NOISE IMPACT ANALYSIS

WARMINGTON RESIDENTIAL PROJECT
12841 VALLEY VIEW AVENUE

LA MIRADA, CALIFORNIA

Prepared by:

Giroux & Associates
1800 E Garry St., #205
Santa Ana, CA 92705

Prepared for:

Phil Martin & Associates
Attn: Phil Martin
4860 Irvine Boulevard, Suite 203
Irvine, CA 92620

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NOISE SETTING

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise is generally considered to be unwanted sound. Sound is characterized by various parameters that describe the rate of oscillation of sound waves, the distance between successive troughs or crests, the speed of propagation, and the pressure level or energy content of a given sound. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level.

Loud or soft, noisy or quiet, high-and-low pitch are all qualitative terms used to describe sound. These terms are relative descriptions. The science of acoustics attempts to quantify the human perception of sound into a quantitative and measurable basis. Amplitude is the measure of the pressure exerted by sound waves. Amplitude may be so small as to be inaudible by humans, or so great as to be painful. Frequency refers to pitch or tone. The unit of measure is in cycles per second called “hertz”. Very low frequency bass tones and ultra-high frequency treble are difficult for humans to detect. Many noise generators in the ambient world are multi-spectral.

The decibel (dB) scale is used to quantify sound pressure levels. Although decibels are most commonly associated with sound, "dB" is a generic descriptor that is equal to ten times the logarithmic ratio of any physical parameter versus some reference quantity. For sound, the reference level is the faintest sound detectable by a young person with good auditory acuity.

Since the human ear is not equally sensitive to all sound frequencies within the entire auditory spectrum, human response is factored into sound descriptions by weighting sounds within the range of maximum human sensitivity more heavily in a process called “A-weighting,” written as dB(A). Any further reference in this discussion to decibels written as "dB" should be understood to be A-weighted.

Leq is a time-averaged sound level; a single-number value that expresses the time-varying sound level for the specified period as though it were a constant sound level with the same total sound energy as the time-varying level. Its unit is the decibel (dB). The most common averaging period for Leq is hourly.

Because community receptors are more sensitive to unwanted noise intrusion during more sensitive evening and nighttime hours, state law requires that an artificial dBA increment be added to quiet time noise levels. The 24-hour noise descriptor with a specified evening and nocturnal penalty is called the Community Noise Equivalent Level (CNEL). CNEL’s are a weighted average of hourly Leq’s.

PLANNING STANDARDS

The City of La Mirada has established guidelines for acceptable community noise levels that are based upon the CNEL rating scale to insure that noise exposure is considered in any development. CNEL-based standards apply to noise sources whose noise generation is preempted from local control (such as from on-road vehicles, trains, airplanes, etc.) and are used to make land use decisions as to the suitability of a given site for its intended use. These CNEL-based standards are articulated in the Noise Element of the General Plan.

