320 Sheridan Drive

Menlo Park, CA

UPDATED CEQA NOISE STUDY

6 November 2024

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Salter Project 24-0069

INTRODUCTION

This report summarizes our CEQA noise study for the 320 Sheridan Drive residential project (the "Project") located at 320 Sheridan Drive in Menlo Park, California. Our analysis is based on the Planning Submittal drawing set dated 26 February 2024, the draft traffic memo dated 8 March 2024 with supporting information, and construction information provided by the design team. In summary, the project would not result in a significant impact with respect to noise, based on the California Environmental Quality Act ("CEQA") checklist, and the Class 32 CEQA Exemption might apply.

The Project proposes to construct three 3-story apartment buildings, a community center with a laundry room, fitness center, computer area and office, and outdoor use spaces provided via a BBQ area and Tot Lot in the southern portion of the approximately 2.52-acre site. The Project will include a total of 88 dwelling units. In addition to this report, we also prepared an Environmental Noise Assessment for the Project, the results of which are summarized in a separate draft report dated 9 May 2024. Readers less familiar with the fundamental concepts of environmental noise, please refer to Appendix A attached.

ACOUSTICAL CRITERIA

Menlo Park General Plan

The Noise Goals, Policies, and Programs section of the Menlo Park General Plan includes the following policies which pertain to noise:

- Policy N1.4: Protect existing residential neighborhoods and noise sensitive uses from unacceptable noise levels and vibration impacts. Noise sensitive uses include, but are not limited to, hospitals, schools, religious facilities, convalescent homes and businesses with highly sensitive equipment. Discourage having noise-sensitive uses in areas in excess of 65 dB DNL without appropriate mitigation and locate noise sensitive uses away from noise sources unless mitigation measures are included in development plans.
- Policy N1.5: Design residential developments to minimize the transportation-related noise impacts to adjacent residential areas and encourage new development to be site planned and architecturally designed to minimize noise impacts on noise sensitive spaces. Proper site planning can be effective in reducing noise impacts.
- Policy N1.6: Encourage the use of construction methods, state-of-the-art noise abating materials and technology and creative site design including, but not limited to, open space, earthen berms, parking, accessory buildings, and landscaping to buffer new and existing development from noise and to reduce potential conflicts between ambient noise levels and noise-sensitive land uses. Use sound walls only when other methods are not practical or when recommended by an acoustical expert.
- Policy N1.8: Preclude the generation of annoying or harmful noise on stationary noise sources, such as construction and property maintenance activity and mechanical equipment.

- Policy N-1.10: Nuisance Noise. Minimize impacts from noise levels that exceed community sound levels through enforcement of the City's Noise Ordinance. Control unnecessary, excessive, and annoying noises within the City where not preempted by Federal and State control through implementation and updating of the Noise Ordinance.
- Policy N-1.D: Minimize Construction Activity Noise. Minimize the exposure of nearby properties to excessive noise levels from construction-related activity through CEQA [California Environmental Quality Act] review, conditions of approval and enforcement of the City's Noise Ordinance.

Menlo Park Municipal Code

Section 8.06 of the Menlo Park Municipal Code states the following:

- Section 8.06.030 sets maximum noise levels for all sources of sound measured from any residential property to any receiving residential property to a maximum of 60 dB during the daytime hours between 7:00 a.m. to 10:00 p.m., and to 50 dB during the nighttime hours between 10:00 p.m. and 7:00 a.m.
- Section 8.06.040 includes exceptions for construction activities (a) and powered equipment (b), summarized as follows:

  (a) Construction Activities

  – Construction activities are exempt from the noise ordinance between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday.

  – A sign, containing the permitted hours of construciton activities exceeding the noise limits set forth in Section 8.06.030, shall be posted at all entrances to a construction site upon the commencement of construction, for the purpose of informing contractors and subcontractors and all other persons at the construction site of the basic requirements of this chapter. The sign shall be at least five (5) feet above ground level and shall consist of a white background with black letters.

  – Notwithstanding any other provision set forth above, all powered equipment shall comply with the limits set forth in Section 8.06.040 (b).

