
Appendix K



Environmental Noise Assessment

Summer Villas EIR

City of Elk Grove, California

July 25, 2025

Project #230512

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Table of Contents

INTRODUCTION	1
ENVIRONMENTAL SETTING	1
<i>BACKGROUND INFORMATION ON NOISE</i>	<i>1</i>
EXISTING NOISE AND VIBRATION ENVIRONMENTS.....	6
<i>EXISTING NOISE RECEPTORS</i>	<i>6</i>
<i>EXISTING GENERAL AMBIENT NOISE LEVELS</i>	<i>6</i>
FUTURE TRAFFIC NOISE ENVIRONMENT AT OFF-SITE RECEPTORS	9
<i>OFF-SITE TRAFFIC NOISE IMPACT ASSESSMENT METHODOLOGY.....</i>	<i>9</i>
EVALUATION OF PROJECT-GENERATED NOISE SOURCES ON EXISTING SENSITIVE RECEPTORS	10
EVALUATION OF FUTURE TRANSPORTATION NOISE ON PROJECT SITE.....	13
CONSTRUCTION NOISE ENVIRONMENT	15
CONSTRUCTION VIBRATION ENVIRONMENT	18
REGULATORY CONTEXT	18
<i>FEDERAL</i>	<i>18</i>
<i>STATE.....</i>	<i>18</i>
<i>LOCAL.....</i>	<i>18</i>
<i>CRITERIA FOR ACCEPTABLE VIBRATION</i>	<i>20</i>
IMPACTS AND MITIGATION MEASURES.....	23
<i>THRESHOLDS OF SIGNIFICANCE</i>	<i>23</i>
<i>PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES</i>	<i>24</i>
REFERENCES	34

List of Figures

Figure 1: Site Plan.....	2
Figure 2: Noise Measurement Sites and Receptor Locations	3
Figure 3: Existing Daytime Ambient Noise Levels (dBA L _{eq}).....	8
Figure 4: Project-Generated Noise Levels (dBA L _{eq}).....	12
Figure 5: Future Transportation Noise Levels on Project Site (dBA L _{dn})	14
Figure 6: Construction Noise Levels (dBA L _{eq}).....	17
Figure 7: Future Transportation Noise Levels with Sound Walls (dBA L _{dn}).....	28
Figure 8: Pickleball Noise Levels with Barriers (dBA L _{eq}).....	30

List of Tables

Table 1: Typical Noise Levels.....	4
Table 2: Summary of Existing Background Noise Measurement Data	6
Table 3: Predicted Traffic Noise Level and Project-Related Traffic Noise Level Increases	9
Table 4: EPAP Traffic Noise Level and Project-Related Traffic Noise Level Increases	10
Table 5: Cumulative Traffic Noise Level and Project-Related Traffic Noise Level Increases	10
Table 6: Construction Equipment Noise Levels for Primary Construction Phases	15
Table 7: Vibration Levels for Various Construction Equipment.....	18
Table 8: Maximum Allowable Noise Exposure, Transportation Noise Sources.....	19
Table 9: Noise Level Performance Standards For Non-Transportation Noise Sources*	20
Table 10: Effects of Vibration on People and Buildings	22
Table 11: Construction Noise Level Increases.....	26
Table 12: Off-Site Construction Noise Level Increases	27
Table 13: Off-Site Construction Noise Level Increases	32

Appendices

Appendix A: Acoustical Terminology
Appendix B: Field Noise Measurement Data
Appendix C: Traffic Noise Calculations

INTRODUCTION

The proposed Project is located at the southeast corner of Sheldon Road and Waterman Road in the City of Elk Grove, California. The Project would require approval of a General Plan/Rural Area Community Plan Amendment and a Rezone to allow for the creation of the 116-acre Summer Villas SPA. The Summer Villas SPA contains three distinct sub-zones: 1) Active Adult Neighborhood (71.3 acres), 2) Laguna Creek Open Space (20.3 acres), and 3) Waterman Recreational Open Space (19.4 acres). The Project will consist of single-family active adult residential uses, a clubhouse, and several outdoor activity areas.

Figure 1 shows the project site plan. **Figure 2** shows an aerial photo of the project site and noise measurement locations.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE

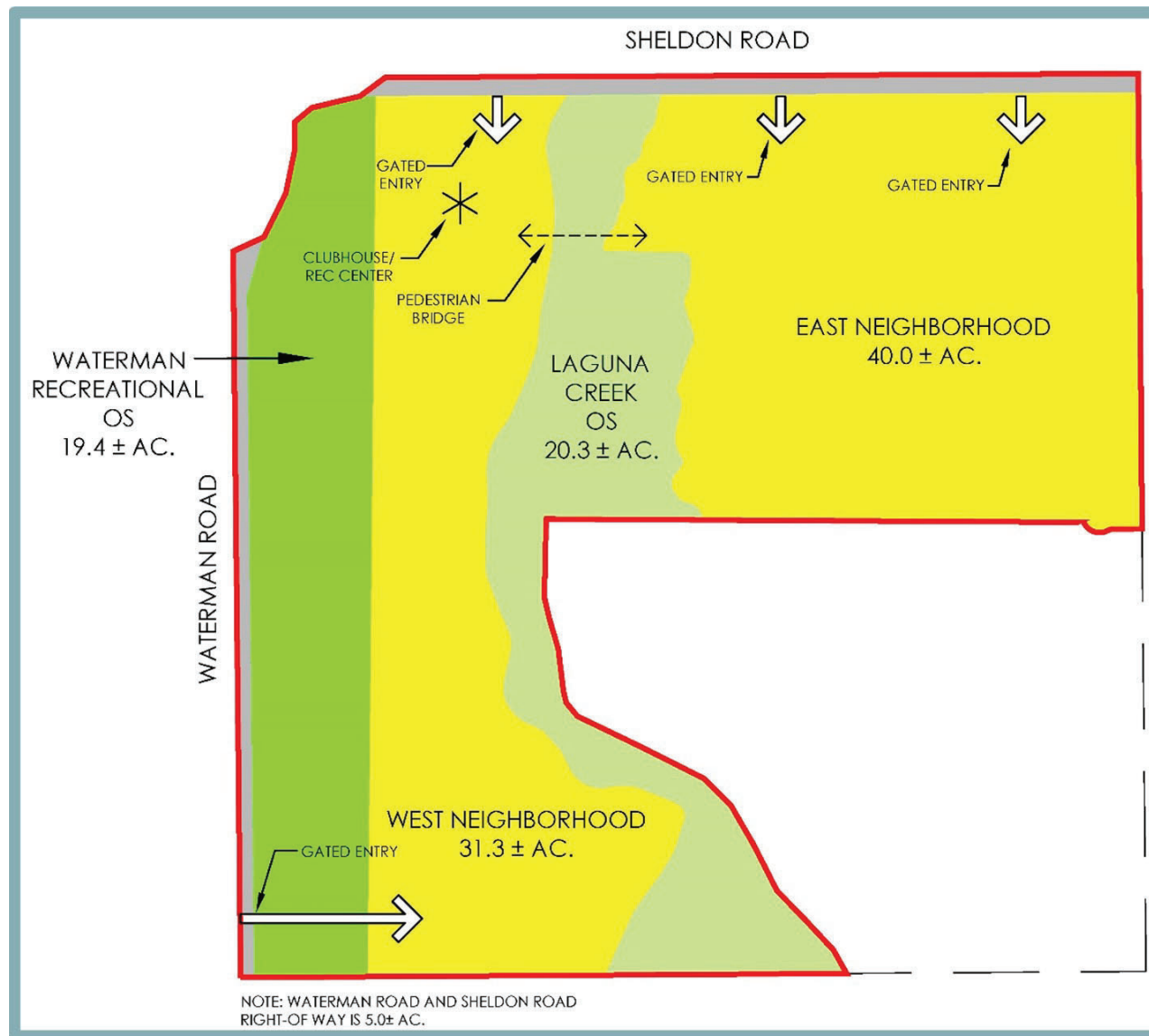
Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

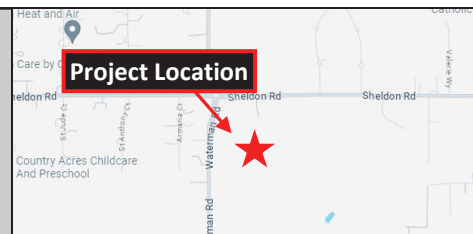
Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

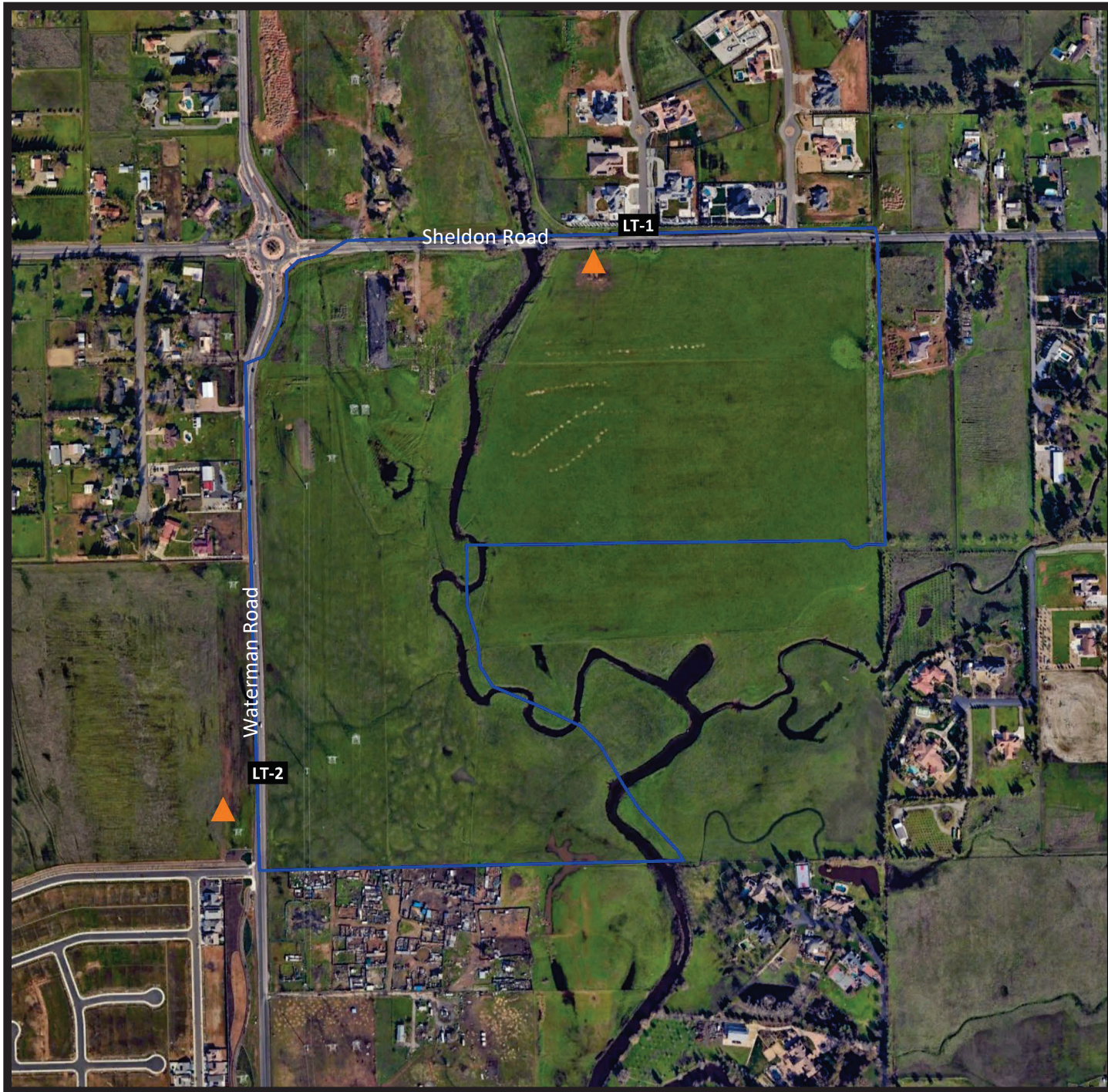
The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.



