Appendix G.
Acoustical Assessment

Michael Baker

INTERNATIONAL

ACOUSTICAL ASSESSMENT

ARE Science Village

City of San Diego, California

April 2022

This page intentionally left blank

Acoustical Assessment

ARE Science Village

City of San Diego, California

Prepared for: Alexandra Real Estate Equities, Inc.
10996 Torreyana Road, Suite 250
San Diego, CA 92121
Contact: Neil Hyytinen
Phone: (858) 610-5420
Email: nhyytinen@hechtsolberg.com

Prepared by: Michael Baker International
9755 Clairemont Mesa Boulevard, Suite 100
San Diego, California 92124
Contact: Bob Stark, AICP
Phone: (858) 614-5000
Email: bstark@mbakerintl.com

April 2022

This page intentionally left blank

TABLE OF CONTENTS

LIST OF TABLES

LIST OF EXHIBITS

LIST OF APPENDICES

EXECUTIVE SUMMARY

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise and vibration impacts resulting from implementation of the proposed ARE Science Village Project ("project" or "proposed project").

The project site is generally located west of Interstate 805 and north of State Route 52 in the City of San Diego, California. Specifically, the approximately 3.97-acre project site is located at the northeast corner of Towne Centre Drive and Executive Drive in the University Towne Center. The project site is developed and surrounded by a variety of land uses, such as light industrial, scientific/clinical research, medical, and general office uses. The project proposes to redevelop an existing commercial site. The proposed project consists of two primary components: (1) demolition of the existing on-site buildings totaling approximately 138,400 square feet (sq. ft.) and (2) redevelopment of the site with approximately 369,878 sq. ft. of mixed-use research, retail, and office uses across two buildings. The project would consist of approximately 310,416 sq. ft. of scientific research and development (R&D) uses and 59,462 sq. ft. are planned as accessory/amenity space. The accessory/amenity space is expected to consist of a 7,655 sq. ft. market, 563 sq. ft. food and beverage space, 23,397 sq. ft. fitness center, and 27,847 sq. ft. conference space(s). Additionally, three levels of subterranean with approximately 938 parking spaces are proposed.

<u>Short-Term Construction Impacts</u>. Based upon the results of the analysis, noise associated with short-term construction would not exceed the City of San Diego's noise standard for construction (12-hour average noise level of 75 dBA) with implementation of Mitigation Measures NOI-1 and NOI-2 and impacts would be less than significant. Similarly, construction vibration impacts would be less than significant.

<u>Long-Term Operational Impacts</u>. The analysis found that implementation of the proposed project would result in less than significant impacts related to vehicular (mobile) noise and stationary noise sources.

1 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise and vibration impacts resulting from implementation of the proposed ARE Science Village Project ("proposed project" or "project") in the City of San Diego (City).

1.1 PROJECT LOCATION

The project site is generally located west of Interstate 805 (I-805) and north of State Route 52 in the City; refer to Figure 1, *Regional Vicinity*. Specifically, the approximately 3.97-acre project site is located at 9393 Towne Centre Drive at the northeast corner of Towne Centre Drive and Executive Drive in the University Towne Center; refer to Figure 2, *Site Vicinity*. The site is located within the University Community Plan Area. Regional access to the project area is provided via I-805 approximately one mile to the east and Interstate 5 approximately two miles to the west.

1.2 ENVIRONMENTAL SETTING/EXISTING CONDITIONS

The area surrounding the project site is highly developed and urbanized with a variety of land uses, such as light industrial, scientific/clinical research, medical, and general office uses. Open space uses are located approximately 0.6 miles to the east beyond I-805. Commercial uses are located immediately adjacent to the west and south. The University of California, San Diego campus is located further west. Additionally, residential uses are located approximately 0.2 mile to the southwest.

The site currently supports existing office buildings which are connected below grade by one level of subterranean parking. Surface parking exists on the roof of the subterranean parking level. Access to the parking garage is provided from a driveway on Executive Drive and from a ramp located in the surface parking lot.

1.3 PROJECT DESCRIPTION

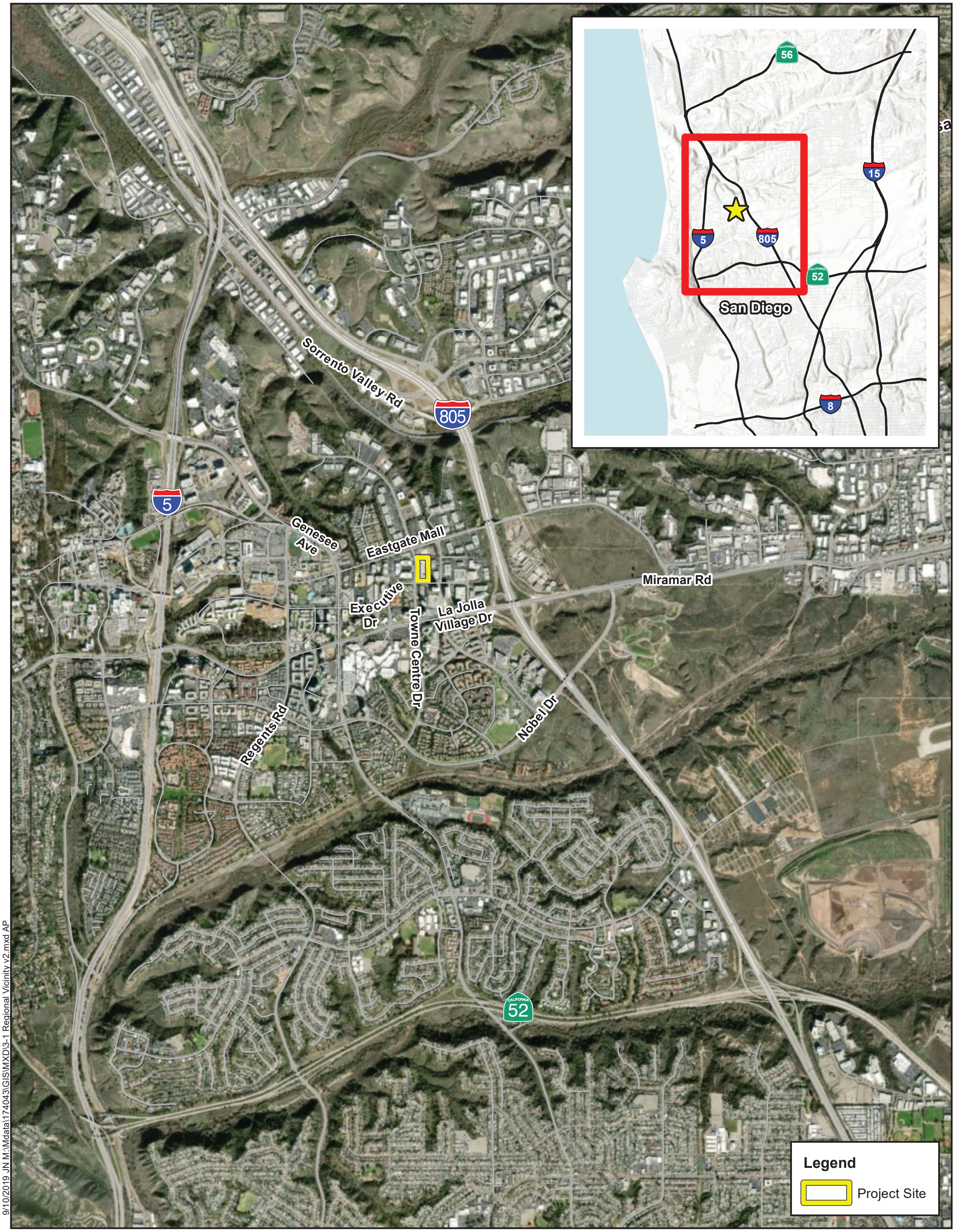
Alexandria Real Estate Equities (applicant) proposes to redevelop an existing commercial site in the community of La Jolla, located in the City of San Diego, California. The proposed project consists of two primary components: (1) demolition of the existing on-site buildings totaling approximately 138,400 square feet (sq. ft.) and (2) redevelopment of the site with approximately 369,878 sq. ft. of mixed-use research, retail, and office uses across two buildings. The project would consist of approximately 310,416 sq. ft. of scientific research and development (R&D) uses and 59,462 sq. ft. are planned as accessory/amenity space. The accessory/amenity space is expected to consist of a 7,655 sq. ft. market, 563 sq. ft. food and beverage space, 23,397 sq. ft. fitness center, and 27,847 sq. ft. conference space(s). Additionally, three levels of subterranean with approximately 938 parking spaces are proposed. Consistent with the current University Community Plan, accessory and amenity spaces would be provided on-site within the principal buildings (non-freestanding) and the uses are planned to be oriented towards the interior of the project.

