Korean Buddhist Temple of DAE SEUNG
Environmental Noise Analysis

Santa Clara County, California

December 10, 2018

jcb Project # 2018-152

Prepared for:

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EST. 1910
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1. INTRODUCTION

The proposed Korean Buddhist Temple of Dae Seung project proposes to construct four new structures. The four buildings are as follows:

- Building A is Buddha Hall for daily prayers with 10-15 people during the week days and up to 30 people on Sunday;
- Building B is a kitchen/dining room for after worship meals;
- Building C is a library and youth/toddler area;
- Building D is a guest quarters.

The proposed project will operate 7-days per week, and the hours of operations are 10:00 a.m. to 12:00 noon, & 7;00 p.m. to 9:00 p.m. daily. There is no amplified music associated with the project. The maximum capacity is expected to be up to 100 people during special events, and 10-15 people on typical days. There is also parking for up to 84 stalls. No outdoor play areas are proposed.

The proposed project site is located adjacent to the north side of Buena Vista Avenue, and the south side of Denio Avenue, in the unincorporated area of Santa Clara County

Figure 1 shows the project area, and Figure 2 shows the project site plan.

This analysis will evaluate the potential noise levels associated with the project, as it may affect adjacent residences, and noise levels from adjacent noise sources that may affect the project site.

Legend

A : 24-Hour Noise Monitoring Site

: Short Term Monitoring Site

Figure 1
Korean Buddhist Temple

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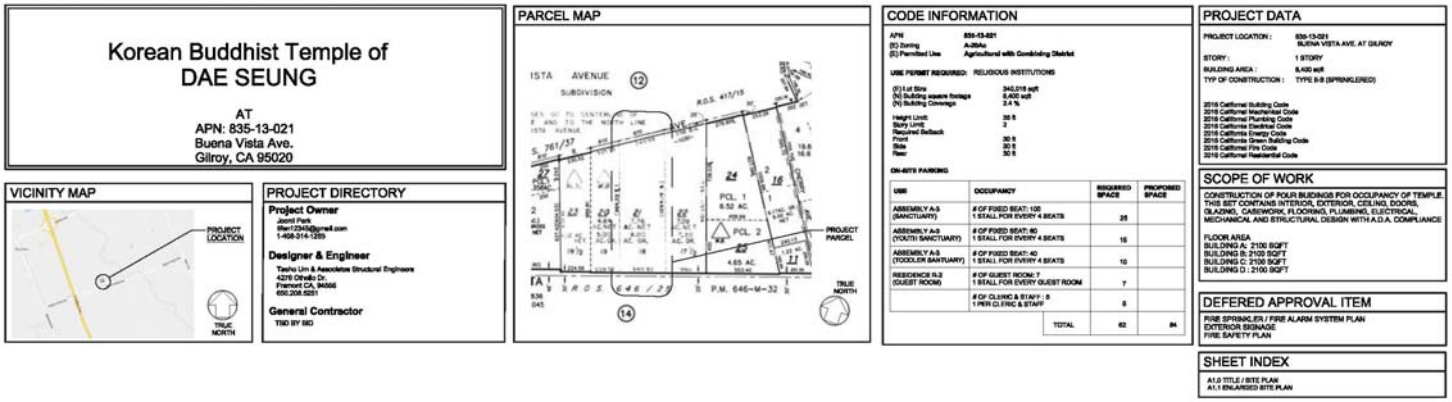