Summer Villas EIR
City of Elk Grove, California

Figure 1
Project Site Plan





Summer Villas EIR

City of Elk Grove, California

Figure 2
Noise Measurement Sites

Legend

-  Project Site
-  Noise Measurement Site - Long Term



Projection: UTM Zone 10 / WGS84 / meters
Rev. Date: 02/18/2025



The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60-dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn} , and shows very good correlation with community response to noise.

The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.

Effects of Noise on People

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

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regards to increases in A-weighted noise level, the following relationships occur:

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

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING NOISE AND VIBRATION ENVIRONMENTS

EXISTING NOISE RECEPTORS

Some land uses are considered more sensitive to noise than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise-sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

Sensitivity is a function of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved. In the vicinity of the project site, sensitive land uses include existing single-family residential uses surrounding the project.

EXISTING GENERAL AMBIENT NOISE LEVELS

The existing noise environment in the project area is primarily defined by traffic on Waterman Road and Sheldon Road. To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted continuous (24-hr.) noise level measurements at two locations on the project site. Noise measurement locations are shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max} , represents the highest noise level measured. The average value, denoted L_{eq} , represents the energy average of all the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50} , represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) model 820 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

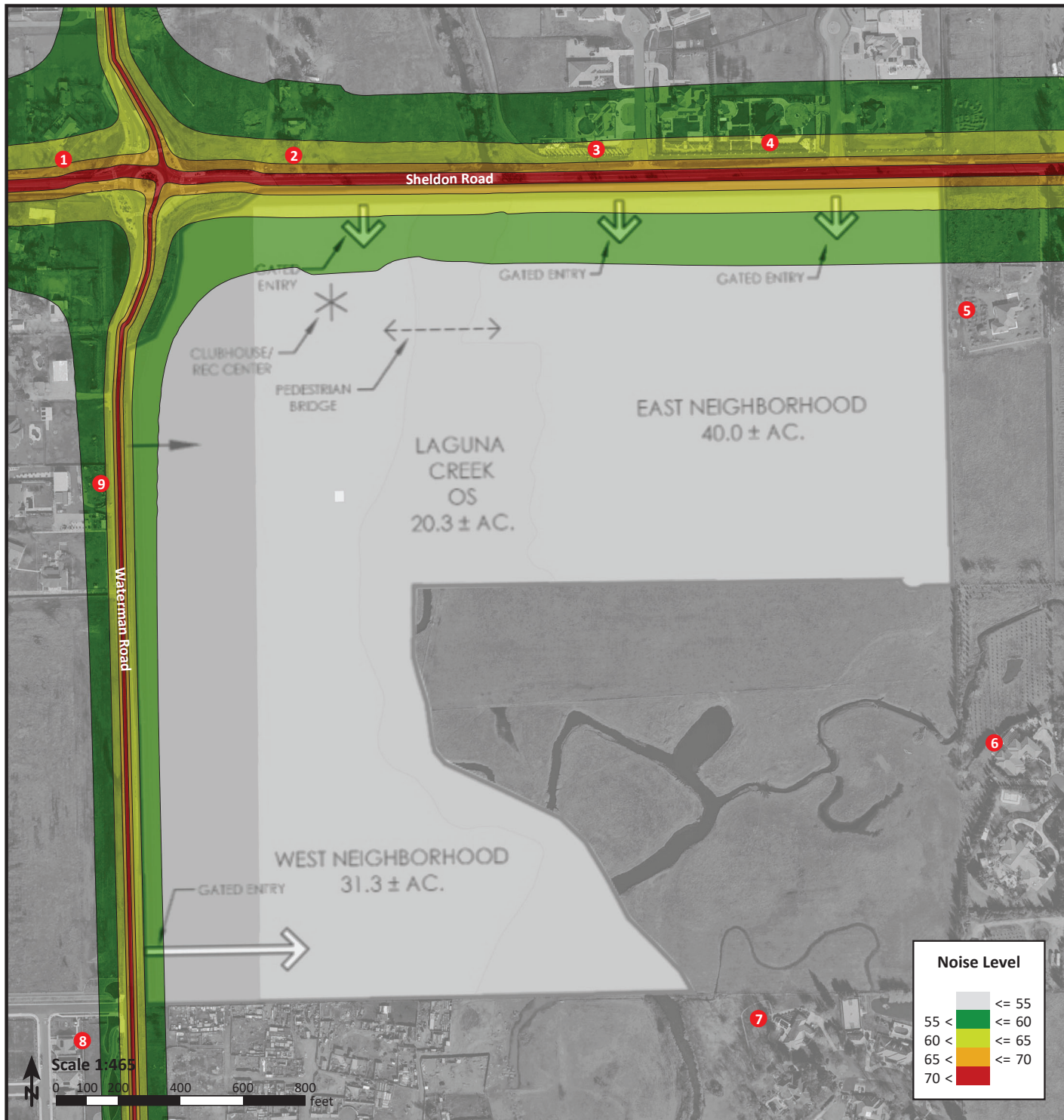
Location	Date	L_{dn}	Daytime L_{eq}	Daytime L_{50}	Daytime L_{max}	Nighttime L_{eq}	Nighttime L_{50}	Nighttime L_{max}
LT-1: 75 ft. to CL of Sheldon Rd.	Friday, June 16, 2023	64	62	59	80	56	47	74
LT-2: 160 ft. to CL of Waterman Rd.	Friday, June 16, 2023	56	52	49	72	50	45	67

Notes:

- All values shown in dBA
- Daytime hours: 7:00 a.m. to 10:00 p.m.
- Nighttime Hours: 10:00 p.m. to 7:00 a.m.
- Source: Saxelby Acoustics, 2023.

Saxelby Acoustics utilized the SoundPLAN modeling software and the ambient noise level data presented in **Table 2** to model existing noise levels at sensitive receptors in the project vicinity. This analysis is presented graphically in **Figure 3**.





Summer Villas EIR

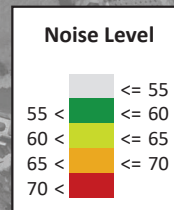
City of Elk Grove, California

Figure 3

Existing Daytime Ambient
dBA Leq

Legend

● Receiver



FUTURE TRAFFIC NOISE ENVIRONMENT AT OFF-SITE RECEPTORS

OFF-SITE TRAFFIC NOISE IMPACT ASSESSMENT METHODOLOGY

To assess noise impacts due to project-related traffic increases on the local roadway network, traffic noise levels are predicted at sensitive receptors for existing and future, project and no-project conditions.

Existing, Existing Plus Approved Projects (EPAP), and Cumulative noise levels due to traffic are calculated using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108). The model is based upon the Calven reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn} , it is necessary to adjust the input volume to account for the day/night distribution of traffic.

Project trip generation volumes were provided by the project traffic engineer (Fehr & Peers, 2024), truck usage and vehicle speeds on the local area roadways were estimated from field observations. The predicted increases in traffic noise levels on the local roadway network for Existing, EPAP, and Cumulative conditions which would result from the project are provided in terms of L_{dn} .

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each project-area roadway segment. In some locations, sensitive receptors may not receive full shielding from noise barriers or may be located at distances which vary from the assumed calculation distance.

Tables 3-5 summarize the modeled traffic noise levels at the nearest sensitive receptors along each roadway segment in the Project area. **Appendix C** provides the complete inputs and results of the FHWA traffic modeling.

TABLE 3: PREDICTED TRAFFIC NOISE LEVEL AND PROJECT-RELATED TRAFFIC NOISE LEVEL INCREASES

Roadway	Segment	Predicted Exterior Noise Level (dBA L_{dn}) at Closest Sensitive Receptors		
		Existing No Project	Existing + Project	Change
Bond Rd	West of Waterman Rd	60.7	60.8	0.1
Bradshaw Rd	North of Sheldon Rd	60.8	60.8	0.0
Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	58.2	58.4	0.2
Sheldon Rd	Waterman Rd to Bradshaw Rd	58.5	59.0	0.5
Sheldon Rd	West of Elk Grove Florin Rd	59.1	59.4	0.3
Waterman Rd	Calvine Rd to Sheldon Rd	52.6	52.8	0.2
Waterman Rd	Sheldon Rd to Bond Rd	57.9	58.1	0.2
Waterman Rd	North of Calvine Rd	57.3	57.4	0.1
Waterman Rd	South of Bond Rd	59.1	59.2	0.1

TABLE 4: EPAP TRAFFIC NOISE LEVEL AND PROJECT-RELATED TRAFFIC NOISE LEVEL INCREASES

Roadway	Segment	Predicted Exterior Noise Level (dBA L _{dn}) at Closest Sensitive Receptors		
		EPAP No Project	EPAP + Project	Change
Bond Rd	West of Waterman Rd	60.9	61.0	0.1
Bradshaw Rd	North of Sheldon Rd	60.8	60.9	0.1
Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	58.2	58.4	0.2
Sheldon Rd	Waterman Rd to Bradshaw Rd	58.5	59.0	0.5
Sheldon Rd	West of Elk Grove Florin Rd	59.0	59.4	0.4
Waterman Rd	Calvine Rd to Sheldon Rd	52.7	52.8	0.1
Waterman Rd	Sheldon Rd to Bond Rd	57.9	58.1	0.2
Waterman Rd	North of Calvin Rd	57.3	57.5	0.2
Waterman Rd	South of Bond Rd	59.2	59.3	0.1

TABLE 5: CUMULATIVE TRAFFIC NOISE LEVEL AND PROJECT-RELATED TRAFFIC NOISE LEVEL INCREASES

Roadway	Segment	Predicted Exterior Noise Level (dBA L _{dn}) at Closest Sensitive Receptors		
		Cumulative No Project	Cumulative + Project	Change
Bond Rd	West of Waterman Rd	61.3	61.4	0.1
Bradshaw Rd	North of Sheldon Rd	62.4	62.4	0.0
Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	58.9	59.1	0.2
Sheldon Rd	Waterman Rd to Bradshaw Rd	59.5	59.9	0.4
Sheldon Rd	West of Elk Grove Florin Rd	60.0	60.1	0.1
Waterman Rd	Calvine Rd to Sheldon Rd	53.9	54.1	0.2
Waterman Rd	Sheldon Rd to Bond Rd	59.1	59.2	0.1
Waterman Rd	North of Calvin Rd	61.2	61.3	0.1
Waterman Rd	South of Bond Rd	61.5	61.5	0.0

Based upon the **Tables 3-5** data, the proposed project is predicted to result in an increase in a maximum traffic noise level increase of 0.5 dBA.

