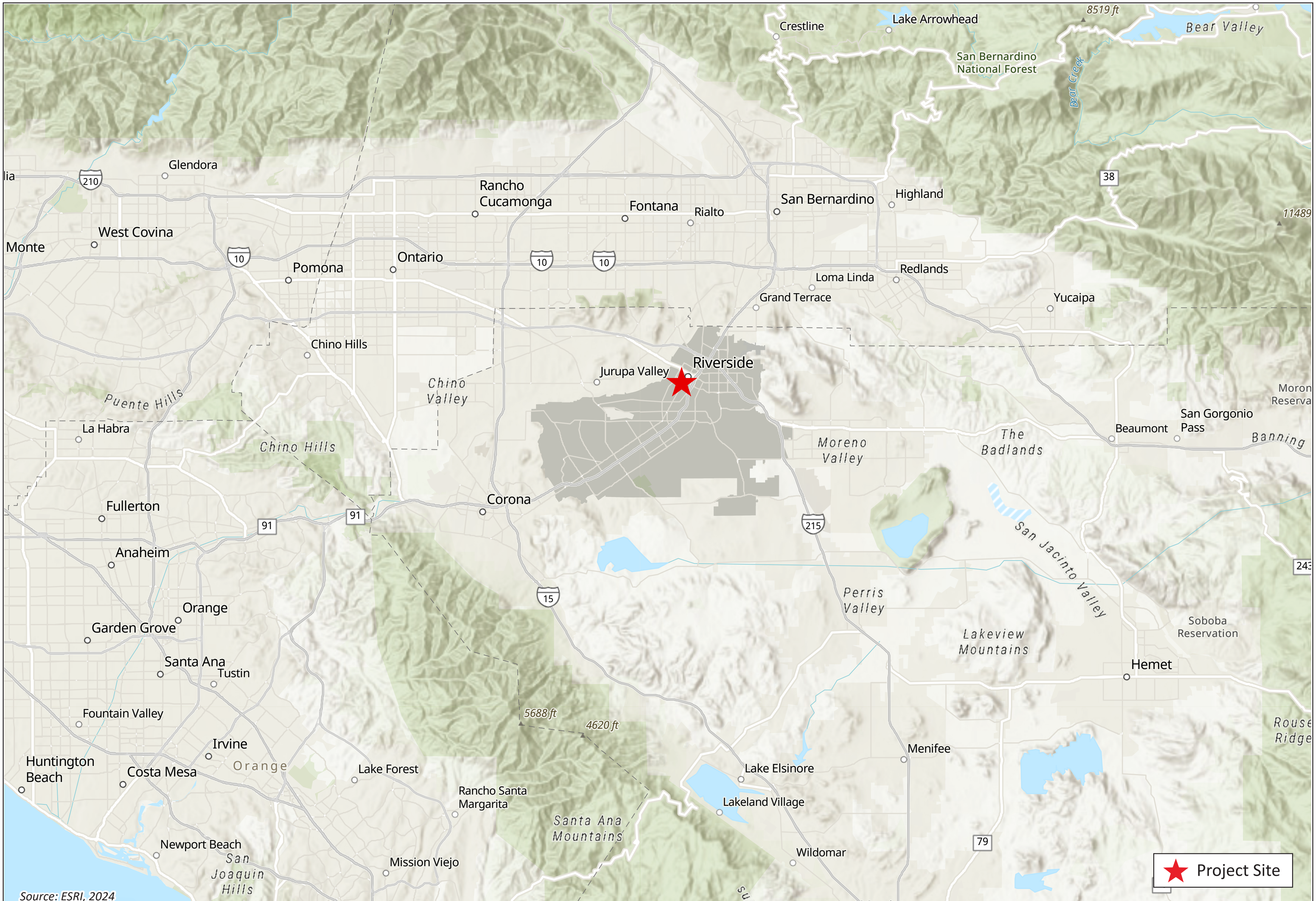

Figure 1: Regional Vicinity Map
Brockton Parking Garage Project

Not to scale.

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Figure 2: Local Vicinity Map
Brockton Parking Garage Project

Not to scale.

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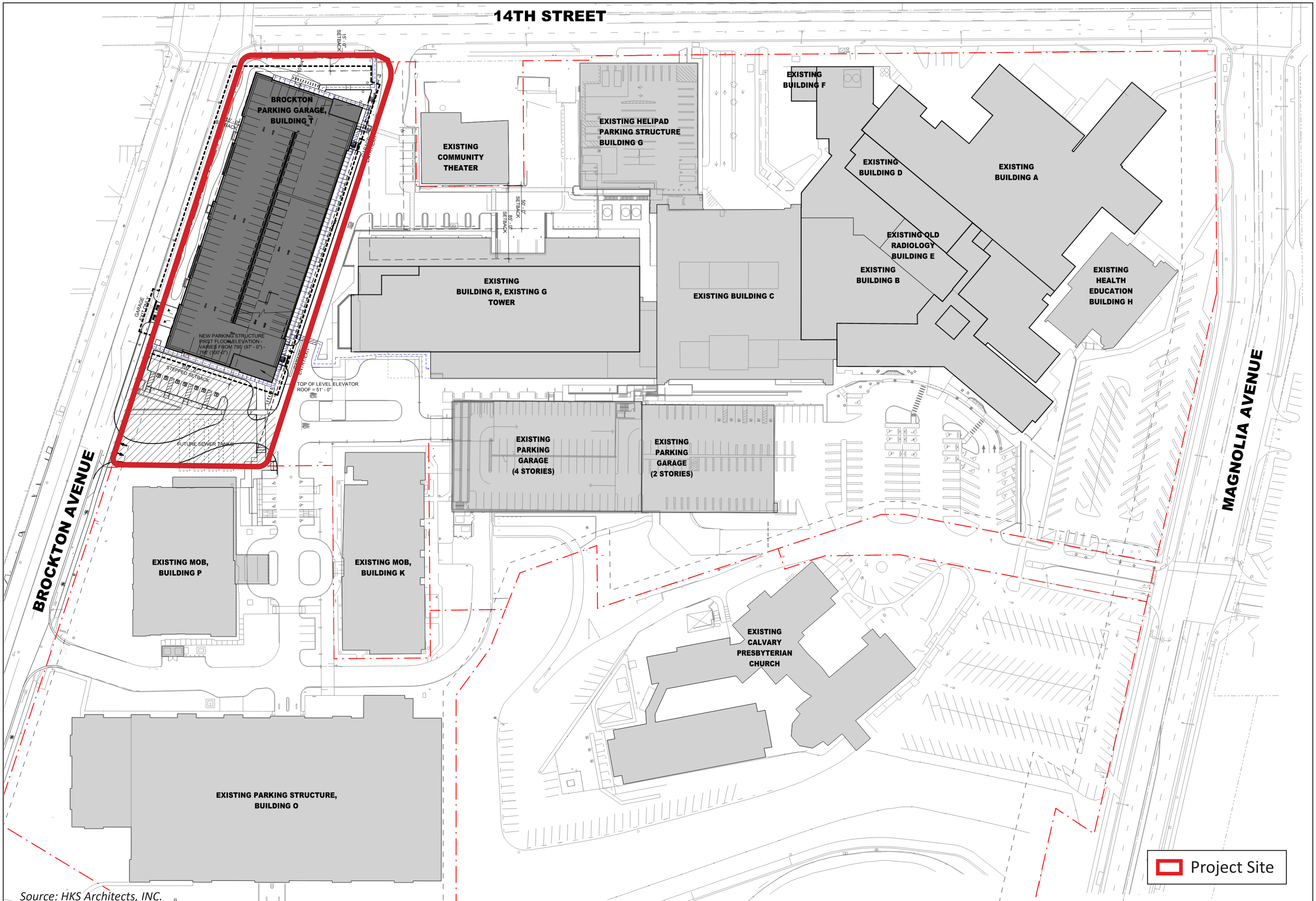

Source: HKS Architects, INC.

