Environmental Noise Assessment

Rocklin Commons

City of Rocklin, California

Job # 2008-175

Prepared For:

Donahue Schriber

200 E. Baker St., Suite 100
Costa Mesa, California 92626

Attn: Janet Petersen

cc: Mark Perlberger

Prepared By:

j.c. brennan & associates, Inc.

Jim Brennan
President
Member, Institute of Noise Control Engineering

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j.c. brennan & associates
consultants in acoustics

P.O. Box 6748 - 263 Nevada Street - Auburn, California 95603 -p: (530) 823-0960 -f: (530) 823-0961

INTRODUCTION

The proposed Rocklin Commons commercial/retail center development project is located at the northwest quadrant of Interstate 80 (I-80) and Sierra College Boulevard, in the City of Rocklin, California. The project site is bounded by Granite Drive and retail/commercial use (Harley Davidson Dealer) to the west, Sierra College Boulevard to the east, I-80 to the southeast, and a vacant parcel to the north. The Rocklin Commons commercial/retail center is proposed to include a combined 415,000 square feet of retail uses which include Major stores designated as A through F, and eleven specialty shop tenants. No specific users have been identified at this time.

Existing noise sensitive land uses nearest to the project site are located approximately 0.3 miles northeast of the project site on Brace Road. Other residential uses are located to the south, and across I-80.

The intent of this noise analysis is to examine potential project generated noise levels associated with project-related increased traffic on the local street system, as well as on-site activities which include loading dock use, on-site truck circulation, drive-through lanes, parking lot movements, parking lot cleaning, and HVAC mechanical equipment. Noise mitigation measures will be recommended in cases where noise levels are predicted to exceed the applicable City of Rocklin noise level criteria. Figure 1 shows the project site.

BACKGROUND ON NOISE AND ACOUSTICAL TERMINOLOGY [1]

Fundamentals of Acoustics

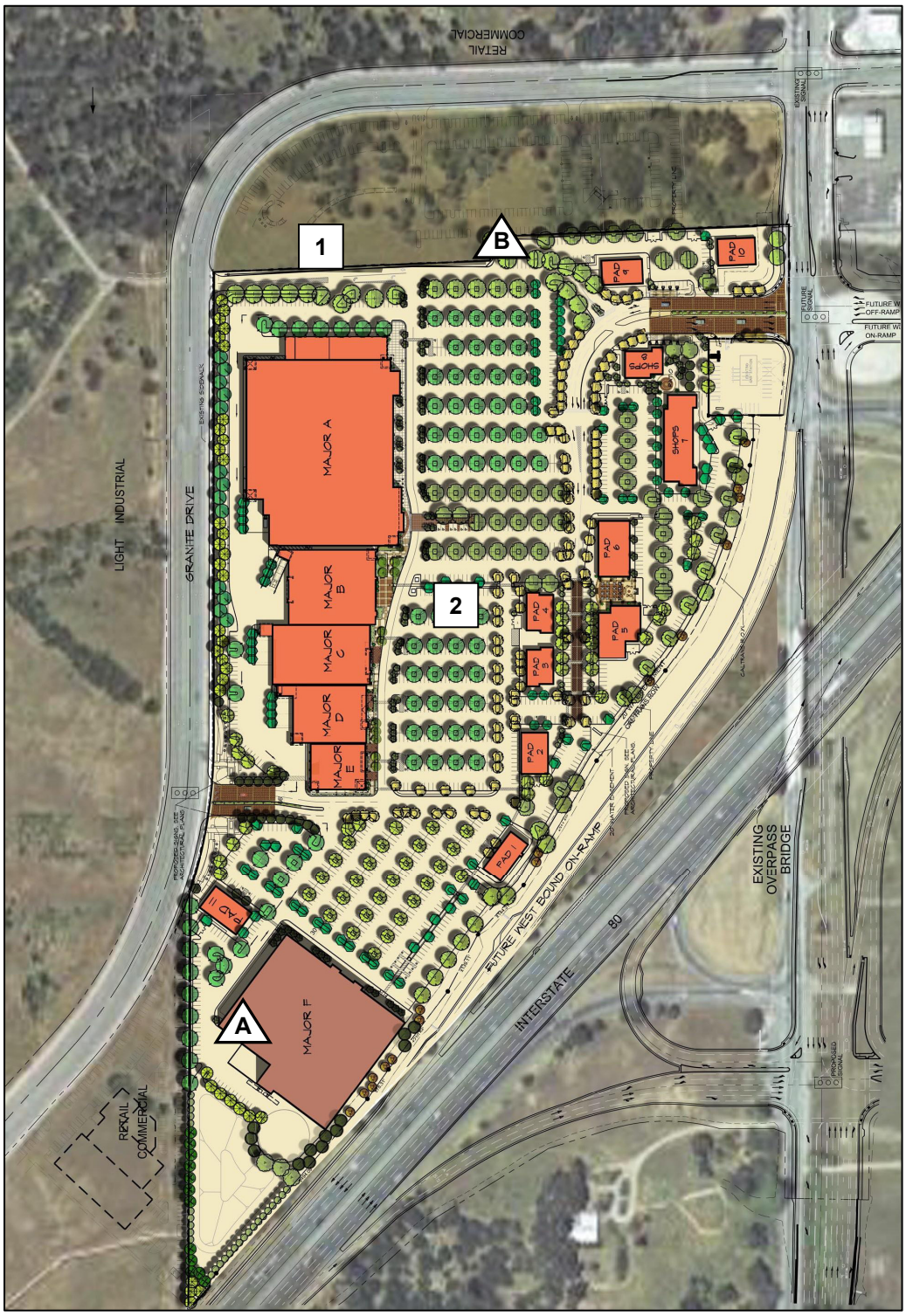
Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. 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. Often, someone's music is described as noise by another.

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.

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

Figure 1
Rocklin Commons – City of Rocklin, California
Site Plan and Noise Measurement Locations



△ : **Continuous Noise Measurement Site**

□ : **Short-term Noise Measurement Site**

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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. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

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 to measure the ambient noise level 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 (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.

Figure 2 lists several examples of the noise levels associated with common noise sources.

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.

Figure 2
Typical Maximum 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. October 1998.

With regard 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.

