

EXTERIOR NOISE ANALYSIS REPORT

MERCADO APARTMENTS (PTS 696585)

San Diego, CA

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EXECUTIVE SUMMARY

This analysis evaluates noise associated with the implementation of the proposed Mercado Apartments project. The project proposes development of 92 apartments in six 4-story buildings. The project site is located at the north corner of Main Street and Evans Street, in the Barrio Logan neighborhood of the City of San Diego, California (Figure 1).

Future exterior noise levels would be below 60 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL) or lower at all common open space areas in the project. Future exterior noise levels at all required outdoor spaces in the project would be below 60 dBA CNEL, and would be considered Compatible with the multi-family residential land use per the City's General Plan Noise Element Land Use – Noise Compatibility Guidelines [City of San Diego 2015].

Future exterior noise levels would exceed 60 dBA CNEL at some project building façades. Therefore, interior noise levels in habitable rooms could exceed the City of San Diego General Plan Noise Compatibility Guidelines and California Building Code (CBC) Section 1206.4 (Title 24) requirement of 45 dBA CNEL in residences. To comply with this requirement, upgraded building façade elements (windows, walls, doors, and/or exterior wall assemblies) with Sound Transmission Class (STC) ratings of 35 or higher may be necessary. If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets CBC requirements. Implementation of these measures would ensure that interior noise levels would be 45 dBA CNEL or below in residences, and the project would comply with the City of San Diego General Plan Noise Compatibility Guidelines and the CBC Section 1206.4 (Title 24) requirement. As a condition of approval, an interior noise analysis would be required to demonstrate that interior noise levels in the proposed residences would not exceed 45 dBA CNEL and would therefore be compatible.

The project site is exposed to aircraft noise levels below 60 dBA CNEL from operations associated with the San Diego International Airport (SDIA) and Naval Air Station North Island (NASNI). These noise levels are compatible with the multi-family residential use per the Noise Element [City of San Diego 2015].

Project operation would generate noise levels up to 40 dBA average / equivalent level (Leq) at its property lines under normal circumstances. Project-generated operational noise would comply with Municipal Code Section 59.5.401, and project operation impacts would be less than significant.

As a condition of approval, noise abatement would be required prior to the start of demolition until the end of concrete pouring. This abatement may consist of unit vacation, barriers, a combination of these, or another method, as described in Section 4.1 of this report.

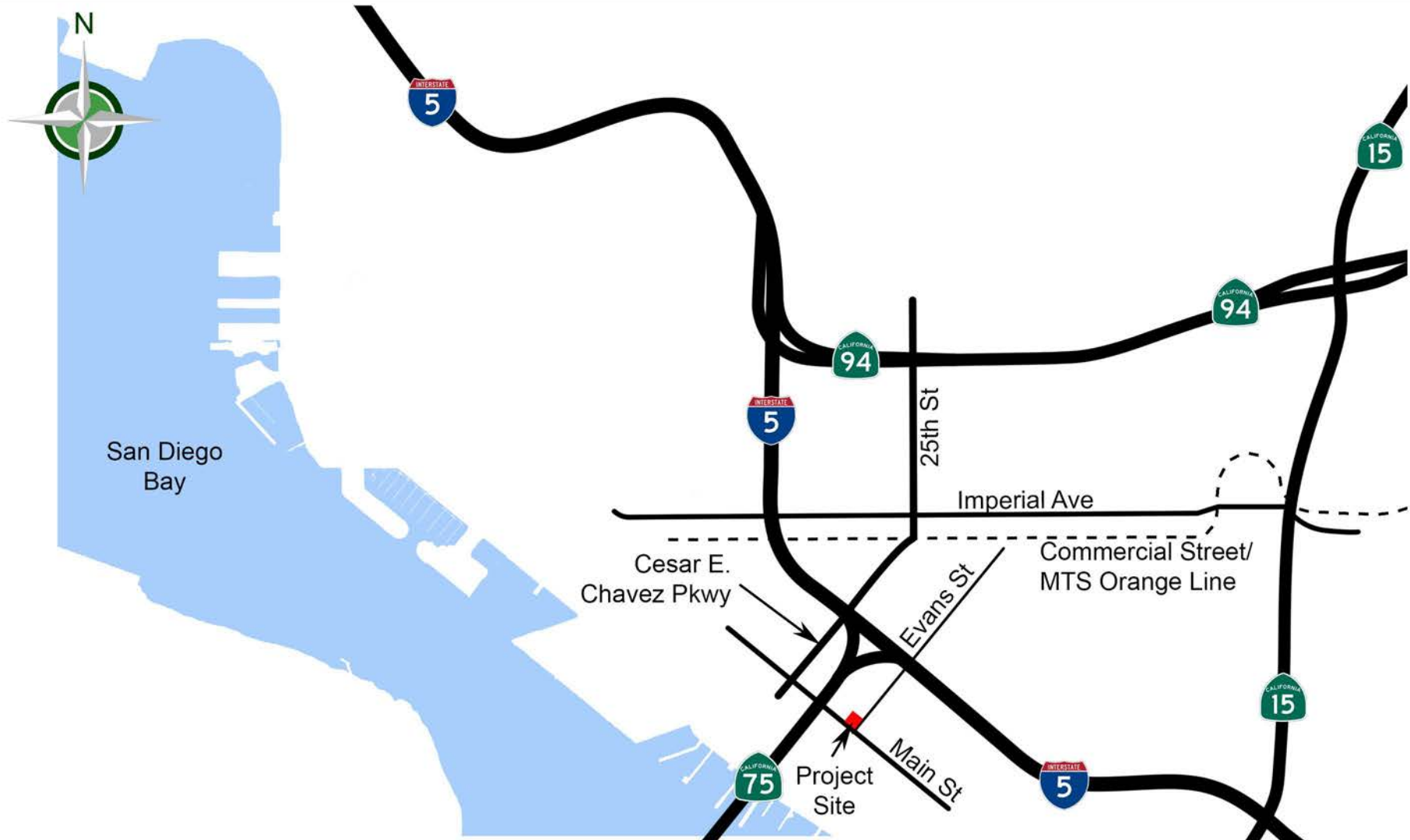
Project demolition would generate noise levels up to approximately 70 dBA Leq at the property lines of offsite residences without abatement. With abatement, project demolition would generate noise levels up to approximately 74 dBA Leq at first-floor façades of existing adjacent residences on the Mercado Apartments property. Project demolition noise impacts would be less than the 75 dBA Leq threshold at occupied residences in accordance with Municipal Code Section 59.5.0404, and would be less than significant.

Project construction would generate noise levels up to approximately 73 dBA Leq at offsite residential property lines without abatement. With abatement, the project construction noise levels would be up to 74 dBA Leq at first-floor façades of existing adjacent residences on the Mercado Apartments property. Project construction noise impacts would be less than the 75 dBA Leq threshold at occupied residences in accordance with Municipal Code Section 59.5.0404, and would be less than significant.

