NUVO EL TORO RESIDENTIAL PROJECT

NOISE STUDY

Prepared for:

VCS Environmental, Inc.
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, CA 92675

Prepared by:

BPG
BIRDSEYE
PLANNING GROUP

April 2020

NUVO EL TORO RESIDENTIAL PROJECT
MISSION VIEJO, CALIFORNIA
Noise Study

Table of Contents

Page

List of Figures

List of Tables

Appendices

NUVO EL TORO RESIDENTIAL PROJECT
MISSION VIEJO, CALIFORNIA
NOISE STUDY

This report is an analysis of the potential noise impacts associated with the proposed Nuvo El Toro Residential Project (proposed project) in the City of Mission Viejo. This report has been prepared by Birdseye Planning Group (BPG) under contract to VCS Environmental, Inc., to support preparation of the environmental documentation pursuant to the California Environmental Quality Act (CEQA). This study analyzes the potential for permanent impacts associated with operation of the proposed project and temporary impacts associated with construction activity within proximity to the construction area.

PROJECT DESCRIPTION

The Nuvo El Toro Residential Project would construct 91 multifamily residential units on 3.8-acre (6.46 gross acres) site located at the southeast corner of the El Toro Road/Marguerite Parkway intersection in the northeastern area of the City of Mission Viejo. The site is vacant and comprised of hilly, heavily vegetated terrain. The project site is currently zoned Open Space/Recreation and designated for the same use in the General Plan. The project site is located within an urbanized setting and is surrounded by a parking lot and office building to the west, State Route 241 to the east, an open space slope and multiple family land uses (California Court Condominiums) to the south and a self-storage facility to the northeast across El Toro Road. Regional access to the site would be provided from State Route 241 and local access would be from El Toro Road. The project would include all on-site infrastructure improvements including primary and secondary access, utilities, streets and stormwater detention facilities. The City of Mission Viejo would be the Lead Agency for the project.

For planning purposes, construction is expected to begin in early 2021 and be completed by mid-2022. The vicinity map is provided as Figure 1. The site plan is provided as Figure 2.

SETTING

Overview of Sound Measurement

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero

Source: Google Earth Pro; March 2020.
- approximate Project Site Boundary

Figure 1 — Vicinity Map

Figure 2 — Site Plan

sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations. Noise levels typically attenuate (or drop off) at a rate of 6 dBA per doubling of distance from point sources (i.e., industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units and office buildings construction to California Energy Code standards is generally 30 dBA or more (Harris, Miller, Miller and Hanson, 2006).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB. Daytime Leq levels are louder than Ldn or CNEL levels; thus, if the Leq meets noise standards, the Ldn and CNEL are also met. Table 1 shows sounds levels of typical noise sources in Leq.

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

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level (Decibels)	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140	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., 2016

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Urban areas contain a variety of land use and development types that are noise sensitive including residences, schools, churches, hospitals and convalescent care facilities. Nearby sensitive receptors are the multifamily residences abutting the site to the south and across Marguerite Parkway to the west. The project will also be a sensitive receptor at completion.

Project Site Setting

The project area is located in an urbanized portion of the City of Mission Viejo. The most common and primary sources of noise in the project site vicinity are motor vehicles (e.g., automobiles and trucks) on Marguerite Parkway, El Toro Road and State Route 241 which abuts the site to the east. Traffic noise is of concern because where a high number of individual events occur, it can create a sustained noise level. Other noise sources in the area are primarily associated with common residential activities (i.e., landscape maintenance equipment); however, these sources do not noticeably contribute to the ambient noise environment.

To gather data on the general noise environment at the project site, weekday morning 15-minute noise measurements were taken on April 23, 2020. Site 1 is located near the northwest corner of the site. Site 2 is located near the middle of the site generally between the southern-most project units and the adjacent California Court Condominiums. Monitoring locations are shown in Figure 3.