CRITERIA FOR ACCEPTABLE NOISE EXPOSURE

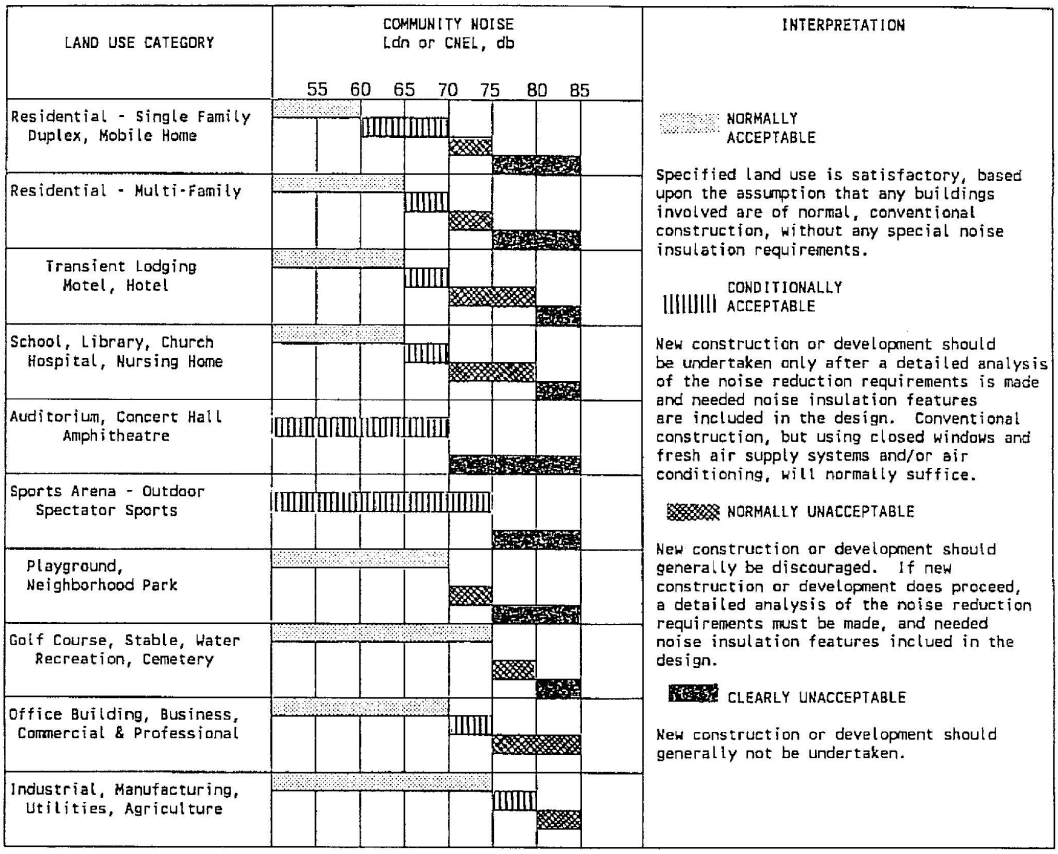
State of California

The California Environmental Quality Act (CEQA) Guidelines indicate that a significant noise impact may occur if a project exposes persons to noise levels in excess of local general plan or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels.

City of Rocklin Existing Element

The City of Rocklin General Plan Noise Element "requires noise analyses of new development projects as part of the environmental review process and to require mitigation measures that reduce noise impacts to acceptable levels". Figure 3 shows the land use noise compatibility guidelines for the City of Rocklin (Figure 18 of the City of Rocklin General Plan).

Figure 3
Land Use Compatibility Guidelines
City of Rocklin General Plan Noise Element Figure 18



CONSIDERATIONS IN DETERMINATION OF NOISE-COMPATIBLE LAND USE

A. NORMALIZED NOISE INFORMATION DESIRED

Where sufficient data exists, evaluate land use suitability with respect to a "normalized" value of CNEL or L_{dn}.

B. NOISE SOURCE CHARACTERISTICS

The land use-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas.

C. SUITABLE INTERIOR ENVIRONMENTS

One objective of locating residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL or L_{dn}. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

D. ACCEPTABLE OUTDOOR ENVIRONMENTS

Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typically below the maximum considered "normally acceptable" for that land use category, may be appropriate.

Source: City of Rocklin General Plan

State of California Stationary Noise Source Recommendations

The Ldn descriptor is a composite 24-hour average noise level. This descriptor applies a +10 dBA penalty to noise levels which occur during the nighttime period (10pm to 7am). This descriptor is typically considered to provide good correlation for annoyance due to transportation related noise sources (i.e. roadway traffic, aircraft operations, and to a lesser extent railroad operations).

Generally, Ldn is not be the most appropriate descriptor for evaluating noise impacts associated with on-site activities or stationary noise sources such as those associated with a loading dock, truck passbys, or mechanical equipment. These types of noise sources generally operate between 2 and 5 hours per day. If one applies the Ldn descriptor, the noise levels due to loading dock activities will be averaged over 24 hours, and the potential impact or potential for annoyance will be artificially discounted.

The State of California Office of Noise Control Model Community Noise Control Ordinance recommends that noise sources such as those associated with the project site be evaluated relative to hourly average (L50/Leq) and maximum (Lmax) noise standards. For noise sensitive uses such as residential uses, the recommended daytime average and maximum exterior noise levels are 55 dB Leq/L50 and 75 dB Lmax. The recommended nighttime average and maximum exterior noise levels are 45 dB Leq/L50, and 65 dB Lmax.

Since the Leq is calculated on a logarithmic scale, loud noise levels of short duration are emphasized. For example, a maximum noise level of 70 dBA can only be generated for 2 minutes without exceeding an hourly average (Leq) noise level of 55 dBA. If an on-site noise source generated a noise level of 73 dBA for 1 minute, the hourly average (Leq) noise level would be approximately 55 dBA.

Based upon discussions with the City of Rocklin Planning staff for previous projects where the noise source is a stationary noise source, an exterior hourly average noise level criterion of 55 dBA Leq shall be applied during the daytime period, and a 45 dBA Leq criterion shall be applied during the nighttime period at noise sensitive land uses.

Proposed City of Rocklin Noise Element

Currently, the City of Rocklin is in the process of adopting a General Plan Update. The proposed General Plan includes criteria for stationary noise sources similar to the California State criteria. The proposed or Draft General Plan also establishes noise level criteria for transportation noise sources. Tables 1 and 2 below show the proposed stationary and transportation noise source criteria, respectively from the Draft General Plan (Tables 4-13 and 4-14 of the Draft General Plan).

Table 1
Exterior Noise Level Design Standards for New Projects
Affected by or Including Stationary Noise Sources

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	55 dBA	45 dBA

Each of the noise levels specified above shall be lowered by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises (e.g., humming sounds, outdoor speaker systems). These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

The City can impose noise level standards that are more restrictive than those specified above based upon determination of existing low ambient noise levels.

