APPENDIX J.
NOISE STUDY

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NOISE STUDY

Piraeus Point
City of Encinitas, CA

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GLOSSARY OF COMMON TERMS

Sound Pressure Level (SPL): a ratio of one sound pressure to a reference pressure (L_{ref}) of 20 µPa. Because of the dynamic range of the human ear, the ratio is calculated logarithmically by 20 log (L/L_{ref}).

A-weighted Sound Pressure Level (dBA): Some frequencies of noise are more noticeable than others. To compensate for this fact, different sound frequencies are weighted more.

Minimum Sound Level (L_{min}): Minimum SPL or the lowest SPL measured over the time interval using the A-weighted network and slow time weighting.

Maximum Sound Level (L_{max}): Maximum SPL or the highest SPL measured over the time interval the A-weighted network and slow time weighting.

Equivalent sound level (L_{eq}): the true equivalent sound level measured over the run time. Leq is the A-weighted steady sound level that contains the same total acoustical energy as the actual fluctuating sound level.

Day Night Sound Level (Ldn): Representing the Day/Night sound level, this measurement is a 24 –hour average sound level where 10 dB is added to all the readings that occur between 10 pm and 7 am. This is primarily used in community noise regulations where there is a 10 dB "Penalty" for nighttime noise. Typically, Ldn's are measured using A weighting.

Community Noise Exposure Level (CNEL): The accumulated exposure to sound measured in a 24-hour sampling interval and artificially boosted during certain hours. For CNEL, samples taken between 7 pm and 10 pm are boosted by 5 dB; samples taken between 10 pm and 7 am are boosted by 10 dB.

Octave Band: An octave band is defined as a frequency band whose upper band-edge frequency is twice the lower band frequency.

Third-Octave Band: A third-octave band is defined as a frequency band whose upper band-edge frequency is 1.26 times the lower band frequency.

Response Time (F, S,I): The response time is a standardized exponential time weighting of the input signal according to fast (F), slow (S) or impulse (I) time response relationships. Time response can be described with a time constant. The time constants for fast, slow and impulse responses are 1.0 seconds, 0.125 seconds and 0.35 milliseconds, respectively.

EXECUTIVE SUMMARY

This noise study has been completed to determine the noise impacts to and from the proposed Piraeus Point project. The proposed project is located at the northeast corner of Piraeus Street and Plato Place in the Leucadia community of the City of Encinitas, California. The project is located east of Interstate 5 (I-5) between La Costa Avenue and Leucadia Boulevard. The community would be situated on a 6.88-acre site and would consist of 149 residential homes including 134 market-rate homes and 15 "very low" income affordable residential homes. The project would also include a pool, spa, pool house, fire pit with seating, and lounge seating.

Construction Noise Levels

The City of Encinitas requires that noise levels from construction activities do not exceed 75 dBA for more than eight hours, and that construction activity is limited to the hours of 7:00 a.m. to 7:00 p.m. on Mondays through Saturdays. Construction activity noise levels associated with the proposed project are only expected to be 75 dBA or greater at residential property lines when activity is taking place in close proximity to the property line, and at all other times will be less than 75 dBA. Due to the large area of the site, this scenario is only expected to take place for very brief periods of time throughout the day, and for this reason, construction limited to the twelve allowable hours of operation established within the code will comply with City of Encinitas noise regulations. Therefore, the 8 hour noise level is anticipated to be well below the 75 dBA threshold and would be considered less than significant.

Construction Vibration

The nearest vibration-sensitive uses are the residences located to the east of the project site, 60 feet or more from the proposed construction. The average vibration levels that would be experienced at the nearest vibration sensitive land uses to the east from temporary construction activities were found to be below the City thresholds for vibration.

Onsite Transportation Related Noise Levels

The results of this analysis indicate that future vehicle noise from Interstate 5 to the west is the principal source of community noise that could impact the site. Based upon the findings, the outdoor use areas were determined to be above the City's Noise compatibility threshold of 70 dBA Ldn without attenuation measures. It was determined that a minimum 5-foot barrier be located along the rooftop decks and a minimum 8-foot barrier be located around the pool area. The barriers must be constructed of a non-gapping material consisting of masonry, wood, plastic, fiberglass, glass, vinyl, steel, or a combination of those materials, with no cracks or gaps through or below the enclosure walls.

The City of Encinitas as part of its noise guidelines also states, consistent with Title 24 of the California Code of Regulations (CCR), a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above the normally compatible noise level in order to ensure that acceptable interior noise levels can be achieved. The City of Encinitas' Noise Compatibility Guidelines require interior noise levels in residential structures to be reduced to 45 dBA Ldn.

Additionally, a preliminary interior noise assessment was conducted for all units since the building facades noise levels are above 60 dBA CNEL. It was determined that an STC rating of 33-40 will be needed for all glass assemblies to reduce the interior noise levels below 45 dBA CNEL. It should be noted: with a closed window condition, the units require a means of mechanical ventilation (e.g., air conditioning). Once the final architectural plans are available, a final interior noise study should be conducted to ensure interior noise reductions.

Offsite Project Related Transportation Noise Levels

The project will not create a direct impact of more than 3 dBA Ldn on any roadway segment and no cumulative noise increase of 3 dBA Ldn or more was found. Therefore, the proposed project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any existing or future noise sensitive land uses.

Operational Noise Levels

The proposed operational noise levels are in compliance with the City's daytime 50 dBA property line standard and would also meet the most restrictive nighttime standard of 45 dBA. No impacts are anticipated and no further mitigation is required.

1.0 PROJECT INTRODUCTION

1.1 Purpose of this Study

The purpose of this noise study is to determine noise impacts, if any, to and from the proposed project (i.e., traffic, operations and construction). Should impacts be determined, the intent of this study would be to recommend suitable mitigation measures to reduce impacts to below a level of significance.

