Ridgefield Weddings

Arcata, CA

ENVIRONMENTAL NOISE STUDY

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INTRODUCTION

Ridgefield Weddings is a professional wedding venue, which hosts ceremonies and receptions ranging from elopement to 120 guests. The business' conditional use permit is up for renewal. At the owner's request, the following environmental noise study was prepared to assess the land use compatibility as well as addressing potential noise concerns from adjacent neighbors. Where necessary, this study recommends mitigation measures to meet these requirements. This report is divided into five sections including a discussion of environmental acoustics at the end of this report:

1. Summary
2. Acoustical Criteria
3. Project Location and Neighbors
4. Project Generated Noise
5. Fundamentals of Environmental Noise

1. SUMMARY

Prior to the applicants' submission for their conditional use permit, the project already operates within the allowable limits of the Humboldt County Noise Element. Additionally, ownership mandates that guests conclude amplified outdoor activities by 9:30 p.m. This self-imposed time limit begins 30 minutes prior to the County's more stringent nighttime standards. Music is arguably the greatest source of complaints and ownership has taken administrative measures to cease these activities in advance of nighttime hours. In summary, the project would continue to meet the noise goal and objectives stated in the Humboldt County Noise Element as well as CEQA. This report provides additional suggestions such as speaker placement and configuration to further reduce amplified music from wedding activities to the neighboring residents.

2. ACOUSTICAL CRITERIA

Humboldt County Noise Element

Applicable acoustical criteria are contained in Chapter 13 the Noise Element section of the Humboldt General Plan (adopted 2017). This document expresses its goals, policies, and standards as follows:

13.1 Purpose

This Element identifies the County's approach to managing noise levels to minimize the exposure of community residents to excessive noise. The analysis follows the guidelines adopted by the Office of Noise Control of the California Department of Health Services.

13.4 Goals and Policies and Standards

Goals

1. N-G1. Excessive Noise. A quiet and healthful environment with limited disagreeable noise.
2. N-G2. Incompatible Land Uses. Land uses arranged to reduce annoyance and complaints and minimize the exposure of community residents to excessive noise.

Policies

N-P1. Minimize Noise from Stationary and Mobile Sources. Minimize stationary noise sources and noise emanating from temporary activities by applying appropriate standards for average and short-term noise levels during permit review and subsequent monitoring.

Standards

N-S7. Short-term Noise Performance Standards (Lmax). The following noise standards, unless otherwise specifically indicated, shall apply to all property within their assigned noise zones and such standards shall constitute the maximum permissible noise level within the respective zones.

SHORT-TERM NOISE STANDARDS (Lmax)		
Zoning Classification	**Day (maximum) 6:00 a.m. to 10:00 p.m. dBA**	**Night (maximum) 10:00 p.m. to 6:00 a.m. dBA**
MG, MC, AE, TPZ,TC, AG, FP, FR, MH	80	70
CN, MB, ML, RRA, CG, CR	75	65
C-1, C-2. C-3, RM, R-3, R-4	65	60
RS, R-1, R-2, NR	65	60

Exceptions. The Short Term Noise levels shown in the above table shall not apply to uses such as, but not limited to:

1. Portable generator use in areas served by public electricity when electrical service is interrupted during emergencies as determined by the Planning Director.
2. Temporary events in conformance with an approved Conditional Use Permit.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) guidelines include a checklist of items, some of which relate to noise and vibration. One item asks if the project will exceed any established noise standards or substantially increase existing ambient noise levels. To address the future increase in noise levels from this project, a change of 3 dB or less to the day-night average noise level is considered just noticeable and not expected to cause significant community response. A change of 4 to 5 dB is marginal but could be considered an impact if the resultant noise level exceeds “normally acceptable” levels. A change of more than 5 dB would be clearly noticeable and considered a significant impact, especially since it could potentially cause adverse community response.

3. PROJECT LOCATION AND NEIGHBORS

The following site map shows the location of the project as it relates to the nearest seven residential neighbors. These neighbors represent the closest neighbors to the project and would be subject to the highest levels of noise from the project events.

The following table lists the neighbors by address and provides the estimated distance (to the nearest 100 feet) to the project.