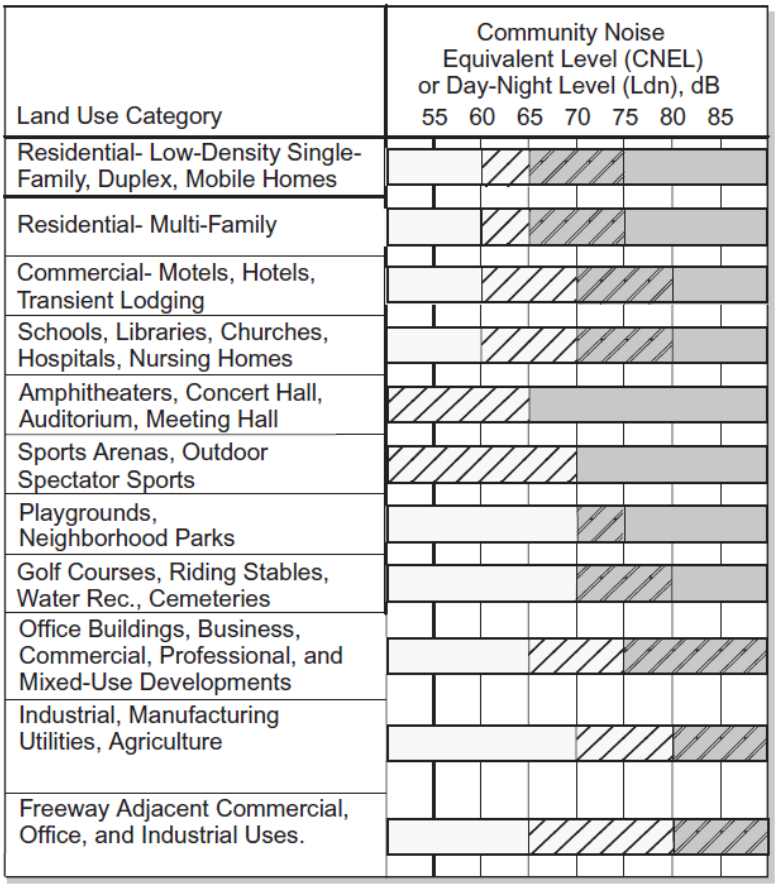
Figure 1 shows the noise compatibility guidelines for various uses. These guidelines would apply in usable outdoor space such as patios, yards, spas, etc. The guidelines indicate that an exterior noise level of 60 dB CNEL is considered to be a "normally acceptable" noise level for single family, duplex and mobile homes involving normal conventional construction, without any special noise insulation requirements. Exterior noise levels up to 65 dB CNEL are typically considered "conditionally acceptable", and residential construction should only occur after a detailed analysis of the noise reduction requirements is made and needed noise attenuation features are included in the project design. Exterior noise attenuation features include, but are not limited to, setbacks to place structures outside the conditionally acceptable noise contour, orienting structures so no windows open to the noise source, and /or installing noise barriers such as berms or solid walls.

An interior CNEL of 45 dB is mandated by the State of California Noise Insulation Standards (CCR, Title 24, Part 6, Section T25-28) for multiple family dwellings and hotel and motel rooms. In 1988, the State Building Standards Commission expanded that standard to include all habitable rooms in residential use, included single-family dwelling units. Since normal noise attenuation within residential structures with closed windows is 20-30 dB, an exterior noise exposure of 65-75 dB CNEL allows the interior standard to be met without any specialized structural attenuation (dual paned windows, etc.), but with closed windows and fresh air supply systems or air conditioning in order to maintain a comfortable living environment.

Noise standards applicable to those sources not preempted from local control (i.e., not from traffic on public streets, airplanes, trains, etc.) are contained in Section 9.04 of the La Mirada Municipal Code. Section 9.04.010 of the Code, based upon the definition of nuisance in the State Health and Safety Code, defines noise nuisance as follows:

- 9.04.010 (b)(4) No construction activities making "unnecessary" noise from 8 p.m. to 7 a.m. the next day, and all day on Sunday.

Figure 1 Noise Compatibility Guidelines (La Mirada General Plan)



Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB
Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB
Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB
Very noisy urban areas near arterials, freeways or airports.

75+ dB
Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

Normally Acceptable

Specific land use is satisfactory, based on the assumption that any building is of normal conventional construc-tion, without any special

Conditionally Acceptable

New construction or development should be undertaken only after a detailed analysis of noise reduction require-ments is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems

Normally Unacceptable

New construction or development should generally be discour-aged. If new construc-tion or development does proceed, a de-tailed analysis of noise reduction requirements must be made and needed noise insulation features included in design.

Clearly Unacceptable

New construction or development should generally not be undertaken.

BASELINE NOISE LEVELS

A noise study was conducted by Giroux & Associates on Friday, June 7, 2019. Three short term noise readings were made along in the project vicinity. The measurement results are shown below and the location of the monitors is shown on Figure 1.

Short-Term Noise Measurements (dB[A])

Start Time	Leq	Lmax	Lmin
13:00	69.6	82.1	51.0
13:15	64.7	74.0	43.2
13:30	62.1	74.3	39.1

Meter 1 was located in the shopping center immediately north of the site fronting Valley View Avenue. The meter was sited between the Teriyaki and Sushi Restaurant and the site driveway in order to capture noise from the existing commercial shopping center. It was observed that the majority of the noise was from traffic on Valley View Avenue and very little noise was associated with the shopping center. There was little car traffic in the southern end of the shopping center parking lot and only an occasional delivery truck. This meter was approximately 80 feet from the Valley View Avenue centerline. Monitoring experience has shown that 24-hour weighted CNELs are typically 2-3 dB higher than mid-afternoon Leq readings shown above which would translate to 71-72 dBA CNEL near the Valley View Avenue centerline.