EVALUATION OF PROJECT-GENERATED NOISE SOURCES ON EXISTING SENSITIVE RECEPTORS

The proposed project includes the development of several tennis courts and/or pickleball courts. The project description depicts four tennis courts. Saxelby Acoustics assumed that up to eight pickleball courts could fit in the same area based on similar projects. Pickleball gameplay produces higher noise levels than tennis; therefore, Saxelby Acoustics conservatively modeled eight pickleball courts operating simultaneously during a peak hour of use. It was assumed that no nighttime (10:00 p.m. to 7:00 a.m.) use of the courts would be permitted.

Pickleball gameplay typically produces noise levels of 56 dBA L_{eq} at 25 feet from the edge of the side of the court and 61 dBA L_{eq} at 25 feet from the ends of the court based upon Saxelby Acoustics measurements at similar facilities. It was assumed that each court would operate at this level of activity simultaneously during daytime (7:00 a.m. to 10:00 p.m.) hours.

It was also assumed that the proposed parking lot near the courts would contribute to project-generated noise levels. Saxelby Acoustics assumed up to 50 passenger vehicles could access the site in a peak hour. Two heavy truck movements were included to account for potential garbage collection. Parking lot movements are predicted to generate a sound exposure level (SEL) of 71 dBA SEL at 50 feet for cars and 85 dBA SEL at 50 feet for trucks.

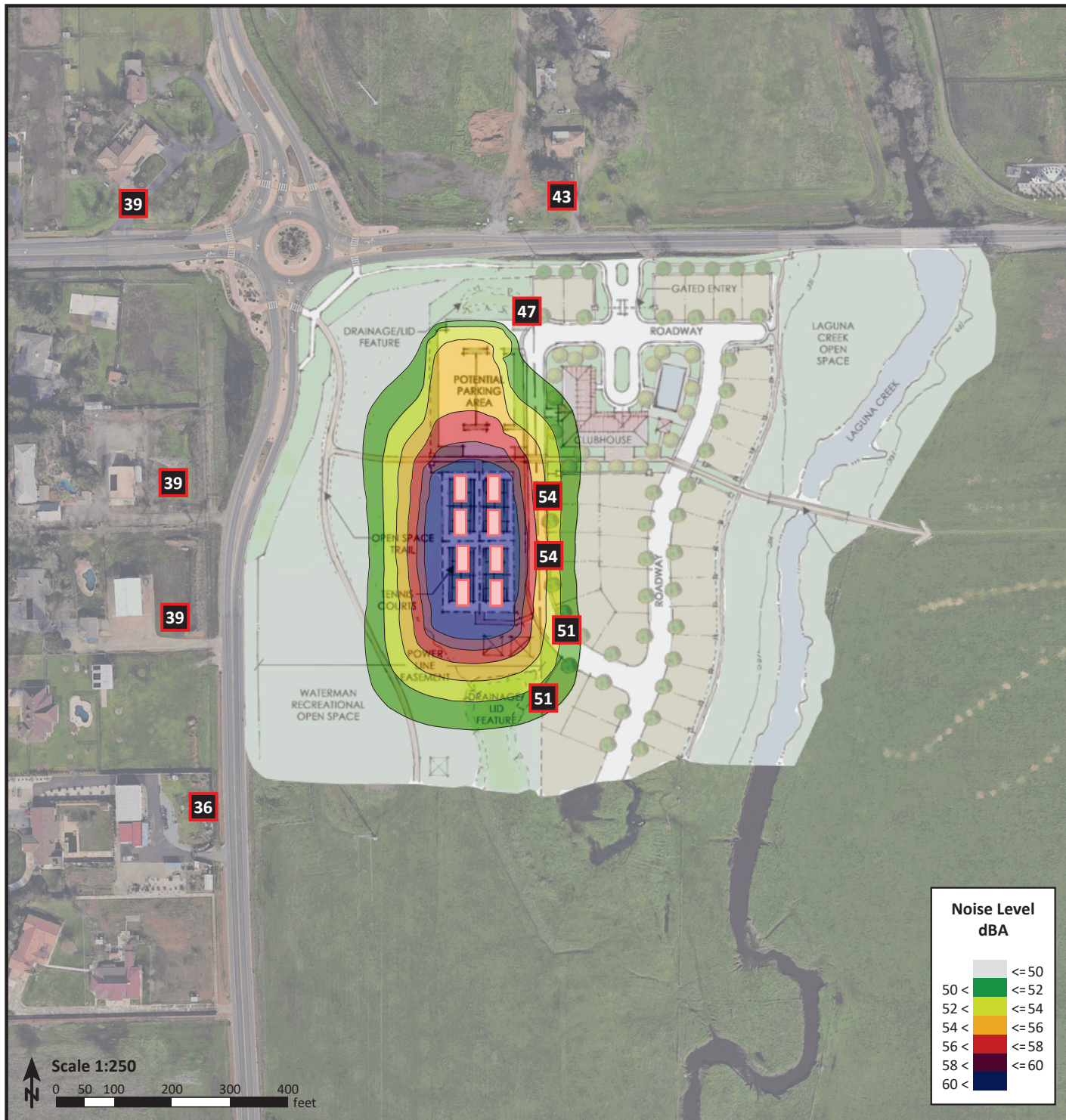
Saxelby Acoustics used the SoundPLAN noise modeling software to predict project-generated noise levels at off-site and on-site receptors. Inputs to the model include sound power levels for the sport courts and parking lots, proposed structures, topography, and locations of sensitive receptors. These predictions are made in accordance with International Organization for Standardization (ISO) standard 9613-2:2024-01 (Acoustics – Attenuation of sound during propagation outdoors). ISO 9613 is the most commonly used method for calculating exterior noise propagation. **Figure 4** shows the resulting noise level contours.

Summer Villas EIR

City of Elk Grove, California

Figure 4

Project Generated Noise Levels
(Daytime Leq, dBA)



Legend

6 57
11 58
12

Noise Level



Pickleball Courts

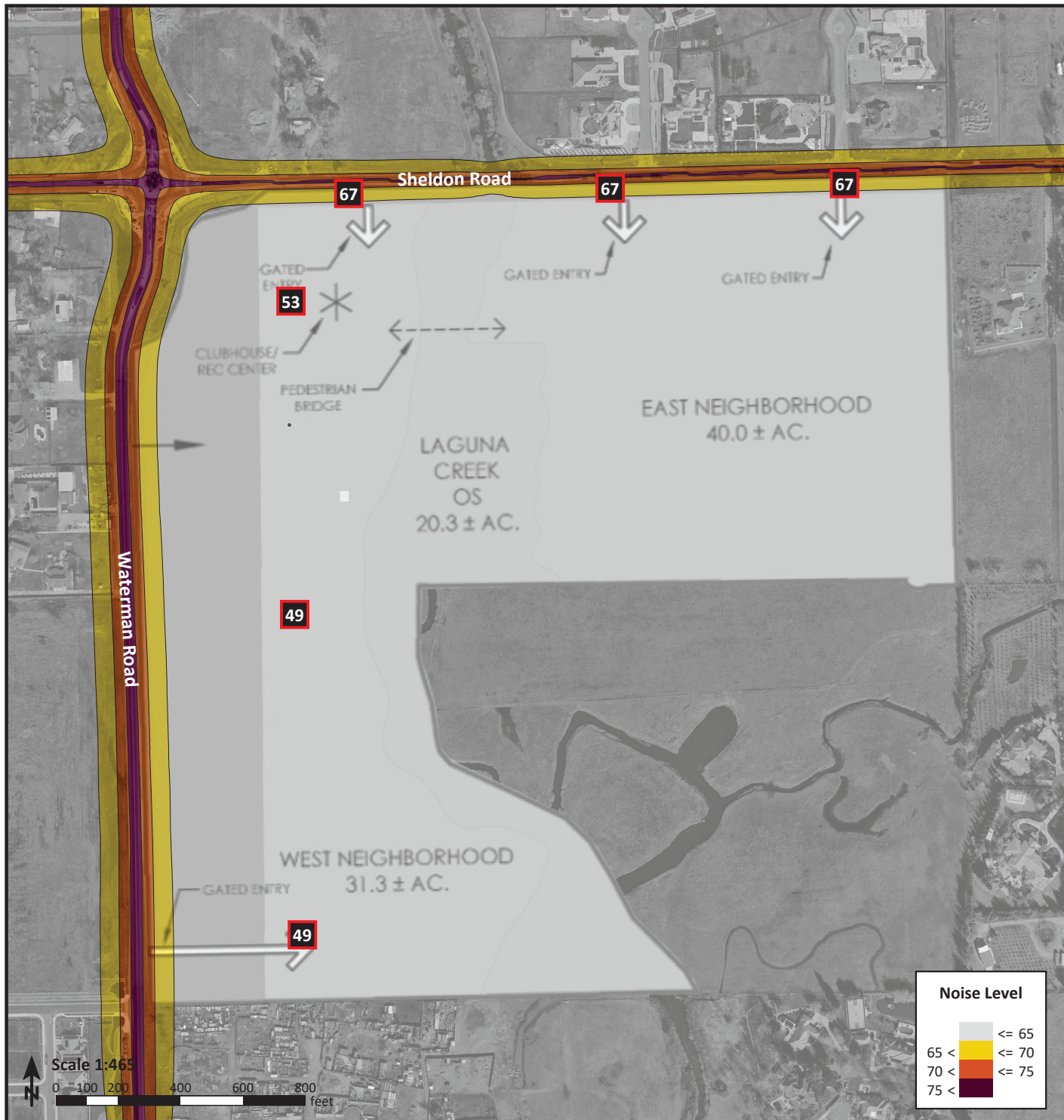
Noise Level dBA

<= 50
50 < <= 52
52 < <= 54
54 < <= 56
56 < <= 58
58 < <= 60
60 <

EVALUATION OF FUTURE TRANSPORTATION NOISE ON PROJECT SITE

Saxelby Acoustics used the SoundPLAN noise model to calculate traffic noise levels at the proposed residential uses due to traffic on Waterman Road and Sheldon Road. Inputs to the SoundPLAN noise model include results of the FHWA modeling using Cumulative Plus Project trip volumes provided by the traffic engineer (Fehr & Peers 2024), topography, existing structures, roadway elevations, and the proposed building pad elevations. Waterman Road was estimated to increase by +1.7 dBA and Sheldon Road was estimated to increase by +1.3 dBA based upon project traffic increases provided by the project traffic engineer (Fehr & Peers 2024). The results of this analysis are shown graphically on **Figure 5**.





Summer Villas EIR

City of Elk Grove, California

Figure 5

Future Transportation Noise Levels
dBA Ldn

Legend

67
53
49

Noise Level

CONSTRUCTION NOISE ENVIRONMENT

The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) was used to predict noise levels for standard construction equipment used for roadway improvement projects. The assessment of potential significant noise effects due to construction is based on the standards and procedures described in the Federal Transit Authority (FTA) guidance manual and FHWA's RCNM.

The RCNM is a Windows-based noise prediction model that enables the prediction of construction noise levels for a variety of construction equipment based on a compilation of empirical data and the application of acoustical propagation formulas. It enables the calculation of construction noise levels in more detail than the manual methods, which eliminates the need to collect extensive amounts of project-specific input data. RCNM allows for the modeling of multiple pieces of construction equipment working either independently or simultaneously, the character of noise emission, and the usage factors for each piece of equipment.

Construction noise varies depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week), and the duration of the construction work.

Noise sources in the RCNM database include actual noise levels and equipment usage percentages. This source data was used in this construction noise analysis. **Table 6** shows predicted construction noise levels for each of the project construction phases.

