MEMORANDUM

DATE: 8 October 2025

NAME:	COMPANY:	EMAIL:
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FROM: Blake Wells, LEED GA and Jeremy Decker, PE

SUBJECT: **Aquino (SPA-20-019-03)**
Extended Construction Hours Noise Analysis

PROJECT: **20-0421**

We understand that the project is requesting extended construction hours to allow for work on Saturdays from 7:00 am to 7:00 pm for the duration of the project. The allowance for extended construction hours is expected to reduce the project timeline by up to three months (90 days).

By adding another day of work each week, this change would reduce the total construction duration. Below is the projected construction schedule with the approval of Saturday work hours:

1. October to December 2025
    a. Underground: Grading, soil off-haul, excavation for footings and stacker pits, trenching and installation of utilities, backfill dirt
    b. Foundation and Slab: Rebar and concrete placement
2. January to June 2026
    a. Podium: Formwork, rebar and concrete placement, material deliveries, formwork disassembly
3. May 2026 to April 2027
    a. Frame and Rough-in: Wood structure framing, MEPF rough-in, material delivery
4. January to July 2027
    a. Interiors: Sheetrock install, wall finish, fixture install, cabinet install, paint, flooring
5. August 2026 to August 2027
    a. Exteriors: Scaffolding, exterior walls, waterproofing, windows, facade, site work, landscaping

Generally, the team plans for Saturday construction activities to be similar to typical weekday activities. Average construction generated noise levels are expected to be 88 dBA or lower at a distance of 50 feet from the source. Construction generated noise levels drop off at a rate of approximately 6 dB per doubling of distance between the source and receptor.

Consistent with the Construction Noise and Vibration Logistics Plan (CNVLP), Saturday construction activities will implement the following noise reduction measures, along with the best management practices outlined in the Conditions of Approval.

1. Hours of Construction
   a. Standard construction activities will be limited to between 7:00 am and 7:00 pm
2. Construction of the project will use the best available and feasible noise control techniques. This will be implemented as follows:
   a. The contractor will coordinate with contractors and sub-contractors to ensure that all heavy earthmoving equipment, impact tools, compressors, engine generators, and diesel fueled trucks use the best available noise control techniques wherever feasible (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds, wherever feasible).
   b. Internal combustion engines will be turned off when not in use to avoid unnecessary idling. The maximum idling time shall be limited to five minutes.
   c. Impact tools used for this project will be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools; however, where use of pneumatic tools is unavoidable an exhaust muffler on the compressed air exhaust will be used.
   d. Where commercially available, impact tools shall use external jackets to reduce noise generation.
   e. Locate stationary equipment at the work area such as a crane, air compressors, pumps, and similar equipment as far to the north and west as possible to maximize the distance to the nearest residential receptors and take advantage of any shielding that may be provided by other on-site equipment.
3. Posting and Notification: The dates of construction activities, and equipment to be used during the noisier phases, will be posted at the job site in a location visible to the public, including to pedestrians, at least seven days prior and no more than three weeks prior to the construction activity. The contractor shall provide photographic evidence to the City that this information has been posted.
4. Noise Disturbance Coordinator: The construction team will include a noise disturbance coordinator who will track and respond to any complaints that arise from this construction activity.
   a. The noise disturbance coordinator will be as follows:

   i. Robert Pacheco: Project Manager
   ii. Telephone: (925) 440-3893
   iii. Email: rpacheco@swenson.com

b. The disturbance coordinator will determine the cause of the complaint and implement reasonable measures to correct the problem as feasible. All complaints will be logged, with at a minimum, the following information:
   i. Date of complaint
   ii. Name, address, phone number of individual(s) complaining
   iii. Reason for the complaint
   iv. Action taken
   v. Resolution notes – Note: The complainants will be notified by phone, email or other means of the corrective measures to address their complaints

c. A telephone number for the disturbance coordinator will be posted at the site and will be included in any construction notices sent to adjacent neighbors. The contractor shall provide photographic evidence to the City that the posting of the contact information for the noise disturbance coordinator is posted to the public at the site.

To further reduce the noise impact during extended construction hours, we recommend the following additional practices during Saturday construction:

- Stage equipment and vehicles as far from residences as possible
- Schedule the noisiest construction activities Monday through Friday, as feasible.
- Do not use pneumatically powered impact tools, as feasible
- Work primarily at the interior, as feasible

With the implementation of these noise reduction techniques, the project is expected to minimize the construction noise impact on the community during the extended construction hours.

*   *   *

This concludes our extended construction hours noise analysis. Please contact us with any questions.