Meter 2 was placed farther back from Valley View Avenue to approximate noise in the center of the site. It was placed in front of the existing structure, approximately 210 feet from the Valley View centerline. The leq was almost 65 dBA. The site is currently abandoned such that all traffic noise was from Valley View Avenue and other surrounding roadways.

Meter 3 was placed by the senior living facility building on Adoree Street that is closest to Valley View Avenue. Noise readings at this location showed a Leq of 62.1 dBA again from traffic along Valley View Avenue. This meter was approximately 240 feet from the Valley View centerline.

Figure 2 Noise Meter Location

NOISE IMPACTS

NOISE SIGNIFICANCE CRITERIA

Noise impacts are considered significant if they result in:

a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

STANDARDS OF SIGNIFICANCE

Noise impacts are considered significant if they expose persons to levels in excess of standards established in local general plans or noise ordinances. The exterior noise standard for the City of La Mirada residential uses is 65 dBA CNEL in usable outdoor space such as backyards, decks, patios, etc. If required, attenuation through setback and project perimeter barriers is anticipated to be used to reduce traffic noise to the 65 dBA CNEL goal. However, an inability to achieve this goal through the application of reasonably available mitigation measures would be considered a significant impact.

Impacts may also be significant if they create either a substantial permanent or temporary increase. The term "substantial" is not quantified in CEQA guidelines. In most environmental analyses, "substantial" is taken to mean a level that is clearly perceptible to humans. In practice, this is at least a +3 dB increase. Some agencies, such as Caltrans, require substantial increases to be +10 dB or more if noise standards are not exceeded by the increase. For purposes of this analysis, a +3 dB increase is considered a substantial increase. The following noise impacts due to project-related traffic would be considered significant:

1. If construction activities were to audibly intrude into adjacent uses south and east of the site.

2. If project traffic noise were to cause an increase by a perceptible amount (+3 dB CNEL) or expose receivers to levels exceeding city compatibility noise standards.

3. If future build-out noise levels were to expose La Mirada sensitive receivers to levels exceeding compatibility standards of 65 dB CNEL exterior at any outdoor uses or 45 dB CNEL interior noise levels in any habitable space.

CONSTRUCTION NOISE SIGNIFICANCE

The La Mirada Noise Ordinance regulates construction noise by a prohibition against making "unnecessary" noise from construction during noise-sensitive weekday hours and all day on Sundays.

CONSTRUCTION NOISE IMPACTS

Temporary construction noise impacts vary markedly because the noise strength of construction equipment ranges widely as a function of the equipment used and its activity level. Short-term construction noise impacts tend to occur in discrete phases dominated by large, earth-moving equipment sources for demolition and grading. During construction and paving, equipment is generally less noisy.

The closest sensitive uses to the project site are the single level mobile home park residences adjacent to the western project boundary and the four-story senior housing structure on the southern perimeter. There are planned 6-9 foot retaining walls along both property lines and there are currently block walls in place. The projects rear yard (western) setback is 20-feet, and the mobile homes are only 5 feet from this property line. This would provide a 25-foot setback for the mobile homes from the closest on-site structure. The senior housing to the south is 15-20 feet from the property line and the project will have a 10-foot side (southern) yard setback. Again, there will be an approximate 25-foot setback to the closest on-site structure.

In 2006, the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model that includes a national database of construction equipment reference noise emissions levels. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power during a construction phase. The usage factor is a key input variable that is used to calculate the average Leq noise levels.

Table 3 identifies highest (Lmax) noise levels associated with each type of equipment identified for use, then adjusts this noise level for distance to the closest sensitive receptor and the extent of equipment usage (usage factor), which is represented as Leq. The table is organized by construction activity and equipment associated with each activity

Quantitatively, the primary noise prediction equation is expressed as follows for the hourly average noise level (Leq) at distance D between the source and receiver (dBA):

Leq = Lmax @ 50' – 20 log (D/50') + 10log (U.F%/100) – I.L.(bar)
Where:
Lmax @ 50' is the published reference noise level at 50 feet
U.F.% is the usage factor for full power operation per hour
I.L.(bar) is the insertion loss for intervening barriers

For the proposed project, CalEEMod predicts the construction fleet would include equipment as shown in Table 1. Table 1 describes the noise level for each individual piece of equipment individually at a reference 50-foot distance.

