Appendix G: Noise

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G.1 - Environmental Noise Assessment

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April 11, 2018

Mr. Adam Tennant
WestGate Ventures
2551 San Ramon Valley Blvd., Suite 204
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VIA E-Mail: atennant@westgateventures.net

Subject: Lassen Road Property, Livermore – Environmental Noise Assessment

Dear Adam,

This letter presents the results of the environmental noise assessment completed for the Lassen Road Property project proposed north of Interstate 580 (I-580) and west of First Street/ Springtown Boulevard in Livermore, California. The proposed project would construct 196 unit, multi-family homes on the 35 acre site. This study evaluates the compatibility of the proposed residential uses with the noise environment at the project site. Included in the report are the fundamentals of environmental noise, a summary of the applicable objectives and policies contained in the City of Livermore Health and Safety Element of the General Plan, and a description of existing noise levels at the project site. The report then summarizes future noise levels expected at the project site and describes measures necessary to reduce noise levels to acceptable levels.

Fundamentals of Environmental Noise
Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in

acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level* (*dBA)*. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the

variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* (L_{dn} or *DNL*) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Regulatory Background

2013 California Building Code, Title 24, Part 2.

The current (2013) California Building Code (CBC) does not place limits on interior noise levels attributable to exterior environmental noise sources. The July 1, 2015 Supplement to the 2013 CBC corrects this omission, reinstating limits on interior noise levels attributable to exterior environmental noise sources which had been contained in all prior versions of the CBC dating back to 1974. In keeping with the provisions of the 2015 supplement, this report considers interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA L_{dn} in any habitable room for new dwellings other than detached single-family dwellings.

City of Livermore General Plan

The purpose of the Noise Element of The City's 2013 General Plan is to identify and appraise noise generation in the community in order to minimize problems from intrusive sound and to ensure that the new development does not expose people to unacceptable noise levels. The following policies are applicable to the proposed project:

Policy N-1.1.P2 Noise shall be measured in dBA CNEL or dBA L_{dn}.

Policy N-1.1.P4 The City shall use the Land Use Compatibility Guidelines for Exterior Noise (measured in dBA CNEL or L_{dn}) as shown in Table 3.

Table 3 Land Use Compatibility Guidelines for Exterior Noise

Land Use	Normally Acceptable (dBA)	Conditionally Acceptable (dBA)	Normally Unacceptable (dBA)	Clearly Unacceptable (dBA)
Residential-Low Density, Single Family Homes	≤ 60	55-70	70-75	>75
Residential Multi-Family Homes	≤ 65	60-70	70-75	>75

Policy N-1.2.P7 The interior noise level of up to 45 dBA, with windows closed, must not be exceeded.

Policy N-1.4.P4 The City shall require exterior noise in the backyards to be Normally Acceptable at a maximum of 60 dBA CNEL for single-family development and a maximum of 65 dBA for multi-family development.

Policy N-1.4.P5 The City will consider walls as a means of noise mitigation along the proposed and existing roadway segments and railroad right-of-ways only after other noise attenuation programs such as building construction, larger landscaping berms, and distances have been considered to reduce noise to appropriate levels in residential areas.

Existing Noise Environment

The project site is located north of I-580 in Livermore, west of First Street. There are multi-family residences along Springtown Boulevard to the east of proposed project site and a shopping arena with commercial use buildings to south across the I-580 highway. The existing noise environment at the site results primarily due to traffic along I-580.

A noise monitoring survey was completed Tuesday, December 6th to Friday, December 8th, 2017 to quantify existing ambient noise levels. The noise monitoring survey consisted of eight short-term (10-minute) noise measurement locations and one long-term (24+ hour) noise measurement location. Noise monitoring locations are shown on Figure 1.

Measurement location LT-1 was situated at the south property line fence of the project site, approximately 190 feet from the center of Interstate 580 (I-580). Daytime hourly average noise levels at this location typically ranged from 71 to 75 BA L_{eq}. Noise levels were as low as 68 to 70 dBA L_{eq} during the 11:00 pm to 1:00 am hours. The day-night average noise level calculated at this location was 80 dBA L_{dn}. The LT-1 data was used to determine L_{dn} noise levels at the short-term locations and also to calibrate the noise model.

A summary of the short-term noise data is presented in Table 4. The long-term noise measurement data is provided in APPENDIX A.