Figure 3: Conceptual Site Plan
Brockton Parking Garage Project

Not to scale.

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2.0 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).[1]

Noise is defined as loud, unexpected, or annoying sound.[2] The fundamental model consists of a noise source, a receptor, and the propagation path between the two.[3] The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound.[4] A typical noise environment consists of ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this ambient noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micro-pascals (μPa) as a point of reference, defined as 0 dB.[5] Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)

1 California Department of Transportation, _Technical Noise Supplement to the Traffic Noise Analysis Protocol_, September 2013.
2 Harris, Cyril M., _Noise Control in Buildings: A Practical Guide for Architects and Engineers,_ 1994.
3 California Department of Transportation, _Technical Noise Supplement to the Traffic Noise Analysis Protocol_, September 2013.
4 Ibid.
5 Ibid.

Table 1: Typical Noise Levels		
Common Outdoor Activities	**Noise Level (dBA)**	**Common Indoor Activities**
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing
Source: California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.		

Noise Descriptions

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. [6] The equivalent noise level (L_{eq}) represents the equivalent continuous sound pressure level over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of sound energy during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of L_{eq} that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in Table 2: Definitions of Acoustical Terms.

Table 2: Definitions of Acoustical Terms	
Term	**Definitions**
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in μPa (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g. 20 μPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level	The average acoustic energy content of noise for a stated period of time. Thus, the

[6] Ibid.

Table 2: Definitions of Acoustical Terms	
Term	**Definitions**
(L_{eq})	L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10-dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10-dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Source: California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.	

The A-weighted decibel (dBA) sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA.[7] Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source.

[7] Ibid.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content.[8] However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10.[9] When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound.[10] When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions.[11] Under the dB scale, three sources of equal loudness together would produce an increase of approximately 5 dBA.[12]

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics.[13] No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed when soft ground conditions exist between the source and receptor locations.[14] For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed in this report.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm can reduce noise levels by 5 to 15 dBA.[15] The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows.

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8 Harris, Cyril M., *Noise Control in Buildings: A Practical Guide for Architects and Engineers*, 1994.
9 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol,* September 2013.
10 Federal Highway Administration, *Noise Fundamentals,* 2017, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed November 2024.
11 Ibid.
12 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.
13 Ibid.
14 Federal Highway Administration, *FHWA Traffic Noise Model User's Guide*, January 1998.
15 Federal Highway Administration, *Highway Traffic and Construction Noise - Problem and Response***,** April 2006.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA.[16] Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA.[17] Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:[18]

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.[19]

[16] Compiled from James P. Cowan, *Handbook of Environmental Acoustics,* 1994, and Cyril M. Harris, *Handbook of Noise Control*, 1979.
[17] Ibid.
[18] Compiled from California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals,* 2017.
[19] U.S. Department of Labor, *Occupational Safety and Health Standards, 29 CFR 1910 (Occupational Noise Exposure)*.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[20]

2.2 Ground-Borne Vibration

Sources of ground-borne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions or heavy equipment used during construction). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero.[21] Several different methods are typically used to quantify vibration amplitude. One is vibration decibels (VdB) (the vibration velocity level in decibel scale). Other methods are the peak particle velocity (PPV) and the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave and expressed in terms of inches-per-second (in/sec). The RMS velocity is defined as the average of the squared amplitude of the signal and is expressed in terms of VdB.[22] The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations displays the reactions of people and the effects on buildings produced by continuous vibration levels. The human annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where ground-borne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible.[23] Common sources for ground-borne vibration are planes, trains, and construction activities such as earth-moving, which requires the use of heavy-duty earth moving equipment.[24] For the purposes of this analysis, a PPV descriptor with units of inches per second

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[20] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.
[21] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* September 2018.
[22] Ibid.
[23] Ibid.
[24] Ibid.

(in/sec) was used to evaluate construction-generated vibration for building damage and human complaints.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Caltrans Vibration Annoyance Potential Criteria	Caltrans Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.08	Readily Perceptible	--	--
0.1	Begins to Annoy	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	Annoying	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry
0.4	Unpleasant	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit Administration, *Transit Noise and Vibration Assessment Manual*, 2018.

2.3 Ground-Borne Noise

Ground-borne noise specifically refers to the rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings.[25] The relationship between ground-borne vibration and ground-borne noise depends on the frequency content of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, ground-borne vibration that causes low frequency noise (i.e., the vibration spectrum peak is less than 30 Hz) results in a ground-borne noise level that is approximately 50 decibels lower than the velocity level. For ground-borne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is between 30 and 60 Hz), the ground-borne noise level will be approximately 35 dB lower than the velocity level. For ground-borne vibration that cause high-frequency noise (i.e., the vibration spectrum peak is greater than 60 Hz), the ground-borne noise level will be approximately 20 dB lower than the velocity level.[26] The Federal Transit Administration (FTA) provides a ground-borne noise threshold of 43 dBA for infrequent vibration events in Category 2 buildings such as residences and buildings where people normally sleep. For frequent and occasional vibratory events, the FTA established ground-borne noise thresholds of 35 dBA and 38 dBA, respectively.[27]

[25] Ibid.
[26] Ibid.
[27] Ibid.

3.0 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging, as well as intrusive, noise levels, the State of California and City of Riverside have established standards and ordinances to control noise.

3.1 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services.[28] The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Assembly Bill 1307

On September 7, 2023, Governor Newsom signed AB 1307, which added section 21085 to the Public Resources Code to read, in pertinent part, "for residential projects, the effects of noise generated by project occupants and their guests on human beings is not a significant effect on the environment".[29]

[28] State of California Governor's Office of Planning and Research, *General Plan Guidelines, Appendix D: Noise Element Guidelines*, page 374, 2017, https://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf, accessed November 2024.
[29] AB 1307, *Public Resources Code Section 21085*.