TABLE 1. BUILDING USE SUMMARY

Use by Building	Square Footage of Proposed Use
Existing Buildings (to be Demolished)	
Scientific Research and Development	138,400
Total	**138,400**
Proposed Buildings	
Scientific Research and Development	310,416
Secondary Uses	
Food and Beverage	*563*
Retail/Market	*7,655*
Fitness Center	*23,397*
Conference Space	*27,847*
Subtotal	59,462
Total	**369,878**

Discretionary actions associated with the project include a Specific Plan Amendment (SPA) to the Nexus Technology Centre Specific Plan, Planned Development Permit (PDP), a Rezone, and a Community Plan Amendment (CPA). If approved, these entitlements would allow for the proposed redevelopment of the project site.

This page intentionally left blank.



9/10/2019 JN M:\Mdata\174043\GIS\MXD\3-1 Regional Vicinity v2.mxd AP

Michael Baker INTERNATIONAL

0 0.25 0.5 1 Miles

Source: ESRI World Imagery, US Census Tiger/Line, National Highway Planning Network

Science Village

Regional Map

Exhibit 1

This page intentionally left blank

9/4/2019 JN M:\Mdata\174043\GIS\MXD\3-2 Location Map.mxd AP

Michael Baker INTERNATIONAL

0 100 200 400 Feet

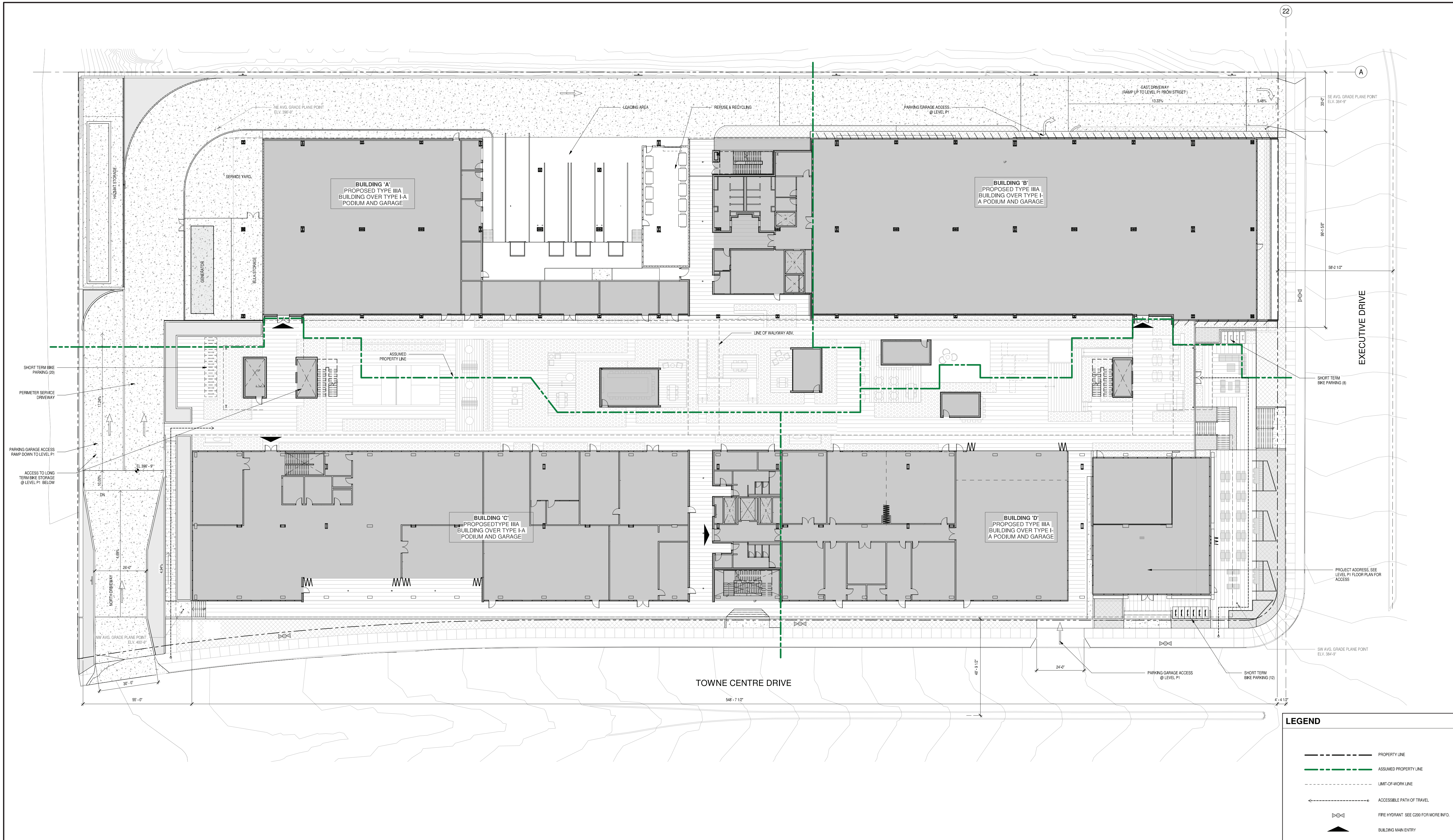
Source: ESRI World Imagery

Science Village

Location Map

Exhibit 2

This page intentionally left blank



Michael Baker INTERNATIONAL

File: 174043Figures.indd

Not to Scale

Sources: The Miller Hull Partnership, LLP and Alexandria, 02/22/2022

ARE SCIENCE VILLAGE

Site Plan

Exhibit 3

This page intentionally left blank

2 DESCRIPTION OF NOISE METRICS

2.1 STANDARD UNIT OF MEASUREMENT

Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by differentiating among frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Figure 4, *Common Environmental Noise Levels*.

Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Table 2, *Noise Descriptors*, provides a listing of methods to measure sound over a period of time.

