

APPENDIX F
NOISE ASSESSMENT – SOFTBALL FIELDS

Arcadia Park Softball Fields

San Jose, CA

Draft Environmental Noise Impact Assessment

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Prepared for:

Denise Duffy & Associates, Inc.

Leianne Humble
947 Case Street, Suite 5
Monterey, CA 93940
Email: lhumble@ddaplanning.com

Prepared by:

Charles M. Salter Associates, Inc.

Greg R. Enenstein
Joshua M. Roper, PE, LEED AP
100 W. San Fernando, Suite 430
San Jose, CA 95113
Email: josh.roper@cmsalter.com

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INTRODUCTION

This report summarizes our environmental noise impact assessment for the Arcadia Park Softball Fields located southwest of the intersection of Quimby Road and Capitol Expressway in San Jose, California. The 18-acre field complex will include four softball fields with a central public address system, a restroom and concession building, and two parking lots. It is part of a larger 81-acre parcel with prior planning approval for a mix of retail commercial use, residential, and a sports complex.¹ For readers less familiar with the fundamental concepts with acoustics, please refer to Appendix A, attached.

Following is a summary of our findings:

1. Environmental noise at the site falls into the City's *normally* and *conditionally acceptable* categories for land use compatibility with parks.
2. Estimated noise levels from softball activities are DNL 46 to 52 at the nearest planned residences. This is consistent with the City's DNL 55 dB criterion, and does not significantly increase environmental noise at the residences.
3. Stationary noise sources, including the public address system and mechanical equipment, must be selected and designed to meet the Municipal Code limit of 55 dB at adjacent residences.
4. Traffic noise associated with the project is estimated to increase environmental noise by less than 1 dB, which is considered less than significant.

PROJECT DESCRIPTION

The proposed field complex, south of Quimby Road, will contain four softball fields as shown on Figure 1, attached. Following is a summary of anticipated operational characteristics:

- Parking lots, with a combined total of 244 parking spaces, will be located north and east of the fields. The northern lot will be accessed via Quimby Road, and the eastern lot will be access the site via a new roadway as part of the larger parcel. This new roadway will extend from Quimby Road to Capitol Expressway.
- Existing residences are located to the west of the larger parcel, and future residences are planned for a separate site between the field complex site and existing residences (see Figure 1).
- The project will include a concession building between the four fields, and spectator seating along the sides of the fields.
- Fields will primarily be used for evening (5:30 PM to 10:00 PM) and weekend (8:00 AM to 10:00 PM) softball games. A secondary use will be afternoon Little League practices and games (4:00 PM to 5:30 PM).
- Schedules will accommodate up to three weeknight games, and nine weekend games, per field per day.
- Average attendance for softball games is 24 to 30 players with 10 to 15 spectators per field.
- Average attendance for little league practices and games is 15 to 20 players and coaches on each field.
- A central public address system will be used to make announcements to all fields. However, this system will not be used for game commentary.

¹ Evergreen East Hills Vision Strategy Project DEIR, dated February 2006. For reference, the noise assessment prepared for the DEIR, dated September 2005, indicates the four fields and public address system will have no adverse effect on residences off-site, but potential intra-project impacts.

ACOUSTICAL CRITERIA

Acoustical criteria are included in the Envision San Jose 2040 General Plan and the San Jose Municipal Code, which are summarized as follows:

- Policy EC-1.1 provides land use compatibility guidelines for environmental noise, based on exterior noise levels. It identifies Day/Night Average Sound Levels² (DNL) of up to 65 dB³ as *normally acceptable*, and DNL 65 to 80 dB as *conditionally acceptable*, for parks. For reference, the *normally acceptable* level for residences is DNL 60 dB or lower.
- Policy EC-1.2 of the General Plan considers noise impacts to be significant if a project would increase noise levels on adjacent sensitive land uses, including residences, as follows:
 - Cause the DNL at noise sensitive receptors to increase by five dB or more where the noise levels would remain *normally acceptable*; or
 - Cause the DNL at noise sensitive receptors to increase by three dB or more where noise levels would equal or exceed the *normally acceptable* level.
- Policy EC-1.3 of the General Plan limits noise generation of new nonresidential land uses to DNL 55 dB at adjacent residential properties.
- Policy EC-1.6 of the General Plan limits operational noise to the noise standards in the City's Municipal Code. Section 20.40.700 of the San Jose Municipal Code limits noise to 55 dB at residential properties.

NOISE ENVIRONMENT

On-Site Environmental Noise

The Evergreen Visioning Project EIR Noise Report, dated 9 September 2005, identifies noise levels along Quimby Road and at the terminus of Brahms Avenue. In summary, the identified noise level along Quimby Road is DNL 67 dB at a distance of 100 feet from the roadway centerline. At the terminus of Brahms Avenue, near the southern end of the site, the noise level is DNL 57 dB.

