APPENDIX G:
Noise Studies

NOISE STUDY
FOR THE CONSTRUCTION AND OPERATION
OF THE CANYON HILLS MANOR
BANQUET FACILITY TO BE LOCATED
IN THE CITY OF ANAHEIM
CALIFORNIA

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SECTION 1.0 - OVERVIEW

A proposal has been made to construct and operate the Canyon Hills Manor wedding chapel and banquet facility in the City of Anaheim (City), California. The proposed facility is to include approximately 25,000 square feet of enclosed structure located on a 28-acre parcel. The project site is currently undeveloped. The facility is to include two outdoor patio areas located along the northeast and northwest sides of the structure. The site would be served by two parking areas. These would be located to the east and west of the facility. An access road would allow for ingress and egress from Santa Ana Canyon Road to the north.

This noise assessment follows the California Environmental Quality Act (CEQA) Guidelines for environmental documents by discussing the current noise environment, analyzing potential impacts associated with the proposed project, and discussing any potential mitigation measures. The report also describes the characteristics and propagation of sound, outlines local noise ordinances and policies, and presents projected noise levels due to site construction and facility operations, as well as noise modeling results for both existing and existing with project traffic volumes. These traffic volumes were modeled using accepted Caltrans methodology and the results indicate that the project will not significantly raise noise levels along existing site access roads. Furthermore, the analysis includes an analysis of onsite noise sources including that produced within the structure, patio noise, and parking lot and vehicle access noise. These too were all found to be below any regulatory levels and their impacts are less than significant. Still, in the interest of community relations, measures are included to reduce this noise where reasonable and feasible.

SECTION 2.0 - CHARACTERISTICS OF SOUND

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air and is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). Noise can be defined as unwanted sound. In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale (a logarithmic loudness scale) is used to quantify sound intensity in a convenient and manageable manner. Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called A-weighted decibels written as dBA. In accordance with published literature, the human ear can detect changes in sound levels of approximately 3 dBA under normal ambient conditions. Changes of 1 to 3 dBA are noticeable to some people under quiet conditions while changes of less than 1 dBA are only discernable by few people under controlled, extremely quiet conditions.

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Because the area of the sound wave increases as the sound gets further and further from the source, less energy strikes any given point over the surface area of the wave. This phenomenon is known as spreading loss. Due to spreading losses, noise attenuates (decreases) with distance. The typical atmospheric spreading loss rate for point source noise is 6 dBA per doubling of the distance as predicted by the equation:

$$\text{Attenuated dBA} = 20 (\log) \frac{\text{measured distance}}{\text{reference distance}}$$

A line source will also attenuate with distance, but the rate of attenuation is a function of both distance and, due to reflection and absorption, the type of terrain over which the noise passes. Over hard sites, such as developed areas with paving, noise attenuates at a rate of 3 dBA per doubling of the distance as predicted by the equation:

$$\text{Attenuated dBA} = 10 (\log) \frac{\text{measured distance}}{\text{reference distance}}$$

Over soft sites, such as undeveloped areas, open space, and vegetated areas, an attenuation rate of 4.5 dBA per doubling of the distance is noted as predicted by the equation:

$$\text{Attenuated dBA} = 15 (\log) \frac{\text{measured distance}}{\text{reference distance}}$$

(It should be noted that Caltrans specifies the use of a 7.5-dBA reduction per doubling of the distance for point source noise over soft sites. However, as a reasonable worst-case scenario, the 6-dBA reduction is used for all point-source noise in this analysis.)

These represent the extremes and most areas will actually contain a combination of both hard and soft elements with the noise attenuation placed somewhere in between these two attenuation factors. (Note that the *Orange County Land Use/Noise Compatibility Manual* specifies the use of 4.5 dB for each doubling of the distance for traffic-generated noise regardless of the surface type [Orange County, 1993]). Unfortunately, the only way to actually determine the absolute amount of attenuation that an area provides is through field measurement under operating conditions with subsequent noise level measurements conducted at varying distances from a constant noise source.

Noise may also be influenced by atmospheric effects and most notably wind and temperature. Research by Caltrans and others has shown these atmospheric effects to be most profound within 200 feet from a highway. (While the project would not produces the noise levels associated with roadways, atmospheric effects could be of a similar nature.) Wind has shown to be the most important meteorological factor within about 500 feet. Vertical air temperature gradients become more important over longer distances.

The effects of wind on noise are mostly confined to noise paths close to the ground. This is because of the wind shear phenomenon. Wind shear is caused by the slowing down of wind in the vicinity of a ground plane due to friction. As the surface roughness of the ground increases, so does the friction between the ground and the air moving over it. As the wind slows with decreasing heights, it creates a sound velocity gradient (due to differential movement of the medium) with respect to the ground. The velocity gradient tends to bend sound waves downward in the same direction of the wind and upward in the opposite direction. The process, called refraction, creates a noise reduction upwind from the source and a noise increase downwind from the source. This phenomenon is illustrated in Figure 1. Caltrans has found these wind effects to be very dependant on wind angle, receiver distance, and site characteristics. A 6 mph crosswind can increase noise levels at 250 feet by about 3 dBA downwind and can reduce upwind noise by this same amount. Caltrans has also studied the effects of wind turbulence and has found this to produce a localized scattering effect on noise levels that is difficult to predict. Again, it should be pointed out that these studies are conducted along highways, and their relation to the project is only inferred.

Another meteorological aspect that can effect noise is that of temperature gradients. Normally, air temperature decreases with height above the ground. Since the speed of sound decreases as air temperature decreases, the resulting temperature gradient creates a sound velocity gradient with height. The slower speed of sound higher above the ground tend to refract sound waves upward in the same manner as wind shear does upwind from the source. The result is a decrease in noise. Under certain stable atmospheric conditions, however, temperature profiles are inverted, or the temperatures increase with height either from the ground up, or at some altitude above the ground. The inversion results in speeds of sound that temporarily increase with altitude, causing noise refraction similar to that caused by wind shear downwind from the noise source. These effects are less pronounced than those created by wind shear and may be more important over longer distances.

Objects that block the line-of-sight attenuate the noise source if the receptor is located within the shadow of the blockage (such as behind a sound wall). If a receptor is located behind the wall, but has a view of the source, the wall will do little to attenuate the noise. Additionally, a receptor located on the same side of the wall as the noise source may experience an increase in the perceived noise level as the wall can reflect noise back to the receptor compounding the noise.

Time variation in noise exposure is typically expressed in terms of the average energy over time (Leq), or alternatively, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Other values typically noted during a noise survey include the Lmin and Lmax. These values represent the minimum and maximum root-mean-square noise levels obtained over a given period; typically of 1 second.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or the day/night average noise level (Ldn). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 p.m. to 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. to 7:00 a.m. The Ldn descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 p.m. and 10:00 p.m. Both descriptors give roughly the same 24-hour level with the CNEL being only slightly more restrictive (i.e., higher).