During monitoring, 136 cars/light trucks, four medium (two-axles and six wheels) and three heavy (18-wheel) trucks passed Site 1. Traffic on the SR 241 toll road was counted during the measurement period at Site 2. A total of 217 cars/light trucks, 16 medium (two-axles and six wheels) and 4 heavy (18-wheel) trucks passed Site 2. Table 2 identifies the noise measurement location and measured noise levels. As shown, the Leq was 64.7 dBA at Site 1 and 58.2 dBA at Site 2. The monitoring data sheet is provided as Appendix A. Measured noise levels reflect the fact that traffic on El Toro Road dominates the noise environment at the site. It is understood that measurements were taken during the "stay at home" order issued on March 19, 2020 to address the COVID-19 pandemic. The noise measurements were taken to calibrate the noise model and are not relied on herein to assess project-related noise impacts. However, based on measurements taken in the field relative to those conducted at other times of the year and the level of acoustic energy required to cause a noticeable change (+/- 3 dBA) in noise levels, measured conditions are likely similar to ambient conditions during typical traffic operations.

Regulatory Setting

The Federal Noise Control Act (1972) addressed the issue of noise as a threat to human health and welfare. To implement the Federal Noise Control Act, the U.S. Environmental Protection Agency (EPA) undertook a number of studies related to community noise in the 1970s. The EPA

Source: Google Earth Pro; March 2020.
- approximate Project Site Boundary

Figure 3 — Monitoring Locations

Source: Google Earth Pro; March 2020.
- approximate Project Site Boundary

Figure 4 — Receiver Locations

Table 2
Noise Monitoring Results

Measurement Location	Primary Noise Source	Sample Time	Leq (dBA)
1. Northwest corner of project site fronting El Toro Road	Traffic on El Toro Road	Weekday morning	64.7
2. South center of project site near California Court Condominiums	Traffic on SR 241 and El Toro Road	Weekday morning	58.2

Source: Field visit using ANSI Type II Integrating sound level meter.

found that 24-hour averaged noise levels less than 70 dBA would avoid measurable hearing loss, levels of less than 55 dBA outdoors and 45 dBA indoors would prevent activity interference and annoyance (EPA 1972).

The U.S. Department of Housing and Urban Development (HUD) published a Noise Guidebook for use in implementing the Department's noise policy. In general, HUD's goal is exterior noise levels that are less than or equal to 55 dBA Ldn. The goal for interior noise levels is 45 dBA Ldn. HUD suggests that attenuation be employed to achieve this level, where feasible, with a special focus on sensitive areas of homes, such as bedrooms (HUD 2009).

Title 24 of the California Code of Regulations (CCR) establishes standards governing interior noise levels that apply to all new single-family and multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing Ldn exceeds 60 dBA. Such acoustical studies are required to establish mitigation measures that will limit maximum Ldn levels to 45 dBA in any habitable room. Although there are no generally applicable interior noise standards pertinent to all uses, many communities in California have adopted an Ldn of 45 dBA as an upper limit on interior noise in all residential units.

In addition, the State of California General Plan Guidelines (OPR 2003), provides guidance for noise compatibility. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

City of Mission Viejo General Plan Noise Element**.** The City of Mission Viejo has adopted noise referral zones as the criterion for assessing the compatibility of residential land uses with transportation related noise sources. The 60 dBA CNEL contour represents the noise referral zone for which any proposed noise sensitive land use within this zone should be examined on a project specific basis. This includes projects that may require mitigation to meet City or State (Title 25) standards. For Mission Viejo, the 60 dBA CNEL contour represents zones where residential development may require noise mitigation as part of the project. Typical noise

standards for sensitive land uses include a 65 dBA CNEL for exterior areas and 45 dBA CNEL for interior areas.

City of Mission Viejo Noise Standards. The City of Mission Viejo Municipal Code Section 6.35.040 and 6.35.050 addresses exterior and interior noise standards for residential properties. The thresholds are shown in Table 3.

Table 3
City of Mission Viejo Sound Level Limits

Exterior Standards	
Noise Level	Time Period
55 dBA	7:00 a.m. to 10:00 p.m.
50 dBA	10:00 p.m. to 7:00 a.m.
Interior Standards	
Noise Level	Time Period
55 dBA	7:00 a.m. to 10:00 p.m.
45 dBA	10:00 p.m. to 7:00 a.m.