  (b) Powered Equipment

  – Powered equipment used on a temporary, occasional or infrequent basis operated between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday. No piece of equipment shall generate noise in excess of eighty-five (85) dB at fifty (50) feet.

Section 16.08.095 of the Menlo Park Municipal Code states the following which applies to roof-mounted mechanical equipment:

- Mechanical equipment, such as air conditioning equipment, ventilation fans, vents, ducting, or similar equipment, may be placed on the roof of a building; provided, that such equipment shall be screened from view as observed at an eye level horizontal to the top of the roof-mounted equipment, except for the SP-ECR/D district which has unique screening requirements, and all sounds emitted by such equipment shall not exceed fifty (50) decibels at a distance of fifty (50) feet from such equipment.

California Environmental Quality Act (CEQA)

The CEQA Guidelines contain a checklist intended to determine whether the project would result in a significant noise impact. The checklist items ask whether a project would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies
- Generate excessive ground-borne vibration or ground-borne noise levels
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels

NOISE ENVIRONMENT

The Project site is located in Menlo Park and is bordered by Highway 101 to the north, with an existing Concrete Masonry Wall (CMU) sound wall separating the site from the highway, existing 1 and 2-story single-family residences to the east, existing 1-story multi-family residences to the west, and a public park to the south. The noise environment is predominantly controlled by vehicular traffic on Highway 101.

To quantify the existing noise environment, we conducted three multi-day measurements between 26 and 28 February 2024. In addition, we conducted 15-minute ‘spot’ measurements at two additional locations and compared the data with corresponding time periods of the multi-day monitors to help determine how noise levels vary with location and elevation. Table 1, below, summarizes the measured noise levels and Figure 1, attached, shows the approximate measurement locations.

Table 1: Existing Noise Environment

Monitor[1]	Location	Date/Time	DNL
LT-1	Flood Park monitor Approx. 5' from south property line	26 to 28 February 2024	70 dB
LT-2	Southwest property line monitor Approx. 20' from west property line		68 dB
LT-3	Highway 101 monitor Approx. 150' from roadway centerline		73 dB
ST-1[2]	Building 1 setback spot Approx. 120' from Hwy 101 centerline First floor/Second & Third Stories	28 February 14:35 – 14:50	69 dB / 85 dB
ST-2	Buildings 2 & 3 setback spot Approx. 260' from Hwy 101 centerline First floor/Second & Third Stories	28 February 15:05 – 15:20	69 dB / 73 dB

We also measured $L_{eq}(h)$ levels, and these were typically 2 dB quieter than the measured DNL levels at each monitor.

Analysis of Potential Noise Impacts for purposes of CEQA

Overall changes to the noise environment, attributable to the Project, include the following:

- Project-related traffic increases (permanent)
- Potential rooftop mechanical equipment noise (permanent)
- Short-term construction noise (temporary)

The following summarizes the portion of the CEQA checklist pertaining to noise. As noted previously, this analysis is part of a study being prepared for purposes of determining whether the Project qualifies for the Class 32 CEQA Exemption. As indicated below, the Project would not result in significant effects relating to noise.

CEQA itself does not define what noise level increase would be considered significant. Typically, a project is considered to have a significant impact if it would increase DNL by more than 3 dB (the minimum increase generally perceptible to most people) and cause ambient noise levels to exceed the normally acceptable guidelines in the General Plan. Where existing levels are well below the General Plan guidelines, a somewhat higher increase (i.e., 5 dB) may be tolerated before the impact is considered significant. For the purpose of this analysis, an increase exceeding 3 dB is considered significant for

[1] Multi-day monitors were at approximate heights of 10 to 12 feet above grade. Short term monitors were at approximate heights of 5 feet above grade for ST-1 and ST-4, 16 feet for ST-2 and ST-5 and 26 feet for ST-3 and ST-6. The monitoring locations were selected to document noise levels at the site as part of the environmental noise assessment. They also serve to quantify noise levels in the project area.

[2] Data for the short-term monitors was calculated using the offset from the Highway 101 multi-day monitor LT-3.

permanent noise sources, and existing noise levels at the nearest residences along Hedge Road and Van Buren Road are assumed to be similar to those measured at the site.

Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

This analysis compares noise from the following long and short-term generators with the CEQA Guidelines: potential permanent noise from project-generated traffic and rooftop mechanical equipment, and temporary noise from construction activities.[3]

Project Generated Traffic

Fehr & Peers prepared a Transportation Analysis for the project, summarized in a memo dated 8 March 2024. Supporting information they provided includes peak hour traffic volume data for the intersections of Sheridan Drive and Hedge Road, Hedge road and Greenwood Drive, and Greenwood Drive and Bay Road. The volumes are provided for existing and future conditions exclusive of the Project, as well as project-generated data.[4] The data shows that Project generated traffic is expected to enter and exit the site via a path along Hedge Road, Greenwood Drive, and Bay Road. Following is a summary of the associated noise levels:

- Sheridan Drive and Hedge Road – The Project will increase peak-hour traffic volumes along these roadways by 100-percent or more. However, when combined with the influence of traffic noise from US-101, which was measured to be approximately DNL 69 dB at the setback of the intersection, the project generated increase in DNL is less than 1 dB.
- Hedge Road and Greenwood Drive – The Project will increase peak-hour traffic volumes along these roadways by 22 to 80-percent or more, which corresponds with a 1 to 3 dB increase in DNL due to the project.
- Greenwood Drive and Bay Road – The Project will increase peak-hour traffic volumes along these roadways be 2 to 26-percent, which corresponds with a 0 to 1 dB increase in DNL due to the project.

As indicated above, the estimated increases in traffic noise due to the project are DNL 0 to 3 dB, which is considered less than significant. Therefore, mitigation measures are not required.

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[3] This report cites a portion of AB 1307, which states the following: "This bill would specify that the effects of noise generated by project occupants and their guests on human beings is not a significant effect on the environment for residential projects for purposes of CEQA."

[4] Project generated traffic volumes have been reduced by 25-percent in our analysis based on our understanding of the Transportation Demand Management Policy Implementation Guide (TDM) document dated April 2022, which calls for the project to meet this reduction.

Operational Stationary Noise

The Project will locate outdoor air condensing units on the building rooftops. While conceptual locations are identified on roof plans, specific equipment will be selected and located during the design phase. Equipment shall be selected and located to meet the Municipal Code criteria, which identifies 50 dB as the maximum noise level allowable at the nearest property line. If needed to meet this criterion, noise reduction measures are expected to consist of equipment selection, shielding from barriers and/or parapet walls, equipment enclosures, etc.

Assuming a worst-case scenario where all rooftop air condensing units operate simultaneously 24-hours per day, the corresponding contribution to the noise environment would be DNL 56 dB. Based on the existing noise levels measured at the site, which ranged from approximately DNL 68 to 85 dB, this would increase environmental noise by less than 1-decibel, which is considered less-than-significant.

Construction Noise

Construction of the Project is expected to occur over an approximately 12-month period starting in 2025. Noise levels from construction activities will vary, depending on the type of equipment being used, the process, and the location. The loudest phases of construction are expected to be demolition, grading/excavation, and trenching/foundation. Construction will not include pile driving. Table 2, below, provides a list of construction equipment expected to be used during each phase and Table 3 provides reference sound levels for construction equipment at a distance of 50 feet. Following is an overall breakdown of Project phasing:

- Demolition for approximately a month (starting month one)
- Site preparation (starting month one)
- Grading/Excavation and Trenching/Foundation (starting month two)
- Building – Exteriors (starting month two)
- Building – Interior/Architectural Coating (starting month eleven)
- Paving for approximately a month (during month twelve)

Table 2: Construction Equipment

Phase	Equipment
Demolition	Concrete/Industrial Saws, Excavators, Rubber-Tired Dozers, Tractors/Loaders/Backhoes
Site Preparation	Graders, Rubber-Tired Dozers, Tractors/Loaders/Backhoes
Grading/Excavation	Excavators, Graders, Rubber-Tired Dozers, Concrete/Industrial Saws, Tractors/Loaders/Backhoes
Trenching/Foundation	Tractors/Loaders/Backhoes, Excavators
Building – Exterior	Cranes, Forklifts, Generator Sets, Tractors/Loaders/Backhoes, Welders
Building – Interior/Architectural Coating	Air Compressors, Aerial Lift
Paving	Cement and Mortar Mixes, Pavers, Paving Equipment, Rollers, Tractors/Loaders/Backhoes