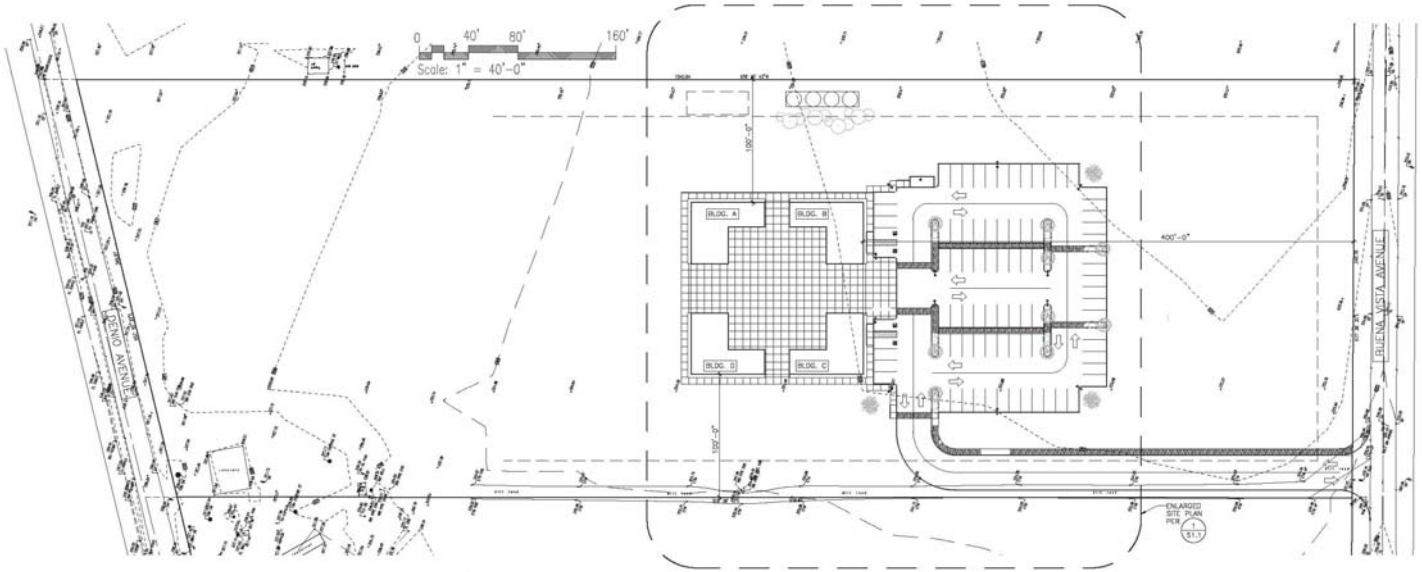

Figure 2
Project Site Plan

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2. CRITERIA FOR ACCEPTABLE NOISE AND VIBRATION EXPOSURE[1]

Santa Clara County General Plan Noise Element:

The Santa Clara County General Plan Noise Element establishes goals, policies and criteria for determining land use compatibility with major noise sources within the community. The following provides the applicable goals, policies and criteria for evaluating the feasibility and potential noise impacts associated with the proposed project.

Strategy #1 - Prevent or Minimize Noise Conflicts:

The ideal is a complete separation of noise sensitive uses from noise generating sources. Given that all types of land uses must coexist within the county's urban areas, the planning challenge is in achieving adequate noise compatibility. Land use planning and development review must carefully evaluate the noise producing potential of new development. Where that potential exceeds acceptable limits, steps must be taken to minimize impacts on both existing and projected surrounding uses.

Policy C-HS 24:
Environments for all residents of Santa Clara County free from noises that jeopardize their health and well-being should be provided through measures which promote noise and land use compatibility.

Policy C-HS 25:
Noise impacts from public and private projects should be mitigated.

Implementation Recommendations

C-HS(i) 23: *Project design review should assess noise impacts on surrounding land uses.*

C-HS(i) 24: *Where necessary, construct sound walls or other noise mitigations.*

C-HS(i) 25: *Prohibit construction in areas which exceed applicable interior and exterior standards, unless suitable mitigation measures can be implemented.*

C-HS(i) 26: *Require project-specific noise studies to assess actual and protected dB noise contours for proposed land uses likely to generate significant noise.*

C-HS(i) 27: *Take noise compatibility impacts into account in developing local land use plans.*

[1] For an explanation of these terms, see Appendix A: "Acoustical Terminology"

Strategy #2 - Provide Adequate Sound Buffers:

Another approach to noise compatibility is providing noise buffers between noise sources and new projects. There are many noise reduction techniques which can be built into new development. This approach is most effective in large scale, mixed use or planned developments. Such techniques include locating noise sensitive buildings away from noise sources and using the natural topography and intervening buildings to shield noise sensitive uses. There are a number of techniques to minimize interior noise, including site planning, architectural design and construction standards, and noise barriers.

Policy C-HS 26:
New development in areas of noise impact (areas subject to sound levels of 55 DNL or greater) should be approved, denied, or conditioned so as to achieve a satisfactory noise level for those who will use or occupy the facility (as defined in "Noise Compatibility Standards for Land Use" and "Maximum Interior Noise Levels For Intermittent Noise").