"Fixed" noise sources which are typically of concern include, but are not limited to the following:

HVAC Systems	Cooling Towers/Evaporative Condensers
Pump Stations	Lift Stations
Emergency Generators	Boilers
Steam Valves	Steam Turbines
Generators	Fans
Air Compressors	Heavy Equipment
Conveyor Systems	Transformers
Pile Drivers	Grinders
Drill Rigs	Gas or Diesel Motors
Welders	Cutting Equipment
Outdoor Speakers	Blowers

The types of uses which may typically produce the noise sources described above include but are not limited to: industrial facilities including pump stations, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.

Table 2
Maximum Allowable Noise Exposure
Transportation Noise Sources

Land Use	Outdoor Activity Areas[1] L_{dn}/CNEL, dB	Interior Spaces	
		L_{dn}/CNEL,dB	L_{eq}, dB[2]
Residential	60[3]	45	--
Transient Lodging	65[4]	45	--
Hospitals, Nursing Homes	60[3]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Non-Commercial Places of Public Assembly	60[3]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

[1] The outdoor activity area is generally considered to be the location where individuals may generally congregate for relaxation, or where individuals may require adequate speech intelligibility. Such places may include patios of residences, picnic facilities, or instructional areas.

Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.

At the discretion of the City, where no outdoor activity areas are provided or known, only the interior noise level criteria can be applied to the project.

[2] As determined for a typical worst-case hour during periods of use.

[3] Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

[4] 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. In these cases, only the interior noise level criterion will apply.

EXISTING AMBIENT NOISE ENVIRONMENT

The existing noise environment in the vicinity of the project site is dominated by roadway traffic along I-80, Sierra College Boulevard and Granite Drive. To quantify the existing background noise levels on, and in the vicinity of the project site, j.c. brennan & associates, Inc. conducted continuous hourly noise level measurements at two locations on the project site on July 1st through the 2nd, 2008. Additionally, short-term noise level measurements were conducted at two locations on the project site. Figure 1 shows the measurement locations.

Equipment used for the noise measurements included Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters. The meters were calibrated before and after use with an LDL CAL200 acoustical calibrator to ensure the accuracy of the measurements.

A summary of the noise level measurement results is provided in Table 3. Appendix B graphically shows the results of the 24-hour noise level measurements for the period at each measurement location.

Table 3
Existing Ambient Noise Monitoring Results
Rocklin Commons

Site	Location	Date	Average Measured Hourly Noise Levels, (dBA)						
			24-hr Ldn	Daytime (7:00 am - 10:00 pm)			Nighttime (10:00 pm - 7 am)		
				Leq	L50	Lmax	Leq	L50	Lmax
Continuous 24hr Measurement Locations									
A	Southern portion of project site, ~490' east of Granite Dr.	July 1-2, 2008	62.6	56.8	55.4	73.7	56.1	53.9	68.5
B	Northern portion of project site, ~345' south of Granite Dr.	July 1-2, 2008	60.7	50.7	49.1	66.7	54.7	52.8	68.8
Short-Term Measurement Locations									
1	Northwest corner of project site	July 1, 2008	--	49.1	46.9	62.9	10 minute interval @ 11:01 a.m.		
		July 2, 2008	--	49.5	48.1	60.5	10 minute interval @ 11:40 a.m.		
2	Center of project site	July 1, 2008	--	49.1	48.7	56.4	10 minute interval @ 11:30 a.m.		
		July 2, 2008	--	47.1	46.3	57.1	10 minute interval @ 11:59 a.m.		
Source - j.c. brennan & associates, Inc. 2008									

EXISTING AND FUTURE TRAFFIC NOISE LEVELS

Existing Traffic Noise Levels

To determine the existing traffic noise levels at noise sensitive land uses within the project vicinity, j.c. brennan & associates, Inc. employed the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA Model is based upon the Calveno 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 inputs consisted of existing PM peak traffic volumes obtained from the traffic study prepared for this project, and j.c. brennan & associates, Inc., site observations. A compete listing of the FHWA model inputs is provided in Appendix C.

Table 4 shows the predicted existing traffic noise levels in terms of the Day/Night Average Level descriptor (Ldn) at a standard distance from the centerlines of the existing immediate project-area roadways for existing conditions, as well as distances to existing traffic noise contours. The extent by which existing land uses in the project vicinity are affected by existing traffic noise depends on their respective proximity to the roadways and their individual sensitivity to noise.

Table 4
Existing No Project Traffic Noise Levels

Roadway	Segment	Distance[1]	Traffic Noise Level, Ldn (dBA)	Distance to Contours (feet)		
				70 Ldn	65 Ldn	60 Ldn
Sierra College	Brace to Granite	100	61	25	55	118
Sierra College	Granite to WB I-80 Ramps	100	62	27	58	126
Sierra College	EB I-80 Ramps to Dominguez (future intersection)	100	61	26	57	122
Brace Road	East of Sierra College	100	55	10	22	48
Granite Drive	South of Dominguez	100	57	15	31	67
Granite Drive	Dominguez to Sierra College	100	57	14	31	67
Dominguez Road	Pacific to Granite	100	52	7	15	31

[1]Distances are reference distances from centerline of roadway.

Future Traffic Scenario Noise Levels

An increase in traffic noise levels at surrounding land uses, due to the project, is expected. Though, an increase greater than 3 dBA is required before any noticeable change in human response would be expected. Table 5 shows the predicted existing and existing plus project traffic noise levels on the local roadway network. Table 6 shows the predicted Baseline and Baseline plus Project scenario. Tables 7-8 show the future 2025 no project and plus project traffic noise scenarios with and without an extension of Dominguez Road, south of the project site.

Table 5
Predicted Existing and Existing + Project Traffic Noise Levels

			Traffic Noise Levels (Ldn dBA)			Distance to contours (feet) Existing			Distance to Contours (feet) Existing + Project		
Roadway	Segment	Distance	Existing	Existing + Project	Change	70 Ldn	65 Ldn	60 Ldn	70 Ldn	65 Ldn	60 Ldn
Sierra College Blvd	Brace to Granite	100	61	62	1	25	55	118	31	67	144
Sierra College Blvd	Granite to WB I-80 Ramps	100	62	63	1	27	58	126	32	69	149
Sierra College Blvd	EB I-80 Ramps to Dominguez	100	61	62	1	26	57	122	31	66	142
Brace Road	East of Sierra College	100	55	57	2	10	22	48	13	29	62
Granite Drive	South of Dominguez	100	57	58	1	15	31	67	16	34	74
Granite Drive	Dominguez to Project Drive #2 (No Project: Dominguez to Sierra College)	100	57	58	1	14	31	67	16	34	74
Granite Drive	Project Drive #2 to Sierra College	100	--	58	--	--	--	--	15	32	69
Dominguez Road	Pacific to Granite	100	52	53	1	7	15	31	7	15	33

-- Indicates that the roadway segment does not contain noise level data under that scenario.