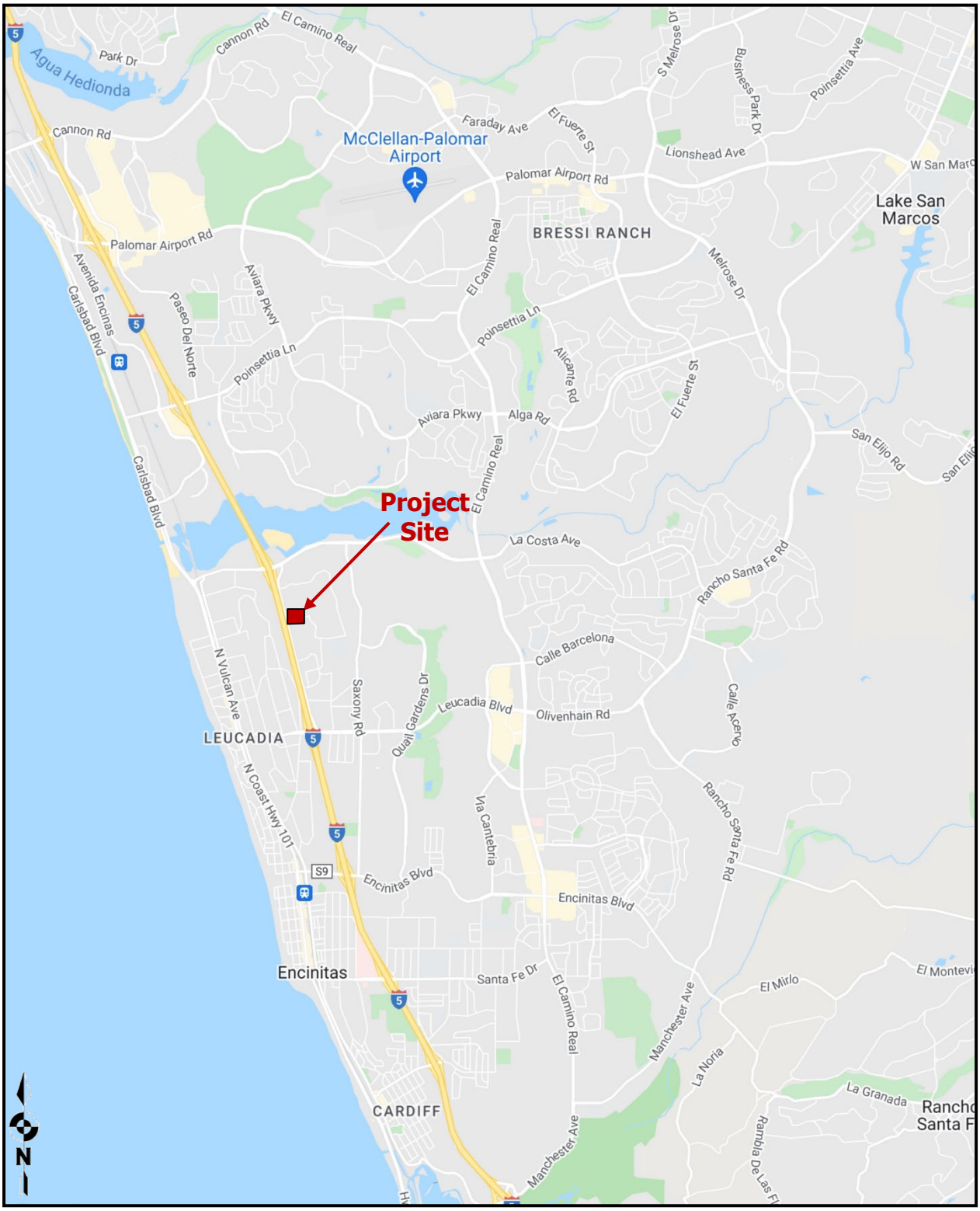
1.2 Project Location

The proposed Piraeus Townhomes project is located on a 6.88-acre project site on the northeast corner of Piraeus Street and Plato Place in the Leucadia community of the City of Encinitas, California. The project is located east of Interstate 5 (I-5) between La Costa Avenue and Leucadia Boulevard. The project site is bordered by Piraeus Street to the west, Plato Place to the south, and existing single-family homes to the north and east. A general project vicinity map is shown in Figure 1-1.

1.3 Project Description

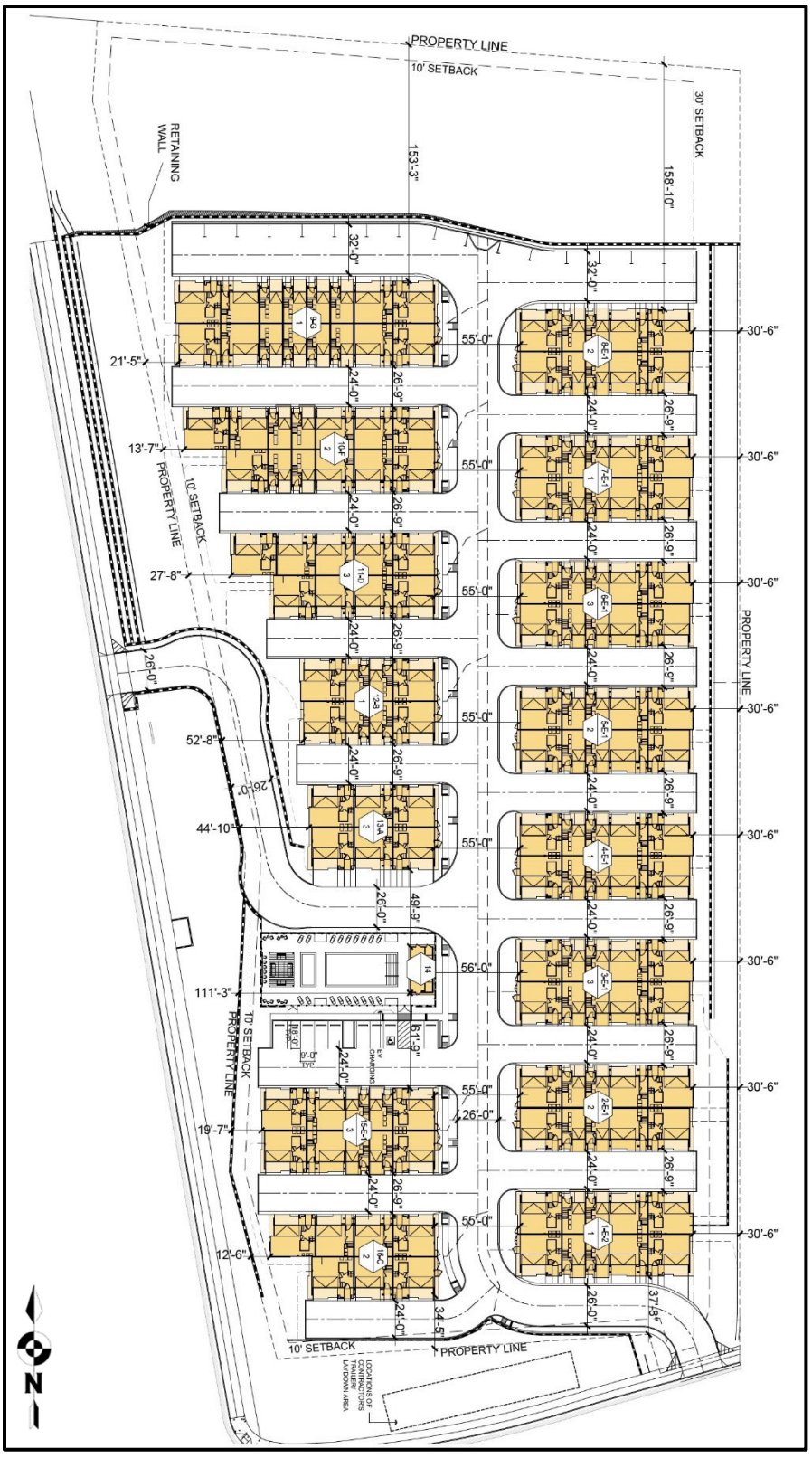
The community would be situated on a 6.88-acre site and would consist of 149 residential homes including 134 would be market-rate homes and 15 would be "very low" income affordable residential homes. The project would also include a pool, spa, pool house, fire pit with seating, and lounge seating. Proposed biological open space is to the north of the development area. The proposed project site configuration is shown in Figure 1-2.

Figure 1-1: Project Vicinity Map



Source: (Google, 2022)

Figure 1-2: Proposed Project Site Plan



Source: (KTGY, 2022)

2.0 FUNDAMENTALS

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs, and when the noise occurs.

Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency but of a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as Leq represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The Day-Night Average Sound Level (Ldn) is the 24 hour A-weighted average for sound, with corrections for nighttime hours. The corrections require an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the nighttime hours when sound appears louder. Ldn values do not represent the actual sound level heard at any particular time, but rather represents the total sound exposure.

A vehicles noise level is a combination of the noise produced by a vehicle's engine, exhaust, and tires. The cumulative traffic noise levels along a roadway segment are based on three primary factors: the amount of traffic, the travel speed of the traffic, and the vehicle mix ratio or number of medium and heavy trucks. The intensity of traffic noise is increased by higher traffic volumes, greater speeds, and increased number of trucks.

Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore, the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA. Mobile noise levels radiate in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. Hard site conditions consist of concrete, asphalt, and hard pack dirt while soft site conditions exist in areas having slight grade changes, landscaped areas, and vegetation. Alternately, fixed/point sources radiate outward uniformly as it travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance.

The most effective noise reduction methods consist of controlling the noise at the source and

blocking the noise transmission with barriers. Any or all of these methods may be required to reduce noise levels to an acceptable level. To be effective, a noise barrier must have enough mass to prevent significant noise transmission through it and high enough and long enough to shield the receiver from the noise source. A safe minimum surface weight for a noise barrier is 3.5 pounds/square foot (equivalent to 3/4-inch plywood), and the barrier must be carefully constructed so that there are no cracks or openings.

Barriers constructed of wood or as a wooden fence must have minimum design considerations as follows: the boards must be ¾ inch thick and free of any gaps or knot holes. The design must also incorporate either overlapping the boards at least 1 inch or utilizing a tongue-and-grove design for this to be achieved.

3.0 REGULATORY FRAMEWORK

3.1 State of California

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix." The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services.

3.2 Municipal Code

Construction Noise

Section 9.32.410 of the City of Encinitas Municipal Code restricts the operation of construction equipment to the hours of 7 a.m. to 7 p.m., Mondays through Saturdays. The Municipal Code also states that it is unlawful to operate construction equipment that exceeds a noise level of 75 dBA for more than eight hours during any 24-hour period when measured at residential property lines (City of Encinitas Municipal Code).

Operational Noise

Section 30.40 of the City of Encinitas Municipal Code contains noise limits that would apply to noise sources located on the project site, including air conditioning units. The Municipal Code specifies noise limits based on the zoning of the properties in question. Properties zoned RR to R-8 have noise limits of 50 dBA between the hours of 7 a.m. and 10 p.m., and 45 dBA between the hours of 10 p.m. and 7 a.m. Properties zoned R-11 to R-30 have noise limits of 55 dBA between the hours of 7 a.m. and 10 p.m., and 50 dBA between the hours of 10 p.m. and 7 a.m. Commercial zones have noise limits of 60 dBA between the hours of 7 a.m. and 10 p.m., and 55 dBA between the hours of 10 p.m. and 7 a.m. As air conditioning equipment may be operational during nighttime hours, the more stringent nighttime noise limits would also apply at surrounding properties. The exterior property line noise limits are shown in Table 3-1 below.