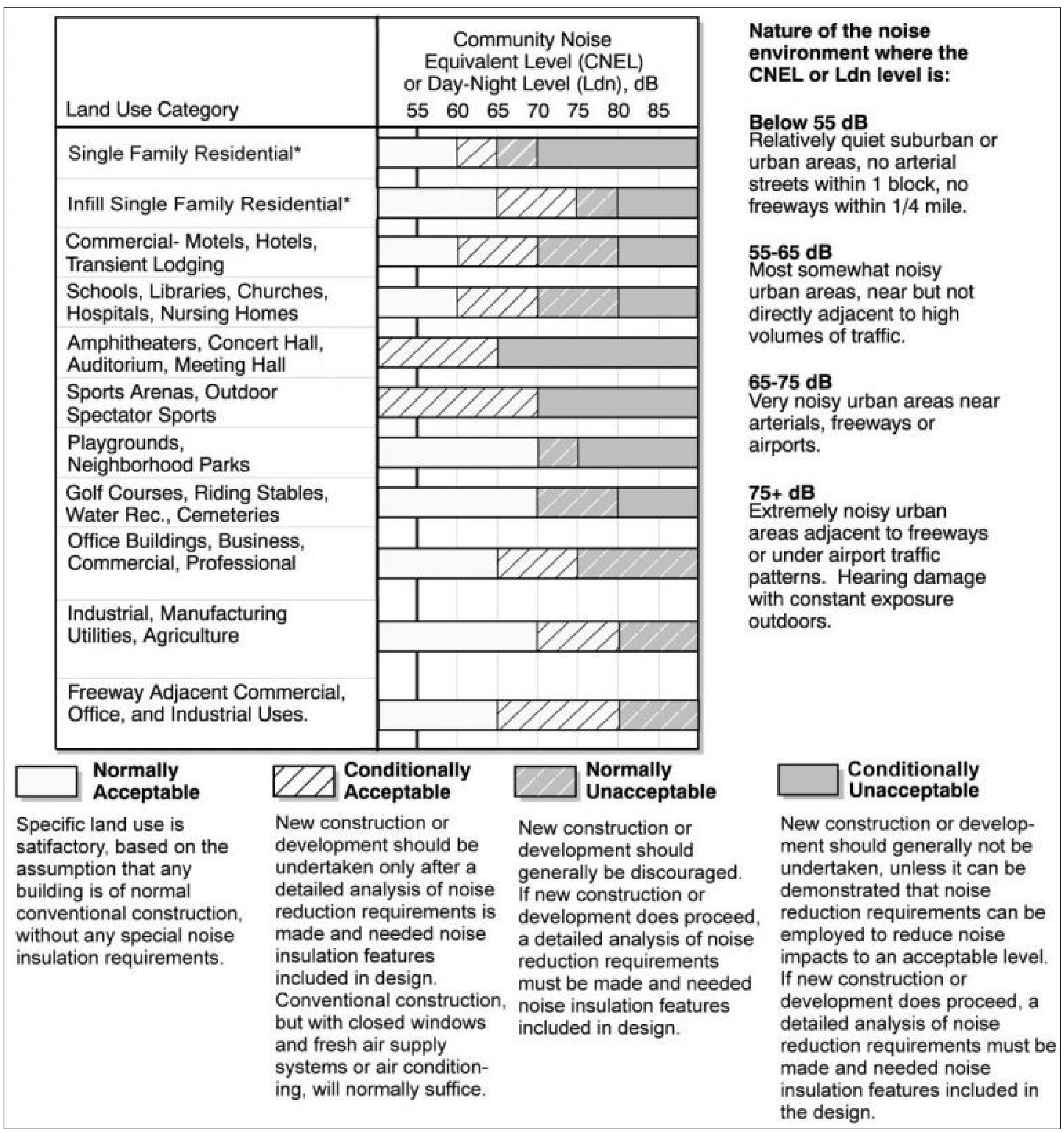
3.2 Local

City of Riverside General Plan

The _City of Riverside General Plan 2025_ Noise Element (Noise Element) identifies noise-sensitive land uses and noise sources, defines areas of noise impact, and contains policies and programs to achieve and maintain noise levels compatible with various types of land uses. The element addresses noise which affects the community at large, rather than noise associated with site-specific conditions.

The Noise Element identifies land use guidelines to protect residential neighborhoods and noise-sensitive receptors such as schools and hospitals from potentially harmful noise sources. The noise and land use compatibly criteria are shown in Figure 4: Land Use Compatibility for Community Noise Exposure.

Figure 4: Land Use Compatibility for Community Noise Exposure



City of Riverside Code of Ordinances

The following sections of the City Riverside Code of Ordinances (Riverside City Code) are applicable to the proposed project.

Section 7.25.010 Exterior Sound Level Limits

Stationary noise sources will comply with the following limits:

Table 4: Exterior Noise Standards		
Land Use Category	**Time Period**	**Noise Level**
Residential	Night (10:00 p.m. to 7:00 a.m.)	45 dBA
	Day (7:00 a.m. to 10:00 p.m.)	55 dBA
Office/Commercial	Any Time	65 dBA
Industrial	Any Time	70 dBA
Community Support	Any Time	60 dBA
Public Recreation Facility	Any Time	65 dBA
Nonurban	Any Time	70 dBA
Source: City of Riverside, *Riverside Code of Ordinances*, 2022.		

A. Unless a variance has been granted as provided in this title, it shall be unlawful for any person to cause or allow the creation of any noise which exceeds the following:

1. The exterior noise standard of the applicable land use category, up to five decibels, for a cumulative period of more than 30 minutes in any hour; or

2. The exterior noise standard of the applicable land use category, plus five decibels, for a cumulative period of more than 15 minutes in any hour; or

3. The exterior noise standard of the applicable land use category, plus ten decibels, for a cumulative period of more than five minutes in any hour; or

4. The exterior noise standard of the applicable land use category, plus 15 decibels, for the cumulative period of more than one minute in any hour; or

5. The exterior noise standard for the applicable land use category, plus 20 decibels or the maximum measured ambient noise level, for any period of time.

B. If the measured ambient noise level exceeds that permissible within any of the first four noise limit categories, the allowable noise exposure standard shall be increased in five decibel increments in each category as appropriate to encompass the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Section 7.30.015 Interior Sound Level Limits

Stationary noise sources will comply with the following limits:

Table 5: Interior Noise Standards		
Land Use Category	**Time Period**	**Noise Level**
Residential	Night (10:00 p.m. to 7:00 a.m.)	35 dBA
	Day (7:00 a.m. to 10:00 p.m.)	45 dBA
School	7:00 a.m. to 10 p.m. (while school is in session)	45 dBA
Hospital	Any Time	45 dBA
Source: City of Riverside, *Code of Ordinances*, 2024.		

A. No person shall operate or cause to be operated, any source of sound indoors which causes the noise level, when measured inside another dwelling unit, school or hospital, to exceed:

1. The interior noise standard for the applicable land category area, up to five decibels, for a cumulative period of more than five minutes in any hour;

2. The interior noise standard for the applicable land use category, plus five decibels, for a cumulative period of more than one minute in any hour;

3. The interior noise standard for the applicable land use category, plus ten decibels or the maximum measured ambient noise level, for any period of time.