Vibration is distinctly perceptible at 0.04 inches per second (in/sec) peak particle velocity (PPV) per industry standards. The project would include specific construction and demolition equipment and practices as a condition of approval to control vibration to below levels that would be distinctly perceptible. With the proposed equipment selection and usage constraints, project vibration impacts would be less than significant.

Project traffic would add less than 1 dBA CNEL to existing land uses along project access roadways. As this would be below a 3-dBA perceptible change, project-generated traffic noise impacts would be less than significant.

Mercado Apartments Noise Analysis



1.0 INTRODUCTION

1.1 Purpose of the Report

The purpose of this report is to evaluate noise affecting and produced by the proposed Mercado Apartments project.

1.2 Project Location

The project site is located at the north corner of the intersection of Main Street and Evans Avenue, in the Barrio Logan neighborhood of the City of San Diego (Figure 1).

1.3 Project Description

The project is the demolition of two existing 2-story buildings and construction of a 4-story, 92-unit affordable residential development designed in a “square-donut” configuration.

1.4 Environmental Noise Background

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies with each area. This is called ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound’s pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound’s loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. Studies have shown that the smallest perceptible change in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and would likely evoke a community reaction. A 10-dBA increase is subjectively heard as a doubling in loudness and would cause a community response [Caltrans 2013a]. Sound levels of typical noise sources and environments are provided in Table 1.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140 Decibels	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud Threshold of Pain
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud Very Loud
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness Moderately Loud
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud Quiet
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud Just Audible
		0	1/64 as loud Threshold of Hearing

Source: Compiled by dBF Associates, Inc.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, $60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB}$, and $80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$. The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz.

However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (L_{eq}) is often used to describe the time-varying character of community noise. The L_{eq} is the energy-averaged A-weighted sound level during a measured time interval, and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. Unless otherwise specified, the presumed period in this report is one hour. Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the L_{max} and L_{min} indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The L_{min} value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10} , L_{50} , and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10, 50, and 90 percent of a stated time, respectively. Sound levels associated with L_{10} typically describe transient or short-term events, whereas levels associated with L_{90} describe the steady-state (or most prevalent) noise conditions.

The Community Noise Equivalent Level (CNEL) is a descriptor representing a 24-hour, time-weighted, annual average noise level based on the "A-weighted" decibel. In the calculation process, noise occurring in the evening time period (7 p.m. to 10 p.m.) is penalized by adding 5 dB, while noise occurring in the nighttime period (10 p.m. to 7 a.m.) is penalized by adding 10 dB. These time periods and decibel increases are intended to reflect a typical person's increased sensitivity to noise during late-night and early morning hours. This descriptor is used by the State of California and the City of San Diego to evaluate land-use compatibility with regard to noise.

2.0 REGULATORY FRAMEWORK

2.1 City of San Diego

2.1.1 General Plan

The City of San Diego requires new projects to meet noise level standards as established in the Noise Element of the General Plan [City of San Diego 2008, Amended 2015: Policy NE-A.4]. These standards are shown in Table NE-3: Land Use – Noise Compatibility Guidelines (Table 2 of this report).

In the Residential – Multiple Dwelling Units land use category, noise levels up to 60 dBA CNEL are considered Compatible with outdoor use areas; noise levels up to 70 dBA CNEL are considered Conditionally Compatible. The building structure must attenuate exterior noise in occupied areas to 45 dBA CNEL or below.

Table 2. City of San Diego Land Use – Noise Compatibility Guidelines

Land Use Category	Exterior Noise Exposure (dBA CNEL)			
	60	65	70	75
<i>Parks and Recreational</i>				
Parks, Active and Passive Recreation				
Outdoor Spectator Sports, Golf Courses; Water Recreational Facilities; Indoor Recreation Facilities				
<i>Agricultural</i>				
Crop Raising & Farming; Community Gardens, Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables				
<i>Residential</i>				
Single Dwelling Units; Mobile Homes		45		
Multiple Dwelling Units <i>*For uses affected by aircraft noise, refer to Policies NE-D.2. & NE-D.3.</i>		45	45*	
<i>Institutional</i>				
Hospitals; Nursing Facilities; Intermediate Care Facilities; Kindergarten through Grade 12 Educational Facilities; Libraries; Museums; Child Care Facilities		45		
Other Educational Facilities including Vocational/Trade Schools and Colleges and Universities		45	45	
Cemeteries				
<i>Retail Sales</i>				
Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories			50	50
<i>Commercial Services</i>				
Building Services; Business Support; Eating & Drinking; Financial Institutions; Maintenance & Repair; Personal Services; Assembly & Entertainment (includes public and religious assembly); Radio & Television Studios; Golf Course Support			50	50
Visitor Accommodations		45	45	45
<i>Offices</i>				
Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters			50	50
<i>Vehicle and Vehicular Equipment Sales and Services Use</i>				
Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals; Vehicle Parking				
<i>Wholesale, Distribution, Storage Use Category</i>				
Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution				
<i>Industrial</i>				
Heavy Manufacturing; Light Manufacturing; Marine Industry; Trucking & Transportation Terminals; Mining & Extractive Industries				
Research & Development				50
Compatible	Indoor Uses	Standard construction methods should attenuate exterior noise to an acceptable indoor noise level. Refer to Section I.		
	Outdoor Uses	Activities associated with the land use may be carried out.		
45, 50	Indoor Uses	Building structure must attenuate exterior noise to the indoor noise level indicated by the number (45 or 50) for occupied areas. Refer to Section I.		
	Outdoor Uses	Feasible noise mitigation techniques should be analyzed and incorporated to make the outdoor activities acceptable. Refer to Section I.		
Incompatible	Indoor Uses	New construction should not be undertaken.		
	Outdoor Uses	Severe noise interference makes outdoor activities unacceptable.		

2.1.2 CEQA Significance Thresholds

The City California Environmental Quality Act (CEQA) Significance Determination Thresholds [City of San Diego 2022] asks if the project would:

1. Result or create a significant increase in the existing ambient noise levels?
2. Expose people to noise levels which exceed the City's adopted noise ordinance or are incompatible with Table K-4?
3. Expose people to current or future transportation noise levels which exceed standards established in the Transportation Element of the General Plan or an adopted airport Comprehensive Land Use Plan?
4. Result in land uses which are not compatible with aircraft noise levels as defined by an adopted airport Comprehensive Land Use Plan (CLUP)?

Related to those issues, the Thresholds discuss interior and exterior noise impacts from traffic generated noise; United States Department of Housing and Urban Development (HUD) funded projects and noise; airport noise impacts; noise from adjacent stationary uses (noise generators); impacts to sensitive wildlife; temporary construction noise; and noise / land use compatibility. While these topics are included in the Thresholds, updates to CEQA have occurred specifying that CEQA analysis is only to address project impacts on the environment, and not the converse. The effects of environmental noise to the project are considered land use planning issues, not CEQA issues. It is also noted that the source of Thresholds Table K-2 regarding traffic noise significance thresholds was the previous General Plan, which has been superseded. The currently adopted 2015 General Plan noise information is utilized for this analysis herein.