2.2 HEALTH EFFECTS OF NOISE

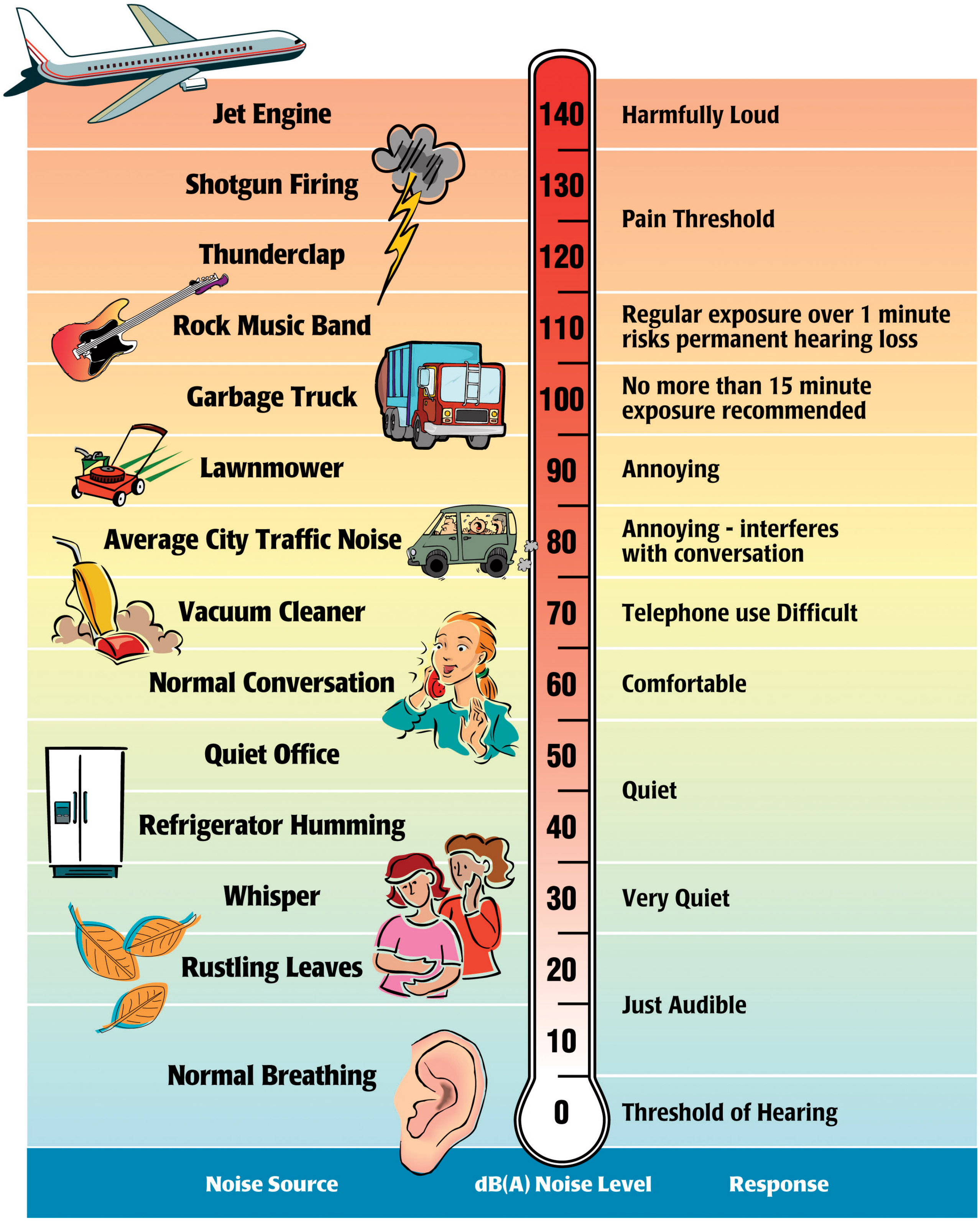
Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses would range from "not annoyed" to "highly annoyed."

TABLE 2. NOISE DESCRIPTORS

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. CNEL is the average sound level taken over a 24-hour period with adjustments made during evening and nighttime hours. These adjustments are +5 dBA for the evening, 7:00 p.m. to 10:00 p.m., and +10 dBA for the night, 10:00 p.m. to 7:00 a.m.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 p.m. to 7:00 a.m.) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1, 10, 50, and 90 percent (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.

Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.

Michael Baker INTERNATIONAL



Source:

Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.

Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004)*, March 1974.

Michael Baker INTERNATIONAL

ARE Science Village

Common Environmental Noise Levels

Source: Melville C. Branch and R. Dale Beland, Environmental Protection Agency

Figure 4

This page intentionally left blank

When the noise level of an activity rises above 70 dBA, the chance of receiving a complaint is possible, and as the noise level rises, dissatisfaction among the public steadily increases. However, an individual's reaction to a particular noise depends on many factors, such as the source of the sound, its loudness relative to the background noise, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the National Institute on Deafness and Other Communication Disorders, at least ten million Americans with hearing impairments owe their losses to noise exposure (NIH, 2019). Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proven to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of "helping" behavior, and increased incidence of "hostile" behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the number of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the U.S. Department of Transportation, the relationship between the effects of annoyance and the community were quantified. In areas where exterior noise levels were consistently above 60 dBA Community Noise Equivalent Level (CNEL), approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress-related.

3 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

This noise analysis was conducted in accordance with Federal, State, and local criteria described in the following sections.

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) offers guidelines for community noise exposure in the publication *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*. These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB L_{dn}) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other Federal agencies have adopted suggested land use compatibility guidelines that indicate that residential noise exposures of 55 to 65 dB L_{dn} are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

3.2 CITY OF SAN DIEGO

CITY OF SAN DIEGO GENERAL PLAN

The Noise Element of the *City of San Diego General Plan* (General Plan) provides goals and policies to guide compatible land uses and to incorporate noise attenuation measures for new uses to protect people living and working in the City from an excessive noise environment. The City's goal is controlling noise to acceptable levels at its source. However, when this is not feasible, the City applies additional measures to limit the effect of noise on future land uses, which include spatial separation, site planning, and building design techniques that address noise exposure and the insulation of buildings to reduce interior noise levels. The following goals and policies from the General Plan are applicable to the project.

Goal A: Consider existing and future noise levels when making land use planning decisions to minimize people's exposure to excessive noise.

Policy A.1: Separate excessive noise-generating uses from residential and other noise-sensitive land uses with a sufficient spatial buffer of less sensitive uses.

Policy A.2: Assure the appropriateness of proposed developments relative to existing and future noise levels by consulting the guidelines for noise-compatible land use (Table 3, *City of San Diego Land Use Compatibility for Community Noise Environments*) to minimize the effects on noise sensitive land uses.

Goal G: Minimize exposure of residential and other noise-sensitive land uses to excessive construction, refuse vehicles, parking lot sweeper-related noise and public noise.

Policy G.1: Implement limits on the hours of operation for non-emergency construction and refuse vehicle and parking lot sweeper activity in residential areas and areas abutting residential areas.

TABLE 3. CITY OF SAN DIEGO LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS

Land Use Category	Exterior Noise Exposure (dBA CNEL)				
	60	65	70	75	
Parks and Recreational					
Parks, Active and Passive Recreation					
Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities					
Agricultural					
Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables					
Residential					
Single Dwelling Units; Mobile Homes		45			
Multiple Dwelling Units **For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.*		45	45*		
Institutional					
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12Educational Facilities; Libraries; Museums; Child Care Facilities		45			
Other Educational Facilities including Vocational/Trade Schools and Colleges and Universities		45	45		
Cemeteries					
Retail Sales					
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories			50	50	
Commercial Services					
Building Services; Business Support; Eating & Drinking; Financial Institutions; Maintenance & Repair; Personal Services; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support			50	50	
Visitor Accommodations		45	45	45	
Offices					
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters			50	50	
Vehicle and Vehicular Equipment Sales and Services Use					
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking					
Wholesale, Distribution, Storage Use Category					
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution					
Industrial					
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries					
Research & Development				50	

	Compatible	**Indoor Uses**	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I.
		Outdoor Uses	Activities associated with the land use may be carried out.
45, 50	**Conditionally Compatible**	**Indoor Uses**	Building structure must attenuate exterior noise to the indoor noise level indicated by the number (45 or 50) for occupied areas. Refer to Section I.
		Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated t make the outdoor activities acceptable. Refer to Section I.
	Incompatible	**Indoor Uses**	New construction should not be undertaken.
		Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.

Source: City of San Diego General Plan Noise Element, 2015.

CITY OF SAN DIEGO MUNICIPAL CODE

The City regulates noise through the *City of San Diego Municipal Code* (Municipal Code), Chapter 5, Article 9.5, *Noise Abatement and Control*. The following sections of the Noise Ordinance provide sound level limits between adjacent properties, noise insulation standards, and construction noise limits.