FIGURE 1 Noise Monitoring Locations at Lassen Road Property

TABLE 4 Summary of Short-Term Noise Measurement Data

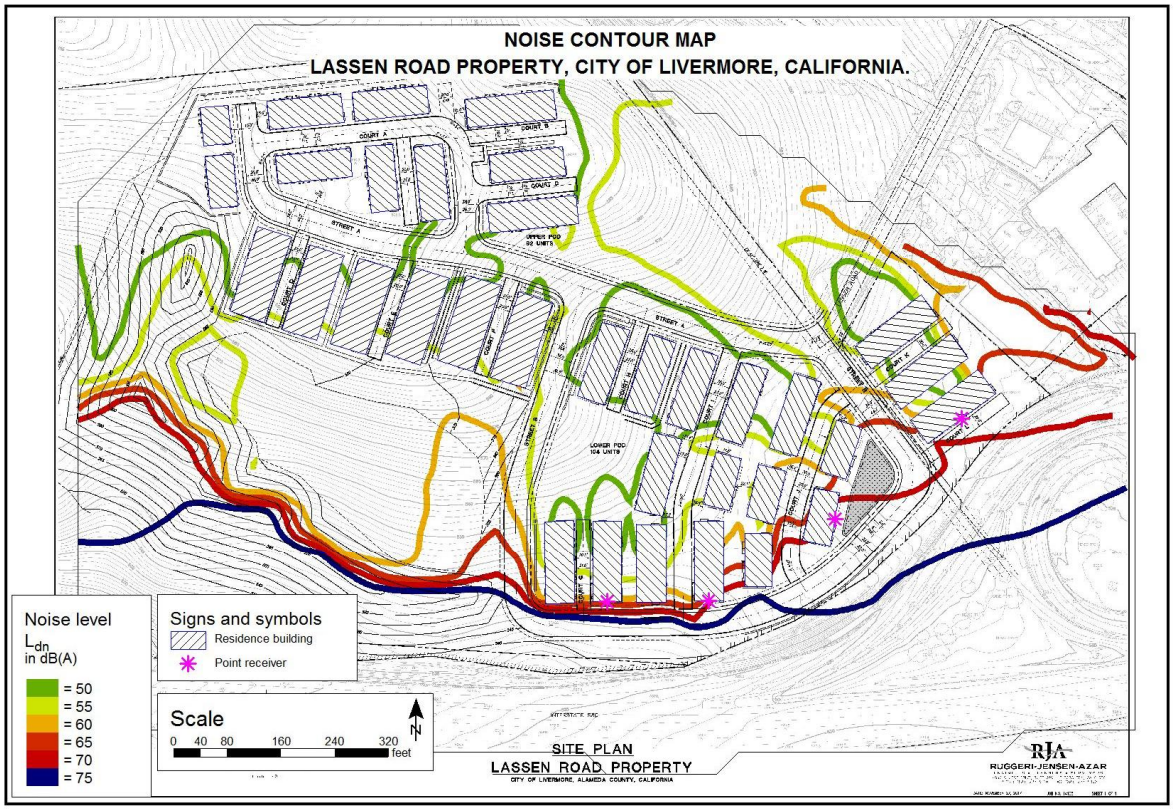
Noise Measurement Location	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	L_{dn}
ST-1: East corner of the site. (12/4/2017, 11:40 a.m. – 11:50 a.m.)	61	58	56	59	65
ST-2: 45 feet east from south end of Lassen Road. (12/8/2017, 12 p.m. - 12:10 p.m.)	60	58	57	59	65
ST-3: North east corner of the site (12/4/2017, 12:20 p.m. to 12:30 p.m.)	61	57	55	58	64
ST-4: Mid site, 330 feet from end of Lassen Road. (12/4/2017, 12:40 p.m. - 12:50 p.m.)	59	56	54	57	63
ST-5: 210 feet southwest from the end of Lassen Road. (12/4/2017, 1:00 p.m.-1:10 p.m.)	62	59	58	60	66
ST-6: 285 feet north from centerline of I-580. (12/8/2017, 12:00 p.m. – 12:10 p.m.)	63	61	59	62	68
ST-7: Rear of the project site. (12/8/2015, 11:10 a.m.-11:20 a.m.)	51	50	49	50	56
ST-8: West side of the project site. (12/8/2015, 11:30 a.m.-11:40 a.m.)	53	51	50	52	58

Note: L_{dn} approximated by correlating to corresponding period at long-term site and through noise modeling, as described below.