Figure 3 shows the Santa Clara County Land Use Compatibility Standards, as referenced in Policy C-HS 26 above.

Figure 4 shows the proposed maximum interior noise levels.

Figure 3
Santa Clara County Land Use Compatibility Noise Standards

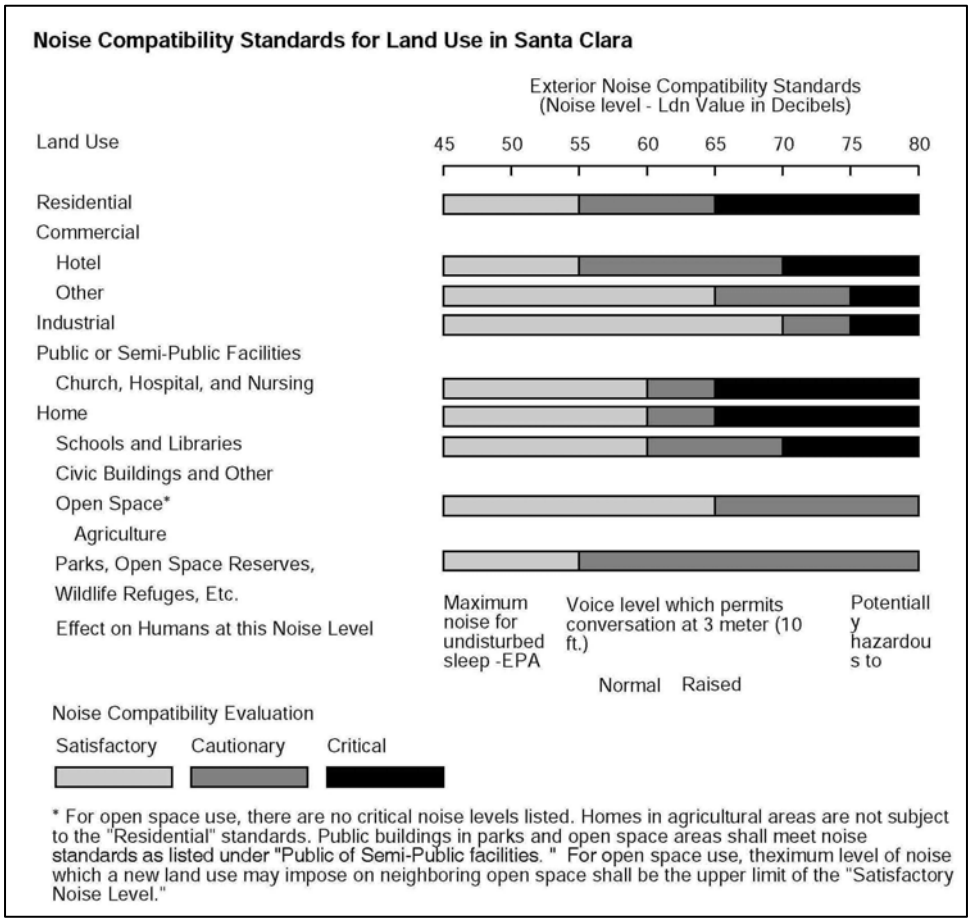

Figure 4
Interior Noise Levels in Terms of Ldn

Recommended Maximum Interior Noise Levels For Intermittent Noise

Use		dBA
Residential		45
Commercial		
	Hotel-Motel	45
	Executive Offices, Conference Rooms	55
	Staff Offices	60
	Restaurant, Markets, Retail Stores	60
	Sales, Secretarial	65
	Sports Arena, Bowling Alley, etc.	75
Industrial		
	Offices (same as above)	55-60
	Laboratory	60
	Machine shop, Assembly and others	75
	Mineral Extraction	75
Public or Semi-Public Facility	Concert Hall & Legitimate Theater	30
	Auditorium, Movie Theater & Church	45
	Hospital, Nursing Home & Firehouse (sleeping quarters)	45
	School Classroom	50
	Library	50
	Other Public Buildings	55

Determination of a Significant Increase in Noise Levels

The California Environmental Quality Act (CEQA) guidelines define a significant impact of a project if it "increases substantially the ambient noise levels for adjoining areas."