Softball Activity Noise

Noise from softball activity will include the bat hitting the ball, players communicating, and spectator or crowd noise. To quantify noise from these types of activities, noise levels were measured during softball games at the Twin Creeks Sports Complex in Sunnyvale on 19 September 2014. This site was chosen due to its similar field layout and usage to the proposed fields. Measurements were taken between approximately 7:00 and 9:00 PM with a Rion NL-22 Class 2 sound level meter. The meter was located between two outfields, approximately 300 feet from the home plate of the nearest field. The location is similar to the outfield between Fields 1 and 2 in Figure 1, attached. During the measurement period, two back-to-back softball games were played on each of the nearest two fields, with additional games on one

² Day-Night Average Sound Level (DNL) – A descriptor established by the U.S. Environmental Protection Agency to describe the average day-night level with a penalty applied to noise occurring during the nighttime hours (10 pm - 7 am) to account for the increased sensitivity of people during sleeping hours.

³ A-Weighted sound pressure level (dB) represents the noisiness or loudness of a sound by weighting the amplitudes of various acoustical frequencies to correspond more closely with human hearing. A 10-dB (decibel) increase in noise level is perceived to be a doubling of loudness. A-Weighting is specified by the U.S. EPA, OSHA, Caltrans, and others for use in noise measurements.

of the two fields directly behind these. Each of these games had approximately 20 players and about 6 to 10 spectators.

The average sound level (L_{eq})⁴ during the measurement period was L_{eq} 51 dB. For reference, the loudest noise level measured, during energetic play, was 71 dB. With the exception of this play, nearly all observed sources fell within the range of typical noise levels shown in Table 1 below.

Table 1: Measured Typical Noise Levels from Softball Activities

| Source | Typical Noise Level |
|---------------------|---------------------|
| Bat hitting ball | 48 – 60 dB |
| Players | 45 – 65 dB |
| Spectators Cheering | 50 – 64 dB |

Noise from Project Generated Traffic

Hexagon Transportation Consultants prepared a memo, dated 2 September 2014, summarizing peak hour traffic volumes for vehicles associated with the softball fields. These volumes, as well as overall traffic volumes, are summarized for three roadways in the project vicinity as follows:

- Quimby Road – The project will add 71 peak-hour trips to the existing 2,346
- Capitol Expressway – The project will add 47 peak-hour trips to the existing 5,719
- Future roadway between the fields and planned residences to the east – The project will add 35 peak-hour trips to the estimate of 797

In summary, project-generated trips will increase peak-hour volumes along local roadways by 4-percent or less. This corresponds with an increase in environmental noise of 1 dB or less.

ANALYSIS AND FINDINGS

The site, as well as noise associated with the project are compared with the noise criterion in the San Jose General Plan and Municipal Code as follow.

Land Use Compatibility

As indicated above, the noise environment at the project site ranges between approximately DNL 57 to 67 dB, depending on the distance to Quimby Road. This falls into the City's *normally* and *conditionally acceptable* land use categories for environmental noise. For reference, the portions of the site where transportation noise will exceed DNL 65 dB are the northern parking lot and outfields of Fields 1 and 3.

⁴ L_{eq} --The equivalent steady-state A-weighted sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period.

Softball Activity Noise

As indicated above, the reference noise level measured at the Sunnyvale fields was L_{eq} 51 dB with three games played concurrently. Adjusting this reference level for the additional players and spectators identified in the Project Description section above, as well as distance, results in average estimated noise levels of approximately L_{eq} 50 to 52 dB during softball games, and L_{eq} 45 to 48 dB during Little League play, at the nearest planned residences. Corresponding DNL is 46 to 52 dB at the residences, which will increase existing levels by 1 dB or less. This is consistent with the City's DNL 55 dB criterion, and the increase is not considered significant.

Complying with the City's noise goals does not imply that softball activity will be inaudible at the nearest adjacent residences. Table 2, below, summarizes typical estimated noise levels from individual noise sources, at the nearest planned residences.