Future Exterior Noise Environment

The future noise environment at the project site would continue to result primarily from vehicular traffic along Interstate 580. Exterior traffic noise levels were calculated with SoundPLAN version 7.4, and are shown in Figure 2. Roadway, barrier, terrain features, and receptor locations were digitized and input into the traffic noise model in a three-dimensional reference coordinate system. The calculated noise levels account for the acoustical shielding provided by the proposed site grading and proposed project structures. The geometrical input was based on the topography provided in the Preliminary Grading and Drainage Plan[1]. Roadway traffic volumes, including the vehicle mix ratio, and traffic speeds were anticipated to be as the existing traffic on I-580 and were input into the model based on the existing traffic volumes in from Caltrans database[2,3]. Noise levels were calculated assuming calm wind conditions with moderate temperatures and humidity. Figure 2 shows the noise contour for future exterior noise environment.

FIGURE 2 Future Traffic Noise Contours



[1] Preliminary Grading and Drainage Plan, Lassen Road Property; City of Livermore, Alameda County, California; Ruggeri-Jensen-Azar, Pleasanton CA; November 27, 2017.
[2] 2016 Traffic Volumes on California State Highways; Division of Traffic Operations, Department of Transportation, Sacramento, CA; December 2017.
[3] 2015 Annual Average Daily Truck Traffic on the California State Highway System; Department of Transportation.

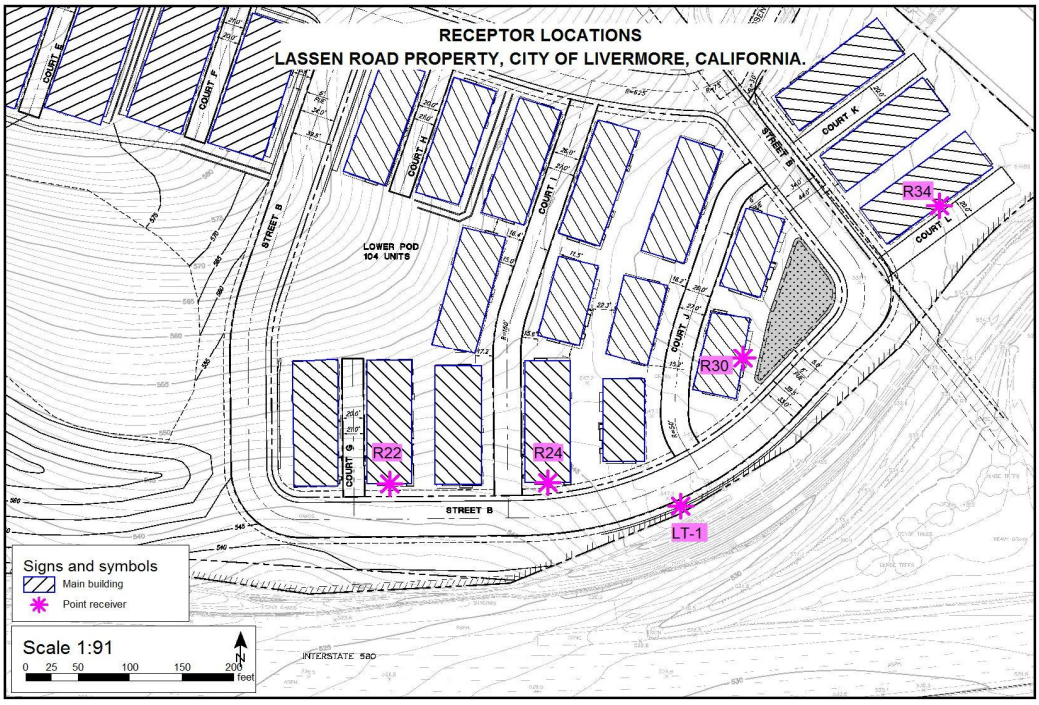
As shown in Figure 2, the noise environment at the site varies depending on the proximity of the receptor to adjacent roadways and the elevation of the receptor with respect to the elevation of I-580 travel lanes. Proposed common use areas include a playground and plaza, located near the lower pods, a lounge area and promenade near Court E, and a trail, which travels throughout the site.