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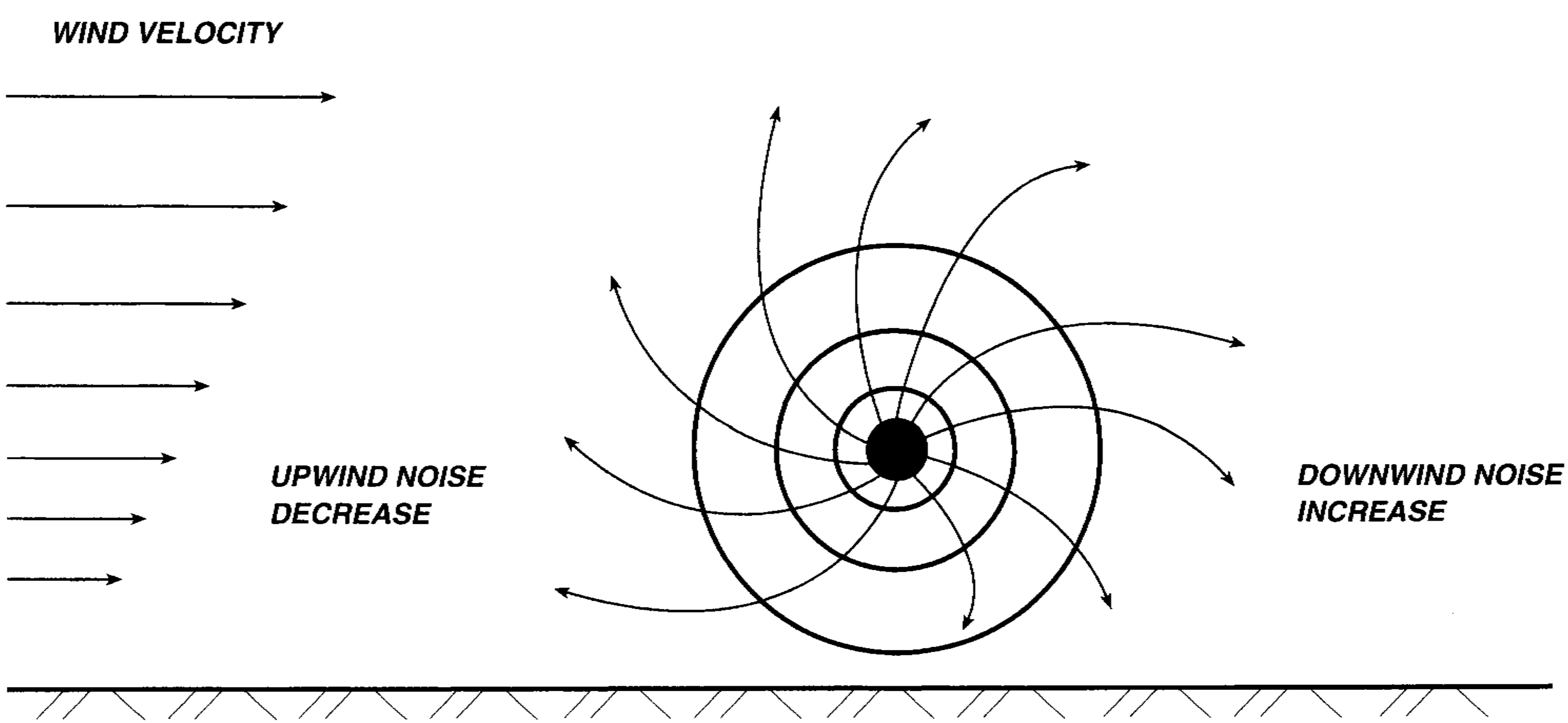

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Source: Synectecology

WIND EFFECTS ON NOISE LEVELS
Figure 1

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SECTION 3.0 - REGULATORY BACKGROUND

To limit population exposure to physically and/or psychologically damaging, as well as intrusive noise levels, the federal government, the state of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 FEDERAL GOVERNMENT

The federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the U.S. Environmental Policy Act (EPA). Noise exposure of this type is dependant on work conditions and is addressed through a facility's Health and Safety Plan. These regulations would apply to project construction and are addressed, and mitigated, through the construction contractor's Health and Safety Plan and will not be addressed further in this document.

The U.S. Department of Housing and Urban Development (HUD) has set a goal of 65 dBA Ldn as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the state of California.) While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings constructed under Title 24 standards typically provide 20 dBA of attenuation with the windows closed. Based on this premise, the interior Ldn should not exceed 45 dBA.

3.2 STATE OF CALIFORNIA

The California Department of Health Services (DHS) Office of Noise Control has studied the correlation of noise levels and their effects on various land uses. As a result, the DHS has established four categories for judging the severity of noise intrusion on specified land uses. The types of land uses addressed by the DHS and acceptable noise, by category, are presented in Figure 2.

Noise in the normally acceptable category is generally acceptable with no mitigation necessary. Noise in the conditionally acceptable category may require some mitigation as established through a noise study. The normally unacceptable category would require substantial mitigation while the clearly unacceptable category is probably not mitigable to a level of less than significant. As noted in Figure 2, there is some overlap between categories.

Applicable interior standards for new multifamily dwellings are governed by Title 24 of the California Administrative Code. These standards require that acoustical studies be performed prior to construction in areas that exceed 60 dBA Ldn. Such studies are required to establish measures that will limit interior noise to no more than 45 dBA Ldn and this level has been applied to many communities in California.

3.3 CITY OF ANAHEIM POLICY

The proposed project site is located within the City and is subject to the General Plan and noise ordinance incorporated therein. In accordance with the City's General Plan Noise Element (August, 1978), the City has adopted the State of California standards as included in Figure 2. Furthermore, the Noise Element indicates that exterior noise levels at residential locations should not exceed a CNEL of 65 dB while interior levels shall not exceed an annual CNEL of 45 dB in any habitable room.