Table 3: Typical Construction Equipment Noise Levels[5]

Construction Equipment	Typical Noise Level (dB) at 50 feet
Air Compressor	80 dB
Backhoe	80 dB
Bulldozer	85 dB
Cement and Mortar Mixers	85 dB
Compressor (air)	81 dB
Concrete/Industrial Saw	76 dB
Concrete Mixer	85 dB
Concrete Trucks	85 dB
Excavator	81 dB
Generator	82 dB
Grader	85 dB
Loader	80 dB
Plaster Pump	82 dB
Pneumatic Tool	85 dB
Pump	77 dB
Rebar Saw	76 dB
Roller	85 dB
Scraper	85 dB
Truck (traveling)	84 dB

The nearest adjacent residences are located to the east and west of the site, approximately 40 to 65 feet from the closest planned Project buildings. Between the hours of 8:00 am and 6:00 pm, Monday through Friday, construction noise will be limited to 85 dB at 50 feet (the reference equipment noise levels listed

[5] Based on the Federal Highway Administration document "FHWA Highway Construction Noise Handbook" Tables 7.3 and 9.9, Federal Transit Administration document "Transit Noise and Vibration Impact Assessment" Table 12-1, US EPA document, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances" (1971), and data from other Salter construction noise monitoring projects. Construction-generated noise typically drops off at a rate of approximately 6 dB for each doubling of distance, and construction noise will be lower during quieter phases.

in Table 3 meet this criterion), and signs will be posted at all entrances to the site, per the Municipal Code.[6] During other times, construction activity noise must be limited to 60 dB between 7:00 am and 10:00 pm, and 60 dB between 10:00 pm and 7:00 am. Since construction of the project will comply with the noise goals outlined I the General Plan and Municipal Code, the potential impact of construction noise is less than significant.

The Project, which is located on a Housing Element site, also must comply with the City's standard conditions of approval and measures for projects on such sites, which include the following noise reduction measures[7]:

- Construction activities will generally be limited to between 8:00 am and 6:00 pm Monday through Friday.
  - Noise from individual pieces of equipment shall not exceed 85 dB at 50 feet.
  - Any construction activities taking place outside these hours shall comply with the general Municipal Code criteria of Leq 60 dB between the hours of 7:00 am and 8:00 am, and 50 dB between the hours of 6:00 am and 7:00 am. Combined construction noise shall be limited to 10 dB above the ambient for any hour, as measured at nearby sensitive receivers (i.e., the adjacent residences). This will be evaluated by the developer or contactor on a case-by-case basis when the need for specific construction activities outside standard construction hours is needed.
- A note shall be included in development plans indicating the developer or contractor will be responsible for ensuring that construction activities are consistent with these noise reduction measures. If needed, the Project may consider alternative means and methods, construction equipment, and/or temporary barriers to help reduce noise transfer.
- All internal combustion engines on construction equipment and trucks shall be fitted with properly maintained mufflers, air intake silencers, and/or engine shrouds that are no less effective than as originally equipped by the manufacturer.
- Locate stationary noise-generating equipment, such as air compressors or portable power generators, as far as possible from sensitive receptors as feasible.
- Construction staging areas, including truck loading and unloading operations, shall be scheduled and located so they minimize the noise impact on adjacent off-site residences.
- Unnecessary idling of internal combustion engines should be strictly prohibited. We understand the Project must also comply with the air districts rules regarding construction emissions, which limits idling times of diesel equipment to 5 minutes or less.
- Limit the use of public address systems.

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6 The signs will containing the permitted hours of construction activities exceeding the noise limits set forth in Section 8.06.030, will be posted at all entrances to the site, shall be at least five (5) feet above ground level, and shall consist of a white background with black letters.