Address	Distance
2234 Fickle Hill	400 feet
2236 Fickle Hill	700 feet
2066 Fickle Hill	900 feet
2198 Fickle Hill	600 feet
2164 Fickle Hill	700 feet
2142 Fickle Hill	700 feet
33 Inga	900 feet

4. PROJECT GENERATED NOISE

Anticipated noise from the wedding venue includes the following sources:

1. Traffic noise
2. Patron noise and music

These sources of noise have been compared to the limits set forth in N-S7. Short-term Noise Performance Standards (Lmax). Our study assumes "worst case" conditions (i.e. large weddings of 100 people or more). Our findings follow:

Traffic Noise

The project will receive over 100 guests per peak wedding day generating 100 additional trips daily (50 arriving at the wedding and 50 leaving the wedding). Using the FHWA method for estimating traffic noise, we calculate the noise from the peak traffic hour (arriving) to be the following noise levels at these nearby residences:

Address	Distance	Noise Level (dBA)
2234 Fickle Hill	400 feet	44
2236 Fickle Hill	700 feet	41
2066 Fickle Hill	900 feet	40
2198 Fickle Hill	600 feet	42
2164 Fickle Hill	700 feet	41
2142 Fickle Hill	700 feet	41
33 Inga	900 feet	40

Mitigation:

Vehicular noise levels comply with Standard N-S7, 65 dB/60 dB day/night maximum noise levels at residences. Noise levels from vehicular traffic would be audible at these residences. However, infrequent trips should not increase existing daytime background noise levels. Traffic due to wedding events would increase to the day-night average noise levels less than one decibel, which is not considered a significant impact. No further mitigation would be necessary.

Patron Noise

Conversation

Ridgefield plans to host wedding ceremonies and receptions at the outdoor patio. Assuming worst case conditions (i.e. 100 or more guests) people speaking with raised voices, we estimate that conversation noise levels would be up to 77 dBA at 3 feet. The table below lists the projected maximum noise levels from conversations at the nearby residences:

Address	Distance	Noise Level (dBA)

2234 Fickle Hill	400 feet	34
2236 Fickle Hill	700 feet	30
2066 Fickle Hill	900 feet	27
2198 Fickle Hill	600 feet	31
2164 Fickle Hill	700 feet	30
2142 Fickle Hill	700 feet	30
33 Inga	900 feet	27

Mitigation:

Guest conversation noise levels comply with Standard N-S7, 65 dB/60 dB day/night maximum noise levels at residences. We predict that conversation noise would be mostly indistinguishable from the existing background noise at the nearest residences. Some instantaneous noise such as laughter may be occasionally audible, but not loud enough to increase the background noise level at the nearby residences. Patron noise would increase the day-night average noise levels less than one decibel, which is not considered a significant impact. Therefore, no further mitigation is necessary.

Amplified Music

Many wedding events hire DJs to play music through an amplified system. During dancing, average noise levels are typically the loudest averaging 90 dBA to 100 dBA depending on the system and number of guests. For the purposes of this study, 90 dBA at 3 feet over one hour is the reference noise level. The table below lists the projected maximum noise levels from amplified music at the nearby residences:

Address	Distance	Noise Level (dBA)
2234 Fickle Hill	400 feet	48
2236 Fickle Hill	700 feet	43
2066 Fickle Hill	900 feet	40
2198 Fickle Hill	600 feet	44
2164 Fickle Hill	700 feet	43
2142 Fickle Hill	700 feet	43
33 Inga	900 feet	40

Mitigation:

Amplified music noise levels comply with Standard N-S7, 65 dB/60 dB day/night maximum noise levels at residences. Music noise could increase the day-night average noise levels by two decibels, which is not considered a significant impact.

Compliance with this standard does not preclude ownership from receiving complaints. Background noise levels may decrease significantly during the nighttime hours. Music will almost certainly be audible at all residences selected for this study. To further reduce amplified music noise levels, consider the following measures:

- Locate the speakers so that they are closer to the ground and face away from neighboring properties. Angle speakers so that the audio dispersion faces the wedding guests.
- Use multiple speakers dispersed throughout the dance floor. Larger speaker arrays allow music levels to be played at lower volumes while still providing energetic noise levels for wedding guests.

APPENDIX A

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL NOISE

This section provides background information to aid in understanding the technical aspects of this report.