The CEQA Significance Determination Thresholds also identify that construction noise that exceeds 75 dBA Leq at a sensitive receptor, or that would occur between 7 p.m. to 7 a.m. or on holidays, would be considered significant. Additionally, construction noise that would substantially interfere with normal business communications or affect sensitive receptors may be significant.

Note: Table K-4 was updated in the 2008 General Plan. The updated land use noise compatibility table is included as Table 2 of this report.

2.1.3 Municipal Code

2.1.3.1 Operational Noise

Operational noise within the City is governed by Municipal Code Section 59.5.401: Sound Level Limits.

It shall be unlawful for any person to cause noise by any means to the extent that the one-hour average sound level exceeds the applicable limit given in the following table, at any location in the City of San Diego on or beyond the boundaries of the property on which the noise is produced. The noise subject to these limits is that part of the total noise at the specified location that is due solely to the action of said person.

TABLE OF APPLICABLE LIMITS

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

The sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts. Permissible construction noise level limits shall be governed by Section 59.5.0404 of this article.

...

(Amended 9-11-1989 by O-17337 N.S.)

(Amended 11-28-2005 by O-19446 N.S.; effective 2-9-2006.)

With the project building in place, the project property would have a density less than one dwelling unit per 2,000 square feet of lot area, which means that the project is considered in the “Multi-Family Residential” land use category. Surrounding land uses to the northeast and northwest are multifamily residential buildings on the same property. Surrounding offsite land uses include commercial buildings to the southeast and southwest, and single-family residential buildings to the east.

At the southeast and southwest project property lines, adjacent to commercial uses, the operational sound level limits are:

- 60 dBA Leq during daytime hours (7:00 a.m. to 7:00 p.m.),
- 55 dBA Leq during evening hours (7:00 p.m. to 10:00 p.m.), and
- 52.5 dBA Leq during nighttime hours (10:00 p.m. to 7:00 a.m.).

At the east project property line, adjacent to single-family residential uses, the operational sound level limits are:

- 52.5 dBA Leq during daytime hours (7:00 a.m. to 7:00 p.m.),
- 47.5 dBA Leq during evening hours (7:00 p.m. to 10:00 p.m.), and
- 42.5 dBA Leq during nighttime hours (10:00 p.m. to 7:00 a.m.).

2.1.3.2 Construction Noise

Construction noise within the City is governed by Municipal Code Section 59.5.0404: Construction Noise.

It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator. In granting such permit, the Administrator shall consider whether the construction noise in the vicinity of the proposed work site would be less objectionable at night than during the daytime because of different population densities or different neighboring activities; whether obstruction and interference with traffic particularly on streets of major importance, would be less objectionable at night than during the daytime; whether the type of work to be performed emits noises at such a low level as to not cause significant disturbances in the vicinity of the work site; the character and nature of the neighborhood of the proposed work site; whether great economic hardship would occur if the work were spread over a longer time; whether proposed night work is in the general public interest; and he shall prescribe such conditions, working times, types of construction equipment to be used, and permissible noise levels as he deems to be required in the public interest.

Except as provided in subsection C. hereof, it shall be unlawful for any person, including The City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m.

The provisions of subsection B. of this section shall not apply to construction equipment used in connection with emergency work, provided the Administrator is notified within 48 hours after commencement of work.

(Amended 1-3-1984 by O-16100 N.S.)

2.1.3.3 Refuse Vehicles and Parking Lot Sweepers

Refuse vehicle and parking lot sweeper noise within the City is governed by Municipal Code Section 59.5.0406: Refuse Vehicles and Parking Lot Sweepers.

No person shall operate or permit to be operated a refuse compacting, processing, or collection vehicle between the hours of 7:00 p.m. to 6:00 a.m. or a parking lot sweeper between the hours of 7:00 p.m. to 7:00 a.m. in any residential area unless a permit has been applied for and granted by the Administrator.

*(“Refuse Vehicles” added 9-18-1973 by O-11122 N.S.; amended 9-22-1976 by O-11916 N.S.)
(Amended 6-9-2010 by O-19960 N.S.; effective 7-9-2010.)*

2.2 State of California

2.2.1 Residential

California Building Code (CBC), Chapter 12: Interior Environment, Section 1206: Sound Transmission regulates noise levels in buildings with multiple habitable units [State of California 2019]. Relevant portions are reproduced below.

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.

2.2.2 Vibration

The City of San Diego does not regulate construction vibration levels. In the absence of vibration limits, the California Department of Transportation (Caltrans) criteria were used. For continuous or frequent intermittent sources, vibration is “barely perceptible” at 0.01 in/sec PPV and “distinctly perceptible” at 0.04 in/sec PPV. Damage to “older residential structures” could occur at 0.3 in/sec PPV.

The City of San Diego considers a vibration level of 0.04 in/sec PPV or greater to be significant.

3.0 ENVIRONMENTAL SETTING AND EXISTING CONDITIONS

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise-sensitive and may warrant unique measures for protection from intruding noise.

3.1 Existing Conditions

The project site is currently developed with two residential buildings and a parking lot. Noise-sensitive land uses in the project area include the existing multifamily residences to the northeast and northwest, and the single-family residences to the east. The primary existing noise source in the vicinity of the project is vehicular traffic on Main Street. A secondary source is the San Diego & Arizona Eastern (SD&AE) Railroad line.

3.1.1 Roadway

Main Street is a two-lane two-way southbound Collector adjacent to the project site on the southwest. Main Street carries an existing (year 2021) average daily traffic (ADT) volume of 3,450 vehicles between Cesar Chavez Parkway and Evans Street [City of San Diego 2023]. Its speed limit is unposted; vehicles were observed travelling generally 45 miles per hour (mph). The existing vehicle mix is approximately 1.5% heavy trucks and 0.5% buses, based on observations conducted during the site visit.

3.1.2 Rail

The project site is approximately 300 feet from the SD&AE Railroad line to the southeast.

3.1.2.1 Freight Rail

In a 24-hour period, there would be up to two freight trains in each direction, during nighttime hours, with one locomotive and 30 cars, at up to 40 mph [Kimley-Horn and Associates 2009; SANDAG 2010]. To our knowledge, no more recent data is available.

Freight train noise levels were estimated using the noise prediction methodology in the Federal Transit Authority (FTA) Transit Noise and Vibration Impact Assessment manual [FTA 2006]. Noise levels from freight train movements would range up to approximately 57 dBA CNEL at the southwestern project property line (Appendix A).