B. If the measured interior ambient noise level exceeds that permissible within the first two noise limit categories in this section, the allowable noise exposure standard shall be increased in five decibel increments in each category as appropriate to reflect the interior ambient noise level. In the event the interior ambient noise level exceeds the third noise limit category, the maximum allowable interior noise level under said category shall be increased to reflect the maximum interior ambient noise level.

C. The interior noise standard for various land use districts shall apply, unless otherwise specifically indicated, within structures located in designated zones with windows opened or closed as is typical of the season.

Section 7.35.020 Exemptions

The following activities shall be exempt from the provisions of this title:

G. Construction. Noise sources associated with construction, repair, remodeling, or grading of any real property; provided a permit has been obtained from the City as required; and provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m. on weekdays, between the hours of 5:00 p.m. and 8:00 a.m. on Saturdays, or at any time on Sunday or a federal holiday.

Riverside Community Hospital Specific Plan Expansion Project Final EIR

The 2014 Final EIR contains construction and operational mitigation measures applicable to the proposed Project would reduce potential noise-related impacts to a less than significant level. The following mitigation measures from the 2014 Final EIR apply to the proposed Project:

MM NOISE-1: *In order to reduce impacts related to heavy construction equipment moving and operating on site during all phases (Phase I, Phase IIa, Phase IIb, and Phase IIc) of demolition, grading, and construction, prior to issuance of grading permits, mitigation measures shall be incorporated by the City of Riverside (City) as conditions on permits. Examples of measures to be required by the City are as follows:*

- *All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.*
- *Construction noise reduction methods, such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and using electric air compressors and similar power tools rather than diesel equipment, shall be used.*
- *During construction, stationary construction equipment shall be placed such that noise is directed away from or shielded from sensitive noise receivers.*
- *During construction, stockpiling and vehicle staging areas shall be located far from noise- sensitive receptors.*
- *The project shall be in compliance with the City' s Municipal Code: Construction shall occur between the hours of 7: 00 a.m. and 7: 00 p.m. on weekdays, and between 8:00 a.m. and 5:00 p.m. on Saturdays. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent.*

MM NOISE-2: *If surface parking or parking structures are proposed during Phase IIa, IIb, or IIc of the project, the project proponent shall retain an acoustical specialist to conduct an analysis of noise effects from the proposed parking facilities at nearby noise-sensitive land uses, and to provide mitigation measures that will reduce noise levels to below 60 A-weighted decibels (dBA) or less at the property line and will not otherwise result in the project exceeding relevant noise standards at nearby noise- sensitive land uses (e.g., recreation, residential). Examples of mitigation measures are as follows: requirement of pavement treatments to reduce or eliminate tire squeal, administrative measures such as restricted speed limits and active enforcement thereof, or restricted parking hours.*

MM NOISE-3: *Because heating, ventilation, and air conditioning (HVAC) equipment, boilers, and generators can generate noise that could affect surrounding sensitive receptors for all phases (Phase I, Phase IIa, Phase IIb, and Phase IIc) of the project if not placed inside buildings or enclosures or otherwise shielded from receptors, and because* *the details, specifications, and locations of these facilities is not known yet, the project proponent shall retain an acoustical specialist to review project construction- level plans at every phase (Phase I, Phase IIa, Phase IIb, and Phase IIc) of the project to ensure that the equipment specifications and plans for HVAC, central plant, and emergency generator equipment incorporate measures, such as the specification of quieter equipment or provision of acoustical enclosures, that will reduce noise levels to below 60 dBA or less at the property line and will not otherwise result in the project exceeding relevant noise standards at nearby noise-sensitive land uses (e.g., recreation, residential). Prior to the commencement of construction for all phases (Phase I, Phase IIa, Phase IIb, and Phase IIc) of the project, the acoustical specialist shall certify in writing to the City that the equipment specifications and plans incorporate measures that will achieve the relevant noise limits.*

4.0 EXISTING CONDITIONS

4.1 Existing Noise Sources

The Project site is currently impacted by various noise sources. Mobile sources of noise, including traffic along 14th Street and Brockton Avenue are the most common and prominent existing sources of noise in the Project area. The primary stationary noise sources in the Project vicinity are those associated with the surrounding residential, commercial, and institutional uses, and existing Riverside Community Hospital operations. Such stationary noise sources include mechanical equipment (e.g., heating, ventilation, and air conditioning [HVAC] equipment), idling vehicles and parking lot movements, music playing, dogs barking, and people talking. Helicopter operations at the hospital helipad directly east of the Project site are also prominent noise sources, although less frequent than those described above. The noise associated with these sources may represent a single-event noise occurrence or short-term noise.

Mobile Traffic Noise

According to the *Riverside General Plan 2025 Noise Element* (Noise Element), the Project site is located within the 60-65 dBA CNEL traffic noise contour for 14th Street, and the 60 dBA CNEL noise contour for SR-91 and railroad noise sources.

Noise Measurements

Ambient noise measurements were conducted as part of the 2014 Final EIR. Based on noise measurement data obtained from the 2014 Final EIR, existing noise levels in the Project vicinity range from approximately 57.1 dBA L_{eq} to 66.4 dBA L_{eq}.[30]

4.2 Sensitive Receptors

Noise exposure standards and guidelines for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Noise sensitive receptors typically include residences, dormitories, hotels, transient lodging, houses of worship, hospitals, schools, and places of assembly. Sensitive receptors near the Project site are shown in Table 6: Sensitive Receptors.

[30] Based on noise measurement data for locations R1-R2, and R7 from the 2014 Final EIR (see Table 4.9-3 from the 2014 Final EIR). Land use patterns have changed minimally since the 2014 Final EIR noise measurements were taken in 2014, and therefore, current (2024) ambient noise conditions are anticipated to be similar to those established in 2014.

Table 6: Sensitive Receptors

Receptor Description[1]	Distance[2] and Direction from the RCHSP Area	Distance[3] from the Project
1 – Calvary Presbyterian Church	60 feet to the south	480 feet
2 – Riverside Community Players Theatre	65 feet to the east	65 feet
3 – Newman Park	630 feet to the northeast	1,090 feet
4 – Evans Sports Complex	450 feet to the south	640 feet
5 – Nearest Residence along 14th Street	225 feet to the northwest	225 feet
6 – Grant Elementary School	75 feet to the north	75 feet
7 – Daycare on Magnolia Avenue and 15th Street	560 feet to the southeast	1,100 feet

1. Sensitive receptor locations are the same as those identified in the 2014 Final EIR for the Riverside Community Hospital Expansion Project.
2. Distance measured from the RCHSP boundary to the nearest receptor.
3. Distance measured from the proposed construction area to the nearest receptor.

Source: Google Earth, 2024.