7 See the Mitigation Monitoring and Reporting Program for the Housing Element Update, adopted on January 23, 2024.

- Construction traffic shall be limited to the haul routes established by the City of Menlo Park.

Would the project result in generation of excessive ground-borne vibration or ground-borne noise levels?

The Project is not expected to include any significant sources of ground-borne vibration or ground-borne noise. However, temporary construction activities may generate temporary ground-borne vibration. Construction of the project will include demolition of existing foundations and/or concrete slabs, site preparation and utilities, new building foundations, framing, and finishing, and is expected to use the equipment included in Table 3 above (the project is not expected to include pile driving or blasting). Published vibration levels for common construction equipment at a reference distance of 25 feet are summarized in Table 4 below.[8]

Table 4: Measured Noise Levels

Equipment	Reference PPV (in/sec) at 25'	Corresponding PPV (in/sec) at 12'
Jackhammer	0.035	0.105
Large Bulldozer	0.089	n/a
Loaded Truck	0.076	n/a
Small Bulldozer	0.003	0.009
Vibratory Roller	0.210	n/a

The nearest adjacent residences are single-family homes along Sheridan Drive which are approximately 12-feet and farther from an existing concrete slab and 25-feet and farther from planned buildings and hardscape (sidewalks and roadways), on the project site. The houses appear to be of normal conventional construction, and we are not aware of specific vibration-sensitive uses or sensitivity of these buildings.

Estimated vibration levels for the construction equipment included in Table 4 are below the 0.25 in/sec PPV level identified in the Housing Element Update EIR[9], as potentially damaging for historic and older buildings. Therefore, construction of the project would result in a less than significant vibration impact.

[8] Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018, Table 7-4: Vibration Source Levels for Construction Equipment. Vibration levels for building damage are provided in Table 7-5: Construction Vibration Damage Criteria. Construction vibration levels may vary, depending on factors such as soil conditions, construction methods, equipment location, etc., and may be perceptible on adjacent sites.

[9] City of Menlo Park Housing Element Update Draft Subsequent Environmental Impact Report (Housing Element Update EIR), November 2022.

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The Project site is located over two miles from the Palo Alto and San Carlos airports, San Francisco International, Oakland International and San Jose Mineta International airports, Moffett Federal Airfield, and does not fall within the airport land use planning areas, runway protection zones, or the 55 dB CNEL noise contours of any of these airports.

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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:

- The intensity or level of the sound
- The frequency spectrum of the sound
- 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 "dB." 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 below.

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 pass-bys, 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 exceeds 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 DNL.