Table 3-1: City of Encinitas Exterior Noise Limits

Adjacent Zone	Noise Level [dB(A)]	
	7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
Rural Residential (RR), Rural Residential-1 RR-1), Rural Residential-2 (RR-2), Residential-3 (R-3), Residential-5 (R-5), Residential-8 (R-8)	50	45
Residential-11 (R-11), Residential Single Family-11 (RS-11), Residential-15 (R-15), Residential-20 (R-20), Residential-25 (R-25), Mobile Home Park (MHP)	55	50
Office Professional (OP), Limited Local Commercial (LLC), Local Commercial (LC), General Commercial (GC), Limited Visitor Serving Commercial (L-VSC), Visitor Serving Commercial (VSC)	60	55
Light Industrial (L-I), Business Park (BP)	60	55
Source: City of Encinitas Municipal Code 30.40.010(A)		

As stated in Section 30.40.10 (B), every use shall be operated so that the ground vibration generated at any time and measured at any point along the lot line of the lot on which the use is located shall not be perceptible and shall not exceed the limits of any adjacent zone. The property line ground vibration limits are summarized in Table 3-2.

Table 3-2: City of Encinitas Ground Vibration Limits

Adjacent Zone	Vibration in Inches per Second	
	Impact	Steady-State
Residential	0.006	0.03
Commercial	0.010	0.05
Light Industrial	0.040	0.020
Public/Semi-Public	0.010	0.05
Source: City of Encinitas Municipal Code 30.40.010(B)		

3.3 Noise Element

Onsite Transportation Noise (Land Use Compatibility)

The City of Encinitas General Plan Noise Element states that the Noise and Land Use Compatibility Guidelines, (shown in Figure 2 of the Noise Element and provided below in Figure 3-1 in this report) and the accompanying discussion should set forth the criteria for siting new development in the City of Encinitas (City of Encinitas General Plan, 1994). These guidelines state that any project which would be located in a normally unacceptable noise exposure area, based on the Land Use Compatibility Guidelines, shall require an acoustical analysis. Noise mitigation in the

future shall be incorporated in the project as needed. As a condition of approval of a project, the City may require post-construction noise monitoring and sign off by an acoustician to ensure that City requirements have been met.

Pursuant to the Noise and Land Use Compatibility Guidelines (Figure 3-1 below), exterior noise levels ranging up to 60 dBA Ldn are classified as "normally acceptable" for multi-family residential development based upon the assumption that the homes are built with normal conventional construction. Noise levels ranging from 60 to 70 dBA Ldn are "conditionally acceptable". "Conditionally acceptable" means that noise levels are acceptable only when a detailed noise analysis is conducted and needed noise insulation features are included in the design.

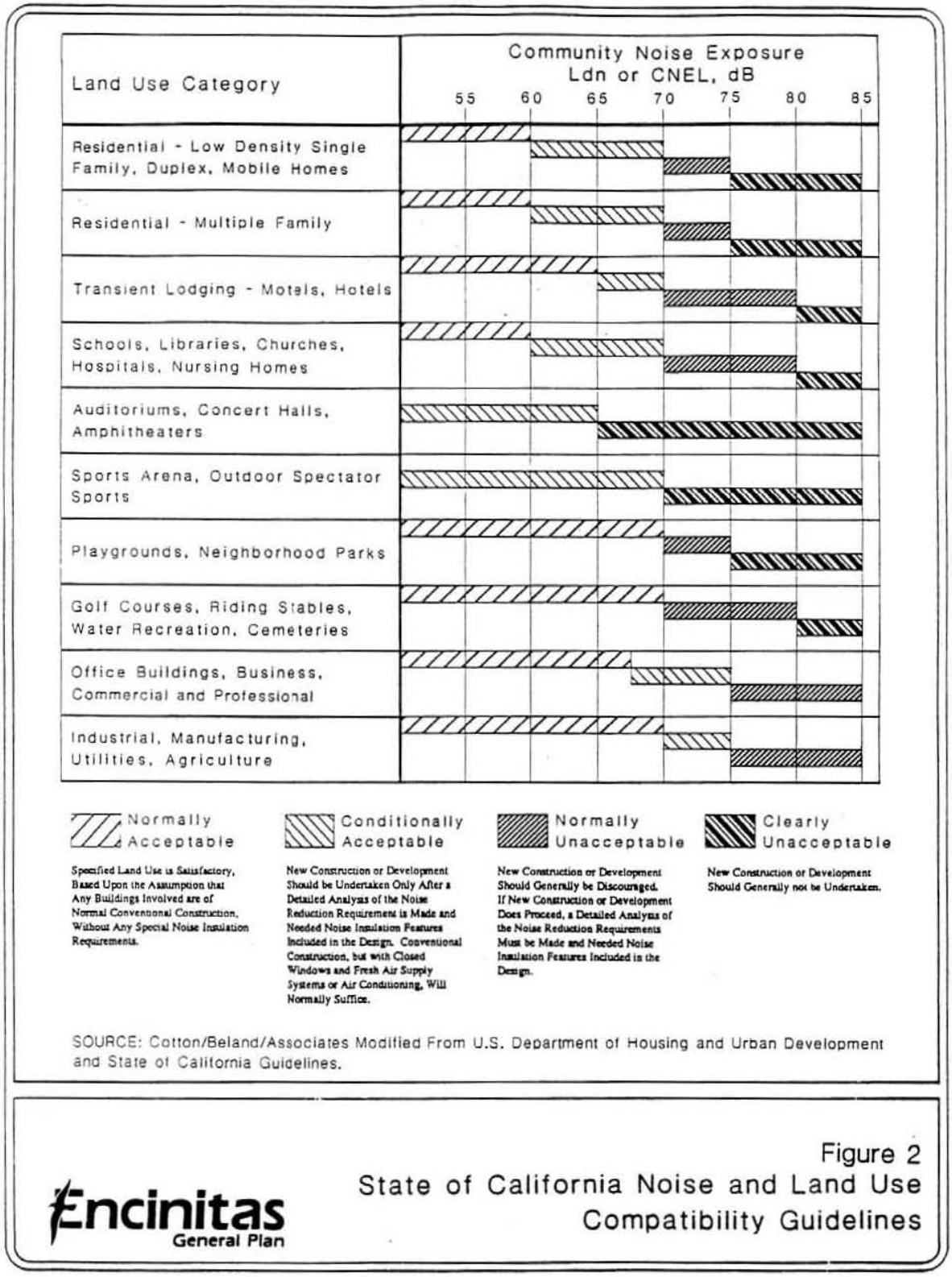
Conventional construction with closed windows and a fresh air supply system or air conditioning will normally suffice as "acceptable noise insulation" features. Noise levels in the 70 to 75 dBA Ldn range are classified as "generally unacceptable" and new construction or development is discouraged, but may proceed if a detailed noise analysis is conducted and needed noise insulation features included in the design. For commercial and industrial uses noise levels up to 70 dBA Ldn are normally acceptable; noise levels between 70-80 dBA Ldn are generally unacceptable and development of these land uses in noise environments that exceed 75 dBA Ldn are discouraged.

Interior noise levels should be mitigated to a maximum of 45 dBA Ldn in all habitual rooms when the exterior of the residence are exposed to levels of 60 dBA Ldn or more. If windows and doors are required to be closed to meet the interior noise standard, then mechanical ventilation shall be provided per City requirements.

Offsite Transportation Noise

In accordance with CEQA, a project should not have a noticeable adverse impact on the surrounding environment. Noise level changes greater than 3 dBA, or a doubling of the acoustic energy, are often identified as audible and considered potentially significant, while changes less than 3 dBA are typically not discernible. For the purposes for this analysis, a direct and cumulative roadway noise impact would be considered significant if the project increases noise levels at a noise sensitive land use 3 dBA Ldn and if the noise level increases above an unacceptable noise level per the City's General Plan.