Construction noise is addressed in Section 6.35.060 of the Municipal Code. Per Section 6.35.060(5), noise sources associated with construction, repair, remodeling or grading of any real property, and delivery or repair of construction and grading equipment are exempt from the noise ordinance, provided such activities do not take place between the hours of 8:00 p.m. to 7:00 a.m. on weekdays and Saturdays, or at any time on Sunday or a federal holiday.

Vibration Standards

Vibration is a unique form of noise as the energy is transmitted through buildings, structures and the ground whereas audible noise energy is transmitted through the air. Thus, vibration is generally felt rather than heard. The ground motion caused by vibration is measured as peak particle velocity (PPV) in inches per second and is referenced as vibration decibels (VdB) for the purpose of evaluating the potential for adverse construction-related impacts. The vibration velocity level threshold of perception for humans is a PPV of approximately 0.01 inches/second which equates to 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels.

The City of Mission Viejo Municipal Code and General Plan do not provide vibration standards for the purpose of addressing environmental impacts. The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (September 2018) provides thresholds that are commonly used for the purpose of environmental impact assessment. The FTA uses a threshold of 65 VdB for buildings where low ambient vibration is essential for interior operations. These buildings include hospitals and recording studios. A threshold of 72 VdB is used for residences and buildings where people normally sleep (i.e., hotels and rest homes). A threshold of 75 VdB is used for institutional land uses where activities occur primarily during the daytime (i.e., churches and schools). The threshold used for the proposed project is 72 VdB.

The term threshold as used herein is not intended to indicate that vibration levels above the threshold would cause an adverse impact. Rather, the thresholds indicate that vibrations levels above the threshold could be temporarily felt or perceived by occupants during construction activities occurring in proximity to sensitive properties.

With respect to potential ground-borne vibration impacts on structures, the FTA states that ground-borne vibration levels in excess of PPV 0.2 inches/second (100 VdB) could damage fragile buildings and levels in excess of PPV 0.12 inches/second (95 VdB) could damage extremely fragile historic buildings. No historic buildings are located on the site. The nearest residences are the multifamily apartments located adjacent to and south of the site. These are modern residences constructed consistent with California Building Code and seismic standards. To conservatively estimate potential vibration impacts on neighboring residences, a PPV of 0.2 inches per second (100 VdB) is used herein.

Construction activities such as blasting, pile driving, demolition, deep excavation and drilling have the potential to generate the highest level of ground vibration. The proposed project will not require blasting, pile driving, demolition of any existing structures or drilling. Because of the terrain, the project will require extensive grading to create the development area. It is presumed that once the rough development pads are created, excavation and compaction of soils to a depth of 5 feet below grade for building foundations and 8-10 feet below grade for utility installation would be required.

IMPACT ANALYSIS

Methodology and Significance Thresholds

Construction noise estimates are based upon noise levels reported by the FTA, Office of Planning and Environment, and the distance to nearby sensitive receptors. Reference noise levels from that document were used to estimate noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation). As referenced, construction noise is exempt from the Mission Viejo Municipal Code provided construction activities do not take place between the hours of 8:00 p.m. to 7:00 a.m. on weekdays and Saturdays, or at any time on Sunday or a federal holiday. Measured noise levels are under the 70-dBA maximum. As shown in Table 3, the exterior noise threshold at residential properties is 55 dBA from 7:00 a.m. to 10:00 p.m., 50 dBA from 10:00 p.m. to 7:00 a.m. Noise associated with the project would be traffic related. The primary source would be traffic on El Toro Road with secondary noise generated from traffic on Marguerite Parkway. SR 241 would remain a background source of ambient noise. Because ambient conditions exceed the 55 dBA daytime thresholds, impacts are addressed herein based on whether the change in traffic volumes between existing conditions and project conditions on would noticeably increase noise levels. A noticeable increase would be 3 dBA Leq and require a doubling of peak hour traffic volumes.