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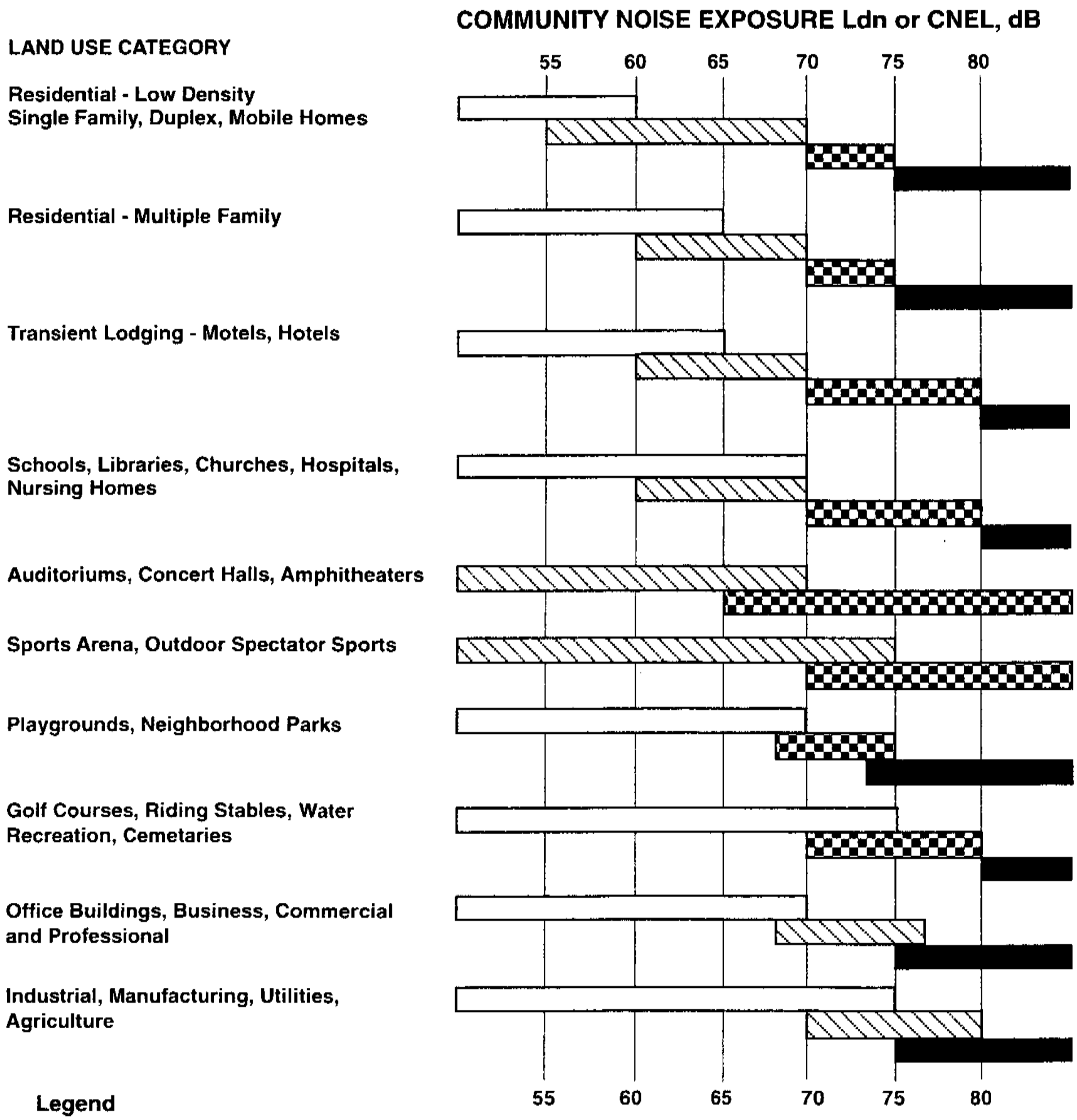

Legend

Normally Acceptable
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. Outdoor environment will seem noisy.

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made with needed noise insulation features included in the design. Outdoor areas must be shielded.

Clearly Unacceptable
New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.

Source: Synectecology

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NOISE AND LAND USE COMPATIBILITY
Figure 2

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Stationary sources of noise are governed under the local *Municipal Code*, Chapter 6.70, Sound Pressure Levels. Section 6.70.010 simply states that "No person shall, within the City, create any sound, radiated for extended periods from any premises which produces a sound pressure level at any point on the property in excess of 60 dB (Re 0.0002 Microbar) read on the A-scale of a sound level meter. Readings shall be taken in accordance with the instrument manufacturer's instructions, using the slowest meter response." The section goes on to state "Traffic sounds, sound created by emergency activities and sound created by governmental units shall be exempt from the applications of this chapter. Sound created by construction or building repair of any premises within the City shall be exempt from the applications of this chapter during the hours of 7:00 a.m. and 7:00 p.m."

Section 6.72.010 of the Municipal Code allows for the regulation of amplified sound. Specifically, Section 6.72.020.010 states that "In all residential zones and within 200 feet thereof, no sound amplifying equipment shall be installed, operated or used for commercial purposes at any time." Beyond of 200 feet from residential area, Section 6.72.020.030 limits the use of sound amplifying equipment for commercial purposes to between the hours of 8:00 a.m. and 9:00 p.m. However, Section 6.72.030.0202 exempts "Radios, televisions, phonographs, tape recorders and players, musical instrument amplifiers and similar devices when used and heard only by occupants of the premises in which the devices are located." Finally, Section 6.72.030.0203 exempts horns or other warning devices on vehicles when used for traffic safety.

SECTION 4.0 - EXISTING NOISE ENVIRONMENT

The Canyon Hills Manor project is to be located in an area which currently includes both low density residential and commercial land uses. The project is to be located on a ridge top along the south side of Santa Ana Canyon Road between Eucalyptus Drive and Festival Drive within the City of Anaheim. Specifically, the project is to be sited on Lots 22, 23, and 24 of Tract 117 on Santa Ana Canyon Road. Site access is to be provided from Santa Ana Canyon Road. The site is currently undeveloped and covered by sage scrub.

The north side of the site is bounded by Santa Ana Canyon Road with the Riverside Freeway (SR-91) lying to the north. The most proximate commercial land uses include the Anaheim Hills Festival located to the east along the east side of Festival Drive and the Madison Square self storage facility located along the north side of Santa Ana Canyon Road to the north of the project site. A "Residence Inn by Marriott" is also located to the east along the west side of Festival Drive and is currently undergoing completion.

Various residential uses also lie within the project area. The "Fountains of Anaheim Hills" senior apartments are located to the east along the west side of Festival Drive just south of the Residence Inn. Single-family residential units are located to the west off Eucalyptus Drive with the nearest unit located at the eastern terminus Autry Drive. The most proximate residential units to the south are located at the northern terminus of Raspberry Lane, Owens Drive, and Danielle Circle. These receptors are illustrated in Figure 3.

4.1 NOISE MONITORING

To determine proximate ambient noise levels, Synectecology conducted field studies on both September 29, 1999 and March 8, 2002 within the project area. Each of these field studies is discussed below. Reading locations are depicted in Figure 3.

1999 Field Study

For the 1999 field study, noise monitoring was conducted using a Brüel & Kjær Model 2230 Type 1 Precision Integrating Sound Level Meter. The unit meets the American National Standards Institute (ANSI) Standard S1.4-1983 for Type 1, International Electrotechnical Commission (IEC) Standard 651 - 1979 for Type 1, and IEC Standard 651 - 1979 for Type 1 sound level meters. The unit was field calibrated at 10:58 a.m. using a Quest Technologies QC-10 calibrator immediately prior to the first reading. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The calibration unit meets the requirements of the ANSI Standard S1.4-1984 and the IEC Standard 942: 1988 for Class 1 equipment.

Noise monitoring included four 15-minute noise measurements in immediate proximity of the project area. All obtained noise level measurements are included in Table 1. Each reading is summarized below.

Table 1
September 29, 1999 Field Study

Noise Level Location	Leq (dBA)	Lmin (dBA)	Lmax (dBA)
NR-1	55.3	50.4	61.1
NR-2	44.7	38.3	63.6
NR-3	49.5	46.1	61.0
NR-4	56.1	51.4	68.0
Note: The Leq represents the equivalent sound level and is the numeric value of a constant level that over the given period of time transmits the same amount of acoustic energy as the actual time-varying sound level. The Lmin and Lmax represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second.			

NR-1
This reading was taken at the in front of the dwelling located at 7730 Autry Drive located at the eastern terminus of the road. This dwelling represent the closest residential unit located to the west to the site. A 15-minute reading was obtained from 11:00 a.m. The dominant source of ambient noise was from traffic on the Riverside Freeway, however, aircraft noise was also notable. Additionally, a breeze was blowing and the rustling of leaves in the trees added to the overall noise profile.

NR-2
This reading was taken on the paved emergency access road which lies directly west of the project site. The meter was located approximately 500 feet south of Santa Ana Canyon Road. The noted self-storage facility is located immediately north of this emergency road. A 15-minute reading was taken from 11:36 a.m. Again, the dominant noise source was from the local freeway, however, in this location freeway noise was effectively blocked by the canyon walls. Aircraft flyovers also contributed to the ambient noise.

