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NOISE ASSESSMENT STUDY FOR THE PLANNED

CONDOMINIUM DEVELOPMENT

64-70 & 80-82 GLEN EYRIE AVENUE, SAN JOSE

Prepared for
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I. Executive Summary

This report presents the results of a noise assessment study, in compliance with the California Environmental Quality Act, for the proposed condominium development at 64-70 & 80-82 Glen Eyrie Avenue in San Jose. This study includes an analysis of traffic noise impacts to the project, project-generated noise impacts from traffic, mechanical equipment and construction noise and vibration.

The plans for the project include demolition of the existing residential buildings on the site and construction of 3-story townhouse style condominiums in three buildings. The following report includes background information on acoustics, noise standards applicable to the project, project-generated noise impacts, and project construction noise and vibration impacts. Noise impacts from the project are evaluated against the City of San Jose noise limits established in the Envision San Jose 2040 General Plan and Zoning Ordinance. For purposes of environmental review under CEQA, conformance to General Plan policies reduces any potential noise impacts from a project to a less than significant level.

The results of this study reveal that the noise exposures at the site are within the limits of the City of San Jose General Plan Goals and Policies for residential land use and within the interior noise exposure standards of the State of California Code of Regulations, Title 24. There will be no significant noise impacts to the project. Increases in traffic noise due to the project will be negligible and less than significant. Project-generated noise from mechanical equipment will be within the limits of the City of San Jose Zoning Ordinance. Construction noise and vibration will be less than significant per the incorporation of the noise and vibration control methods outlined in the project description.

In terms of the CEQA compliance checklist, the project results in the following:

- | | |
|---|-----------------------|
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | Less Than Significant |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | No impact |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | Less Than Significant |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | Less Than Significant |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | Less Than Significant |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | No impact |

II. Background Information on Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing.

Most of the sounds which we hear in our normal environment do not consist of a single frequency, but rather a broad range of frequencies. As humans do not have perfect hearing, environmental sound measuring instruments have an electrical filter built in so that the instrument's detector replicates human hearing. This filter is called the "A-weighting" network and filters out low and very high frequencies. All environmental noise is reported in terms of A-weighted decibels, notated as "dBA". All sound levels used in this report are A-weighted unless otherwise noted. Table I, below, shows the typical human response and noise sources for A-weighted noise levels.

Although the A-weighted noise level may adequately indicate the level of noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that create a relatively steady background noise from which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_1 , L_{10} , L_{50} and L_{90} are often used. They are the A-weighted noise levels exceeded for 1%, 10%, 50% and 90% of a stated time period. The continuous equivalent-energy level (L_{eq}) is that level of a steady state noise which has the same sound energy as a time-varying noise. It is often considered the average noise level and is used to calculate the Day-Night Levels (DNL) and the Community Noise Equivalent Level (CNEL) described below.

TABLE I

**The A-Weighted Decibel Scale, Human Response,
and Common Noise Sources**

<u>Noise Level, dBA</u>	<u>Human Response</u>	<u>Noise Source</u>
120-150+	Painfully Loud	Sonic Boom (140 dBA)
100-120	Physical Discomfort	Motorcycle at 20 ft. (110 dBA) Nightclub Music (105 dBA)
70-100	Annoying	Diesel Pump at 100 ft. (95 dBA) Freight Train at 50 ft. (90 dBA) Food Blender (90 dBA) Jet Plane at 1000 ft. (85 dBA) Freeway at 50 ft. (80 dBA) Alarm Clock (80 dBA)
50-70	Intrusive	Average Traffic at 100 ft. (70 dBA) Pass. Car, 30 mph @ 25 ft. (65 dBA) Vacuum Cleaner (60 dBA) Suburban Background (55 dBA)
0-50	Quiet	Normal Conversation (50 dBA) Light Traffic at 100 ft. (45 dBA) Refrigerator (45 dBA) Desktop Computer (40 dBA) Whispering (35 dBA) Leaves Rustling (20 dBA) Threshold of Hearing (0 dBA)

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, the Day-Night Level (DNL) noise descriptor was developed. The DNL is also called the L_{dn} . Either is acceptable, however, DNL is more popular worldwide. The DNL divides the 24-hour day into the daytime period of 7:00 a.m. to 10:00 p.m. and the nighttime period of 10:00 p.m. to 7:00 a.m. The nighttime noise levels are penalized by 10 dB to account for the greater sensitivity to noise at night. The Community Noise Equivalent Level (CNEL) is another 24-hour average which includes a 5 dB evening (7:00 p.m. - 10:00 p.m.) penalty and a 10 dB nighttime penalty. Both the DNL and the CNEL average the daytime, evening and nighttime noise levels over a 24-hour period to attain a single digit *noise exposure*. The proper notations for the Day-Night Level and the Community Noise Equivalent Level are dB DNL and dB CNEL, respectively, as they can only be calculated using A-weighted decibels. It is, therefore, considered redundant to notate dB(A) DNL or dB(A) CNEL.

The effects of noise on people can be listed in three general categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning, relaxing;
- physiological effects such as startling, hearing loss.

The levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants, airports, etc., can experience noise in the last category. Unfortunately, there is, as yet, no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction. This is primarily due to the wide variation in individual thresholds of annoyance and differing individual past experiences with noise.

An important way to determine a person's subjective reaction to a new noise is to compare it to the existing environment to which one has adapted, i.e., the "ambient". In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by the receivers.

With regard to increases in A-weighted noise levels, the Environmental Protection Agency has determined the following relationships that will be helpful in understanding this report.

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived.
- Outside of the laboratory, a 3 dB change is considered a just-perceptible difference.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected.
- A 10 dB change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse change in community response.

The adding or subtracting of sound levels is not simply arithmetic. The sound levels, in decibels, must be converted to Bels, the anti-logarithms of which are then calculated. The manipulation is then performed (arithmetic addition or subtraction), the logarithm of the sum or difference is calculated. The final number is then multiplied by 10 to convert Bels to decibels. The formula for adding decibels is as follows:

$$\text{Sum} = 10\log(10^{\text{SL}/10} + 10^{\text{SL}/10}) \quad \text{where, SL is the Sound Level in decibels.}$$

For example, 60 dB + 60 dB = 63 dB, and 60 dB + 50 dB = 60 dB. Two sound sources of the same level are barely noisier than just one of the sources by itself. When one source is 10 dB higher than the other, the less noisy source does not add to the noisier source.