Figure 3-1: Land Use - Noise Compatibility Guidelines



4.0 EXISTING NOISE ENVIRONMENT

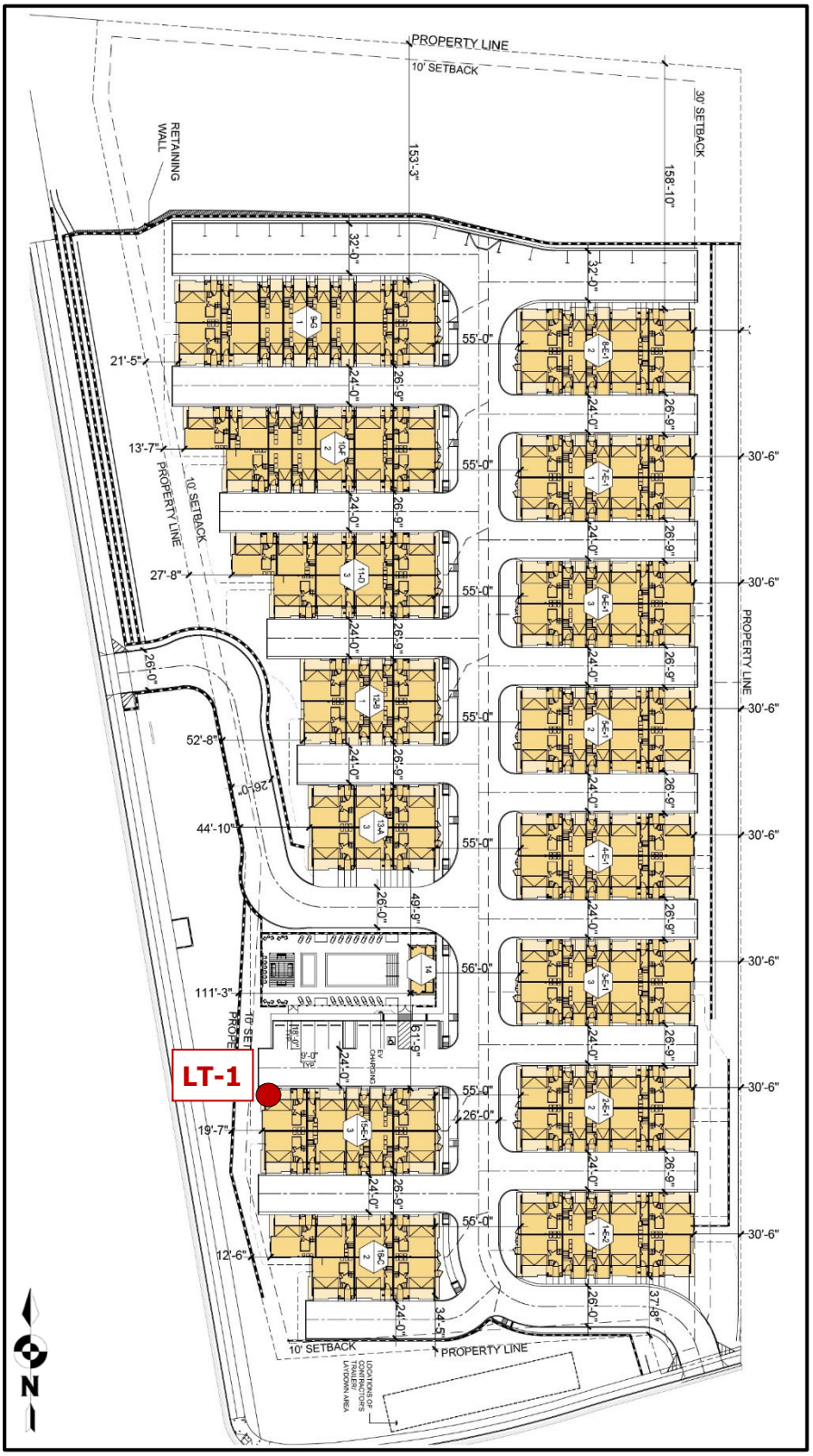
Long-term 24-hour measurements were taken at the project site having a relatively flat terrain and no obstruction from trees or structures. The noise measurements were recorded on Wednesday February 9th to Thursday February 10th, 2022 by Ldn Consulting between approximately 11:00 a.m. and 11:00 a.m. the following day. Noise measurements were taken using a Larson-Davis Spark Model 706 Type 2 precision sound level meter, programmed, in "slow" mode, to record noise levels in "A" weighted form. The sound level meter and microphone were mounted on a tripod, five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200.

Table 4-1 provides the hourly noise levels along with the average and Ldn values. The noise measurement locations were determined based on site access and noise impact potential to the proposed sensitive uses. Long-term monitoring location 1 (LT-1) was located at the southern portion of the project site. The noise monitoring locations are provided graphically in Figure 4-1.

Table 4-1: Long-Term Noise Level Summary

Time	LT-1 (Leq)	LT-1 (Ldn)
12:00 PM	64.8	64.8
1:00 PM	65.6	65.6
2:00 PM	65.6	65.6
3:00 PM	63.5	63.5
4:00 PM	65.5	65.5
5:00 PM	65.3	65.3
6:00 PM	65.0	65.0
7:00 PM	67.7	67.7
8:00 PM	68.1	73.1
9:00 PM	67.8	72.8
10:00 PM	66.7	71.7
11:00 PM	65.8	75.8
12:00 AM	64.3	74.3
1:00 AM	61.9	71.9
2:00 AM	61.3	71.3
3:00 AM	60.9	70.9
4:00 AM	63.0	73.0
5:00 AM	62.0	72.0
6:00 AM	63.9	73.9
7:00 AM	67.7	77.7
8:00 AM	66.3	66.3
9:00 AM	63.6	63.6
10:00 AM	64.8	64.8
11:00 AM	62.3	62.3
Overall	**65.2**	**71.2**

Figure 4-1: Noise Measurement Locations



5.0 POTENTIAL IMPACTS

5.1 Construction Noise Levels

Construction noise represents a short-term impact on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders, and scrapers and can reach relatively high levels. Grading activities typically represent one of the highest potential sources for noise impacts. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment can range from 60 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 75 dBA measured at 50 feet from the noise source to the receptor would be reduced to 69 dBA at 100 feet from the source to the receptor and reduced to 63 dBA at 200 feet from the source.

The City of Encinitas requires that noise levels from construction activity do not exceed 75 dBA for more than eight hours, and that construction activity is limited to the hours of 7:00 a.m. to 7:00 p.m. on Mondays through Saturdays. As detailed in Table 5-1, instantaneous noise levels from construction equipment during grading activities are expected to range from 73 to 79 dBA at 50 feet from the equipment.

Potential Noise Impact Identification

Based on the EPA noise emissions, empirical data and the amount of equipment needed, worst-case noise levels from the construction equipment operations would occur during the base operations (grading/site preparation). The construction schedule identifies that grading activities will occur in a single phase all at the same time, with anticipated equipment including an excavator, a grader, a rubber tire dozer, and three tractors/backhoes. Due to physical constraints and normal site preparation operations, most of the equipment will be spread out over the site. A list of equipment used during grading is summarized in Table 5-1.

Table 5-1: Construction Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA)*	Cumulative Noise Level @ 50-Feet (dBA)
Tractor/Backhoe	3	72	76.8
Dozer	1	74	74.0
Loader/Grader	1	73	73.0
Excavator	1	79	79.0
*Source: U.S. Environmental Protection Agency (U.S. EPA), 1971 and Empirical Data			

At any given time, a piece of construction equipment would only be within 50 feet of a sensitive receptor for a very short duration, after which it would move to another part of the project site, further from existing sensitive receptors.

Construction activity noise levels are only expected to be 75 dBA or greater at residential property lines when activity is taking place in close proximity to the property line, and at all other times will be less than 75 dBA. Due to the large area of the site, this scenario is only expected to take place for very brief periods of time throughout the day, and for this reason, construction limited to the twelve allowable hours of operation established within the code will comply with City of Encinitas noise regulations. Therefore, the 8 hour noise level is anticipated to be below the 75 dBA threshold and would be considered less than significant.

Potential Vibration Impact Identification

Increases in groundborne vibration and noise levels attributable to the proposed project would be primarily associated with short-term construction-related activities. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

The nearest vibration-sensitive uses are the residential uses located to the east of the project site, 60 feet or more from the proposed construction. Table 5-2 lists the average vibration levels that would be experienced at the nearest vibration sensitive land uses to the east from temporary construction activities based on vibrations. Loaded trucks will be traveling on site and were assessed at a minimum distance of 60 feet from the proposed construction activities to be conservative. No impactive vibration sources (i.e., pile drivers) are anticipated and therefore the project would not exceed the impact thresholds.