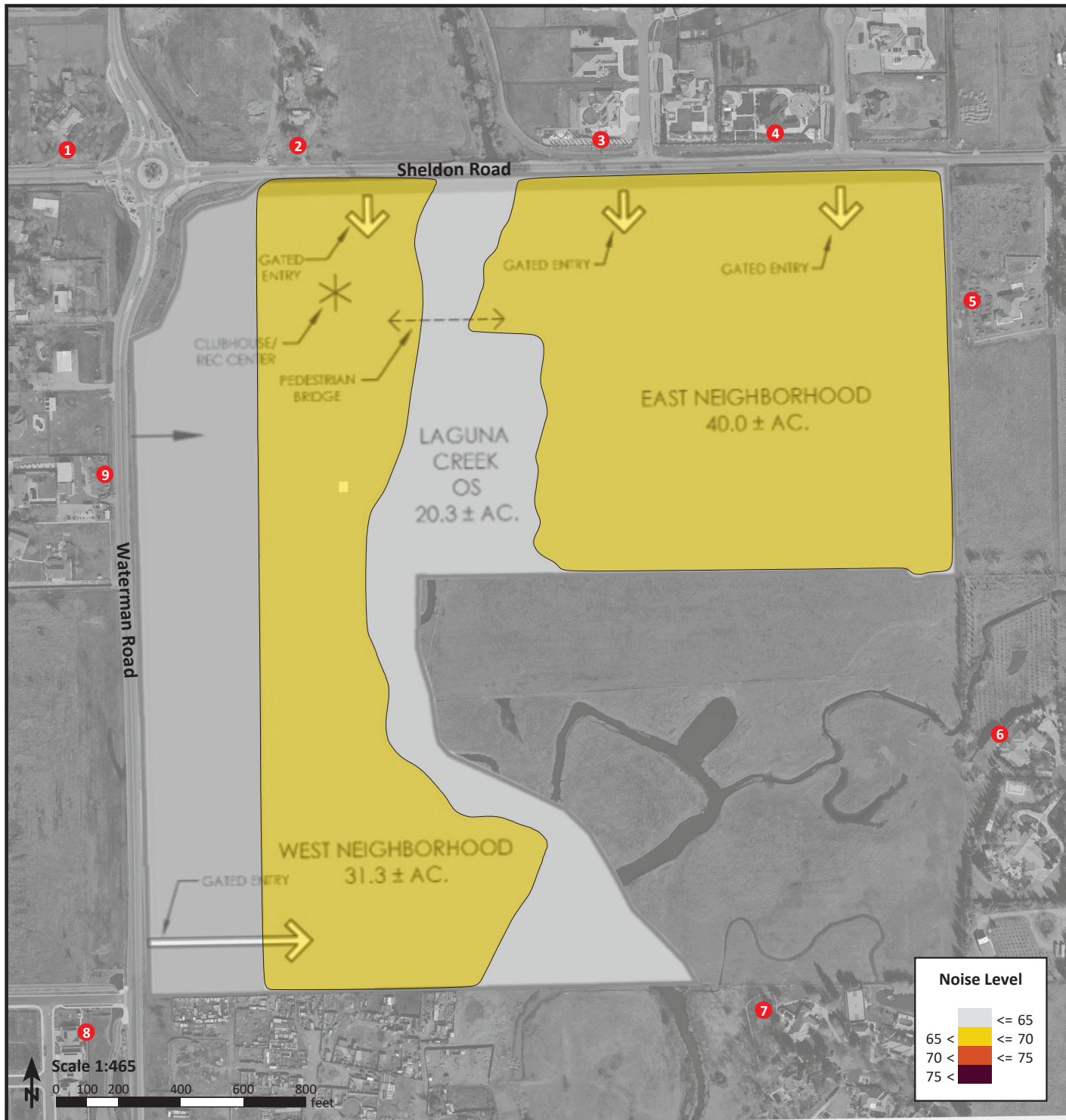
TABLE 6: CONSTRUCTION EQUIPMENT NOISE LEVELS FOR PRIMARY CONSTRUCTION PHASES

Equipment	Quantity	Usage (%)	Maximum, L_{max} (dBA at 50 feet)	Hourly Average, L_{eq} (dBA at 50 feet)
Demolition				
Dozer	2	40	82	81
Excavator	3	40	81	82
Concrete Saw	1	20	90	83
Total:				87
Site Preparation				
Dozer	3	40	82	83
Tractor/Loader/Backhoe	4	40	84	86
Total:				88
Grading				
Excavator	2	40	81	80
Grader	1	40	85	81
Dozer	1	40	82	78
Scraper	2	40	84	83
Tractor/Loader/Backhoe	2	40	84	83
Total:				88

Building Construction				
Crane	1	16	81	73
Fork Lift	3	40	83	84
Generator	1	50	81	78
Tractor/Loader/Backhoe	3	40	84	85
Welder / Torch	1	40	74	70
Total:				88
Paving				
Paver	2	50	77	77
Paving Equipment	2	50	77	77
Roller	2	20	80	76
Total:				81
Architectural Coating				
Air Compressor	1	40	79	75
Total:				75
Linear, Drainage, Utilities, & Sub-Grade (Off-Site Construction)				
Air Compressor	1	40	79	75
Concrete Saw	1	20	90	83
Generator	1	50	81	78
Generator (<25KVA, VMS signs)	3	50	73	75
Tractor/Loader/Backhoe	2	40	84	83
Slurry Trenching Machine	1	50	80	77
Paving Equipment	1	50	77	74
Total:				88

Source: FHWA, Roadway Construction Noise Model (RCNM), January 2006.

Based upon the **Table 6** data, the loudest phases of construction with an average noise exposure of 88 dBA L_{eq} at 50 feet would occur during site preparation, grading, building construction, and off-site Linear, Drainage, Utilities, and Sub-Grade. The results of the on-site construction noise analysis are shown graphically on **Figure 6**.



Summer Villas EIR

City of Elk Grove, California

Figure 6

Construction Noise
dBA Leq

Legend

● Receiver



CONSTRUCTION VIBRATION ENVIRONMENT

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading, utilities placement, and parking lot construction occur. **Table 7** shows the typical vibration levels produced by construction equipment.

TABLE 7: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 25 feet (inches/second)	Peak Particle Velocity at 50 feet (inches/second)	Peak Particle Velocity at 100 feet (inches/second)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210 (Less than 0.20 at 26 feet)	0.074	0.026

Source: Transit Noise and Vibration Impact Assessment Guidelines. Federal Transit Administration. May 2006.

REGULATORY CONTEXT

FEDERAL

There are no federal standards which apply to the proposed project.

STATE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicate that a significant noise impact may occur if a project exposes persons to noise or vibration levels in excess of local general plans or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels. CEQA standards are discussed more below under the Thresholds of Significance section.

LOCAL

City of Elk Grove General Plan

Policy N-1-1: New development of the uses listed in **Table 8** shall conform with the noise levels contained in the table. All indoor and outdoor areas shall be located, constructed, and/or shielded from noise sources in order to achieve compliance with the City's noise standards.

TABLE 8: MAXIMUM ALLOWABLE NOISE EXPOSURE, TRANSPORTATION NOISE SOURCES

Land Use	Outdoor Activity Area	Interior Spaces	
		L _{dn} , dB	L _{eq} , dB ^c
Residential	60 ^{d,g}	45	-
Residential subject to noise from railroad tracks, aircraft overflights, or similar noise sources which produce clearly identifiable, discrete noise events (the passing of a single train, as opposed to relatively steady noise sources as roadways).	60 ^{d, g}	40 ^f	-
Transient Lodging	60 ^{e,g}	45	-
Hospitals, Nursing Homes	60 ^{e, g}	45	-
Theaters, Auditoriums, Music Halls	-	-	35
Churches, Meeting Halls	60 ^{d, g}	-	40
Office Buildings	-	-	45
Schools, Libraries, Museums	-	-	45

- a. Where the location of outdoor activity areas is unknown, the exterior noise level standards shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patios or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.
- b. Transportation projects subject to Caltrans review or approval shall comply with the Federal Highway Administration noise standards for evaluation and abatement of noise impacts.
- c. As determined for a typical worst-case hour during periods of use.
- d. Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn} or less using a practical application of the best available noise reduction measures, an exterior noise level of up to 65 dB L_{dn} may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
- e. In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.
- f. The intent of this noise standard is to provide increased protection against sleep disturbance for residences located near railroad tracks.
- g. In cases where the existing ambient noise level exceeds 60 dBA, the maximum allowable project-related permanent increase in ambient noise levels shall be 3 dBA/L_{dn}.

Policy N-1-2: Where noise mitigation measures are required to achieve the standards of Tables 8-3 and 8-4, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design related noise mitigation measures, including the use of distance from noise sources, have been integrated into the project.

Policy N-2-2: The following criteria shall be used as CEQA significance thresholds for transportation and stationary noise sources:

- Where existing ambient noise levels are less than 60 dB L_{dn} at the outdoor activity areas of noise sensitive uses, a +5 dB L_{dn} increase in noise levels shall be considered significant; and
- Where existing ambient noise levels range between 60 and 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in noise levels shall be considered significant; and
- Where existing ambient noise levels are greater than 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +1.5 dB L_{dn} increase in noise levels shall be considered significant. Public roadway improvements to alleviate traffic congestion and safety hazards shall utilize FHWA noise standards to allow a reasonable dollar threshold per dwelling to be used in the

evaluation and abatement of impacts.

- The standards outlined in Table 8-4 shall not apply to public projects to alleviate traffic congestion and safety hazards.

TABLE 9: NOISE LEVEL PERFORMANCE STANDARDS FOR NON-TRANSPORTATION NOISE SOURCES*

Performance Standards for Stationary Sources	Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Performance Standards for Typical Stationary Noise Sources ^a	Hourly Leq, dB	55 ^{c, d}	45 ^{c, d}
Performance Standards for Stationary Noise Sources Which Are Tonal, Impulsive, Repetitive, or Consist Primarily of Speech or Music ^b	Hourly Leq, dB	50 ^{c, d}	40 ^{c, d}

* Applies to noise-sensitive land uses only

a. These standards will apply generally to noise sources that are not tonal, impulsive, or repetitive in nature. Typical noise sources in this category would include HVAC systems, cooling towers, fans, and blowers.

b. These standards apply to noises which are tonal in nature, impulsive, repetitive, or which consist primarily of speech or music (e.g., humming sounds, outdoor speaker systems). Typical noise sources in this category include: pile drivers, drive-through speaker boxes, punch presses, steam valves, and transformer stations. HVAC/pool equipment are exempt from these standards.

c. These noise levels do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwelling). HVAC/pool equipment are exempt from these standards

d. The City may impose noise level standards which are more or less restrictive based upon determination of existing low or high ambient noise levels

City of Elk Grove Municipal Code

6.32.100 Exemptions.

E. Noise sources associated with construction, repair, remodeling, demolition, paving or grading of any real property, provided said activities only occur between the hours of 7:00 a.m. and 7:00 p.m. when located in close proximity to residential uses. Noise associated with these activities not located in close proximity to residential uses may occur between the hours of 6:00 a.m. and 8:00 p.m. However, when an unforeseen or unavoidable condition occurs during a construction project and the nature of the project necessitates that work in progress be continued until a specific phase is completed, the contractor or owner shall be allowed to continue work after 7:00 p.m. and to operate machinery and equipment necessary until completion of the specific work in progress can be brought to conclusion under conditions which will not jeopardize inspection acceptance or create undue financial hardships for the contractor or owner;

CRITERIA FOR ACCEPTABLE VIBRATION

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an

amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. **Table 10**, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 10 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v. A threshold of 0.20 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

TABLE 10: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

Peak Particle Velocity		Human Reaction	Effect on Buildings
mm/second	in/second		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of “architectural” damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of “architectural” damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize “architectural” damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage

Source: *Transportation Related Earthborne Vibrations*. Caltrans. TAV-02-01-R9601. February 20, 2002.