NR-3
This reading was taken at the northern end of the cul-de-sac on Raspberry Lane to the north of the project site. The meter was placed overlooking the canyon between the residences located at 203 and 206 Raspberry Lane. The 15-minute reading began at 12:08 p.m. During this time, a car door slam was observed in the driveway at 203 approximately 30 feet from the meter. Additionally, a large truck pulled up to the house for a delivery. As with the prior readings, the freeway and aircraft provided the dominant noise sources.

NR-4
This reading was taken at the western end of the graded lot located along the west side of Festival Drive, (now the location of the Residence Inn). This placed the meter immediately east of the utility easement. A 15-minute reading was obtained from 12:47 p.m. The dominant noise sources were the freeway and aircraft overflights including a helicopter flyover.

2002 Field Study

At the request of the City Planning Staff, Synectecology returned to the project area to obtain readings during the evening. To this end, a second field study was performed on Friday night, March 8, 2002. Noise monitoring was performed using a Quest Technologies Model 2900 Type 2 Integrating/ logging Sound Level Meter. The unit meets the ANSI Standard S1.4-1983 for Type 2, IEC Standard 651 - 1979 for Type 2, and IEC Standard 651 - 1979 for Type 2 sound level meters. The unit was calibrated at 10:05 p.m. using a Quest Technologies QC-10 calibrator immediately prior to the first set of readings. The calibration was then rechecked at 11:23 p.m. after the last reading and no meter drift was noted. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The unit meets the requirements of ANSI Standard S1.4-1984 and IEC Standard 942: 1988 for Class 1 equipment.

The study included three noise readings. The Leq, Lmin, Lmax, L_{02}, L_{08}, L_{25}, and L_{50} values were recorded. As discussed above, the Leq value is representative of the equivalent noise level or logarithmic average noise level obtained over the measurement period. The Lmin and Lmax represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second. The L_{02}, L_{08}, L_{25}, and L_{50} represent the values that are exceeded 1, 5, 15, and 30 minutes per hour if the readings were extrapolated out to an hour's duration. The readings are included in Table 2. Each reading is summarized below.

SR-1
This reading was taken at the in front of the dwelling located at 7730 Autry Drive in the same approximate location as NR-1 from the 1999 field study. Again, this dwelling represents the closest residential unit located to the west to the site. A 15-minute reading was obtained from 10:10 p.m. The dominant source of ambient noise was from traffic on the Riverside Freeway which was clearly visible to the northwest and northeast. Winds were calm.

It is interesting to note that this and the following reading, both obtained well after 10:00 p.m., were considerably louder than the noise level measured in the same location at 11:00 a.m. (i.e., NR-1). While this may possibly be attributed in part to a greater traffic volume (either due to temporal differences or over 2 years of ambient growth), it is more probably due to the increased vehicle speeds during the night. To increase (or reduce) traffic noise by 3 dBA requires a doubling (or halving) of the number of vehicles. However, this same change in noise may also be attributed to a 5 to 10 mph speed differential. As more vehicles crowd onto a road, their speeds, and resultant noise level, decrease as the road reaches capacity. At night as traffic relaxes, speeds and noise levels increase until the point where vehicles travel no faster and traffic continues to decrease. This is in all probability the situation that was noted to occur during the noise measurements.

SR-2
This reading was obtained approximately 20 feet north of the dwelling lying to the south of 7730 Autry Drive and about 100 feet south of SR-1. In this location the view of the freeway is largely obscured by the terrain though the freeway was still readily audible. The reading was obtained from 10:30 to 10:48 p.m. Again, the freeway was the dominant source of noise, but dogs barking also added to the noise level, producing the noted Lmax value.

SR-3
This reading was taken along the southeast portion of the cul-de-sac along Danielle Circle. This placed the meter almost directly south of the project location. The meter was placed overlooking the canyon to the northeast. The 15-minute reading began at 11:05 p.m. As with the prior readings, the freeway was still audible and provided the dominant noise sources.

Table 2
March 8, 2002 Field Study

Monitoring Location	Leq (dBA)	L_{02} (dBA)	L_{08} (dBA)	L_{25} (dBA)	L_{50} (dBA)	Lmin (dBA)	Lmax (dBA)
SR-1	61.5	64.6	63.7	62.4	60.9	57.3	65.8
SR-2	61.0	67.3	64.4	61.6	59.6	52.0	70.8
SR-3	48.0	53.4	50.0	48.2	46.9	43.0	61.1

The Leq represents the equivalent sound level and is the numeric value of a constant level that over the given period of time transmits the same amount of acoustic energy as the actual time-varying sound level. The L_{02}, L_{08}, L_{25} and L_{50} are the levels that are exceeded 2, 8, 25, and 50 percent of the time, respectively. Alternatively, these values represent the noise level that would be exceeded for 1, 5, 15, and 30 minutes during a 1-hour period if the reading was extrapolated out to 1-hour's duration. The Lmin and Lmax represent the minimum and maximum root-mean-square noise levels obtained over a period of 1 second.

4.2 TRAFFIC-GENERATED NOISE MODELING

The site is to be accessed from Santa Ana Canyon Road. The road is four lanes, undivided immediately north of the project site. A single access road at Santa Ana Canyon Road, located easterly of Eucalyptus Drive, is planned for the site access. The traffic analysis notes that Santa Ana Canyon Road currently handles approximately 24,000 average daily traffic (ADT) through the project area. To determine the existing CNEL noise levels along this route, existing traffic volumes were modeled using the Federal Highways Administration (FHWA) Highway Noise Prediction Model (CALVENO Version). The model calculates the Leq noise level for a particular reference set of input conditions and makes a series of adjustments for site-specific traffic volumes and mixes, time of day, distances, and speeds.

In calculating CNEL noise levels for the referenced roadway, the ADT volume was based on data provided in the traffic analysis. The CNEL was calculated using the following methodology:

- The moming rush hour lasts from 6:00 a.m. to 9:00 a.m., and the traffic volume for this period is estimated at 11.59 percent of the ADT volume.
- The evening rush hour lasts from 4:00 p.m. to 7:00 p.m. and the volume for this period is estimated at 31.11 percent of the ADT.
- Nighttime traffic is estimated at 5.23 percent of the total ADT traffic and is divided between the hours of 10:00 p.m. and 6:00 a.m.

These percentages are based on counts obtained by WPA Traffic Engineering, Inc. and included in the memo, *Signal Warrant Analysis-Canyon Hills Manor* (WPA, August 17, 1999).

In the calculation of a CNEL value, evening traffic (7:00 p.m. to 10:00 p.m.) was given a 5-dBA penalty, and for nighttime traffic (10:00 p.m. to 7:00 a.m.), a 10-dBA penalty added to its predicted value. The traffic noise level is as modeled at a distance of 50 feet from the centerline of the roadway under study.

The ratio of automobiles, medium trucks, and heavy trucks used in this computation is as prescribed by the County of Orange and includes 97.42 percent automobiles, 1.84 percent medium trucks, and 0.74 percent heavy trucks. Based on an estimated average speed of 35 mph, the FHWA model projects a CNEL of 68 dBA as measured at a distance of 50 feet from the centerline of Santa Ana Canyon Road. (Model runs are included in Appendix A.) The 65 and 60 dBA CNELs fall at distances 79 and 171 feet, respectively. Note that the actual distances to these contours could be considerably less than predicted where intervening structures or terrain breaks the line-of-sight to the roadway.