Table 6
Predicted Baseline and Baseline + Project Traffic Noise Levels

			Traffic Noise Levels (Ldn dBA)			Distance to contours (feet) Baseline			Distance to Contours (feet) Baseline + Project		
Roadway	Segment	Distance	Baseline	Baseline + Project	Change	70 Ldn	65 Ldn	60 Ldn	70 Ldn	65 Ldn	60 Ldn
Sierra College Blvd	Brace to Granite	100	62	63	1	31	67	145	36	78	169
Sierra College Blvd	Granite to WB I-80 Ramps	100	63	64	1	36	78	167	40	87	187
Sierra College Blvd	EB I-80 Ramps to Dominguez	100	63	64	1	36	78	169	40	86	186
Brace Road	East of Sierra College	100	56	58	2	12	26	55	15	32	68
Granite Drive	South of Dominguez	100	58	59	1	17	37	79	18	39	85
Granite Drive	Dominguez to Project Drive #2 (No Project: Dominguez to Sierra College)	100	59	59	0	17	38	81	17	37	81
Granite Drive	Project Drive #2 to Sierra College	100	--	59	--	--	--	--	19	40	87
Dominguez Road	Pacific to Granite	100	53	54	1	8	16	36	8	17	37

-- Indicates that the roadway segment does not contain noise level data under that scenario.

Table 7
Predicted 2025 No Project Without and With Dominguez Road Extension Traffic Noise Levels

			Traffic Noise Levels (Ldn dBA)			Distance to contours (feet) Without			Distance to Contours (feet) With		
Roadway	Segment	Distance	Without	With	Change	70 Ldn	65 Ldn	60 Ldn	70 Ldn	65 Ldn	60 Ldn
Sierra College Blvd	Brace to Granite	100	64	64	0	39	85	182	38	83	178
Sierra College Blvd	Granite to WB I-80 Ramps	100	64	64	0	42	91	196	40	87	187
Sierra College Blvd	EB I-80 Ramps to Dominguez	100	65	65	0	45	98	211	43	94	201
Brace Road	East of Sierra College	100	60	60	0	21	44	95	20	44	94
Granite Drive	South of Dominguez	100	60	61	1	23	49	106	25	55	118
Granite Drive	Dominguez to Sierra College	100	60	60	0	23	49	105	22	48	103
Dominguez Road	Pacific to Granite	100	56	58	2	12	25	54	15	33	72
Dominguez Road	Granite to Sierra College	100	--	59	--	--	--	--	18	38	82

-- Indicates that the roadway segment does not contain noise level data under that scenario.

Table 8
Predicted 2025 + Project Without and With Dominguez Road Extension Traffic Noise Levels

			Traffic Noise Levels (Ldn dBA)			Distance to contours (feet) Without			Distance to Contours (feet) With		
Roadway	Segment	Distance	Without	With	Change	70 Ldn	65 Ldn	60 Ldn	70 Ldn	65 Ldn	60 Ldn
Sierra College Blvd	Brace to Granite	100	65	65	0	44	95	204	43	93	200
Sierra College Blvd	Granite to WB I-80 Ramps	100	65	65	0	46	100	215	44	96	206
Sierra College Blvd	EB I-80 Ramps to Dominguez	100	65	65	0	49	105	226	47	101	217
Brace Road	East of Sierra College	100	60	60	0	23	49	105	23	49	105
Granite Drive	South of Dominguez	100	61	61	0	24	52	111	26	57	123
Granite Drive	Dominguez to Project Drive #2	100	61	61	0	24	51	111	24	51	109
Granite Drive	Project Drive #2 to Sierra College	100	60	60	0	23	50	108	21	46	98
Dominguez Road	Pacific to Granite	100	56	58	2	12	26	56	16	34	73
Dominguez Road	Granite to Sierra College	100	--	59	--	--	--	--	18	38	82

-- Indicates that the roadway segment does not contain noise level data under that scenario.

This analysis will apply the City of Rocklin General Plan 70 dB exterior criterion for commercial/office space to the parcels adjacent to the project site. Additionally, a 60 dB criterion will be applied to outdoor activity areas for sensitive receivers, such as residential uses. However, the nearest sensitive receiver is approximately 0.3 miles from the project site and is not expected to be affected by project related traffic noise levels.

The Table 5 data indicates that traffic noise levels at surrounding land uses are expected to increase no more than 2 dB under the Existing plus Project conditions, when compared to Existing conditions. This change is barely perceptible and is not considered significant. The Table 6 data indicates that a change in traffic noise levels will rage between 0 dB to 2 dB under Baseline plus Project conditions, when compared to Baseline Conditions. Tables 7 and 8 show a change in noise traffic noise levels which range between 0 dB to 2 dB. A maximum increase of 1 dB is expected on roadway segments when you compare Future 2025 No Project (Table 7) to Future 2025 plus Project (Table 8) conditions.

Based upon the surrounding land uses, the future traffic noise levels will comply with the City of Rocklin Transportation noise level standards shown in Figure 3. In addition, the changes in traffic noise levels due to the project are not expected to result in a significant increase in traffic noise levels.

EVALUATION OF POTENTIAL COMMERCIAL USE NOISE LEVELS

The noise producing components of a commercial development generally consist of on-site truck traffic and loading areas, as well as HVAC equipment and parking lot activities. To generally quantify potential noise levels associated with the on-site noise sources, j.c. brennan & associates, Inc. utilized a combination of noise measurement file data, and application of accepted noise modeling techniques.

Potential Truck Circulation and Loading Dock Noise Levels:

In conducting the analysis of impacts and mitigation measures associated with noise sources such as truck traffic and unloading areas, it is important to note the relative elevations of the noise sources. In the case of truck passbys, the noise source height is considered to be at an elevation of 8-feet, which is consistent with Caltrans and FHWA procedures. Step-side vans have a noise source height of 2-feet. In the case of unloading areas, the noise source height is conservatively estimated at an elevation of 3-feet, which is generally the height of air-brake release and the height where the majority of noise due to unloading occurs.

To determine noise levels associated with trucks circulating on the project site combined with loading dock activities, j.c. brennan & associates, Inc. collected noise level data associated with the Natomas Center in Sacramento, California. The Natomas Center is a large commercial center, and is somewhat larger in size to the proposed project. The loading dock and truck unloading area on the west side of the Natomas Center includes six large store loading docks for a Ross Dress for Less, Michael's, Wal-Mart, Pet's Mart, Staples, and a Home Depot.