Aquino Residences

San Jose, California

CONSTRUCTION NOISE AND VIBRATION LOGISTICS PLAN

21 February 2025

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Salter Project 20-0421

INTRODUCTION

The purpose of this plan is to outline potential noise and vibration impacts from construction activities for the Aquino Residences project at the southeast corner of West San Carlos Street and Josefa Street (486, 490, and 498 West San Carlos Street and 332 and 346 Josefa Street) in San Jose, California. The project is an eight-story residential building (five levels of Type III-A wood-framed construction over three levels of Type I-A mixed occupancy metal-framed construction) with a ground-level parking garage. Construction is expected to begin in May 2025 and last approximately 18 months. Construction will not include pile driving. For readers less familiar with the fundamental concepts of environmental noise, please refer to Appendix A.

The nearest adjacent residences are single-family homes along Josefa Street to the south and southeast of the site. There is also a hotel across W San Carlos Street, approximately 90 feet to the northwest of the site. Adjacencies to the northeast and southwest are commercial.

CRITERIA

San Jose General Plan and Municipal Code

General Plan Policy EC-1.7: Require construction operations within San Jose to use the best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.
- For such large and complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordination who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

Municipal Code Section 20.100.450: The hours of construction within 500 feet of a residential unit are limited to between 7:00 AM and 7:00 PM, Monday through Friday unless permission is granted with a development permit or other planning approval.

Conditions of Approval

MM NOI-1.1: Prior to the issuance of any grading or demolition permits, the project applicant shall submit and implement a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting and notification of construction schedules, equipment to be used, and designation of a noise disturbance coordinator. The noise disturbance coordinator shall respond to neighborhood complaints and shall be in lace prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. The noise logistic plan shall be submitted to the Director of Planning, Building and Code enforcement or Director's designee prior to the issuance of any grading or demolition permits.

As part of the noise logistic plan, construction activities for the proposed project shall include, but are not limited to, the following best management practices:

- Construction activities shall be limited to the hours between 7:00 AM and 7:00 PM, Monday through Friday for any on-site or off-site work within 500 feet of any residential unit. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Planning, Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.
- Construct solid plywood fences around ground level construction sites adjacent to operational business, residences, or other noise-sensitive land uses.
- Utilize "quiet" models of air compressors and other stationary noise sources where technology exists.
- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment.
- Locate all stationary noise-generating equipment, such as air compressors and portable power generators, as far away as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.
- Prohibit all unnecessary idling of internal combustion engines.
- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.
- Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to the adjacent land uses and nearby residences.
- If complaints are received or excessive noise levels cannot be reduced using the measures above, erect a temporary noise control blanket barrier along surrounding building facades that face the construction sites.
- A "noise disturbance coordinator" shall be designated to respond to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., beginning work too early, bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at the construction site and include it in the notice sent to neighbors regarding the construction schedule.
- Preparation of a construction noise logistics plan and adherence to best management practices for noise reduction during construction activities.

- The noise logistics plan shall be submitted to the Director of Planning, Building, and Code Enforcement or Director's designee.

MM NOI-2.1: The project applicant shall implement a Construction Vibration Monitoring Plan (Plan) to document conditions prior to, during, and after vibration generating construction activities. All Plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in accordance with industry-accepted standard methods. The plan shall be submitted to the Director of Planning, Building and Code Enforcement or the Director's designee for review and approval prior to issuance of a demolition, grading, or building permit, whichever occurs earliest. The Plan shall include, but not be limited to, the following measures:

- Identification of sensitivity to ground-borne vibration of the residences and commercial structures adjacent to the site.
- A list of all heavy construction equipment to be used for this project known to produce high vibration levels (e.g., tracked vehicles, vibratory compaction, jackhammers, hoe rams, etc.) shall be submitted to the City by the contractor. This list shall be used to identify equipment and activities that would potentially generate substantial vibration and to define the level of effort for reducing vibration levels below the thresholds.
- Place operating equipment on the construction site as far as possible from vibration-sensitive receptors.
- Use smaller equipment to minimize vibration levels below the limits.
- Limit the use of vibratory rollers, hoe rams, large bulldozers, and caisson drilling, and avoid clam shovel drops within 15 feet of the property lines shared with residences and commercial structures adjacent to the site.
- Select demolition methods not involving impact tools.
- Avoid dropping heavy objects or materials.
- Performance of a photo survey, elevation survey, and crack monitoring survey for the residences and commercial structures adjacent to the site. Surveys shall be performed prior to and after completion of vibration generating construction activities located within 25 feet of the structure. The surveys shall include internal and external crack monitoring in the structure, settlement, and distress, and shall document the condition of the foundation, walls and other structural elements in the interior and exterior of the structure.
- Conduct a post-survey on the structure where either monitoring has indicated high levels or complaints of damage. Make appropriate repairs in accordance with the Secretary of the Interior's Standards where damage has occurred as a result of construction activities.