Table 1
Construction Equipment Noise Levels

Phase Name and Duration	Equipment	Usage Factor[1]	Noise @ 50 feet (dB)[2]	Hourly Noise Level @ 50 feet (dB))
Demolition	Concrete Saw	20%	90	83
	Dozer	40%	85	82
	Loader/Backhoe	37%	78	74
Grading	Grader	40%	85	81
	Dozer	40%	85	82
	Loader/Backhoe	37%	78	74
Construction	Crane	16%	81	73
	Loader/Backhoe	37%	78	74
	Welders	46%	74	71
	Generator Set	50%	81	78
	Forklift	20%	75	69
Paving	Paver	50%	77	74
	Mixer	40%	79	75
	Paving Equipment	40%	76	72
	Loader/Backhoe	37%	78	74
	Roller	20%	80	74

Source: FHWA's Roadway Construction Noise Model, 2006

1. Estimates the fraction of time each piece of equipment is operating at full power during a construction operation
2. The Lmax values presented are the actual measured values summarized in the Roadway Noise Model User Guide (FHWA 2006) unless the actual is unavailable in which case the equipment specifications were used.

However, as discussed, this project could have setbacks closer than the 50-foot reference distance. There will be a 25-foot setback from the on-site structures to the closest homes to the west and south. The existing and proposed minimal 6-foot property line walls would assist in blocking construction noise at the homes to the west and south. A -6 dBA credit was taken for the walls.

At these setback distances, the noise levels shown in Table 3 would likely be observed:

Table 2
Construction Noise Equipment Levels at Off-Site Sensitive Uses (dBA Leq)

Phase Name and Duration	Equipment	Noise @ 25 feet	Noise Reduction for Wall	Expected Noise Level at Off-Site Receivers
Demolition	Concrete Saw	89	-6	83
	Dozer	88	-6	82
	Loader/Backhoe	80	-6	74
Grading	Grader	87	-6	81
	Dozer	88	-6	82
	Loader/Backhoe	80	-6	74
Construction	Crane	79	-6	73
	Loader/Backhoe	80	-6	74
	Welders	77	-6	71
	Generator Set	84	-6	78
	Forklift	75	-6	69
Paving	Paver	80	-6	74
	Mixer	81	-6	75
	Paving Equipment	78	-6	72
	Loader/Backhoe	80	-6	74
	Roller	80	-6	74

Interior noise levels would be approximately 25-30 dBA lower assuming closed windows. This would mean that adjacent residences would experience an interior noise level of 42-58 dBA during construction activities.

For indoor noise environments, the highest noise level that permits relaxed conversation with 100 percent intelligibility throughout the room is 45 dBA. Speech interference is considered to be highly intrusive when normal conversation is precluded at 3 feet, which occurs when ambient noise levels substantially exceed 60 dBA. An interior noise level of 42-58 dBA at indoor locations would maintain a barely acceptable interior noise environment with closed dual paned windows. In some cases, this noise reduction could be maintained only on a temporary basis, since it requires that windows remain closed at all times assuming homes have air conditioning.

The potential for construction-related noise to adversely affect nearby residential receptors would depend on the location and proximity of construction activities to these receptors. Most construction equipment will be located at a much greater setback than the worst-case examples provided in Table 2.

Construction noise is exempt from numerical noise standards from 7 a.m. to 8 p.m. Monday through Friday and 9 a.m. through 8 p.m. on Saturdays with no construction allowed on Sundays and any legal holiday.

CONSTRUCTION ACTIVITY VIBRATION

Ground-borne vibration occurs when heavy equipment travels over unpaved surfaces or when it is engaged in soil movement. The effects of ground-borne vibration include discernable movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Vibration related problems generally occur due to resonances in the structural components of a building because structures amplify groundborne vibration. Within the "soft" sedimentary surfaces of much of Southern California, ground vibration is quickly damped out. Groundborne vibration is almost never annoying to people who are outdoors (FTA 2006).

Groundborne vibrations from construction activities rarely reach levels that can damage structures. Because vibration is typically not an issue, very few jurisdictions have adopted vibration significance thresholds. Vibration thresholds have been adopted for major public works construction projects, but these relate mostly to structural protection (cracking foundations or stucco) rather than to human annoyance.