Table 5-2: Vibration Levels from Construction Activities (Nearest Receptors)

Equipment	Approximate Velocity Level at 25 Feet (VdB)	Approximate RMS Velocity at 25 Feet (in/sec)[1]	Approximate RMS Velocity at 60 Feet (in/sec)[2]
Small bulldozer	58	0.003	0.0008
Jackhammer	79	0.035	0.0094
Loaded trucks	86	0.076	0.0204
Large bulldozer	87	0.089	0.0239
		City Criteria	0.03
		Significant Impact?	**No**

[1] Root Mean Square (RMS) Velocity provided by the (FTA, 2006)
[2] Peak Particle Velocity (PPV) at Distance D = PPVref x $(25/D)^{1.5}$ provided by the (FTA, 2006)

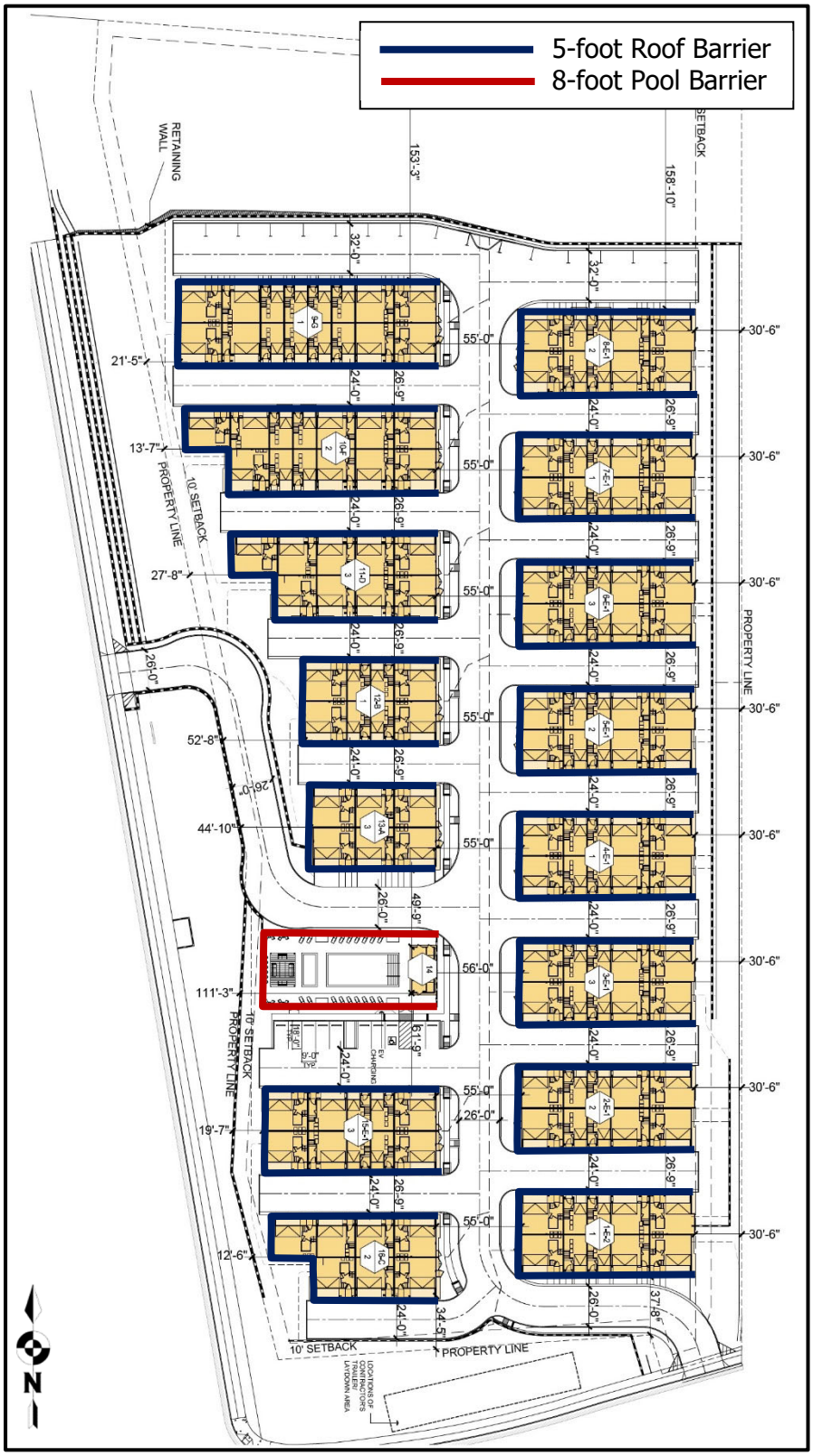
5.2 Transportation Noise Levels

Onsite Transportation Related Noise Levels

The primary source of noise impacts to the project site is from vehicular noise from Interstate 5 (I-5) to the west. According to the Caltrans Preliminary Noise Abatement Decision Report (NADR) for the Interstate 5 North Coast Corridor Project prepared by Dokken Engineering, future peak hour noise levels at the project site are expected to be as high as 73 dBA Leq with no shielding at approximately 340 feet from the centerline of Interstate 5 (Dokken Engineering, 2007). The nearest proposed building façade is located 220 feet from the centerline of Interstate 5. Therefore, noise levels at the project site could potentially reach 75 dBA Leq at the building facades with no shielding. According to the Caltrans Technical Noise Supplement (2009), the general rule is that Ldn is within about 2 dBA of Leq under normal traffic conditions. Therefore, to convert the noise levels from Leq to Ldn, 2 dBA must be added. The resultant noise levels at the project site are calculated to be 77 dBA Ldn.

Outdoor usable space is provided by private rooftop decks and the common pool area. To meet the City's 70 dBA Ldn noise threshold to be considered "conditionally acceptable", the outdoor use areas will need a minimum 7 dBA reduction. To determine the required mitigation for the outdoor use areas, the Fresnel Barrier Reduction Calculations based on distance, source height, receiver elevation and the top of barrier were modeled. It was determined that a minimum 5-foot barrier be located along the rooftop decks and a minimum 8-foot barrier be located around the pool area as shown in Figure 5-1. The Fresnel calculations are provided as an ***Attachment A.***

Figure 5-1: Noise Barrier Locations



The barriers must be constructed of a non-gapping material consisting of masonry, wood, plastic, fiberglass, glass, vinyl, steel, or a combination of those materials, with no cracks or gaps through or below the enclosure walls.

The City of Encinitas noise guidelines also state, consistent with Title 24 of the California Code of Regulations (CCR), that a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above the normally compatible noise level in order to ensure that acceptable interior noise levels can be achieved. The first row of buildings would be exposed to noise levels of 77 dBA Ldn. Based on the additional distance to the second row of buildings, noise levels would be reduced an additional 2 dBA. Typically, three decibels of attenuation is allowed for the first row of buildings when they block 40 to 65% of the line of sight to the noise source, and three to five decibels of attenuation is allowed when the buildings obstruct more than 65% of the line of sight (Source: CALTRANS Technical Noise Supplement Section N-5515). The line of sight to the roadway at the second row of buildings is blocked by the proposed structures by more than 40%, therefore a factor of 3 dBA was taken into account. Therefore, the second row of buildings would be exposed to noise levels of 72 dBA Ldn.

The methodology used to determine the resultant interior noise levels is based upon the exterior noise level minus the sound transmission loss as identified in the American Society of Testing and Materials (ASTM) guidelines: E413 &E90. Standard building construction will provide a noise reduction of approximately 12-15 dBA with a windows open condition and a minimum 20 dBA noise reduction with the windows closed. The exterior noise levels at the proposed structures calculated in terms of dBA are converted to the six octave band sound pressure levels between: 125 - 4000 Hertz.

Acoustical modeling of the proposed project dwelling units was performed in accordance with the above guidelines and included combining the transmission loss for each of the building components that will reduce the interior noise levels. Building components typically include the windows, exterior doors, and exterior walls. The total noise reduction is dependent upon the transmission loss of each building component, their subsequent surface area, quality of the building/construction materials, a building façade and angle correction.

The interior noise level is also dependent on the acoustical energy absorbed within the room based upon the Noise Reduction Coefficients (NRC). NRC is a scalar representation of the amount of sound energy absorbed upon striking a particular surface and the arithmetic value average of sound absorption coefficients indicating a material's ability to absorb sound. The absorption coefficients for individual surface areas such as carpet, drywall and furnishings are used to calculate the interior room effects. The calculated building noise reduction includes both the room absorption characteristics and the transmission loss from the exterior wall assembly.

The interior noise reduction calculations were performed using Ldn's interior noise model. The model converts the exterior sound level to octave band frequencies and accounts for the transmission loss, correction factors and room absorption. The preliminary floor plans used for this analysis were provided by the project applicant's architects (KTGY, 2022).