Future noise levels at the playground, plaza, lounge area, promenade, trail overlooks, the majority of the trail, and throughout the majority of the site fall within the City's "normally acceptable" range for residential land use compatibility (65 dBA L_{dn} or less), primarily due to the landscape contouring that is planned for the site and the shielding provided by the project buildings. The playground and plaza areas, lounge area and promenade, and trail overlook areas would be exposed to 55 to 60 dBA L_{dn}. The outdoor seating areas near pods 1 and 9 would be exposed to less than 50 dBA L_{dn}. These levels are less than the "normally acceptable" range for exterior noise in residential land use. The part of the trail adjacent to Highway I-580 would be exposed to noise levels ranging from 65 dBA L_{dn} to 75 dBA L_{dn}. The site is elevated above I-580; therefore, a barrier located at the southern property line of the site would provide limited noise reduction to these areas. Given that the majority of the trail would be exposed to levels below 65 dBA L_{dn} and occupants would have access to numerous outdoor areas throughout the site that are exposed to "normally acceptable" traffic noise levels, exterior noise levels are the site would be considered compatible with the land use.

Future Interior Noise Environment

Noise levels were calculated at four residential facades adjacent to I-580 (R22, R24, R30, R34). The receptors were named after the pad numbers in the project plan. Figure 3 shows the locations of all measurement and modeling receptors.

FIGURE 3 Modeled Receptor Locations



As shown in Table 5, future exterior noise levels at residential façades nearest Interstate 580 are calculated to be 67 to 74 dBA L_{dn} at unshielded ground level exposures (Level 1). Exterior noise levels at the Level 2 façades of these same receptors are calculated to range from 71 to 79 dBA L_{dn}, while the exposure levels at the third level façade the Level 3 facades range from 73 to 80 dBA L_{dn}.

TABLE 5 Calculated Future Traffic Noise Levels at Residential Façades (dBA, L_{dn})

Receptor Location	Calculated Future Noise Exposure, dBA L_{dn}		
	Level 1	Level 2	Level 3
R22	74	79	79
R24	74	79	80
R30	71	74	74
R34	67	71	73

Interior noise levels within new residential units are required to be maintained at or below 45 dBA L_{dn}. Residential building façades facing and adjacent to I-580 would be exposed to future noise levels greater than 65 dBA L_{dn}. Interior noise levels would vary depending on the final design of the buildings (relative window area to wall area) and construction materials and methods. Standard residential construction provides approximately 15 dBA of exterior to interior noise reduction assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces.

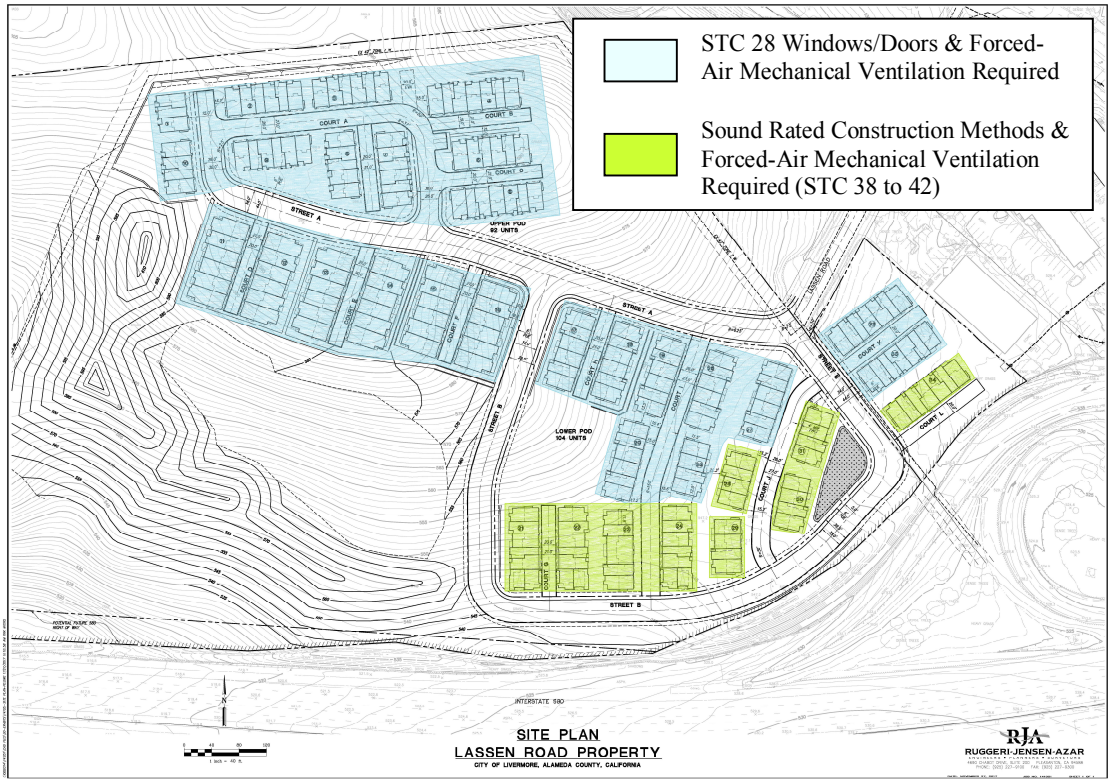
In exterior noise environments ranging from 60 dBA L_{dn} to 65 dBA L_{dn}, interior noise levels can typically be maintained below City standards with the incorporation of an adequate forced air mechanical ventilation system in each residential unit. Preliminary calculations indicate that this measure would be applicable to residential lots located on the northern and central portion of the site (See Figure 4). It is assumed that standard thermal-pane residential windows/doors with a minimum rating of STC 28 would be installed in these residences.