The vibration descriptor commonly used to determine structural damage is the peak particle velocity (ppv) which is defined as the maximum instantaneous positive or negative peak of the vibration signal, usually measured in in/sec. The range of such vibration is shown in Table 3:

Table 3
Human Response To Transient Vibration

Average Human Response	ppv (in/sec)
Severe	2.00
Strongly perceptible	0.90
Distinctly perceptible	0.24
Barely perceptible	0.03

Source: Caltrans Transportation and Construction Vibration Guidance Manual, 2013.

Over the years, numerous vibration criteria and standards have been suggested by researchers, organizations, and governmental agencies. There are no Caltrans or Federal Highway Administration standards for vibration.

According to Caltrans, the threshold for structural vibration damage for modern structures is 0.5 in/sec for intermittent sources, which include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. The American Association of State Highway and Transportation Officials (AASHTO) (1990) identifies maximum vibration levels for preventing damage to structures from intermittent construction or maintenance activities for residential buildings in good repair with gypsum board walls to be 0.4–0.5 in/sec. The damage threshold criterion of 0.2 in/sec is appropriate for fragile buildings. For the purpose of this analysis because area residences can be older, the 0.2 in/sec damage threshold for older fragile buildings is used as the evaluation criteria. Below this level there is virtually no risk of building damage. Table 4 shows the predicted vibration levels generated by construction equipment at varying distances.

Table 4
Estimated Vibration Levels During Project Construction

Equipment	PPV at 25 ft (in/sec)	PPV at 40 ft (in/sec)	PPV at 50 ft (in/sec)	PPV at 100 ft (in/sec)	PPV at 150 ft (in/sec)
Large Bulldozer	0.089	0.044	0.031	0.011	0.006
Loaded trucks	0.076	0.038	0.027	0.010	0.005
Jackhammer	0.035	0.017	0.012	0.004	0.002
Small Bulldozer	0.003	0.001	0.001	<0.001	<0.001

Source: FHWA Transit Noise and Vibration Impact Assessment

The calculation to determine PPV at a given distance is:

PPVdistance = PPVref*(25/D)^1.5

Where:

PPVdistance = the peak particle velocity in inches/second of the equipment adjusted for distance,

PPVref = the reference vibration level in inches/second at 25 feet, and

D = the distance from the equipment to the receiver.

The closest home to the proposed project buildings have an approximately a 25-foot separation. As seen on Table 5, even at a 25-foot setback the vibration levels are below levels that could create structural damage in fragile buildings (i.e., 0.2 in/sec). Operation of jackhammers as a typical source of construction vibration would generate vibration levels below the threshold for possible cosmetic damage level. Vibration would be less than the recommended acceptability threshold of 0.2 inches per second for fragile buildings.

VEHICULAR NOISE IMPACTS

Long-term noise concerns from the residential uses at the project site can be derived from vehicular operations on project area roadways. These concerns were addressed using the California specific vehicle noise curves (CALVENO) in the federal roadway noise model (the FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108). The model calculates the Leq noise level for a reference set of input conditions, and then makes a series of adjustments for site-specific traffic volumes, distances, speeds, or noise barriers.

Table 5 summarizes the 24-hour CNEL level at 50 feet from the roadway centerline along area roadway segments. The noise calculations utilize data from the project traffic analysis, prepared by the traffic consultant for this project. Two traffic years were evaluated; existing conditions ("with project" and "without project"), and opening year 2021, ("with project" and "without project").

As shown in Table 5, project implementation in the existing and opening year timeframe does little to change the overall traffic noise environment. Because the area is mostly built out, addition of project traffic to area roadways does little to the traffic noise environment. The project area will experience limited traffic volume changes and the amount of traffic generated by the proposed project is diluted by significant background traffic volumes. The largest increase attributed to project implementation is along Adoree Street east of the site which currently carries very little traffic; 760 daily vehicle trips. The project will only add 40 additional trips but because the current volumes are so low this roadway segment will experience the largest proportional noise increase. However, this noise increase is only+0.2 dB CNEL which is well below the +3 dBA CNEL significance threshold. In addition, the "with project" noise level at 50 feet from the roadway centerline is only 54.4 dBA CNEL even in the "2021 with project" scenario. This is well below the recommended residential compatibility threshold of 65 dBA CNEL. The next largest project related traffic noise impact is +0.1 dBA CNEL and many segments will not see any appreciable noise difference. Therefore, project related noise increases are much less than either the +3 dBA significance threshold or the recommended noise compatibility threshold and therefore project traffic impact is less than significant.