- The results of any vibration monitoring shall be summarized and submitted in a report shortly after substantial completion of each phase identified in the project schedule. The report shall include a description of measurement methods, equipment used, calibration certificates, and graphics as required to clearly identify vibration-monitoring locations. An explanation of all events that exceeded vibration limits shall be included together with proper documentation supporting any such claims.
- Designate a person responsible for registering and investigating claims of excessive vibration. The contact information of such person shall be clearly posted on the construction site.

CONSTRUCTION NOISE

Phases and Equipment

Noise levels from construction activities will vary depending on the type of equipment being used, the process, and the location. Construction of the project will be completed in six main phases with multiple activities in each phase, as listed below.

- Phase 1: Demolition/Grading/Mass Excavation – May 2025 to September 2025
- Phase 2: Concrete Superstructure – September 2025 to March 2026
- Phase 3: Metal Infill Framing – October 2025 to May 2026
- Phase 4: Exterior Building Skin/Roof – November 2025 to June 2026
- Phase 5: Interior Finishes – May 2026 to January 2027
- Phase 6: Exterior Site Improvements – July 2026 to November 2026

The expected construction equipment for each of these phases is detailed in **Table 1**. Work during Phase 5 is expected to be primarily indoors, therefore an equipment list and further analysis during that phase has not been provided.

Table 1: Construction Equipment by Phase

Phase 1	Phase 2	Phase 3	Phase 4	Phase 6
Excavator	Crane	Crane	Pneumatic Tools	Backhoe
Trucks	Concrete Pumps	Welders	Crane	Skip Loader
Track Loader	Concrete Trucks	Concrete Pumps	Air Compressor	Concrete Saw
Sheepsfoot Roller	Air Compressors	Concrete Trucks	Forklift	Hand Tools
Bulldozer	Concrete Finish Equipment	Man Lift		Concrete Trucks
Forklift	Forklift	Saws		
		Forklift		

Table 2 provides construction equipment noise levels at a reference distance of 50 feet.

Table 2: Typical Equipment Noise Levels[1]

Equipment	Noise Level (dB) at 50 feet
Bulldozer, Concrete Trucks, Pneumatic Tools	85 dB
Backhoe, Compactor (Ground), Front End Loader	80 dB
Compressor, Excavator	81 dB
Concrete Pump, Plaster Pump	82 dB
Crane	88 dB
Forklift	83 dB
Manlift	75 dB
Rebar Saw	76 dB
Trucks (traveling)	84 dB
Welder	73 dB

The noise levels shown in **Table 2** are typical for such construction projects. To control noise levels, the following noise reduction measures, in addition to the best management practices outlined in the Conditions of Approval, are to be implemented.

Noise Reduction Measures

In accordance with Condition of Approval MM NOI-1.1, the following noise reduction measures shall be implemented throughout construction:

1. Hours of Construction
   a. Standard construction activities will be limited to between 7:00 AM and 7:00 PM Monday through Friday
   b. No construction activities shall be allowed on weekends, except that interior construction shall be permitted after buildings are enclosed, without a development permit or other prior planning approval.
   c. Any construction activity proposed outside of the above days and hours for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case-by-case basis and proposed to the City for approval.
2. Solid plywood fences will be constructed around the ground level construction site adjacent to operational business and residences.
3. Construction of the project will use the best available and feasible noise control techniques. This will be implemented as follows:

1 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.