The FTA manual does not address train horn noise. Freight train horn noise levels were estimated using the rail horn noise model developed by the Federal Railroad Administration [FRA 2020]. Noise levels from freight train horns would range up to approximately 66 dBA CNEL at the southwestern project property line (Appendix A).

3.1.2.2 Light Rail

The project site is approximately 1,000 feet southeast of the Barrio Logan Station of the MTS Blue Line, which carries San Diego Trolley light rail traffic. The existing average San Diego Trolley volume near the project site is 95 daytime trolleys and 26 nighttime trolleys (northbound) & 94 daytime trolleys and 23 nighttime trolleys (southbound) [MTDB 2020].

Trolley traffic was audible at the project site; however, due to the other various noise sources in the area, isolated measurements of only trolley noise were not possible. As such, trolley measurements from another project site were used where trolley noise could be isolated. At that site, approximately 700 feet north of the MTS Blue Line Palm Avenue Station, two southbound trolleys and one northbound trolley were measured at 100 feet from the centerline of the tracks. The ambient noise level was approximately 55 dBA. The measurements were conducted on Wednesday, January 5, 2022, at approximately 10:30 a.m., with a RION Model NL-31 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meter (SLM). The sound exposure level (SEL) of the passbys were 80.9 dBA (northbound), 81.6 (southbound), and 84.2 (simultaneous northbound and southbound). Each trolley is expected to generate an average SEL of approximately 81 dBA at 100 feet, based on these measurements. Considering distance and schedule, noise levels from light rail traffic would range up to approximately 56 dBA CNEL at the southwestern project property line.

3.1.3 Aircraft

The project site is exposed to an existing (year 2018) and projected future (year 2026) aircraft noise level of less than 60 dBA CNEL from SDIA operations [SDCRAA 2021]. The project site is exposed to an aircraft noise level of less than 60 dBA CNEL from NASNI operations [Ricondo & Associates, Inc. 2020]. However, noise associated with aircraft operations may be periodically audible on the project site or within the project building. As the project is located outside of any 60 dBA CNEL airport noise level contour per the aforementioned documents, aircraft noise does not warrant further discussion herein.

3.2 Ambient Sound Level Measurements

Ambient sound level measurements were conducted to estimate the existing acoustical environment on the project site. A RION Model NL-31 ANSI Type 1 Integrating SLM was used as the data-collection device. The meter was mounted on a tripod roughly 5 feet above ground to simulate the average height of the human ear. The microphone was fitted with a windscreen. The sound level meter was calibrated before the measurement periods. Simultaneous traffic counts were conducted during the measurement periods. The measurement results are summarized in Table 4 and correspond to the locations depicted on Figure 2.

The primary noise source was roadway traffic on Main Street. Other noise sources included a distant ship horn, distant industrial activity, traffic on State Route 75 (Coronado Bridge), one trolley, and two ambulances on Harbor Drive.

Table 3. Sound Level Measurements (dBA)

Measurement Location		Date / Time	Leq	Lmin	Lmax	L10	L50	L90	Traffic
ML1	45' from Main Street CL, 35' from Evans Street CL	2022-05-03 10:30 – 10:45	65.0	57.0	81.3	67.3	60.6	58.3	Main Street: 16 cars, 3 heavy trucks, 1 bus Evans Street: 3 cars
ML2	Sidewalk between onsite buildings north of project area	2022-05-03 11:05 – 11:15	56.1	52.3	64.1	57.3	55.5	54.2	Not counted

Note: Traffic reported in cars / medium trucks / buses.

Mercado Apartments Noise Analysis



FIGURE 2
Sound Level Measurement Locations

4.0 POTENTIAL NOISE IMPACTS AND LAND USE COMPATIBILITY

4.1 Construction Noise

The project would involve the demolition of two 2-story buildings, trash enclosure and parking lot areas within a 0.98-acre area of the site. Subsequently, the project would involve grading the 0.98-acre project area. Project grading would involve balanced cut and fill of 750 cubic yards, with cuts and fills extending approximately 4 feet. Construction would involve installation of utilities, constructing six buildings with 92 units, hardscape, and landscape. Construction activity and delivery of construction materials and equipment would be limited to between 7:00 a.m. and 7:00 p.m., except on Sundays or holidays when no construction would occur.

As a condition of approval, to ensure that noise levels at onsite building windows do not exceed 75 dBA Leq (12 hours), noise abatement would be required prior to the start of demolition until the end of concrete pouring. Options to meet this requirement include, but are not limited to:

1. Vacation of the first-floor units facing the project area (#124, 128, 129, 130, 134, 135, 136, 157, 160, 164, 165, and 166) and second-story units facing the project area (#224, 228, 229, 230, 234, 235, 236, 257, 260, 264, 265, and 266).
2. Vacation of the second-story units facing the project area and a 12-foot-high barrier with a transmission loss of 10 dBA or an STC 10 rating along the full northeast and northwest project boundaries.
3. A barrier with a transmission loss of 10 dBA or an STC 10 rating along the full northeast and northwest project boundaries, with minimum height(s) equal to the top of the nearest window.
4. Reducing hours of use, specifying mufflers / quieter equipment, or a combination.

4.1.1 Demolition

Site demolition is expected to produce an average sound power level of approximately 117 dBA [Atkins]. The equipment in the source document includes a crane, dumper, excavator, loader, trucks, handheld air tools, a compressor, and an excavator-mounted breaker.

The Datakustik Cadna/A industrial noise prediction model was used to estimate demolition noise levels. It was assumed that demolition would occur continuously within the grading area boundary. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations. It was assumed that the equipment would be operational for no more than 8 total hours per day. No noise reduction related to ground effects, atmospheric absorption, or intervening topography was included in the model.

The closest offsite occupied residential properties are located approximately 55 feet away from the southeast project boundary, across Evans Street to the southeast. Without noise abatement, under the assumptions detailed above, project demolition activity would produce noise levels up to approximately 70 dBA Leq (12 hours) at the property lines of the offsite residences.

At the onsite residences, noise levels would range from 75 dBA Leq (12 hours) near the north corner of the project site to approximately 78 dBA Leq (12 hours) along the northeast and northwest sides without abatement. With a 12-foot barrier, project demolition activity would produce noise levels up to approximately 74 dBA Leq (12 hours) at first-floor onsite unit Mercado Apartments façades. With a barrier as high as the top of the nearest second-story window, noise levels would be as high as 74 dBA Leq (12 hours). Temporary demolition noise would also not substantially interfere with normal business operations or affect any other sensitive receptors. Project demolition noise impacts would be less than significant.

4.1.2 Construction

The primary noise source from project construction would be from site preparation. Grading could require the use of heavy equipment such as bulldozers, loaders, and scrapers. No blasting would be necessary. No soil import or export during grading is expected.

Construction of the project would generate a short-term temporary increase in noise in the project area. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the impact would depend on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the construction phase, acoustical shielding and distance between the noise source and receiver.