5.0 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

California Environmental Quality Act (CEQA) Guidelines Appendix G contains analysis guidelines related to noise impacts. The City has determined to use these guidelines as thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive ground-borne vibration or ground-borne noise levels; and
- For a project located within the vicinity of a private airstrip or 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, expose people residing or working in the project area to excessive noise levels.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the FTA and FHWA. Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe the noise level from the operation of each piece of equipment separately, and the levels can be combined to represent the noise level from all equipment operating concurrently during a given period.

Construction noise was modeled using the FHWA Roadway Construction Noise Model (RCNM). Reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

The analysis of Project operations is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project operational noise impacts from stationary sources. Noise levels were collected from published sources from similar types of activities and used to estimate noise levels expected with the Project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day.

Vibration

Ground-borne vibration levels associated with construction activities for the Project were evaluated utilizing typical ground-borne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential ground-borne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria for structural damage.

For a structure built traditionally, without assistance from qualified engineers, the FTA Transit Noise and Vibration Manual shows that a vibration level of up to 0.20 in/sec is considered safe and would not result in any vibration damage. The FTA Transit Noise and Vibration Manual shows that modern engineered buildings built with reinforced-concrete, steel or timber can withstand vibration levels up to 0.50 in/sec and not experience vibration damage. The Caltrans 2020 *Transportation and Construction Vibration Guidance Manual* identifies the vibration threshold for human annoyance, vibrations levels of 0.4 in/sec PPV is when vibrations are considered severe by people subjected to continuous vibrations and levels of 0.2 in/sec is used for building damage.

6.0 POTENTIAL IMPACTS AND MITIGATION

6.1 Project-Level Impacts

Threshold 6.1 **Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?**

Construction

On-Site Construction Noise

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the receptors near the construction site. The nearest noise-sensitive uses/receptors to the Project site are the Riverside Community Players Theatre (65 feet east), Grant Elementary School (75 feet north), and single-family residences (225 feet northwest); refer to Table 6.

Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating applications. Such activities could require dozers, excavators, and concrete saws during demolition; dozers and tractors during site preparation; graders, excavators, tractors, dozers, and scrapers during grading; forklifts, cranes, generators, tractors, and welders during building construction; pavers, rollers, and paving equipment during paving; and air compressors during architectural coating applications. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts. Noise levels associated with individual construction equipment operating at full power are listed in Table 7: Project Construction Equipment Noise Levels.[31]

Table 7: Project Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA L_{max}) at 50 feet from Source
Air Compressor	80
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82

[31] Federal Highway Association, *Roadway Construction Noise Model, User Guide 2006*.

Table 7: Project Construction Equipment Noise Levels	
Equipment	**Typical Noise Level (dBA L_{max}) at 50 feet from Source**
Graders	85
Loader	80
Pavers	85
Roller	85
Saw	76
Scraper	85
Shovel	82
Truck	84
1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$ Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance	
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, *September 2018.*	

The FHWA RCNM was used to calculate noise levels during construction activities. Noise levels were calculated for each construction phase and are based on the equipment used, distance to the nearest receptor, and acoustical use factor for equipment. The modeled receptor locations represent the nearest noise-sensitive land uses to Project construction activities. Noise levels at other sensitive receptors surrounding the Project site would be located further away and would experience lower construction noise levels than the closest receptors modeled. The noise levels calculated in Table 8: Project Construction Noise Levels show estimated exterior noise levels at the nearest receptors for the worst-case construction noise scenario without accounting for attenuation from intervening barriers, structures, or topography.

As shown in Table 8, Project construction noise levels would range between approximately 60.7 dBA and 85.1 dBA and would exceed the Riverside City Code Section 7.25.010 exterior noise standards of 55 dBA for residential and 60 dBA for community support uses. Project construction noise levels would likely result in a noticeable increase above ambient noise levels and could interrupt regular conversations and operations at nearby sensitive receptors. Thus, construction noise would result in a potentially significant impact.

To reduce construction noise impacts, the proposed Project would be required to comply with 2014 Final EIR Mitigation Measure NOI-1 (MM NOI-1). MM NOI-1 requires construction noise reduction measures such as mufflers for construction equipment, locating/orienting the staging area and equipment away from sensitive receptors (as feasible), and compliance with the City’s allowable construction hours, among others. However, Project construction details such as specific construction equipment sizes/types and noise specifications, and proposed mufflers are currently unknown. Thus, the actual noise reduction(s) from implementation of 2014 Final EIR MM NOI-1 are difficult to quantify, and construction noise levels would not likely be reduced below the City’s 60 dBA. Therefore, Project construction noise impacts would be considered significant and unavoidable despite implementation of 2014 Final EIR MM NOI-1.

As concluded in the 2014 Final EIR, on-site construction noise levels during all RCHSP phases (Phase I, Phase IIa, Phase IIb, and Phase IIC) would result in significant and unavoidable impacts. As shown above, the Project’s estimated construction noise levels would exceed City noise standards and also result in significant and unavoidable impacts despite implementation of mitigation measures. Therefore, the Project would not result in any significant project-level effects relating to construction noise. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of significant and unavoidable impact under this issue area.

Table 8: Project Construction Noise Levels

Construction Phase	Land Use[1]	Receptor Location			Noise Threshold (dBA L_{eq})[4]	Exceeded?
		Direction	Distance to Project site (feet)[2]	Worst Case Modeled Exterior Noise Level (dBA L_{eq})		
Demolition	Riverside Community Players Theatre	East	65	85.1	60	**Yes**
	Grant Elementary School	North	75	83.8	60	**Yes**
	Single-Family Residential	Northwest	225	74.3	55	**Yes**
Site Preparation	Riverside Community Players Theatre	East	65	82.3	60	**Yes**
	Grant Elementary School	North	75	81.0	60	**Yes**
	Single-Family Residential	Northwest	225	71.5	55	**Yes**
Grading	Riverside Community Players Theatre	East	65	83.6	60	**Yes**
	Grant Elementary School	North	75	82.4	60	**Yes**
	Single-Family Residential	Northwest	225	72.8	55	**Yes**
Infrastructure Improvements	Riverside Community Players Theatre	East	65	81.8	60	**Yes**
	Grant Elementary School	North	75	80.5	60	**Yes**
	Single-Family Residential	Northwest	225	71.0	55	**Yes**
Building Construction	Riverside Community Players Theatre	East	65	81.8	60	**Yes**
	Grant Elementary School	North	75	80.5	60	**Yes**
	Single-Family Residential	Northwest	225	71.0	55	**Yes**
Paving	Riverside Community Players Theatre	East	65	83.2	60	**Yes**
	Grant Elementary School	North	75	82.0	60	**Yes**
	Single-Family Residential	Northwest	225	72.4	55	**Yes**
Architectural Coating	Riverside Community Players Theatre	East	65	71.4	60	**Yes**
	Grant Elementary School	North	75	70.2	60	**Yes**
	Single-Family Residential	Northwest	225	60.7	55	**Yes**

1. Recreational land uses were not analyzed because the FTA has not established a noise threshold for recreational uses.
2. For a conservative, worst-case exterior noise level estimation, it is assumed that the loudest piece of equipment would be operated near the Project property boundary and all other equipment would operate at the center of the Project site.
3. For the demolition, site preparation, and grading phases, the site was considered to be the Project site. For the building construction, paving, and architectural coating phases.
4. The City does not have a quantitative noise threshold for construction and only limits the hours of the construction activities. Therefore, FTA's construction noise threshold is conservatively used for this analysis (FTA, *Transit Noise and Vibration Impact Assessment Manual*, September 2018).