Three dimensions of environmental noise are important in determining subjective response. These are:

a) The intensity or level of the sound;
b) The frequency spectrum of the sound;
c) The time-varying character of the sound.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

The "frequency" of a sound refers to the number of complete pressure fluctuations per second in the sound. The unit of measurement is the cycle per second (cps) or hertz (Hz). Most of the sounds which we hear in the environment do not consist of a single frequency, but of a broad band of frequencies, differing in level. The name of the frequency and level content of a sound is its sound spectrum. A sound spectrum for engineering purposes is typically described in terms of octave bands which separate the audible frequency range (for human beings, from about 20 to 20,000 Hz) into ten segments.

Many rating methods have been devised to permit comparisons of sounds having quite different spectra. Surprisingly, the simplest method correlates with human response practically as well as the more complex methods. This method consists of evaluating all of the frequencies of a sound in accordance with a weighting that progressively de-emphasizes the importance of frequency components below 1000 Hz and above 5000 Hz. This frequency weighting reflects the fact that human hearing is less sensitive at low frequencies and at extreme high frequencies relative to the mid-range.

The weighting system described above is called "A"-weighting, and the level so measured is called the "A-weighted sound level" or "A-weighted noise level." The unit of A-weighted sound level is sometimes abbreviated "dBA." In practice, the sound level is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting characteristic. All U.S. and international standard sound level meters include
such a filter. Typical sound levels found in the environment and in industry are shown in Figure A-

1.

Although a single sound level value may adequately describe environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise is a conglomeration of distant noise sources which results in a relatively steady background noise having no identifiable source. These distant sources may include traffic, wind in trees, industrial activities, etc. and are relatively constant from moment to moment. As natural forces change or as human activity follows its daily cycle, the sound level may vary slowly from hour to hour. Superimposed on this slowly varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities such as single vehicle passbys, aircraft flyovers, etc. which cause the environmental noise level to vary from instant to instant.

To describe the time-varying character of environmental noise, statistical noise descriptors were developed. "L10" is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L10 is considered a good measure of the maximum sound levels caused by discrete noise events. "L50" is the A-weighted sound level that is equaled or exceeded 50 percent of a stated time period; it represents the median sound level. The "L90" is the A-weighted sound level equaled or exceeded during 90 percent of a stated time period and is used to describe the background noise.

As it is often cumbersome to quantify the noise environment with a set of statistical descriptors, a single number called the average sound level or "Leq" is now widely used. The term "Leq" originated from the concept of a so-called equivalent sound level which contains the same acoustical energy as a varying sound level during the same time period. In simple but accurate technical language, the Leq is the average A-weighted sound level in a stated time period. The Leq is particularly useful in describing the subjective change in an environment where the source of noise remains the same but there is change in the level of activity. Widening roads and/or increasing traffic are examples of this kind of situation.

In determining the daily measure of environmental noise, it is important to account for the different response of people to daytime and nighttime noise. During the nighttime, exterior background noise levels are generally lower than in the daytime; however, most household noise also decreases at night, thus exterior noise intrusions again become noticeable. Further, most people trying to sleep at night are more sensitive to noise. To account for human sensitivity to nighttime noise levels, a special descriptor was developed. The descriptor is called the Ldn (Day/Night Average Sound Level) which represents the 24-hour average sound level with a penalty for noise occurring at night. The Ldn computation divides the 24-hour day into two periods: daytime (7:00 am to 10:00 pm); and nighttime (10:00 pm to 7:00 am). The nighttime sound levels are assigned a 10 dB penalty prior to averaging with daytime hourly sound levels.

For highway noise environments, the average noise level during the peak hour traffic volume is approximately equal to the Ldn.

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

a) Subjective effects of annoyance, nuisance, dissatisfaction;
b) Interference with activities such as speech, sleep, and learning;
c) Physiological effects such as startle, hearing loss.

The sound levels associated with environmental noise usually produce effects only in the first two categories. Unfortunately, there has never been a completely predictable measure for the subjective effects of noise nor of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over time.

Thus, an important factor in assessing a person's subjective reaction is to compare the new noise environment to the existing noise environment. In general, the more a new noise exceeds the existing, the less acceptable the new noise will be judged.