This project would implement conventional construction techniques and equipment. Standard equipment such as bulldozers, backhoes, and miscellaneous trucks would be used for construction of most project facilities. Sound levels of typical construction equipment range from approximately 65–95 dBA at 50 feet from the source (U.S. Environmental Protection Agency [U.S. EPA] 1971). Worst-case noise levels are typically associated with grading. Noise sources associated with grading of the proposed project, and associated noise levels, are shown in Table 5.

Table 4. Grading Noise Source Levels

Noise Source	Noise Level	Number
Bulldozer	80 dBA at 10 meters	1
Backhoe	69 dBA at 10 meters	1
Water Truck	81 dBA at 10 meters	1
Roller	73 dBA at 10 meters	1

Source: DEFRA 2005

The Datakustik Cadna/A industrial noise prediction model was used to estimate construction noise levels. It was assumed that up to two pieces of equipment at any given time would operate continuously within the grading area boundary. For this analysis, the worst-case combination of a bulldozer and water truck were used. It was assumed that grading would occur up to the edge of the project boundary. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations. It was assumed that the construction equipment would operate in the central 50% of the site for half of any given

day, and that the equipment would be operational for no more than 8 total hours per day. No noise reduction related to ground effects, atmospheric absorption, or intervening topography was included in the model.

The closest offsite occupied residential properties are located approximately 55 feet away from the southeast project boundary, across Evans Street to the southeast. Without noise abatement, under the assumptions detailed above, project construction activity would produce noise levels up to approximately 73 dBA Leq (12 hours) at the property lines of the residences.

The closest onsite residences are immediately adjacent to the project boundary. At the onsite residences, noise levels would range from 76 dBA Leq (12 hours) near the north corner of the project site to approximately 79 dBA Leq (12 hours) along the northeast and northwest sides without abatement. With a 12-foot barrier, project demolition activity would produce noise levels up to approximately 74 dBA Leq (12 hours) at first-floor onsite unit Mercado Apartments façades. With a barrier as high as the top of the nearest second-story window, noise levels would be as high as 74 dBA Leq (12 hours).

Construction would occur during the days and hours proscribed by the City of San Diego Municipal Code. Construction noise levels at residential property lines would not exceed the 75 dBA Leq (12 hour) sound level allowed by the City of San Diego Municipal Code. Temporary construction noise would also not substantially interfere with normal business operations or affect any other sensitive receptors. Project construction noise impacts would be less than significant.

4.2 Construction Vibration

Vibration levels were estimated using the following Caltrans formula:

$$PPV_{Equipment} = PPV_{Ref} (25/D)^n \quad (in/sec) \quad (Eq. 12)$$

Where:

PPV_{Ref} = reference PPV at 25 ft.

D = distance from equipment to the receiver in ft.

$n = 1.1$ (the value related to the attenuation rate through ground)

Note: For PPVs measured at a different reference distance than 25 feet, that value was substituted into the equation.

Equipment	Vibration Level (PPV)	Distance		
		0.3 in/sec	0.04 in/sec	0.01 in/sec
Small Vibratory Roller	0.022 in/sec at 100 feet [ATS] – 0.029 in/sec at 99 feet [University of Nebraska]	9-12 feet	58-75 feet	205-263 feet
Hand-Operated Tamper	0.0079 in/sec at 49.2 feet [King / Demarco]	2 feet	11 feet	40 feet
Walk-Behind Compactor	0.0039 in/sec at 49.2 feet [King / Demarco]	1 foot	6 feet	21 feet
Excavators, Dozers, Loaders, Motor Grader, Backhoe	0.089 in/sec at 25 feet [FTA]	8 feet	52 feet	182 feet
Trucks, Reach Lift	0.076 in/sec at 25 feet [FTA]	7 feet	45 feet	158 feet
Small Bulldozer	0.003 in/sec at 25 feet [FTA]	-	2 feet	8 feet

As a condition of approval, to avoid annoyance from vibration, the following would be required and included on the grading plan prior to grading permit issuance:

- When grading occurs within 52 feet of a residence, use a small bulldozer, or temporarily relocate the resident(s).
- When soil compaction occurs within 75 feet of a residence, use a hand-operated tamper or walk-behind compactor, or temporarily relocate the resident(s).
- When soil compaction occurs within 11 feet of a residence, temporarily relocate the resident(s).

This equipment is expected to be used during demolition and construction. With these preventive measures, vibration impacts would be less than significant.

4.3 Operational (Non-Construction) Noise

4.3.1 Stationary Noise Sources

The project building would have rooftop HVAC units. It is anticipated that there would be one unit per residence, plus approximately 10% additional units for common areas. It was assumed that the units would be screened with parapet walls at least as tall as the units. The unit sizes are not currently specified; however, it was assumed that 3-ton units would be used. A typical 3-ton HVAC condenser produces a sound power level of approximately 77 dBA [Carrier].

The Datakustik Cadna/A industrial noise prediction model was used to estimate operational noise levels. It was assumed that the units could operate continuously. The HVAC units would produce operational noise levels up to approximately 40 dBA Leq at the project property lines.

Project operation would not exceed the property line sound levels allowed by the City of San Diego Municipal Code. Operational stationary noise source impacts of the project would be less than significant.

4.3.2 Mobile Noise Sources

The project would add an ADT volume of 442 vehicles to the existing volume of 2,210 vehicles on Newton Avenue [LLG 2023]. As the project parking lot is accessed from Newton Avenue, and the project driveway on Evans Street would be for deliveries only, the project would add fewer vehicles to all other streets.

This increase in traffic would result in an increase of less than 1 dBA CNEL. As this increase in traffic noise would be less than 3 dBA, it would be considered not perceptible to the average person and less than significant. Project operation mobility noise impacts would be less than significant.

4.4 Land Use Compatibility

The future noise environment on the project site would primarily be a result of vehicular traffic on Main Street; a secondary source would be rail operations.

4.4.1 Vehicular Traffic Noise

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 was used to estimate traffic noise levels. The modeling effort considered the peak-hour traffic volume, average estimated vehicle speed, and estimated vehicle mix, i.e., percentage of cars, medium trucks, heavy trucks, buses, and motorcycles. The peak hour traffic noise level was considered equivalent to the CNEL [24 CFR §51.106]. The model was calibrated using actual traffic counts and sound level measurements. Measured sound levels were approximately 6 dBA higher than modeled sound levels, due to multiple extraneous noise sources detailed above; no adjustment was made to future modeled levels. Future vehicular traffic calculations are summarized in Appendix B.

Sound levels caused by line sources (i.e., variable or moving sound sources such as traffic) generally decrease at a rate of 3 to 4.5 dBA when the distance from the road is doubled, depending on the ground surface hardness between the source and the receiving property [Caltrans 2013a]. The model assumed “pavement” propagation conditions, which corresponds to a drop-off rate of approximately 3 dBA per doubling of distance. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures (walls and buildings), barriers, and topography. The noise attenuating effects of changes in elevation and topography were not included in the model. Therefore, the modeling effort is considered a worst-case representation of the roadway noise.