Temporary Construction Noise

The main sources of noise during construction activities would include heavy machinery used during clearing the site and grading as well as equipment used for construction. Table 4 shows the typical noise levels associated with heavy construction equipment. As shown, average noise levels associated with the use of heavy equipment at construction sites range from about 81 to 95 dBA at 25 feet from the source, depending upon the types of equipment in operation at any given time and phase of construction. As referenced, the City of Mission Viejo Municipal Code Section 6.35.060 exempts noise sources associated with construction, repair, remodeling or grading of any real property and delivery or repair of construction and grading equipment from the noise ordinance, provided such activities do not take place between the hours of 8:00 p.m. to 7:00 a.m. on weekdays and Saturdays, or at any time on Sunday or a federal holiday.

Noise-sensitive uses near the project site are the California Court Condominiums located adjacent to and south of the site. The average distance from the center of the site to the nearest receiver is approximately 400 feet; however, construction could occur as close as approximately 170 feet from the southern property line based on the site plan. It is important to note that the adjacent condominiums are approximately 95 feet above final grade for the project. The intervening hillside will reduce noise levels during construction as well as on-site operation of the project. For the purpose of this evaluation, a line of site attenuation for construction noise is assumed. It is a conservative approach and provides an accurate assessment of temporary noise impacts for CEQA review purposes. It is assumed grading and site preparation work would require the use of heavy equipment. Building construction and finishing would utilize hand tools; however, equipment would also be required to deliver materials to the project site and work areas.

Based on EPA noise emissions, empirical data and the amount of equipment needed for construction of the proposed project, worst-case noise levels from the construction equipment would occur during grading activities. The anticipated equipment used on-site would include an excavator, backhoe/tractor and a grader. Due to size of the site (i.e., 6.46 gross acres), multiple pieces of equipment will be working on the site simultaneously but likely spread out over the entire site and likely only used for specific operations. Construction nearest the west and southern boundaries would be closest to the neighboring residences.

If during site preparation and grading, a bulldozer, (82 dBA), a backhoe (78 dBA) and a dump truck (82 dBA) were working simultaneously generally in the same area over an 8-hour work-day, the 8-hour Leq would be approximately 86 dBA at 50 feet. Thus, work occurring in proximity to the nearest residences could cause noise levels as high as 75 dBA Leq at the southern property line. However, the intervening hillside and grade difference will provide approximately 10 dBA of additional attenuation. For reference purposes, noise levels associated with the above construction scenario are shown at varying distances in Table 5.

To avoid potentially significant impacts associated with construction noise, it is recommended the contractor be conditioned to work only within the time period allowed per City of Mission

Table 4
Typical Construction Equipment Noise Levels

Equipment Onsite	Typical Level (dBA) 25 Feet from the Source	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source
Air Compressor	84	78	64
Backhoe	84	78	64
Bobcat Tractor	84	78	64
Concrete Mixer	85	79	73
Bulldozer	88	82	76
Jack Hammer	95	89	83
Pavement Roller	86	80	74
Street Sweeper	88	82	76
Man Lift	81	75	69
Dump Truck	82	76	70

Source: Hanson, Towers and Meister, May 2006
Noise levels based on FHWA Roadway Construction Noise Model (2006) Users Guide Table 1.
Noise levels based on actual maximum measured noise levels at 50 feet (Lmax).
Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.

Table 5
Typical Maximum Construction Noise Levels at Various Distances from Project Construction

Distance from Construction	Maximum Noise Level at Receptor (dBA)
25 feet	88
50 feet	85
100 feet	72
250 feet	66
500 feet	60
1,000 feet	54

Viejo Municipal Code as referenced above. Working consistent with the code limitations referenced herein would avoid potentially significant temporary noise impacts. Temporary construction noise impacts would be **less than significant.**