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix A: Noise Data for noise modeling results.

Off-Site Construction Noise

In addition to on-site construction noise, the Project would generate mobile-source noise from delivery/haul trucks and construction workers traveling to and from the Project site during construction activities. Haul trucks would travel to and from the Project site using 14th Street and Magnolia Avenue. Although construction workers would arrive from various directions, worker trips would likely all utilize 14th Street and/or Magnolia Avenue to arrive at to the Project site. According to modeling assumptions included in the air quality assessment prepared by Kimley-Horn (December 2024), the construction phase with the highest assumed number of haul trucks and worker trips would be building construction, when there would be up to 34 daily haul truck trips and 87 worker trips (121 total daily trips) accessing the Project site.

In general, a 3 dBA increase in traffic noise is barely perceptible to people, while a 5 dBA increase is readily noticeable. Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to generate a barely perceptible 3-dBA increase.[32] Based on traffic count data obtained by Kimley-Horn,[33] Brockton Avenue and 14th Street in the Project vicinity, currently experience average daily traffic (ADT) volumes of 17,322 and 20,474, respectively. As noted above, the Project would generate a maximum of 107 daily trips during the building construction phase, which would not double the existing traffic volumes on Magnolia Avenue or 14th Street. Therefore, the Project would not result in a noticeable increase in traffic noise during construction and impacts would be less than significant.

As concluded in the 2014 Final EIR, construction traffic noise levels during all RCHSP phases (Phase I, Phase IIa, Phase IIb, and Phase IIC) would result in a less than significant impact. Project construction traffic would result in a nominal increase in traffic noise levels compared to existing conditions and impacts would also be less than significant. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of no significant impact under this issue area.

Operations

The proposed parking structure would serve the Riverside Community Hospital and would not generate additional vehicle trips. The major noise sources associated with the Project include parking areas (i.e. car door slamming, car radios, engine start-up, and car pass-by), and off-site traffic noise.

Parking Structure Noise

Surface and basement parking lots currently exist on the Project site. Parking noise also occurs at adjacent properties and the Riverside Community Hospital under existing conditions. The proposed Project involves a new five-level parking structure parking structure with a total of 587

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32 According to the California Department of Transportation *Technical Noise Supplement to Traffic Noise Analysis Protocol* (September 2013), it takes a doubling of traffic to create a noticeable (i.e., 3 dBA) noise increase.

33 24-hour traffic volumes provided by Counts Unlimited, Inc., 2024.

parking spaces. Traffic associated with parking areas is typically not of sufficient volume to exceed community noise standards, which are based on time-averaged scales. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA at 50 feet and may be an annoyance to adjacent noise-sensitive receptors.[34] Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech.[35] It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period.

For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from the vehicles entering and exiting the parking structure, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used. Using the methodology, the Project's peak hourly noise level that would be generated by the on-site parking levels was estimated using the following FTA equation for a parking lot:

$$L_{eq(h)} = SEL_{ref} + 10\log(NA/1{,}000) - 35.6$$

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

NA = number of automobiles per hour

35.6 is a constant in the formula, calculated as 10 times the logarithm of the number of seconds in an hour

Based on the peak hour trip generation rates from Project's Traffic Analysis Scoping Form (approved October 21, 2024) (Traffic Scoping Form), the Project would generate 226 trips during the a.m. and 333 trips during the p.m. peak hours. Using the FTA's reference noise level of 92 dBA SEL[36] at 50 feet from the noise source, the Project's p.m. peak hour vehicle trips would generate noise levels of approximately 51.6 dBA L_{eq} at 50 feet from the parking structure. The nearest residential uses would be located approximately 230 feet to the northwest, the Riverside Community Players Theatre would be located approximately 80 feet east, and Grant Elementary School would be located approximately 115 feet north of the proposed parking structure. Based on these distances, vehicle-related noise levels at the parking structure would range from approximately 38.3 dBA L_{eq} to 47.5 dBA L_{eq} and would exceed Riverside City Code noise standards. Parking noise levels at the Project boundary (as close as 15 feet from the proposed parking garage) would be approximately 57.1 dBA[37] and would not exceed the 60 dBA limit established in 2014 Final EIR MM NOI-2. During

34 Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
35 Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. Noise Navigator Sound Level Database with Over 1700 Measurement Values, July 6, 2010.
36 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
37 Assuming a minimum 5 dBA reduction from intervening walls and structures within the parking garage.

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. Additionally, parking noise would be partially masked by background noise from traffic along 14th Street and Brockton Avenue. As noted above, the Project site is located within the 60-65 dBA CNEL noise contour for 14th Street. Therefore, existing noise levels near the proposed parking structure already exceed 60 dBA and the noise levels associated with parking noise. As such, parking lot noise would not result in substantially greater noise levels than currently exist in the vicinity and would not exceed the City standards, operational noise impacts would less than significant in this regard.

As concluded in the 2014 Final EIR, parking structure noise impacts from the RCHSP would result in a less than significant impact with incorporation of MM NOI-2. Project parking structure noise levels would not exceed the City's noise standards or the 60 dBA noise limit established in 2014 Final EIR MM NOI-2 and impacts would also be less than significant. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of no significant impact under this issue area.

Off-Site Traffic Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments. According to the Traffic Scoping Form, the proposed Project would generate 3,654 net daily trips which would result in noise increases on Project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable.[38] Therefore, increases in traffic noise levels of less than 5 dBA would be less than significant consistent with the 2014 Final EIR methodology.

Traffic noise levels on roadways primarily affected by Project-generated trips were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling shown in Table 9: Existing Plus Project Traffic Noise Levels, was conducted for conditions with and without the Project based on existing traffic volumes.

As shown in Table 9, traffic-generated noise levels on the primary access roadways would range between 63.9 dBA CNEL and 64.5 dBA CNEL at 100 feet from the roadway centerline and would not exceed the 65 dBA CNEL noise standard. The Project would result in a maximum increase of 0.8 dBA CNEL along 14th Street which is less than 5 dBA and is unnoticeable. Therefore, the traffic associated with the Project, in combination with background traffic noise levels, would result in a less than significant impact.

38 Federal Highway Administration, _Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals_, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed November 2024.

Table 9: Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Year		Existing + Project		Existing Plus Project Noise Level Exceeds 65 dBA?	Incremental Increase	Significant Impact[3]
	ADT	dBA CNEL[1]	ADT[2]	dBA CNEL[1]			
14th Street West of Brockton Avenue	17,322	63.1	20,976	63.9	No	0.8	**No**
Brockton Avenue between 14th Street and Tequesquite Avenue	20,474	63.8	24,128	64.5	No	0.7	**No**

ADT = average daily trips; dBA = A-weighted decibels; CNEL= Community Equivalent Noise Level
1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Existing Plus Project ADT conservatively assumes 100 percent of Project traffic would occur on each roadway.
3. Consistent with the 2014 Final EIR, potential impacts occur when the Project change exceeds 5 dBA and/or the with project traffic noise level exceeds 65 dBA CNEL.