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

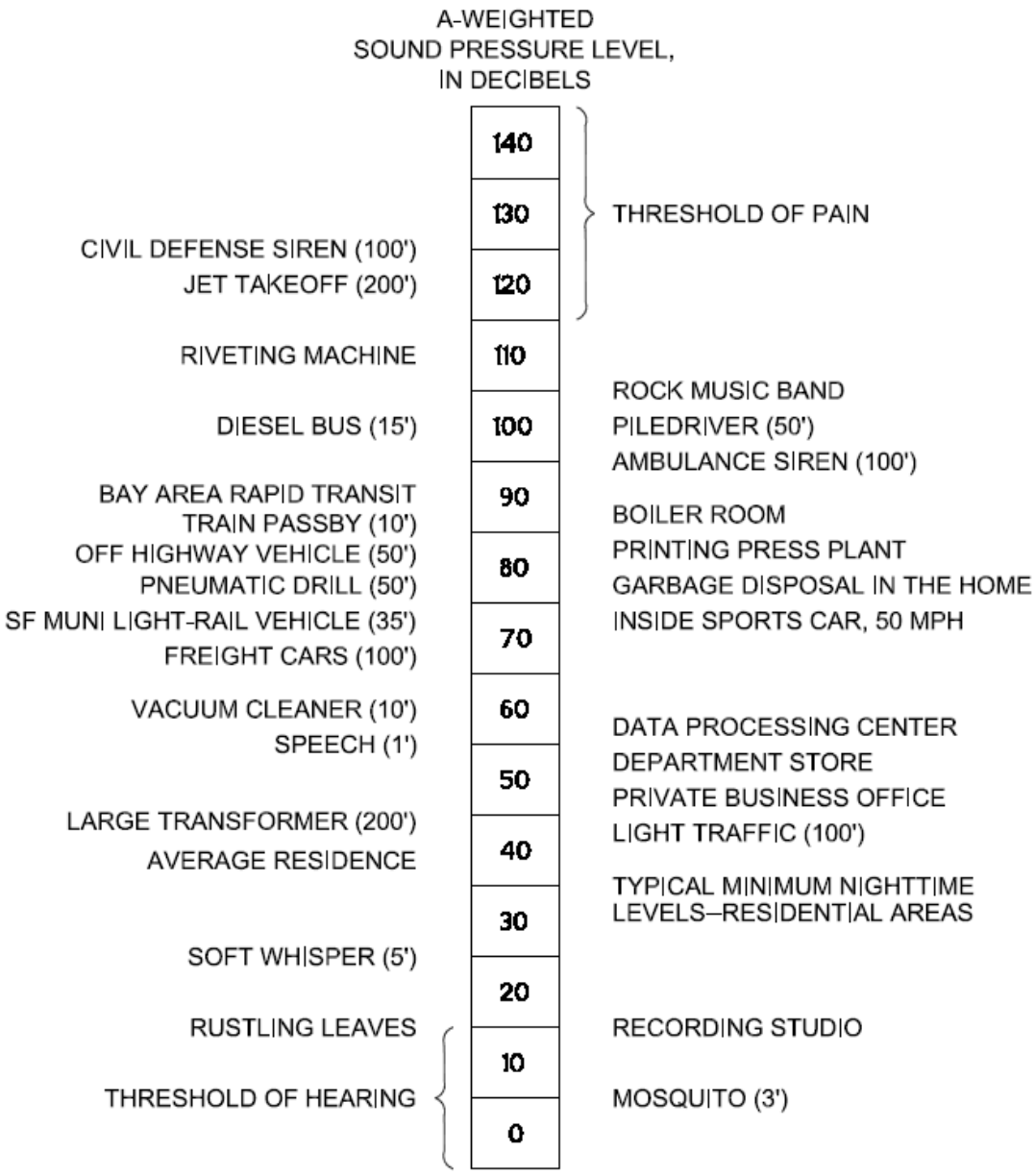
- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startle, hearing loss

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:

Except in carefully controlled laboratory experiments, a change of only 1 dB in sound level cannot be perceived. Outside of the laboratory, a 3 dB change is considered a just-noticeable difference. A change in level of at least 5 dB is required before any noticeable change in community response would be expected. 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
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130
120
110
100
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30
20
10
0
THRESHOLD OF PAIN
CIVIL DEFENSE SIREN (100')
JET TAKEOFF (200')
RIVETING MACHINE
DIESEL BUS (15')
ROCK MUSIC BAND
PILEDRIVER (50')
AMBULANCE SIREN (100')
BAY AREA RAPID TRANSIT
TRAIN PASSBY (10')
OFF HIGHWAY VEHICLE (50')
PNEUMATIC DRILL (50')
BOILER ROOM
PRINTING PRESS PLANT
GARBAGE DISPOSAL IN THE HOME
SF MUNI LIGHT-RAIL VEHICLE (35')
FREIGHT CARS (100')
INSIDE SPORTS CAR, 50 MPH
VACUUM CLEANER (10')
SPEECH (1')
DATA PROCESSING CENTER
DEPARTMENT STORE
PRIVATE BUSINESS OFFICE
LARGE TRANSFORMER (200')
AVERAGE RESIDENCE
LIGHT TRAFFIC (100')
TYPICAL MINIMUM NIGHTTIME
LEVELS–RESIDENTIAL AREAS
SOFT WHISPER (5')
RUSTLING LEAVES
RECORDING STUDIO
THRESHOLD OF HEARING
MOSQUITO (3')
(100') = DISTANCE IN FEET BETWEEN SOURCE AND LISTENER
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TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY
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