   a. The contractor will coordinate with contractors and sub-contractors to ensure that all heavy earthmoving equipment, impact tools, compressors, engine generators, and diesel fueled trucks use the best available noise control techniques wherever feasible (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds, wherever feasible).
   b. Internal combustion engines will be turned off when not in use to avoid unnecessary idling. The maximum idling time shall be limited to five minutes.
   c. Impact tools used for this project will be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools; however, where use of pneumatic tools is unavoidable an exhaust muffler on the compressed air exhaust will be used.
   d. Where commercially available, impact tools shall use external jackets to reduce noise generation.
   e. Locate stationary equipment at the work area such as a crane, air compressors, pumps, and similar equipment as far to the north and west as possible to maximize the distance to the nearest residential receptors and take advantage of any shielding that may be provided by other on-site equipment.
4. Posting and Notification: The dates of construction activities, and equipment to be used during the noisier phases, will be posted at the job site in a location visible to the public, including to pedestrians, at least seven days prior and no more than three weeks prior to the construction activity. The contractor shall provide photographic evidence to the City that this information has been posted.
5. Noise Disturbance Coordinator: The construction team will include a noise disturbance coordinator who will track and respond to any complaints that arise from this construction activity.
   a. The noise disturbance coordinator will be as follows:
      i. Kent Gerber: Project Executive
      ii. Telephone: (408) 938-6337
      iii. Email: kgerber@swenson.com
   b. The disturbance coordinator will determine the cause of the complaint and implement reasonable measures to correct the problem as feasible. All complaints will be logged, with at a minimum, the following information:
      i. Date of complaint
      ii. Name, address, phone number of individual(s) complaining
      iii. Reason for the complaint
      iv. Action taken
      v. Resolution notes – Note: The complainants will be notified by phone, email or other means of the corrective measures to address their complaints

c. A telephone number for the disturbance coordinator will be posted at the site and will be included in any construction notices sent to adjacent neighbors. The contractor shall provide photographic evidence to the City that the posting of the contact information for the noise disturbance coordinator is posted to the public at the site.

CONSTRUCTION VIBRATION

Equipment

Table 3 presents typical vibration levels from the California Department of Transportation (Caltrans) Transportation and Construction Vibration Guidance Manual[2] that could be expected from construction equipment at 25 feet. Where no vibration source levels are available, data from the most similar piece of equipment is used.

Table 3: Typical Equipment Vibration Levels[3]

Equipment	PPV at 25 ft (in/sec)
Large bulldozer	0.089
Caisson/pier drilling	0.089
Loaded trucks	0.076
Small bulldozer	0.003
Excavator	0.020
Mini-excavator	0.003
Concrete pumps	0.076
Bobcat	No significant vibration
Crane	No significant vibration
Forklift	No significant vibration

Based on the site plan and equipment, we expect that the activities that will generate the highest levels of vibration will be excavation and grading. Erection of the building structure and interior construction work are not anticipated to be sources of substantial vibration, except for sporadic events such as dropping of heavy objects, which should be avoided. However, vibration levels will vary depending on the actual equipment being used, construction methods, and the location of work.

Vibration Reduction Measures

In accordance with Condition of Approval MM NOI-2.1, the following vibration reduction measures shall be implemented throughout construction:

1. Limit the use of vibratory rollers and avoid clam shovel drops within 15 feet of the property lines shared with residences and commercial structures adjacent to the site.

2 Transportation and Construction Vibration Guidance Manual April 2020 (Caltrans document)

3 Data is from Table 18 of the Caltrans document and our measured data from similar equipment

2. Place operating equipment on the construction site as far as possible from vibration-sensitive receptors.
3. Use smaller equipment to minimize vibration levels below the limits.
4. Select demolition methods not involving impact tools.
5. Avoid dropping heavy objects or materials near vibration sensitive locations.
6. A list of all heavy construction equipment to be used for this project known to produce high vibration levels (tracked vehicles, vibratory compaction, jackhammers, hoe rams, etc.) shall be submitted to the City by the contractor. This list shall be used to identify equipment and activities that would potentially generate substantial vibration and to define the level of effort required for continuous vibration monitoring.
7. A construction vibration-monitoring plan shall be implemented to document conditions at the residences and commercial structures adjacent to the site prior to, during, and after vibration generating construction activities. All plan tasks shall be undertaken under the direction of a licensed Professional Structural Engineer in the State of California and be in accordance with industry accepted standard methods.

Additionally, the following recommendations represent equipment and methods that would generate the least groundborne vibration levels that can be feasibly implemented. These measures should be implemented to manage construction activities and reduce the impact from construction vibration.

- Earth-moving and ground-impacting operations should be phased so as not to occur at the same time along the property line to mitigate cumulative vibration impacts.
- Minimize discontinuities in roadway pavement where trucks will travel.
- Avoid using vibratory rollers and tampers along property lines shared with sensitive neighboring properties.
- Avoid routing heavily-loaded trucks along residential streets, if possible. Select streets with fewest homes if no alternatives are available.
- Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.
- Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours.
- Adjacent vibration-sensitive uses (i.e., residences) within 100 feet of construction activity shall be notified of the construction schedule, as well as the name and contact information of the project disturbance coordinator.
- Conduct post-survey on above ground and below ground structures where either monitoring has indicated high levels or complaints of damage has been made. Make appropriate repairs or compensation where damage has occurred as a result of construction activities.