Section 59.5.0401 It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit given in the following table, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The property line noise level limits for various land uses by time of day are shown in Table 4, *Sound Level Limits*.

TABLE 4. SOUND LEVEL LIMITS

Land Use	Time of Day	One-Hour Average Sound Level (decibels)
Single Family Residential	7 a.m. to 7 p.m.	50
	7 p.m. to 10 p.m.	45
	10 p.m. to 7 a.m.	40
Multi-Family Residential (Up to a maximum density of 1/2000)	7 a.m. to 7 p.m.	55
	7 p.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
All other Residential	7 a.m. to 7 p.m.	60
	7 p.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial	7 a.m. to 7 p.m.	65
	7 p.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	60
Industrial or Agriculture	Any time	75

Source: City of San Diego, City of San Diego Municipal Code, 2019.

Section 59.5.0404 Construction Noise of the noise ordinance regulates noise produced by construction activities. Construction activities are prohibited between the hours of 7 p.m. and 7 a.m. and on Sundays and certain legal holidays, unless a permit has been granted beforehand by the Noise Abatement and Control Administrator or conjunction with emergency work. Section 59.5.0404 limits construction noise to an average sound level of 75 dBA during the 12-hour period from 7 a.m. to 7 p.m. at or beyond the property lines of any property zoned residential.

CITY OF SAN DIEGO SIGNIFICANCE DETERMINATION THRESHOLDS

The following applicable thresholds have been used in this analysis for identifying significant noise impacts applicable to the project:

Interior and Exterior Noise Impacts from Traffic-Generated Noise

The City's California Environmental Quality Act (CEQA) Significance Determination Thresholds provide guidance on implementing the City's noise policies and ordinances, including the general thresholds of significance for uses affected by traffic noise included in Table 5, *Traffic Noise Significance Thresholds*.

Operational noise is typically considered permanent. A significant permanent increase is defined as a direct project related permanent ambient increase of 3 dBA or greater, where exterior noise levels would already exceed the City's significance thresholds. An increase of 3 dBA is perceived by the human ear as a barely perceptible increase.

TABLE 5. TRAFFIC NOISE SIGNIFICANCE THRESHOLDS

Structure or Proposed Use That Would Be Impacted by Traffic Noise	Interior Space	Exterior Useable Space[1]	General Indication of Potential Significance
Single-family detached	45 dB	65 dB	Structure or outdoor useable area[2] is <50 feet from center of the closest (outside) lane on a street with existing or future ADTs > 7,500
Multi-family, school, library, hospital, day care center, hotel, motel, park, convalescent home	- Development Services Department (DSD) ensures - 45 dB pursuant to Title 24	65 dB	
Office, church, business, professional uses	N/A	70 dB	Structure or outdoor useable area is <50 feet from the center of the closest lane on a street with existing or future ADTs > 20,000
Commercial, retail, industrial, outdoor sports uses	N/A	75 dB	Structure or outdoor useable area is <50 feet from the center of the closest lane on a street with existing or future ADTs > 40,000

Notes:
ADT = average daily trips; dB = decibels; N/A = not applicable
1 If a project is currently at or exceeds the significance thresholds for traffic noise described above and noise levels would result in less than a 3-dB increase, then the impact is not considered significant.
2
Source: City of San Diego, *California Environmental Quality Act Significance Determination Thresholds*, 2020.

4 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, Michael Baker International utilized three noise measurements conducted by dBF Associates (dBF Associates 2016) during the afternoon peak traffic period of Tuesday, February 9, 2016 to quantify the existing on-site acoustical environment due to vehicle traffic (refer to Table 6, *Noise Measurements*). Agencies such as the U.S. Department of Housing and Urban Development (HUD) and the City consider the peak hour sound level reasonably equivalent to the CNEL for vehicular traffic.

A RION Model NA-28 American National Standards Institute Type 1 Integrating Sound Level Meter was used as the data-collection device. The meter was mounted to a tripod, roughly five feet above ground, to simulate the average height of the human ear. The sound level meter was calibrated before and after the measurement period.

The measurement results are summarized in Table 6 and correspond to the locations depicted on Figure 5, *Noise Measurement Locations and Sensitive Receptors*. A review of Table 6 shows that the measured noise levels ranged from 58.6 to 63.3 dBA L_{eq} in the project vicinity. Other noise sources observed during the site visit include heating, ventilation, and air conditioning (HVAC) units on nearby buildings, birds calling, and wind in trees. The meter was occasionally paused briefly during aircraft overflights, to isolate the measurements to traffic noise.

TABLE 6. NOISE MEASUREMENTS

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
ML1	Towne Centre Drive	58.6	61.3	69.9	3:45 p.m.
ML2	Eastgate Mall	63.3	56.3	71.5	4:10 p.m.
ML3	Judicial Drive	59.2	52.9	73.2	4:35 p.m.

Notes: dBA = A-weighted decibels; L_{eq} = Equivalent Sound Level; L_{min} = Minimum Sound Level; L_{max} = Maximum Sound Level
Source: dBF Associates, *Towne Centre Drive Redevelopment Exterior Noise Analysis Report*, August 9, 2016.

4.2 SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, libraries, museums, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Existing sensitive receptors located in the project vicinity include residential uses, schools, places of worship, and parks. Sensitive receptors are listed in Table 7, *Sensitive Receptors* and shown in Figure 5.

9/6/2019 JN M:\Mdata\174043\GIS\MXD\Noise\5 Location Map.mxd AP

Michael Baker INTERNATIONAL

Source: dBF Associates, ESRI World Imagery

ARE Science Village
Noise Measurment Locations and Sensitive Receptors

Figure 5

This page intentionally left blank

TABLE 7. SENSITIVE RECEPTORS

Type	Receptor No.	Name	Location	Distance from Project Site[1] (feet)	Direction from Project Site
Multi-Family Residential	1	Devonshire Woods II	4639 Executive Drive, San Diego 92121	220	Southwest
	2	La Jolla Mesa Estates	9505 Easter Way, San Diego CA 92121	780	Northwest
Schools	3	Braille Institute	4555 Executive Drive, San Diego, CA 92121	710	Southwest
	4	La Jolla Country Day School	9490 Genesee Avenue, San Diego, CA 92037	2,750	West
	5	University City High School	6949 Genesee Avenue, San Diego, CA 92122	5,665	South
	6	Doyle Elementary School	3950 Berino Court, San Diego, CA 92122	6,265	Southwest
	7	Standley Middle School	6298 Radcliffe Drive, San Diego, CA 92122	8,375	South
Places of Worship	8	La Jolla Community Church	4377 Eastgate Mall, San Diego, CA 92121	1,460	West
	9	Newman Center Catholic Community	4321 Eastgate Mall, San Diego, CA 92121	1,800	West
Parks	10	Mandell-Weiss Eastgate Park	Regents Road and Eastgate Mall, San Diego, CA 92121	2,870	West
	11	Nobel Athletic Area	8810 Judicial Drive, San Diego, CA 92121	3,100	Southeast

Note:
1. The distance is measured from the project site property line to the sensitive receptor property line.

Source: Google Earth, 2021.

4.3 EXISTING NOISE LEVELS

MOBILE SOURCES

The noise environment at the project site is dominated by vehicular traffic on Towne Centre Drive, Executive Drive, and Judicial Drive, as well as aircraft operations associated with Marine Corps Air Station (MCAS) Miramar.

In order to assess the potential for mobile source noise impacts, it is necessary to determine the noise currently generated by vehicles traveling through the project area. Vehicle noise was modeled using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108). The model calculates the average noise level at specific locations based on traffic volumes, average speeds represented by the posted speed limit, roadway geometry, and site environmental conditions. The model does not account for ambient noise levels. Noise projections are based on modeled vehicular traffic as derived from the street segment analysis (refer to Appendix A). As shown in Table 8, *Existing Traffic Noise*

Levels, mobile noise sources in the vicinity of the project site range from 62.0 to 63.7 dBA CNEL at 100 feet from roadway centerline.