The noise measurements were conducted during the morning hours between 7:00 a.m. and 10:00 a.m. on January 6, 2006. During the noise measurement survey, the primary noise sources associated with the Natomas Center was loading dock activities, heavy and medium delivery trucks circulating on the site, trash compactors, palate jacks, trash pick-up activities and truck air brakes.

During the noise measurement periods, the measured hourly noise levels ranged between 60 dB and 64 dB Leq and between 79 dB and 85 dB Lmax, at a distance of approximately 40 feet from the center of the truck circulation service road. Based upon the site plan for the Rocklin Commons, the nearest residences are a minimum of 450 feet from the unloading docks of the nearest proposed buildings. Based upon the noise measurement data, the predicted loading dock and truck circulation noise levels are predicted to be less than 45 dB Leq, and less than 65 dB Lmax at the nearest residences, without accounting for shielding from the proposed building facades. Therefore, the predicted noise levels associated with the loading docks and on-site truck circulation would comply with the most restrictive daytime and nighttime noise level criteria utilized by the City of Rocklin for evaluating on-site noise sources.

Potential HVAC Equipment Noise Levels:

Based upon a typical roof-top mechanical plan for a medium sized commercial use such as a Nugget Market, HVAC equipment includes a Baltimore Aircoil Company evaporative condenser, and two large Voyager air conditioning units.

Noise level data for the evaporative condenser is 64 dBA at a distance of 50 feet. The two air conditioning units have a sound power rating of approximately 95 dBA. The overall noise level for each air conditioning unit at 50 feet is expected to be 61 dBA. The cumulative noise level from the HVAC units is expected to be 67 dBA Leq at 50 feet. The predicted noise levels from HVAC equipment at the nearest residences is not expected to exceed 30 dBA at the nearest residences. Therefore, the noise levels associated with the HVAC equipment would comply with the most restrictive daytime and nighttime noise level criteria utilized by the City of Rocklin for evaluating on-site

noise sources.

Potential Construction Noise Impacts

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 9, ranging from 85 to 90 dB at a distance of 50 feet. Construction activities would be temporary in nature and normally occur during normal daytime working hours.

Noise would also be generated during the construction phase by increased construction-related traffic. The intensity of this traffic will depend on how uses are under construction at any given time. A potentially significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours.

Table 9
Construction Equipment Noise

Type of Equipment	Maximum Level, dB at 50 feet
Bulldozers	87
Heavy Trucks	88
Backhoe	85
Pneumatic Tools	85

Source: Environmental Noise Pollution, Patrick R. Cunniff, 1977.

Potential Noise Impacts Associated with Trash Pickup

During removal of garbage from the site, brief periods of elevated noise levels. However, due to the considerable distance from the garbage storage on the site, to the nearest residences, and provided that these garbage removal operations occur during daytime hours, the noise levels associated with these activities would likely be no greater than that occurring during normal residential garbage removal activities in those residential neighborhoods. As a result, significant adverse noise impacts are not anticipated to result from normal garbage removal activities.

Potential Parking Lot Sweeper Noise Levels

Parking lot sweeper noise varies considerably due to the type sweeper truck equipment. Due to the considerable distance from the parking areas on the site, to the nearest residences, the noise levels associated with these activities would likely be no greater than existing background noise levels in those residential neighborhoods.

MITIGATION

None Required.

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.
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.
Noise	Unwanted sound.
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 "Maximum" 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	A 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.
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

2008-175 Rocklin Commons

24hr Continuous Noise Monitoring, Site A

July 1-2, 2008

Hour	Leq	Lmax	L50	L90
11:00	56	72	54	51
12:00	56	74	54	51
13:00	57	79	54	51
14:00	57	76	55	52
15:00	56	73	55	52
16:00	57	74	55	52
17:00	57	77	56	53
18:00	57	79	55	52
19:00	56	65	56	54
20:00	57	75	57	54
21:00	56	67	55	53
22:00	55	67	54	50
23:00	54	68	53	48
0:00	53	72	51	46
1:00	54	70	52	47
2:00	53	65	52	47
3:00	54	65	53	48
4:00	56	72	55	51
5:00	59	69	58	54
6:00	60	68	59	56
7:00	59	76	58	54
8:00	58	66	57	55
9:00	56	80	55	53
10:00	56	70	55	52

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	58.6	55.6	56.8	60.1	52.9	56.1
Lmax (Maximum)	80.2	64.9	73.7	71.8	65.1	68.5
L50 (Median)	57.5	54.1	55.4	59.3	50.8	53.9
L90 (Background)	54.9	51.2	52.7	56.3	46.5	49.7