CEQA does not define "substantial increase." Webster's Dictionary defines "substantial" as "considerable in quantity." The human ear can detect changes of 3 dBA and changes of less than 3 dBA, while audible under controlled circumstances, are not readily discernable in an outdoor environment. Thus a change of 3 dBA is considered a barely audible change. However, CEQA uses "substantial change" as its criterion. Because most people can readily hear a change of 5 dBA Ldn in an exterior environment, this value is established as a "substantial change" for the purposes of CEQA. As a point of reference, Caltrans defines a noise increase as substantial when the predicted noise level with the project would exceed existing noise levels by 12 dBA L_{eq}.

Santa Clara County Noise Ordinance:

The Santa Clara County Noise Ordinance Section B11-190-199 establishes limits for noise generation from uses such as the proposed project. Table 1 summarizes the exterior noise limits outlined in the ordinance. The ordinance also allows higher limits for noise generation of shorter duration. However, because the project would have full hours of busy operation, the L50 is considered to be the more appropriate descriptor.

Table 1
Exterior Hourly Noise Level Standards for Stationary Noise Sources
Santa Clara County Noise Ordinance

Noise Level Descriptor	Maximum Acceptable Noise Level	
	Daytime (7 am - 10 pm)	Nighttime (10 pm - 7 am)
Hourly L50, dBA –Limit 1 Category *(Level not exceeded more than 30 minutes in any hour)*	55 dB	45 dB
Maximum Level (Lmax), dBA – Limit 5 Category	75 dB	65 dB

** In the event the alleged offensive noise contains a steady, audible tone such as a whine, screech or hum, or contains music or speech conveying informational content, the standard limits set forth in Table 1 shall be reduced by five (5) dB.*

** If the measured ambient level exceeds that permissible within any of the first four (4) noise limit categories above, the allowable noise exposure standard shall be increased in five dB increments in each category as appropriate to encompass or reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.*

Source: Santa Clara County General Plan Noise Element, Table B11-192

It should be noted that the Table 1 Noise Ordinance standards are based upon hourly median (L50) and maximum (Lmax) criteria and are therefore more restrictive than the day/night average (Ldn) standards, shown in Figure 2. Therefore, application of the Table 1 criteria to noise generated from on-site activities is the more conservative approach and would result in compliance with both the Santa Clara County General Plan Noise Element and Noise Ordinance standards.

3. SETTING AND IMPACT EVALUATION

Ambient Noise Levels in the Project Vicinity

The existing noise environment at the project site is defined primarily by traffic on Buena Vista and Denio Avenues. j.c. brennan & associates, Inc. conducted continuous hourly ambient noise level measurements for a period of 24-hours adjacent to the project site on October 9-10, 2018.

In addition, 3 sets of short-term noise level measurements were also conducted on the site. See Figure 1 for the locations of the noise level measurements.

The noise level measurements were conducted to determine typical background average (L_{eq}), median (L_{50}) and maximum (L_{max}) noise levels at the closest noise-sensitive receptors areas. Instrumentation consisted of a Larson Davis Laboratories (LDL) Model 820 and 824 precision integrating sound level meters, which were calibrated in the field before and after use with an LDL Model CAL200 acoustical calibrator.

Table 2 shows the results of the ambient noise level measurements. Appendix B graphically shows the results of the noise level measurements.

Table 2
Summary of Measured Ambient Noise Levels
October 9-10, 2018

Site	Measured Ldn,	Average Hourly Daytime (7:00am - 10:00pm)			Average Hourly Nighttime (10:00pm – 7:00am)		
		Leq	L50	Lmax	Leq	L50	Lmax
A	66.7 dBA	64.6 dBA	51.8 dBA	83.0 dBA	58.7 dBA	45.7 dBA	76.7 dBA
ST-1	NA	49.9	48.7 dBA	55.1 dBA	@11:35 a.m.		
ST-2	NA	52.4	52.1 dBA	55.8 dBA	@11:50 a.m.		
ST-3	NA	57.4	54.5 dBA	70.6 dBA	@12:10 p.m.		
Source: j.c. brennan & associates, Inc. - 2018							

Existing and Future Traffic Noise Levels

Existing Traffic Noise Levels

j.c. brennan & associates, Inc. employs the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA RD-77-108) for the prediction of traffic noise levels. The model is based upon the CALVENO noise emission 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.