SECTION 5.0 - IMPACT ASSESSMENT

The proposed project involves the construction and use of a 25,000-square-foot wedding chapel and banquet facility on approximately 28 acres of land. The generation of noise associated with the proposed project could occur over the short-term from site preparation and construction activities to implement the proposed project. In addition, noise could result from the long-term operation of the project. Both short- and long-term noise impacts associated with the project are examined in this analysis.

5.1 STANDARDS OF SIGNIFICANCE

Noise impacts can be broken down into three categories. As discussed above, audible impacts, refer to increases in noise level that are perceptible to humans and generally refer to a change of 3 dBA or more since this level has been found to be barely perceptible in exterior environments. Potentially audible, refers to a change in noise level between 1 and 3 dBA. This range of noise levels was found to be noticeable to sensitive people in laboratory environments. The last category is changes in noise level of less than 1 dBA that are typically inaudible to the human ear except under quiet conditions in controlled environments.

The State CEQA Guidelines indicate a project will normally have a significant effect on the environment related to noise if it will:

> "...increase substantially the ambient noise levels for adjoining areas...," or
>
> "...conflict with adopted environmental plans and goals of the community where it is located..."

Based on these Guidelines, only audible changes in noise level or an incompatibility with local adopted plans are considered significant impacts.

5.2 STANDARD CONDITIONS AND UNIFORM CODES

All projects constructed in the City are subject to standard conditions set forth in the Municipal Code. Compliance with these provisions is mandatory and as such, does not constitute mitigation under CEQA. Section 6.70.010 of the Code exempts noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 7:00 p.m. and 7:00 a.m.

5.3 POTENTIAL IMPACTS

<u>Construction</u>

Noise levels associated with construction activities would be higher than the ambient noise levels in the project area today, but would subside once construction of the proposed project is completed. Two types of noise impacts could occur during the construction phase. First, the transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there could be a relatively high single event noise exposure potential with passing trucks (a maximum noise level of 86 dBA at 50 feet), the increase in noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact on noise receptors along the truck routes.

The second type of impact is related to noise generated by onsite construction operations and local residents could be subject to elevated noise levels due to the operation of this equipment. Construction activities are carried out in discrete steps, each of which has its own mix of equipment, and consequently its own noise characteristics. These various sequential phases would change the character of the noise levels surrounding the construction site as work progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow noise ranges to be categorized by work phase. Table 3 lists typical construction equipment noise levels recommended for noise impact assessment at a distance of 50 feet.

The grading and site preparation phase tends to create the highest noise levels, because the noisiest construction equipment is found in the earthmoving equipment category. This category includes excavating machinery (backfillers, bulldozers, draglines, front loaders, etc.) and earthmoving and compacting equipment (compactors, scrapers, graders, etc.). Typical operating cycles may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Noise levels at 50 feet from earthmoving equipment range from 73 to 96 dBA while Leq noise levels range up to about 89 dBA. The later construction of structures is somewhat reduced from these values and the physical presence of the structure as well as acoustic shielding afforded by any equipment set-back from the ridgeline may break up line-of-sight noise propagation further reducing these levels.

Table 3
Noise Associated with Typical Construction Equipment

Type of Equipment	Range of Sound Levels Measured (dBA at 50 feet)	Suggested Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers, 12,000-18,000 ft-lb/blow	81-96	93
Rock Drills	83-99	96
Jack Hammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	68-80	77
Dozers	85-90	88
Tractor	77-82	80
Front-End Loaders	86-90	88
Hydraulic Backhoe	81-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	86
Air Compressors	76-86	86
Trucks	81-87	86
Source: Noise Control for Buildings and Manufacturing Plants, BBN 1987.		

Composite construction noise is best characterized by Bolt, Beranek, and Newman (EPA, December 31, 1971). In this study, the noisiest phases of construction for commercial development are presented as 89 dBA while residential development are presented as 88 dBA Leq, both as measured at a distance of 50 feet from the construction effort. These values takes into account both the number of pieces and spacing of the heavy equipment used in the construction effort. As noted above, in later phases during building construction, noise levels are typically reduced from these values and the physical structures further break up line-of-sight noise. However, as a worst-case scenario the 89-dBA value is used for the construction effort.

Single-family residential units are located to the east and south of the project site. The nearest homes are located at the east end of both Autry Drive and Dorothy Way. Distances to these units were based on a topographic map of the site and surrounding area and found to be over 700 feet from the nearest construction (i.e., the westernmost access road cut). Based on spreading losses, noise levels could be on the order of 66 dBA Leq at these locations. Homes located to the south along Danielle Circle are located in excess of 2,000 feet from the project site. Based on a clear line-of-sight, construction noise is estimated at less than 57 dBA Leq. However, most (if not all) of these homes are precluded by views of the site by an intervening ridge top located to the south of the project site and construction noise would be further reduced. Homes located along Raspberry Lane are in excess of 1,500 feet from the site and are blocked from view of the site by the intervening ridgeline that includes the Southern California Edison (SCE) easement. Similarly, homes along Owens Drive are precluded from views of the site by the ridgeline and those homes located along Eucalyptus Drive. While land designated for residential development abuts the project site to the west and south, no homes are currently situated in these areas nor would any homes be expected to be constructed and occupied by the time of project construction. As such, any potential for impact on these adjoining, undeveloped properties is not significant.

The City recognizes that the control of construction noise is difficult at best and provides exemption for this type of noise. Any required site construction would be subject to Section 6.70.010 of the City Municipal Code and regulated to between the hours of 7:00 a.m. and 7:00 p.m. However, construction noise does represent a potential nuisance value to local residents that may be home during the day. To further reduce construction noise, the following project commitments shall be followed to the extent feasible.

- All construction equipment shall be properly maintained and tuned to minimize noise emissions,
- All equipment shall be fitted with properly operating mufflers and air intake silencers no less efficient than those originally installed,
- All stationary noise sources (e.g., generators and compressors) shall be located as far from the existing residents as is feasible,
- Construction shall be restricted to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, including Saturday. No construction shall occur at any time on Sunday or a federal holiday. These days and hours shall also apply any servicing of equipment and to the delivery of materials to or from the site, and
- Construction shall be subject to any and all provisions deemed reasonable and feasible as set forth by the City Planning Department.

Implementation of these commitments will ensure that any impacts remain less than significant.

Another potential impact of construction is that of vibration. Groundborne vibration is typically associated with blasting operations and potentially, the use of pile drivers, neither of which would be necessary for the construction (or operation) of the project. As such, no excessive groundborne vibrations would be created by the proposed project and any impact would be less than significant.

<u>Long-Term Operational Impacts</u>

Long-term noise impacts are those associated with both mobile and stationary sources. Impacts on existing land uses may be produced from the addition of project-generated vehicle traffic as well as from onsite activities.