Source: Based on traffic data within the Traffic Scoping Form (Kimley-Horn, 2024) and existing ADT counts provided by Counts Unlimited, 2024. See Appendix A for traffic noise modeling data.

As concluded in the 2014 Final EIR, operational traffic noise impacts from the RCHSP would result in a less than significant impact. Project operational traffic would result in a nominal increase in traffic noise levels compared to existing conditions and impacts would also be less than significant. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of no significant impact under this issue area.

Generators

The Project would include a generator room located within the parking garage. However, the generators would only be used in emergency situations and would be fully enclosed within a room in the parking garage structure. Thus, generator noise would be minimal when operating during emergency situations and would not exceed 60 dBA in accordance with 2014 Final EIR MM NOI-3. A less than significant impact would occur in this regard.

As concluded in the 2014 Final EIR, emergency generator noise impacts from the RCHSP would result in a less than significant impact with incorporation of 2014 Final EIR MM NOI-3. Project emergency generator noise levels would not exceed the City's noise standards or the 60 dBA noise limit established in 2014 Final EIR MM NOI-3 and impacts would also be less than significant. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of no significant impact under this issue area.

2014 Final EIR Mitigation Measures:

NOISE-1: In order to reduce impacts related to heavy construction equipment moving and operating on site during all phases (Phase I, Phase IIa, Phase IIb, and Phase IIc) of demolition, grading, and construction, prior to issuance of grading permits, mitigation measures shall be incorporated by the City of Riverside (City) as conditions on permits. Examples of measures to be required by the City are as follows:

- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
- Construction noise reduction methods, such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and using electric air compressors and similar power tools rather than diesel equipment, shall be used.
- During construction, stationary construction equipment shall be placed such that noise is directed away from or shielded from sensitive noise receivers.
- During construction, stockpiling and vehicle staging areas shall be located far from noise- sensitive receptors.
- The project shall be in compliance with the City' s Municipal Code: Construction shall occur between the hours of 7: 00 a.m. and 7: 00 p.m. on weekdays, and between 8:00 a.m. and 5:00 p.m. on Saturdays. Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted at all construction entrances to allow surrounding property owners and residents to contact the job superintendent.

Project Mitigation Measures: No mitigation is required.

Level of Significance: Significant and unavoidable impact.

Threshold 6.2 Would the Project generate excessive ground-borne vibration or ground-borne noise levels?

Construction

On-Site Construction Vibration

Increases in ground-borne vibration levels attributable to the Project would be primarily associated with short-term construction-related activities. Project construction would have the potential to result in varying degrees of temporary ground-borne vibration, depending on the specific construction equipment used and the operations involved.

The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. The City does not provide numerical vibration standards for construction activities. The nearest structure is the Riverside Community Players Theatre located approximately 65 feet to the east of the Project site. This impact discussion uses the FTA and Caltrans structural damage criterion of 0.5 in/sec PPV for commercial buildings and the human annoyance criterion of 0.4 in/sec PPV.

Table 10: Typical Construction Equipment Vibration Levels lists the reference vibration levels for typical construction equipment (measured at 25 feet). The ground-borne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Equipment expected to be used at the Project site that FTA guidance includes reference vibration levels for include loaded haul trucks, large bulldozer, small bulldozer, jackhammer, hoe ram, and vibratory roller.[39] Haul trucks would be staged at locations that would provide ease of access/egress from the Project site and onto the roadway network. Loaded trucks would travel at distances greater than 25 feet from adjacent structures. A vibratory roller could be used during the construction of the parking garage, approximately 65 feet from the Riverside Community Players Theatre to the east and at further distances for other surrounding structures.

As indicated in Table 10, vibration velocities from typical heavy construction equipment operations that would be used during Project construction range from 0.004 to 0.294 in/sec PPV at 65 feet from the source of activity (the distance to the nearest off-site building/structure) and would not exceed the 0.5 in/sec PPV structural damage threshold or 0.4 in/sec PPV annoyance threshold. Therefore, approval of the Project would not result in any significant effects relating to on-site construction vibration.

Table 10: Typical Construction Equipment Vibration Levels

Equipment	Reference Level PPV at 25 Feet (in/sec)	PPV at 65 Feet (in/sec)[1]
Large Bulldozer	0.089	0.021
Loaded Trucks	0.076	0.018
Jackhammer	0.035	0.008
Small Bulldozer	0.003	0.001
Hoe Ram	0.089	0.021
Vibratory Roller	0.21	0.050
Structural Damage Threshold	**0.50**	**0.50**
Human Annoyance Threshold	**0.4**	**0.4**
Exceeds Thresholds?	**No**	**No**

1. Calculated using the following formula: PPVequip = PPVref x $(25/D)^{1.5}$, where: PPVequip = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPVref = the reference vibration level in in/sec from *Table 7-4 of the Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018

[39] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018. For equipment where FTA guidance does not include reference vibration levels for are assumed to not require analysis.

Off-Site Construction Vibration

With regard to construction trucks, Project construction would involve truck travel along nearby roadways, generating vibration events with each passing truck. During excavation, soil would be stockpiled by trucks within designated areas of the Project site prior to export. According to the FTA's Transit Noise and Vibration Impact Assessment, a truck rarely creates vibration levels that exceed 70 VdB (equivalent to 0.012 inches per second PPV) when on a roadway.[40] The factors influencing levels of ground-borne vibration include vehicle speed, vehicle suspension, and wheel condition and type. The frequency of vibration events is not listed as an influencing factor for vibration velocity by the FTA.[41] As such, multiple trucks traveling along the roadway would increase the frequency of vibration events but would not affect the vibration velocity experienced by receptors. Therefore, approval of the Project would not result in any significant effects relating to off-site construction vibration.

Operation

With respect to vibration-generating activities, operation of the Project would involve personal automobiles used by employees and patients accessing the parking garage that generate minimal vibration levels. Therefore, operational vibration levels from automobiles accessing the parking garage would not be perceptible and impacts would be less than significant.

As concluded in the 2014 Final EIR, construction and operational vibration impacts from the RCHSP would be less than significant. Project vibration levels would not exceed any applicable standards and would also result in a less than significant impact. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of no significant impact under this issue area.

2014 Final EIR Mitigation Measures: No mitigation is required.

Project Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport of public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The Project site is located approximately 1.43 miles east of Flabob Airport. According to the Riverside County Airport Land Use Compatibility Plan Policy Document,[42] the Project site is not located within any Flabob Airport noise contour or Land Use Compatibility zones. There is an existing helipad at the Riverside Community Hospital located approximately 310 feet east of the

[40] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
[41] Ibid.
[42] Riverside County Airport Land Use Commission, *Riverside County Airport Land Use Compatibility Plan Policy* Document, *Flabob Airport,* adopted December 2004.