With regard to increases in noise level, knowledge of the following relationships will be helpful in understanding the quantitative sections of this report:

a) Except in carefully controlled laboratory experiments, a change of only 1 dB in sound level cannot be perceived.

b) Outside of the laboratory, a 3 dB change is considered a just-noticeable difference.

c) A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

d) A 10 dB change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse community response.

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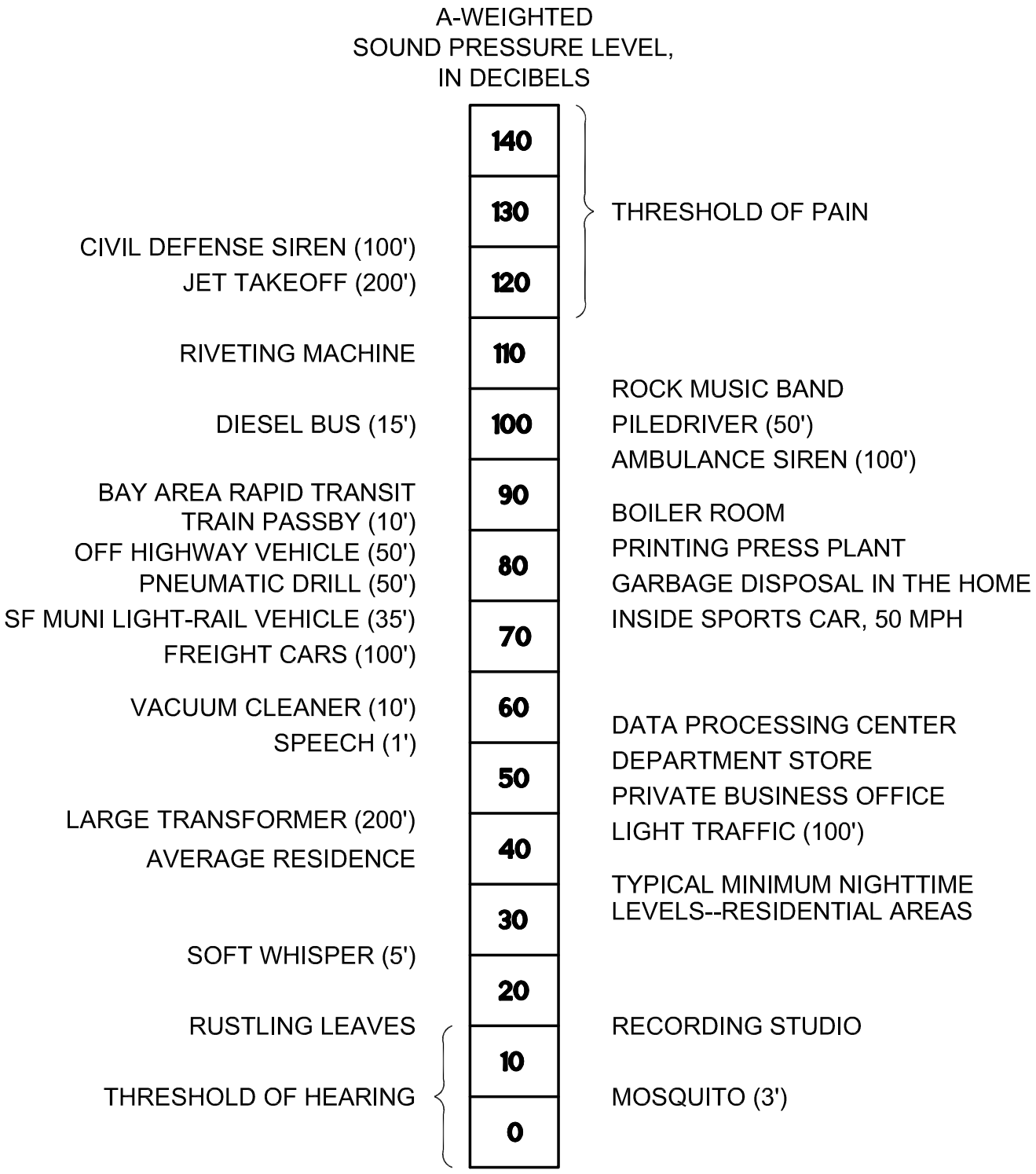

(100') = DISTANCE IN FEET BETWEEN SOURCE AND LISTENER

TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

FIGURE A1

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