<u>Offsite Project-Generated Impacts</u>

Vehicular Traffic Noise

The development of a new project often results in an increase in local traffic thereby raising mobile-source noise. In accordance with the traffic report, the proposed project is estimated to result in the production of about 500 average daily trips (ADT) from a peak-event day. This volume of vehicles was then added to the approximately 24,000 ADT existing along Santa Ana Canyon Road. While the traffic analysis assigns these trips to the evening hour, for the purposes of noise calculations, a worst-case scenario adds the entirety of this traffic to the night period where a 10-dBA penalty is added. Furthermore, because this analysis looks at the project's contribution to the existing noise as a worst-case scenario, it does not include the cumulative traffic associated with other projected projects so that the project has a greater percentage of the whole. Finally, all of this traffic was assumed to enter and leave the site from the same direction along Santa Ana Canyon Road. In actuality, this traffic would be split between the east- and westbound directions reducing its noise contribution to either side of the project entrance. Based on this scenario, the 500 trips for the project were added during the night to the existing ADT for a total of 24,500

ADT. This raised the CNEL value by less than 1 dBA. This increase would not be audible and does not constitute a significant impact. Because of offsite distribution patterns, more distal access routes would include even fewer project-generated vehicles and any noise increase along these routes would also be inaudible.

Another potential source of vehicle traffic noise expressed by the City was that from the operation of the Riverside Freeway (SR-91) and specifically, the grading of a hilltop. The project would reduce the 625-foot high peak to 560 feet above mean sea level. The concern is that the removal of this material could then create a line-of-sight from for existing residents to the freeway. The only residents that may be affected by topping the peak would be those to the southwest along Eucalyptus Drive and its tributaries. The senior apartments located to the east and accessed from Festival Drive do not lie in the noise shadow from the removed peak and would not be affected by the grading of the hilltop. Furthermore, homes to the southeast along Bauer Road, Raspberry Lane, etc. are protected from northwest freeway noise by the intervening ridgeline located to the east of the project that includes SCE easement and precludes view of the project area.

Based on the U.S. Department of the Interior Orange Quadrangle map (Photorevised 1981) as well as large-scale topographic maps of the project site and adjoining area, the homes that are located along the southern portion of Eucalyptus Drive would be the only residents susceptible to increased freeway noise through removal of the hill top. These residents have a base elevation of approximately 400 to 500 feet above sea level. The project would retain a pad elevation of 560 feet. As such, no residents that currently have an obstructed view of the freeway would loose this obstruction due to project implementation. Furthermore, the Quadrangle map shows that those residents that do lie to the south at the higher elevations, such as along Danielle Circle, are shielded by a second ridge top that is also in excess of 600 feet above sea level. Finally, those residents to the south that *may* have views in the direction of the site look to the north or northeast. Even if the entirety of the hill that is to include the project were removed, these residents still would not have a view of the SR-91 Freeway which runs through a cut in the direction of any view from the south or southwest of the project site. As such, removal of the hilltop and the grading of the proposed site would not create a line-of-sight to the freeway for existing residents and no measurable increase in freeway noise would be expected with project implementation.

Stationary-Source Noise

While some noise is associated with the use of heating, air conditioning, and ventilation equipment, these sources are regulated under the Uniform Building Code and are commonplace in both commercial and residential areas. Any stationary-source noise concerns are then based on the use of sound-reinforcement equipment used within the facility for dance and public address in reception activities, from activities on the two exterior patio areas, or from parking lot activities such as door slams and drive-bys. Each type of noise is addressed below. Figure 3 also provides a graphic representation of noise produced onsite from the various activities associated with the operation of the facility. Each potential source of this noise is discussed below.

Interior Use of Sound Reinforcement Equipment

An attempt was made to document the noise associated with the interior use of sound reinforcement equipment at two of the Applicant's existing facilities. The results of this monitoring are discussed below.

The Garden Room in Garden Grove

Noise readings were obtained outside of this facility on September 25, 1999. Noise monitoring was conducted using a Quest Technologies Model 2900 Type 2 Integrating/logging Sound Level Meter. The unit meets the ANSI Standard S1.4-1983 for Type 2, IEC Standard 651 - 1979 for Type 2 sound level meters. The unit was field calibrated at 4:50 p.m. The calibration was performed using a Quest Technologies QC-10 calibrator immediately prior to the first reading. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The calibration unit meets the requirements of the ANSI Standard S1.4-1984 and the IEC Standard 942: 1988 for Class 1 equipment.

GR-1

This reading was obtained at the Garden Room facility located at 12777 Knott Avenue in the City of Garden Grove. The reading was obtained to document the noise produced by the indoor use of the public address (PA) system used during a wedding reception. The facility is a similar-type land use to that proposed and like all of the Applicants facilities, uses double-pane glass windows.

The meter was placed at a distance of 10 feet from the patio which has an approximate 6-foot high plexiglass enclosure. This placed the meter approximately 35 feet from the facility wall and windows. During this reading the disc jockey was playing "chit chat" music (i.e., relatively low key background music). The noise of the PA was totally inaudible outside of the facility unless one was to press their ear up against the door. The major sources of noise were traffic along Knott Avenue located approximately 85 to 90 feet to the east, and the Garden Grove Freeway, located about 500 to 600 feet to the south. A 1-hour reading was obtained from 4:58 p.m. The Leq was noted as 61.8 dBA with Lmin and Lmax values of 55.5 and 71.5 dBA, respectively.

GR-2

This reading was obtained in the same location as GR-1 except that the party had started. Exterior noise from interior activities was still inaudible except during peak noise events such as applause and cheers or when the exterior doors were opened for patio access. However, even these types of noise were inaudible at a distance of 50 feet from the rear wall. A 15-minute reading was obtained from 5:59 p.m. The Leq was noted as 62.0 dBA with Lmin and Lmax values of 56.4 and 75.0 dBA, respectively. Again, the ambient noise was due to local traffic.

GR-3

This reading was obtained in the same location as GR-1 and GR-2 and was used to verify the GR-2 readings. A 15-minute reading was obtained from 6:15 p.m. The Leq was noted as 62.2 dBA with Lmin and Lmax values of 56.0 and 71.9 dBA, respectively. In addition to the mentioned road noise, background sirens were twice noted during the measurement. Additionally, an automobile started its engine in the parking lot approximately 100 feet from the monitored location.

The Garden Room in La Habra

GR-4

This reading was obtained to document wedding reception noise at the Garden Room facility located at 801 North Beach Boulevard in the City of La Habra. The equipment is as described in the measurements for the Garden Grove facility and the meter was field calibrated at 7:15 p.m. This facility, like that in Garden Grove, uses double-pane glass windows.

The meter was placed at a distance of about 15 feet from the facility windows outside of the reception room. From this point, interior music was barely audible and the dominant noise sources included traffic on Beach Boulevard to the east and Whittier Boulevard to the north. Additionally, a compressor associated with the adjoining automobile repair shop was notable in the background. Finally, the noise from bodywork on an automobile located about 50 feet from the meter was noted. A 15-minute reading was obtained from 7:15 p.m. The Leq was noted as 54.8 dBA with Lmin and Lmax values of 45.7 and 75.0 dBA, respectively.

GR-5

This reading was obtained in the same location as GR-4. Exterior noise from interior activities was still inaudible except during peak noise events and during "loud" music in which case this noise was barely audible and traffic noise still dominated the reading. A 15-minute reading was obtained from 7:40 p.m. The Leq was noted as 54.8 dBA with Lmin and Lmax values of 47.1 and 68.3 dBA, respectively.