III. Noise Standards, Goals & Policies

A. City of San Jose General Plan

The noise assessment results presented in the findings were evaluated against the City of San Jose Goals and Policies of the General Plan standards, Ref. (a), which utilize the Day-Night Level (DNL) 24-hour noise descriptor.

For residential land uses, the Goals and Policies define the “Normally Acceptable” noise environment up to 60 dB DNL, as shown in GP Policy EC-1. Exterior noise environments for residential uses between 60 dB DNL and 75 dB DNL are “Conditionally Acceptable”, i.e., the specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

The Goals and Policies also quantify substantial noise increases for the determination of significant noise impacts related to CEQA. In GP Policy EC-1.2, the General Plan increases allowed are: less than 5 dB where the noise exposure remains within the Normally Acceptable (60 dB DNL) limit and less than 3 dB where the noise exposure equals or exceeds the Normally Acceptable level.

Per GP Policy EC-1.3, new non-residential land use project-generated noise exposures are limited to 55 dB DNL at the property line when adjacent to noise sensitive residential or public land uses.

Policy EC-1.7; Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City’s Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

B. State of California Code of Regulations, Title 24

The Title 24 standards, Ref. (b), also use the DNL descriptor and specify a limit of 45 dB DNL for interior noise exposures due to exterior sources.

The Title 24 standards also specify minimum sound insulation ratings for common partitions separating different dwelling units and dwelling units from interior common spaces. The standards specify that common walls and floor/ceiling assemblies must have a design Sound Transmission Class (STC) rating of 50 or higher. In addition, common floor/ceiling assemblies must have a design Impact Insulation Class (IIC) rating of 50 or higher. As design details of the interior partitions were not available at the time of this study, evaluations of the interior partitions has not been made.

C. California Environmental Quality Act (CEQA)

The project-generated noise exposures were evaluated against the guidelines of the California Environmental Quality Act (CEQA). CEQA does not limit noise levels or noise exposures nor does it quantify noise exposure or noise level increases over the ambient to define noise impacts. CEQA evaluates a project as a significant noise impact if it "...caused a substantial increases in the ambient noise levels...". The quantification of the threshold of significance is left up to the local jurisdiction. The City of San Jose Goals and Policies provides thresholds of significance in the General Plan. The thresholds of significance shall be applied at the existing residential area to the east, north and west of the site.

The City of San Jose General Plan Policy EC-1.2 state that significant noise impacts would occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dB DNL or more where the noise levels would remain “Normally Acceptable”; or
- Cause the DNL at noise sensitive receptors to increase by three dB DNL or more where the noise levels equal or exceed the “Normally Acceptable” level.

If the project causes either of the above criteria to occur, the project will be considered a significant noise impact to the areas where it occurs and mitigation measures will be required. Table II summarizes the quantitative noise limits applied on the residential side of the property lines at the first floor elevations. For instance, the ambient + 2 dB is considered acceptable, whereas the ambient + 3 dB is considered a noise impact. Thus, the values in the Table represent the noise limit of acceptability on the project before a noise impact occurs.

Another way to look at this is:

(Ambient) + (Ambient -2) = (Ambient + 2) = Acceptable Limit

(Ambient) + (Ambient -1) = (Ambient + 3) = Impact

The ambient noise exposure near Glen Eyrie Avenue is 58 dB DNL. Noise measurements near the residences at the back (southerly side) of the site could not be performed due to construction activity at adjacent residences that would have affected the noise data. From the noise data at the front of the site and observation, the noise exposure at the southerly side of the site is estimated to be 54 dB DNL.

The noise limits on the project before a significant impact occurs are:

56 dB DNL at receptor locations near Glen Eyrie Avenue and 58 dB DNL at receptor locations along the southerly border of the site.

A project-generated noise exposure of 55 dB DNL, per Policy EC-1.3, is the most stringent acceptable noise exposure. Therefore, the design goal of this project is a noise exposure of no more than 55 dB DNL at the adjacent residential properties.

B. City of San Jose Zoning Ordinance

The project-generated noise levels from mechanical equipment (project air-conditioners) were also evaluated against the standards of the City of San Jose Zoning Ordinance, Ref. (c), which limits project-generated short-term noise levels to 55 dBA.

The short-term noise level limit of 55 dBA is the most stringent standard of the Zoning Ordinance. Thus, the design goal of no more than 55 dBA at the residential property lines is also used herein as the design standard.

IV. Acoustical Setting

A. Site and Noise Source Descriptions

The planned project site is located at 64-70 & 80-82 Glen Eyrie Avenue in San Jose. The site is relatively flat and at-grade with the surrounding roadways and land uses. The site currently contains single-story residential structures and detached garage structures. Surrounding land uses include 2-story multi-family residential adjacent to the east, multi-family residential across Glen Eyrie Avenue to the north, single-story multi-family and single-family residential adjacent to the south and single-story multi-family residential adjacent to the west. There are no upper floor exterior living areas associated with any of the homes adjacent to the site.

The primary source of noise at the site is traffic on Glen Eyrie Avenue. Traffic noise from Interstate 280 and Lincoln Avenue is audible in the distance. These sources, along with aircraft noise, do not add significantly to the on-site noise environment.

B. Project Description

The planned project, as shown on the Site Plan, Ref. (d), includes the demolition of the existing structures on the site and construction 18 three-story townhouse style condominiums in 3 three buildings. Each unit will have either a private rear yard along the easterly and westerly borders of the site, or second floor decks for the units of the building central to the site.

Each dwelling unit will have a Carrier 24AHA430 air-conditioning condensing unit in the rear yard (northerly end to separate the units from each other) or on the second floor deck. The air-conditioners on the decks of the central building are too far from the south property line and shielded by the east and west buildings to be considered for noise level evaluation.

A 6 ft. high solid CMU block noise control barrier will be located along the west, south and east property lines. The height of the barrier is in reference to the nearest patio pad elevation.

The existing buildings and pavement will be demolished for construction of the proposed project. Construction would be completed in one phase, lasting approximately 12 months. Construction activities would be restricted to Monday through Friday during the daytime between the hours of 7:00 a.m. to 7:00 p.m., pursuant to City of San José Zoning Ordinance, Title 20.100.450. Additionally, the City is imposing the following Conditions of Approval on the project that reduce on-site exhaust emissions, noise, and vibration during construction:

On-site Exhaust Emissions Controls

- All diesel-powered off-road equipment, larger than 25 horsepower, operating on the site for more than two days continuously shall, at a minimum, meet U.S. EPA particulate matter emissions standards for Tier 3 engines with CARB-certified Level 3 Diesel Particulate Filters (DPF).¹

- Alternatives, the use of equipment meeting U.S. EPA Tier 4 standards for particulate matter equipment or the use of equipment that is electric or alternatively fueled (i.e., non-diesel) would meet this requirement.