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines states that a project would normally be considered to result in significant noise impacts if noise levels conflict with adopted environmental standards or plans or if noise generated by the project would substantially increase existing noise levels at sensitive receivers on a permanent or temporary basis. Significance criteria for noise impacts are drawn from CEQA Guidelines Appendix G (Items XI [a-c]).

Would the project:

- a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- b. Generate excessive groundborne vibration or groundborne noise levels?
- c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Noise Level Increase Criteria for Long-Term Project-Related Noise Level Increases

The City of Elk Grove establishes the following criteria to determine significance of project-related noise level increases:

- Where existing ambient noise levels are less than 60 dB L_{dn} at the outdoor activity areas of noise sensitive uses, a +5 dB L_{dn} increase in noise levels shall be considered significant; and
- Where existing ambient noise levels range between 60 and 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +3 dB L_{dn} increase in noise levels shall be considered significant; and
- Where existing ambient noise levels are greater than 65 dB L_{dn} at the outdoor activity areas of noise-sensitive uses, a +1.5 dB L_{dn} increase in noise levels shall be considered significant. Public roadway improvements to alleviate traffic congestion and safety hazards shall utilize FHWA noise standards to allow a reasonable dollar threshold per dwelling to be used in the evaluation and abatement of impacts.

Temporary Construction Noise Impacts

With temporary noise impacts (construction), identification of “substantial increases” depends upon the duration of the impact, the temporal daily nature of the impact, and the absolute change in decibel levels. Per the City of Elk Grove Municipal Code, construction activities operating between 7:00 a.m. and 7:00 p.m. when located in close proximity to residential uses are exempt from the ordinance.

The City has not adopted any formal standard for evaluating temporary construction noise which occurs within allowable hours. For short-term noise associated with Project construction, Saxelby Acoustics recommends use of the Caltrans increase criteria of 12 dBA (Caltrans Traffic Noise Protocol, 2020), applied to existing residential receptors in the project vicinity. This level of increase is approximately equivalent to a doubling of sound energy and has been the standard of significance for Caltrans projects at the state level for many years.

Application of this standard to construction activities is considered reasonable considering the temporary nature of construction activities.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

Impact 1: *Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Traffic Noise Increases at Off-Site Receptors

The FICON guidelines specify criteria to determine the significance of traffic noise impacts. Where existing traffic noise levels are greater than 65 dB L_{dn} , a +1.5 dB L_{dn} increase in roadway noise levels will be considered significant. According to **Tables 3-5**, the maximum increase is traffic noise at the nearest sensitive receptor is predicted to be 0.5 dBA. Therefore, impacts resulting from increased traffic noise would be considered ***less-than-significant***, and no mitigation is required.

Operational Noise at Existing Sensitive Receptors

Compliance with City of Elk Grove Noise Level Standards

The proposed project includes several sport courts. The project description states that these could include tennis or pickleball courts. Saxelby Acoustics conservatively assumed that all proposed sport courts would be pickleball courts. It was assumed that a maximum of eight courts would be installed.

The City of Elk Grove General Plan provides noise level standards for stationary sources such as pickleball. Pickleball noise is considered to be impulsive, so the applicable daytime (7:00 a.m. to 10:00 p.m.) noise level standard would be 50 dBA L_{eq} (**Table 9**).

As shown in **Figure 4**, the proposed pickleball courts and parking lots are predicted to generate up to 43 dBA L_{eq} at the off-site existing residences north and west of the proposed project. These levels comply with the City's standard of 50 dBA L_{eq} . Therefore, impacts resulting from project operational noise would be considered ***less-than-significant***.

Compliance with City standards at new on-site receptors are assessed separately below.

Long-Term Project-Related Noise Level Increases

To evaluate long-term noise level increases due to operation of the sport courts and parking lot, Saxelby Acoustics utilized the City's significance thresholds. This evaluation is based upon the hourly average L_{eq} instead of the day/night average L_{dn} because pickleball courts are not predicted to operate during nighttime hours. Where existing noise levels are less than 60 dBA L_{eq} , an increase of +5.0 dBA would be considered significant. Where existing noise levels are between 60 dBA L_{eq} and 65 dBA L_{eq} , a +3.0 dBA increase would be considered significant. Where existing noise levels are greater than 65 dBA L_{eq} , a +1.5 dBA increase would be considered significant.

As shown in **Figure 4**, the project is predicted to generate up to 43 dBA L_{eq} at the residence north of the project site. At this location, the ambient daytime noise level was measured to be 62 dBA L_{eq} . The logarithmic sum of

the existing noise levels (62 dBA L_{eq}) plus project-generated noise levels (43 dBA L_{eq}) would be 62.0 dBA L_{eq} . This would result in a 0.0 dBA increase above existing noise levels. Therefore, this would be a ***less-than-significant*** impact.

Construction Noise

On-Site Construction Noise

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would occur during daytime hours.

Caltrans defines a significant increase due to noise as an increase of 12 dBA over existing ambient noise levels; Saxelby Acoustics used this criterion to evaluate increases due to construction noise associated with the project. Construction noise levels were modeled using the input data shown in **Table 6** and evaluated for significance in **Table 11** below. **Figure 3** shows existing daytime (7:00 a.m. to 10:00 p.m.) ambient noise level contours and receptor locations. **Figure 6** shows modeled construction noise level contours as well as the locations of the analyzed receptors.

TABLE 11: CONSTRUCTION NOISE LEVEL INCREASES

Receptor	Existing Ambient (dBA L _{eq})	Construction Noise (dBA L _{eq})	Ambient + Construction (dBA L _{eq})	Difference (dBA L _{eq})
1	63.6	49.2	63.8	0.2
2	62.6	57.8	63.8	1.2
3	61.5	57.8	63.0	1.5
4	61.2	57.9	62.9	1.7
5	52.5	59.1	60.0	7.5
6	42.3	50.4	51.0	8.7
7	40.0	49.8	50.2	10.2
8	52.6	48.5	54.0	1.4
9	57.1	47.9	57.6	0.5

As shown in the table, construction of the project is not predicted to generate noise levels which exceed the existing average ambient noise level by greater than the +12.0 dBA threshold.

Although construction activities are temporary in nature and would occur during normal daytime working hours, construction-related noise could result in sleep interference at existing noise-sensitive land uses in the vicinity of the construction if construction activities were to occur outside the normal daytime hours. Therefore, impacts resulting from noise levels temporarily exceeding the threshold of significance due to construction would be considered **potentially significant**. Mitigation measure 1(a) would reduce construction noise levels at the existing sensitive receptors.

Off-Site Construction Noise

The proposed project includes off-site construction improvements to connect the project site to existing City water and sewer lines as well as improvements to the roundabouts at the intersections of Sheldon Road with Waterman Road and Bradshaw Road.

Construction of sewer and water lines will occur along Waterman Road and Sheldon Road. The preferred off-site water connection would occur along Waterman Road from Calvine Road to Sheldon Road. The alternative water connection would occur along the segment of Sheldon Road from Elk Grove Florin Road to Waterman Road. The proposed sewer main would be constructed along Sheldon Road from Elk Grove Florin Road to Waterman Road and along approximately 1,000 feet of Elk Grove Florin Road.

The improvements at the Sheldon Road/Waterman Road Roundabout would reconfigure the roundabout to a two-lane circulatory design and widen the approaches to accommodate an additional lane for all movements at the intersection. Widening will be limited to the intersection only, with the two lanes tapering off into one lane.

The improvements at the Sheldon Road/Bradshaw Road Roundabout would reconfigure the roundabout to include two travel lanes in the east-west direction. Widening will be limited to the intersection only, with the two east-west lanes tapering off into one lane.

As shown in **Table 6**, off-site Linear, Drainage, Utilities, & Sub-Grade construction improvements would produce approximately 88 dBA L_{eq} at 50 feet. The typical setback distance for residences along these roadways

is approximately 85 feet. Assuming an attenuation rate of -6 dB per doubling of distance, the predicted off-site construction noise levels would be 83.4 dBA L_{eq} at the residences. It was assumed that construction would occur during the hours of 7:00 a.m. to 7:00 p.m. only.

Table 2 shows the existing noise levels measured along Waterman Road and Sheldon Road. **Table 12** below shows the predicted increase over existing noise levels due to off-site construction.

TABLE 12: OFF-SITE CONSTRUCTION NOISE LEVEL INCREASES

Segment	Approximate Distance from Sensitive Receptors to Construction (feet)	Predicted Construction Noise Levels (dBA L_{eq})	Existing Daytime Ambient (dBA L_{eq}) ^{1,2}	Existing Daytime + Construction (dBA L_{eq})	Daytime Difference (dBA L_{eq})
Waterman Road	85	83.4	52.0	83.4	31.4
Sheldon Road	85	83.4	62.0	83.4	21.4
Elk Grove Florin Road	85	83.4	61.5	83.4	21.9
Sheldon Road/Waterman Road Roundabout	150	78.5	62.0	78.6	16.6
Sheldon Road/Bradshaw Road Roundabout	150	78.5	62.0	78.6	16.6

¹Existing noise levels at Sheldon Road and Waterman Road determined through ambient noise level survey (see **Table 2**).

²Existing noise levels at Elk Grove Florin Road were calculated using FHWA traffic noise model and volumes provided by traffic engineer.