Summary

The obtained noise measurements from both of the existing facilities illustrate that any projected exterior noise from interior activities is extremely minimal. Because of extraneous noise sources that were not associated with the use of these facilities, there is no way to determine how much (or how little) noise is actually contributed by their use. However, the measurements do demonstrate that exterior noise from facility is certainly less than the 54.8 dBA Leq noted at the La Habra facility which was inclusive of traffic noise as well as that from the adjacent automotive repair facility.

The human ear can distinguish simultaneous noise from two sources to about a 20-dBA differential. Beyond this 20-dBA differential, the quieter of the two sources would not be notable. As such, exterior noise due to the interior use of the PA system (which was barely audible) could be on the order of 40 to 45 dBA as measured at a distance of 50 feet from the structure. Because the nearest existing residence is located in excess of 1,000 feet from the proposed structure, any noise from the interior use of the PA system would be extremely minimal (less than 20 dBA) at the residence. This noise would not be audible, especially in comparison with that measured at the nearest residence to the project site on the night of March 8, 2002 (i.e., 61 dBA Leq) and is less than significant. Due to even greater distances, the noise at any other local residences would be further reduced and will not be audible, especially in light of the noise generated by the freeway. While winds could increase this noise at downwind receptors, any increase would be less than 3 dBA and the resultant values would still be inaudible at any existing residence.

Another potential impact is on the properties that adjoin the site to the south and west. While no residences are currently located in these areas, they are zoned for residential development and there is the potential for impact at some time in the future. The nearest property line to the south is located in excess of 350 feet from the structure while that to the west is over 650 feet. Note that these distances are in excess of 200 feet, thereby allowing the use of a public address system for commercial purposes. If exterior PA noise is again estimated at 45 dBA as measured at a distance of 50 feet, the sound levels at the southern and western property lines are calculated at 28 dBA and 23 dBA, respectively, and would not exceed the City standard of 60 dBA. Even if winds were to increase these values by 3 dBA, the resultant values would still be well under the City's standard and less than the ambient levels measured in the field studies. As such, any noise impact from interior facility operations would not be significant.

<u>Exterior Use of Patio</u>

The City expressed concern regarding the exterior use of the patios during the evening and at night. To this end, an attempt was made to measure patio noise at the Garden Room on February 23, 2002. The patio is open, but separated from the parking area by Plexiglas partitions. During the course of the evening, people would intermittently wander onto the patio. These were usually small groups of 5 to 10, but as many at 15 to 20 people were observed on the patio simultaneously at times. At 50 feet, the noise from people on the patio was totally inaudible over road noise from Knott Boulevard. The 15-minute reading was obtained from 9:05 p.m. Monitoring equipment is as described for the Garden Room measurements and the meter was field calibrated at 8:30 p.m. prior to the reading. The meter was placed approximately 170 feet west of the curbline and 50 feet from the patio area. Even with the vehicles on Knott Boulevard, an Leq of 57.2 dBA was recorded. The Lmax and Lmin were 65.8 and 51.8 dBA, respectively.

The proximity of the road makes it difficult to determine the noise from people using the patio. However, face-to-face conversation is typically noted at 65 dBA at a distance of 5 feet. If it is assumed that 30 people were to use the patio simultaneously with 15 talking at any one time, the composite Leq is calculated at less than 77 dBA as measured at a distance of 5 feet. Figure 4 presents in Leq noise contours associated with patio use. The nearest existing residential use is over 1,000 feet from the patio area and at this distance, noise would be reduced to 31 dBA Leq. Even with wind effects, the resultant level is inaudible and far less than the Leq values measured the night of March 8, 2002 at the residential units located at the east end of Autry Drive. (In actuality, it would be uncommon for people to use the patio during high wind conditions.) At over 2,000 feet, homes to the south near the end of Eucalyptus Drive as well as those along Danielle Circle could realize noise levels of less than 25 dBA Leq. Again, this value is well under the 48 dBA Leq value measured on the night of March 8, 2002 and would be inaudible. Additionally, the intervening ridgeline would further reduce any exterior patio noise.

Finally, the City expressed a concern over the adjoining parcels that are zoned for residential uses, but currently have no receptors. The most proximate site border is located to the south and is in excess of 350 feet from the structure. At this distance patio noise would be reduced by about 36 dBA and the resultant value is estimated at no more than 41 dBA Leq. This value is well under the City's 60-dBA noise standard and also less than the ambient noise levels. Actually, the patios face toward the northeast and northwest and the properties to the south are shielded from any noise by the physical presence of the structure which would serve as an effective sound wall. The nearest property line to the west is located approximately 650 feet from the patio area. This location does have a line of sight to the northwest patio. If it is again assumed that patio use creates an Leq of 77 dBA as measured at a distance of 5 feet, the Leq at 650 feet is reduced to less than 35 dBA. This value is well under the City's standard of 60 dBA at the property line. Furthermore, this value is well under the noise produced by the freeway, even during the night. As such, any potential for impact is less than significant.

Parking Lot Noise

Some types of noises are associated with parking lot operations and their potential impact on proximate receptors should not be ignored. Synectecology performed noise measurements of automobile door slams on March 11, 2002. Noise monitoring equipment is as described for the year 2002 field study and the meter was field calibrated at 6:05 p.m. The ambient noise level was noted at 43 to 44 dBA.

The measurements include 13 door slams. The vehicles included a 1999 Oldsmobile Aurora (six slams) and a 1990 Jeep Grand Wagoneer (seven slams); both full-size family vehicles. The meter was located 50 feet from the car door(s). The doors were purposely and forcefully slammed. Furthermore, the vehicle occupant stood to the side as the doors were slammed so that the meter had a clear line-of-sight to the car doors. Additionally, the meter was allowed to return to the ambient noise level between door slams. Instantaneous readings for the Aurora ranged from 55.3 to 59.8 dBA. The Jeep produced readings ranging from 57.4 to 61.4 dBA. As a worst-case scenario, it is assumed that a door slam produces an instantaneous noise level of 65 dBA. (This is well above any of the measured values and no shielding due to the presence of the occupant or other vehicles in the lot is assumed.) Note that this value represents an instantaneous, Lmax level. The west parking area is located at a distance of approximately 850 feet from the nearest existing residents. Based on an assumed value of 65 dBA as measured at a distance of 50 feet, noise from door slams could be on the order of 40 dBA at these homes. Noise from the east parking lot would be further reduced by the additional distance as well as the physical presence of the structure which would serve as an effective sound wall.

With respect to the adjoining parcels, the west and east parking areas are located approximately 350 and 400 feet, respectively, from the nearest property line to the south. Based on an assumed level of 65 dBA as measured at a distance of 50 feet, door slams would be on the order of 47 to 48 dBA at the property line.

The City's noise ordinance notes that for a noise to be offensive, measurements shall consist of "the average of not less than three readings taken at two minute intervals." Furthermore, "to have valid readings, the levels must be 5 dB or more above the levels prevailing at the same point when the source(s) of the alleged objectionable sound are not operating." Any parking lot noise is of extremely short duration and if averaged over the period noted in the ordinance would add only minimally to the ambient noise and would certainly be far less than the 60-dBA standard. As such, these types of noises will not present a significant impact.