Based upon the traffic volumes for existing conditions provided by Hexagon Transportation Consultants who prepared the traffic analysis for the project site, the average daily traffic volume (ADT) along Buena Vista Avenue is 1,350 vehicles on a typical weekday. A typical Saturday has approximately 1,300 ADT, and a typical Sunday has 1,100 ADT.

Using the FHWA traffic noise prediction model, the predicted existing traffic noise levels along Buena Vista Avenue are shown in Table 3. Appendix C shows the inputs to the predicted traffic noise levels.

Table 3
Predicted Existing Buena Visa Avenue Traffic Noise Levels

Scenario	Traffic Noise Level at 100-feet*	Distance to Noise Contours (feet)*		
		55 dB Ldn	*60 dB Ldn*	*65 dB Ldn*
Weekday ADT of 1,350	*54 dB Ldn*	*84*	*39*	*18*
Saturday ADT of 1,300	*54 dB Ldn*	*82*	*38*	*18*
Sunday ADT of 1,100	*53 dB Ldn*	*73*	*34*	*16*

Sources: j.c. brennan & associates, Inc., and FHWA RD-77-108
* Distances are measured from the center of the roadway.

Based upon Table 3, existing traffic noise levels at a distance of 100-feet from the Buena Vista Avenue centerline ranges between 53 dB and 54 dB Ldn. The distance to the proposed project building is 425-feet, and is predicted to be less than 45 dB Ldn.

Future Traffic Noise Levels

Based upon the traffic report prepared by Hexagon Transportation Consultants for the project site, the trip generation for the project is 200 trips per day.

Using the FHWA Model, the project traffic noise level increases were calculated. Table 4 shows the results of the analysis.

Table 4 Predicted Existing Plus Project Related Buena Vista Avenue Traffic Noise Levels					
Scenario	**Traffic Noise Level at 100-feet**	**Change**	**Distance to Noise Contours**		
			55 dB Ldn	*60 dB Ldn*	*65 dB Ldn*
Weekday ADT of 1,350	*54 dB Ldn*	*0*	*92*	*43*	*20*
Saturday ADT of 1,300	*54 dB Ldn*	*0*	*90*	*42*	*19*
Sunday ADT of 1,100	*54 dB Ldn*	*+1*	*82*	*38*	*18*
Sources: j.c. brennan & associates, Inc., and FHWA RD-77-108 * Distances are measured from the center of the roadway.					

Based upon Table 4, the project will not result in an increase in traffic noise levels along Buena Vista Avenue by up to 1 dB. The predicted traffic noise levels at the nearest project building continue to be less than 45 dB Ldn. The project will comply with the exterior and interior noise level criteria shown in Figures 3 and 4 of this report. This is a less than significant impact.

Mitigation: None Required

Parking Lot Noise Levels at Adjacent Residential Uses.

As a means of determining the noise levels due to parking lot activities, j.c. brennan & associates, Inc., utilized noise level data collected for previous parking lot studies, and peak hour trip generation numbers provided by the traffic consultant. A typical SEL due to automobile arrivals/departures, including car doors slamming and people conversing is approximately 71 dB, at a distance of 50 feet. During the peak hour the project will generate 50 vehicles. Parking lot noise levels were determined using the following formulas.

$$\text{Peak Hour } L_{eq}/L_{50} = 71 + 10\log (N) - 35.6,$$

Where 71 is the mean Sound Exposure Level (SEL) for an automobile operation, N is the number of parking lot operations in a peak hour (N is assumed to be 50 for this project), and 35.6 is 10 times the logarithm of the number of seconds in an hour.

Using the equations and operations data described above, the proposed parking lot would result in noise levels of approximately 52 dB Peak Hour L_{eq}/L_{50} at a distance of 50 feet. Assuming that the closest property lines to the center of the nearest parking lot is 125-feet, the parking lot noise levels are predicted to be 44 dB L_{eq}/L_{50}. Access road noise levels are predicted to be 45 dB L_{eq}/L_{50}, based upon use of the FHWA traffic noise prediction model. The parking lot and access road noise levels will comply with the noise level criteria contained in Table 1 (Santa Clara County Noise Ordinance).