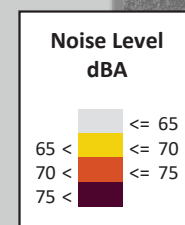
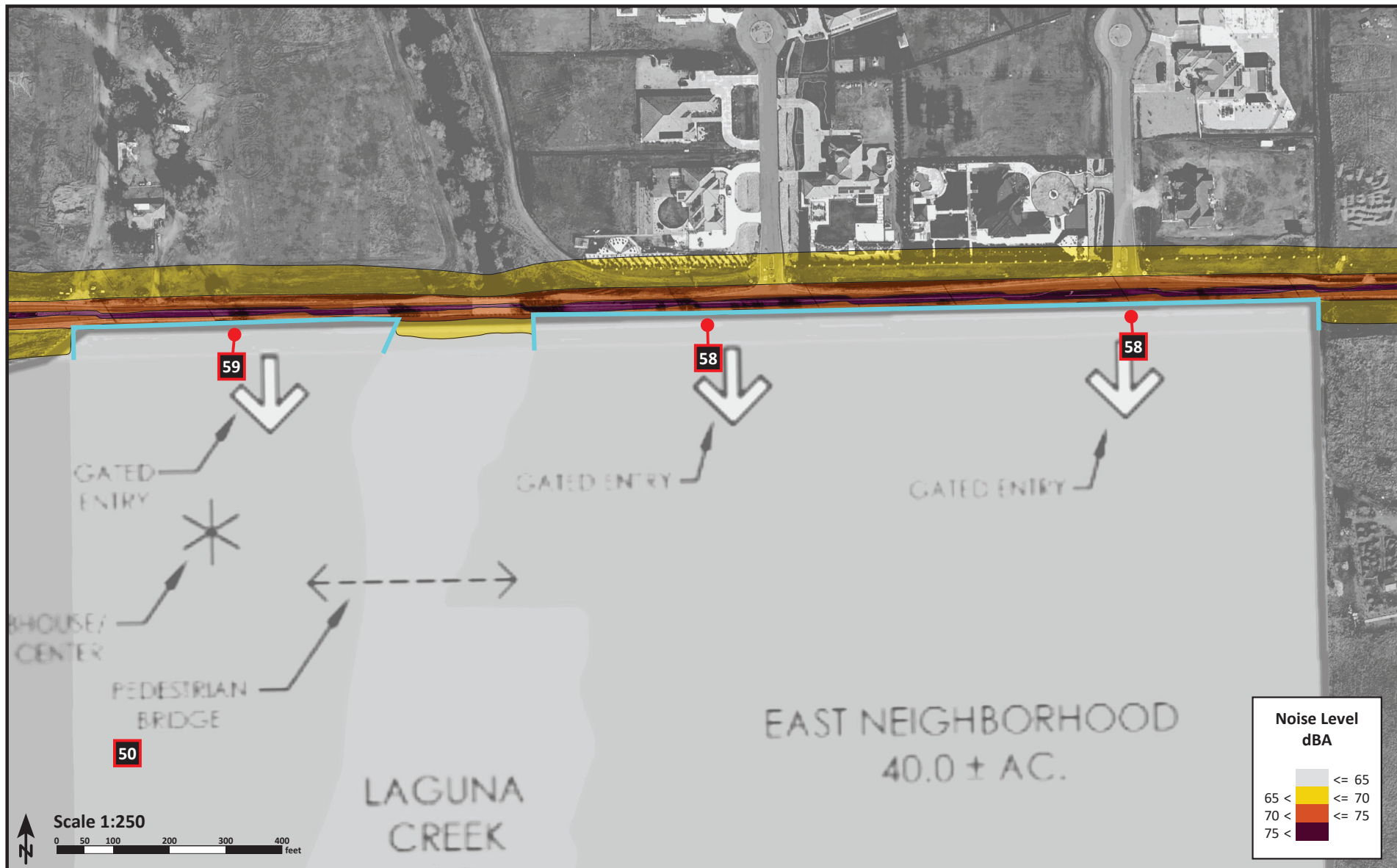
As shown in the table, construction of the project is predicted to generate noise levels which exceed the existing average ambient noise level by greater than the +12.0 dBA threshold. To reduce these increases, Saxelby Acoustics recommends Mitigation Measure 1(a) which specifies the use of 8-foot-tall temporary noise barriers at the boundary of the construction area adjacent to residential uses.

Transportation Noise on Project Site (Non-CEQA Issue)

Exterior Transportation Noise

Compliance with City's standards on new noise-sensitive receptors is not a CEQA consideration. However, this information is provided here so that a determination can be made regarding the ability of the proposed project to meet the requirements of the City of Elk Grove for exterior and interior noise levels at new sensitive uses proposed under the project.

As shown in **Figure 5**, traffic noise levels are predicted to be 67 dBA L_{dn} at the residences directly adjacent to Sheldon Road. This would exceed the City's noise level standard of 60 dBA L_{dn} . Therefore, Saxelby Acoustics recommends the construction of 8-foot-tall sound walls along Sheldon Road. **Figure 7** shows the location of the sound walls and resulting noise level contours. As shown in the figure, the sound walls would reduce noise levels in the outdoor areas of the new residences to 59 dBA L_{dn} or below. This would comply with the City's noise level standards.



Legend

8' Sound Wall

Noise Level

Summer Villas EIR

City of Elk Grove, California

Figure 7
Future Transportation Noise Contours with Walls (dBA Ldn)



*Figure not OCR compatible.

Interior Transportation Noise

As shown in **Figure 5**, the proposed project would be exposed to unshielded exterior noise levels of up to 67 dBA L_{dn} at the ground floor building facades closest to Sheldon Road. Second floor receivers are typically exposed to noise levels 2-3 dB higher than ground floor receivers, resulting in noise levels of up to 70 dBA L_{dn} at the second-floor facades. Where sound walls are utilized, exterior noise levels at ground floor receivers are predicted to be 59 dBA L_{dn} or less, as shown in **Figure 7**. Conventional construction typically achieves a 25 dBA noise level reduction (assuming a minimum of STC 29 rated glazing). This would result in first-floor interior noise levels of up to 34 dBA L_{dn} and second floor interior noise levels of up to 45 dBA L_{dn} , which complies with the City's interior noise level standard of 45 dBA L_{dn} . Therefore, no additional noise control measures would be required.

Stationary Noise on Project Site (Non-CEQA Issue)

The proposed project includes several sport courts. The project description states that these could include tennis or pickleball courts. Saxelby Acoustics conservatively assumed that all proposed sport courts would be pickleball courts. It was assumed that a maximum of eight courts would be installed.

The City of Elk Grove General Plan provides noise level standards for stationary sources such as pickleball. Pickleball noise is considered to be impulsive, so the applicable daytime (7:00 a.m. to 10:00 p.m.) noise level standard would be 50 dBA L_{eq} (**Table 9**).

As shown in **Figure 4**, the proposed pickleball courts and parking lots are predicted to generate up to 54 dBA L_{eq} at the on-site proposed residences. These levels exceed the City's standard of 50 dBA L_{eq} . Therefore, additional noise control measures would be required.

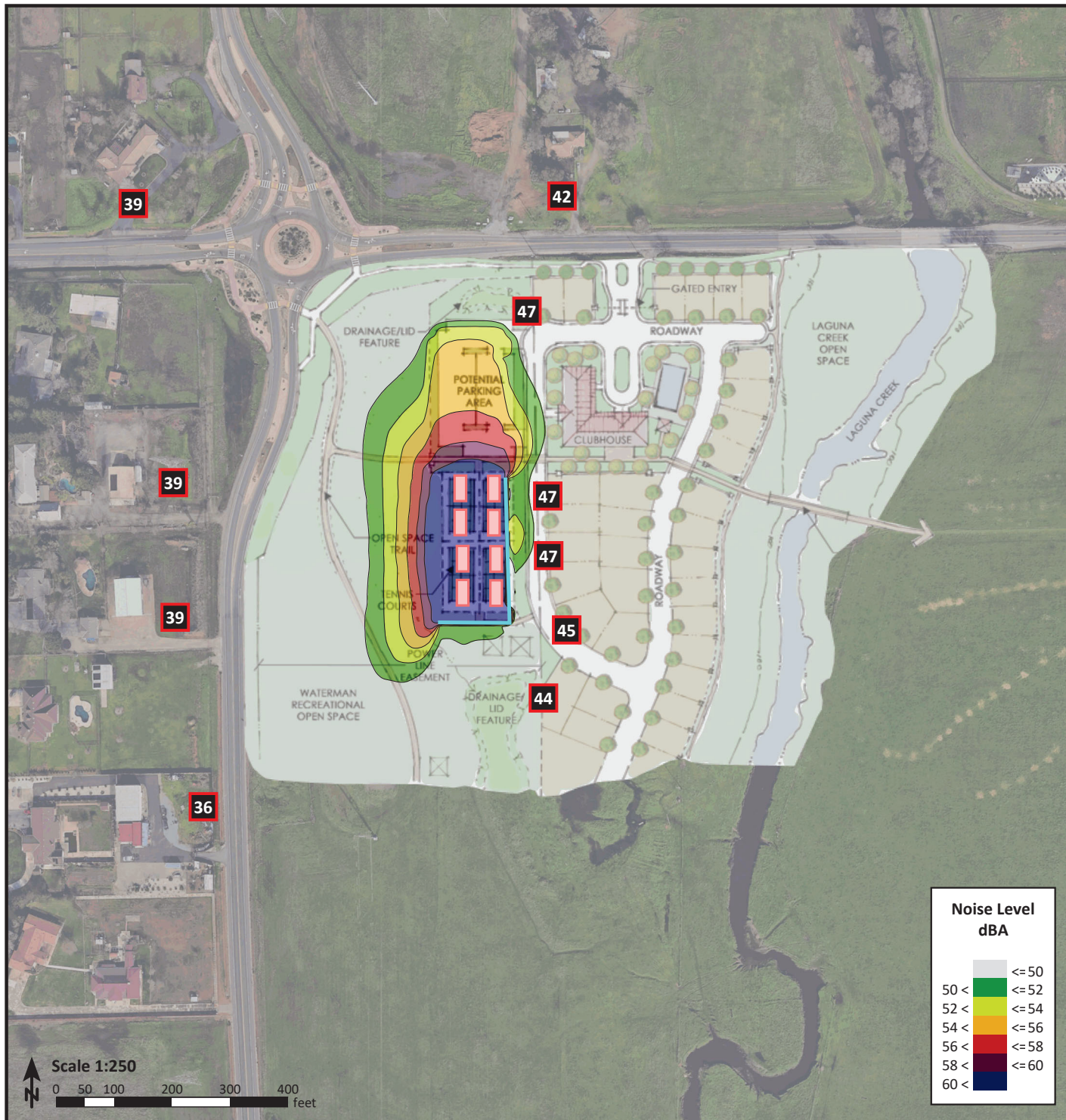
Saxelby Acoustics recommends the construction of 8-foot-tall sound barriers along the eastern and southern borders of the pickleball courts. These barriers may be comprised of CMU walls or acoustic curtains hung on chain link fencing. The barrier units should be installed such that there are no gaps between barrier units or gaps between the barrier and the ground. **Figure 8** shows the locations of the recommended barriers and resulting noise levels.

Summer Villas EIR

City of Elk Grove, California

Figure 8

Pickleball Noise Levels with Barriers
(Daytime Leq, dBA)



Legend

6 57
11 58
12

Noise Level

Pickleball Courts

Pickleball Courts

8' Sound Wall

8' Sound Wall

Noise Level dBA

<= 50
50 < <= 52
52 < <= 54
54 < <= 56
56 < <= 58
58 < <= 60
60 <

Mitigation Measures

1(a) The City shall establish the following as conditions of approval for any permit that results in the use of construction equipment:

- For off-site construction activities, the proposed project shall incorporate the use of 8-foot-tall temporary sound barriers between the existing sensitive receptors and construction activities. The sound barrier fencing should consist of ½" plywood or minimum STC 27 sound curtains placed to shield nearby sensitive receptors. The plywood barrier should be free from gaps, openings, or penetrations to ensure maximum performance.
- On-site construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the daytime hours of 7 AM and 7 PM daily when located in close proximity to residential uses.
- Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
- When not in use, motorized construction equipment shall not be left idling for more than 5 minutes.
- Stationary equipment (power generators, compressors, etc.) shall be located at the furthest practical distance from nearby noise-sensitive land uses or sufficiently shielded to reduce noise-related impacts.

Timing/Implementation: Implemented prior to approval of grading and/or building permits

Enforcement/Monitoring: City of Elk Grove Community Development Services Department

Recommended Condition of Approval

Prior to approval of project improvement plans, the plans for the proposed project shall show that the outdoor activity areas of residential uses along Sheldon Road shall be shielded from the Road through the use of minimum eight-foot-tall sound walls per the approval of the City Engineer. The sound wall may be constructed of combination of earthen berm and masonry wall to achieve the required wall height. Wall heights shall be measured relative to either pad or roadway centerline elevations, whichever is higher. This shall apply to all first-row receiver rooms with a view of Sheldon Road. Other types of barriers may be employed but shall be reviewed by an acoustical engineer prior to being constructed.