In addition to door slams, parking lot noise would include engine starts and vehicle travel along the onsite access road. As a worst-case scenario, it is assumed that the entirety of the 250 trips per day that would leave the site were to leave in a 1-hour period. This noise was then modeled using the Caltrans, Sound32 Noise Model. The average onsite speed is assumed at 15 mph. The model notes that based on soft-site modeling, the volume of vehicles would create a 1-hour noise level of 46.5 dBA Leq as measured at a distance of 50 feet. The 45 dBA Leq noise contour is presented in Figure 4. At its nearest point the access road is in excess of 700 feet from the nearest existing residents and noise is calculated at approximately 30 dBA Leq. The road comes to within about 200 feet of both the southern and western property lines and this noise is calculated at less than 39 dBA Leq at the property line. All of these values are well under the City's 60 dBA and any impact is less than significant. Furthermore, these levels are all well below the ambient noise measured the night of March 8, 2002 and the project would not contribute significantly to this ambient noise.

Other sources of parking lot noise are also possible. People gather at the building entrance and converse while walking through the lot and entering their vehicles. Occasional horns and car alarms may also be sounded. The noise produced by people gathering outside the facility would not exceed that noted for patio activities and is less than significant. People conversing within the lot would not exceed the value used for door slams and as demonstrated, is also less than significant.

The use of horns and unintentional sounding of car alarms would be rare occurrences. The sound created by the use of automobile horns and alarms is specifically exempted from the regulation within the City Municipal Code. Specifically, Section 6.70.010 of the ordinance notes, "Traffic sounds, sound created by emergency activities and sound created by governmental units shall be exempt from the applications of this chapter." Section 6.72.030.0203 notes that warning devices include horns or other warning devices on other vehicles when used for traffic safety purposes. Furthermore, because these warning devises sound for such short duration, they do not measurably raise the CNEL. As such, their impact ,while potentially adverse, is less than significant.

SECTION 6.0 - MITIGATION

No significant impacts have been identified and under CEQA, no mitigation is warranted. However, to ensure good community relations the Applicant shall abide by the following measures:

- specify the use of double-pane glass or acoustic-rated window facilities in all rooms where a PA system may be used,
- enclose the outdoor patio areas with glass or Plexiglas sheeting,
- no truck deliveries shall be scheduled between 7:00 p.m. and 7:00 a.m., and
- any other measures deemed reasonable and feasible as set forth by the City Planning Department.

SECTION 7.0 - REFERENCES

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APPENDIX A

FHWA NOISE MODELING
OF EXISTING TRAFFIC VOLUMES ALONG
SANTA ANA CANYON ROAD

MODEL INFORMATION

Input units = (E)nglish or (M)etric? E Input number of elements this run? 1
Input number of traffic lanes/element? 1
Input element # and lane # description (30 char. max.)
SANTA ANA CANYON, EXISTING____
Roadway angle, left? -90 Roadway angle, right? 90
Dropoff rate hard site=0 soft site=0.5 ? .5
Shielding due to trees or buildings (Neg dBA value)? 0
(N)o barrier (W)all, (B)erm ? N
Barrier:
Barrier height 0 Receptor height 0 Barrier to receptor distance 0
Volumes for the hour starting : Average Daily Traffic : 24000
Morning Rush? .1159 Off-Hours? .5207 Evening Rush? .3111 Night? .0523
Autos? 903 .9742 Medium? 17 .0184 Heavy? 7 .0074
Speed (all vehicles)? 35
Distance to center of near lane >50 Ft. (15 M) ? 50
Grade correction: 0

0 - 2 % = +0 dBA 5 - 6 % = +3 dBA
3 - 4 % = +2 dBA 7+ % = +5 dBA

ELEMENT NUMBER AND DESCRIPTION

Esc=ABORT F6=REPEAT F10=NEXT LANE/ELEMENT

Calveno emissions

Lane #/Road segment SANTA ANA CANYON, EXISTING FOR 6:00am - 7:00am

Vehicle Class	Auto	Med Truck	Hvy Truck
Volume(VPH)	903	17	7
Leq(h)(dBA)/Veh type	62.7	55.1	56.5

Leq(Σ h)(dBA) Tot. this run 64
CNEL Adj.(dBA) 10 Adjusted total 74
Ldn Adj.(dBA) 10 Adjusted total 74
Leq(Σ Lanes/element) 74
Leq(Σ elements) 74
CNEL = 68 dBA
Ldn = 67 dBA

ANY KEY -> CONTINU_
Esc -> MENU

APPENDIX B

FHWA NOISE MODELING OF EXISTING PLUS PROJECT-GENERATED TRAFFIC VOLUMES ALONG SANTA ANA CANYON ROAD

MODEL INFORMATION

Input units = (E)nglish or (M)etric? E Input number of elements this run? 1
Input number of traffic lanes/element? 1
Input element # and lane # description (30 char. max.)
SANTA ANA CANYON, WITH PROJECT
Roadway angle, left? -90 Roadway angle, right? 90
Dropoff rate hard site=0 soft site=0.5 ? .5
Shielding due to trees or buildings (Neg dBA value)? 0
(N)o barrier (W)all, (B)erm ? N
Barrier:
Barrier height 0 Receptor height 0 Barrier to receptor distance 0
Volumes for the hour starting : Average Daily Traffic : 24500
Morning Rush? .1136 Off-Hours? .5101 Evening Rush? .3047 Night? .0716
Autos? 904 .9742 Medium? 17 .0184 Heavy? 7 .0074
Speed (all vehicles)? 35
Distance to center of near lane >50 Ft. (15 M) ? 50
Grade correction: 0
0 - 2 % = +0 dBA 5 - 6 % = +3 dBA
3 - 4 % = +2 dBA 7+ % = +5 dBA

ELEMENT NUMBER AND DESCRIPTION

Esc=ABORT F6=REPEAT F10=NEXT LANE/ELEMENT

Calveno emissions

Lane #/Road segment
SANTA ANA CANYON, WITH PROJECT FOR 6:00am - 7:00am

Vehicle Class	Auto	Med Truck	Hvy Truck
Volume(VPH)	904	17	7
Leq(h)(dBA)/Veh type	62.7	55.1	56.5
Leq(Σ h)(dBA) Tot. this run	64		
CNEL Adj.(dBA) 10		Adjusted total 74	
Ldn Adj.(dBA) 10		Adjusted total 74	
Leq(Σ Lanes/element)	74		
Leq(Σ elements)	74		

CNEL = 68 dBA
Ldn = 68 dBA

ANY KEY -> CONTINU_
Esc -> MENU

APPENDIX C

SOUND32 NOISE MODELING
OF PARKING LOT AND ACCESS ROAD NOISE
FROM PROJECT-GENERATED TRAFFIC

```
Canyon Manor Site Access Road @ 250 Vehicles Per Hour, Noise @ 50 Feet
T-, 1
 250 , 15 , 0 , 0 , 0 , 0
L-, 1
N,-750.,0,0,
N,750.,0,0,
R, 1 , 67 ,1
0,50,5.,
D, 4.5
ALL,ALL
C,C
```

SOUND32 - RELEASE 07/30/91

TITLE:
Canyon Manor Site Access Road @ 250 Vehicles Per Hour, Noise @ 50 Feet

BASED ON FHWA-RD-108 AND
CALIFORNIA REFERENCE ENERGY MEAN EMISSION LEVELS

RECEIVER	LEQ
R-1	46.5