TABLE 8. EXISTING TRAFFIC NOISE LEVELS

Roadway Segment	Existing Conditions				
	ADT[1]	dBA @ 100 Feet from Roadway Centerline	Distance in Feet from Roadway Centerline to:		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Towne Centre Drive					
Eastgate Mall to Project Driveway "A"	14,996	62.0	136	63	-
Project Driveway "A" to Executive Drive	15,274	62.3	142	66	-
Executive Drive to Towne Centre Driveway	21,886	63.7	176	82	-
Towne Centre Driveway to La Jolla Village Drive	21,734	63.7	176	82	-
Judicial Drive					
Executive Drive to Judicial Driveway	9,028	60.0	100	-	-
Judicial Driveway to Golden Haven Drive/Brook Lane	9,320	60.1	102	-	-
Executive Drive					
Towne Centre Drive to Project Driveway "B"	6,489	56.1	55	-	-
Project Driveway "B" to Judicial Drive	6,489	56.1	55	-	-

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = Community Noise Equivalent Level, "-" = contour located within roadway right of way

1. Existing ADTs were provided by Urban Systems Associates, Inc. on November 11, 2021.

Source: Refer to Appendix A, *Noise Data*.

STATIONARY SOURCES

The project site is located in an industrial area of the University Community Plan Area. Primary sources of stationary noise in the project vicinity are urban-related activities, including mechanical equipment and parking areas. Noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

5 POTENTIAL ACOUSTICAL IMPACTS

CITY OF SAN DIEGO

The *City of San Diego California Environmental Quality Act Significance Determination Thresholds*, dated July 2016, outline the criteria and thresholds used to determine whether project impacts are significant (City of San Diego 2016). A significant impact would occur if the project would cause one or more of the following to occur:

- Exposure of people to noise levels that exceed the City's adopted Noise Ordinance, San Diego Municipal Code, Section 5.9.5.0404 (i.e., 75db(A) L_{eq});

- Exposure of people to transportation noise levels that exceed the sound level limits as presented in *Table K-2* (Table 5) of the City's Significance Determination Thresholds (refer to Impact Statement N-1); Exposure of people to noise levels that exceed the City's adopted Noise Ordinance, San Diego Municipal Code, Section 5.9.5.0401, as identified in Table 4;

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant and unavoidable impact.

PROJECT-RELATED IMPACTS

CONSTRUCTION

Construction of the proposed project would occur over approximately 31 months and would include demolition, grading, paving, building construction, and architectural coatings. The anticipated construction schedule and equipment are shown in Table 9, *Construction Schedule and Equipment*.

TABLE 9. CONSTRUCTION SCHEDULE AND EQUIPMENT

Construction Phase	Construction Equipment	Start Date	End Date
Demolition	Excavators, Rubber Tired Dozers, Concrete Saws	1/3/2022	4/29/2022
Grading	Excavators, Graders, Rubber Tired Dozers, Scrapers, Tractors	4/1/2022	7/29/2022
Building Construction	Cranes, Pile Driver, Tractors, Generator Sets, Welders	8/1/2022	7/31/2024
Paving	Pavers, Rollers	5/1/2023	6/29/2023
Architectural Coating	Air Compressors	1/1/2024	6/28/2024

Groundborne noise and other types of construction-related noise impacts would typically occur during excavation activities in the grading and construction phases. Table 10, *Maximum Noise Levels Generated by Construction Equipment*, indicates the anticipated noise levels of construction equipment. It should be noted that the noise levels identified in Table 10 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

TABLE 10. MAXIMUM NOISE LEVELS GENERATED BY CONSTRUCTION EQUIPMENT

Equipment Type	Actual L_{max} at 50 Feet (dBA)	Actual L_{max} at 220 Feet[1] (dBA)
Backhoe	78	65
Bulldozer	82	69

Compactor	82	69
Compressor	78	65
Concrete Mixer	79	66
Concrete Pump	81	68
Crane, Mobile	81	68
Dump Truck	76	63
Excavator	81	68
Generator	81	68
Grader	85	72
Impact Pile Driver	101	88
Loader	79	66
Paver	77	74
Pump	81	68
Roller	80	67
Tractor	84	71
Flatbed Truck	74	61
Welder	74	61

Notes:
dBA = A-Weighted Decibel; L_{max} = Maximum Sound Level
1 Distance from the closest sensitive receptor to the project boundary.
Source: Federal Highway Administration, *Roadway Construction Noise Model User's Guide,* January 2006.

The nearest sensitive receptor (residential use) is located approximately 220 feet southwest of the proposed project boundary. As shown in Table 10, construction equipment noise levels would range between 61 dBA and 88 dBA at a distance of 220 feet.

Using the FHWA's Roadway Construction Noise Model and construction information, the estimated noise levels from construction was calculated for the nearest sensitive receptor (Sensitive Receptor #1); refer to Figure 5. Modeled construction equipment are shown in Table 9. The estimated noise levels for construction activities at the nearest sensitive receptor are shown in Table 11, *Construction Noise Model Results Summary*. As discussed previously, the City's Noise Ordinance states that construction noise may not exceed 75 dBA L_{eq} at or beyond the property line of a residentially zoned property.

TABLE 11. CONSTRUCTION NOISE MODEL RESULTS SUMMARY

<table>
<tr><th>ID</th><th>Distance from Receptor Site to Project Boundary (feet)</th><th>Land Use</th><th>Demolition (dBA L_{eq})</th><th>Grading (dBA L_{eq})</th><th>Building Construction (dBA L_{eq})</th><th>Paving (dBA L_{eq})</th><th>Architectural Coating (dBA L_{eq})</th></tr>
<tr><td colspan="8">Unmitigated</td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">220</td><td rowspan="3">Residential</td><td>71.7</td><td>73.4</td><td>81.6</td><td>70.6</td><td>60.8</td></tr>
<tr><td colspan="2">73.4
When these two construction phases overlap</td><td colspan="3"></td></tr>
<tr><td colspan="2"></td><td colspan="3">82.0
When these three construction phases overlap</td></tr>
<tr><td colspan="8">Mitigated</td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">220</td><td rowspan="3">Residential</td><td>51.7</td><td>53.4</td><td>61.6</td><td>50.6</td><td>40.8</td></tr>
<tr><td colspan="2">53.4
When these two construction phases overlap</td><td colspan="3"></td></tr>
<tr><td colspan="2"></td><td colspan="3">62.0
When these three construction phases overlap</td></tr>
</table>

Notes: dBA = A-Weighted Decibel; L_{eq} = Equivalent
Source: Refer to Appendix A, *Noise Data*.

The noise levels presented in Table 11 are conservative, as these noise levels assume the simultaneous operation of all construction equipment at the same precise location. In reality, construction equipment would be used throughout the project site and would not be concentrated at the point closest to the sensitive receptors. It should also be acknowledged that construction activities would occur during normal daytime hours (between 7:00 a.m. and 7:00 p.m. Monday through Saturday) to avoid noise disturbances at nearby receptors during the more sensitive hours (between 7:00 p.m. and 7:00 a.m.).[1]

As depicted in Table 11, construction noise levels would range from 60.8 dBA L_{eq} to 82.0 dBA L_{eq} at the nearest receptor. As shown in Table 11, construction phases may overlap during the demolition and grading phases, as well as the building construction, paving, and architectural coating phases. During the time when the demolition and grading phases would occur at the same time, the combined noise level would be approximately 73.4 dBA L_{eq} at the nearest residential sensitive receptor to the southwest of the project site. Similarly, the noise level generated during the overlapping building construction, paving, and architectural coating phases would be approximately 82.0 dBA L_{eq} at the nearest residential sensitive

[1] Project construction will not occur at night (7:00 p.m. to 7:00 a.m.), on Sundays, or legal holidays.

receptor to the southwest of the project site. Thus, construction noise levels would exceed the 75 dBA L_{eq} threshold during the overlapping building construction, paving, and architectural coating phases.