*Additionally, eight-foot-tall sound barriers should be installed at the eastern and southern boundaries of the proposed sports courts as shown in **Figure 8** to reduce recreational noise levels at the proposed residences to below the City's 50 dBA L_{eq} noise level standard. These barriers may be comprised of CMU walls or acoustic curtains hung on chain link fencing. The barrier units should be installed such that there are no gaps between barrier units or gaps between the barrier and the ground.*

Significance After Mitigation

Off-Site Construction

The recommended temporary construction noise barriers detailed in Mitigation Measures 1(a) are expected to achieve an average noise level reduction of -5 dBA. The resulting noise levels are listed in **Table 13** below:

TABLE 13: OFF-SITE CONSTRUCTION NOISE LEVEL INCREASES

Segment	Approximate Distance from Sensitive Receptors to Construction (feet)	Predicted Construction Noise Levels (dBA L _{eq})	Existing Daytime Ambient (dBA L _{eq}) ^{1,2}	Existing Daytime + Construction (dBA L _{eq})	Daytime Difference (dBA L _{eq})
Waterman Road	85	78.4	52.0	78.4	26.4
Sheldon Road	85	78.4	62.0	78.5	16.5
Elk Grove Florin Road	85	78.4	61.5	78.5	17.0
Sheldon Road/Waterman Road Roundabout	150	73.5	62.0	73.8	11.8
Sheldon Road/Bradshaw Road Roundabout	150	73.5	62.0	73.8	11.8

¹Existing noise levels at Sheldon Road and Waterman Road determined through ambient noise level survey (see **Table 2**).

²Existing noise levels at Elk Grove Florin Road were calculated using FHWA traffic noise model and volumes provided by traffic engineer.

As shown in table, the temporary barriers would not reduce all of the construction-related noise increases to less-than-significant. The resulting increase over ambient of up to 26.4 dBA is greater than the 12 dBA test of significance. Therefore, this would be considered a **significant and unavoidable** impact.

Impact 2: **Would the project generate excessive groundborne vibration or groundborne noise levels?**

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural.

The **Table 7** data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec threshold at distances of 26 feet. Sensitive receptors which could be impacted by construction related vibrations, especially vibratory compactors/rollers, are located further than 26 feet from typical construction activities. At distances greater than 26 feet construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours.

This is a **less-than-significant** impact and no mitigation is required.

Impact 3: *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

There are no airports within two miles of the project vicinity. Therefore, this impact is not applicable to the proposed project.



REFERENCES

- American National Standards Institute. (1998). *[Standard] ANSI S1.43-1997 (R2007): Specifications for integrating-averaging sound level meters*. New York: Acoustical Society of America.
- American Standard Testing Methods, *Standard Guide for Measurement of Outdoor A-Weighted Sound Levels, American Standard Testing Methods (ASTM) E1014-08*, 2008.
- ASTM E1014-12. *Standard Guide for Measurement of Outdoor A-Weighted Sound Levels*. ASTM International. West Conshohocken, PA. 2012.
- ASTM E1780-12. *Standard Guide for Measuring Outdoor Sound Received from a Nearby Fixed Source*. ASTM International. West Conshohocken, PA. 2012.
- Barry, T M. (1978). *FHWA highway traffic noise prediction model (FHWA-RD-77-108)*. Washington, DC: U.S. Department of transportation, Federal highway administration, Office of research, Office of environmental policy.
- California Department of Transportation (Caltrans), *Technical Noise Supplement, Traffic Noise Analysis Protocol*, September 2013.
- California Department of Transportation (Caltrans), *Traffic Noise Analysis Protocol*, May 2011.
- Egan, M. D. (1988). *Architectural acoustics*. United States of America: McGraw-Hill Book Company.
- Federal Highway Administration. *FHWA Roadway Construction Noise Model User's Guide*. FHWA-HEP-05-054 DOT-VNTSC-FHWA-05-01. January 2006.
- Hanson, Carl E. (Carl Elmer). (2006). *Transit noise and vibration impact assessment*. Washington, DC: U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment.
- International Electrotechnical Commission. Technical committee 29: Electroacoustics. International Organization of Legal Metrology. (2013). *Electroacoustics: Sound level meters*.
- International Organization for Standardization. (1996). *Acoustic - ISO 9613-2: Attenuation of sound during propagation outdoors. Part 2: General methods of calculation*. Geneva: I.S.O.
- Miller, L. N., Bolt, Beranek, & and Newman, Inc. (1981). *Noise control for buildings and manufacturing plants*. Cambridge, MA: Bolt, Beranek and Newman, Inc.
- SoundPLAN. SoundPLAN GmbH. Backnang, Germany. <http://www.soundplan.eu/english/>

Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
SPC	Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

Appendix B: Continuous Long-Term Ambient Noise Measurement Results



Appendix B1: Continuous Noise Monitoring Results

Date	Time	Measured Level, dBA			
		L _{eq}	L _{max}	L ₅₀	L ₉₀
Friday, June 16, 2023	0:00	53	70	44	41
Friday, June 16, 2023	1:00	50	70	42	40
Friday, June 16, 2023	2:00	49	68	41	40
Friday, June 16, 2023	3:00	50	71	42	40
Friday, June 16, 2023	4:00	55	80	46	41
Friday, June 16, 2023	5:00	58	71	53	46
Friday, June 16, 2023	6:00	62	84	57	48
Friday, June 16, 2023	7:00	63	79	61	49
Friday, June 16, 2023	8:00	61	75	59	47
Friday, June 16, 2023	9:00	60	76	57	45
Friday, June 16, 2023	10:00	60	73	57	44
Friday, June 16, 2023	11:00	61	75	58	45
Friday, June 16, 2023	12:00	60	73	58	46
Friday, June 16, 2023	13:00	60	77	57	46
Friday, June 16, 2023	14:00	61	75	59	47
Friday, June 16, 2023	15:00	63	86	60	51
Friday, June 16, 2023	16:00	67	97	61	54
Friday, June 16, 2023	17:00	62	75	62	55
Friday, June 16, 2023	18:00	62	81	61	53
Friday, June 16, 2023	19:00	61	79	59	52
Friday, June 16, 2023	20:00	61	102	60	51
Friday, June 16, 2023	21:00	61	74	57	47
Friday, June 16, 2023	22:00	58	76	51	46
Friday, June 16, 2023	23:00	56	73	49	44

Statistics	L _{eq}	L _{max}	L ₅₀	L ₉₀
Day Average	62	80	59	49
Night Average	56	74	47	43
Day Low	60	73	57	44
Day High	67	102	62	55
Night Low	49	68	41	40
Night High	62	84	57	48
Ldn	64	Day %		88
CNEL	64	Night %		12

Site: LT-1

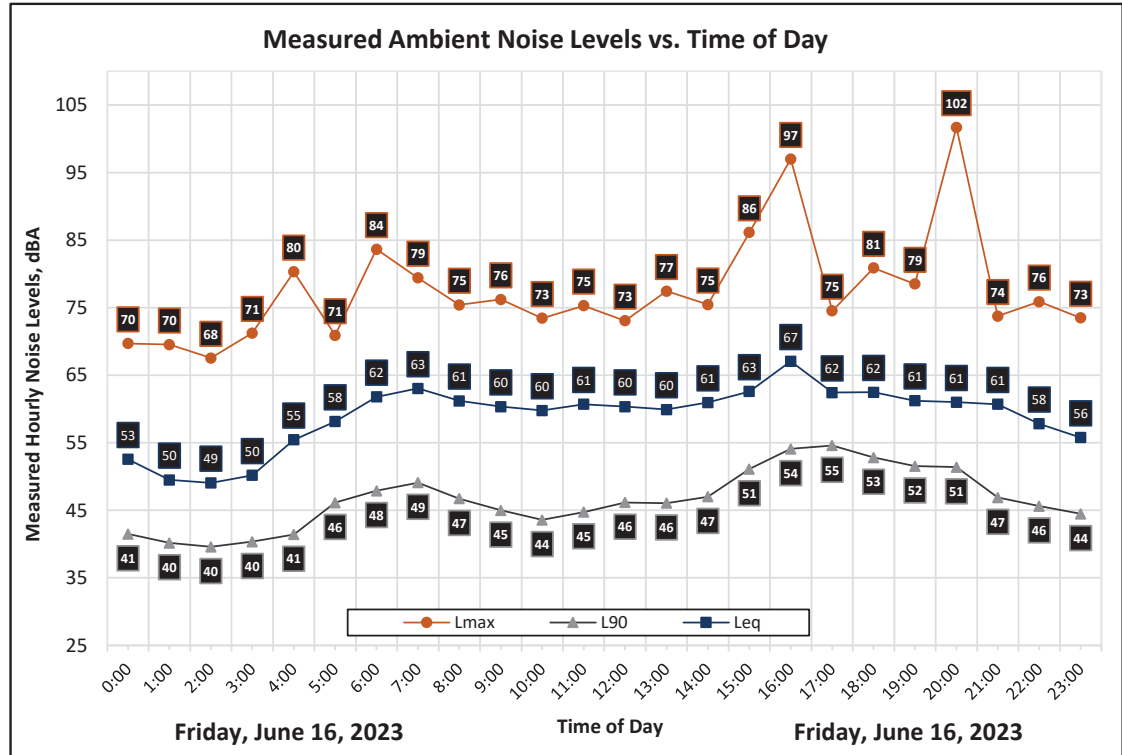
Project: Summer Villas EIR

Location: Northern Project Boundary

Coordinates: (38.4379201, -121.3481425)

Meter: LDL 820-3

Calibrator: CAL200



Appendix B2: Continuous Noise Monitoring Results

Date	Time	Measured Level, dBA			
		L _{eq}	L _{max}	L ₅₀	L ₉₀
Friday, June 16, 2023	0:00	48	72	42	39
Friday, June 16, 2023	1:00	44	57	40	38
Friday, June 16, 2023	2:00	45	68	39	37
Friday, June 16, 2023	3:00	45	67	41	38
Friday, June 16, 2023	4:00	48	70	45	41
Friday, June 16, 2023	5:00	53	66	50	47
Friday, June 16, 2023	6:00	53	67	50	45
Friday, June 16, 2023	7:00	54	72	51	45
Friday, June 16, 2023	8:00	52	66	50	44
Friday, June 16, 2023	9:00	52	76	49	41
Friday, June 16, 2023	10:00	51	70	48	40
Friday, June 16, 2023	11:00	51	65	48	40
Friday, June 16, 2023	12:00	53	77	48	41
Friday, June 16, 2023	13:00	52	67	48	41
Friday, June 16, 2023	14:00	51	69	48	41
Friday, June 16, 2023	15:00	53	76	49	44
Friday, June 16, 2023	16:00	53	74	50	46
Friday, June 16, 2023	17:00	52	67	51	47
Friday, June 16, 2023	18:00	52	93	50	46
Friday, June 16, 2023	19:00	52	66	51	46
Friday, June 16, 2023	20:00	52	69	50	46
Friday, June 16, 2023	21:00	51	71	50	44
Friday, June 16, 2023	22:00	52	69	49	43
Friday, June 16, 2023	23:00	50	67	46	42

Statistics	L _{eq}	L _{max}	L ₅₀	L ₉₀
Day Average	52	72	49	44
Night Average	50	67	45	41
Day Low	51	65	48	40
Day High	54	93	51	47
Night Low	44	57	39	37
Night High	53	72	50	47
Ldn	56	Day %		77
CNEL	56	Night %		23