Operational and Situational Controls

- Construction of the exterior walls of buildings along the common property lines will be completed as early as possible to use the building elements as noise barriers for work conducted in the central areas of the site.
- No material deliveries would occur on Sundays and Federal Holidays.
- Cranes would not be located within 100 feet of any neighboring residential property line with the exception of cranes or lifts necessary to dismantle scaffolding.
- Movement of materials would be minimized along the east and west property lines.
- Stockpiles and dirt berms will be located adjacent to residential neighbors as much as possible to help shield residences from on-site noise generation.
- Driveways and other vehicle travel paths would be graded and smooth to minimize vibration and “bangs” from vehicles traveling over rough surfaces.
- Music would not be played on-site during construction consistent with OSHA safety requirements.
- Long-term stationary equipment would be located as far away from the residential areas as possible.
- Mobile equipment (haul trucks, concrete trucks, etc.) would be kept off of local streets near residences as much as possible.
- Use of heavy diesel engine equipment work would be limited to less than 10 consecutive days when working within 40 feet of the property lines.

Interior Work

- During interior construction work, windows of the interior spaces facing neighboring residences where work is performed would be kept closed.

- Noise generating equipment indoors would be located within the building to utilize building elements as noise screens.

Equipment

- The project would use stationary equipment rated no higher than 85 dBA at 25 feet reference distance under equipment's most noisy condition.
- Scrapers would be used as much as possible for earth removal.
- A backhoe would be utilized for backfilling.
- Motor grader would be used rather than a bulldozer for final grading.
- The project would utilize wheeled equipment rather than track equipment whenever possible.
- During building construction, nail guns would be used where possible.
- Generators and compressors used during project construction would be housed in acoustical enclosures rather than weather enclosures.
- The project would utilize temporary power service from the utility company in lieu of generators whenever possible.
- Circular saws, miter/ chop saws, and radial arm saws would not be used closer than 50 feet from any residential property line unless the saw is screened from view at any and all residences using an air-tight screen material of at least 2.0 lbs./sq. ft. surface weight, such as 3/4" plywood.
- The project would use electricity powered tools rather than pneumatic tools and quieter "new technology" equipment whenever possible.
- The project would utilize construction equipment and machinery that is maintained in good mechanical condition and where machinery uses internal combustion engines, they will be fitted with mufflers recommended by the vehicle manufacturer to quiet the exhaust noises.
- The project will not use diesel vibrating compaction equipment within 100 feet of residential structures.

- A backhoe would be utilized for backfilling.
- Motor grader would be used rather than a bulldozer for final grading.
- The project would utilize wheeled equipment rather than track equipment whenever possible.
- During building construction, nail guns would be used where possible.
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- Circular saws, miter/ chop saws, and radial arm saws would not be used closer than 50 feet from any residential property line unless the saw is screened from view at any and all residences using an air-tight screen material of at least 2.0 lbs./sq. ft. surface weight, such as ¾" plywood.
- The project would use electricity powered tools rather than pneumatic tools and quieter "new technology" equipment whenever possible.
- The project would utilize construction equipment and machinery that is maintained in good mechanical condition and where machinery uses internal combustion engines, they will be fitted with mufflers recommended by the vehicle manufacturer to quiet the exhaust noises.
- The project will not use diesel vibrating compaction equipment within 100 feet of residential structures.

Noise Compliant Management

- A noise disturbance coordinator will be designated and available at all times during construction hours via both telephone and email.
- Signs listing the contact information for the noise disturbance coordinator would be posted at site entries.
- A flyer will be sent to all residents within 300 feet of the site including the name, phone number, and email address of the noise disturbance coordinator.

- The project noise disturbance coordinator would maintain a log containing the name and address of complaints, the date and time of the complaint, the nature/description of the noise source, a description of the remediation attempt or the reason remediation could not be attempted.

Ingress and egress to the project will be by way of a project driveway loop off of Glen Eyrie Avenue.

The Site Plan is shown in Figure 1 on page 12.