Noise source control is the most effective method of controlling construction noise. Source controls, which limit noise, are the easiest to oversee on a construction project. Mitigation at the source reduces the problem everywhere, not just along one single path or for one receiver. Noise path controls are the second method in controlling noise. Barriers or enclosures can provide a substantial reduction in the nuisance effect in some cases. Path control measures include moving equipment farther away from the receiver; enclosing especially noisy activities or stationary equipment; erecting noise enclosures, barriers, or curtains; and using landscaping as a shield and dissipater.

Noise barriers or enclosures can provide a sound reduction up to 20 dBA or greater.[2] To be effective, a noise enclosure/barrier must physically fit in the available space, must completely break the line of sight between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source, and extend length-wise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In these cases, the enclosure/barrier system must either be very tall or have some form of roofed enclosure to protect upper-story receptors.

To ensure compliance with the City's maximum construction noise limits (outlined in Municipal Code Section 59.5.0404) and substantially reduce construction-generated noise at nearby receptors, the proposed project would be required to implement Mitigation Measures NOI-1 and NOI-2. Mitigation Measure NOI-1 would include the designation of a "Noise Disturbance Coordinator" and orientation of stationary construction equipment away from nearby sensitive receivers, among other requirements. Further, as shown in Table 11, implementation of Mitigation Measure NOI-2 would reduce the project's construction noise levels below the City's 75 dBA standard during the overlapping building construction, paving, and architectural coating phases with the use of a temporary noise barrier or enclosure along the eastern and southern property lines to break the line of sight between the construction equipment and the nearest sensitive receptor (residential use). Therefore, project construction activities would not generate noise levels in excess of City standards with implementation of Mitigation Measures NOI-1 and NOI-2. A less than significant impact would occur in this regard.

OPERATIONS

Vehicle Traffic Noise

The project would increase traffic volumes on local roadways. Based on the *ARE Science Village Trip Generation Table* prepared by Urban Systems Associates (received November 29, 2021), the proposed project is forecasted to generate approximately 2,959 average daily trips. Traffic noise modeling was conducted using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108). The noise model calculates the average noise level at specific locations based on traffic volumes, average speeds represented by the posted speed limit, roadway geometry, and site environmental

2 Echo Barrier, *H9 Acoustic Barrier*, https://echobarrier.com/product/h9-acoustic-barrier, accessed December 8, 2021.

conditions. Street segment traffic noise calculations for "Opening Year Without Project" and "Opening Year With Project" conditions are detailed in Appendix A.

The "Opening Year Without Project" and "Opening Year With Project" scenarios are compared in Table 12, *Opening Year (2027) Traffic Noise Levels With and Without Project*. As depicted in Table 12, under the "Opening Year Without Project" scenario, noise levels would range from approximately 56.9 dBA to 64.5 dBA at 100 feet from roadway centerline, with the highest noise levels occurring along the Towne Centre Drive segment from Executive Drive to Towne Centre Driveway. The "Opening Year With Project" scenario noise levels would range from approximately 57.2 dBA to 64.6 dBA at 100 feet from roadway centerline, with the highest noise levels also occurring along the Towne Centre Drive segment from Executive Drive to Towne Centre Driveway. As shown in Table 12, project-related traffic would result in a less than 1 dBA increase in traffic noise over existing without project conditions for all roadway segments. As discussed under the City of San Diego Significance Determination Thresholds, an increase of 3 dBA or greater would result in a significant impact, therefore, project generated traffic noise would be less than significant.

TABLE 12. OPENING YEAR (2027) TRAFFIC NOISE LEVELS WITH AND WITHOUT PROJECT

Roadway Segment	Traffic Volume (ADT)		Noise Level (CNEL) at 100 feet from Roadway Centerline		
	Opening Year without Project	Opening Year with Project	Opening Year without Project	Opening Year with Project	Noise Increase
Towne Centre Drive					
Eastgate Mall to Project Driveway "A"	18,262	19,151	62.9	63.1	0.2
Project Driveway "A" to Executive Drive	18,541	19,430	63.1	63.3	0.2
Executive Drive to Towne Centre Driveway	26,140	26,709	64.5	64.6	0.1
Towne Centre Driveway to La Jolla Village	25,988	26,557	64.4	64.5	0.1
Judicial Drive					
Executive Drive to Judicial Driveway	10,179	10,890	60.5	60.8	0.3
Judicial Driveway to Golden Haven Drive/Brook Lane	10,473	11,184	60.6	60.9	0.3
Executive Drive					
Towne Centre Drive to Project Driveway "B"	7,832	8,384	56.9	57.2	0.3
Project Driveway "B" to Judicial Drive	7,832	8,384	56.9	57.2	0.3
Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = Community Noise Equivalent Level, "-" = contour located within roadway right of way					

Source: Refer to Appendix A, Noise Data.

Stationary Noise Impacts

Mechanical Equipment

The proposed project would require the use of commercial heating, ventilation, and air conditioning (HVAC) units. Commercial-scale HVAC equipment units are generally equipped with noise shielding cabinets, placed on the roof, and are not usually significant sources of noise impacts. HVAC units typically result in noise levels that average 55 dBA at 50 feet from the source.[3] Roof-mounted HVAC units would be located as close as 272 feet from the nearest sensitive receptor (Sensitive Receptor #1). At this distance, HVAC noise levels would be approximately 40 dBA. In addition, the HVAC units would not be visible to the nearest sensitive receptors as a parapet would separate the proposed Scientific Research building and receptors, further attenuating the HVAC noise levels by approximately 5 dBA.[4] Therefore, the closest HVAC unit could produce a noise level of approximately 35 dBA. As such, the City's most restrictive multi-family residential noise standard (45 dBA during nighttime hours [10:00 p.m. to 7:00 a.m.]) would not be exceeded as a result of HVAC units at the project site. It should be noted that additional mechanical equipment, including an emergency generator, may be located in the first level of the underground parking garage. As the mechanical equipment would be fully enclosed and not visible to the nearest sensitive receptors, noise from mechanical equipment operations would not be perceptible at the nearest sensitive receptors (Sensitive Receptor #1). Impacts would be less than significant in this regard.

Parking Garage

Parking for the project would be provided by a three-level underground parking garage. The parking garage would provide approximately 938 parking spaces for project tenants and employees.

Traffic noise associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the L_{dn} scale. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Estimates of the maximum noise levels associated with typical parking lot activities are presented in Table 13, *Typical Noise Levels Generated by Parking Lots*.

TABLE 13. TYPICAL NOISE LEVELS GENERATED BY PARKING LOTS

Noise Source	Maximum Noise Levels at 50 Feet from Source
Car door slamming	61 dBA L_{eq}
Car starting	60 dBA L_{eq}
Car idling	53 dBA L_{eq}

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

As shown in Table 13, parking lot noise levels range between 53 dBA and 61 dBA at a distance of 50 feet. The nearest sensitive receptor is located approximately 220 feet southwest of the project site. Given the distance and the parking garage being below ground, parking lot noise levels would be negligible at the nearest sensitive receptor. In addition, the project would comply with all Municipal Code ordinances related to stationary noise sources. Therefore, noise related to the underground parking structure would be less than significant.

[3] U.S. Environmental Protection Agency, Community Noise, 1971.

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

Mitigation Measures:

NOI-1 Prior to issuance of a demolition permit, the applicant/permittee shall coordinate with the City of San Diego Mitigation Monitoring Coordination and come to an agreement on the following measures:,

- Construction contracts shall specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state-required noise attenuation devices.