Exterior walls typically have a Sound Transmission Class (STC) rating of 46 dB or better and consist of 2-inch x 4- inch studs or larger, spaced 16-1nch o.c. with R13 insulation minimum and an exterior surface of cement plaster (stucco). Exterior walls with lap siding and fiberglass insulation typically have a Sound Transmission Class (STC) rating of 40. Exterior walls with this rating consist of 2"x4" studs or larger, spaced 16" o.c. with R-13 insulation minimum and an exterior surface of lap siding with fiberglass insulation (Hardi Plank/Panel). Interior wall and ceiling surfaces shall be at least 1/2" thick gypsum or plaster. Roof assemblies should have a minimum of 1/2" sheathing, R-19 insulation and sealed to prevent noise leaks. Exterior entry doors should be of solid core construction and glass assemblies should be dual-glazed and sealant applied around the exterior edges. The window and door assemblies are generally the weakest noise reducing component but are the most convenient and cost effective elements to change if additional attenuation is needed. Bedrooms should be installed with carpet flooring to provide additional sound absorption. The STC ratings for the glass assemblies and exterior entry doors were calculated in the interior noise model and provided in the findings below.

Bathrooms, kitchens, closets and corridors are not required to meet the 45 dBA Ldn standard and therefore were not modeled. All living areas where lower noise levels are essential for conversation and sleep, this includes bedrooms, living rooms and dining rooms, were modeled to determine the interior noise reductions. If the modeled interior noise levels were found to be higher than 45 dBA Ldn in the living areas with the minimum assembly requirements described above additional modeling was performed to determine the minimum STC rating for the glass assemblies to further reduce interior noise levels below the acceptable interior threshold of 45 dBA Ldn.

The building façade noise levels were determined to be as high as 77 dBA Ldn for the first row of buildings facing Interstate 5 and 72 dBA Ldn for the second row. Basic calculations show that a windows open condition will typically reduce the interior noise levels 12-15 dBA Ldn and not provide adequate interior noise mitigation. To meet the 45 dBA Ldn interior noise standard, an overall minimum interior noise level reduction of roughly 27 to 32 dBA Ldn is needed for the proposed project. Therefore, a closed window condition is required to reduce interior noise levels to comply with CCR Title 24 and City of Encinitas requirements. The windows/doors closed condition does not require the windows or doors to be non-operable but does requires that mechanical ventilation is installed to move air within the structure and control temperatures when the windows are closed. The mechanical ventilation must meet the jurisdictional requirements for these dwelling units.

The sound transmission class (STC) is a method of rating how well wall partitions, such as doors

and windows, reduce sound transmission. A higher number indicates better sound than a lower number. Based on numerous studies and efficiency standards in current residential Title 24 standards, standard assembly windows have a STC of 28. The STC and transmission losses for all glass assemblies are provided in Table 5-3. The modeled results with an anticipated interior noise level of 45 dBA Ldn or less are provided as an ***Attachment B*** to this report.

No interior noise impacts are anticipated with the incorporation of the preliminary STC ratings provided in Table 5-3, which are consistent with the construction type proposed based on the architectural plans. Since the final architectural plans are not available at this time, a site specific interior noise assessment will be required prior to the issuance of the first building permit once the plans are available.

Table 5-3: Sound Transmission Class Ratings

Location	Assembly	STC Rating[1]	Octave Band Transmission Loss (Hz)[1]					
			125	250	500	1000	2000	4000
First Row Facing I-5	Operable Windows	**40**	20	26	40	50	52	42
	Fixed Window	**40**	27	26	36	45	49	50
	Glass Doors	**40**	27	29	40	41	43	44
Second Row	Operable Windows	**33**	23	24	29	34	37	37
	Fixed Window	**33**	23	20	28	38	41	38
	Glass Doors	**33**	26	20	32	34	34	36

[1] *STC and Octave ratings used in Model*

Offsite Project Related Transportation Noise Levels

To determine if direct or cumulative off-site noise level increases associated with the development of the proposed project would create noise impacts, the traffic volumes for the existing conditions were compared with the traffic volume increase of existing plus the proposed project. The project is estimated to only generate 894 daily trips with a peak hour volume of 81 trips according to the project traffic study (Intersecting Metrics, 2022). According to the project traffic study, existing year traffic along Piraeus Street is 1,786 ADT. Typically, it requires a project to double (or add 100%) the traffic volumes to have a direct impact of 3 dBA Ldn or be a major contributor to the cumulative traffic volumes. Additionally, existing homes are located past the project site to the east and would not cause an increase in traffic along those segments of Plato Place. Therefore, no direct or cumulative impacts are anticipated.

Transportation Noise Conclusions

Onsite Transportation Related Noise Levels

The results of this analysis indicate that future vehicle noise from Interstate 5 to the west is the principal source of community noise that could impact the site. Based upon the findings, the outdoor use areas were determined to be above the City's Noise compatibility threshold of 70 dBA Ldn without attenuation measures. It was determined that a minimum 5-foot barrier be located along the rooftop decks and a minimum 8-foot barrier be located around the pool area. The barriers must be constructed of a non-gapping material consisting of masonry, wood, plastic, fiberglass, glass, vinyl, steel, or a combination of those materials, with no cracks or gaps through or below the enclosure walls.

The City of Encinitas as part of its noise guidelines also states, consistent with Title 24 of the California Code of Regulations (CCR), a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above the normally compatible noise level in order to ensure that acceptable interior noise levels can be achieved. The City of Encinitas' Noise Compatibility Guidelines require interior noise levels in residential structures to be reduced to 45 dBA Ldn.

As shown, interior noise levels of 45 dBA Ldn can easily be obtained with conventional building construction methods and providing a closed window condition requiring a means of mechanical ventilation (e.g., air conditioning) for each building and upgraded windows for all sensitive rooms (e.g., bedrooms and living spaces).

Offsite Project Related Transportation Noise Levels

The project does will not create a direct impact of more than 3 dBA Ldn on any roadway segment and no cumulative noise increase of 3 dBA Ldn or more were found. Therefore, the proposed project's direct and cumulative contributions to off-site roadway noise increases will not cause any significant impacts to any existing or future noise sensitive land uses.

5.3 Operational Noise

Section 30.40 of the City of Encinitas Municipal Code contains noise limits that would apply to noise sources located on the project site, including air conditioning units. The Municipal Code specifies noise limits based on the zoning of the properties in question. Properties zoned RR to R-8 have noise limits of 50 dBA between the hours of 7 a.m. and 10 p.m., and 45 dBA between the hours of 10 p.m. and 7 a.m. Properties zoned R-11 to R-30 have noise limits of 55 dBA between the hours of 7 a.m. and 10 p.m., and 50 dBA between the hours of 10 p.m. and 7 a.m. Commercial zones have noise limits of 60 dBA between the hours of 7 a.m. and 10 p.m., and 55

dBA between the hours of 10 p.m. and 7 a.m. As air conditioning equipment may be operational during nighttime hours, the more stringent nighttime noise limits would also apply at surrounding properties.

This section examines the potential stationary noise source levels associated with the development and operation of the proposed project. Noise from a fixed or point source drops off at a rate of 6 dBA for each doubling of distance, which means that a noise level of 70 dBA at 5-feet would be 64 dBA at 10-feet and 58 dBA at 20-feet.

HVAC

A review of the proposed project indicates that noise sources from the mechanical ventilation system (HVAC) are a potential source of stationary noise. Each residential unit would have a HVAC unit for temperature control, as discussed in more detail below. The most sensitive off-site property lines to the operational noise sources, by distance and orientation, are the property lines at the existing single-family homes adjacent to the project to the east. This section analyzes the property line to determine the worst-case noise levels. All other off-site property lines are located further from the noise sources or have less restrictive property line limits. The proposed project must meet the most restrictive daytime and evening standards of 50.0 dBA and 45.0 dBA at the residential property lines per the City of Encinitas Municipal Code for R-2 zoning.

Roof-top mechanical ventilation units (HVAC) will be installed at the proposed residential units. The project anticipates installing Carrier CA15NA (Series, 24-A) or equivalent HVAC units with a reference noise level of 71 dBA at 3-feet (Source: Carrier). The manufacturer's specifications and noise levels are provided in Attachment A. The HVAC units will cycle on and off throughout the day. Typically, HVAC units run for approximately 20 minutes each operating cycle to provide the necessary heating or cooling. It is anticipated that the HVAC units will operate twice in any given hour or run for 40 minutes in any given hour. Noise levels drop 3 decibels each time the duration of the source is reduced in half.

Therefore, hourly HVAC noise level over a 40 minute period would be reduced approximately 2 decibels to 69 dBA based on operational time. To predict the property line noise level, a reference noise level of 69 dBA at 3-feet was used to represent the HVAC units.