Computed Ldn, dB	62.6
% Daytime Energy	66%
% Nighttime Energy	34%

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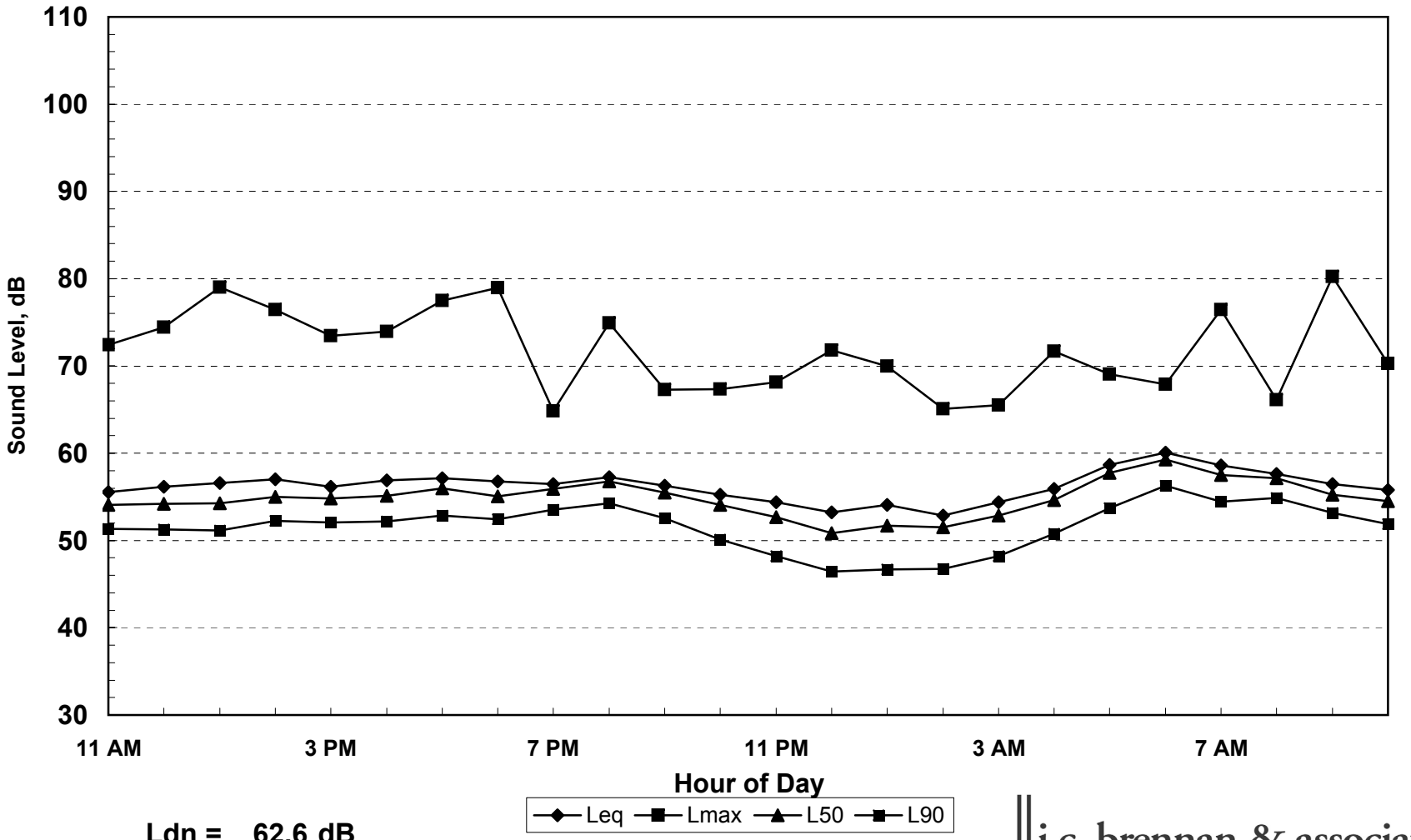
Appendix B
24hr Continuous Noise Monitoring, Site A
2008-175 Rocklin Commons
July 1-2, 2008



Ldn = 62.6 dB

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Appendix B

2008-175 Rocklin Commons

24hr Continuous Noise Monitoring, Site B

July 1-2, 2008

Hour	Leq	Lmax	L50	L90
11:00	49	62	48	46
12:00	51	69	48	45
13:00	48	59	47	45
14:00	49	72	48	45
15:00	50	71	48	46
16:00	48	59	47	45
17:00	50	69	48	45
18:00	49	72	47	44
19:00	52	73	51	49
20:00	54	67	53	51
21:00	53	66	52	50
22:00	53	72	51	48
23:00	52	71	50	47
0:00	53	66	50	47
1:00	57	73	55	50
2:00	56	76	54	48
3:00	53	64	53	50
4:00	53	61	52	49
5:00	55	66	55	52
6:00	57	69	56	55
7:00	52	65	52	50
8:00	51	65	50	47
9:00	50	65	49	47
10:00	50	66	48	45

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	53.5	48.4	50.7	57.4	52.1	54.7
Lmax (Maximum)	72.9	58.7	66.7	76.0	60.7	68.8
L50 (Median)	53.0	47.4	49.1	56.3	49.7	52.8
L90 (Background)	51.1	44.2	46.7	54.5	47.0	49.6

Computed Ldn, dB	60.7
% Daytime Energy	40%
% Nighttime Energy	60%

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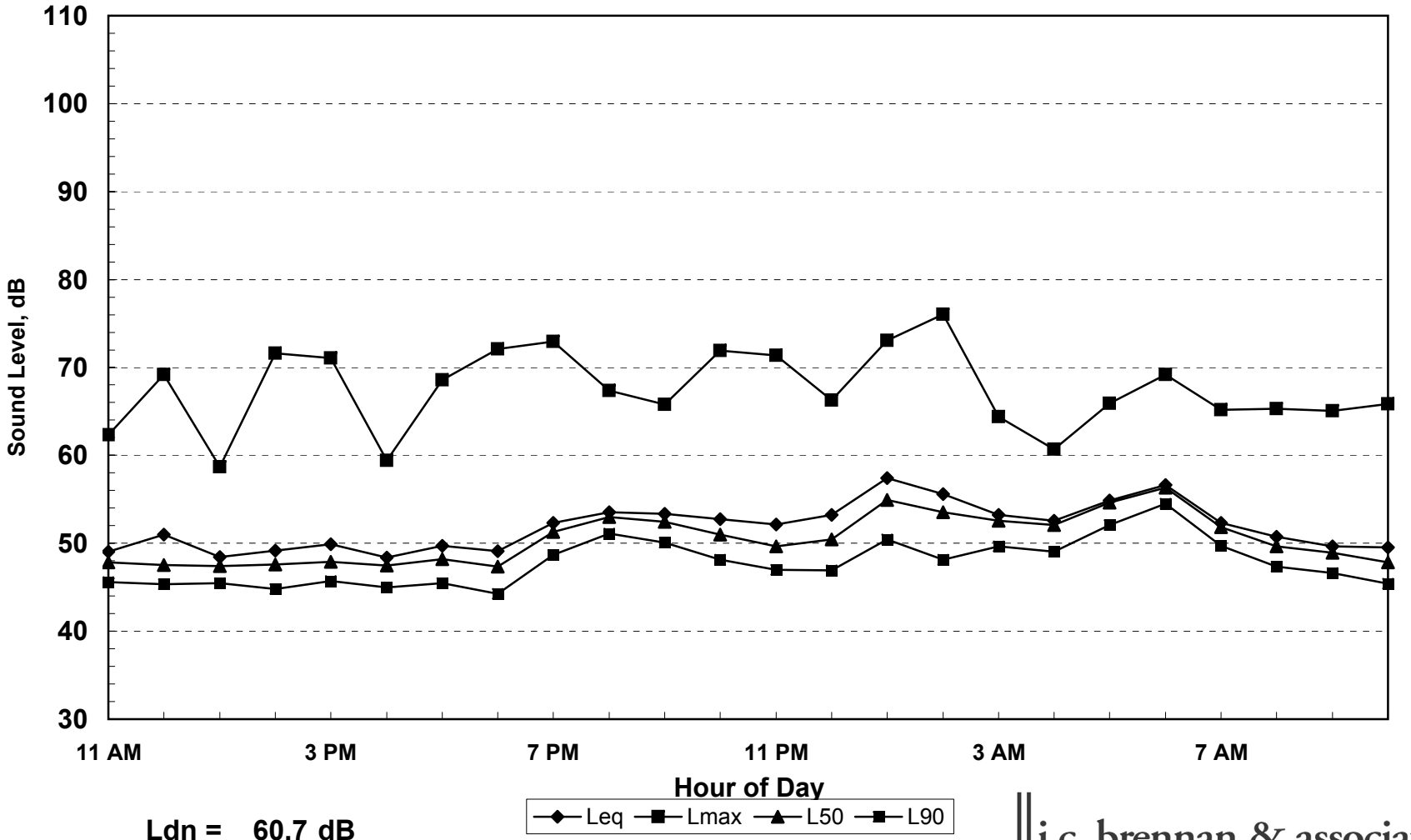
Appendix B
24hr Continuous Noise Monitoring, Site B
2008-175 Rocklin Commons
July 1-2, 2008