Project site. However, helicopter landings/takeoffs occur infrequently and would not conflict with the Riverside City Code noise standards as concluded in the 2014 Final EIR. The proposed Project would not change the existing location of the helipad or increase helicopter operations. Therefore, approval of the Project would not result in any significant effects relating to excessive airport/airstrip noise.

As concluded in the 2014 Final EIR, impacts related to airport/aircraft noise from the RCHSP would be less than significant. The proposed Project would also result in less than significant impacts in this regard. No new impacts or a substantial increase in the severity of a previously identified impact evaluated in the 2014 Final EIR would occur. Additionally, no new information of substantial importance that was not known and could not have been known at the time the 2014 Final EIR was certified is available that would impact the prior finding of no significant impact under this issue area.

2014 Final EIR Mitigation Measures: No mitigation is required.

Project Mitigation Measures: No mitigation is required.

Level of Significance: No impact.

7.0 REFERENCES

1. AB 1307, Public Resources Code Section 21085.

2. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol* ("TeNS"), September 2013, https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf.

3. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020.

4. City of Riverside, *Code of Ordinances*, current through Ordinance No. 7686, adopted September 17, 2024.

5. City of Riverside, *Riverside Community Hospital Expansion Project Final Environmental Impact Report, 2014*.

6. City of Riverside, *Riverside General Plan 2025*, November 2007.

7. Cyril M. Harris, *Handbook of Noise Control*, 1979.

8. Cyril M. Harris, *Noise Control in Buildings: A Practical Guide for Architects and Engineers, 1994*.

9. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010

10. Federal Highway Administration, *FHWA Traffic Noise Model User's Guide*, January 1998.

11. Federal Highway Administration, *Highway Traffic and Construction Noise - Problem and Response*, April 2006.

12. Federal Highway Administration, *Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals*, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed November 2024.

13. Federal Highway Administration, *Noise Fundamentals*, 2017.

14. Federal Highway Association, *Roadway Construction Noise Model, User Guide 2006, Appendix A: Best Practices for Calculating Estimated Shielding for Use in the RCNM*.

15. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

16. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

17. James P. Cowan, *Handbook of Environmental Acoustics*, 1994

18. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

19. Kimley-Horn and Associates, Inc., *Phase II Brockton Parking Garage Traffic Analysis Scoping*

Form, October 2024.

20. Riverside County Airport Land Use Commission, *Riverside County Airport Land Use Compatibility Plan Policy* Document, *Flabob Airport,* adopted December 2004.

21. State of California Governor's Office of Planning and Research, *General Plan Guidelines, Appendix D: Noise Element Guidelines*, page 374, 2017, https://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf.

22. U.S. Department of Labor, *Occupational Safety and Health Standards, 29 CFR 1910 (Occupational Noise Exposure)*.

Appendix A

NOISE DATA

Project: Riverside Community Hospital Parking Garage Project

Construction Noise Impact on Sensitive Receptors

Parameters

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

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Riverside Community Players Theatre	65	0	E
2	Grant Elementary School	75	0	NE
3	Single-Family Residential	225	0	NW

					RECEPTOR 1		RECEPTOR 2		RECEPTOR 3	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**
Demolition										
	Concrete Saw	1	20%	90	87.3	80.3	86.1	79.1	76.5	69.5
	Dozer	1	40%	82	79.4	75.4	78.2	74.2	68.6	64.7
	Tractor	3	40%	84	86.5	82.5	85.2	81.3	75.7	71.7
Combined LEQ						**85.1**		**83.8**		**74.3**
Site Preparation										
	Grader	1	40%	85	82.7	78.7	81.5	77.5	71.9	68.0
	Dozer	1	40%	82	79.4	75.4	78.2	74.2	68.6	64.7
	Tractor	1	40%	84	81.7	77.7	80.5	76.5	70.9	67.0
Combined LEQ						**82.3**		**81.0**		**71.5**
Grading										
	Grader	1	40%	85	82.7	78.7	81.5	77.5	71.9	68.0
	Dozer	1	40%	82	79.4	75.4	78.2	74.2	68.6	64.7
	Tractor	2	40%	84	84.7	80.8	83.5	79.5	73.9	70.0
Combined LEQ						**83.6**		**82.4**		**72.8**
Infrastructure Improvements										
	Crane	1	16%	81	78.3	70.4	77.1	69.1	67.5	59.6
	Excavator	1	40%	81	78.4	74.4	77.2	73.2	67.6	63.7
	Generator	1	50%	81	78.3	75.3	77.1	74.1	67.5	64.5
	Tractor	1	40%	84	81.7	77.7	80.5	76.5	70.9	67.0
	Welder/Torch	3	40%	74	76.5	72.5	75.2	71.3	65.7	61.7
Combined LEQ						**81.8**		**80.5**		**71.0**
Building Construction										
	Crane	1	16%	81	78.3	70.4	77.1	69.1	67.5	59.6
	Excavator	1	40%	81	78.4	74.4	77.2	73.2	67.6	63.7
	Generator	1	50%	81	78.3	75.3	77.1	74.1	67.5	64.5
	Tractor	1	40%	84	81.7	77.7	80.5	76.5	70.9	67.0
	Welder/Torch	3	40%	74	76.5	72.5	75.2	71.3	65.7	61.7
Combined LEQ						**81.8**		**80.5**		**71.0**
Paving										
	Concrete Mixer Truck	1	40%	79	76.5	72.5	75.3	71.3	65.7	61.8
	Paver	1	50%	77	74.9	71.9	73.7	70.7	64.1	61.1
	Pavement Scarafier	1	20%	90	87.2	80.2	86.0	79.0	76.4	69.4
	Roller	1	20%	80	77.7	70.7	76.5	69.5	66.9	59.9
	Tractor	1	40%	84	81.7	77.7	80.5	76.5	70.9	67.0
Combined LEQ						**83.2**		**82.0**		**72.4**
Architectural Coating										
	Compressor (air)	1	40%	78	75.4	71.4	74.2	70.2	64.6	60.7
Combined LEQ						**71.4**		**70.2**		**60.7**

Source for Ref. Noise Levels: RCNM, 2005

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Riverside Community Hospital Parking Garage
Project Number: 99670009
Scenario: Existing
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Brockton Avenue	14th Street to Tequesquite Avenue	4	0	17,322	35	0	2.0%	1.0%	63.1	-	65	204	646
2	14th Street	West of Brockton Avenue	2	0	20,474	35	0	2.0%	1.0%	63.8	-	75	238	752

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Riverside Community Hospital Parking Garage
Project Number: 99670009
Scenario: Existing Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Brockton Avenue	14th Street to Tequesquite Avenue	4	0	20,976	35	0	2.0%	1.0%	63.9	-	78	247	782
2	14th Street	West of Brockton Avenue	2	0	24,128	35	0	2.0%	1.0%	64.5	-	89	280	886

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.