Mitigation: None Required

Future Construction Noise Levels

Construction of the Proposed Project would temporarily increase noise levels during construction. During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 5, ranging from 76 to 88 dB at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Table 5
Construction Equipment Noise

Type of Equipment	Predicted Noise Levels, L_{max} dB				Distances to Noise Contours (feet)	
	Noise Level at 50'	Noise Level at 100'	Noise Level at 200'	Noise Level at 400'	70 dB L_{max} contour	65 dB L_{max} contour
Backhoe	78	72	66	60	126	223
Compactor	83	77	71	65	223	397
Compressor (air)	78	72	66	60	126	223
Concrete Saw	90	84	78	72	500	889
Dozer	82	76	70	64	199	354
Dump Truck	76	70	64	58	100	177
Excavator	81	75	69	63	177	315
Generator	81	75	69	63	177	315
Jackhammer	89	83	77	71	446	792
Pneumatic Tools	85	79	73	67	281	500

Source: *Roadway Construction Noise Model User's Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

Mitigation: The following is the list of measures required to reduce project construction noise to less than significant levels.

- Noise-generating construction activities, including truck traffic coming to and from the site for any purpose, shall be limited to the hours between 7:00 AM to 7:00 PM on weekdays, and 8:00 AM to 6:00 PM on Saturdays. No construction activities will be allowed on Sundays and holidays.
- All equipment driven by internal combustion engines shall be equipped with mufflers which are in good working condition and appropriate for the equipment.
- The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where the technology exists.
- At all times during project grading and construction, stationary noise-generating equipment shall be located as far as practical from noise-sensitive receptors.
- Unnecessary idling of internal combustion engines shall be prohibited.
- Owners and occupants of residential properties located with 300 feet of the construction site shall be notified of the construction schedule in writing.

Future Construction Vibration Levels

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 6, 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 6 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v.

Table 6 Effects of Various Vibration Levels on People and Buildings			
Vibration Level (Peak Particle Velocity)*			
mm/s	*in/sec*	*Human Reaction*	*Effect on Buildings*
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 extablished 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 Experiences.* Technical Advisory: TAV-02-01-R9601. February 20, 2002.

The primary vibration-generating activities associated with the project would occur when the infrastructure such as grading, utilities, and parking lots are constructed. The closest sensitive structure is more than 100-feet from the site. Based upon Table 7, construction activities would produce peak particle velocities of less than 0.2 inches/second. Therefore, this impact is considered less than significant.

Table7
Vibration Levels for Varying Construction Equipment

Type of Equipment	*Peak Particle Velocity @ 25 feet (inches/second)*	*Approximate Velocity Level @ 25 feet (VdB)*
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86
Small Bulldozer	0.003	58
Auger/drill Rigs	0.089	87
Jackhammer	0.035	79
Vibratory Hammer	0.070	85

4. CONCLUSIONS

The project will comply with the Santa Clara County noise level criteria, provided that the following mitigation measures are included in the project design:

1. Construction activities shall include the following mitigation measures:

    - Noise-generating construction activities, including truck traffic coming to and from the site for any purpose, shall be limited to the hours between 7:00 AM to 7:00 PM on weekdays, and 8:00 AM to 6:00 PM on Saturdays. No construction activities will be allowed on Sundays and holidays.
    - All equipment driven by internal combustion engines shall be equipped with mufflers which are in good working condition and appropriate for the equipment.
    - The construction contractor shall utilize “quiet” models of air compressors and other stationary noise sources where the technology exists.
    - At all times during project grading and construction, stationary noise-generating equipment shall be located as far as practical from noise-sensitive receptors.
    - Unnecessary idling of internal combustion engines shall be prohibited.
    - Owners and occupants of residential properties located with 300 feet of the construction site shall be notified of the construction schedule in writing.

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.
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 a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	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 L_{50} 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.
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.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the AMaximum@ level, which is the highest RMS level.
RT_{60}	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 s rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.
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.
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
2018-152 Korean Buddhist Temple
24hr Continuous Noise Monitoring - Site A
10/09/2018-10/10/2018

Hour	Leq	Lmax	L50	L90
13:00	64	86	48	41
14:00	65	81	55	52
15:00	66	88	57	55
16:00	66	82	58	56
17:00	66	86	58	56
18:00	65	82	58	56
19:00	65	83	51	48
20:00	62	83	49	46
21:00	61	82	45	42
22:00	59	80	42	39
23:00	57	79	50	47
0:00	54	81	49	46
1:00	56	79	45	43
2:00	53	79	43	38
3:00	37	44	36	33
4:00	56	81	45	37
5:00	62	85	48	45
6:00	65	84	54	46
7:00	67	86	53	47
8:00	66	84	48	40
9:00	64	85	46	39
10:00	63	81	44	40
11:00	64	83	52	41
12:00	63	81	56	54