Table 2: Estimated Typical Noise Levels from Softball Activities

| Source | Typical Noise Level |
|---------------------|---------------------|
| Bat hitting ball | 45 – 57 dB |
| Players | 46 – 68 dB |
| Spectators cheering | 50 – 65 dB |

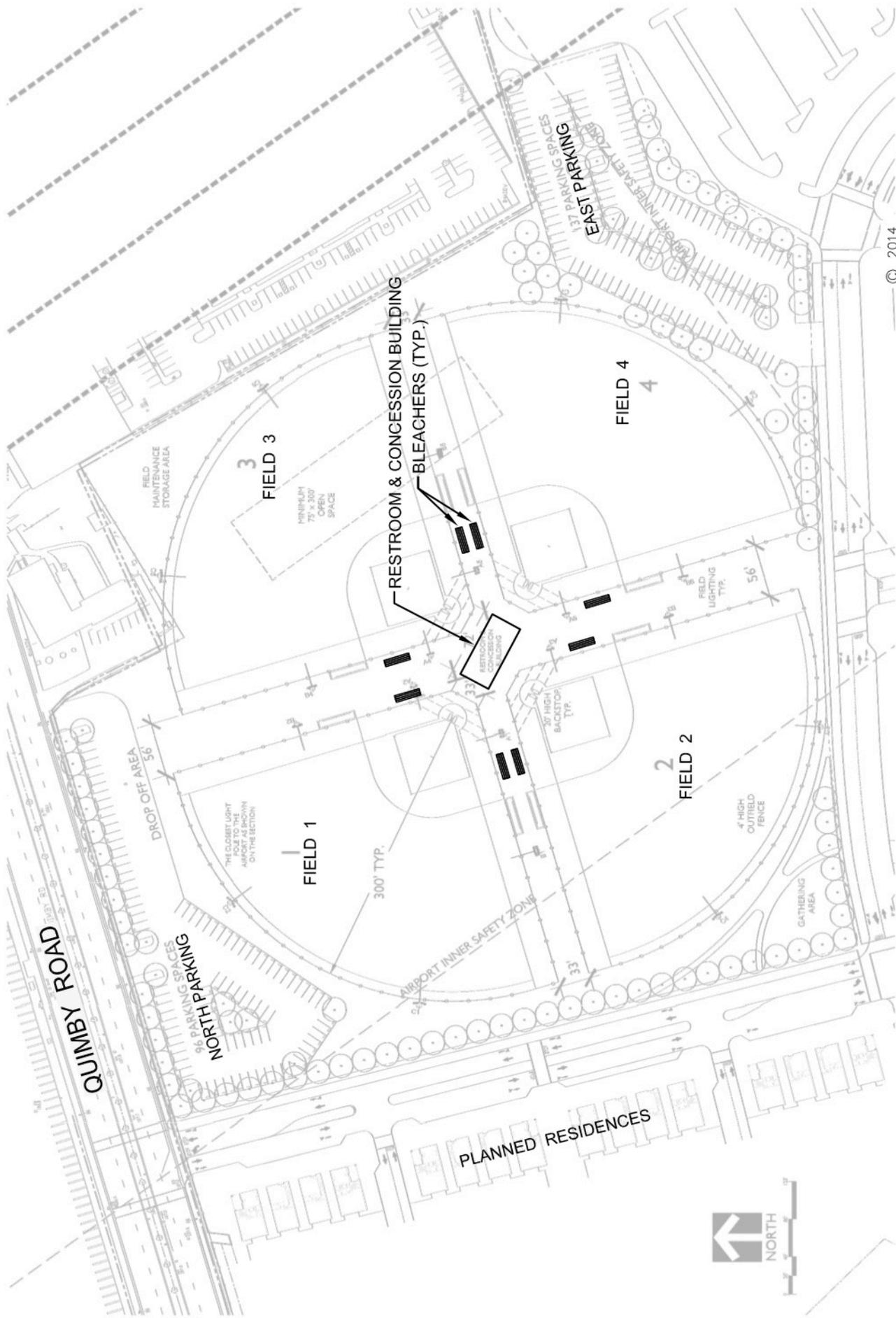
Stationary Noise Sources

Stationary noise sources are subject to the San Jose Municipal Code limit of 55 dB at adjacent residences. This may include noise from the planned public address system, and rooftop mechanical equipment. Detailed information for these systems is not available at this time. The design should include equipment selection, location, and if necessary, mitigation measures, to reduce radiated noise to the 55 dB criterion.

Traffic Noise Associated with the Project

As indicated in the Noise from Project Generated Traffic section above, project-generated traffic will increase the noise environment (DNL) by 1 dB or less in the project vicinity. This is considered a less than significant impact.

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**ARCADIA SOFTBALL FIELDS:
 RESIDENCES ADJACENT TO SOFTBALL FIELDS**

FIGURE 1

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GE/PNS
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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; and
- 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." All sound levels in this report are A-weighted. 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.