Facades of residential buildings adjacent to I-580, facing the road will be exposed to interior noise levels of 65 dBA L_{dn} or greater. In such cases, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA L_{dn} with proper wall construction techniques, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems. Preliminary calculations show that it is likely that windows/doors with ratings of STC 30 to 40 would be required in noise environments of 75 dBA L_{dn} or less. This measure would be applicable to residential lots located in the southern portion of the site (See Figure 4).

In noise environments exceeding 75 dBA L_{dn}, the construction materials and techniques necessary to reduce interior noise levels to acceptable levels become more expensive and

difficult to implement. Noise insulation features such as stucco-sided staggered-stud walls and high STC-rated windows and doors (STC 38 to 42) would be required for first-row façades facing and adjacent to I-580. First-row residences would also need to be equipped with a full heating and air-conditioning system because it is unlikely residents would open their windows for ventilation. Figure 4 provides an overview of preliminary recommendations for noise installation features.

Figure 4: Preliminary Noise Insulation Requirements



Noise insulation features to be included in the project's design will need to be developed once detailed floor plans and building elevations are available. The noise control treatments should be designed to reduce interior noise levels to 45 dBA L_{dn} or less. The detailed design plans of units proposed by the project should be reviewed by an acoustical specialist prior to the issuance of building permits to ensure that interior noise levels would be maintained at or below 45 dBA L_{dn}.

♦ ♦ ♦

This concludes our environmental noise assessment for the Lassen Road residential project. If you have any questions or comments regarding this analysis, please do not hesitate to call.

Sincerely yours,

Manasi Biwalkar

Staff Consultant
ILLINGWORTH & RODKIN, INC.
(17-205)

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G.2 - Traffic Noise Model Appendix

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TABLE Existing (2018)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/09/2018
ROADWAY SEGMENT: Springtown Boulevard - Lassen Road to Bluebell Drive
NOTES: - Existing (2018)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17300 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	91.2	191.0	408.9

TABLE Existing + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/09/2018
ROADWAY SEGMENT: Springtown Boulevard - Lassen Road to Bluebell Drive
NOTES: - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18300 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	94.4	198.2	424.4

TABLE Near Term Without Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/09/2018
ROADWAY SEGMENT: Springtown Boulevard - Lassen Road to Bluebell Drive
NOTES: - Near Term Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18200 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.71

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	94.1	197.5	422.9

TABLE Near Term + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/09/2018
ROADWAY SEGMENT: Springtown Boulevard - Lassen Road to Bluebell Drive
NOTES: - Near Term + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19200 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	97.3	204.5	438.2

TABLE Cumulative-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/09/2018
ROADWAY SEGMENT: Springtown Boulevard - Lassen Road to Bluebell Drive
NOTES: - Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19400 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	97.9	205.9	441.2

TABLE Cumulative + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/09/2018
ROADWAY SEGMENT: Springtown Boulevard - Lassen Road to Bluebell Drive
NOTES: - Cumulative + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24000 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
56.2	112.0	236.9	508.1