Temporary Construction-Related Vibration

Activities associated with residences do not generate vibration. Thus, this discussion focuses on temporary vibration caused by construction. As referenced, the closest residences to the site are approximately 250 feet south of the development area. Based on the information presented in Table 6, vibration levels from operation of a large bulldozer would be approximately 87 VdB (0.089 inches/second) or less at 25 feet (Caltrans 2013). Grading would be required to create building pads, install utilities and street corridors. It is important to note that the equipment would be moving around the site rather than in a stationary position. Noise and vibration energy at the property line will fluctuate depending on where the equipment is operating. As referenced, at a distance of approximately 250 feet, vibration energy would be less than the 72 VdB threshold referenced above. As discussed, a PPV of 0.2 inches/second (100 VdB) is the vibration energy required to damage fragile historic buildings. While vibration from grading may be perceived at neighboring residences south of the site, the vibration energy would be below that required to cause structural damage. Temporary vibration impacts would be **less than significant.**

Table 6
Vibration Source Levels for Construction Equipment

Equipment	Approximate VdB				
	25 Feet	50 Feet	60 Feet	75 Feet	100 Feet
Large Bulldozer	87	81	79	77	75
Loaded Trucks	86	80	78	76	74
Jackhammer	79	73	71	69	67
Small Bulldozer	58	52	50	48	46

Source: Federal Railroad Administration, 1998

Long-Term Operational Noise Exposure

Long-term operation of the proposed project was evaluated for potential exterior traffic related impacts caused by increased traffic volumes associated with the project as well as interior noise levels caused by traffic.

Exterior Traffic Noise. Traffic is the primary noise source that would be generated by the proposed project. Existing measured noise levels exceed the 55-dBA daytime standard along the northern property line which borders El Toro Road. Whether a traffic-related noise impact would occur to existing and proposed residences is based on whether project traffic, when added to the existing traffic, would cause the Leq to noticeably increase (+3 dBA) or exceed the 45-dBA interior standard.

Noise levels generated by traffic on El Toro Road, Marguerite Parkway and SR 241 was modeled using the Federal Highway Administration Traffic Noise Model (TNM) version 2.5

software (see Appendix A). The model calculates traffic noise at receiver locations based on traffic volumes, travel speed, mix of vehicle types operating on the roadways (i.e., cars/trucks, medium trucks and heavy trucks) and related factors. Traffic volumes and vehicle mix used to calibrate TNM were based on vehicle counts obtained during the monitoring period. The 15-minute counts were multiplied by four to obtain hourly traffic counts. The model was calibrated to calculate noise levels that are +/- 2 dBA those measured on-site and reported in Table 2.

Traffic volumes for peak hour existing and project operation on El Toro Road and Marguerite Parkway were obtained from the Traffic Impact Assessment (Linscott, Law and Greenspan, Inc., April 2020). Traffic volumes for the segment of SR 241 east of the site were obtained from California Department of Transportation counts and. Peak hour project trips were incorporated into TNM to determine baseline noise conditions. Project trips were then added to the baseline trips to determine whether the Leq at neighboring receivers would noticeably change or exceed the thresholds referenced above. The proposed project is forecast to generate a total of 666 daily trips, including 42 trips during the AM peak hour and 51 trips during the PM peak hour. The PM peak hour trips were used in the analysis. Noise levels were calculated at the following receivers and are intended to represent conditions at multiple receivers within proximity to these locations:

1. Project Site – northeast corner;
2. Project Site – northwest corner;
3. Project Site – southwest corner;
4. California Court Condominiums – northwest corner abutting Marguerite Parkway; and
5. Residences at northern terminus of Primrose Lane, west side of Marguerite Parkway.

The receiver locations are shown in Figure 4. As shown in Table 7, the daytime hourly average (Leq) exceeds the 55-dBA standard at four of the five receivers modeled under baseline conditions. Existing noise levels along El Toro Road are 66.9 (Receiver 1) and 65.5 (Receiver 2) at locations on the project site that represent project units that would front El Toro Road. Evening peak hour project traffic (51 trips) was distributed evenly on El Toro Road and Marguerite Parkway. The addition of 51 peak hour trips would have no effect on noise levels at receivers surrounding the site or those construction as part of the project (i.e., Receivers 1, 2 and 3).