Main Street is projected to carry an ADT volume of 6,900 vehicles between Cesar Chavez Parkway and Evans Street [SANDAG 2022]. The existing speed of 45 mph and traffic mix of 1.5% heavy trucks were assumed to remain constant in the future; the hourly volume of buses was not expected to increase.

Future exterior roadway noise levels at the proposed buildings would range from below 55 dBA CNEL at the north façade corner to approximately 68 dBA CNEL at the south façade corner.

4.4.2 Rail Noise

Freight train and light rail traffic projections are not available. As such, the existing rail noise environment is considered applicable to describe the future rail noise environment.

4.4.3 Composite Noise

Future exterior composite (traffic + rail) noise levels at the proposed buildings would range from below 55 dBA CNEL at the northeast façade to approximately 71 dBA CNEL at the southwest façade.

The project includes the following common outdoor usable areas: a courtyard, play yard, and plaza. These areas are shielded from roadway and rail traffic by the project buildings and existing buildings to remain. Future exterior composite noise levels would be below 60 dBA CNEL at all common outdoor spaces in the project. Refer to Figure 3 for details.

Multi-family residential uses are compatible with noise levels up to 60 dBA CNEL and conditionally compatible with noise levels up to 70 dBA CNEL per the General Plan Noise Element. As a condition of approval, an interior noise analysis would be required to demonstrate that interior noise levels in the proposed residential buildings would not exceed 45 dBA CNEL, as discussed further in Section 4.4.4 below.

4.4.4 Interior Noise

Because future exterior noise levels would exceed 60 dBA CNEL at some building façades, interior noise levels in habitable rooms could exceed the City of San Diego General Plan Noise Compatibility Guidelines and CBC Section 1206.4 requirement of 45 dBA CNEL in residences.

To comply with this requirement, upgraded building façade elements (windows, walls, doors, and/or exterior wall assemblies) with Sound Transmission Class (STC) ratings of 35 or higher may be necessary.

If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets CBC requirements.

Implementation of these measures would ensure that interior noise levels would be 45 dBA CNEL or below in residences, and the project would comply with the City of San Diego General Plan Noise Compatibility Guidelines and the CBC Section 1206.4 requirement.

As a condition of approval, an interior noise analysis for the project will be required to demonstrate that interior noise levels would be 45 dBA CNEL or below.

Mercado Apartments Noise Analysis

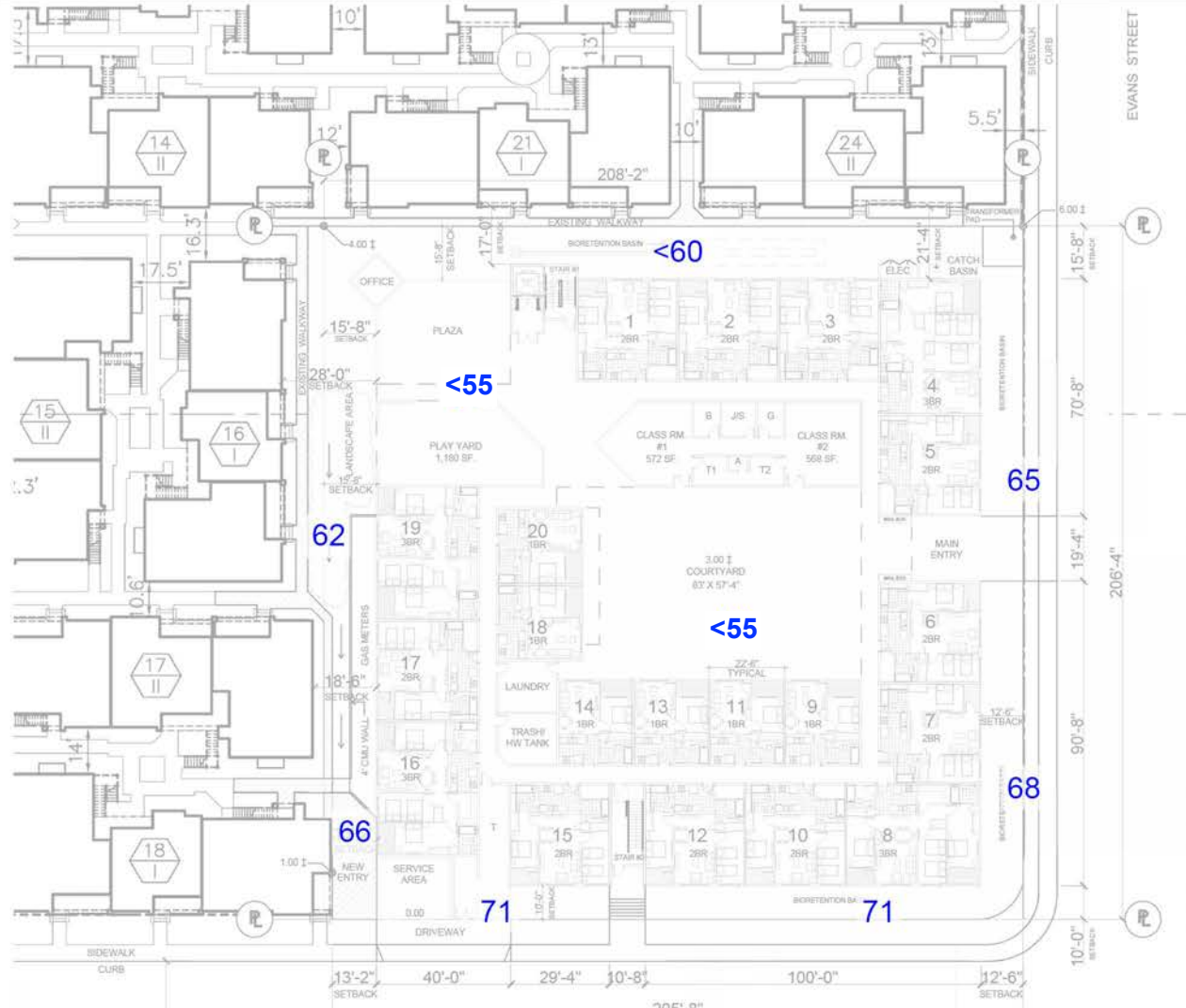


FIGURE 3
Future Exterior Noise Levels (CNEL)

5.0 RECOMMENDATIONS

5.1 Vehicular Traffic and Rail Noise

As a condition of approval, an interior noise analysis would be required to demonstrate that interior noise levels in the proposed residential buildings would not exceed 45 dBA CNEL.

5.2 Operational (Non-Construction) Noise

No recommendations are required.