- A sign, legible at a distance of 50 feet, shall be posted at the project construction site providing a contact name and a telephone number where residents can inquire about the construction process and register complaints. This sign shall indicate the dates and duration of construction activities. In conjunction with this required posting, a noise disturbance coordinator shall be identified to address construction noise concerns received. The coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the disturbance coordinator shall notify the City within 24 hours of the complaint and determine the cause of the noise complaint (starting too early, malfunctioning muffler, etc.) and shall implement reasonable measures to resolve the complaint, as deemed acceptable by the City. All signs posted at the construction site shall include the contact name and the telephone number for the noise disturbance coordinator.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Per Municipal Code Section 59.5.0404, construction shall be limited to the hours between 7:00 a.m. and 7:00 p.m. daily (except Sundays and legal holidays). All construction activities shall be prohibited at night (between 7:00 p.m. and 7:00 a.m.) and on Sundays and legal holidays.

NOI-2 In order to reduce construction noise, a temporary noise barrier or enclosure shall be used along the eastern and southern property lines to break the line of sight between the construction equipment and the adjacent residences. The temporary noise barrier shall have a sound transmission class (STC) of 20 or greater in accordance with American Society for Testing and Materials Test Method E90, or at least 2 pounds per square foot to ensure adequate transmission loss characteristics. In order to achieve this, the barrier may consist of 3-inch steel tubular framing, welded joints, a layer of 18-ounce tarp, a 2-inch-thick fiberglass blanket, a half-inch-thick weatherwood asphalt sheathing, and 7/16-inch sturdy board siding with a heavy duct seal around the perimeter. The length, height, and location of noise control barrier walls shall be adequate to assure proper acoustical performance. In addition, to avoid objectionable noise reflections, the source side of the noise barrier shall be lined with an acoustic absorption material meeting a noise reduction coefficient rating of 0.70 or greater in accordance with American Society for Testing and Materials Test Method C423. All noise control barrier walls shall be designed to preclude structural failure due to such factors as winds, shear, shallow soil failure, earthquakes, and erosion.

Vibration

Construction Vibration

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The impacts from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. 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. According to the Caltrans *Transportation and Construction Vibration Guidance Manual*, the threshold for architectural damage to commercial structures is 0.5 inch-per-second peak particle velocity (PPV) and the human annoyance threshold is 0.2 inch-per-second PPV.[5] Typical vibration produced by construction equipment is illustrated in Table 14, *Typical Vibration Levels for Construction Equipment*.

[5] California Department of Transportation (Caltrans), *Transportation and Construction Vibration Guidance Manual*, April 2020.

TABLE 14. TYPICAL VIBRATION LEVELS FOR CONSTRUCTION EQUIPMENT

	Equipment	Approximate peak particle velocity at 25 feet (inches/second)	Approximate peak particle velocity at 55 feet (inches/second)	Approximate peak particle velocity at 220 feet (inches/second)
Impact Pile Driver	Upper Range	1.518	0.465	0.058
	Typical	0.644	0.197	0.025
Sonic Pile Driver	Upper Range	0.734	0.225	0.028
	Typical	0.170	0.052	0.007
Vibratory Roller		0.210	0.064	0.008
Large Bulldozer		0.089	0.027	0.003
Loaded Trucks		0.076	0.023	0.003
Jackhammer		0.035	0.011	0.001
Small bulldozer		0.003	0.001	<0.001

Notes:

1. Calculated using the following formula:

$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

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

Construction activities are anticipated to occur up to the project boundary line. Therefore, the nearest structure (i.e. commercial uses) would be located approximately 55 feet to the north of the project site boundary and the nearest sensitive receptors (residential uses) would be located approximately 220 feet to the southwest of the project site boundary. As indicated in Table 14, groundborne vibration generated during project construction activities would range from 0.001 to 0.465 inch-per-second PPV at the nearest structure (i.e. commercial uses) and from less than 0.001 to 0.058 inch-per-second PPV at the nearest sensitive receptors (residential uses). Therefore, groundborne vibration generated during project construction activities would not exceed the human annoyance criterion (0.2 inch-per-second PPV) or the structural damage criterion (0.5 inch-per-second PPV). A less than significant impact would occur in this regard.

OPERATIONAL VIBRATION

The proposed scientific research and retail uses would not generate groundborne vibration that could be felt by surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. Thus, no impact would occur in this regard.

AIRPORT NOISE

The proposed project is located approximately 2.5 miles to the northwest of the MCAS Miramar and is within the Airport Influence Area (Review Area 2) of the adopted MCAS Miramar Airport Land Use Compatibility Plan (ALUCP) (San Diego County 2011). The project is located within airport's 60 dBA CNEL noise contour and therefore must comply with the ALUCP's land use compatibility policies. Similar to the General Plan, the ALUCP considers outdoor noise levels of up to 75 dBA CNEL commercial and industrial uses (e.g., clinical laboratories, office buildings, and eating/drinking establishments) as being conditionally compatible as long as interior noise levels of 50 dBA CNEL can be maintained. As shown in Table 6, outdoor noise levels in the project vicinity range from 59.2 to 63.3 dBA. Accounting for a 24 dBA exterior-to-interior attenuation factor, interior noise levels would be approximately 39.3 dBA or lower. Therefore, the proposed project would be compatible with the ALUCP standards and guidelines (i.e. 75 dBA CNEL exterior noise threshold and 50 dBA CNEL interior noise threshold). Additionally, the project site is not located within the vicinity of a private airstrip or related facilities. Thus, project implementation would not expose people residing or working in the project area to excessive noise levels associated with aircraft and impacts would be less than significant.

6 REFERENCES

6.1 LIST OF PREPARERS

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, California 92707
949/472-3505
Eddie Torres, INCE, Planning Department Manager
Danielle Regimbal, Senior Air Quality & Noise Specialist

6.2 DOCUMENTS

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

City of San Diego, *California Environmental Quality Act Significance Determination Thresholds*, July 2016.

City of San Diego, *City of San Diego General Plan Noise Element*, 2015.

City of San Diego, *City of San Diego Municipal Code*, 2019.

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

dBF Associates, *Towne Centre Drive Redevelopment Exterior Noise Analysis Report*, August 9, 2016.

Echo Barrier, *H9 Acoustic Barrier*, https://echobarrier.com/product/h9-acoustic-barrier, accessed December 8, 2021.

FTA (Federal Highway Administration), *Roadway Construction Noise Model User's Guide*, January 2006.

FTA, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

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

NIH (National Institute on Deafness and Other Communication Disorders), *Noise-Induced Hearing Loss*, June 2019. https://www.nidcd.nih.gov/sites/default/files/Documents/health/hearing/NoiseInducedHearingLoss.pdf, accessed September 30, 2021.

Office of Planning and Research, California, *General Plan Guidelines,* July 2017.

San Diego County Regional Airport Authority, *Marine Corps Air Station Miramar Airport Land Use Compatibility Plan*, December 1, 2011.

U.S. Environmental Protection Agency, Community Noise, 1971.

6.3 SOFTWARE/WEBSITES

Federal Highway Administration, *Roadway Construction Noise Model* (FHWA-HEP-05-054), January 2006.

Federal Highway Administration, *Highway Traffic Nosie Prediction Model* (RD-77-108), 1978.

Google Earth, 2021.