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	67.0	60.6	64.6	64.5	36.6	58.9
Lmax (Maximum)	87.8	81.1	83.6	85.2	43.6	76.7
L50 (Median)	57.9	44.0	51.8	54.3	36.1	45.7
L90 (Background)	56.1	39.4	47.5	47.1	32.7	41.7

Computed Ldn, dB	66.7
% Daytime Energy	86%
% Nighttime Energy	14%

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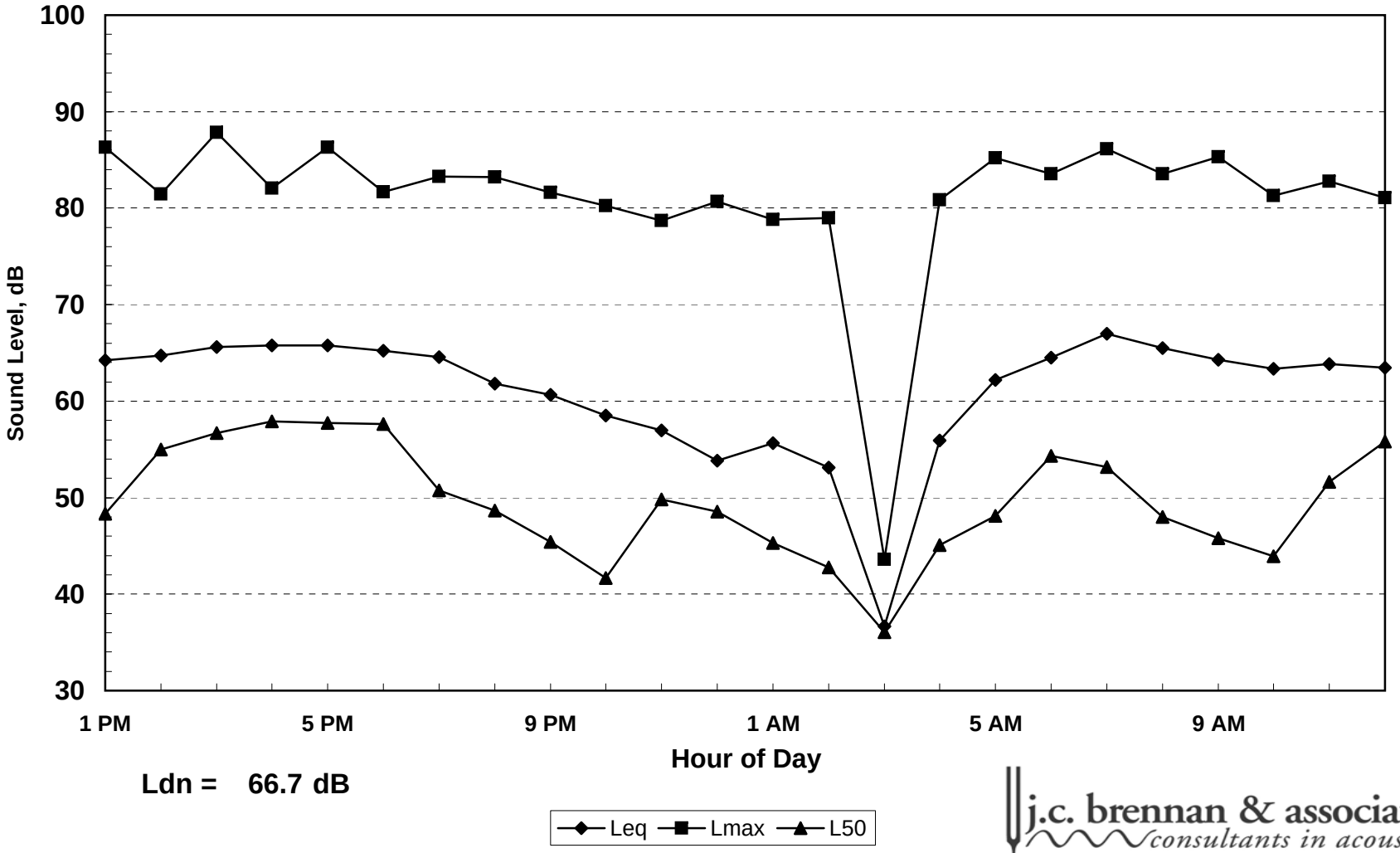
Appendix B