5.3 Demolition and Construction Noise

As a condition of approval, a solid 12-foot-high wall would be placed along the northeast and northwest project boundaries prior to the start of demolition. This wall would be constructed of a material with a minimum density of 3.5 pounds per square foot, and remain in place until the end of construction. As a condition of approval, the second-story units in the onsite buildings facing the project area would be vacant during this period.

As a condition of approval, to avoid annoyance from vibration, the following would be required and included on the grading plan prior to grading permit issuance:

- When grading occurs within 52 feet of a residence, use a small bulldozer, or temporarily relocate the resident(s).
- When soil compaction occurs within 75 feet of a residence, use a hand-operated tamper or walk-behind compactor, or temporarily relocate the resident(s).
- When soil compaction occurs within 11 feet of a residence, temporarily relocate the resident(s).

6.0 REFERENCES

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7.0 LIST OF PREPARERS



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Principal, dBF Associates, Inc.

Noise Model Based on Federal Transit Administration General Transit Noise Assessment
 Developed for Chicago Create Project
 Copyright 2006, HMMH Inc.
 Case: Palm City Transit Neighborhood

RESULTS			
Noise Source	Ldn (dB)	Leq - daytime (dB)	Leq - nighttime (dB)
All Sources	57	30	51
Source 1	49	27	43
Source 2	52	10	46
Source 3	49	27	43
Source 4	52	10	46
Source 5	0	0	0
Source 6	0	0	0
Source 7	0	0	0
Source 8	0	0	0

Enter noise receiver land use category below.

LAND USE CATEGORY	
Noise receiver land use category (1, 2 or 3)	2

Enter data for up to 8 noise sources below - see reference list for source numbers.

NOISE SOURCE PARAMETERS												
Parameter	Source 1			Source 2			Source 3			Source 4		
Source Num.	Freight Locomotive	9	Freight Cars	10	Freight Locomotive	9	Freight Cars	10	Freight Locomotive	9	Freight Cars	10
Distance (source to receiver)	distance (ft)	290	distance (ft)	290	distance (ft)	300	distance (ft)	300	distance (ft)	300	distance (ft)	300
Daytime Hours (7 AM - 10 PM)	speed (mph)		speed (mph)		speed (mph)		speed (mph)		speed (mph)		speed (mph)	
	trains/hour		trains/hour		trains/hour		trains/hour		trains/hour		trains/hour	
	locos/train		length of cars (ft) / train		locos/train		length of cars (ft) / train		locos/train		length of cars (ft) / train	
Nighttime Hours (10 PM - 7 AM)	speed (mph)	40	speed (mph)	40	speed (mph)	40	speed (mph)	40	speed (mph)	40	speed (mph)	40
	trains/hour	0.222	trains/hour	0.222	trains/hour	0.222	trains/hour	0.222	trains/hour	0.222	trains/hour	0.222
	locos/train	1	length of cars (ft) / train	2040	locos/train	1	length of cars (ft) / train	2040	locos/train	1	length of cars (ft) / train	2040
Wheel Flats?			% of cars w/ wheel flats	100.00%			% of cars w/ wheel flats	100.00%			% of cars w/ wheel flats	100.00%
Jointed Track?	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N
Embedded Track?	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N
Aerial Structure?	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N
Barrier Present?	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N	Y/N	N
Intervening Rows of Buildings	number of rows	0	number of rows	0	number of rows	0	number of rows	0	number of rows	0	number of rows	0

SOURCE REFERENCE LIST	
Source	Number
Commuter Electric Locomotive	1
Commuter Diesel Locomotive	2
Commuter Rail Cars	3
RRT/LRT	4
AGT, Steel Wheel	5
AGT, Rubber Tire	6
Monorail	7
Maglev	8
Freight Locomotive	9
Freight Cars	10
Hopper Cars (empty)	11
Hopper Cars (full)	12
Crossover	13
Automobiles	14
City Buses	15
Commuter Buses	16
Rail Yard or Shop	17
Layover Tracks	18
Bus Storage Yard	19
Bus Op. Facility	20
Bus Transit Center	21
Parking Garage	22
Park & Ride Lot	23

FRA Grade Crossing Noise Model

User Input	
Noise Situation (Pick from List)	1
Horn Lmax (dBA) @ 100 feet	104
Horn Location on Locomotive(Pick from List)	1
Non Train Noise Environment (pick from list)	2
Shielding (Pick from List)	6
Length of Impact Area (pick from list)	1
Existing Train Speed (mph)	40
Future Train Speed (mph)	40
Number of Existing Trains in one Direction	2
Number of Future Trains in one Direction	2
Existing Number of Day Trains (7 am to 10 p.m.)	0
Future Number of Day Trains (7 am to 10 p.m.)	0
Existing Number of Night Trains (10 p.m. to 7 am)	2
Future Number of Night Trains (10 p.m. to 7 am)	2
Existing Average Number of Cars	30
Future Average Number of Cars	30
Existing Average Number of Locomotives	1
Future Average Number of Locomotives	1

Noise Situation	
Horns Existing and Future	1
Horns in Future Only	2
No Horns Existing and Future	3

Horn Location on Locomotive	
National Average (50% front, 50% middle)	1
All Front Mounted	2
All Middle Mounted	3
User Defined	80 % front mounted horns 4

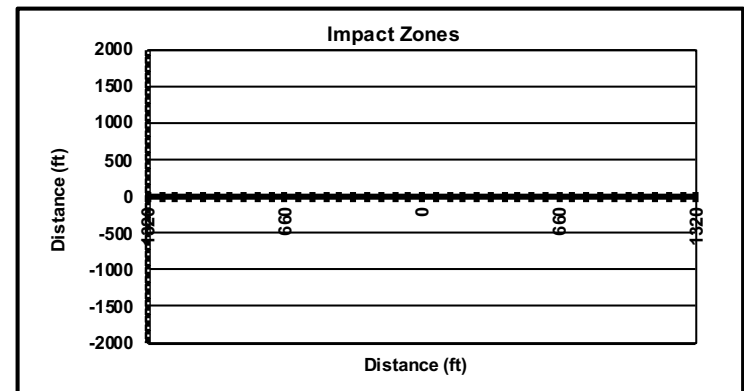
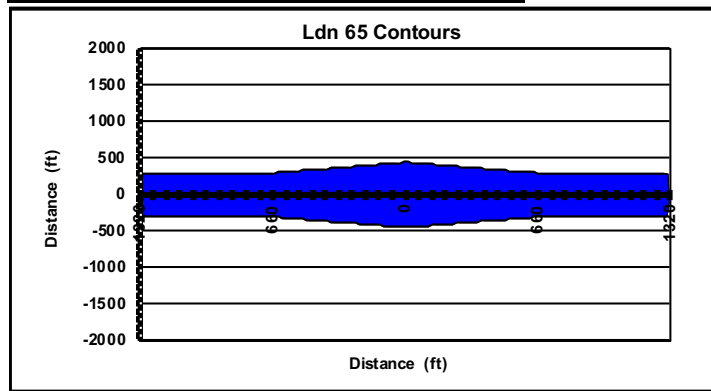
Non Train Noise Environment	
Urban	1
Suburban	2
Rural	3
User Defined Ldn =	0 dBA 4