The HVAC units are located a minimum of 38 feet from the property lines and will be shielded by a proposed screen wall that will break the line of sight to the HVAC units and will provide a minimum 5 dBA reduction. The typical locations of the proposed HVAC units are shown in Figure 5-2. Two HVAC units maybe located near each other with the proposed buildings separating them and would create the worst case cumulative noise level. The remainder of the units are separated by at least 80 feet and the proposed screen walls shielding them. This separation of 80 feet would

result in a 20 dBA difference between two separate HVAC units and would not cumulatively increase the noise levels. Therefore, the worst case combined noise from the HVAC would occur from four units.

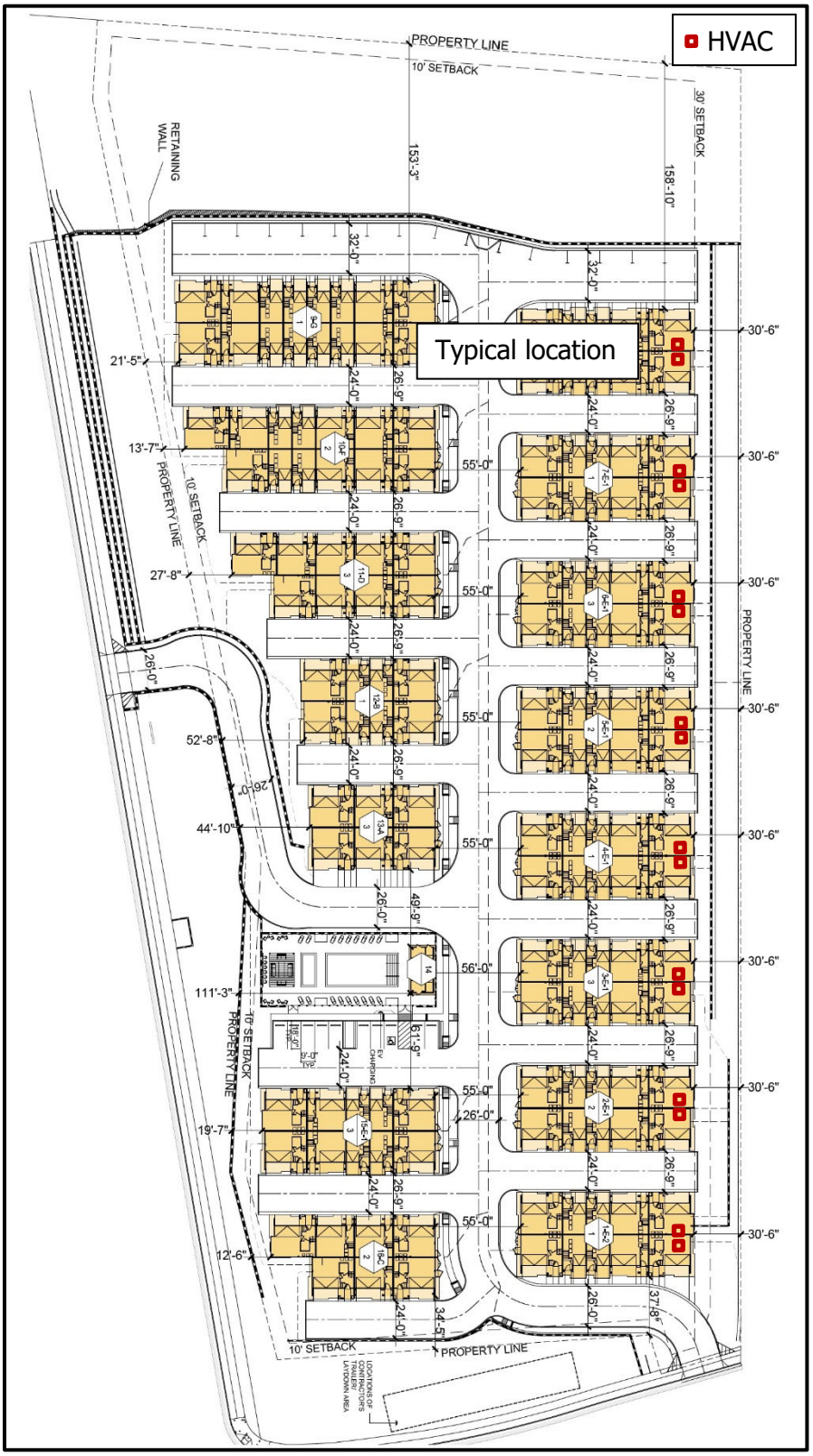
Utilizing a 6 dBA decrease per doubling of distance, noise levels at the nearest property line as described above were calculated for the HVAC. The noise levels associated with the HVAC will be limited by the buildings that will shield them both visually and acoustically. The HVAC units are located a minimum of 38 feet from the nearest property lines. The noise level reductions due to distance and the building for the nearest property line is provided in Table 5-4 below.

Table 5-4: Project HVAC Noise Levels (Eastern Property Line)

Distance to Nearest Observer Location (Feet)	Hourly Reference Noise Level (dBA)	Noise Source Reference Distance (Feet)	Noise Reduction Due to Distance (dBA)	Reduction Due to Buildings (dBA)	Noise Level at Property Line (dBA)	Quantity	Property Line Cumulative Noise Level (dBA)*
38	69.0	3.0	-22.1	-5.0	41.9	2	**45.0**
*Complies with the nighttime Noise Standard of 45 dBA.							

No impacts are anticipated at the residential property line to the east with the proposed screen walls and are in compliance with the City of Encinitas Municipal Code Sections 9.32 and 30.40. All other property lines are located further from the proposed HVAC units and the resulting noise levels would also be below the 45 dBA threshold.

Figure 5-2: Locations of Proposed HVAC Units



6.0 REFERENCES

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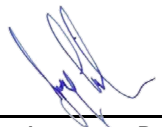
7.0 CERTIFICATIONS

The contents of this report represent an accurate depiction of the noise environment and potential impacts within and surrounding the proposed development. This report was prepared utilizing the latest guidelines and reduction methodologies.



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Date November 15, 2022

ATTACHMENT A

Fresnel Barrier Calculations

Roof Deck - 5' Barrier
Source to Receiver Horizontal Distance (ft) = 230.00
Source to Barrier Horizontal Distance (ft) = 220.00
Barrier to Receiver Horizontal Distance (ft) = 10.00
Source Height (ft) = 72.00
Receiver Height (ft) = 164.00
Barrier Height (ft) = 165.00
Distance Source to Receptor (ft) d = 247.72
Distance Source to Barrier top (ft) d1 = 238.85
Distance Barrier top to Receiver (ft) d2 = 10.05

Frequency (Hz) = 8000 Attenuation (db) = 17.7 Fresnel N = 16.775
Frequency (Hz) = 4000 Attenuation (db) = 15.9 Fresnel N = 8.388
Frequency (Hz) = 2000 Attenuation (db) = 14.2 Fresnel N = 4.194
Frequency (Hz) = 1000 Attenuation (db) = 12.5 Fresnel N = 2.097
Frequency (Hz) = 500 Attenuation (db) = 10.9 Fresnel N = 1.048
Frequency (Hz) = 250 Attenuation (db) = 9.2 Fresnel N = 0.524
Frequency (Hz) = 125 Attenuation (db) = 7.8 Fresnel N = 0.262
Frequency (Hz) = 63 Attenuation (db) = 6.5 Fresnel N = 0.131

Pool Area - 8' Barrier
Source to Receiver Horizontal Distance (ft) = 260.00
Source to Barrier Horizontal Distance (ft) = 240.00
Barrier to Receiver Horizontal Distance (ft) = 20.00
Source Height (ft) = 72.00
Receiver Height (ft) = 135.00
Barrier Height (ft) = 138.00
Distance Source to Receptor (ft) d = 267.52
Distance Source to Barrier top (ft) d1 = 248.91
Distance Barrier top to Receiver (ft) d2 = 20.22

Frequency (Hz) = 8000 Attenuation (db) = 18.3 Fresnel N = 22.851
Frequency (Hz) = 4000 Attenuation (db) = 16.8 Fresnel N = 11.425
Frequency (Hz) = 2000 Attenuation (db) = 14.9 Fresnel N = 5.713
Frequency (Hz) = 1000 Attenuation (db) = 13.3 Fresnel N = 2.856
Frequency (Hz) = 500 Attenuation (db) = 11.6 Fresnel N = 1.428
Frequency (Hz) = 250 Attenuation (db) = 10.0 Fresnel N = 0.714
Frequency (Hz) = 125 Attenuation (db) = 8.4 Fresnel N = 0.357
Frequency (Hz) = 63 Attenuation (db) = 7.1 Fresnel N = 0.179