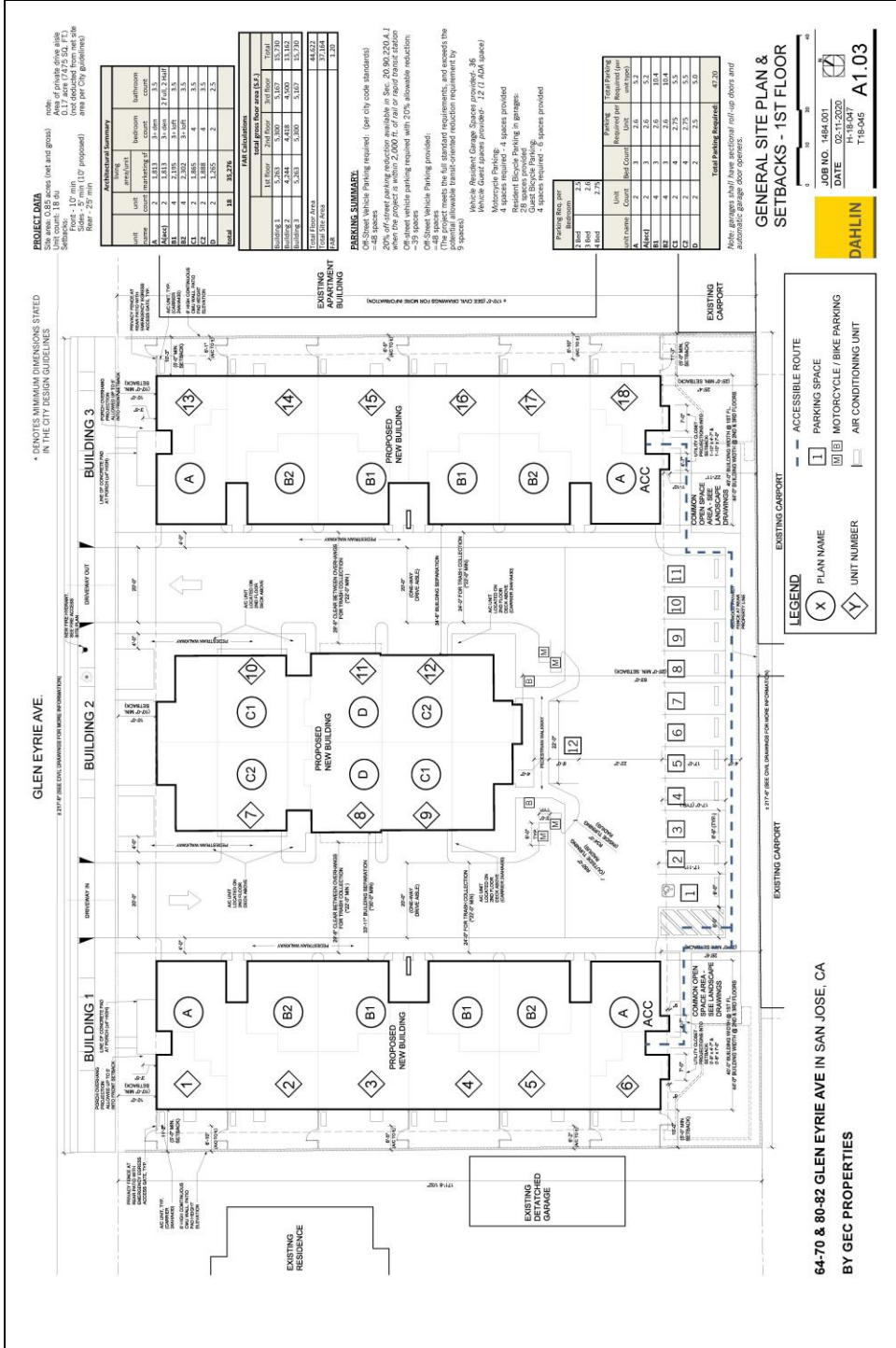


FIGURE 1 – Site Plan

V. Existing Noise Environment (Without the Project)

A. Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at a location 42 ft. from the centerline of Glen Eyrie Avenue. This location was chosen for security of the sound measuring instrument. The measurement location is shown on Figure 2 on page 14. The measurements were made on January 28-29, 2019 for a continuous period of 24 hours and included measurements during the daytime and nighttime periods of the DNL index. The on-site sound levels were recorded and analyzed using a Larson-Davis Model 812 Precision Integrating Sound Level Meter. The meter yields, by direct readout, a series of descriptors of the sound levels versus time, which include the L_1 , L_{10} , L_{50} , and L_{90} , i.e., those levels that are exceeded 1%, 10%, 50%, and 90% of the time. The meters also yield the maximum and minimum levels, and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL's. The measured L_{eq} 's are shown in the data tables in Appendix C.

The L_{eq} 's at the measurement location, 42 ft. from the centerline of Glen Eyrie Avenue, ranged from 48.6 to 56.2 dBA during the daytime and from 39.7 to 58.6 dBA at night.

B. Future Noise Levels

Future traffic volume data for Glen Eyrie Avenue were not available at the time of this study. Due to the buildout of the area and small increases in predicted traffic volumes for I-280, we estimate that the future traffic volume for Glen Eyrie Avenue will be lower than the 15% increase necessary to increase the noise environment by 1 decibel.



FIGURE 2 – Noise Measurement Locations

C. Existing and Future Noise Exposures

To determine the acceptability of the site for the intended use and the existing ambient noise environments at the adjacent residential receptors, the DNL for the survey location was calculated by decibel averaging of the L_{eq} 's as they apply to the daily time periods of the DNL index. A 10 decibel nighttime weighting factor was applied to account for the increased human sensitivity to noise during the nighttime period. Adjustments were made to the measured noise levels to account for the difference in distance between the measurement locations and the house setbacks, using methods established by the Highway Research Board, Ref. (e). The DNL was calculated using the formula shown in Appendix B. The measured L_{eq} 's and DNL calculations are shown in the data tables in Appendix C.

The results of the calculations indicate that the noise exposure at the measurement location is 58 dB DNL.

Traffic noise diminishes at a rate of 3-6 dB for each doubling of the distance from the source to the receiver.

The noise exposure at the planned minimum building setback and rear yards closest to Glen Eyrie Avenue, 35 ft. from the centerline of the road was calculated to be 59 dB DNL. Under future conditions, the noise exposure is expected to remain at 59 dB DNL.

VI. Noise Impacts

A. Impacts to the Project

The City of San Jose General Plan specifies land use compatibility guidelines for residential land uses. The “Normally Acceptable” noise exposure limit is 60 dB DNL and the “Conditionally Acceptable noise exposure limit is 75 dB DNL. These standards are typically applied to rear yards, patios and common areas of multi-family housing. These standards are not applied to small balconies.

The exterior noise exposure at the planned minimum setback of the project buildings and rear yards from Glen Eyrie Avenue, 35 ft. from the centerline of the road (most noise impacted) is 59 dB DNL. Under future conditions, the noise exposure is expected to remain at 59 dB DNL. Thus, the noise exposures at the site are within the 60 dB DNL Normally Acceptable limit of Policy EC-1.1 of the City of San Jose Goals and Policies standards.

The interior noise exposures in the most impacted living spaces of the project will be up to 44 dB DNL under existing and future traffic conditions. Thus, the noise exposures will be within the limits of the City of San Jose General Plan Goals and Policies and Title 24 standards.

CEQA has no requirement for addressing noise impacts to a project from ambient sources.

Impact: Less Than Significant

B. Project-Generated Noise Impacts

Potential noise impacts or effects from the project to the nearby residences will be restricted to project traffic, project outdoor mechanical equipment and construction of the project. Traffic noise increases due the project will be negligible. Noise from project air-conditioners will be within the limits of the City of San Jose Zoning Ordinance standards as adequate noise control measures are incorporated into the project design. Construction noise and vibration will be adequately controlled through the methods outlined in the project description.

The noise exposures and noise levels presented in this section apply to all floor elevations of the adjacent residences that are in close proximity to the property lines.

Project Traffic Noise

Noise from project traffic on the local road network is expected to be negligible as the project would need to add at least 15% of the existing daily traffic volume on any given roadway. Changes in traffic noise based changes in traffic volume are calculated by:

$$10\log_{10}(V_1/V_2) \quad \text{where } V_x = \text{Volume}$$

Traffic volume data provided by the project traffic consultant, Ref. (f) revealed the following:

<u>Existing</u>	<u>Exist. + Project</u>	<u>ΔdB</u>
2,240 ADT	2,320 ADT	0.15

The project traffic will cause a negligible increase in the Glen Eyrie Avenue traffic noise levels. Thus, the project is in compliance with Policy EC-1.2 of the City of San Jose General Plan Goals and Policies and CEQA.