Table 5
Traffic Noise Impact Analysis
(dBA CNEL at 50 feet from centerline)

Segment		Existing No Project	Existing With Project	2021 No Project	2021 With Project
Valley View Ave/	N of Imperial	69.9	69.9	70.0	70.0
	S of Imperial	71.0	71.1	71.1	71.2
	N of Site	71.3	71.3	71.4	71.4
	S of Site	71.1	71.2	71.3	71.3
	Adoree St-Foster Rd	71.0	71.1	71.1	71.2
	Foster Rd-Rosecrans	71.3	71.3	71.4	71.4
	S of Rosecrans Ave	70.7	70.7	70.8	70.9
Rosecrans Ave/	W of Valley View	69.5	69.5	69.6	69.6
	E of Valley View	70.1	70.1	70.3	70.3
Foster Rd/	W of Valley View	62.7	62.7	62.8	62.8
Adoree St/	E of Valley View	55.4	55.6	55.6	55.8
Imperial Hwy/	W of Valley View	71.1	71.1	71.2	71.2
	E of Valley View	70.9	70.9	71.1	71.1

The project site itself will be potentially noise impacted by traffic along Valley View Avenue. As seen in Table 5, the "future with project" traffic noise level along Valley View Avenue adjacent to the project site is 71 dBA CNEL at 50 feet from the roadway centerline.

The project has a 15-foot setback from the Valley View Avenue ROW. The distance from the project property line to the center of Valley View Avenue is about 50 feet, for a total setback distance of 65 feet. This will afford -1 dBA of noise mitigation for a resultant noise loading at the closest project façade of 70 dBA CNEL.

There are planned balconies fronting Valley View Avenue. However, the balconies are recessed and enclosed on three sides. This will limit the field of view and provide -3 dBA of noise attenuation. The resultant noise level at receivers on the balconies would be around 67 dBA CNEL and would almost meet the recommended 65 dBA CNEL compatibility guidelines for recreational use. However, there is no mitigation measure that would reduce noise by -2 dBA. A plexi-glass shield on the balconies Valley View Avenue frontage would provide more than the -2 dBA and would limit air flow. Approximately 82 percent of the projects recreational space is made up of common areas and individual patios interior to the site which would be noise protected by distance and by shielding offered by the buildings themselves.

The residences must also be able to achieve the 45 dB CNEL interior noise threshold. As discussed, the closest building façade is approximately 65 feet from the roadway centerline. The noise loading at the closest building façade will be as high as 71 dB CNEL at build-out such that a -26 dBA noise reduction would be needed

For typical wood-framed construction with stucco and gypsum board wall assemblies, the exterior to interior noise level reduction is as follows:

Partly open windows – 12 dBA

Closed single-paned windows – 20 dBA

Closed dual-paned windows – 30 dBA

Use of dual-paned windows is required by the California Building Code (CBC) for energy conservation in new residential construction.

Interior standards will be met as long as residents have the option to close their windows. Where window closure is needed to shut out noise, supplemental ventilation is required by the CBC with some specified gradation of fresh air. Central air conditioning or a fresh air inlet on a whole house fan would meet this requirement.

SUMMARY AND MITIGATION

Noise from temporary construction activities is exempt from noise ordinances as long as the construction activities are between the hours of 7 a.m. and 8 p.m., Monday through Saturday, with no activity on Sundays or federal holidays. In addition, the following construction practices are recommended:

- Stockpiling and staging activities must be located as far as practicable from dwellings.
- All mobile equipment shall have properly operating and maintained mufflers.

Vibration levels from heavy equipment will not cause any structural damage.

The project noise impact study indicates a less-than-significant noise impact from project-related traffic on project vicinity receptors. Project-related traffic will not make substantially worse any existing violations.

Exterior traffic noise levels at upper level balconies fronting Valley View Boulevard may be slightly more than 65 dBA CNEL, but less than 70 dBA CNEL. Only 18 percent of the projects recreational space is comprised of private balconies. All other recreational areas will be noise protected because they are interior to the site or shielded by buildings and the property line walls.

Habitable interior space will be adequately noise protected to achieve 45 dB with only the ability to close windows at perimeter units adjacent to Valley View Avenue. Where window closure is needed for policy compliance, supplemental fresh air ventilation will be provided at rates specified in the California Building Code.