Table 7
Modeled Noise Levels

Receptor	Existing Leq	Exceed 55 dBA Standard?	With Project Leq	dBA Change	Significant Impact
Site 1	63.9	Yes	64.0	+0.1	No
Site 2	60.8	Yes	60.8	0.0	No
Site 3	59.6	Yes	59.6	0.0	No
Site 4	57.5	Yes	57.5	0.0	No
Site 5	54.5	No	54.5	0.0	No

To cause a significant noise impact, project related traffic would have to cause the existing Leq at one or more existing receivers to exceed the 55-dBA standard. Where the standard is already

Source: Google Earth Pro; March 2020.
- approximate Project Site Boundary

Figure 4 — Receiver Locations

exceeded, project traffic would have to cause a noticeable (+3 dBA) increase. As shown in Table 7, traffic associated with the project would have no noticeable effect at the receivers modeled. Ambient noise conditions on the site would continue to be dominated by El Toro Road. Impacts would be **less than significant.**

Interior Traffic Noise. California Energy Code Title 24 standards specify construction methods and materials that result in energy efficient structures and up to a 30-dBA reduction in exterior noise levels (assuming windows are closed). This includes operation of mechanical ventilation (e.g. heating and air conditioning), in combination with standard building construction that includes dual-glazed windows with a minimum Sound Transmission Class (STC) rating of 26 or higher. When windows are open, the insertion loss drops to about 10 dBA. Assuming windows are closed, interior noise levels at sensitive properties along the northern property line, the portion of the site where traffic noise would be highest, would range from 31 and 34 dBA and less at residences located interior to the project site. This would be below the 45-dBA interior standard. In all cases modeled, the existing interior noise levels would not noticeably change with the addition of project traffic. Interior noise levels at existing residences along Marguerite Parkway would be unaffected by project-related traffic noise.

Because the project would not noticeably increase noise levels off-site over ambient conditions, a **less than significant** impact would occur under this threshold.

CONCLUSION

If construction occurs within the hours allowed per the City of Mission Viejo Municipal Code, the proposed project would not have a significant or adverse construction noise impact on neighboring properties. Vibration associated with grading along the site perimeter would not be perceptible at neighboring properties located to the south of the site. Vibration energy would not be high enough to cause any structural damage to neighboring residential structures.

The existing 55 dBA Leq exterior threshold is exceeded under existing conditions at four of the five receivers modeled. Operation of the proposed project would have no effect on exterior noise levels at existing receivers. Noise levels post-construction would remain above the 55-dBA standard at all but Receiver 5. As referenced in the General Plan Noise Element, typical noise standards for sensitive land uses include a 65 dBA CNEL for exterior areas and 45 dBA CNEL for interior areas. Noise levels at all receivers modeled would be within the 65-dBA exterior standard and be below the interior standard for residential uses. Thus, a **less than significant** operational noise impact would occur.

REFERENCES

California Office of Planning and Research. *OPR General Plan Guidelines*, 2003.

California Department of Transportation. *Transportation and Construction Vibration Guidance Manual*, September 2013.

City of Mission Viejo. *Municipal Code* Section 6.35.040, 6.35.050 and 6.35.060(5) *(Noise Limits)*, December 2019.

City of Mission Viejo. *General Plan, Noise Element*, May 2013.

California Department of Transportation, *Traffic Counts, SR 241*, 2016.

dBF & Associates, Inc., Reference Noise Level Compilation Table, 2016.

Federal Highway Administration. *Roadway Construction Noise Model. 2006.* Users Guide Table 1.

Federal Highway Administration, Transportation Noise Model Version 2.5, 2004.

Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*. September 2018.

Federal Rail Administration (FRA) *Guidelines (Report Number 293630-1),* December 1998.

Hanson, Carl E., Towers, David A., and Meister, Lance D. (2006, May). *Transit Noise and Vibration Impact Assessment.* Federal Transit Administration, Office of Planning and Environment. http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf

Harris Miller Miller & Hanson Inc. T*ransit Noise and Vibration Impact Assessment, Final Report*. May 2006.

Linscott, Law and Greenspan, Inc., Traffic Impact Analysis for Nuvo Residential Project, April 2020.

United States Environmental Protection Agency. *Federal Noise Control Act of 1972, 42 U.S.C. §4901 et seq.,* 1972

United States Department of Housing and Urban Development. *Noise Control Guidebook*, 2009.