Impact: Less Than Significant

Project Mechanical Equipment

A mechanical engineer has not been brought on board for this project at the time of this study. However, the project architect has specified the use of Carrier 24AHA430 2 ½-ton condensing units. The Carrier 24HA430 unit is factory rated at 68 dBA Sound Power (Lwa), Ref. (g). The Carrier 24AHA430 sound data sheet is provided in Appendix C.

The air-conditioners in the rear yards of the units along the east and west property lines are located at the north end of each rear patio and separated from each other so the AC units do not add to each other.

The air-conditioner noise levels were calculated by converting the rated Sound Power levels (Lwa) to Sound Pressure at a distance of 5 ft. from the center of the plane of the fan. Additional adjustments were made for the additional distances from the equipment to the various receptor locations using an attenuation rate of:

$$20\log_{10}(r_1/r_2) \quad \text{where } r_x = \text{distances}$$

Increases of 3 dB were added for each sound reflective surface behind the air-conditioners. The planned CMU block noise barrier along the property line reduces condensing noise by 11 dB for the property lines to the east and west and by 7 dB for the property line to the south. The second floors of the adjacent properties do not realize noise reduction (insertion loss) provide by the barrier.

The effect of the ground is included in the manufacturer's rated sound level.

Table II, below, provides the noise analysis for an air-conditioner at the nearest and most impacted property lines (actually 1 ft. behind the property line barrier) and at the second floor of the nearest residential building, as applicable. The homes adjacent to the west are single-story. Thus, the second floor analysis does not apply.

TABLE II							
Mechanical Equipment Analysis, dBA							
Limit = 55 dBA	AC Unit	Unit Sound	Distance	Barrier	Dist	Dist	Sound Level
E & W PL	Power Level	Prop. Line	Insertion Loss	1st Fl. Prop. Line	2nd Fl. Setback	@ Prop. Line	2nd Floor Setback
1	68	6	11	7	19	50	53
S.F. South PL							
1	68	44	7	45	136	33	36
APTS South PL							
1	68	44	7	45	88	33	40

As shown in Table II, the air-conditioner noise levels at the property lines to the east, west and south of the site will be within the 55 dBA limit of the City of San Jose Zoning Ordinance. The noise levels at the second floors of the apartments to the east and south and at the second floor setbacks of the single-family homes to the south of the site will also be within the 55 dBA limit.

As the noise levels from the air-conditioners will be within the limits of the City of San Jose Zoning Ordinance standards, noise reduction measures will not be required.

Demolition and Construction Phase Impacts

Short-term noise impacts may be created during demolition of the existing structures on the site and construction of the project. Demolition and construction equipment are typically similar, with the exception of paving equipment and pile drivers (impact hammers). However, pile driving is not expected on this project. The noise levels generated by the two phases will be similar over the course of entire process. With the exception of pile driving, blasting, vibratory compacting or rolling, construction equipment expected to be used on the site generates groundborne vibration level lower than 0.02 in/sec. peak particle velocity (ppv) at distances greater than 13 ft. The nearest homes are 5 ft. to the east, 44 ft. to the south and 5 ft. to the west.

A table from the EPA providing standard construction equipment noise levels at a distance of 50 ft. is provided below. From the information provided in the Table, demolition/construction equipment noise levels range from 74 to 102 dBA at a 25 ft. distance

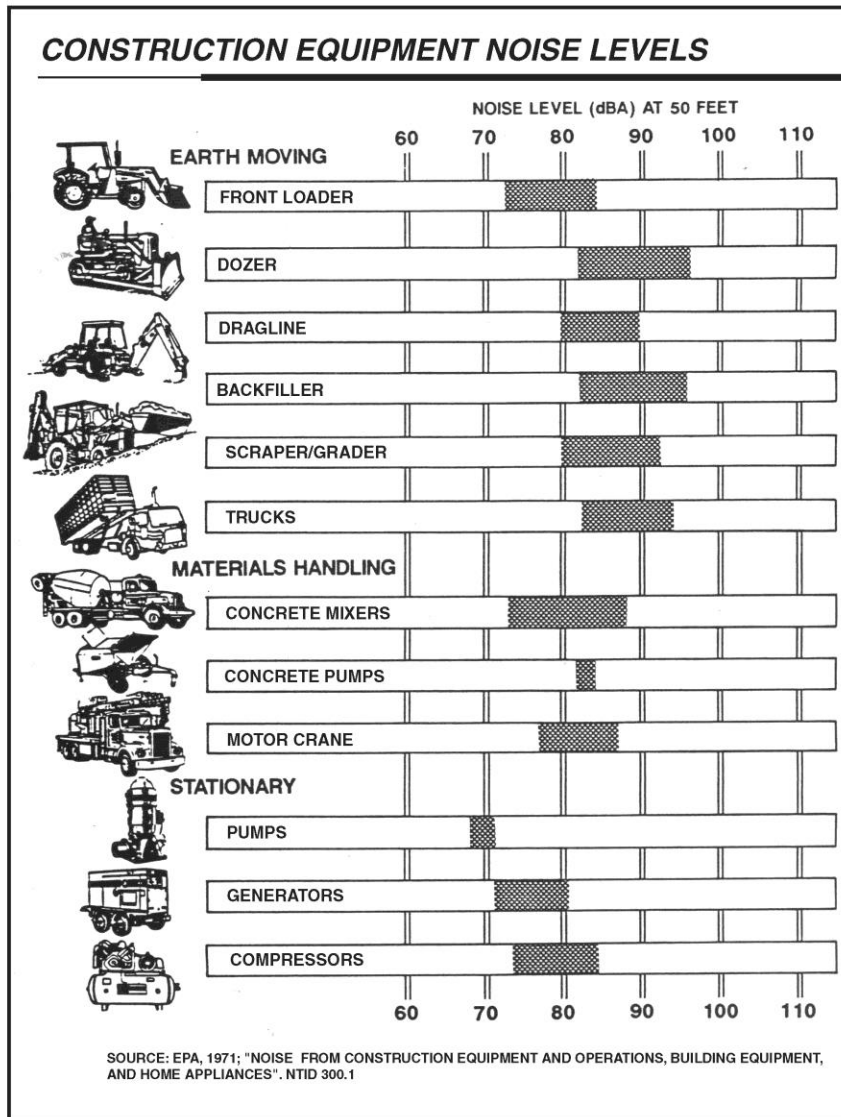


FIGURE 3 – Environmental Protection Agency Equipment Noise Levels

Table III, below, provides the noise levels and noise exposures at the most impacted adjacent land uses under the guidelines and restrictions indicated in the project description.