Ldn = 60.7 dB

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Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: Existing Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	13,420	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	14,880	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	14,240	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	3,500	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	5,830	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Sierra College	5,740	87		13	2	1	35	100	
7	Dominguez Road	Pacific to Granite	1,840	87		13	2	1	35	100	

Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: Existing Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	59.3	52.1	54.3	61
2	Sierra College Blvd	Granite to WB I-80 Ramps	59.7	52.5	54.7	62
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	59.5	52.4	54.5	61
4	Brace Road	East of Sierra College	53.4	46.3	48.4	55
5	Granite Drive	South of Dominguez	55.6	48.5	50.7	57
6	Granite Drive	Dominguez to Sierra College	55.6	48.4	50.6	57
7	Dominguez Road	Pacific to Granite	50.6	43.5	45.7	52

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: Existing Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	12	25	55	118	253
2	Sierra College Blvd	Granite to WB I-80 Ramps	13	27	58	126	271
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	12	26	57	122	264
4	Brace Road	East of Sierra College	5	10	22	48	103
5	Granite Drive	South of Dominguez	7	15	31	67	145
6	Granite Drive	Dominguez to Sierra College	7	14	31	67	144
7	Dominguez Road	Pacific to Granite	3	7	15	31	67

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: Existing Plus Project Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	18,230	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	19,120	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	17,880	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	5,120	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	6,670	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Project Drive #2	6,710	87		13	2	1	35	100	
7	Granite Drive	Project Drive #2 to Sierra College	5,990	87		13	2	1	35	100	
8	Dominguez Road	Pacific to Granite	1,980	87		13	2	1	35	100	

Appendix C-2

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

Predicted Levels

Project #: 2008-175 Rocklin Commons
Description: Existing Plus Project Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	60.6	53.4	55.6	62
2	Sierra College Blvd	Granite to WB I-80 Ramps	60.8	53.6	55.8	63
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	60.5	53.3	55.5	62
4	Brace Road	East of Sierra College	55.1	47.9	50.1	57
5	Granite Drive	South of Dominguez	56.2	49.1	51.3	58
6	Granite Drive	Dominguez to Project Drive #2	56.3	49.1	51.3	58
7	Granite Drive	Project Drive #2 to Sierra College	55.8	48.6	50.8	58
8	Dominguez Road	Pacific to Granite	51.0	43.8	46.0	53

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: Existing Plus Project Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	14	31	67	144	311
2	Sierra College Blvd	Granite to WB I-80 Ramps	15	32	69	149	321
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	14	31	66	142	307
4	Brace Road	East of Sierra College	6	13	29	62	133
5	Granite Drive	South of Dominguez	7	16	34	74	159
6	Granite Drive	Dominguez to Project Drive #2	7	16	34	74	160
7	Granite Drive	Project Drive #2 to Sierra College	7	15	32	69	148
8	Dominguez Road	Pacific to Granite	3	7	15	33	71

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: Baseline Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	18,280	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	22,720	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	23,100	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	4,330	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	7,370	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Sierra College	7,670	87		13	2	1	35	100	
7	Dominguez Road	Pacific to Granite	2,230	87		13	2	1	35	100	

Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: Baseline Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	60.6	53.4	55.6	62
2	Sierra College Blvd	Granite to WB I-80 Ramps	61.6	54.4	56.6	63
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	61.6	54.5	56.6	63
4	Brace Road	East of Sierra College	54.4	47.2	49.4	56
5	Granite Drive	South of Dominguez	56.7	49.5	51.7	58
6	Granite Drive	Dominguez to Sierra College	56.8	49.7	51.9	59
7	Dominguez Road	Pacific to Granite	51.5	44.3	46.5	53

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: Baseline Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	14	31	67	145	311
2	Sierra College Blvd	Granite to WB I-80 Ramps	17	36	78	167	360
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	17	36	78	169	364
4	Brace Road	East of Sierra College	6	12	26	55	119
5	Granite Drive	South of Dominguez	8	17	37	79	170
6	Granite Drive	Dominguez to Sierra College	8	17	38	81	175
7	Dominguez Road	Pacific to Granite	4	8	16	36	77

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: Baseline Plus Project Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	23,080	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	26,970	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	26,730	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	5,940	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	8,210	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Project Drive #2	7,640	87		13	2	1	35	100	
7	Granite Drive	Project Drive #2 to Sierra College	8,500	87		13	2	1	35	100	
8	Dominguez Road	Pacific to Granite	2,370	87		13	2	1	35	100	

Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: Baseline Plus Project Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	61.6	54.5	56.6	63
2	Sierra College Blvd	Granite to WB I-80 Ramps	62.3	55.1	57.3	64
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	62.3	55.1	57.3	64
4	Brace Road	East of Sierra College	55.7	48.6	50.7	58
5	Granite Drive	South of Dominguez	57.1	50.0	52.2	59
6	Granite Drive	Dominguez to Project Drive #2	56.8	49.7	51.8	59
7	Granite Drive	Project Drive #2 to Sierra College	57.3	50.1	52.3	59
8	Dominguez Road	Pacific to Granite	51.7	44.6	46.8	54

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: Baseline Plus Project Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	17	36	78	169	364
2	Sierra College Blvd	Granite to WB I-80 Ramps	19	40	87	187	404
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	19	40	86	186	401
4	Brace Road	East of Sierra College	7	15	32	68	147
5	Granite Drive	South of Dominguez	8	18	39	85	183
6	Granite Drive	Dominguez to Project Drive #2	8	17	37	81	174
7	Granite Drive	Project Drive #2 to Sierra College	9	19	40	87	187
8	Dominguez Road	Pacific to Granite	4	8	17	37	80

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: 2025 no Project no Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	25,880	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	28,850	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	32,210	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	9,770	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	11,480	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Sierra College	11,300	87		13	2	1	35	100	
7	Dominguez Road	Pacific to Granite	4,230	87		13	2	1	35	100	

Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: 2025 no Project no Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	62.1	55.0	57.1	64
2	Sierra College Blvd	Granite to WB I-80 Ramps	62.6	55.4	57.6	64
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	63.1	55.9	58.1	65
4	Brace Road	East of Sierra College	57.9	50.7	52.9	60
5	Granite Drive	South of Dominguez	58.6	51.4	53.6	60
6	Granite Drive	Dominguez to Sierra College	58.5	51.4	53.5	60
7	Dominguez Road	Pacific to Granite	54.3	47.1	49.3	56

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: 2025 no Project no Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	18	39	85	182	393
2	Sierra College Blvd	Granite to WB I-80 Ramps	20	42	91	196	422
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	21	45	98	211	454
4	Brace Road	East of Sierra College	10	21	44	95	205
5	Granite Drive	South of Dominguez	11	23	49	106	228
6	Granite Drive	Dominguez to Sierra College	10	23	49	105	226
7	Dominguez Road	Pacific to Granite	5	12	25	54	117

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: 2025 no Project with Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	24,980	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	26,830	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	30,090	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	9,660	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	13,500	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Sierra College	11,050	87		13	2	1	35	100	
7	Dominguez Road	Pacific to Granite	6,380	87		13	2	1	35	100	
8	Dominguez Road	Granite to Sierra College	7,760	87		13	2	1	35	100	

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Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: 2025 no Project with Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	62.0	54.8	57.0	64
2	Sierra College Blvd	Granite to WB I-80 Ramps	62.3	55.1	57.3	64
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	62.8	55.6	57.8	65
4	Brace Road	East of Sierra College	57.8	50.7	52.9	60
5	Granite Drive	South of Dominguez	59.3	52.1	54.3	61
6	Granite Drive	Dominguez to Sierra College	58.4	51.3	53.4	60
7	Dominguez Road	Pacific to Granite	56.0	48.9	51.1	58
8	Dominguez Road	Granite to Sierra College	56.9	49.7	51.9	59

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: 2025 no Project with Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	18	38	83	178	383
2	Sierra College Blvd	Granite to WB I-80 Ramps	19	40	87	187	402
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	20	43	94	201	434
4	Brace Road	East of Sierra College	9	20	44	94	204
5	Granite Drive	South of Dominguez	12	25	55	118	254
6	Granite Drive	Dominguez to Sierra College	10	22	48	103	223
7	Dominguez Road	Pacific to Granite	7	15	33	72	154
8	Dominguez Road	Granite to Sierra College	8	18	38	82	176

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: 2025 Plus Project no Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	30,690	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	33,090	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	35,850	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	11,390	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	12,320	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Project Drive #2	12,270	87		13	2	1	35	100	
7	Granite Drive	Project Drive #2 to Sierra College	11,770	87		13	2	1	35	100	
8	Dominguez Road	Pacific to Granite	4,370	87		13	2	1	35	100	

Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: 2025 Plus Project no Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	62.9	55.7	57.9	65
2	Sierra College Blvd	Granite to WB I-80 Ramps	63.2	56.0	58.2	65
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	63.5	56.4	58.6	65
4	Brace Road	East of Sierra College	58.6	51.4	53.6	60
5	Granite Drive	South of Dominguez	58.9	51.7	53.9	61
6	Granite Drive	Dominguez to Project Drive #2	58.9	51.7	53.9	61
7	Granite Drive	Project Drive #2 to Sierra College	58.7	51.5	53.7	60
8	Dominguez Road	Pacific to Granite	54.4	47.2	49.4	56

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: 2025 Plus Project no Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	20	44	95	204	440
2	Sierra College Blvd	Granite to WB I-80 Ramps	21	46	100	215	462
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	23	49	105	226	488
4	Brace Road	East of Sierra College	11	23	49	105	227
5	Granite Drive	South of Dominguez	11	24	52	111	239
6	Granite Drive	Dominguez to Project Drive #2	11	24	51	111	239
7	Granite Drive	Project Drive #2 to Sierra College	11	23	50	108	232
8	Dominguez Road	Pacific to Granite	6	12	26	56	120

Appendix C-1

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

Data Input Sheet

Project #: 2008-175 Rocklin Commons
Description: 2025 Plus Project with Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	Sierra College Blvd	Brace to Granite	29,790	87		13	2	1	35	100	
2	Sierra College Blvd	Granite to WB I-80 Ramps	31,070	87		13	2	1	35	100	
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	33,730	87		13	2	1	35	100	
4	Brace Road	East of Sierra College	11,280	87		13	2	1	35	100	
5	Granite Drive	South of Dominguez	14,340	87		13	2	1	35	100	
6	Granite Drive	Dominguez to Project Drive #2	12,020	87		13	2	1	35	100	
7	Granite Drive	Project Drive #2 to Sierra College	10,240	87		13	2	1	35	100	
8	Dominguez Road	Pacific to Granite	6,520	87		13	2	1	35	100	
9	Dominguez Road	Granite to Sierra College	7,760	87		13	2	1	35	100	

j.c. brennan & associates
consultants in acoustics

Appendix C-2

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

Project #: 2008-175 Rocklin Commons
Description: 2025 Plus Project with Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	Sierra College Blvd	Brace to Granite	62.7	55.6	57.7	65
2	Sierra College Blvd	Granite to WB I-80 Ramps	62.9	55.7	57.9	65
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	63.3	56.1	58.3	65
4	Brace Road	East of Sierra College	58.5	51.3	53.5	60
5	Granite Drive	South of Dominguez	59.6	52.4	54.6	61
6	Granite Drive	Dominguez to Project Drive #2	58.8	51.6	53.8	61
7	Granite Drive	Project Drive #2 to Sierra College	58.1	50.9	53.1	60
8	Dominguez Road	Pacific to Granite	56.1	49.0	51.2	58
9	Dominguez Road	Granite to Sierra College	56.9	49.7	51.9	59

Appendix C-3

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

Project #: 2008-175 Rocklin Commons
Description: 2025 Plus Project with Dominguez Revised
Ldn/CNEL: Ldn
Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	Sierra College Blvd	Brace to Granite	20	43	93	200	431
2	Sierra College Blvd	Granite to WB I-80 Ramps	21	44	96	206	443
3	Sierra College Blvd	EB I-80 Ramps to Dominguez	22	47	101	217	468
4	Brace Road	East of Sierra College	10	23	49	105	226
5	Granite Drive	South of Dominguez	12	26	57	123	265
6	Granite Drive	Dominguez to Project Drive #2	11	24	51	109	235
7	Granite Drive	Project Drive #2 to Sierra College	10	21	46	98	212
8	Dominguez Road	Pacific to Granite	7	16	34	73	157
9	Dominguez Road	Granite to Sierra College	8	18	38	82	176