Appendix A: Noise Data

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 181315
Project Name: ARE Science Village
Scenario: Existing

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes:	Urban Systems Associates, Inc. (2021)
Community Noise Descriptor:	L_{dn}: ____ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.50%	12.90%	9.60%
Medium-Duty Trucks	84.80%	4.90%	10.30%
Heavy-Duty Trucks	86.50%	2.70%	10.80%

Analysis Condition Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist
Towne Centre Drive													
Eastgate Mall to Project Driveway “A”	4	0	14,996	40	0.5	1.8%	0.7%	62.0	-	63	136	294	100
Project Driveway “A” to Executive Drive	4	20	15,274	40	0.5	1.8%	0.7%	62.3	-	66	142	305	100
Executive Drive to Towne Centre Driveway	4	5	21,886	40	0.5	1.8%	0.7%	63.7	-	82	176	380	100
Towne Centre Driveway to La Jolla Village Drive	4	5	21,734	40	0.5	1.8%	0.7%	63.7	-	82	176	378	100
Judicial Drive													
Executive Drive to Judicial Driveway	4	20	9,028	40	0.5	1.8%	0.7%	60.0	-	-	100	215	100
Judicial Driveway to Golden Haven Drive/Brook Lane	4	20	9,320	40	0.5	1.8%	0.7%	60.1	-	-	102	219	100
Executive Drive													
Towne Centre Drive to Project Driveway “B”	4	5	6,489	30	0.5	1.8%	0.7%	56.1	-	-	55	119	100
Project Driveway “B” to Judicial Drive	4	5	6,489	30	0.5	1.8%	0.7%	56.1	-	-	55	119	100

Distance from Centerline of Roadway

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

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 181315
Project Name: ARE Science Village
Scenario: Opening Year 2027

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes:	Urban Systems Associates, Inc. (2021)
Community Noise Descriptor:	L_{dn}: ____ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.50%	12.90%	9.60%
Medium-Duty Trucks	84.80%	4.90%	10.30%
Heavy-Duty Trucks	86.50%	2.70%	10.80%

Analysis Condition Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Distance from Centerline of Roadway: CNEL at 100 Feet	Distance to Contour: 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist
Towne Centre Drive													
Eastgate Mall to Project Driveway “A”	4	0	18,262	40	0.5	1.8%	0.7%	62.9	-	72	156	335	100
Project Driveway “A” to Executive Drive	4	20	18,541	40	0.5	1.8%	0.7%	63.1	-	75	161	347	100
Executive Drive to Towne Centre Driveway	4	5	26,140	40	0.5	1.8%	0.7%	64.5	-	92	199	428	100
Towne Centre Driveway to La Jolla Village Drive	4	5	25,988	40	0.5	1.8%	0.7%	64.4	-	92	198	426	100
Judicial Drive													
Executive Drive to Judicial Driveway	4	20	10,179	40	0.5	1.8%	0.7%	60.5	-	-	108	233	100
Judicial Driveway to Golden Haven Drive/Brook Lane	4	20	10,473	40	0.5	1.8%	0.7%	60.6	-	-	110	237	100
Executive Drive													
Towne Centre Drive to Project Driveway “B”	4	5	7,832	30	0.5	1.8%	0.7%	56.9	-	-	62	135	100
Project Driveway “B” to Judicial Drive	4	5	7,832	30	0.5	1.8%	0.7%	56.9	-	-	62	135	100

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

TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 181315
Project Name: ARE Science Village
Scenario: Opening Year 2027 + Project

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes:	Urban Systems Associates, Inc. (2021)
Community Noise Descriptor:	L_{dn}: ______ CNEL: x

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.50%	12.90%	9.60%
Medium-Duty Trucks	84.80%	4.90%	10.30%
Heavy-Duty Trucks	86.50%	2.70%	10.80%

Analysis Condition Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Distance from Centerline of Roadway CNEL at 100 Feet	Distance to Contour 70 CNEL	Distance to Contour 65 CNEL	Distance to Contour 60 CNEL	Distance to Contour 55 CNEL	Calc Dist
Towne Centre Drive													
Eastgate Mall to Project Driveway “A”	4	0	19,151	40	0.5	1.8%	0.7%	63.1	-	75	161	346	100
Project Driveway “A” to Executive Drive	4	20	19,430	40	0.5	1.8%	0.7%	63.3	-	77	166	358	100
Executive Drive to Towne Centre Driveway	4	5	26,709	40	0.5	1.8%	0.7%	64.6	-	94	202	434	100
Towne Centre Driveway to La Jolla Village Drive	4	5	26,557	40	0.5	1.8%	0.7%	64.5	-	93	201	433	100
Judicial Drive													
Executive Drive to Judicial Driveway	4	20	10,890	40	0.5	1.8%	0.7%	60.8	-	-	113	243	100
Judicial Driveway to Golden Haven Drive/Brook Lane	4	20	11,184	40	0.5	1.8%	0.7%	60.9	-	-	115	248	100
Executive Drive													
Towne Centre Drive to Project Driveway “B”	4	5	8,384	30	0.5	1.8%	0.7%	57.2	-	-	65	141	100
Project Driveway “B” to Judicial Drive	4	5	8,384	30	0.5	1.8%	0.7%	57.2	-	-	65	141	100

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

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:		12/9/2021
Case Description:	Buliding Construction, Paving, Architectural Coating	

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	220	0
Impact Pile Driver	Yes	20		101.3	220	0
Tractor	No	40	84		220	0
Paver	No	50		77.2	220	0
Pavement Scarafier	No	20		89.5	220	0
Roller	No	20		80	220	0
Compressor (air)	No	40		77.7	220	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		67.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver		88.4	81.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		71.1	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		64.4	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier		76.6	69.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		67.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)		64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	88.4	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/9/2021
Case Description: Demolition, Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	220	0
Dozer	No	40		81.7	220	0
Grader	No	40	85		220	0
Scraper	No	40		83.6	220	0
Tractor	No	40	84		220	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		67.8	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		72.1	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		70.7	66.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		71.1	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	72.1	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 12/9/2021
Case Description: Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	220	0
Excavator	No	40		80.7	220	0
Dozer	No	40		81.7	220	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		76.7	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator		67.8	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	76.7	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	12/9/2021
Case Description:	Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	220	0
Grader	No	40	85		220	0
Dozer	No	40		81.7	220	0
Scraper	No	40		83.6	220	0
Tractor	No	40	84		220	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		67.8	63.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		72.1	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		68.8	64.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		70.7	66.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		71.1	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	72.1	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	12/9/2021
Case Description:	Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	220	0
Pavement Scarafier	No	20		89.5	220	0
Roller	No	20		80	220	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver		64.4	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier		76.6	69.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		67.1	60.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	76.6	70.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	12/9/2021	
Case Description:	Building Construction	

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	220	0
Impact Pile Driver	Yes	20		101.3	220	0
Tractor	No	40	84		220	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane		67.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver		88.4	81.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		71.1	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	88.4	81.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	12/9/2021
Case Description:	Architectural Coating

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residential Sensitive Receptors to the Southwest	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	220	0

				Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

"Science Village" Trip Generation

Land Use	Intensity	Rate*	ADT	AM						PM					
				Peak%*	Vol.	In %	Out%	In	Out	Peak%*	Vol.	In %	Out%	In	Out
Existing Land Uses															
Scientific Research and Development	138.4 KSF	8 /KSF	1,107	16%	177	90% :	10%	159	18	14%	155	10% :	90%	16	140
Existing Sub-Total			1,107		177			159	18		155			16	140
Proposed Land Uses															
Scientific Research and Development	369.878 KSF	8 /KSF	2,959	16%	473	90% :	10%	426	47	14%	414	10% :	90%	41	373
Specialty Retail / Strip Commercial* **	24.256 KSF	Non-Trip Generating													
Proposed Sub-Total			2,959		473			426	47		414			41	373
Transit Reductions															
Transit Reduction % (Scientific Research and Development - Industrial)*			4%		15%			15%	15%		15%			15%	15%
Transit Reduction (Scientific Research and Development - Industrial) of Existing Uses			44		27			24	3		23			2	21
Transit Reduction (Scientific Research and Development - Industrial) of Proposed Uses			118		71			64	7		62			6	56
Existing Sub-Total With Transit Credit			1,063		151			136	15		132			13	119
Proposed Sub-Total With Transit Credit			2,841		402			362	40		352			35	317
Net Increase			1,778		252			227	25		220			22	198

Source:
*Rates taken from the City of San Diego Trip Generation Manual, May 2003
Note:
ADT= Average Daily Trips
KSF = 1,000 Square Feet

This page intentionally left blank

Michael Baker

INTERNATIONAL