TABLE III				
Construction Noise Table				
		EPA		
		Dist. 50	Noise Level 80	
Receptor	Distance	Noise Level Ranges		
		Max Level	Leq(h)	DNL
Res. To North	161	70	63	52
Res. To East	113	73	66	55
Res. To South	137	71	64	53
Res. To West	114	73	66	55

The construction noise exposures will not cause increases in the ambient noise environment by more than 3 decibels during the construction process. The construction noise exposures will conform to the limits of Policy EC-1.2 of the City of San Jose General Plan Goals and Policies. **This is a less than significant impact.**

Demolition and construction activities can produce varying amounts of ground-borne vibration, which depend on the type of equipment used and various methods. Vibration is produced by the equipment operation and the vibrational waves travel through the ground/soil that diminishes over distance. It is rare that construction vibration is intense enough to cause damage to existing structures. However, due to the close proximity of the neighbors to the west, a quantitative analysis of vibration is warranted.

Ground-borne vibration is typically reported in terms of “peak particle velocity” or PPV, and sometimes reported in terms of decibels of vibration, notated as VdB, which is a level of vibration (L_v). The use of PPV is more common for construction equipment and methods.

Table IV on the following page provides building damage criteria from construction vibration established by the Federal Transit Administration, Ref. (h).

TABLE IV		
Construction Vibration Damage Criteria		
Building Category	PPV (in/sec)	Approx. L _v (VdB)
I. Reinforced-concrete, steel or timber (no plaster)	0.50	102
II. Engineered concrete and masonry (no plaster)	0.30	98
III. Non-engineered timber and masonry buildings	0.20	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

** RMS velocity in decibels (VdB) re: 1 micro-inch/second

The adjacent residential buildings are lightweight, wood framed standard residential/commercial construction. The siding and foundation types are unknown. These structures fall into Building Category III where the vibration limit is 0.20 in/sec PPV. There are no buildings adjacent to or near the site that would fall under Categories I, II or IV.

The contractors used for the demolition of the site and construction of the project have not yet been selected, nor has a construction schedule and list of equipment been developed. Table V on page 23 provides a list of typical construction equipment, some of which will likely not be used on this project, such as pile driving, their vibration levels at 25 ft., the vibration levels at the building setback of the closest residence or offices to the north, east and south. Under the construction guidelines in the project description, equipment generated significant levels of vibration will be used outside of the 0.20 in./sec. vibration contour. Thus, the construction vibration levels are expected to be within the 0.20 in./sec. vibration limit established by the FTA. **This is a less than significant impact.**

Additional noise mitigation measures will not be required for construction noise and vibration.

TABLE V Construction Equipment Vibration Levels, in/sec PPV						
Dist. to Res. To North, ft.	7					
Dist to Res. To East, ft.	12					
Dist to Office to South, ft.	10					
EQUIPMENT d =	Reference Vibration at d, ft. 25	Vibration Level @ Res. To North	Vibration Level @ Res. To East	Vibration Level @ Office To South	Dist for 0.2 PPV limit	
Excavator	0.089	0.6	0.3	0.4	13	
Vibratory Roller	0.21	1.4	0.6	0.8	23	
Hoe Ram	0.089	0.6	0.3	0.4	13	
Large Bulldozer	0.089	0.6	0.3	0.4	13	
Loaded Trucks	0.076	0.5	0.2	0.3	12	
Jackhammer	0.035	0.2	0.1	0.1	7	
Small Bulldozer	0.003	0.0	0.0	0.0	1.5	
Backhoe	0.088	0.6	0.3	0.3	15	
Compactor	0.240	1.6	0.7	0.9	25	
concrete Mixer	0.080	0.5	0.2	0.3	12	
Concrete Pump	0.080	0.5	0.2	0.3	12	
Crane	0.008	0.1	0.0	0.0	3	
Dump Truck	0.080	0.5	0.2	0.3	12	
Front End Loader	0.088	0.6	0.3	0.3	13	
Grader	0.088	0.6	0.3	0.3	13	
Hydra Break Ram*	0.040	0.3	0.1	0.2	35	
Impact Pile Driver*	1.600	10.8	4.8	6.3	87	
Soil Sampling Rig	0.088	0.6	0.3	0.3	13	
Paver	0.080	0.5	0.2	0.3	12	
Pickup Truck	0.080	0.5	0.2	0.3	12	
Slurry Trenching	0.016	0.1	0.0	0.1	5	
Tractor	0.080	0.5	0.2	0.3	12	
Tunnel Boring rock	0.460	3.1	1.4	1.8	9	
Tunnel Boring soil	0.024	0.2	0.1	0.1	7	
Vibratory Pile Driver	1.120	7.6	3.4	4.4	68	
Vibratory Roller (lge)	0.477	3.2	1.4	1.9	39	
Vibratory Roller (sm)	0.176	1.2	0.5	0.7	20	
Blasting*	6.000	40.5	18.0	23.7	209	
Clam Shovel*	0.208	1.4	0.6	0.8	23	
Rock Drill	0.088	0.6	0.3	0.3	13	

* Transient vibration levels

VII. Conclusions

In conclusion, noise impacts to the project will be within the “Normally Acceptable” standard of the City of San Jose Goals and Policies, per Policy EC-1.

Project-generated noise from project traffic and mechanical equipment will be within the limits of Policy EC-1.2 of the City of San Jose General Plan Goals and Policies. This is a less than significant impact. The construction noise and vibration control plan shown in the project description will result in compliance with Policy EC-1.7 of the City of San Jose General Plan Goals and Policies.

This report presents the results of a noise assessment study for the planned condominium development at 64-70 and 80-82 Glen Eyrie Avenue in San Jose. The study findings for existing conditions are based on field measurements and other data and are correct to the best of our knowledge. However, significant changes in the traffic volumes, project mechanical equipment, site planning, noise regulations or other future changes beyond our control may produce long-range noise results different from our estimates.

Report Prepared By:

EDWARD L. PACK ASSOC., INC.

A handwritten signature in blue ink, reading "Jeffrey K. Pack", is written over a horizontal line.