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. " L_{10} " is the A-weighted sound level equaled or exceeded during 10 percent of a stated time period. The L_{10} is considered a good measure of the maximum sound levels caused by discrete noise events. " L_{50} " 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 " L_{90} " 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 " L_{eq} " is now widely used. The term L_{eq} 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 L_{eq} is the average A-weighted sound level in a stated time period. The L_{eq} 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 DNL (Day/Night Average Sound Level), which represents the 24-hour average sound level with a penalty for noise occurring at night. The DNL 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 DNL.

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

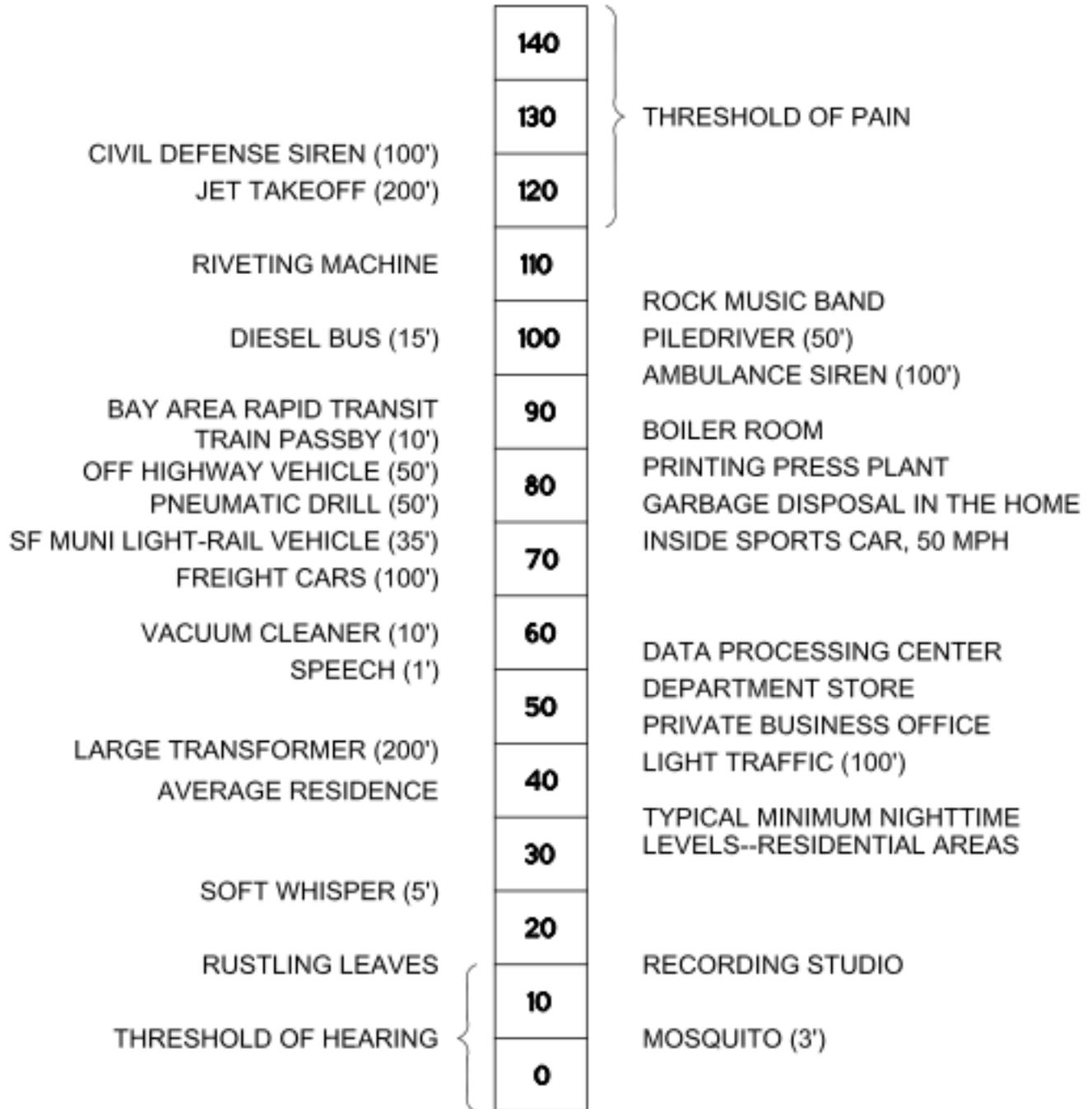
- a) Subjective effects of annoyance, nuisance, dissatisfaction;
- b) Interference with activities such as speech, sleep, and learning; and
- c) Physiological effects such as startle, hearing loss.

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.

A-WEIGHTED
SOUND PRESSURE LEVEL,
IN DECIBELS



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

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TYPICAL SOUND LEVELS
MEASURED IN THE
ENVIRONMENT AND INDUSTRY

FIGURE 2

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