Appendix A

Monitoring Data Sheet and Modeling Results

FIELD NOISE MEASUREMENT DATA

Project Name: Mission Viejo APTS — Page 1 of
Project #: — Day / Date: 4/23/2020 — My Name:

Sound Level Meter	Calibrator	Weather Meter
Model #: Piccolo II	Model #	Model # — Serial #
Serial #	Serial #	
Weighting: (A) / C / Flat	Pre-Test: ____ dBA SPL	Terrain: Hard / Soft / (Mixed)
Response: (Slow) / Fast / Impl	Post-Test: ____ dBA SPL	Topo: (Flat) / Hilly (describe)
Windscreen: (Yes) / No		Wind: (Steady) / Gusty

ID	Time Start	Time Stop	Leq	Lmin	Lmax	L10	L50	L90	Wind Spd/ Dir (mph)	Temp (°F)	RH (%)	Bar Psr (in Hg)	Cloud Cover (%)
1	9:05	9:20	64.7	44.6	83.4				0	70			0%
2	9:30	9:47	51.8	38.2	41.6								

			Location(s) / GPS Reading(s):
Roadway Name	El Toro EB	SB 241	
Speed (post/obs)	55	65	
Number of Lanes	6	4	
Width (pave/row)		48	
1- or 2- way		2	
Grade	+2% EB	+2% SB	
Bus Stops	NO	NO	
Stoplights	YES	NO	
Street Parking	NO	NO	
Automobiles	136	217	
Medium Trucks	4	16	
Heavy Trucks	3	4	

Other Noise Sources: distant (aircraft) / (roadway traffic) / trains / landscaping / rustling leaves / children playing / dogs barking / birds vocalizing

Notes and Sketches on Reverse

NOTES: EL TORO EB IS PRIMARY SOURCE
SR 241 AUDIBLE BUT DISTANT
RECEIVERS EAST OF SITE ONLY RECEPTORS
TRAFFIC MASKS NOISE FROM EL TORO & SR 241
PROJECT SOURCE WILL BE FROM MARGUERITE PKWY/EL TORO

Site 1

Start Date	4/23/2020
Start Time	9:03:28 AM
End Time	9:18:27 AM
Duration	00:14:59
Meas Mode	Single
Input Range	Low
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	76.3
LCeq	75.9
LAeq	64.7
LZSmax	95.2
LCSmax	95.1
LASmax	83.4
LZSmin	60.3
LCSmin	59.0
LASmin	44.6
LZE	105.8
LCE	105.4
LAE	94.2
LZpeak	105.4
LCpeak	105.3
LApeak	96.9
1%	75.9
2%	73.5
5%	69.8
8%	68.5
10%	67.5
25%	62.8
50%	57.5
90%	49.2
95%	47.7
99%	45.5

Site 2

Start Date	4/23/2020
Start Time	9:35:43 AM
End Time	9:50:42 AM
Duration	00:14:59
Meas Mode	Single
Input Range	Low
Input Type	Mic
SPL Time Weight	Slow
LN% Freq Weight	dBA
Overload	No
UnderRange	No
Sensitivity	18.44mV/Pa

LZeq	64.0
LCeq	62.3
LAeq	51.8
LZSmax	75.4
LCSmax	74.7
LASmax	58.2
LZSmin	58.0
LCSmin	55.9
LASmin	41.6
LZE	93.5
LCE	91.8
LAE	81.3
LZpeak	85.6
LCpeak	85.2
LApeak	84.8
1%	56.8
2%	56.2
5%	55.4
8%	54.8
10%	54.6
25%	53.1
50%	51.1
90%	46.7
95%	45.4
99%	42.9

<Organization?>
<Analysis By?>

27 April 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Nuvo El Toro Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc		LAeq1h	Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
Receiver2	2	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
Receiver3	3	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
Receiver4	4	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
Receiver5	5	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	5	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

<Organization?>
<Analysis By?>

27 April 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: <Project Name?>
RUN: Nuvo El Toro w-Project
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
Receiver2	2	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
Receiver3	3	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
Receiver4	4	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
Receiver5	5	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	5	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