Jeffrey K. Pack
President

APPENDIX A

References

- (a) City of San Jose Envision San Jose 2040 General Plan, November 1, 2011
- (b) State of California Code of Regulations, Title 24, Volume 1, Part 2, Section 1206 “Sound Transmission”, Subsection 1206.4 (Allowable Interior Noise Levels), Revised 2019
- (c) City of San Jose Municipal Code, Title 20, “Zoning”, Part 6, Performance Standards, October 24, 2017
- (d) General Site Plan & Setbacks – 1st Floor, 64-70 & 80-82 Glen Eyrie Ave, by Dahlin Group, Inc., February 11, 2020
- (e) Highway Research Board, Highway Noise – A Design Guide for Highway Engineers, Report 117, 1971
- (f) Information on Existing and Project Traffic Volumes Provided by Mr. Dan Takacks, Project Traffic Consultant, by email to Edward L. Pack Associates, Inc., January 30, 2019
- (g) Product Data Sheet, “24AHA4 Performance Series Air Conditioner with Puron Refrigerant 1-1/2 to 5 Nominal Tons”, Carrier Corporation, Catalog No: 24AHA4-01PD, Edition Date: 01.15
- (h) United States Department of Transportation, Federal Transit Administration, “Transit Noise and Vibration Impact Assessment”, Chapter 12, Noise and Vibration During Construction, by Harris, Miller, Miller & Hanson, Inc., FTA-VA-90-1003-06, May 2006

APPENDIX B

Noise Standards, Terminology, Instrumentation and General Building Shell Controls

1. Noise Standards

A. City of San Jose General Plan Goals and Policies

The City of San Jose General Plan “Envision San Jose 2040”, adopted November 1, 2011, Chapter 3 “Environmental Leadership” contains noise environment goals and policies.

Goal EC-1 – Community Noise Levels and Land Use Compatibility

Minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies.

Policies – Community Noise Levels and Land Use Compatibility

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

The City’s standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard.

The acoustical analysis shall base required noise attenuation techniques on expected *Envision General Plan* traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

The City’s acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

For single family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as backyards.

Table EC-1: Land Use Compatibility Guidelines for Community Noise Level in San Jose

Land Use Category	EXTERIOR NOISE EXPOSURE (dB DNL)					
	55	60	65	70	75	80
Residential, Hotels and Motels, Hospitals and Residential Care						
Outdoor Sports and Recreation, Neighborhood Parks, Playgrounds						
Schools, Libraries, Museums, Meeting Halls, Churches						
Office Buildings, Business, Commercial and Professional						
Sports Arenas, Outdoor Spectator Sports						
Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

	Normally Acceptable
	Conditionally Acceptable
	Unacceptable

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain “Normally Acceptable”; or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the “Normally Acceptable” level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

EC-1.4 Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive uses.

EC-1.5 Encourage the State Department of Transportation and County transportation agencies to provide visually pleasing sound attenuation devices on all new and existing freeways and expressways.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City’s Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City’s Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

EC-1.8 Allow commercial drive-through uses only when consistency with the City's exterior noise level guidelines and compatibility with adjacent land uses can be demonstrated.

EC-1.9 Require noise studies for land use proposals where known or suspected loud intermittent noise sources occur which may impact adjacent existing or planned land uses. For new residential development affected by noise from heavy rail, light rail, BART or other single-event noise sources, implement mitigation so that recurring maximum instantaneous noise levels do not exceed 50 dBA L_{max} in bedrooms and 55 dBA L_{max} in other rooms.

EC-1.10 Monitor Federal legislative and administrative activity pertaining to aircraft noise for new possibilities for noise-reducing modifications to aircraft engines beyond existing Stage 3 requirements. Encourage the use of quieter aircraft at the San José International Airport.

EC-1.11 Require safe and compatible land uses within the Mineta International Airport noise zone (defined by the 65 CNEL contour as set forth in State law) and encourage aircraft operating procedures that minimize noise.

EC-1.12 Encourage the Federal Aviation Administration to enforce current cruise altitudes that minimize the impact of aircraft noise on land use.

Actions – Community Noise Levels and Land Use Compatibility

EC-1.13 Update noise limits and acoustical descriptors in the Zoning Code to clarify noise standards that apply to land uses throughout the City.

EC-1.14 Require acoustical analyses for proposed sensitive land uses in areas with exterior noise levels exceeding the City’s noise and land use compatibility standards to base noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency.

Goal EC-2 - Vibration

Minimize vibration impacts on people, residences, and business operations.

Policies - Vibration

EC-2.1 Near light and heavy rail lines or other sources of ground-borne vibration, minimize vibration impacts on people, residences, and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration. Require new development within 100 feet of rail lines to demonstrate prior to project approval that vibration experienced by residents and vibration sensitive uses would not exceed these guidelines.

EC-2.2 Require new sources of ground-borne vibration, such as transit along fixed rail systems or the operation of impulsive equipment, to minimize vibration impacts on existing sensitive land uses to levels at or below the guidelines of the Federal Transit Administration.

EC-2.3 Require new development to minimize vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, a vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

EC-2.4 Consider the effects of ground-borne vibration in the analysis for potential Land Use / Transportation Diagram changes.

B. Title 24 Noise Standards

2019 California Building Code, Volume 1, Part 2

SECTION 1206 – SOUND TRANSMISSION

1206.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units and sleeping units or between dwelling units and sleeping units and adjacent public areas such as halls, corridors, stairways or service areas.

1206.2 Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units and sleeping units from each other or from public or service areas shall have a sound transmission class of not less than 50, or not less than 45 if field tested, for air-borne noise when tested in accordance to ASTM E-90. Alternatively, the sound transmission class of walls, partitions and floor-ceiling assemblies shall be established by engineering analysis based on a comparison of walls, partitions and floor-ceiling assemblies having sound transmission class ratings as determined by the test procedures in ASTM E90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed lined, insulated or otherwise treated to maintain the required ratings. The requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1206.3 Structure-borne sound. Floor/ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area with the structure shall have an impact insulation class rating of not less than 50, or not less than 45 if field tested, when tested in accordance with ASTM E-492. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

Exception: Impact sound insulation is not required for floor/ceiling assemblies over non-habitable rooms or spaces not designed to be occupied, such as garages, mechanical rooms or storage areas.

1206.4 Allowable interior noise levels. Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

1206.5 Acoustical control. [BSC-CG] See California Green Building Standards code, Chapter 5, Division 5.5 for additional sound transmission requirements.