Shielding	
Dense Urban	1
Light Urban	2
Dense Suburban	3
Light Suburban	4
Rural	5
No Shielding	6

Length of Impact Area	
1/4 mile	1
20 seconds	2
15 seconds	3

Ldn 65 Contours Numeric Output (in feet)	
Existing 65 Ldn Contour at X-ing	446
Future 65 Ldn Contour at X-ing	446
Existing 65 Ldn Contour at 1/2 zone length	298
Future 65 Ldn Contour at 1/2 zone length	298
Zone Length	1320
1/2 Zone Length	660

Impact Zones Numeric Output (in feet)	
Impact Distance at X-ing	0
Severe Impact Distance at X-ing	0
Impact Distance at 1/2 zone length	0
Severe Impact Distance at 1/2 zone length	0
Zone Length	1320
1/2 Zone Length	660



INPUT: ROADWAYS

Mercado Apartments

dBFA Associates, Inc.				7 July 2022							
SPF				TNM 2.5							
INPUT: ROADWAYS											
PROJECT/CONTRACT:		Mercado Apartments								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA	
RUN:		Measured									
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)		Flow Control				Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Main Street SEB	12.0	point1	1	-500.0	-6.0	0.00				Average	
		point2	2	500.0	-6.0	0.00					
Main Street NWB	12.0	point3	3	500.0	6.0	0.00				Average	
		point4	4	-500.0	6.0	0.00					

INPUT: TRAFFIC FOR LAeq1h Volumes

Mercado Apartments

dBF Associates, Inc.		7 July 2022										
SPF		TNM 2.5										
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:		Mercado Apartments										
RUN:		Measured										
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos		V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Main Street SEB	point1	1	32	35	0	0	6	35	2	35	0	0
	point2	2										
Main Street NWB	point3	3	32	35	0	0	6	35	2	35	0	0
	point4	4										

RESULTS: SOUND LEVELS

Mercado Apartments

dB Associates, Inc.													7 July 2022	
SPF													TNM 2.5	
													Calculated with TNM 2.5	
RESULTS: SOUND LEVELS														
PROJECT/CONTRACT:			Mercado Apartments											
RUN:			Measured											
BARRIER DESIGN:			INPUT HEIGHTS							Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.				
ATMOSPHERICS:			68 deg F, 50% RH											
Receiver														
Name		No.	#DUs	Existing	No Barrier			With Barrier						
				LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction			
					Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated minus Goal	
				dB	dB	dB	dB	dB		dB	dB	dB	dB	
ML!		1	1	65.0	59.1	66	-5.9	10	----	59.1	0.0	8	-8.0	
Dwelling Units			# DUs	Noise Reduction										
				Min	Avg	Max								
				dB	dB	dB								
All Selected			1	0.0	0.0	0.0								
All Impacted			0	0.0	0.0	0.0								
All that meet NR Goal			0	0.0	0.0	0.0								

INPUT: TRAFFIC FOR LAeq1h Volumes

Mercado Apartments

dBF Associates, Inc.		7 July 2022										
SPF		TNM 2.5										
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:		Mercado Apartments										
RUN:		Future										
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos		V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Main Street SEB	point1	1	291	35	0	0	52	35	2	35	0	0
	point2	2										
Main Street NWB	point3	3	291	35	0	0	52	35	2	35	0	0
	point4	4										

INPUT: RECEIVERS

Mercado Apartments

							13 September 2023				
dBF Associates, Inc.							TNM 2.5				
SPF											
INPUT: RECEIVERS											
PROJECT/CONTRACT:		Mercado Apartments									
RUN:		Future									
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	
			ft	ft	ft	ft	dB	dB	dB	dB	
S corner west side	1	1	-50.0	55.0	0.00	4.92	0.00	66	10.0	8.0	Y
S corner east side	3	1	-39.2	63.3	0.00	4.92	0.00	66	10.0	8.0	Y
SE side midpoint	4	1	-39.7	138.1	0.00	4.92	0.00	66	10.0	8.0	Y
E corner	5	1	-38.7	224.2	0.00	4.92	0.00	66	10.0	8.0	Y
NE side	7	1	-137.7	246.3	0.00	4.92	0.00	66	10.0	8.0	Y
Courtyard	8	1	-122.9	155.8	0.00	4.92	0.00	66	10.0	8.0	Y
Plaza / Play Yard	9	1	-178.0	210.9	0.00	4.92	0.00	66	10.0	8.0	Y
W corner	10	1	-223.8	69.6	0.00	4.92	0.00	66	10.0	8.0	Y

INPUT: BARRIERS

Mercado Apartments

dBF Associates, Inc.										13 September 2023									
SPF										TNM 2.5									
INPUT: BARRIERS																			
PROJECT/CONTRACT:					Mercado Apartments														
RUN:					Future														
Barrier										Points									
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment			On	Important
		Min	Max	\$ per Unit	\$ per Unit	Top Width	Run:Rise	\$ per Unit			X	Y	Z	at Point	Seg Ht	Perturbs	Struct?		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				
Barrier2	W	0.00	99.99	0.00				0.00	point1	1	-43.0	145.0	0.00	45.00	0.00	0	0		
									point2	2	-43.0	56.0	0.00	45.00	0.00	0	0		
									point3	3	-185.0	56.0	0.00	45.00	0.00	0	0		
									point4	4	-185.0	65.0	0.00	45.00	0.00	0	0		
									point5	5	-220.0	65.0	0.00	45.00	0.00	0	0		
									point6	6	-220.0	175.0	0.00	45.00					

RESULTS: SOUND LEVELS

Mercado Apartments

dB Associates, Inc.										13 September 2023			
SPF										TNM 2.5			
										Calculated with TNM 2.5			
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:										Mercado Apartments			
RUN:										Future			
BARRIER DESIGN:										INPUT HEIGHTS			
										Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.			
ATMOSPHERICS:										68 deg F, 50% RH			
Receiver													
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier				
					Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated LAeq1h	Noise Reduction		
								Sub'l Inc			Calculated	Goal	Calculated minus Goal
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
S corner west side		1	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
S corner east side		3	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
SE side midpoint		4	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
E corner		5	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
NE side		7	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0
Courtyard		8	1	0.0	41.8	66	41.8	10	----	41.8	0.0	8	-8.0
Plaza / Play Yard		9	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
W corner		10	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
Dwelling Units			# DUs	Noise Reduction									
				Min	Avg	Max							
				dB	dB	dB							
All Selected			8	0.0	0.0	0.0							
All Impacted			1	0.0	0.0	0.0							
All that meet NR Goal			0	0.0	0.0	0.0							