2018-152 Korean Buddhist Temple

24hr Continuous Noise Monitoring - Site A

10/09/2018-10/10/2018



Ldn = 66.7 dB

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Appendix C

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

Data Input Sheet

Project #: 2018-152 Vuddhist Temple Dae Seung
Description: Existing Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Scenario	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Buena Vista Avenue	Weekday	1,350	86		14	2	1	45	100	
2	Buena Vista Avenue	Saturday	1,300	86		14	2	1	45	100	
3	Buena Vista Avenue	Sunday	1,100	86		14	2	1	45	100	
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Appendix C

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

Project #: 2018-152 Vuddhist Temple Dae Seung
Description: Existing Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Scenario	Autos	Medium Trucks	Heavy Trucks	Total
1	Buena Vista Avenue	Weekday	52.6	44.0	45.5	54
2	Buena Vista Avenue	Saturday	52.4	43.8	45.3	54
3	Buena Vista Avenue	Sunday	51.7	43.1	44.6	53

Appendix C

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

Project #: 2018-152 Vuddhist Temple Dae Seung
Description: Existing Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Scenario	75	70	65	60	55
1	Buena Vista Avenue	Weekday	4	8	18	39	84
2	Buena Vista Avenue	Saturday	4	8	18	38	82
3	Buena Vista Avenue	Sunday	3	7	16	34	73

Appendix C

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

Data Input Sheet

Project #: 2018-152 Vuddhist Temple Dae Seung
Description: Existing + Project Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Scenario	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Buena Vista Avenue	Weekday	1,550	86		14	2	1	45	100	
2	Buena Vista Avenue	Saturday	1,500	86		14	2	1	45	100	
3	Buena Vista Avenue	Sunday	1,300	86		14	2	1	45	100	
4											
5											
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Appendix C

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

Project #: 2018-152 Vuddhist Temple Dae Seung
Description: Existing + Project Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Scenario	Autos	Medium Trucks	Heavy Trucks	Total
1	Buena Vista Avenue	Weekday	53.2	44.6	46.1	54
2	Buena Vista Avenue	Saturday	53.1	44.5	46.0	54
3	Buena Vista Avenue	Sunday	52.4	43.8	45.3	54

Appendix C

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

Project #: 2018-152 Vuddhist Temple Dae Seung
Description: Existing + Project Traffic Noise Levels
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Scenario	75	70	65	60	55
1	Buena Vista Avenue	Weekday	4	9	20	43	92
2	Buena Vista Avenue	Saturday	4	9	19	42	90
3	Buena Vista Avenue	Sunday	4	8	18	38	82

Appendix C

FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Calibration Worksheet

Project Information:	Job Number:	2018-152
	Project Name:	FHWA Model
	Roadway Tested:	Access Road
	Test Location:	_____
	Test Date:	
Weather Conditions:	Temperature (Fahrenheit):	
	Relative Humidity:	
	Wind Speed and Direction:	
	Cloud Cover:	
Sound Level Meter:	Sound Level Meter:	LDL Model 820
	Calibrator:	LDL Model CA200
	Meter Calibrated:	Immediately before and after test
	Meter Settings:	
Microphone:	Microphone Location:	
	Distance to Centerline (feet):	30
	Microphone Height:	5 feet above ground
	Intervening Ground (Hard or Soft):	**Soft**
	Elevation Relative to Road (feet):	5
Roadway Condition:	Pavement Type	Asphalt
	Pavement Condition:	Good
	Number of Lanes:	2
	Posted Maximum Speed (mph):	15
Test Parameters:	Test Time:	12:00 PM
	Test Duration (minutes):	60
	Observed Number Automobiles:	50
	Observed Number Medium Trucks:	1
	Observed Number Heavy Trucks:	0
	Observed Average Speed (mph):	15
Model Calibration:	Measured Average Level (L_{eq}):	45.0
	Level Predicted by FHWA Model:	44.9
	Difference:	***-0.1 dB***

Conclusions:

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