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the Sound Level Meters and Noise Analyzers. Some of the statistical levels used to describe community noise are defined as follows:

- L₁ - A noise level exceeded for 1% of the time.
- L₁₀ - A noise level exceeded for 10% of the time, considered to be an “intrusive” level.
- L₅₀ - The noise level exceeded 50% of the time representing an “average” sound level.
- L₉₀ - The noise level exceeded 90 % of the time, designated as a “background” noise level.
- L_{eq} - The continuous equivalent-energy level is that level of a steady-state noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dB weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = \left[\left[(10 \log_{10}(10^{\sum L_{eq}(7-10)})) \times 15 \right] + \left[\left((10 \log_{10}(10^{\sum L_{eq}(10-7)}) + 10) \times 9 \right) \right] \right] / 24$$

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the precision acoustical instruments shown below. The acoustical instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters was provided by a microphone extended to a height of 5 ft. above the ground. The meter conforms to ANSI S1.4 for Type 1 instruments. The "A" weighting network and the "Fast" response setting of the meter were used in conformance with the applicable ISO and IEC standards. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter

Larson Davis LDL 812 Precision Integrating Sound Level Meter

Larson Davis 2900 Real Time Analyzer

Larson Davis 831 Precision Integrating Sound Level Meter

4. **Building Shell Controls**

The following additional precautionary measures are required to assure the greatest potential for exterior-to-interior noise attenuation by the recommended mitigation measures. These measures apply at those units where closed windows are required:

- Unshielded entry doors having a direct or side orientation toward the primary noise source must be 1-5/8" or 1-3/4" thick, insulated metal or solid-core wood construction with effective weather seals around the full perimeter.
- If any penetrations in the building shell are required for vents, piping, conduit, etc., sound leakage around these penetrations can be controlled by sealing all cracks and clearance spaces with a non-hardening caulking compound.
- Ventilation openings shall not compromise the acoustical integrity of the building shell.

APPENDIX C

Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: GEC PROPERTIES
 FILE: 51-004
 PROJECT: GLEN EYRIE CONDOS
 DATE: 1/28-29/2019
 SOURCE: GLEN ERYIE AVE., LINCOLN AVE., I-280

LOCATION 1		Glen Eyrie Ave	
Dist. To Source		42 ft.	
TIME	Leq	$10^{Leq/10}$	
7:00 AM	55.6	363078.1	
8:00 AM	56.1	407380.3	
9:00 AM	54.9	309029.5	
10:00 AM	56.2	416869.4	
11:00 AM	53.5	223872.1	
12:00 PM	52.8	190546.1	
1:00 PM	53.3	213796.2	
2:00 PM	54.5	281838.3	
3:00 PM	53.5	223872.1	
4:00 PM	53.2	208929.6	
5:00 PM	53.3	213796.2	
6:00 PM	51.3	134896.3	
7:00 PM	50.2	104712.9	
8:00 PM	48.6	72443.6	
9:00 PM	49.3	85113.8	SUM= 3450174.4
10:00 PM	47.4	54954.1	Ld= 65.4
11:00 PM	43.7	23442.3	
12:00 AM	39.7	9332.5	
1:00 AM	40.8	12022.6	
2:00 AM	43.6	22908.7	
3:00 AM	43.8	23988.3	
4:00 AM	42.4	17378.0	
5:00 AM	46.0	39810.7	
6:00 AM	58.6	724436.0	SUM= 928273.3
			Ln= 59.7
	Daytime Level=	65.4	
	Nighttime Level=	69.7	
	DNL=	57	
	24-Hour Leq=	52.6	

Carrier 24AHA430 Sound Data

ELECTRICAL DATA

UNIT SIZE – voltage,series	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MAX FUSE** or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		
18-30	208/230/1	253	197	56.3	9.0	0.50	11.8	20
24-30				62.9	10.9	0.50	14.1	25
30-30				73.0	14.1	0.70	18.3	30
36-30				77.0	14.1	1.20	18.8	30
48-30				124.0	18.5	1.20	24.3	40
60-30				152.5	23.7	1.45	31.1	50
36-50	208/230/3	253	197	71.0	9.0	1.20	12.5	20
48-50				83.1	13.7	1.20	18.3	30
60-50				110.0	15.9	1.45	21.4	35
36-60				460/3	506	414	38.0	5.6
48-60	41.0	6.2	0.60				8.4	15
60-60	52.0	7.1	0.80				9.7	15

LEGEND:

- FLA – Full Load Amps
 - HACR – Heating, Air Conditioning, Refrigeration
 - LRA – Locked Rotor Amps
 - NEC – National Electrical Code
 - RLA – Rated Load Amps (compressor)
- * Permissible limits of the voltage range at which the unit will operate satisfactorily
 ** Time-Delay fuse.
 Complies with 2007 requirements of ASHRAE Standards 90.1

A-WEIGHTED SOUND POWER (dBA)

Unit Size	Standard Rating (dBA)	Typical Octave Band Spectrum (dBA, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18	69	50.5	57.0	59.5	64.5	60.5	53.5	43.0
24	66	50.5	58.5	60.5	59.5	56.5	51.0	41.5
30	68	55.5	59.5	61.5	63.5	60.0	58.0	49.5
36	71	59.5	59.5	62.0	65.5	63.5	62.0	55.0
48	70	57.5	59.5	64.0	66.0	63.0	60.5	54.5
60	73	60.0	61.5	64.5	67.0	66.0	65.5	58.0

NOTE: Tested in accordance with AHRI Standard 270-08 (not listed in AHRI).

A-WEIGHTED SOUND POWER (dBA) WITH ACCESSORY SOUND SHIELD

Unit Size	Standard Rating (dBA)	Typical Octave Band Spectrum (dBA, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18	68	52.5	58.0	58.5	64.5	59.5	52.5	42.5
24	65	54.5	57.5	59.5	59.0	56.0	50.5	40.5
30	68	55.0	60.0	61.5	62.5	60.0	58.0	49.5
36	71	59.5	59.5	62.5	65.0	63.0	61.5	55.0
48	70	57.5	59.5	63.0	65.0	62.5	60.0	54.0
60	73	61.0	62.0	64.0	67.0	65.5	65.5	57.5

NOTES:

Tested in accordance with AHRI Standard 270-08 (not listed in AHRI).
 Accessory sound shield will not accommodate unit sizes 18 and 24.

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE – SERIES	REQUIRED SUBCOOLING °F (°C)
18	12 (6.7)
24	12 (6.7)
30	12 (6.7)
36	8 (4.4)
48	12 (6.7)
60	10 (5.6)