ATTACHMENT B

Preliminary Interior Noise Levels

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	2	Date:	3/25/22
Arch Plan:	1		
Room Type:	Great Room	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	144	46	27	42	44	46	49	54
Windows	Greenworld	10	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	48	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-23.3	-23.3	-23.3	-23.3	-23.3	-23.3
Noise Level Increase for Defects and Exposed Surface Area	16.8	16.8	16.8	16.8	16.8	16.8
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						34.4
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	3	Date:	3/25/22
Arch Plan:	1		
Room Type:	Bedroom	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	144	40	17	33	40	50	55	50
Windows	Greenworld	10	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	48	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Noise Level Increase for Defects and Exposed Surface Area	16.8	16.8	16.8	16.8	16.8	16.8
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						34.5
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**42**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	2	Date:	3/25/22
Arch Plan:	3		
Room Type:	Great Room	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	279	46	27	42	44	46	49	54
Windows	Greenworld	30	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	48	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6
Noise Level Increase for Defects and Exposed Surface Area	17.5	17.5	17.5	17.5	17.5	17.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						33.6
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point	Ldn Consulting, Inc.
Building (s)	Row 1	
Floor Level	3	Date: 3/25/22
Arch Plan:	3	
Room Type:	Master Bedroom	Project # 22-08

Exterior Noise Levels

	dBA CNEL*	Frequency (Hz.)					
		125	250	500	1000	2000	4000
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

Exterior Assembly	Source	Area	STC	Transmission Loss (dB) Frequency (Hz.) 125	250	500	1000	2000	4000
Stucco	NBS W-50-71	99	40	17	33	40	50	55	50
Windows	Greenworld	30	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	0	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

Interior Characteristics	Source		NRC	Absorption Coefficients Frequency (Hz.) 125	250	500	1000	2000	4000
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	250	500	1000	2000	4000
Noise Reduction from Absorption based upon Floor Area	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2
Noise Level Increase for Defects and Exposed Surface Area	15.4	15.4	15.4	15.4	15.4	15.4
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						35.8
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**41**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	3	Date:	3/25/22
Arch Plan:	3		
Room Type:	Bedroom 2	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	108	40	17	33	40	50	55	50
Windows	Greenworld	30	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	0	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-19.7	-19.7	-19.7	-19.7	-19.7	-19.7
Noise Level Increase for Defects and Exposed Surface Area	15.5	15.5	15.5	15.5	15.5	15.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						35.0
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**42**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	2	Date:	3/25/22
Arch Plan:	4		
Room Type:	Great Room	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	339	46	27	42	44	46	49	54
Windows	Greenworld	120	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	64	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-25.5	-25.5	-25.5	-25.5	-25.5	-25.5
Noise Level Increase for Defects and Exposed Surface Area	18.1	18.1	18.1	18.1	18.1	18.1
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						31.9
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	2	Date:	3/25/22
Arch Plan:	4		
Room Type:	Master Bedroom	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	117	40	17	33	40	50	55	50
Windows	Greenworld	30	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	0	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3
Noise Level Increase for Defects and Exposed Surface Area	15.5	15.5	15.5	15.5	15.5	15.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						35.4
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**42**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 1		
Floor Level	3	Date:	3/25/22
Arch Plan:	4		
Room Type:	Bedroom 3	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	77.0	63.0	67.7	70.5	72.8	69.7	64.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	180	40	17	33	40	50	55	50
Windows	Greenworld	50	40	20	26	40	50	52	42
Fixed Window	Greenworld	0	40	27	26	36	45	49	50
Glass Doors	Greenworld	0	40	27	29	40	41	43	44
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-19.3	-19.3	-19.3	-19.3	-19.3	-19.3
Noise Level Increase for Defects and Exposed Surface Area	16.0	16.0	16.0	16.0	16.0	16.0
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						32.4
Building Façade Noise Level (dBA CNEL)						77.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 2		
Floor Level	2	Date:	3/25/22
Arch Plan:	1		
Room Type:	Great Room	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	144	46	27	42	44	46	49	54
Windows	Greenworld	10	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	48	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-23.3	-23.3	-23.3	-23.3	-23.3	-23.3
Noise Level Increase for Defects and Exposed Surface Area	16.8	16.8	16.8	16.8	16.8	16.8
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						28.9
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 2		
Floor Level	3	Date:	3/25/22
Arch Plan:	1		
Room Type:	Bedroom	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	144	40	17	33	40	50	55	50
Windows	Greenworld	10	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	48	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Noise Level Increase for Defects and Exposed Surface Area	16.8	16.8	16.8	16.8	16.8	16.8
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						29.3
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point	Ldn Consulting, Inc.
Building (s)	Row 2	
Floor Level	2	Date: 3/25/22
Arch Plan:	3	
Room Type:	Great Room	Project # 22-08

Exterior Noise Levels

	dBA CNEL*	Frequency (Hz.) 125	250	500	1000	2000	4000
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

Exterior Assembly	Source	Area	STC	Transmission Loss (dB) Frequency (Hz.) 125	250	500	1000	2000	4000
Stucco	NBS W-50-71	279	46	27	42	44	46	49	54
Windows	Greenworld	30	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	48	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

Interior Characteristics	Source		NRC	Absorption Coefficients Frequency (Hz.) 125	250	500	1000	2000	4000
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	250	500	1000	2000	4000
Noise Reduction from Absorption based upon Floor Area	-24.6	-24.6	-24.6	-24.6	-24.6	-24.6
Noise Level Increase for Defects and Exposed Surface Area	17.5	17.5	17.5	17.5	17.5	17.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						28.7
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point	Ldn Consulting, Inc.
Building (s)	Row 2	
Floor Level	3	Date: 3/25/22
Arch Plan:	3	
Room Type:	Master Bedroom	Project # 22-08

Exterior Noise Levels

	dBA CNEL*	Frequency (Hz.) 125	250	500	1000	2000	4000
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

Exterior Assembly	Source	Area	STC	Transmission Loss (dB) Frequency (Hz.) 125	250	500	1000	2000	4000
Stucco	NBS W-50-71	99	40	17	33	40	50	55	50
Windows	Greenworld	30	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	0	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

Interior Characteristics	Source		NRC	Absorption Coefficients Frequency (Hz.) 125	250	500	1000	2000	4000
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	250	500	1000	2000	4000
Noise Reduction from Absorption based upon Floor Area	-20.2	-20.2	-20.2	-20.2	-20.2	-20.2
Noise Level Increase for Defects and Exposed Surface Area	15.4	15.4	15.4	15.4	15.4	15.4
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						30.6
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**41**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point	Ldn Consulting, Inc.
Building (s)	Row 2	
Floor Level	3	Date: 3/25/22
Arch Plan:	3	
Room Type:	Bedroom 2	Project # 22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	108	40	17	33	40	50	55	50
Windows	Greenworld	30	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	0	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-19.7	-19.7	-19.7	-19.7	-19.7	-19.7
Noise Level Increase for Defects and Exposed Surface Area	15.5	15.5	15.5	15.5	15.5	15.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						29.9
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**42**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 2		
Floor Level	2	Date:	3/25/22
Arch Plan:	4		
Room Type:	Great Room	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	339	46	27	42	44	46	49	54
Windows	Greenworld	120	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	64	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-25.5	-25.5	-25.5	-25.5	-25.5	-25.5
Noise Level Increase for Defects and Exposed Surface Area	18.1	18.1	18.1	18.1	18.1	18.1
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						26.6
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point		Ldn Consulting, Inc.
Building (s)	Row 2		
Floor Level	2	Date:	3/25/22
Arch Plan:	4		
Room Type:	Master Bedroom	Project #	22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	117	40	17	33	40	50	55	50
Windows	Greenworld	30	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	0	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-20.3	-20.3	-20.3	-20.3	-20.3	-20.3
Noise Level Increase for Defects and Exposed Surface Area	15.5	15.5	15.5	15.5	15.5	15.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						30.4
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**42**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Piraeus Point	Ldn Consulting, Inc.
Building (s)	Row 2	
Floor Level	3	Date: 3/25/22
Arch Plan:	4	
Room Type:	Bedroom 3	Project # 22-08

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	72.0	58.0	62.7	65.5	67.8	64.7	59.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	180	40	17	33	40	50	55	50
Windows	Greenworld	50	33	23	24	29	34	37	37
Fixed Window	Greenworld	0	33	23	20	28	38	41	38
Glass Doors	Greenworld	0	33	26	20	32	34	34	36
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-19.3	-19.3	-19.3	-19.3	-19.3	-19.3
Noise Level Increase for Defects and Exposed Surface Area	16.0	16.0	16.0	16.0	16.0	16.0
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						27.3
Building Façade Noise Level (dBA CNEL)						72.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.