We expect that construction efforts for a project of this size will be moderate. With the measures stated above, the impact from construction vibration would be reduced.

* * *

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 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 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 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 "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 L_{dn} (Day/Night Average Sound Level), which represents the 24-hour average sound level with a penalty for noise occurring at night. The L_{dn} 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 L_{dn}.

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

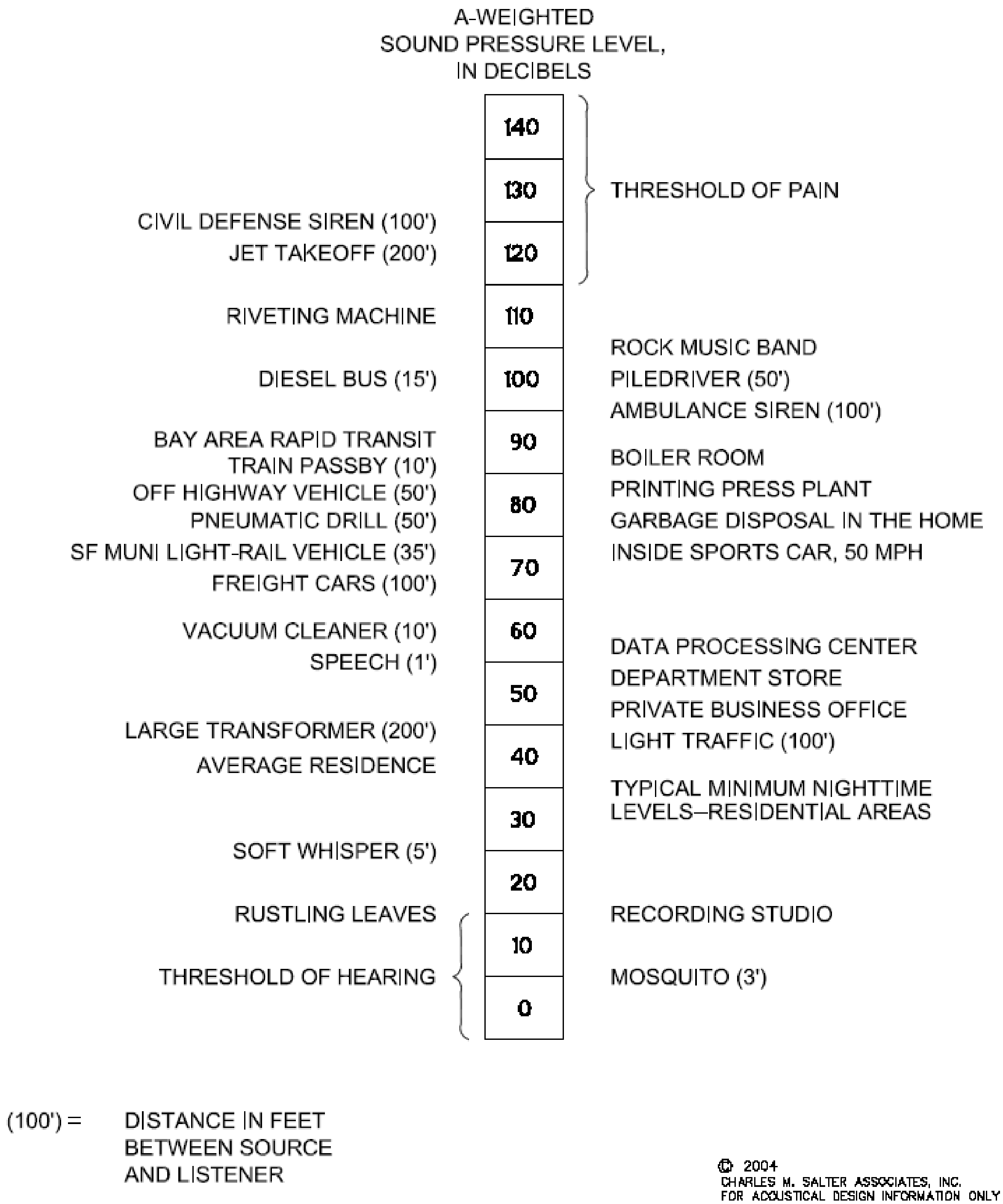
- Subjective effects of annoyance, nuisance, dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startle, hearing loss

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.



TYPICAL SOUND LEVELS
MEASURED IN THE
ENVIRONMENT AND INDUSTRY

FIGURE A-1

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