Site: LT-2

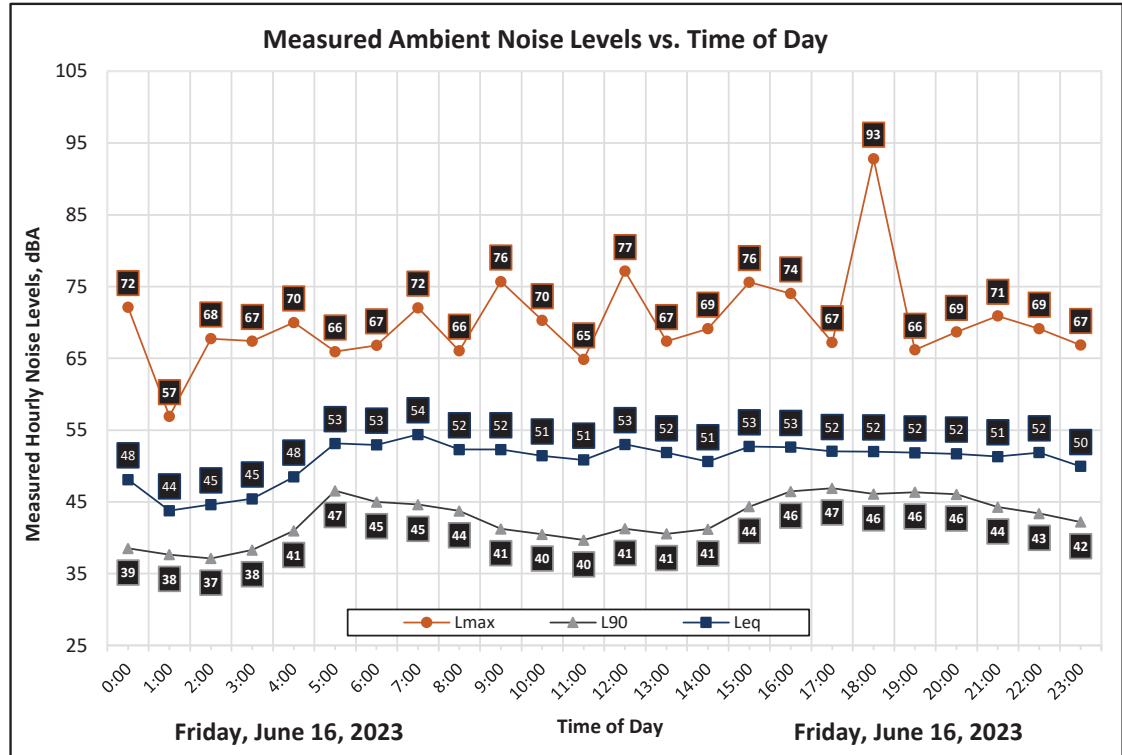
Project: Summer Villas EIR

Location: Southwest of Project Boundary

Coordinates: (38.4316108, -121.3537809)

Meter: LDL 820-4

Calibrator: CAL200



Appendix C: Traffic Noise Calculation Inputs and Results



Appendix C-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 230512 Summer Villas EIR

Description: Existing Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset			Level, dBA
												60 dBA	65 dBA	70 dBA	
1	Bond Rd	West of Waterman Rd	22,530	85	0	15	1.0%	1.0%	35	70	-5	169	78	36	60.7
2	Bradshaw Rd	North of Sheldon Rd	24,170	85	0	15	1.0%	1.0%	50	280	0	317	147	68	60.8
3	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	13,850	85	0	15	1.0%	1.0%	40	200	0	151	70	32	58.2
4	Sheldon Rd	Waterman Rd to Bradshaw Rd	10,760	85	0	15	1.0%	1.0%	40	160	0	127	59	27	58.5
5	Sheldon Rd	West of Elk Grove Florin Rd	19,140	85	0	15	1.0%	1.0%	40	100	-5	187	87	40	59.1
6	Waterman Rd	Calvine Rd to Sheldon Rd	11,690	85	0	15	1.0%	1.0%	45	235	-5	164	76	35	52.6
7	Waterman Rd	Sheldon Rd to Bond Rd	14,460	85	0	15	1.0%	1.0%	45	260	0	189	88	41	57.9
8	Waterman Rd	North of Calvine Rd	9,420	85	0	15	1.0%	1.0%	45	100	-5	142	66	31	57.3
9	Waterman Rd	South of Bond Rd	14,280	85	0	15	1.0%	1.0%	45	100	-5	187	87	40	59.1

Appendix C-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 230512 Summer Villas EIR

Description: Existing Plus Project Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset			Level, dBA
												60 dBA	65 dBA	70 dBA	
1	Bond Rd	West of Waterman Rd	22,790	85	0	15	1.0%	1.0%	35	70	-5	170	79	37	60.8
2	Bradshaw Rd	North of Sheldon Rd	24,340	85	0	15	1.0%	1.0%	50	280	0	319	148	69	60.8
3	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	14,650	85	0	15	1.0%	1.0%	40	200	0	157	73	34	58.4
4	Sheldon Rd	Waterman Rd to Bradshaw Rd	12,060	85	0	15	1.0%	1.0%	40	160	0	138	64	30	59.0
5	Sheldon Rd	West of Elk Grove Florin Rd	20,360	85	0	15	1.0%	1.0%	40	100	-5	195	91	42	59.4
6	Waterman Rd	Calvine Rd to Sheldon Rd	12,150	85	0	15	1.0%	1.0%	45	235	-5	168	78	36	52.8
7	Waterman Rd	Sheldon Rd to Bond Rd	14,980	85	0	15	1.0%	1.0%	45	260	0	193	90	42	58.1
8	Waterman Rd	North of Calvine Rd	9,790	85	0	15	1.0%	1.0%	45	100	-5	145	67	31	57.4
9	Waterman Rd	South of Bond Rd	14,530	85	0	15	1.0%	1.0%	45	100	-5	189	88	41	59.2

Appendix C-3

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 230512 Summer Villas EIR

Description: EPAP Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset			Level, dBA
												60 dBA	65 dBA	70 dBA	
1	Bond Rd	West of Waterman Rd	23,490	85	0	15	1.0%	1.0%	35	70	-5	173	80	37	60.9
2	Bradshaw Rd	North of Sheldon Rd	24,160	85	0	15	1.0%	1.0%	50	280	0	317	147	68	60.8
3	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	13,900	85	0	15	1.0%	1.0%	40	200	0	151	70	33	58.2
4	Sheldon Rd	Waterman Rd to Bradshaw Rd	10,800	85	0	15	1.0%	1.0%	40	160	0	128	59	28	58.5
5	Sheldon Rd	West of Elk Grove Florin Rd	18,800	85	0	15	1.0%	1.0%	40	100	-5	185	86	40	59.0
6	Waterman Rd	Calvine Rd to Sheldon Rd	11,780	85	0	15	1.0%	1.0%	45	235	-5	164	76	35	52.7
7	Waterman Rd	Sheldon Rd to Bond Rd	14,600	85	0	15	1.0%	1.0%	45	260	0	190	88	41	57.9
8	Waterman Rd	North of Calvine Rd	9,490	85	0	15	1.0%	1.0%	45	100	-5	142	66	31	57.3
9	Waterman Rd	South of Bond Rd	14,700	85	0	15	1.0%	1.0%	45	100	-5	191	88	41	59.2

Appendix C-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 230512 Summer Villas EIR

Description: EPAP Plus Project Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset			Level, dBA
												60 dBA	65 dBA	70 dBA	
1	Bond Rd	West of Waterman Rd	23,850	85	0	15	1.0%	1.0%	35	70	-5	175	81	38	61.0
2	Bradshaw Rd	North of Sheldon Rd	24,380	85	0	15	1.0%	1.0%	50	280	0	319	148	69	60.9
3	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	14,700	85	0	15	1.0%	1.0%	40	200	0	157	73	34	58.4
4	Sheldon Rd	Waterman Rd to Bradshaw Rd	12,100	85	0	15	1.0%	1.0%	40	160	0	138	64	30	59.0
5	Sheldon Rd	West of Elk Grove Florin Rd	20,600	85	0	15	1.0%	1.0%	40	100	-5	197	91	42	59.4
6	Waterman Rd	Calvine Rd to Sheldon Rd	12,240	85	0	15	1.0%	1.0%	45	235	-5	169	78	36	52.8
7	Waterman Rd	Sheldon Rd to Bond Rd	15,120	85	0	15	1.0%	1.0%	45	260	0	194	90	42	58.1
8	Waterman Rd	North of Calvine Rd	9,830	85	0	15	1.0%	1.0%	45	100	-5	146	68	31	57.5
9	Waterman Rd	South of Bond Rd	14,950	85	0	15	1.0%	1.0%	45	100	-5	193	89	42	59.3

Appendix C-5

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 230512 Summer Villas EIR

Description: Cumulative Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset			Level, dBA
												60 dBA	65 dBA	70 dBA	
1	Bond Rd	West of Waterman Rd	25,800	85	0	15	1.0%	1.0%	35	70	-5	184	86	40	61.3
2	Bradshaw Rd	North of Sheldon Rd	34,550	85	0	15	1.0%	1.0%	50	280	0	403	187	87	62.4
3	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	16,500	85	0	15	1.0%	1.0%	40	200	0	169	79	37	58.9
4	Sheldon Rd	Waterman Rd to Bradshaw Rd	13,400	85	0	15	1.0%	1.0%	40	160	0	148	68	32	59.5
5	Sheldon Rd	West of Elk Grove Florin Rd	23,520	85	0	15	1.0%	1.0%	40	100	-5	215	100	46	60.0
6	Waterman Rd	Calvine Rd to Sheldon Rd	15,800	85	0	15	1.0%	1.0%	45	235	-5	200	93	43	53.9
7	Waterman Rd	Sheldon Rd to Bond Rd	18,900	85	0	15	1.0%	1.0%	45	260	0	225	105	49	59.1
8	Waterman Rd	North of Calvine Rd	23,250	85	0	15	1.0%	1.0%	45	100	-5	259	120	56	61.2
9	Waterman Rd	South of Bond Rd	24,800	85	0	15	1.0%	1.0%	45	100	-5	270	125	58	61.5

Appendix C-6

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 230512 Summer Villas EIR

Description: Cumulative Plus Project Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset			Level, dBA
												60 dBA	65 dBA	70 dBA	
1	Bond Rd	West of Waterman Rd	26,160	85	0	15	1.0%	1.0%	35	70	-5	186	86	40	61.4
2	Bradshaw Rd	North of Sheldon Rd	34,760	85	0	15	1.0%	1.0%	50	280	0	404	188	87	62.4
3	Sheldon Rd	Elk Grove Florin Rd to Waterman Rd	17,300	85	0	15	1.0%	1.0%	40	200	0	175	81	38	59.1
4	Sheldon Rd	Waterman Rd to Bradshaw Rd	14,700	85	0	15	1.0%	1.0%	40	160	0	157	73	34	59.9
5	Sheldon Rd	West of Elk Grove Florin Rd	24,220	85	0	15	1.0%	1.0%	40	100	-5	219	102	47	60.1
6	Waterman Rd	Calvine Rd to Sheldon Rd	16,260	85	0	15	1.0%	1.0%	45	235	-5	204	95	44	54.1
7	Waterman Rd	Sheldon Rd to Bond Rd	19,420	85	0	15	1.0%	1.0%	45	260	0	230	107	49	59.2
8	Waterman Rd	North of Calvine Rd	23,590	85	0	15	1.0%	1.0%	45	100	-5	261	121	56	61.3
9	Waterman Rd	South of Bond Rd	25,050	85	0	15	1.0%	1.0%	45	100	-5	272	126	59	61.5